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Report Of The 87th National Conference On Weights And Measures

as adopted by the 87th National Conference on Weights and Measures 2002

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Report of the 87th National Conference on Weights and Measures

Cincinnati, OH - July 14 through 18, 2002

as adopted by the 87th National Conference on Weights and Measures 2002

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The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology and is attended by officials from various States, counties, cities, as well as representatives from U.S. Government, other nations, industry, and consumer organizations.

Abstract

The 87th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 14 through 18, 2002, at the Omni Netherland Hotel in Cincinnati, OH. The theme of the meeting was, "A Progressive Partnership for the Future – You and NCWM."

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

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

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

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President's Address
National Conference on Weights and Measures Annual Meeting
Arden Bement, Director, National Institute of Standards and Technology

Cincinnati, Ohio - July 16, 2002

Introduction

Thank you, Rich. I also wish to thank Chairman Ron Murdock for the opportunity to address the Conference members. It is my pleasure as NIST Director and as Honorary President of the National Conference on Weights and Measures to attend my first conference meeting.

And in anticipation of my first meeting with this very important group, I decided to prepare by going back in history—to the inaugural meeting of what was to become the National Conference on Weights and Measures.

In the Beginning: Confusion at Home

Back in 1905, the nation's system of weights and measures wasn't a system, at all. It was, *uniformly*, a mess—decades behind France and Germany. That's why Samuel Stratton, the first director of the National Bureau of Standards (the predecessor of today's NIST), and Louis Fischer, the bureau's chief of weights and measures, convened a meeting of state sealers of weights and measures.

Most states were not represented. Among the missing states, several had no such personnel.

Accounts given by those who did attend—representatives of eight states and the District of Columbia—confirmed the confusing state of affairs. I'll give a few quick anecdotes to convey the situation in the early 1900s.

In Iowa, for example, only 14 of the state's 99 counties had a set of measurement standards. When Iowa's new superintendent of weights and measures instructed the 14 counties to submit the standards for the once-a-decade inspection required by law, the requests was largely ignored. Of those who did respond, most pled ignorance. Some counties said—quote—"they had heard something about a set of standards, but did not know where they were to be found."

By comparison to most states, Massachusetts was near head of the pack. Sealer of weights and measures was a fully funded position, and this person worked closely with his counterparts in cities and towns. Massachusetts began enforcement actions in 1890, but merchants intent on defrauding consumers were not easily deterred.

When Massachusetts inspectors identified thousands of short boxes of strawberries and underfilled bottles of milk, the purveyors of these items simply shipped them to an adjoining state, where they did not undergo inspection.

Then, there was the tongue-in-cheek lament of a scale manufacturer who was sent to represent Vermont. He worried that uniform standards might extend to thermometers, which, at the time, varied up to 15 degrees. On cold winter mornings, temperatures ranged from 35 to 50 degrees below zero.

Vermonters and their newspapers always chose the lowest reading, using it as evidence of their fortitude and proof of New England stoicism. More accurate thermometers, he said, could dull an important point of pride.

In the end, however, the scale manufacturer agreed that, too often, the purchasing public was—quote—"at the mercy of users of unreliable weighing machines and capacity measures and of unscrupulous users of even correct ones."

So began the National Conference on Weights and Measures. And from this nearly one-hundred-year-old partnership between NIST and the states, the District of Columbia, and U.S. territories has come an essential, integrating element of a fair and equitable marketplace: A true system of uniform weights and measures.

We have come a long and productive way!

And, today, there should be a renewed appreciation for the organizations and the people who ensure fairness and equity in retail and wholesale transactions. Headline-making corporate scandals, though few in number, have grabbed the public's attention. Now may be an opportune time to remind the American public of the incredible value they get from their very, very modest investment in weights and measures.

And let me add—for those of you who have a hand in the senior management of our nation's companies—we need to address those concerns about corporate governance. We need to make certain that CEO stands not only for chief executive office, but also for chief ethical officer. The President has introduced some well thought-out reform initiatives that deserve to be adopted.

Trust is not an intangible. It sustains confidence, promotes efficiency, encourages investment, and, in so doing, helps to grow the economy. Through your behind-the-scenes contributions, you build trust by ensuring that buyer and seller get a fair deal.

And what a good deal it is! NCWM has done the math. Just 50 cents per citizen pays for a system that underpins about half of the U.S. economy, or the almost 5 trillion dollars worth of transactions based on the weight, volume, length or count of products. That's a highly leveraged impact.

Today: Advancing toward a Global System of Legal Metrology

Obviously, the marketplace has changed greatly over the years. In the early 1900s, we got serious about putting our own house in order. Domestically, there are still important jobs to be done, and, without a doubt, new ones will arise as technology advances and ways of doing business evolve in sophistication.

Today, we also must think and act at the international level. We have a global marketplace with multinational retailers. Exports are vital to U.S. manufacturers. And they help to fuel economic growth. During the 1990s, increases in exports accounted for one-fourth of the nation's economic growth. Today, almost 10 percent of jobs in the United States depend on exports.

U.S. businesses in every sector now must reckon with the requirements of international standards and the regulations that embody those standards. It's estimated that 80 percent of world merchandise trade is affected by standards.

Legal metrology—your valuable specialty—is part of the infrastructure of international commerce. So, it is gratifying to see the participation of experts from other countries in the NCWM process. They add a much-needed perspective to the development of the U.S. standards.

I understand that our colleagues from Measurement Canada have served as technical advisors on NCWM committees since 1992 and that they were active participants for many years before then. I also understand that Measurement Canada and the conference intend to expand their current mutual recognition agreement on type evaluations.

Our relationship with Canada on weights-and-measures issues has been outstanding over the past 15 years. We need to replicate this partnership many times over.

Recognition of International Guests and Participants

Weights and measures are truly a global concern. The NCWM hosted a NIST Standards-in-Trade group from Latin America at its annual meeting two years ago. This year, I wish to recognize and warmly welcome the 25 representatives from the Gulf Cooperation Council who are attending this meeting. These guests represent the countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. They are here as part of another Standards-in-Trade Workshop.

Through this meeting, they will gain a deeper understanding of how measurements from the NIST calibration laboratories are transferred throughout the manufacturing and retail systems to the benefit of consumers.

`Opportunities to observe the NCWM process, to participate in some technical sessions, and to meet U.S. participants should be constructive for our guests and for conference members. NIST thanks the NCWM for its support of the Standards in Trade workshop program.

Another international aspect to this year's meeting is the attendance of two colleagues from Mexico. Today, Dr. Francisco Ramos, Director General of Research for the PROFECO Laboratories, and Ricardo Muñoz Rodríguez, Director for Accreditation and Metrology in Mexico's General Directorate for Standards, are attending the NCWM Annual Meeting. I understand that Mexico is expanding its legal metrology activities. As part of the NIST collaboration with Mexico, one area of work is legal metrology. We look forward to working more closely with Mexico in this area.

While I'm at it, I also should mention one person whom you don't see at the meeting this week: Tina Butcher. Tina is on detail for one year to my office. She is a dedicated professional with a sincere interest in weights and measures. Your temporary loss of her services in weights and measures is my office's gain.

The Importance of International Standards

If I may, I'd like to say a bit more about the global marketplace, international standards, and the international measurement system. I'll start with a quote from baseball icon Yogi Berra, master of the malapropism.

After leaving a social gathering Yogi made the following comment: "It was impossible to get a conversation going. Everybody was talking too much."

Though unintended, Yogi's remark could have been considered an astute observation on the situation in weights-and-measures, specifically, and on measurement-related matters, overall. Let me explain.

From day one, weights and measures people *knew*, makers of measurement equipment *knew*, testing laboratories *knew*, and we at NIST *knew*—and *fully appreciated*—the bedrock importance of accurate, uniform measurements to the structure and flow of commerce.

Our message competed for attention in the increasingly hectic and ever more complex national and global economies. Often, it was drowned out in the din of discussions over things like tariffs, rules of origin, treatment of intellectual property, and the like.

Over the last few years, however, either our voices have grown louder or more ears have become tuned to our wavelength. In any event, measurement-related issues are beginning to get at least some of the attention they deserve from the users of our services and our equipment.

In Pursuit of Measurement Equivalency

From industry we are getting feedback in the form of a slowly intensifying chorus that goes something like this: *one standard, one measurement, one test, one certification.*

U.S. companies are learning—sometimes the hard way—that standards set and regulations made in other nations and regions may not coincide with U.S. practices. In industries ranging from microelectronics to agriculture, U.S. firms have discovered that they can be shut out of markets if they do not make expensive changes to products or services—changes that are necessary to achieve compliance.

Competition in the rough-and-tumble global market is not always conducted on a level playing field. One means of correcting the tilt in this crucial arena is through measurement equivalency among international, national, and local laboratories. Measurement equivalency is critical for the acceptance of test results for international trade and for human health and safety, worldwide.

Now comes the more difficult part: actually achieving measurement equivalency or, in other words, creating a common global infrastructure that enables direct traceability to international standards.

NIST Strategic Plan

At NIST, efforts to accomplish this goal are key elements of our strategic plan. Some actions already have been taken.

For example, we have merged national weights-and-measures activities with the work NIST does in support of the International Organization of Legal Metrology. Our aim is, in effect, to harmonize work on national and international legal metrology issues. We will leverage the contributions of national work groups that already exist to review international legal metrology standards.

U.S. industry has been actively involved in these work groups for about 30 years. Now, we are enthusiastically encouraging weights and measures officials to become more involved in the national work groups.

Clearly, regulatory officials should participate in developing U.S. positions on international issues.

The NCWM strategic plan complements the steps that NIST has taken to harmonize the outputs of work on legal metrology issues. The conference's Board of Directors has set a priority on participating in the review and development of standards of the International Organization of Legal Metrology.

In addition to this unified focus on national and international matters, we are pursuing long-term strategies that advance our commitment to enabling mutual recognition and worldwide traceability of measurements.

NIST is building the machinery to establish the equivalence of measurement results on regional and, ultimately, global scales. We set up the International Comparisons Database. This is a vehicle for comparing our measurement and calibration capabilities with those of national metrology institutes in other Western Hemisphere nations.

By means of the database, a Brazilian purchaser of U.S.-made equipment, for example, could be certain that measurements shown to be traceable to NIST are equivalent to those traceable to INMETRO, Brazil's measurement authority.

This database, in turn, is associated with a comparison and calibration database maintained by the International Bureau of Weights and Measures, or BIPM. With links to all of the world's regional metrology organizations, the bureau's database will eventually provide direct and indirect means to judge the equivalence of measurement capabilities in different countries.

Of course, we also must tend to the quality and efficiency of traceability linkages at home—the chain of comparisons that run from NIST to federal, state, and private-sector laboratories. Our strategic plan—"NIST 2010," for short—calls for effective use of information technology and organizational strategies to enhance the measurement traceability system in the United States.

In concert, we will use these tools and strategies to improve the quality, timeliness, efficiency, and accessibility of measurement services that NIST provides.

Survey of the U.S. Weights-and-Measures System

So, the increasing importance of global trade is sharpening the focus on the measurement infrastructure. This is good news, but one also might say that it is bad news. Because of tight state and local budgets and an uncertain economy, weights and measures programs are being asked to do more, often with less.

Today, both industry and government must demonstrate the value of what they do. Government agencies must be able to show the impacts and benefits of their work. This is true for NIST and, I am sure, it is true for weights and measures programs.

Last Fall, NIST sponsored two workshops for weights-and-measures administrators to discuss several challenges, including funding.

Administrators said they wanted data they could use to compare weights-and-measures programs in terms of workload, staffing, and effectiveness. In response, NIST is undertaking a study to benchmark the national weights-and-measures system.

We want to see how workloads and resources have changed, to identify adjustments that programs have made to improve efficiency and effectiveness, to estimate the economic impact of weights and measures activities, and to ask members of industry how their customers, markets, and international perspectives have changed.

Henry Oppermann, chief of the NIST Weights and Measures Division, gave you the details on the survey earlier today.

I just want to emphasize that this information is essential to justify impacts and to champion state and local needs. To succeed, the study must have your support and cooperation.

Computer-Based Training

As I already have indicated, one of the challenges NIST faces is improving the effectiveness of the services that NIST delivers to the weights-and-measures community. This requires us to be responsive to changing needs. We are trying to do just that in our training programs.

These programs have been extremely popular with metrologists in state and industry laboratories. However, the constant turnover in staff and ever-expanding amount of material to cover make it difficult to meet all the demands.

So, we are developing a comprehensive computer-based training course for basic mass calibration. This is being done under the direction of Georgia Harris. This multi-media course will be more accessible, and the information and guidance it contains will be available as a reference after training is completed. This course should be completed this Fall.

We also are developing a computer-based course on electronic audit trails used in both weighing and measuring devices. Since the conference approved the use of electronic audit trails in 1990, adoption of the technology has been increasing every year. Expected to be ready later this year, the course will help weights and measures officials to understand how the electronic audit trails operate, how to access them, and how to interpret the information contained in them. Juana Williams is leading this project.

Conclusion

We are doing other jobs to increase the utility and value of the resources that we provide in support of the weights-and-measures system. NIST, like all of you, is trying to keep up with needs spawned by new technology. It's not easy.

In fact, we won't keep up if we don't work together and with other organizations in the private and public sectors.

We do need, like the theme of this meeting says, a "progressive partnership for the future." We at NIST need your input so we can place our resources where they can deliver the greatest impact in service to you, the customer.

Thank you for listening, and thank you for the important contributions you make to our economy and to our nation.

Chairman's Address to the 87th Annual Meeting 2002

Presented by Ronald Murdock
North Carolina Department of Agriculture, Division of Standards

As others have said in finishing their terms, "I am now one of those has-beens"

The National Conference has been moving ahead as we begin 2002. As we continue to move forward into 2002 we now face one of the largest problems that our organization has seen since we took over the NTEP Program. With production meets type, or conformity assessment as it is now called, we face a problem that has caused many sleepless nights for lots of our members. As we deal with this in the future, it will mean a lot of time for our NTEP laboratories and our NTEP Director. It's not like Steve Patoray doesn't have enough on his plate with everything that already comes in. The many other items that we face in our NTEP Program take just as much time as we try to make everyone happy with our decisions.

As we face all the different types of problems we have here at home, we all know that the rest of the world has just as many problems to deal with. We must move forward so that we can see all of the potholes that lie before us. During my years in State Government, all of those in weights and measures, I don't ever remember seeing or hearing of such a daily down turn in the economy as we hear each and every day. Things seem to go from bad to worse each and every day.

My heartfelt thanks go out to Lou Straub and Ross Andersen for all of their hard work and their undying support for both the Conference and me during this past year. My appreciation goes out to the staff at NCWM Headquarters for all of the work they do. Beth and her staff work so hard to support this Conference every day. My appreciation goes out to Henry Oppermann and staff at NIST for all of their support to this organization along with support from all of you, the membership. Your attendance at this meeting shows that we all are able to face these problems at home with our chins up and moving ahead is what we do.

I, and the Board of Directors, feel that the Conference is headed into the future in the right way. We are number-one in the world and we shall remain at that level throughout the years ahead in this great ship called the National Conference on Weights and Measures. It is now being piloted into the future by two of the greatest young men that we now have among us. It has been my pleasure to have known them better over the years. These men are Mr. Ross Andersen and Mr. Dennis Ehrhart.

During my years in weights and measures, I count myself very lucky to have only had four bosses. The first was Mr. John I. Moore, who hired a young man off the farm and out of college as a truck driver for one of his heavy scale test units. The second was Mr. Marion Kinlaw, who hired me as an inspector in our gasoline and oil inspection section and later on as an inspector in our weights and measures program. I enjoyed these times and learned so much in both those jobs.

My third boss was Mr. David Smith, Mr. "Smooth." I remember some of my friends, whose office lies north of the Great North State, telling us to watch out for that new guy, he's so smooth. That's how the nickname came to be. David Smith has said things and been so accurate with his thoughts over the years. He promoted me to a field supervisor and later on to our Measurement Section as Manager. He has been the Director of the Standards Division and now serves as the Assistant Commissioner of Agriculture for North Carolina. No one else was better for that job than David Smith.

My current boss is Mr. Winston Sutton, a man that I have known for a long time. He is now filling the Director's position in the Standards Division. He has worked very hard to be the best Director for the Division. His came back to us from his retirement as Chief of our Motor Fuels Section to begin this new job.

While at the Department of Agriculture, I only had two Commissioners to please. Mr. James A. Graham served there for 36 years and now Mrs. Meg Scott Phipps, who is the daughter of one of our former Governors, has been with us for two years. They both have done a great job for the Department and the citizens of the state.

My thanks goes out to the ladies in our office who daily do it all in the Division. Meri Beth Hibbets and Jennifer Jackson look out for everybody. They have given of their hard work on a daily basis and continue to put up with a crippled old man who loves them very much. Our field supervisors, Ken Nelson and Jerry Butler are daily asked to do more and more with less and less. Their inspectors are doing the same and they are doing a great job. Their efforts are appreciated each and every day. It has been an honor to have known and worked with such outstanding people.

Writing my retirement letter was one of the hardest things that I have ever sat down to do. In the back of my mind I was most concerned for my staff and my department, hoping my retirement would not result in any other job reductions. Coming up with the right words was hard to do. My doctors have wanted me to retire for such a long time. It also was one of the wishes of my loving wife, Peggy, who had often said that she wanted nothing but the best for us as we grew older. She often said, "Once I retire, we could do just what we wanted." I wish she were here to join me in this part of my life.

Thanks to each of you for all that you have done for me and may God bless you and yours.

NCWM 2002 Annual Meeting Honor Award Recipients

Full Name	No. of Years
Robert Murnane, Jr.	5
Bill Ripka	5
Kurt Floren	5
Angelique McCoy	5
Russell E. Robbins	5
Cary P. Frye	5
Larry M. Turberville	5
George Anderson	5
Gerald A. Buendel	5
Ron Balaze	10
Don Onwiler	10
Robert E. Reynolds	10
Richard W. Wotthlie	10
Norman R. Brucker	10
Dennis A. Krueger	10
Thomas Coleman	10
Randy Wise	10
John A. Baker	10
Constantine V. Cotsoradis	10
David K. Heck	15
Louis Straub	15
Carol P. Fulmer	15
Maxwell H. Gray	15
G.W. (Wes) Diggs	20
Ken Butcher	20
Fred P. Clem	20

NCWM 2002 Annual Meeting Honor Award Recipients

Full Name	No. of Years
L.F. Eason	20
F. Michael Belue	25
Marlene Belue	25
William H. Braun	25
Merrill S. Thompson	30

Report of the Board of Directors

Ronald D. Murdock, Chairman
Program Manager, Standards Division
North Carolina Department of Agriculture

Reference
Key Number

100 Introduction

This is the Report of the Board of Directors (BOD) for the 87th Annual Meeting of the National Conference on Weights and Measures (NCWM). This Report is based on the Interim Report offered in Publication 16, Committee Reports; and actions taken by the membership at the Voting Sessions of the Annual Meeting. No addendum sheets were issued at the Annual Meeting.

The Report contains items related to the management of NCWM and the National Type Evaluation Program (NTEP). Items addressed by the NTEP Committee can be found in a separate report (the 500 Series). Title and page number indicates subject series. There are no voting (V) items. All items are information (I) only.

Table A
Index to Reference Key Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
100 (Report in Its Entirety) Voice Vote	All	None	All	None	Passed

Details Of All Items

101 I NCWM Operations and Policies

New Appointments to Committees/Sectors

The following are appointments that NCWM Chairman Ron Murdock and NTEP Committee Chairman Louis Straub made as of January 31, 2002:

NCWM Board of Directors: Don Onwiler, NE, replacing Darryl Brown, IA
NCWM S&T Committee: Mark Buccelli, MN, replacing Constantine Cotsoradis, KS
NCWM L&R Committee: Vicky Dempsey, Montgomery County, OH, replacing Don Onwiler, NE
NTEP Grain Moisture Meter Sector: Alan Lundstedt, Cognis QTA
NTEP Measuring Sector: Mike Gallo, Dresser Wayne

Board Governance Workshop

A Board Governance Workshop was held for the Board of Directors prior to the Annual Meeting on Saturday, July 13, 2002. All incoming Committee Chairs were invited to attend. Other member's interested in future volunteer leadership positions were also encouraged to attend.

In June, Chairman-Elect Ross Andersen and Executive Director Beth Palys attended the CEO Symposium sponsored by the American Society of Association Executives.

NCWM staff was directed to put together orientation materials for new Board members.

NCWM Newsletter

The Board of Directors discussed a request from a field inspector to include material in the NCWM newsletter that is relevant to field inspectors. There were several suggestions as to how to obtain articles of interest to inspectors. These included articles from regional newsletters, developing questions to which inspectors could respond and have the responses published in the newsletter, and articles supplied by the Administration and Public Affairs (A&P) Committee. The Board noted that the newsletter is a 'work in progress' and will continue to evolve over time. The Board encourages feedback from the membership regarding how the newsletter can better meet their needs. The Board also discussed whether or not the NCWM would ultimately need an Editorial Review Board to review articles proposed for the newsletter.

Publications & Handbooks

The Board of Directors had received some requests from State Directors regarding Publication 5. The hard copy publication of Pub 5 was discontinued because the information is on the NCWM or NIST WMD website. Concern was expressed that the information on the NIST WMD website is not current since much of the information has not been updated since the transition of NTEP management from NIST WMD to NCWM. The Board directed staff to send out a needs assessment email survey to State Directors to determine what information is needed, in which format, and how frequently it should be made available. The Board will review the responses at its next Board meeting.

The Board of Directors expressed concern to Henry Oppermann, Chief, NIST WMD, that Publication 15 was so late in getting to members. Henry Oppermann indicated that Pub 15 had been ready to print on December 5th and was posted on the NIST WMD web site at that time. However, publication of the hard copy of Pub 15 was delayed due to other NIST publications being in the queue and giving priority to printing Handbooks 44 and 130. In future years, Publications 15 and 16 will be posted on both the NCWM and NIST WMD websites and meeting brochures will include information that the publications can be found on the websites.

Henry Oppermann asked the Board of Directors if they objected to NIST WMD preparing and distributing electronic versions of the reports of the NCWM from 1905 to the present. The Board responded that NIST WMD could put the reports in electronic format for the 2001 Annual Meeting and Annual Meetings prior to 2001. However, the Board of Directors reserved the right to discuss future Conference proceedings at a later date.

The Board of Directors discussed creating enhanced (hypertext) copies of Handbook 44, Handbook 130, and Handbook 133. Please refer to Series 104 for more information.

Management Company

The Board of Directors selected a subcommittee of the Board to conduct an annual review of the management company during the Spring Board meeting. Ross Andersen, Tom Geiler and Mike Pinagel were selected as subcommittee members. The entire Board will provide feedback to the subcommittee prior to the review.

Consultants

The Board discussed the selection process used for choosing consultants, i.e., auditors, attorneys, board and strategic planning facilitators. For future contracts, staff was asked to provide a choice of three consultants so that the Board can make a final selection.

Membership Report

The total NCWM membership as of January 2, 2002, is 2745. The membership breakdown by category is as follows:

State Government	915	Associate Members	930
Local Government	586	Foreign Associate	21
U.S. Government	41	Retirees	233
Foreign Government	19		

Website

The Board of Directors reviewed and affirmed the current website posting policy. The current policy is that anything to be posted on the NCWM website must first be reviewed and approved by the NCWM Board of Directors. The Board is looking at the website as another means of enhancing the value of membership in the NCWM. Therefore, certain items may be placed in the 'members only section' available only to members of NCWM. Members can obtain the current passwords to the 'members only' section by contacting the NCWM Headquarters office.

The A&P Committee requested that the training material developed by the Gasoline Pump Manufacturers Association for gas pump service technicians be placed on the NCWM website. The Board approved and directed staff to post the training material.

Publications 15 and 16 will be provided to NCWM by NIST WMD for posting to the NCWM website.

Mentoring

The Board reviewed the challenge of increasing participation in NCWM activities. Restricted travel budgets, the recession, and the events of 9/11 are not helping the situation.

Associate Membership Committee Report

The Associate Membership Committee met during the afternoon of January 23, 2002. The minutes of the July 23, 2001, meeting held in Washington, DC, were approved as distributed. The financial report was presented and the following allocations were approved.

The AMC will make available to the NCWM the amount of $14,000 to be administered by the A&P Committee for training scholarships for the 2002 fiscal year. The AMC Board will approve the monies and make the funds available.

The AMC will make available to the NCWM a maximum sum of $10,000 for the 2002 Annual Meeting Outing. In the event that the standard 60% contribution does not require the complete $10,000 the remaining funds are to be returned to the AMC.

David Quinn reported on the activities of the Board of Directors. He reported on the issues of holding association meetings during the Conference and the cost of the meeting rooms. The AMC membership believes that better scheduling of the various meetings would make better use of meeting room space. The membership also felt that this scheduling could be left to the meeting planner, providing the timing of the meetings was considered. The membership also discussed the cost of non-conference meeting rooms and felt that the AMC should consider paying these fees. David was asked to work with the BOD to determine an estimated cost or possibly a fixed fee. David also informed the membership that the NCWM strategic plan is available on the NCWM website and encouraged everyone to read it.

Chris Guay reported on the activities of the Laws and Regulations (L&R) Committee. His report included comments on voting item 250-1 as it relates to the revised Handbook 133. Chris also reported on the International Packaging and Labeling Seminar held in December 2001 in Miami, FL. He asked the membership to bring forward any questions, concerns, or general input anyone had on multi-national labeling.

Chip Kloos reported on the activities of the A&P Committee. Chip, along with Jerry Flanders, discussed the need for reevaluating the timing and procedure regarding the issuance of AMC training funds made available to the States. Jerry noted that the current procedure for requests allows a window of only 5 months from the deadline until receipts for payment are due. The Associate Committee membership agreed on a new procedure to review financial statements and determine the amount of funds available to allocate for scholarships at the end of the fiscal year (September 30). The AMC Executive Committee will convene a teleconference shortly after the close of the books and convey the amount of funds available for scholarships to the A&P Committee rather than waiting until the Interim Meeting. This will permit more time for the use of the funds. All members present agreed on this.

102 I Future Meetings And Events

As of January 30, 2002, the plans for future meetings are as follows:

NCWM Annual Meetings

• 2002	July 14-18	Omni Netherland Hotel, Cincinnati, OH
• 2003	July 13-17	John Ascuaga's Nugget Hotel, Sparks, NV
• 2004	July 11-15	Hilton Pittsburgh & Towers, Pittsburgh, PA

NCWM Interim Meetings

• 2003	January 12-15	Omni Jacksonville Hotel, Jacksonville, FL
• 2004	January 25-28	Bethesda Hyatt, Bethesda, MD

NTEP Lab & Sector Meetings

• NTEP Laboratory Meeting	June 9-12, 2002	Hilton Garden Inn, Albany, NY
• Grain Moisture/NIR Sector	August 21-23, 2002	Chase Suites Hotel, Kansas City, MO
• Weighing Sector	September 29 - October 1, 2002	Sheraton Barcelo Hotel, Annapolis, MD
• Measuring Sector	October 11-12, 2002	Omni Richmond Hotel, Richmond, VA

NCWM Board of Directors Meetings

The Board of Directors met on April 15-16, 2002, at NCWM Headquarters in Rockville, MD. A Board Governance Workshop was held prior to the Annual Meeting on Saturday, July 13, 2002. The Board of Directors also met at the NCWM Annual Meeting in Cincinnati, OH.

Registration Fees

The Board of Directors approved a one-time reduced Observer registration fee of $125, exclusive of the Special Event, for the 2002 Annual Meeting for first-time member attendees from the region where the meeting is taking place. Observers will not have voting rights.

Hotel Rates

The Board of Directors raised the concern that many States, as well as industry, are experiencing reduced and restricted travel. This may have an impact on future attendance at meetings as well as the ability of attendees to stay at Conference hotels. Staff indicated that all future hotels, with the exception of the 2002 Annual Meeting, are contracted at Federal government per diem rates.

Space Utilization at Meetings

The Board of Directors discussed the meeting space needs for both the Interim and Annual Meetings. Because both meetings are so space intensive, NCWM is limited to hotels that can accommodate the meeting needs. NCWM staff negotiates for all space as part of the NCWM package. The meetings of allied associations at NCWM meetings were discussed. Staff was asked to provide a breakdown of the costs of these meetings. The Associate Membership Committee indicated their preference to help defray those costs from the Associate Member Fund rather than from each association.

103 I Financial Issues

Audited Financial Statement

The accounting firm of Dembo, Jones, Healy, Pennington & Marshall, P.C. conducted an annual audit of NCWM, Inc. The following is from their audited Financial Report dated September 30, 2001.

National Conference on Weights & Measures, Inc. Balance Sheet as of September 30, 2001

Assets

Current Assets		
Cash and cash equivalents	707,032	
Prepaid expenses	$ 3,342	
Total assets		$710,374
Liabilities and Net Assets		
Current Liabilities		
Accounts payable	$ 15,112	
Deferred dues revenue	$151,420	
Total Liabilities		166,532
Net Assets		
General Activities	$517,086	
Associate Funds	$ 26,756	
Total Net Assets		$543,842
Total liabilities and net assets		$710,374

National Conference on Weights & Measures, Inc.

Statement of Activities ending September 30, 2001

Revenue and Support	
Dues – government	$ 81,535
Dues – associate	$ 58,905
Associate member fund	$ 17,760
NTEP	$356,743
Interim Meeting Fees	$ 22,830
Annual Meeting Fees	$ 70,905
Publication Sales	$ 16,788
Interest	$ 27,078
Total Revenue and Support	$652,544
Expenses	
Programs	
Membership	$ 8,441
NTEP	$362,824
Interim Meeting	$ 35,237
Annual Meeting	$ 89,183
Publications	$ 21,112
Newsletter	$ 13,167
Total Programs	$529,964
Management and general	
Management fees	$ 51,534
Board of Directors	$ 21,642
Associate fund	$ 15,188
Website	$ 12,301
Strategic planning	$ 12,044
Bank fees	$ 5,571
Legal & accounting	$ 5,024
Telephone	$ 2,339
Insurance	$ 1,928
Printing	$ 804
Office supplies	$ 667
Miscellaneous	$ 523
Total Management & General	$129,565
Total Expenses	$659,529
Change in net assets	(6,985)

2002 Budget

Revenue and Support	
Dues – government	$ 82,000
Dues – associate	$ 58,600
Associate member fund	$ 17,580
NTEP	$437,800
Interim Meeting Fees	$ 22,375
Annual Meeting Fees	$ 80,000
Publication Sales	$ 17,500
Interest	$ 30,000
Total Revenue and Support	$745,855
Expenses	
Programs	
Membership	$ 10,865
NTEP	$387,350
Interim Meeting	$ 50,150
Annual Meeting	$ 98,475
Publications	$ 17,600
Newsletter	$ 18,410
Total Programs	$582,850
Management and general	
Management fees	$ 40,000
Board of Directors	$ 31,475
Associate fund	$ 20,500
Committee contingency fund	$ 1,500
Website	$ 12,060
Bank fees	$ 2,700
Legal & accounting	$ 9,000
Telephone	$ 2,200
Insurance	$ 2,500
Printing	$ 1,200
Office supplies	$ 600
Miscellaneous	$ 800
Storage Space Rental	$ 1,100
Total Management & General	$125,635
Total Expenses	$708,485
Change in net assets	$ 37,370

The Board will provide an overview of NCWM's finances at the Annual Meeting in Cincinnati, OH.

104 I Strategic Plan

The National Conference on Weights and Measures, Inc.'s strategic plan is posted on the NCWM website. The Board of Directors reviewed the strategies that they had identified as priorities for the coming year.

Strategy C4. "Collect basic statistical and summary data on the scope of weights and measures programs, so all fifty states have the background knowledge and credibility to promote weights and measures." The first phase will be to survey

the states to see how data is currently being collected. The second phase is to achieve consensus on how the data *should* be collected. Ross Andersen has asked the following people to serve on that workgroup: Ken Wheeler, OH; John Tillson, MS; Mike Sikula, NY; and Craig Leisy, City of Seattle, WA. The long-term goal is to provide data that programs can use to illustrate the value of W&M to our local, state, and national economies.

Strategy B5. "Explore developing a multi-tiered certification program." NCWM is exploring national training programs as well as certification. NCWM would take the lead role in voluntary assessment. The Board suggested that NCWM and WMD could work together to determine the 'curriculum' of what a weights and measures official should know. Henry Oppermann indicated that WMD would be willing to participate, provided that NCWM takes the lead role in what would be an NCWM project.

Strategy A1. "Involve NCWM in International Organization of Legal Metrology (OIML) activities to work toward the harmonization of U.S. and International Standards." Chuck Ehrlich, Chief, NIST Technical Standards Activities Group (TSAG) encouraged the Board of Directors to participate more at OIML meetings. NCWM will be asking other technical groups to report back to NCWM on discussions related to U.S. issues. The U.S. Working Group level was identified as the arena where NCWM wants to have influence.

Strategy A2. "Jointly identify the appropriate roles for NCWM, NIST and other key stakeholders in advancing weights and measures." Ross Andersen, Lou Straub, and David Quinn, representing the NCWM Board of Directors, met with Henry Oppermann, Chief, Weights and Measures Division, and key WMD staff on December 5, 2001, to begin discussions on this issue. Both parties agreed that future meetings are necessary and the Board of Directors allocated funds for another meeting.

Strategy A3. "Revise the standing committee operation to utilize work groups to develop consensus and background materials to more effectively support informed decisions." In addition to the standing committee structure, the Board, through Chairman-Elect Ross Andersen, has begun to put together small working groups to support the work of the strategic plan and to support the standing committees. The Board has also asked the Enhanced Meat Products Work Group for an action plan.

Strategy B3. "Develop new publications – some that will produce net, non-dues revenue." The Board of Directors is exploring the possibility of creating hypertext editions of Handbooks 44, 130 and 133. When asked, Henry Oppermann indicated that WMD is not planning to create hypertext editions of the handbooks.

105 I NTEP Administration

NTEP Scope and Purpose

The Board of Directors explored the dividing line between NTEP and Handbook 44 issues/questions. The Board affirmed their commitment to answering all NTEP questions. However, the NTEP Director was hired to manage the NTEP program and not to replace the technical advisers at NIST. The Board also made a commitment to resolve issues brought before NTEP by either getting the question answered or referring the issue to the right source.

NTEP Travel Issues

The Board of Directors discussed funding for NTEP lab representatives to attend the sector meetings. The Board of Directors had reached a decision at the 2001 Annual Meeting to limit the number of labs funded to attend the sector meetings. However, in a conference call following that meeting, the Board decided to postpone the implementation of that decision. Their concern was that the Labs had not been given sufficient notice to be able to budget for this travel. The Board will review the issue prior to drafting the 2003 budget.

The Board discussed the funding of public member travel to the Grain Moisture Meter (GMM) Sector. There was concern about the impact that NCWM can have on the program. Diane Lee shared her concern with the Board that they need to consider the impact of grain moisture measurements and not simply the number of meters. The Board directed staff to conduct a cost analysis of the GMM Sector and report back to the Board at the next meeting.

Publication 14

The Board discussed the recommendations presented by the NTEP Sectors for changes to Publication 14. Recommendations for each section, grain moisture/near infrared devices, measuring devices, and weighing devices were reviewed. The NTEP Committee approved the recommendations of the Sectors. Changes will be included in the 2002 version of Publication 14.

Effective Status of Certificates of Conformance

Several companies expressed concerns regarding the change in the markings required by Handbook 44. This change will require the NTEP Certificate of Conformance (CC) number be permanently marked on each device. The companies indicated that a mechanism is needed to provide the Certificate number immediately upon the successful completion of the evaluation. Stephen Patoray presented a proposal that would require a draft Certificate of Conformance to accompany the application for an NTEP Evaluation to speed the issuance of Certificates. This proposal will be finalized and the detailed recommendation will be presented to the NTEP Committee for consideration at their next scheduled meeting.

Mutual Acceptance Agreements (MAAs)

The Board is exploring the potential of developing test data exchange agreements with countries other than Canada. The NCWM is using its experience with Canada in its approach and is also watching closely the work toward international MAA's. The United States (see TSAG report in Appendix A) is currently chairing the OIML work group developing a standard for mutual acceptance of type evaluation test data. While much of the present discussion has focused on an agreement with Germany's Physikalisch-Technische Bundesanstalt (PTB), the Board is not looking to limit itself to agreements with only one country.

The initial work with PTB has centered on an MAA for load cells. Because international load cell intercomparisons have already been done within OIML, the NIST Mass and Force Group (an NTEP Participating Lab) potentially has the ability to demonstrate competence to the satisfaction of PTB and other countries. NTEP would also consider moving toward MAAs for non-automatic weighing instruments, where our participating labs presently have the capability to perform the tests to R-76 requirements.

The Board met with the NIST Mass and Force Group, WMD, and TSAG representatives at the Interim Meetings to discuss some of the issues that may arise from an MAA. These discussions covered a wide range of topics that would need to be addressed in negotiating and managing an MAA. The NCWM assured the Force Group that it would be acting as a Participating Laboratory and would not be required to be a signatory to any MAA.

Lou Straub and Steve Patoray met with Renald Marceau and Alain Casademont, Measurement Canada, to discuss a two-year pilot MAA for liquid-measuring devices with NCWM. Mike Gallo, Gordon Johnson, Richard Tucker, and Mark Joelson represented the Gas Pump Manufacturers Association (GPMA).

Automatic Weighing Systems Code

There is a need to reconvene the Automatic Weighing Systems Code workgroup to work on Handbook 44 issues with ramifications on type evaluation. The purpose of the meeting will be to come up with a proposal for changes to Handbook 44 that can then be given to the Specifications and Tolerances (S&T) Committee. NCWM will host the meeting and fund travel for the Ohio Lab to travel to Maryland. The NTEP Director will also attend the meeting.

Conformity Assessment

The Board discussed conformity assessment. Conformity assessment is viewed as a means to make certain that quality control standards to ensure compliance with Handbook 44 are in place. Stephen A. Patoray, NTEP Director, indicated that it is his intention to complete the conformity assessment work this year. This is important to the device manufacturers so that they get a clear picture of what the program will be. A work group is being formed and several members have already been named representing a wide range of device manufacturers. In the selection process, NCWM wants members of the work group to be representative of different device types and sizes of manufacturers.

NIST Force Group

A meeting was held with representatives of NCWM, NIST WMD, and the NIST Mass and Force Group. The purpose of the meeting was to discuss questions and concerns related to possible bi-lateral agreements between NCWM and any other country. After significant discussion, many of the questions and concerns were answered; however, several specific questions remain to be answered in future discussions with any country wishing to enter into a bi-lateral agreement with NCWM.

106 I Liaison With Other Organizations

WMD/NCWM

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

1. Based on discussions at the two workshops for weights and measures (W&M) administrators held this past fall, WMD will contract for a study of the national weights and measures system to examine how the marketplace and weights and measures programs have changed. The scope and details of the study have not been developed in detail, but included in the study will be:
   - how weights and measures programs vary across the country;
   - compliance levels for jurisdictions across the country;
   - how their budgets and staffing has changed over a 10-year period;
   - how the business community regulated by W&M has changed;
   - how the focus of device manufacturers and consumer product companies has changed as the market has changed; and
   - the level of interest of companies in the use of international standards for devices and package labeling.
2. WMD is preparing a summary of the topics and ideas discussed at the two workshops for weights and measures administrators held last fall. This summary will be a reference document for some of the current and complex issues confronting W&M administrators today.
3. The WMD revision of the examination procedures outlines (EPOs) has been completed and is in the review process for publication. The Handbook 44 references in the EPOs have been updated. The revised EPOs will be available this spring.
4. The template quality manual for NTEP laboratories is finished and in the final review process before publication. This template should be available this spring.
5. WMD will coordinate an NTEP laboratory intercomparison on a price-computing scale. The NTEP labs will be asked to apply the NTEP checklist and performance tests to the scale. The scale will be shipped to the first NTEP lab in the next two months.
6. WMD and TSAG are working with the NCWM and NTEP labs to define the technical support and procedures necessary to implement the bilateral agreements under consideration by the NCWM regarding the acceptance of type evaluation test data. The implementation of these bilateral agreements is expected to require significant staff resources to implement effectively.
7. The NIST Work Group on Weight Carts continues to develop specifications for weight carts used to test large capacity scales. The objective is to develop design specifications that reduce the weight variability of weight carts, thereby reducing the uncertainty associated with the use of weight carts to test scales. The specifications being developed will be published as part of the NIST Handbook 105 series for field standards.

8. The ASTM committee on fat-measuring devices is active. Four subcommittees have been formed, staffed, and are working via e-mail to develop draft documents. Meetings for all four subcommittees will be scheduled, probably before the end of June.

9. WMD will participate in a training seminar developed by the National Weighing and Sampling Association, which are scheduled for April 7-11. Dick Suiter and Steve Cook will be part of the program. As part of their preparation for this course, they are developing draft field reference manuals for belt-conveyor scales and hopper scales. [Note: This seminar was cancelled in March 2000.]

10. The NIST Laws and Metric Group has drafted and submitted suggested changes to the Fair Packaging and Labeling Act (FPLA) to give packagers the option to label consumer packages in either dual units or metric-only quantity statements. The Laws and Metric Group staff is meeting with companies, industry trade associations, and federal agencies to discuss the proposed changes, identify any concerns that these groups may have about the proposed changes, and identify their levels of interest and support for these changes. They are also exploring other projects such as the development of guides for labeling and unit pricing that would facilitate the transition to metric-only labeling.

11. The Laws and Metric Group will be contacting State weights and measures directors in States whose laws do not permit metric-only labeling to encourage them to change their laws to give packagers the option to label packages in either dual units or metric-only quantity statements.

12. Resolutions adopted at the SIM Packaging and Labeling Workshop in December 2001 support the use of labeling in metric-only units and the simplification of the net quantity statement on products sold throughout the Western Hemisphere. WMD will work with TSAG to pursue the implementation of these two resolutions.

13. The CD-ROM training course for laboratory mass calibration is nearing completion. This project is much more complex than originally anticipated, but the work is progressing well. We expect to distribute the final product to State W&M laboratories by early summer.

14. The development of the CD-ROM training course on audit trails is well underway. It is based on the WMD training course conducted in Spring 2001. The CD-ROM course should be completed by this fall.

15. WMD will work with TSAG to promote the alignment of U.S. and OIML standards. Canada is also looking at closer alignment with some OIML standards, particularly related to R117. The NCWM strategic plan states its intent to increase its involvement in the review and development of U.S. positions on OIML documents and recommendations. Various sectors of the weighing and measuring industry have expressed their desire to see alignment of U.S. and OIML standards. Consequently, WMD will take steps to move toward this goal.

16. WMD has contracted with Paul Chase, Chase Technologies, Inc., to identify the similarities and differences in the Belt-Conveyor Scales Code and the OIML standard for belt-conveyor scales. The industry participants in the WMD Technical Workshop of Belt-Conveyor Scales held last May expressed their desire for the OIML standard to be adopted as the U.S. standard. The analysis being done by Paul Chase will be the basis for discussion of possible changes to move the United States closer to the OIML standard.

17. WMD will host another Belt-Conveyor Scale Technical Workshop again this year to address new and remaining issues. This group will also discuss the similarities and differences between the OIML Recommendation and the Belt-Conveyor Scales Code and develop a plan for how to address the differences.

18. For the first time this year, WMD has submitted written positions on a number of issues on the agenda of the S&T Committee. These position statements may be updated following the Interim Meeting and sent to the regional weights and measures associations for consideration in their deliberations on the issues.

19. The Laws and Metric Group developed a strategic plan this past year and sent it to a small group of people for review. Their comments have been received and discussed within WMD. The comments from the reviews have helped shape the priorities of the Laws and Metric Group for this year. The strategic plan will be updated to incorporate these comments and the updated plan will be available this summer.

20. WMD has begun the review of its strategic plan. The objective is to complete the revision by early summer. We plan to ask the members of our original focus group, the NCWM Board of Directors, Scale Manufacturers Association, Gas Pump Manufacturers Association, and Meter Manufacturers Association to review the revised plan for their comments and recommendations.

21. This spring, Tina Butcher will start a one-year detail in the NIST Program Office. In this detail, she will provide support to the office of the NIST Director regarding NIST budget, programs, legislative actions, and interactions with the Department of Commerce.

OIML

The Board is carefully considering how to best represent its membership in OIML activities. The Board initially believes that it can be most effective at the U.S. Working Group level. The Board will encourage participation by key committee people on the appropriate working groups. Members should be aware that much of the U.S. Working Group work is now done through email. You may contact NIST TSAG through Dr. Ehrlich (301-975-4834) to participate at whatever level (full or corresponding member) you wish.

ASTM

Darryl Brown, IA, will represent the NCWM on the newly formed ASTM Committee F-10 working on standards for Livestock, Meat, and Poultry Evaluating Systems. These systems measure fat content and other parameters that affect the quality and value of the livestock carcasses in addition to the weight.

TSAG

Dr. Ehrlich reported that a vote was taken recently on the 8th draft of the Mutual Acceptance Agreement (MAA). The results were fourteen - yes and eight - no. A 9th draft is now being developed. Dr. Ehrlich suggested that the Conference could participate on the Ad Hoc Review Committee. Please see Appendix A for a report on OIML and other international activities.

Canadian Forum on Trade Measurement

George Shefcheck provided the Board with his report. Gilles Vinet suggested that it would be beneficial to have the S&T Chairman as well as a Board member attend future meetings. The Board allocated travel funds for two people to the next meeting.

107 I Other Items

Metrology Subcommittee

The Metrology Subcommittee submitted a request for $1,000 for travel to meet with the NIST Management. The Board discussed what role NCWM should play in this meeting. The funding was approved. The Chairman-Elect of NCWM will also attend the meeting. See Appendix B for the Metrology Subcommittee Report.

R. D. Murdock, North Carolina, Chairman

L. Straub, Maryland, Chairman of the NTEP Committee
R. Andersen, New York, Chairman-Elect
T. Geiler, Barnstable, Massachusetts, Treasurer
D. Brown, Iowa
D. Ehrhart, Arizona
M. Gray, Florida
R. McGrath, Boston, Massachusetts
M. Pinagel, Michigan
D. Quinn, Fairbanks Scales
G. Shefcheck, Oregon

Executive Secretary: H. Oppermann, NIST

Advisors:
B. Palys, Executive Director, NCWM Headquarters
G. Vinet, Canada

Board of Directors

Appendix A

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

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

The Technical Standards Activities Group (TSAG) of the National Institute of Standards and Technology (NIST) is responsible for coordinating U.S. participation in OIML and other international legal metrology organizations. Learn more about OIML at the TSAG website at http://ts.nist.gov/oiml or at the OIML website at *http://www.oiml.org* on the Internet. Dr. Ehrlich can be contacted at *charles.ehrlich@nist.gov* or at 301-975-4834 or by fax at 301- 975-5414.

Table of Contents

I. Report on the 36th Meeting of the International Committee of Legal Metrology (CIML)

Representatives of 47 of the 57 member nations participated in the 36th Annual Meeting of CIML from September 23-29, 2001, in Moscow, Russia. Meetings of the OIML Presidential and Development Councils and a Regional Legal Metrology Forum were also held and are reported on below. Dr. Charles Ehrlich is the CIML Member for the United States

Technical Activities

The Committee adopted the following International Recommendations[1] (R):

R 16 "Non-invasive Sphygmomanometers. Part 1: Mechanical; Part 2: Automated" (revision)

R 133 "Liquid-in-glass Thermometers" (new Recommendation)

R 49-2 "Water Meters (intended for the metering of cold potable water.) Part 2: Test methods" (addition to R 49 that was adopted in 2000)

R 75 "Heat meters. Part 1: General requirements; Part 2: Pattern approval and initial verification tests" (revision)

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

OIML Presidential Council- September 23-24, 2001

Dr. Ehrlich attended a meeting of the OIML Presidential Council (Council) attendees were G. Faber (President, International Committee of Legal Metrology, CIML), M. Kochsiek (CIML First Vice President), L. Issaev (CIML Second Vice President), B. Beard (member), A. Johnston (member), C. Li (member), K. Xiaokang (interpreter for C. Li from Peoples Republic of China), B. Athané (Director, BIML), J. F. Magana (Director-elect, BIML), and G.E.M. Anabe

(Chair, OIML Development Council). H. Imai was recently replaced as Japan's CIML member (by M. Tanaka) and so did not attend as a member. Tanaka has become a PC member. C. Li's replacement probably will as well.

Relations of the OIML and of the Bureau of International Legal Metrology (BIML), the European Commission (EC), the European Committee for Standardization (CEN), and the European Committee for Electrotechnical Standardization (CENELEC)

At previous CIML meetings, Dr. Ehrlich had voiced concern over the way CEN and some European participants had used CENELEC standards to influence the work of some of the OIML Technical Committees. In response to these concerns, the relations between OIML and BIML with the EC, CEN, and CENELEC were discussed and the following action plan adopted:

1. The BIML has been directed to:

   - prepare a draft modification to the OIML Directives (for Presidential Council and CIML review) to clarify how liaison arrangements will be handled in the future (including due-process issues.)

   - draft simplified language in the current Agreements between OIML and CEN/CENELEC to properly reflect the intent to merely provide an avenue for exchange of information between OIML and the committees and subcommittees of those organizations, and

2. Future Agreements (e.g., Memorandums of Understanding and other arrangements) that go beyond a simple exchange of information will require Presidential Council and full CIML involvement from the earliest phases of consideration.

It was decided that draft agreements can be developed and signed by BIML Directors and other organizations if the Presidential Council and CIML review the process. It was reported that the European Measuring Instruments Directive (MID) will not require the development of separate "OIML Normative Documents." BIML confirmed that OIML Recommendations and other documents are not copyrighted by OIML so they may be freely reproduced and distributed.

Honorary CIML Members Named

Mr. Bernard Athane, immediate past director of BIML, and Mr. John Birch, the previous CIML member from Australia were named Honorary CIML Members.

OIML Development Council

The OIML Development Council acts as an advisory body to the CIML on matters of legal metrology in developing countries. This Council has undertaken to look into possible sources of funding (like the World Bank and United Nations Industrial Development Organization) for legal metrology activities (such as for training, equipment and providing internet access/capabilities in developing countries). It was agreed that, while funding is important, developing a legal metrology infrastructure in these countries is equally vital. It was also agreed that having representation and participation by developing countries in the work of the OIML Technical Committees and Subcommittees (TCs/SCs) was not possible at this time due to limited resources. Representatives from the Regional Legal Metrology Organizations (RLMO) gave reports on activities in their regions so that duplicative efforts could be identified and possibly combined or harmonized. Cesar Luiz de Silva (from INMETRO in Brazil) represented the Sistema Interamericano de Metrologia (SIM) and gave a report on the activities of the SIM Legal Metrology Working Group. The Development Council made the following recommendations for consideration and future action:

1. The Council reviewed the working group's terms of reference and recommended that the BIML consult Development Council members to update their composition:

- Switzerland will contribute its experience to Russia in the tasks of Working Group 2 *"Information."*
- The Council Chairperson and the BIML were instructed to follow the progress of, and to improve communications between its three Working Groups.
- The Working Groups were each invited to organize a meeting before the next Council meeting and were asked to take into account the work of RLMOs concerning training, information and equipment in order to avoid overlap in their programs.

2. The Council requested that the Chairperson contact various bodies to explore the possibility of funding to finance legal metrology activities in developing countries, notably the European Commission, the World Bank, and the Islamic Development Bank.

3. The Council recommended that its Chairperson and the BIML continue to work with the World Trade Organization and the United Nations Industrial Development Organization on projects concerning legal metrology.

4. The Council called on RLMOs to designate their representatives to form a "Think Tank" under the Development Council. Where no representative is designated, the RLMO Chairperson will be the representative.

5. The Council directed its Chairperson and the BIML to assist Developing Countries in participating in the work of the OIML Technical Committees.

6. The Council requested that CIML Members send recent information to the BIML to regularly update information on the OIML web site concerning experts and training.

7. The Council requested that the BIML continue to develop and expand the OIML web site.

8. The Council underlined the importance of ensuring that Developing Countries have access to the Internet (and therefore e-mail and associated computer technologies).

Regional Legal Metrology Organizations (RLMOs).

On September 25, 2001, Dr. Charles Ehrlich attended a meeting of the Regional Legal Metrology Organizations (RLMOs). While RLMOs are independent of OIML and are thus not bound by OIML rules, it was felt that bringing together representatives from each RLMO could be useful to see what areas of common interest and potential interactions might exist, and how these areas related to OIML. To stimulate discussions, a series of questions concerning the role of RLMOs in OIML were prepared by the BIML. John Birch submitted the following questions on this subject: How do RLMOs actually interact with each other? What should be the relationship between RLMOs and the OIML Development Council? Can the RLMOs share training courses/materials?

Representatives from the RLMOs reported on the activities of their organizations. The APLMF representative (Birch) reported that the APLMF meeting in Auckland, New Zealand, would include a focus on the role of the consumer in RLMOs and legal metrology in general. The European Cooperation in Legal Metrology (WELMEC) representative (Seton Bennett, UK) reported that the European Measuring Instruments Directive is dominating European legal metrology activities. The issue of developing countries submitting duplicate funding requests to international organizations of legal metrology activities was also raised by several RLMO representatives, and it was agreed that a more coordinated approach should be considered.

In concluding the meeting, it was decided that the representatives from the RLMOs should continue to meet, but that a more formal organizational structure was not warranted at this time. The BIML will prepare a draft paper for review by the CIML on the policy issues involved, including the role of OIML and the BIML in RLMOs, and the ways in which RLMOs can provide inputs to the OIML Technical Committees. One European CIML member expressed the view that the activities of the RLMOs must not be allowed to interfere with the work of OIML.

CIML Meeting

On September 25-27, 2001, Dr. Ehrlich attended the 36th meeting of the International Committee of Legal Metrology (CIML). Mr. Faber opened the meeting by introducing two Russian keynote speakers: Mr. Podofalov, Director of Science (on behalf of the government of the Russian Federation), and by Mr. Voronin, President of Gosstandart (Russian standardization, metrology and certification organization). The necessary quorum of 75 percent was barely met (only 47 out of 57 CIML Members attended). In his opening address, Faber raised the issue that his term as President of OIML will be over in two years and that the search for a successor should begin now so that a good candidate can be identified before the next CIML meeting.

The CIML reviewed the 1999-2002 OIML Action Plan, and its extension to 2003-2004. It was revealed that three countries (Iran, Italy and Kazakhstan) are significantly in arrears of their dues payments and may be "delisted" soon as OIML Member Countries. The BIML director will be doing a thorougb analysis of costs of the BIML and will report his findings to the CIML in 2002. The CIML re-elected Attila Szilvassy to the position of senior Assistant Director of the BIML for a five-year term.

During a review of the OIML technical activities of the past year, Dr. Ehrlich was asked to give an update on the development of an OIML Document on the "Role of Uncertainty in Legal Metrology." He reported that considerable progress has been made and that a draft should be available within six months.

The BIML Director made a presentation on the need to make better use of electronic means (e-mail, internet, video conferencing) in the development of OIML technical work but it was pointed out that many developing countries (about 60 percent of OIML membership) do not have adequate and reliable electronic communication capabilities. The idea of developing Internet sites for each of the OIML Technical Committees was discussed along with proposals that templates be created to simplify the drafting and revision of Recommendations.

During a discussion of the new draft of the OIML Certificate System (United States and BIML are co-Secretariats), a desire was expressed by several people for the next version to address "certification of individual instruments", meaning initial verification and production-meets-type issues (component testing is already included in the latest draft). It was also emphasized that the Certificate System and Mutual Acceptance Arrangement (MAA) must be mutually compatible. Dr. Ehrlich gave two viewgraph presentations, one on the status of the 8th Committee Draft (CD) of the MAA, and a second on the status of OIML R87 (Net Content in Packages) and the proposed IQ (International Quantity) mark system. The CIML expressed its appreciation for the considerable improvements introduced in the 8th committee draft. Copies of the presentations are available at *http://www.oiml.org* on the Internet.

An OIML Reception held on Wednesday, September 26, was "dedicated" to a celebration of Bernard Athane, wbo then retired as Director of the BIML. His successor, Jean-Francois Magana, took over as Director the next day on the floor of the CIML meeting. OIML also made Athane an Honorary CIML Member.

The 2002 CIML meeting will be held in Southern France and the 2003 meeting will be held in Kyoto, Japan. The 2004 CIML meeting, whicb will be held along with the next quadrennial OIML Conference, will be in Israel or in Germany.

OIML Certificate System

A report on the OIML certificate system was presented and discussed. As of February 1, 2002, the total numbers of Certificates issued for R 76 "Non-Automatic Measuring Instruments" is 400, for R 60 "Metrological Regulation for Load Cells" (1991) is 226, and for R 60 (2000) is 57 as of November 2001. The BIML emphasized the importance of the Secretariats to develop Recommendations for components where possible (e.g., R 49, and R 76). The BIML prepares a notice of certificates issued each quarter in the *OIML Bulletin* and reports annually to CIML members on the status of the System. The report identifies participating member nations with testing laboratories that are issuing authorities.

International Workshop on the Future of Legal Metrology

The International Organization of Legal Metrology has organized a Seminar entitled "What will Legal Metrology be in the year 2020" to be held on September 26-27, 2002 in Saint-Jean-de-Luz, France which is located in the soutb of that

country on the Atlantic Ocean. Simultaneous English-French interpretation will be provided. The aim of this Seminar is to encourage a broad exchange of views between legal metrology authorities and those who are subject to legal metrology requirements. This includes representatives of accreditation organizations and manufacturers, sellers, and users of weighing and measuring instruments and consumers. This exchange will encourage the development of participants' thoughts on the long-term evolution of this field and will allow them to be better prepared for major developments in legal metrology.

The themes of the Seminar are:

- Role and position of metrology and legal metrology in society and in the economy,
- Developments in the scope of application of legal metrology,
- Consequences of globalization on the organization of legal metrology in the various countries,
- Consequences of technological evolution on the principles and practical application of legal metrology,
- Conclusions: Perspectives for legal metrology authorities, and the roles of international and regional organizations.

The detailed Seminar program was finalized during the month of March. Participants and interested parties should obtain additional information from the OIML site at *http://www.oiml.org* on the Internet.

II. Report on the Activities of the OIML Technical Committees

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

TC 3 Metrological Control (United States of America)

TC 3/SC 1 Initial and Subsequent Verification (United States of America)

The 1st draft revision of OIML D1 "Elements for a Law on Metrology" was developed by a joint working group of the OIML, the International Bureau of Weights and Measures (BIPM), and the International Laboratory Accreditation Cooperation (ILAC). It has been distributed to the members of TC3/SC1 and to the Laws and Regulations Committee for their review. This revision of D1 presents the various elements that should be considered when preparing laws related to metrology. This document gives advice on general laws covering all the aspects of metrology, as well as specific laws related to some distinct aspect of metrology, such as legal units and traceability. It can also be used to evaluate provisions related to metrology in more general laws such as those on consumer protection and conformity assessment. When completed, the document will be a tool that individuals can use in preparing such laws. They can select appropriate elements and adapt them into their legislation. Please contact Ken Butcher at 301-975-4859 or at *kbutcher@nist.gov* if you would like to obtain a copy of the 1st draft revision D 1 or participate in this project.

TC 3/SC 2 Metrological Supervision (Czech Republic)

A second draft revision of OIML Document 9 "Principles of Metrological Supervision" was distributed by the Secretariat for review and comment in the Fall of 2001. The U.S. included several suggested changes along with its vote in support of this revision of the document. The purposes of D9 are to create the basis for international harmonization and to assist developing countries in the establishment of formal legal metrology programs. The current edition of this document, which was last revised in 1984, contains a survey of the various principles that can be used to establish, organize, and manage legal metrology systems. It is anticipated that this useful information will be updated and expanded in the next edition of this important OIML document. Several members of the NCWM assisted in reviewing and commenting on the 1st and 2nd draft. Updates on this project will be provided when new drafts of D9 are available.

TC 5 Electronic Instruments (Netherlands)

TC 5/SC 1 Electronic Instruments (Netherlands)

The U.S. National Working Group on OIML Technical Committee 9 (TC 9) submitted comments to the Netherlands on the proposed revisions to D11 "General Requirements for Electronic Measuring Instruments." The Netherlands is the OIML Secretariat responsible for this project. OIML D11 specifies the general metrological and technical characteristics that must be met by electronic scales and metering devices undergoing type evaluation. It provides details on how the relevant examinations and tests are conducted and its requirements are based on those in other international standards. Some of the influence factors examined under this document are high and low temperature, humidity, power voltage variation, and electrostatic discharge. OIML Technical Committees use this document as a reference in developing new and revised Recommendations. Dr. Ambler Thompson of TSAG coordinated the development of the U.S. comments and position on D11. This document is significant because it impacts all of the OIML Recommendations on weighing and measuring instruments including those relating to devices for breath analyzers and pollution test equipment. For more information on this activity, contact Dr. Thompson at *ambler@nist.gov* or in writing at:

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

TC 6 Prepackaged Products (United States of America)

TC 6 adopted a third draft revision of R87 "Quantity of Product in Prepackages" in the summer of 2002. A draft Recommendation has been prepared and submitted for adoption to the International Committee on Legal Metrology. The next project on the agenda for TC 6 is the development of an OIML IQ Mark for packages which will be similar to the European Union's CE-mark system. Please contact Ken Butcher at 301-975-4859 or at *kbutcher@nist.gov* if you would like to participate in this project

TC 8 Instruments for Measuring Quantities of Fluids (Switzerland)

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

OIML R117 "Measuring Instruments for Liquids other than Water" is undergoing an extensive revision -- incorporating new instrument technologies and merging the document with other OIML recommendations (R86 "Drum Meters" and R105 "Mass Flowmeters"). The Netherlands (NMi) has started the work required to accomplish this task as the convener of the International Working Group TC8/SC3/WG2 "Revision of R117." The United States is making significant contributions on this revision as both a participating member on WG2 and as the convener of the working group tasked with merging R117 and R105. Please contact Ralph Richter at 301-975-4025 or *ralph.richter@nist.gov* if you would like to participate on this project.

TC 8/SC 4 "Dynamic Mass Measurements (Liquids other than Water)" (United States)

TSAG is working on the merger of OIML R105 "Direct Mass Flow Measuring Systems for Quantities of Liquids" (for which the United States is the Secretariat) with OIML R117 "Measuring Systems for Liquids other than Water" (for which Germany is the Secretariat). The United States is the convener of the international working group TC8/SC4/WG1 named "Combination R105/R117." This is a major priority project for OIML, and TSAG is working with the U.S. National Working Group on flowmeters and the Netherlands (convener of the work group tasked with revising R117) on this effort. Meetings of the U.S. National Working Group on flowmeters were held in July 2001 at the NCWM Annual Meeting, in September 2001 in conjunction with the NTEP Measuring Sector in Lexington, Kentucky, at the NCWM Interim Meeting in January 2002, and during the NCWM Annual Meeting in July 2002. Measurement Canada has been a strong contributor to this effort. A meeting is scheduled for September 2002 with Germany, the Netherlands, and the U.S. to review the work done by the USNWG and to accelerate the effort to combine R105 and R117.

TC8/SC5 "Water Meters" (United Kingdom)

CIML approved a revision of R49 for "mechanical and electronic" water meters in October 1999. Following that adoption, subsequent meetings of TC8/SC5/WG2 were held to develop a test procedure and test report format. Meetings were held in November 1999 at NIST, February 2000 in Paris, and May 2000 in Copenhagen. The WG 2 presented an advanced working draft to OIML TC8/SC5 at another meeting in November 2000 in Paris. The Draft was approved by OIML TC 8/SC 5 and was distributed to the CIML members for ballot. The U.S. voted "yes" to OIML TC8/SC5s proposed amendment to OIML R49-1 *Water Meters Intended for the Metering of Cold Potable Water Part 1: Metrological Requirements* to update the referenced standards for disturbance and influence factor testing. The U.S. voted "no" on a CIML ballot to adopt a proposed recommendation OIML R49-2 *Water Meters Intended for the Metering of Cold Potable Water Part 2: Test Methods*. The negative ballot resulted from the addition of a series of unnecessary tests which would increase the cost of having meters tested, as well as a failure to follow a committee ballot to delay the CIML submission until 2002. The CIML approved OIML R49-2 at its Annual Meeting in Moscow, Russia in September 2001. A subsequent meeting of TC8/SC5 held in Brussels, Belgium in October 2001 involved discussions of the changes required in the OIML R49-1 document to make it consistent with R49-2 and to revise OIML R49-2 as necessary. OIML TC8/SC5 balloted the changes and approved the revisions to OIML R49-1 and OIML R49-2, which will be published.

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

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

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

The Secretariat has sent the members of the committee a letter with the results of a questionnaire asking for comments to guide the initiation of a work program to revise R6 "General provisions for gas volume meters," R31 "Diaphragm Gas Meters", and R32 "Rotary Piston Gas Meters and Turbine Gas Meters." A small majority of members voted to produce one new recommendation for gas meters, independent of the physical principle that will replace R6, R31, and R32. The Secretariat reported that they would develop an initial draft. The new document, according to the Secretariat, may consist of a general chapter mainly consisting of R6 and those aspects in common with R31 and R32 and separate chapters on household and industrial gas meters. The U.S. NWG provided comments and will participate in the development of the new Recommendation.

TC 9 Instruments for Measuring Mass and Density (United States)

A 1st Committee Draft revision of the 1993 edition of OIML R74 "Electronic Weighing Instruments" was distributed to the International Working Group in the fall of 2000. The purpose of this work is to update R74 to reflect changes in International Electrotechnical Commission (IEC) standards and to ensure it is revised concurrently with OIML D11 "General Requirements for Electronic Measuring Instruments." A majority of the participating members of TC9 supported the proposed revisions. However, several comments stated that R74 should be withdrawn since D 11 is being updated and will be much more useful to the Technical Committees than R74. The U.S. National Working Group has developed a second draft incorporating the technical changes suggested in the previous draft. Further work on R74 has been placed on hold pending adoption of a revision of D11.

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

In May of 2002, Germany and France, the co-secretariats of OIML TC 9/SC 1 "Non-automatic Weighing Instruments" (NAWI), announced that they had initiated the first review of OIML Recommendation 76 "Non-automatic Weighing Instruments" since 1994. This review cycle is of major importance to U.S. interests because R76 serves as the foundation for a majority of the laws and regulations that govern weighing instruments around the world. This review is significant for U.S. weighing instrument manufacturers because the international harmonization of requirements will eliminate technical barriers to trade and reduce the delays and the cost of getting new weighing instruments into the global marketplace. It is also important for legal metrology officials since it is taking place when the NCWM is considering

entering into Mutual Acceptance Arrangements for type evaluations with other countries (e.g., Germany). This effort supports one of the Conference's long-range strategies which is to "work toward the harmonization of U.S. (e.g., NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices") and international standards."

The review process for R76 has begun with the Co-Secretariats requesting comments from Member States using a questionnaire that asks for feedback on everything from the basic principles of R76 (e.g., tolerances and accuracy classes) to exploring the addition of new requirements. Some of the new requirements under consideration would allow for the type evaluation of "modules" (e.g., digital indicators and load receiving elements). One question asks if new tests for electronic instruments are needed. Another significant question that has been asked is, basically, "How would OIML R76 need to be revised in order for Member States to implement it in full in their national regulations?"

The U.S. a great opportunity to have an impact on final revisions that will be made to this important international recommendation. The U.S. National Working Group must be proactive and actively participate in the entire review process and international meetings of TC9/SC1 in order to have the most significant impact on the next edition of R76. This process may take several years to complete but the investment of time and resources will be worth it if the result is a greater level of international harmonization. Please contact Ken Butcher at 301-975-4859 or at *kbutcher@nist.gov* if you would like to participate in this project.

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

The U. S. voted "no" on a CIML ballot to adopt a proposed OIML Recommendation on *Automatic Instruments for Weighing Road Vehicles in Motion – Part A: Total Vehicle Weight.* The draft Recommendation specifies requirements for highway weight enforcement scales used to obtain a total vehicle weight of trucks while they are in motion. The negative ballot was cast because the Secretariat failed to accept several U.S. comments regarding the technical accuracy of the terminology used in the proposed standard and because the U.S. did not support the adoption of an incomplete OIML Recommendation. A meeting of the International Working Group was held at the United Kingdom's National Weights and Measures Laboratory in Teddington, England in November 2001. At the meeting it was agreed that a Part B should be developed as a stand-alone Recommendation to apply to both total vehicle weighing (incorporating the requirements from Part A) and axle load determinations. In adopting this approach it was understood that Part B would eventually supersede Part A, as the requirements for total vehicle weighing will be duplicated. Upon completion of Part B, a decision will be made as to whether Part A should be withdrawn and Part B issued as a new Recommendation or, alternatively, whether Part B should be issued as a revision to Part A, (i.e., as a second edition.) In January 2002, TSAG received and commented on the first committee draft Recommendation "Automatic Instruments for Weighing Road Vehicles in Motion" - "Part B - Axle Loads" that was prepared by the OIML Secretariat in the United Kingdom. As of the date of this report, no further information was available on the status of Part B. Please contact Ken Butcher at 301-975-4859 or at *kbutcher@nist.gov* if you would like to participate in this project.

TC 9/SC 3 "Weights" (United States)

A draft revision of OIML Recommendation R111 "Weights...." was adopted by TC9/SC3 in the spring of 2002. TSAG and WMD staff worked closely with Dr. Michael Glaser of PTB (Germany) and Dr. Richard Davis (Paris) to develop a final draft of R111 that was sent to the International Committee on Legal Metrology (CIML) for adoption in September 2002. Adoption of a new edition of this Recommendation was a high priority project for OIML as it is considered one of the most basic and important sets of requirements that member states can adopt as the foundation for their laws on metrology. TC9/SC3 also agreed that OIML R52 "Hexagonal Weights" would not be withdrawn since its requirements may still be used in some developing countries. An updated edition of R52 was also adopted by TC9/SC3 and submitted to CIML for adoption in September 2002.

A draft revision of OIML Recommendation 33 "Conventional Value of the Result of Weighing in Air" was adopted by TC9/SC3 in the spring of 2002. The technical committee also voted to change R33 into an OIML International Document. TSAG worked closely with Dr. Michael Glaser of PTB in Germany and Dr. Richard Davis (Paris) to develop a final draft of R33 that will be sent to the CIML for adoption in September 2002.

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

In February 2001, the 1st Committee Draft Revision of OIML R59 "Moisture Meters for Cereal Grains and Oilseeds" was received from the Peoples Republic of China. China is the Secretariat of OIML TC17/SC1 "Humidity" which is responsible for R59 and other Recommendations relating to moisture measurement. The current edition of R59 was developed in the 1980s and includes technical and metrological requirements for both automatic and manual meters. A U.S. National Working Group was formed to review the draft revision of R59 and actively participate in the revision of this important Recommendation. Comments were sent to the Secretariat in the spring of 2001. In June 2001, Dr. Ambler Thompson and Dr. David Funk of the U.S. Department of Agriculture's Grain Inspection and Packers and Stockyard Administration attended a meeting of TC17/SC1 held in Berlin, Germany. The subject of the meeting was the revision of OIML Recommendation 59. TSAG had submitted comments to the Peoples Republic of China that holds the OIML Secretariat for this Recommendation, and these constituted the basis for the meeting and its discussions. Dr. Thompson presented U.S. proposals to clarify the scope and general direction that the revision process should take and highlighted the need to recognize new technologies and tolerances for these instruments. Another issue is the need to separate the reference moisture method, usually defined by the national responsible authority, from the qualification of instruments since there is no global agreement for a global reference moisture determination test method. These proposals were well received in particular by France, China, and Germany. The Chairman of the meeting asked the United States to prepare an OIML draft based on the National Conference on Weights and Measures National Type Evaluation Program (NTEP) for review by an International Working Group (IWG) composed of France, Germany, Poland, China and the United States. Dr. Thompson agreed to this and will consult with the NTEP Grain Sector and forward copies of the U.S. documents to the IWG. Please contact TSAG if you would like to participate in this working group.

III. 8th Annual Asia-Pacific Legal Metrology Forum (APLMF)

During 13-15 November 2001, Dr. Charles Ehrlich served as Head of Delegation to the 8th Annual Meeting of the APLMF held in Auckland, New Zealand. Mr. Louis Straub, Chief, Weights and Measures, Maryland Department of Agriculture also attended as a guest of NIST. Mr. Straub also serves as the Chairman of the National Conference on Weights and Measures (NCWM) National Type Evaluation Program (NTEP). Seventy-six participants (members and observers) representing nineteen economies attended the meeting. Dr. Ehrlich and Mr. Straub participated in the Forum's working group meetings on mutual recognition agreements, training, rice moisture measurement, intercomparisons, calibration and testing, utility meters and goods packed by measure.

During a session on mutual recognition agreements, Dr. Ehrlich gave a presentation on the 8th Draft "Framework for a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations" under development in OIML Technical Committee 3 (Metrological Control), Subcommittee 5 (Conformity Assessment), of which the United States is Secretariat. Based on his presentation and subsequent discussions, the APLMF decided to continue to support the OIML work and not develop a regional MAA. At the session, Dr. Judith Bennett (Executive Director, National Standards Commission, Australia) announced that Australia has established bilateral arrangements for the mutual acceptance of test reports for non-automatic weighing instruments (NAWIs), load cells, and fuel dispensers with the UK and the Netherlands. A similar agreement with New Zealand on NAWIs was signed at the meeting. Among the highlights at the 8th APLMF Meeting was a presentation entitled "Consumer Involvement in Legal Metrology" by Lesley Harwood, Advisor on Consumer Representation, Ministry of Consumer Affairs of New Zealand. Dr. Harwood gave an overview of the advantages of involving representatives of consumer organizations on government advisory committees that have been widely recognized and discussed the difficulty in getting this involvement (such as travel costs and lost wages). Unfortunately, no easy answers were provided. Dr. Harwood's findings reflect the U.S. experience with weak consumer involvement in the NCWM. Her research report will be available early next year.

Another highlight of the APLMF meeting was the transfer of the Secretariat of the APLMF to Japan. The President of APLMF is now Dr. Akira Ooiwa who is Director of the Mechanical Metrology Division at the National Metrology Institute of Japan. The 2002 APLMF meeting will be held in Ho Chi Minh City, Vietnam. The 2003 APLMF meeting will be held in Kyoto, Japan in conjunction with that year's meeting of the International Committee of Legal Metrology (CIML). A complete report is available upon request.

IV. Inter-American Metrology System (SIM) Legal Metrology Working Group (LMWG) Meeting and Packaging and Labeling Workshop

TSAG, the Weights and Measures Division, and the Global Standards and Information Program (GSIP) worked with Mr. Cesar Luis da Silva, Chairman of the Legal Metrology Working Group (LMWG) of SIM to present a two-day Interamerican Workshop on Packaging and Labeling in Miami on December 9-10, 2002. More than 50 participants from the Americas and Europe attended the workshop and shared a wide variety of information on labeling requirements and packaging experiences.

The three offices cooperated to develop a labeling requirements survey for the workshop. The Spanish language Survey of Labeling Requirements was distributed to SIM member states and a wide spectrum of responses was received. The information collected included the various requirements of the member states for declaring the net quantity, identity, and responsibility on packages intended for consumers. The first draft of the survey was discussed at the meeting and additional efforts will be made to ensure all of the information is up to date and complete so that the survey results can be posted on the SIM web site.

One of the significant issues discussed at the meeting involved the use of the comma versus the use of the period as decimal markers in net quantity declarations. Some countries, including the United States, want to permit either to be used so that manufacturers do not have to maintain different packaging for each market, but many countries want to permit only the comma to be used as the decimal marker. The pros and cons of each approach were exhaustively discussed but no agreement could be obtained. One position was that the comma is specified as the decimal marker in SI; therefore, it isn't necessary to discuss this point, since the LMWG recommends that the SI system of measurement be used. Another comment was that a recent discussion at BIPM indicated that the decimal point might be recognized there as the preferred symbol as the decimal marker (for English language publications). Another comment reported that both the comma and the period are in use and should be allowed, since to reject package labels on this one point would disrupt trade. One participant suggested that the LMWG could not recognize both the comma and the period because it would be inconsistent with the recommendation to use SI. Mr. J. F. Magana, Director of International Bureau of Legal Metrology (BIML) reported that Europe encourages the use of SI, but understands that flexibility is needed. He stated that the International Bureau of Weights and Measures (BIPM) suggest that both the comma and the period be accepted as decimal markers. Further efforts to resolve this issue will be made at future meetings of the LMWG. The SIM Legal Metrology Working Group held a meeting immediately following the workshop and issued the following resolutions and decisions:

Packaging and Labeling

The LMWG agreed to:

- encourage each OIML member country to adopt international Recommendations OIML R 79 and R 87 and collaborate in their revision. The LMWG encouraged OIML to consider procedures for small lot sizes and packages with low counts.

- recommend that information required on package labels be in the language of the country in which the product is sold.

- simplify the net content statement on packages. For example, only the measurement units that are relevant to the consuming market need to be translated into that country's language.

- encourage exclusive use of the SI System for package labeling.

- ask SIM for financial support to develop and provide training programs on labeling subjects (e.g., metrication, net content testing procedures and labeling requirements of OIML R 87 and OIML R 79).

- recommend that a project be undertaken to identify and suggest standardization of reference temperatures used to determine the net quantity of contents of liquids in the Americas.

- request that SIM create a database containing each country's legal metrology regulations (e.g., labeling, net contents testing, contact information, etc.) and that it be made available on the Internet.

- solicit, update, correct and complete the packaging and labeling survey responses of each country in their region so the survey can be posted on the SIM web site.

The LMWG also agreed to:

- request that SIM create a list server for discussion of issues on the SIM website for the LMWG to exchange information, establish priorities for harmonization, and other purposes.

- establish an ongoing forum for industry to bring labeling issues and problems to the SIM LMWG for discussion and possible resolution (e.g., harmonization of requirements or ensuring full disclosure). SIM LMWG representatives will coordinate through e-mail or personal contacts to develop the issues and bring the information to the Group for further discussion and resolution. It was also agreed that the sub regions of SIM implement the above resolutions on a local basis.

V. 9th Draft of the "Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations"

A 9th Draft of the MAA was prepared based on the voting results and comments received on the 8th Draft. The 8th Draft of the MAA was based on comments received from members of OIML TC3/SC5 on the 7th Draft and discussion at the OIML Presidential Council meeting in February 2001, and feedback received from the NCWM NTEP Committee on the MAA Issue Paper presented to the NCWM in 2001 concerning the acceptability of on-site visits (audits) of NTEP Laboratories. The significant modifications to the 7th Draft that were incorporated into the 8th Draft are: (1) the term "self assessment" has been deleted, replaced by "peer assessment," (2) an option for interlaboratory comparisons as a means of demonstrating competence of a testing laboratory is added, (3) clarification of the definitions of "issuing authority" and "national responsible body" are made, along with clarification of responsibilities and signatories to a "declaration of mutual confidence," and (4) the composition and roles of an "ad hoc committee on participation review" are established. Several comments on the 8th Draft objected to interlaboratory comparisons as a stand-alone option so they were incorporated into the "peer assessment" option in the 9th Draft. As part of the proposed MAA, countries will have to sign Declarations of Mutual Confidence to indicate that they will accept test data from other countries. The issue of who will sign the Declaration of Mutual Confidence on behalf of the type evaluation issuing authority within a country will be addressed in the 9th Draft, as well as the assessment requirements to be placed on issuing authorities. The MAA is of special interest to the NCWM because the Board of Directors is currently negotiating a bilateral agreement to exchange test data on type evaluations with Germany's PTB. The 9th Committee Draft passed the OIML TC3/SC5 vote, and a 1st Draft Recommendation is being prepared for circulation to the full CIML for vote.

Appendix B

NCWM Metrology Subcommittee & NIST Management Meeting
April 1 - April 2, 2002

NIST Weights and Measures Division
Contacts: Henry Oppermann, Georgia Harris, Val Miller, Louis Straub, L.F. Eason, and Dan Newcombe

WMD reported on actions resulting from the customer service survey that was delivered to them by the subcommittee last year. Additional "Basic Metrology" seminars have been added. The latest class held in April 2002 was only half filled and the majority of attendees were States' managerial staff, only one was actually a "working metrologist". It appears that the additional seminars have eliminated the backlog which was present a couple years ago.

The trend toward "regional laboratories" was discussed with several issues identified.

1. Certain measurement parameters require high levels of resources to maintain the integrity of the measurement infrastructure and many States have chosen not to support them. Examples are, mass Echelon I, large volume, temperature, and length.
2. Traceability requirements have resulted in the need for more frequent calibration of primary and working standards. Some States do not have the capability to calibrate these standards nor do they have the resources to send them to NIST.
3. Regional laboratories result in less "direct" traceability to NIST.
4. Some States are losing measurement capability by relying on surrounding State laboratories.
5. Regional laboratories are experiencing growing workloads thus taxing their resources and abilities to meet the demands of their own State.
6. State program administrators may determine it not in the best interest of taxpayers to expend resources on out-of-state work.
7. Most State programs do not operate on a total cost recovery, fee system. This makes it difficult to cover the costs of increasing or new measurement services and results in out-of-state work that is subsidized by in-state customers.
8. A high turnover of qualified laboratory staff exists. Even pivot labs are not immune to this, creating a need to monitor pivot laboratory capabilities based on their staffing.
9. Some areas are experiencing considerable competition from high-technology jobs in the private sector. Qualified, trained metrologists are hard to find. Trained metrologists are even harder to keep after significant investments have been made for their training.

Training gaps exist in the system as the high turnover brings new metrologists into the system. Training topics previously covered in the RMAP meetings are being missed by new personnel. It was suggested that WMD develop seminars to help fill these gaps. Identified areas include PMAP, writing and maintaining laboratory quality manuals, internal and external audits, standards documents (ASTM E 617, ISO/IEC 17025, NIST HB 143), and other training which has been delivered at RMAP meetings during the last 10 years.

Funding for systematic calibration of 1-kg State standards was discussed but prospects of NIST funding for this type of project seems dim. It was noted during a later meeting with Dr. Rumble and Dr. Kayser that NIST is required to recover total costs for calibration services by statute.

NCWM - Metrology Subcommittee Standing
Contacts: Louis Straub, Henry Oppermann, Georgia Harris, Val Miller, L.F. Eason, Dan Newcombe

Mr. Straub reviewed the NCWM Strategic Plan and explained some of its goals and objectives. He explained that the BOD is leaning toward small specific task oriented workgroups rather than ongoing committees with wide scopes of responsibilities. He suggested that the Metrology Subcommittee review the NCWM strategic plan he provided and make suggestions to the BOD for how the subcommittee activities fit the goals and objectives of the strategic plan. The subcommittee plans to do this before the July 2002 NCWM Annual Meeting.

The subcommittee wishes to make it clear that we understand the difficulties the Conference is going through at this time and wish to be of service in anyway we can. However, if the formal structure of the Metrology Subcommittee needs to be

changed or even eliminated, we understand. The metrologists have great pride in the NCWM and appreciate the opportunity to participate, but do not want to be burdensome to the Conference in any way.

NIST MEASUREnet Status
Contacts: Mr. Ray Hoffmann, Mr. Justin Leney, Henry Oppermann, Georgia Harris, Val Miller, Louis Straub, L.F. Eason, Dan Newcombe

It was reported that a promising solution to the MEASUREnet server and firewall problems has been found. Funding has been approved and testing will commence soon. It was agreed that this project has merits to expand to other than the initial laboratories without the need for large outlays for the States. The software update will enable laboratories to access the server through their current Internet connections. This program could possibly be expanded to include general weights and measures use as well as the current metrology training and collaboration applications.

NIST Mass & Force Group
Contacts: Dr. Zeina Jabbour, Val Miller, Kelleen Larson, Jose Torres, L.F. Eason, Dan Newcombe

Dr. Jabbour reported on the status of the report for the Key Comparison. The draft report on Phase 1 should be ready for final review and release by late summer or early fall. Phase 2 initial results are being presented at the annual RMAP meetings this year. This presentation will also cover possible corrective actions where problems are identified. Dr. Jabbour seemed very pleased with the data, saying that the mass measurement system propagated across the Nation seemed to be in very good shape. Based on this analysis, she suggests that a cycle of 6 to 8 years seems appropriate to repeat the Key Comparison.

A proposal for funding from the armed services to rewrite the NIST Mass Code was discussed. The amount of money required for this project was more than the armed services were willing to commit and the proposal died. Funding to rewrite the NIST Mass Code is in the budget, but not for several years, and priorities and funding may change (as it did two years ago when a rewrite was anticipated) before it is accomplished. The subcommittee discussed the State Laboratory Program need for a new front end to the existing mass code. LabWizard 1.0, the interface to the mass code that we are currently using, is not Y2K compliant, is no longer supported by the developer, and will not work on Widows versions beyond Windows 98. An adequate front end to generate the data files for mass code processing is a priority for the State Laboratory Program metrologists.

Dr Jabbour discussed the new weight density testing system that is in development and scheduled to be put into use this summer. Though this has delayed the testing of all mass standards at the highest accuracy range until mid-summer 2002, the new system will greatly improve the propagation of kilogram mass value from the platinum iridium kilogram standards to our stainless steel kilograms by minimizing air buoyancy uncertainties.

Dr Jabbour requested that the Laboratories assist the Mass and Force Group in identifying new technologies that may be required, specifically, extremely small mass artifacts requested by the pharmaceutical industry. A need for mass artifacts smaller than 1 mg has been rumored, but no organization has presented a specific request for development of such artifacts. Dr Jabbour noted that to obtain NIST involvement in developing a suitable response, the Laboratories need to communicate with their customers and if such a need exists, to provide documents identifying specific needs.

NIST Thermometry/Humidity Group
Contacts: Dr. Dean Ripple, Dr. Peter Huang, Val Miller, Kelleen Larson, Jose Torres, L.F. Eason, and Dan Newcombe

Several issues were discussed including a SLP thermometry round robin, proper use of the NIST SRM Gallium cells, thermometry training for State laboratories, and using salt solutions for calibration of State laboratory RH sensors.

The NIST thermometry group was enthusiastic about starting a thermometry round robin with the SLP laboratories that test thermometers. The round robin would be similar to the recent mass key comparison, coordinated by the NIST Mass Group and WMD. They already have nearly all the equipment needed (purchased originally as backup equipment for a SIMnet interlaboratory comparison). Therefore, the front-end costs are not excessive, but the equipment will require

NIST calibration at the end of the cycle. The Metrology Subcommittee will survey the State laboratories to determine which labs would be interested in participating in this round robin.

State laboratories are currently expending significant monetary and time resources on outsourcing calibration of relative humidity sensors. Dr Huang discussed salt solution calibration methods as an alternative to sending these units out. The method can achieve accuracy levels of approximately ± 2 percent, which would be adequate for SLP needs. The salt baths must be air-tight, be constructed of glass or other non-hydroscopic materials (no plastics), and must have very tight temperature controls (± 0.5 °C or better). If condensation forms in the container the bath must be discarded and a new bath started. Dr. Huang also suggested testing the bath humidity with a NIST traceable chilled mirror, dew point hygrometer humidity standard to verify that the salt solution had been prepared properly. Concerns regarding traceability and accreditation must also be addressed when salt solutions are used as standards. When L.F. Eason mentioned problems with the lithium chloride bath in his lab, Dr. Huang said that lithium chloride was a difficult salt to work with and suggested magnesium chloride instead.

The group also requested that the metrologist collect some additional information as part of the next SLP survey. This information included:

- How many State laboratories use, or wish to use salt solutions for hygrometer verification and how many would want training?
- How many laboratories want training on the calibration of glass bead thermistors?
- How many States are phasing out mercury in glass thermometers due to safety concerns?

Working Lunch

Contacts: Dr. Rich Kayser, Dr. John Rumble, Henry Oppermann, Georgia Harris, Val Miller, Kelleen Larson, Jose Torres, L.F. Eason, Dan Newcombe

Dr Kayser explained that the requirement for NIST to charge fees based on total cost recovery is mandated by legislative statute and is administered across the board. Clearly, this legislative requirement has replaced the 1960's era understanding that the State Laboratories would not be charged for NBS calibrations. Though the States can no longer expect free calibrations, the number and frequency of calibrations required has been significantly reduced. Advanced Mass Training, as developed by the Office of Weights and Measures in close collaboration with the NIST mass and statistics groups, has resulted in many laboratories only needing NIST mass calibration at the 1-kg and 500-lb mass levels. Originally, all of the NBS-issued State standard weights (approximately 70 weights) had to be sent in for recalibration.

This program continues to be refined; thanks to training and round robin measurements through the WMD sponsored Regional Measurement Assurance Programs (RMAPs). Data acquired during the recent mass key comparisons coordinated by WMD and the NIST mass group has verified the success of these efforts. None of this would have been possible without the support of WMD and the direct collaboration with the various NIST measurement groups, a process that was significantly augmented by the first NCWM metrology subcommittee meeting with NIST management in 1997.

Dr Rumble outlined the procedure for determining these total costs and asked why the State laboratories do not recover total costs with their fee systems. Both Dr. Rumble and Dr. Kayser remarked that the trend is also toward regional specialization within the national laboratories throughout the global measurement system. The trend towards regional laboratories within the State Laboratory Program was discussed at length as were the associated issues identified above during the meeting with WMD. This regional concept has the potential to reduce the cost of maintaining NIST traceability for those State labs that either lack the capability to participate in the advanced mass measurement program or simply have no customers that need this level of service.

The impact of NVLAP accreditation on laboratories' workload was discussed. The consensus of the representatives of accredited laboratories (present during the visit) was that requests for accredited services are rapidly increasing as balance and service companies become accredited to ISO/IEC 17025.

NIST NVLAP

Contacts: Mr. Doug Faison, Mr. Steve Doty, Val Miller, Kelleen Larson, Jose Torres, L.F. Eason, Dan Newcombe

Steve Doty reported eight State laboratories are now accredited and seven others are in the process. Of these seven, two are awaiting onsite audits and five are currently addressing deficiencies.

Doug Faison supplied feedback on some common, generic deficiencies found with some of the State labs.

1. Documentation of the quality system is critical. Some laboratories are relying too heavily on the NIST WMD QM template (NIST IR 5802) and are not tailoring it to the laboratory's individual circumstances.

2. Technical procedures are generally well documented, but following those procedures may be a problem in some laboratories.

3. Internal audits need be held to a documented time frame. The material Georgia requests on an annual basis does not qualify as a complete audit. Other items, as detailed on the NVLAP Handbook 150 (ISO/IEC Standard 17025) checklist, must also be addressed. This checklist (available on the NVLAP WEB site) makes an excellent guide for the internal audit.

4. The technical side of the onsite audits has been generally good. This is a reflection of the many years of excellent training that has been provided by NIST WMD for the State Laboratory program.

5. ANSI Z 540-1 requires audits and reviews to be annual. Those laboratories wanting NVLAP accreditation to ANSI Z 540-1 need to meet additional requirements as detailed on a supplemental checklist.

NIST, National Comparisons Database, NCDB (ICDB)

Contacts: Dr. Bob Watters, Val Miller, Kelleen Larson, Jose Torres, L.F. Eason, Dan Newcombe

Dr. Bob Watters is developing a web-accessible database for tracking international (and now national) interlaboratory comparisons. WMD gave him data for 100-gallon provers and for two, 1-kg standards (Set C) for posting. These will be posted as soon as the data entry staff gets caught up with the international comparisons. This will be an excellent media for posting and comparing data from some of our nation wide interlaboratory comparisons.

Report of the Committee on Laws and Regulations

Pat D'Errico, Chairman
New Jersey Weights and Measures

Reference
Key Number

200 Introduction

This is the report of the Laws and Regulations Committee for the 87th Annual Meeting of the National Conference on Weights and Measures (NCWM.) It is based on the Interim Report offered in the NCWM Publication 16, "Committee Reports," testimony at public hearings, comments received from the Regional Weights and Measures Associations and other parties, the Addendum Sheets issued at the Annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting. The informational items presented below were adopted as presented when the Committee's report was approved.

Table A identifies agenda items by Reference Key Number, title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. Voting items are indicated with a "V" after the item number. Consent calendar items are marked with a "VC." Items marked with an "I" after the item number are informational. Items marked "W" has been withdrawn from consideration. Items marked with a "D" after the key number is developing issues. The developing designation indicates an item has merit; however, the item is returned back to the submitter for further development before any action is taken at the national level. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety. This report contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, 2002 Edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Fourth Edition. Revisions proposed by the Committee are shown in **bold face print** by ~~crossing out~~ information to be deleted and underlining information to be added. New items proposed for the handbooks are designated as such and shown in **bold face print.** Proposals presented for information are shown in *italic* type unless identified as informational. When used in this report, the term "weight" means "mass." A report on the 2001 Interamerican Metrology System Packaging and Labeling Seminar is provided in Appendix B.

Subject Series

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

Table A
Index to Reference Key Items

Table B
Appendices

Table C

Voting Results					
Reference Key Number	House of Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
232-1	11	21	14	71	Item returned to the Committee
231-1	34	0	85	1	Passed
250-1	34	0	85	1	Passed
250-2	34	0	85	1	Passed
250-3	34	0	85	1	Passed
250-4	34	0	85	1	Passed
250-5	33	2	45	34	Passed
200 Committee Report in its Entirety	all	none	all	none	Passed

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

231 Packaging and Labeling Regulation

231-1 VC Indirect Sale of Random Packages

(This item was adopted)

Source: Central Weights and Measures Association (CWMA)

Background: NIST Handbook 44 defines a direct sale as "a sale in which both parties in the transaction are present when the quantity is being determined. An unattended automated or customer-operated weighing or measuring system is considered to represent the device/business owner in transactions involving an unattended device." In direct sales the buyer and seller are present when the actual quantity is determined. In indirect sales only the seller is present when the quantity is determined. The current definition for indirect sales does not clearly make this distinction.

Recommendation: The Committee recommends that NIST Handbook 130, Packaging and Labeling Regulation, Section 11.1.1 be amended to read as follows:

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

(a) unit price
(b) total price

when the following conditions are met:

At the time of the delivery, each package need only bear a statement of net weight, provided that:

(a) the unit price is set forth and established in the initial product offering;
(b) the maximum possible net weight, unit price, and maximum possible price are provided to the consumer by order confirmation when the product is ordered; and

(c) when the product is delivered, the customer receives a receipt bearing the following information: identity, declared net weight, unit price, and total price.

Indirect Sales: For the purpose of Section 11.1.1. "Indirect sales" ~~include all forms of~~ are sales where the customer ~~is not physically present at the time and location of product selection and order~~ makes a selection and places an order, but can not be present when the determination of the net quantity is made. Examples of such indirect methods include, without limitation, Internet or on-line sales, sales conducted by telephone or facsimile, and catalog sales.

Comments: The Committee received several alternative suggestions concerning the wording of this item. The Committee reviewed all of the information and voted to move the item forward using the original language.

232 Method of Sale of Commodities Regulation

232-1 V Stored Tare Weights

(This item did not pass or fail; therefore, it returns to the Committee.)

Source: Southern Weights and Measures Association (SWMA)

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

Recommendation: The Committee recognizes the need for a regulation to require scale operators to maintain accurate and up-to-date stored tare weights. The Committee reviewed the information concerning this issue and voted to move the item forward as Voting, using the language as proposed by the Southern Weights and Measures Association (SWMA). The Committee recommends that NIST Handbook 130, Method of Sale Regulation be amended by adding Section 3.5 - Vehicle Tare Weights.

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

3.5.1 - Allowable differences. - The difference between tare weight and stored tare weight must not exceed plus or minus 3 scale divisions.

3.5.2 - All stored vehicle scale tare weights shall be determined to the nearest scale division. When stored tare weights are used, issued weight certificates shall identify that fact by placing words such as "stored tare" next to the tare weight. Abbreviations or symbols may be used, provided the terminology is defined elsewhere on the printed ticket.

3.5.3 - Stored vehicle scale tare weights shall be verified at regular intervals at a frequency to be determined by the jurisdiction with statutory authority for the device, unless preempted by a more stringent guideline/requirement or modification of the vehicle.

3.5.4 - The use of stored tare weights shall be limited to vehicles moving earth, rock, gravel, refuse, coal, or asphalt material.

236 Uniform Regulation for National Type Evaluation

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

Source: Northeastern Weights and Measures Association (NEWMA)

Background: Recent changes have been made to the National Type Evaluation Program (NTEP) Administrative Procedures, Technical Policy, Checklists, and Test Procedures (NCWM Publication 14) to designate the status of a certificate: active, inactive, or withdrawn. The proposal was to include the certificate status in the Uniform Regulation for NTEP.

Prior to adopting NTEP maintenance fees, Certificates of Conformance (CC) did not expire. Under the maintenance fee system, manufacturers can only sell new devices that have an active CC or those manufactured before the CC expired. However, the regulation does not prohibit a manufacturer from producing and selling devices with an inactive CC. NEWMA believes that the URNTE should include definitions for the status of active, inactive, and withdrawn certificates and clarification of the term "traceable to a CC." NEWMA believes that the current Section 3 is vague and that if a company is prohibited from selling a new device under an inactive or withdrawn certificate, States may be challenged.

Comments: The NCWM Board of Directors (BOD) completed the revision of NCWM Publication 14, Administrative Policy in 2001. The Committee believes that, with the BOD revisions and the adoption of Appendix A in the 2001 L&R Report, the issues presented had been addressed. The committee voted to withdraw this item.

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

237-1 I Petroleum Subcommittee Agenda Items

Source: Petroleum Subcommittee

Background: The Subcommittee submitted several proposed projects for its 1999-2000 work plan. At the 2001 Annual Meeting, the Committee developed an agenda for the Subcommittee based on the comments received on the following projects:

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

Publication 21- The Western Weights and Measures Association recommends that the Petroleum Subcommittee revise the sampling procedures and container requirements in NCWM Publication 21-*Petroleum Products Sampling Procedures and Safety Manual* to provide adequate precautions regarding the use of clear glass containers for product specification conformance testing. This recommendation is based on data presented to the NCWM by Chevron Products Company and the State of Tennessee.

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

Automotive Lubricants – The Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation implies that the document covers lubricants. When

the regulation was developed, the Subcommittee gave developing engine fuel requirements priority with the understanding that in the future they would address lubricants. The uniform law gives broad authority to regulate lubricants; however, the regulation has no requirements. The Subcommittee has proposed developing requirements for lubricants for the Committee to consider.

Comments: The Board of Directors (BOD) stated that funding for the Subcommittee's work is available and will be provided. The Committee believes that the work of the Petroleum Subcommittee is extremely important and requests that Randy Jennings, Chairman, and the Subcommittee proceed with the development of the issues presented in this agenda, including the changes to Publication 21.

The following information is excerpted from the Central Weights and Measures Association (CWMA) 2001 Interim Meeting: "The CWMA considered recommendations provided by Belue Associates on behalf of American Petroleum Institute (API). One of the API's recommendations is to include references to additional standards in "Automotive Lubricants." API 1509 references American Society for Testing and Materials (ASTM) D 4485 and SAE J183. API 1509 describes API's Engine Oil Licensing Prog, D 4485 provides the specifications for current API engine oil categories, and J183 provides the specifications for obsolete categories. There appears to be no conflict in these standards."

The Southern and Western Weights and Measures Association recommends that item number 237-1 be separated into four individual agenda items:

1) Engine Fuels, Petroleum Products, and Lubricants Laboratory Guideline;

2) The Federal Kerosene Dye Information;

3) Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation;

4) Publication 21, Petroleum Products Sampling Procedures and Safety Manual.

Recommendation: The L&R Committee agrees that each item on the Petroleum Subcommittee agenda be addressed separately. Based on comments and proposals, the Committee believes the following two items should be addressed at a later date:

1) Engine Fuels, Petroleum Products, and Lubricants Laboratory Guideline, and
2) The Federal Kerosene Dye Information.

The Committee believes that the remaining two items should be addressed immediately. Therefore, the Committee has added to its agenda item 237-2 Uniform Engine Fuels, Petroleum Products, and Lubricants Regulation and item 237-3 Petroleum Products Sampling Procedures and Safety Manuel.

237-2 I Uniform Engine Fuels, Petroleum Products, and Lubricants Regulation

Source: Western Weights and Measures Association (WWMA)

Background: The Western Weights and Measures Association (WWMA) received numerous comments stating the need to update the Engine Fuels, Petroleum Products, and Lubricants Regulation. This regulation has not been updated since 1994. This recommendation is based on data presented to the WWMA by the Chevron Texaco Corporation.

Recommendation: The changes proposed by WWMA to the Engine Fuels, Petroleum Products, and Lubricants Regulation are given in Appendix A. The Committee recommends that the proposed changes be studied at the regional weights and measures meetings and comments be submitted at the 2003 Interim Meeting.

237-3 I Petroleum Products Sampling Procedures and Safety Manual

Source: Western Weights and Measures Association (WWMA)

Background: The Western Weights and Measures Association recommends the revision of sampling procedures and container requirements in NCWM Publication 21, *Petroleum Products Sampling Procedures and Safety Manual* to provide adequate precautions regarding the use of clear glass containers for product specification conformance testing. This recommendation is based on data presented to the WWMA by the Chevron Texaco Corporation and the State of Tennessee.

Recommendation: Amend Publication 21, *Petroleum Products Sampling Procedures and Safety Manuel*, Section IV. B., Types of Sample Containers as follows:

Sample containers may be clear or brown glass bottles or metal cans. The clear bottle is advantageous because it may be examined visually for cleanliness, and it also allows visual inspection of the sample for free water or solid impurities. The brown glass bottle should be used for samples in which the octane is a concern because it affords some protection from light, which can alter the characteristics of the sample. Plastic coated bottles are available which provide protection from shattering. The only suitable metal cans are those with seams soldered on the exterior surface with a flux of rosin in a suitable solvent, which is easily removed with gasoline, or seamless aluminum bottles.

Comments: The Committee made this item informational to permit jurisdictions time to study the proposed change.

250 NIST Handbook 133

250-1 VC Amend Handbook 133, Fourth Edition, Chapter 1, Section 1.1

(This item was adopted)

Source: Northeastern Weights and Measures Association (NEWMA)

Background: Some packagers have used the lack of multiple inspections as a defense when violations have been issued for the sale of shortweight product. These packagers have taken the position that violation notices cannot be issued and that package lots found to be less than net content cannot be removed from sale unless additional inspections of the same product or product code are completed.

NEWMA believes the amendment will eliminate a significant barrier to effective weights and measures enforcement in the area of net content. The intent of the amendment is to remove what seems to be a baseline requirement for additional inspections prior to any enforcement action. The proposed deletion will not preclude further investigation or inspections if deemed warranted by the inspecting jurisdiction.

Recommendation: The Committee received numerous comments concerning this item. The Committee reviewed all of the information related to this issue and voted to move this item forward as Voting, using a modified version of the Northeastern Weights and Measures Association (NEWMA) proposal. The Committee recommends that NIST Handbook 133, Fourth Edition, Chapter 1. General Information, Section 1.1 Scope, sub-section titled "Retail" be amended as follows:

Retail

Testing packages at retail outlets evaluates the soundness of the manufacturing, distributing, and retailing processes of the widest variety of goods at a single location. It is an easily accessible, practical means for State, county and city jurisdictions to monitor packaging procedures and to detect present or potential problems. Generally retail package testing is not conducive to checking large quantities of individual products of any single production lot. Therefore, ~~at the very least,~~ follow-up inspections of a particular brand or lot code number at a number of retail and wholesale outlets, and ultimately at the point of pack are extremely important aspects in any

package checking scheme. After the evaluation of an inspection lot is reached, the jurisdiction should consider what, if any, further investigation or follow-up is warranted. At the point of sale, a large number of processes impinge on the quality or quantity of the product. Therefore, there may be many reasons for any inspection lot being out of compliance. A shortage in weight or measure may result from mishandling the product in the store or the retailer's failure to rotate stock. Shortages may also be caused through mishandling by a distributor or failure of some part of the packaging process. Shortages may also be caused by moisture loss (desiccation) if the product is packaged in permeable media. Therefore, being able to determine the cause of an error in order to correct defects is more difficult when retail testing is used.

250-2 VC Amend NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3

(This item was adopted)

Source: Western Weights and Measures Association (WWMA)

Background: When the range of the net weights (Rc) is applied to random weight packages, variability in the "range of package errors" is measured instead of "range of net weights." Therefore, the terminology to describe the range of net weights for random weight packages was revised in the Fourth Edition of NIST Handbook 133 to reflect "range of package errors." Using the same terminology, "range of package errors" to describe Rc for standard packages will provide consistency, uniformity and understanding when evaluating Rc/Rt for both random and standard weight packages.

Recommendation: The Central Weights and Measures Association (CWMA), the Western Weights and Measures Association (WWMA) and the Southern Weights and Measures Association (SWMA) support this item. The Committee agrees with the regional associations and recommends amending NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3, page 14 as follows:

"***How are the tare sample and the tare weight of the packaging material determined?***"

(2) For sample sizes of 12 or more, subtract the individual tare weights from the gross weights (block a, minus block b, on the report form) to obtain the net weight for each package and record these values in block c, "Net Wt," on the report form.

~~**Proceed as follows depending on the types of packages you are testing:**~~

- ~~**Standard Weight Packages: Determine and record the "range of net weights" (called Rc) for the initial tare sample in box 9 on the report form. [The range is the difference between the package net weights.]**~~

- ~~**Random Weight Packages:**~~ **Determine and record the "range of package errors" called (Rc) for the initial tare sample in box 9 on the report form. [The range is the difference between the package errors.]**

Comments: During the 87th Meeting of the National Conference on Weights and Measures an editorial change to NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3 was proposed. The proposed change required the deletion of the following question: "How is it determined the tare sample and tare weight of the packaging material?" The replacement language is as follows: "How are the tare sample and the tare weight of the packaging material determined?" The proposed change was reflected in the Addendum Sheets to the Interim Report of the Laws and Regulations Committee.

250-3 VC Amend NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3

(This item was adopted)

Source: Western Weights and Measures Association (WWMA)

Background: Section 2.3, titled ***"What types of tare are or can be used to determine the net weight of packaged goods?"*** states the intention of NIST Handbook 133, Fourth Edition, concerning the three types of tare that may be used to inspect packaged goods. The wording used in Section 2.3, titled ***"When and where is Unused Dry Tare used, and how is it used to determine an average tare weight?***" appears to mandate the use of dry tare for all package inspections.

As written, ***"When and where is Unused Dry Tare used, and how is it used to determine an average tare weight?"*** seems to be in conflict with the stated intent of the Tare Procedures.

Recommendation: The Central Weights and Measures Association (CWMA), the Western Weights and Measures Association (WWMA), and the Southern Weights and Measures Association (SWMA) support including the guidance on moisture allowance from the Third Edition of Handbook 133 to the Fourth Edition. The Committee recommends amending NIST Handbook 133, 4th Edition, Chapter 2, Section 2.3, page 15 as follows:

When and where is Unused Dry Tare used, and how is it used to determine an average tare weight?

You may determine ~~Determine~~ the average tare weight using samples of unused dry tare when testing meat, poultry, or any other products that are not subject to regulation of the Food and Drug Administration (FDA). You may use ~~Use~~ unused dry tare samples when conducting inspections at locations where the point-of-pack and sale are identical (e.g., store-packed products in a supermarket meat case). To determine unused dry tare at the point of sale, randomly select two (2) samples of unused dry tare, and weigh each separately. If there is no measurable variation in weight between the samples, proceed with the test using the weight of one of the samples. If the weight of the two (2) initial samples vary, randomly select three (3) additional tare samples and determine the average weight of all five (5) samples. Use this value as the average tare weight.

250-4 VC Amend NIST Handbook 133, Fourth Edition, Chapter 1, Section 1.2

(This item was adopted)

Source: Western Weights and Measures Association (WWMA)

Background: The Fourth Edition of NIST Handbook 133, adopted at the 86th Annual Meeting of the National Conference on Weights and Measures, addresses established "moisture allowances" for certain meat, poultry, and flour products and states that "you must collect more information before deciding lot compliance or noncompliance." The Third Edition of NIST Handbook 133 included extensive instructions to guide weights and measures officials in conducting further investigation. The Fourth Edition of NIST Handbook 133 includes none.

While one of the reasons to reorganize NIST Handbook 133 was to streamline the document, the phrase "you must collect more information before deciding lot compliance or noncompliance" is not adequate to provide appropriate instruction.

Recommendation: The Committee reviewed all of the material concerning this item. The Committee modified the proposal from the Western Weights and Measures Association (WWMA) proposal and recommends amending NIST Handbook 133, Fourth Edition, Chapter 1, Section 1.2, page 4 as follows:

Why <u>do we</u> allow for moisture loss or gain?

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of lost moisture depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture, apply the moisture allowances to the maximum allowable variations permitted for individual packages and to the average net quantity of contents before determining the conformance of a lot.

This handbook provides "moisture allowances" for some meat and poultry products, flour, and dry pet food (see "Moisture Allowances" in Chapter 2). These allowances are based on the premise that when you find the average net weight of a sample to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either you declare the lot to be within the moisture allowance, or you must collect more information before deciding lot compliance or noncompliance.

<u>Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area (see Section 2.3 Basic Test Procedure – Moisture Allowances – *How do I correct the Maximum Allowable Variation/Average Error for the moisture allowance?*).</u> When the average net weight

of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision area." The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."

250-5 V Amend NIST Handbook 133, 4th Edition, Chapter 2, Section 2.3

(This item was adopted)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Based on the same rationale and regional association support as discussed in the previous item, the Committee recommends amending NIST Handbook 133, Fourth Edition, Chapter 2, Section 2.3, page 19 as follows:

How is the Average Error for moisture allowance corrected?

If the minus average error (box I8) is larger (disregarding the sign) than the SEL (box 23) and moisture loss applies, compare the difference between box I8 and box 23 with the moisture allowance recorded in box 13a. (Make sure that all the values are in units of weight or in dimensionless units before making this comparison.) If box I3a is larger than the difference between box 18 and 23, then the lot is considered to be in the gray area.

Example: Box 13a for 2-lb flour is 60 (dimensionless units); box I8 is 2 (dimensionless units); box 23 is .550 (dimensionless units). The difference between box I8 and box 23 is 1.450 (dimensionless units). Since box 13a is 60 (dimensionless units), 13a is larger than the difference between box 18 and box 23, the lot is considered to be in the gray area and further investigation is necessary before ruling out moisture loss as the reason for shortweight.

When the average error of a lot of fresh poultry, franks, or hot dogs from a USDA-inspected plant is minus, but does not exceed the established "moisture allowance" or "gray area," contact the appropriate USDA official and/or plant management personnel to determine what information is available on the lot in question. Questions to the USDA official and/or plant management representative may include:

(a) Is a quality control program in place?
(b) What information is available concerning the lot in question?
(c) If net weight checks were completed, what were the results of those checks?
(d) What adjustments, if any were made to the target weight?
Note: If USDA or plant management has data on the lot, such data may help to substantiate that the "lot" met net content requirements at the point of manufacture.

This handbook provides "moisture allowances" for some meat and poultry products, flour and dry pet food. These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or further investigation can be conducted.

Deviations from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good distribution practices. If evidence is obtained and documented to prove that the lot was shipped from the packaging plant in a shortweight condition or was distributed under inappropriate or damaging distribution practices, appropriate enforcement action should be taken.

Comments: During the Committee's voting session a proposal to amend the language of this item was heard, but was voted upon and defeated. The proposal, as it appears in this report, was voted upon and approved.

260 Other Items

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

Source: Central Weights and Measures Association (CWMA)

Comments: Last year the L&R Committee recommended, and the NCWM adopted, a proposal to form an Enhanced Product Working Group. This Working Group was not established as of the 2002 Interim Meeting. The Western Weights and Measures Association (WWMA) recommended that the Enhanced Product Working Group propose a plan and scope of action for consideration by the NCWM. The WWMA and the Southern Weights and Measures Association (SWMA) encouraged the Working Group to invite participants from USDA, industry, and other interested parties.

The Central Weights and Measures Association (CWMA) formed a small committee to develop recommendations for the formation of the working group with the goal of providing those recommendations to the NCWM Chairman and the NCWM Laws and Regulations Committee Chairman in advance of the 2002 NCWM Interim Meeting. Henry Oppermann, Director, NIST Weights and Measures Division, provided copies of a previous NCWM study group protocol to assist in the development of this item.

The Committee voted to maintain this item as Informational pending the proposed formation of an Enhanced Product Working Group by the National Conference on Weights and Measures Board of Directors.

P. D'Errico, New Jersey, Chairman

V. Dempsey, Montgomery County, Ohio
D. Johannes, California
E. Price, Texas
J. Gomez, New Mexico

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

Petroleum Subcommittee: Randy Jennings, Tennessee, Chairman

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

Committee on Laws and Regulations

Appendix A
Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation

as adopted by
The National Conference on Weights and Measures*

1. Background

In 1984, the National Conference on Weights and Measures adopted a section (2.20.) in the Uniform Regulation for the Method of Sale of Commodities requiring that motor fuels containing alcohol be labeled to disclose to the retail purchaser that the fuel contains alcohol. The delegates deemed this action necessary since motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends, motor fuel users were complaining to weights and measures officials about fuel quality and vehicle performance, and the American Society for Testing and Materials (ASTM) had not yet finalized quality standards for oxygenated (which includes alcohol-containing) fuels. While many argued that weights and measures officials should not cross the line from quantity assurance programs to programs regulating quality, the delegates were persuaded that the issue needed immediate attention.

A Motor Fuels Task Force was appointed in 1984 to develop mechanisms for achieving uniformity in the evaluation and regulation of motor fuels.

The Task Force developed the Uniform Motor Fuel Inspection Law (see the Uniform Laws section of this Handbook) and the Uniform Motor Fuel Regulation to accompany the Law.

The recommended Law required registration and certification of motor fuel as meeting ASTM standards. The regulation defined the ASTM standards to be applied to motor fuel.

In 1992 the NCWM established the Petroleum Subcommittee under the Laws and Regulations Committee. The subcommittee recommended major revisions to the Regulation that was adopted at the 80th NCWM in 1995. The scope of the regulation was expanded to include all engine fuels, petroleum products, and automotive lubricants; its title was changed accordingly; and the fuel specifications and method of sale sections were revised to address the additional products. Other changes included expansion of the definitions section and addition of sections on retail storage tanks, condemned product, registration of engine fuels designed for special use, and test methods and reproducibility limits.

2. Status of Promulgation

The Uniform Regulation for Engine Fuels, Petroleum Products, and Automotive Lubricants was adopted by the Conference in 1995. The status of State actions with respect to this Regulation is shown in the table beginning on page 8.

**The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology in partial implementation of its statutory responsibility for "cooperation with the States in securing uniformity in weights and measures laws and methods of inspection."*

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Uniform Engine Fuels, Petroleum Products, And Automotive Lubricants Regulation

1. Definitions

1.1. ASTM. – The American Society for Testing and Materials means the national voluntary consensus standards organization formed for the development of standards on characteristics and performance of materials, products, systems, and services; and the promotion of related knowledge.

1.2. Antiknock Index (AKI). – the arithmetic average of the Research Octane Number (RON) and Motor Octane Number (MON): AKI = (RON+MON)/2. This value is called by a variety of names, in addition to antiknock index, including: octane rating, posted octane, (R+M)/2 octane.

1.3. Automatic Transmission Fluid. – a product intended for use in a passenger vehicle, other than a bus, as either a lubricant, coolant, or liquid medium in any type of fluid automatic transmission, or any other type of unit through which or by which force, energy, or power is transferred from a motor vehicle engine by hydraulic means to the driving assembly.

~~1.3.~~ **1.4. Automotive Fuel Rating.** – the automotive fuel rating required under the amended Octane Certification and Posting Rule (or as amended, the Fuel Rating Rule), 16 CFR Part 306. Under this Rule, sellers of liquid automotive fuels, including alternative fuels, must determine, certify, and post an appropriate automotive fuel rating. The automotive fuel rating for gasoline is the antiknock index (octane rating). The automotive fuel rating for alternative liquid fuels consists of the common name of the fuel along with a disclosure of the amount, expressed as a minimum percentage by volume, of the principal component of the fuel. For alternative liquid automotive fuels, a disclosure of other components, expressed as a minimum percentage by volume, may be included, if desired.

~~1.4.~~ **1.5. Automotive Gasoline, Automotive Gasoline-Oxygenate Blend.** – a type of fuel suitable for use in spark-ignition automobile engines and also commonly used in marine and non-automotive applications.

~~1.5.~~ **1.6. Aviation Gasoline.** – a type of gasoline suitable for use as a fuel in an aviation spark-ignition internal combustion engine.

~~1.6.~~ **1.7. Aviation Turbine Fuel.** – a refined middle distillate suitable for use as a fuel in an aviation gas turbine internal combustion engine.

~~1.7.~~ **1.8. Base Gasoline.** – all components other than ethanol in a blend of gasoline and ethanol.

~~1.8.~~ **1.9. Biodiesel.** – a blend consisting of diesel fuel and a substantial amount of esterified animal fats and/or vegetable oil(s).

~~1.9.~~ **1.10. Cetane Index.** – an approximation of the cetane number of distillate diesel fuel, which does not contain a cetane improver additive, calculated from the density and distillation measurements.

~~1.10.~~ **1.11. Cetane Number.** – a numerical measure of the ignition performance of a diesel fuel obtained by comparing it to reference fuels in a standardized engine test.

~~1.11.~~ **1.12. Compressed Natural Gas (CNG).** – natural gas, which has been compressed and dispensed into fuel storage containers and is suitable for use as an engine fuel.

~~1.12.~~ **1.13. Denatured Fuel Ethanol.** – "ethanol" as defined in § 1.19. below.

~~1.13.~~ 1.14. **Diesel Fuel.** – a refined middle distillate suitable for use as a fuel in a compression-ignition (diesel) internal combustion engine.

~~1.14.~~ 1.15. **Distillate.** – any product obtained by condensing the vapors given off by boiling petroleum or its products.

~~1.15.~~ 1.16. **EPA.** – the United States Environmental Protection Agency.

~~1.16.~~ 1.17. **E85 Fuel Ethanol.** – a blend of ethanol and hydrocarbons of which the ethanol portion is nominally 85 to 75 volume percent denatured fuel ethanol.

~~1.17.~~ 1.18. **Energy Content** – the gross energy content or the heating value of diesel fuel as defined by its heat of combustion - the heat released when a known quantity of fuel is burned completely under specific conditions as determined by ASTM Standard Test Method D 240.
(Added 1998)(Amended 1999)

~~1.18.~~ 1.19. **Engine Fuel.** – any liquid or gaseous matter used for the generation of power in an internal combustion engine.

~~1.19.~~ 1.20. **Engine Fuels Designed for Special Use.** – engine fuels designated by the Director requiring registration. These fuels normally do not have ASTM or other national consensus standards applying to their quality or usability; common special fuels are racing fuels and those intended for agricultural and other off-road applications.

~~1.20.~~ 1.21. **Ethanol.** – also known as "Denatured Fuel Ethanol," means nominally anhydrous ethyl alcohol meeting ASTM D 4806 standards. It is intended to be blended with gasoline for use as a fuel in a spark-ignition internal combustion engine. The denatured fuel ethanol is first made unfit for drinking by the addition of Bureau of Alcohol, Tobacco, and Firearms (BATF) approved substances before blending with gasoline.

~~1.21.~~ 1.22. **Fuel Injector Cleanliness.** – a characteristic of the fuel, which allows engine operation without fuel contribution to excessive injector deposits.
(Added 1998)(Amended 1999)

~~1.22.~~ 1.23. **Fuel Oil.** – refined oil middle distillates, heavy distillates, or residues of refining, or blends of these, suitable for use as a fuel for heating or power generation, the classification of which shall be defined by ASTM D 396.

~~1.23.~~ 1.24. **Gasoline.** – a volatile mixture of liquid hydrocarbons generally containing small amounts of additives suitable for use as a fuel in a spark-ignition internal combustion engine.

~~1.24.~~ 1.25. **Gasoline-Alcohol Blend.** – a fuel consisting primarily of gasoline and a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass percent of oxygen if methanol is the only oxygenate) of one or more alcohols.

~~1.25.~~ 1.26. **Gasoline Gallon Equivalent (GGE).** – Gasoline gallon equivalent (GGE) means 2.567 kg (5.660 lb) of natural gas.

~~1.26.~~ 1.27. **Gasoline L Equivalent (GLE).** – Gasoline L equivalent (GLE) means 0.678 kg (1.495 lb) of natural gas.

~~1.27.~~ 1.28. **Gasoline-Oxygenate Blend.** – a fuel consisting primarily of gasoline along with a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass percent of oxygen if methanol is the only oxygenate) of one or more oxygenates.

~~1.28.~~ 1.29. **Kerosene.** – (or "Kerosene") means a refined middle distillate suitable for use as a fuel for heating or illuminating, the classification of which shall be defined by ASTM D 3699.

~~1.29.~~ 1.30. **Lead Substitute.** – an EPA- registered gasoline additive suitable, when added in small amounts to fuel, to reduce or prevent exhaust valve recession (or seat wear) in automotive spark-ignition internal combustion engines designed to operate on leaded fuel.

~~1.30.~~ 1.31. **Lead Substitute Engine Fuel.** – for labeling purposes, a gasoline or gasoline-oxygenate blend that contains a "lead substitute."

~~1.31.~~ 1.32. **Leaded.** – for labeling purposes, any gasoline or gasoline-oxygenate blend which contains more than 0.013 g of lead per L (0.05 g lead per U.S. gal). NOTE: EPA defines leaded fuel as one which contains more than 0.0013 g of phosphorus per L (0.005 g per U.S. gal), or any fuel to which lead or phosphorus is intentionally added.

~~1.32.~~ 1.33. **Liquefied Natural Gas (LNG).** – natural gas that has been liquefied at -126.1 °C (-259 °F) and stored in insulated cryogenic tanks for use as an engine fuel.

~~1.33.~~ 1.34. **Liquefied Petroleum Gas (LPG).** – a mixture of normally gaseous hydrocarbons, predominantly propane, or butane, or both, that has been liquefied by compression or cooling, or both to facilitate storage, transport, and handling.

~~1.34.~~ 1.35. **Low Sulfur.** – low sulfur diesel fuel that meets ASTM D 975 (e.g., Grade Low Sulfur No. 1-D or Grade Low Sulfur No. 2-D) standards. Diesel fuel containing higher amounts of sulfur for off-road use is defined by EPA regulations.

~~1.35.~~ 1.36. **Low Temperature Operability.** – a condition, which allows the uninterrupted operation of a diesel engine through the continuous flow of fuel throughout its fuel delivery system at low temperatures. Fuels with adequate low temperature operability characteristics have the ability to avoid wax precipitation and clogging in fuel filters. (Added 1998)(Amended 1999)

1.37. **Lubricating Oil.** – oil used to lubricate manual transmissions, gears, or axles.

~~1.36.~~ 1.38. **M100 Fuel Methanol.** – nominally anhydrous methyl alcohol, generally containing small amounts of additives, suitable for use as a fuel in a compression-ignition internal combustion engine.

~~1.37.~~ 1.39. **M85 Fuel Methanol.** – a blend of methanol and hydrocarbons of which the methanol portion is nominally 70 to 85 volume percent.

~~1.38.~~ 1.40. **Motor Octane Number.** – a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D 2700 Motor Method engine test.

1.41. **Motor Oil.** – engine oil, engine lubricant, or lubricating oil.

1.42. **Oil.** – motor oil, engine lubricant, engine oil, lubricating oil, or oils used to lubricate transmissions, gears, or axles.

~~1.39.~~ 1.43. **Oxygen Content of Gasoline.** – the percentage of oxygen by mass contained in a gasoline.

~~1.40.~~ 1.44. **Oxygenate.** – an oxygen-containing, ashless, organic compound, such as an alcohol or ether, which can be used as a fuel or fuel supplement.

~~1.41.~~ 1.45. **Reformulated Gasoline.** – a volatile mixture of liquid hydrocarbons and oxygenates meeting the reformulated gasoline requirements of the Clean Air Act Amendments of 1990 and suitable for use as a fuel in a spark-ignition internal combustion engine.

~~1.42.~~ 1.46. **Research Octane Number.** – a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D 2699 Research Method Engine Test.

~~1.43.~~ 1.47. **SAE.** – the Society of Automotive Engineers, a technical organization for engineers, scientists, technicians, and others in positions that cooperate closely in the engineering, design, manufacture, use, and maintainability of self-propelled vehicles.

~~1.44.~~ 1.48. **Substantially Similar.** – the EPA's "Substantially Similar" rule, Section 211 (f) (1) of the Clean Air Act [42 U.S.C. 7545 (f) (1)].

~~1.45.~~ 1.49. **Thermal Stability.** – the ability of a fuel to resist the thermal stress, which is experienced by the fuel when exposed to high temperatures in a fuel delivery system. Such stress can lead to formation of insoluble gums or organic particulates. Insolubles (e.g., gums or organic particulates) can clog fuel filters and contribute to injector deposits.
(Added 1998)(Amended 1999)

~~1.46.~~ 1.50. **Total Alcohol.** – the aggregate total in volume percent of all alcohol contained in any fuel defined in this Chapter.

~~1.47.~~ 1.51. **Total Oxygenate.** – the aggregate total in volume percent of all oxygenates contained in any fuel defined in this Chapter.

~~1.48.~~ 1.52. **Unleaded.** – in conjunction with "engine fuel" or "gasoline" means any gasoline or gasoline-oxygenate blend to which no lead or phosphorus compounds have been intentionally added and which contains not more than 0.013 g of lead per L (0.05 g lead per U.S. gal) and not more than 0.0013 g of phosphorus per L (0.005 g phosphorus per U.S. gal).

~~1.49.~~ 1.53. **Wholesale Purchaser Consumer.** – any person who is an ultimate gasoline consumer of fuel methanol, fuel ethanol, diesel fuel, biodiesel, fuel oil, kerosene, aviation turbine fuels, natural gas, compressed natural gas, or liquefied petroleum gas and who purchases or obtains the product from a supplier and receives delivery of that product into a storage tank.
(Added 1998)(Amended 1999)

2. Standard ~~Fuel~~ Specifications

2.1. Gasoline and Gasoline-Oxygenate Blends (as defined in this regulation) shall meet the following requirements:

2.1.1. The most recent version of ASTM D 4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," except that volatility standards for unleaded gasoline blended with ethanol shall not be more restrictive than those adopted under the rules, regulations, and Clean Air Act waivers of the U.S. Environmental Protection Agency (which includes rules promulgated by the State). Gasoline blended with ethanol shall be blended under any of the following three options:

2.1.1.1. The base gasoline used in such blends shall meet the requirements of ASTM D 4814, or

2.1.1.2. The blend shall meet the requirements of ASTM D 4814, or

2.1.1.3. The base gasoline used in such blends shall meet all the requirements of ASTM D 4814 except distillation, and the blend shall meet the distillation requirements of the ASTM specification.

2.1.2. Blends of gasoline and ethanol shall not exceed the ASTM D 4814 vapor pressure standard by more than 1.0 psi.

2.1.3. Minimum Antiknock Index (AKI). -- The AKI shall not be less than the AKI posted on the product dispenser or as certified on the invoice, bill of lading, shipping paper, or other documentation;

2.1.4. Minimum Motor Octane Number. -- The minimum motor octane number shall not be less than 82 for gasoline with an AKI of 87 or greater;

2.1.5. Minimum Lead Content to Be Termed "Leaded". -- Gasoline and gasoline-oxygenate blends sold as "leaded" shall contain a minimum of 0.013 g of lead per L (0.05 g per U.S. gal);

2.1.6. Lead Substitute Gasoline. -- Gasoline and gasoline-oxygenate blends sold as "lead substitute" gasoline shall contain a lead substitute which provides protection against exhaust valve seat recession equivalent to at least 0.026 g of lead per L (0.10 g per U.S. gal).

2.1.6.1. Documentation of Exhaust Valve Seat Protection. -- Upon the request of the director, the lead substitute additive manufacturer shall provide documentation to the director that demonstrates that the treatment level recommended by the additive manufacturer provides protection against exhaust valve seat recession equivalent to or better than 0.026 g per L (0.1 g/gal) lead. The director may review the documentation and approve the lead substitute additive before such additive is blended into gasoline. This documentation shall consist of:

2.1.6.1.1. Test results as published in the Federal Register by the EPA Administrator as required in Section 211(f)(2) of the Clean Air Act; or

2.1.6.1.2. Until such time as the EPA Administrator develops and publishes a test procedure to determine the additive's effectiveness in reducing valve seat wear, test results and description of the test procedures used in comparing the effectiveness of 0.026 g per L lead and the recommended treatment level of the lead substitute additive shall be provided.

2.1.7. Blending. -- Leaded, lead substitute, and unleaded gasoline-oxygenate blends shall be blended according to the EPA "substantially similar" rule or an EPA waiver for unleaded fuel.

2.2. Diesel Fuel shall meet the most recent version of ASTM D 975, "Standard Specification for Diesel Fuel Oils."

2.2.1. Premium Diesel Fuel – Effective January 1, 2000, all products identified on retail dispensers, bills of lading, invoices, shipping papers, or other documentation such as premium, super, supreme, plus, or premier must conform to at least two of the following requirements:

(a) Energy Content – A minimum energy content of 38.65 Mega Jewels/Liter (MJ/L), gross (138,700 BTU/gallon, gross) as measured by ASTM Standard Test Method D 240.

(b) Cetane Number – A minimum cetane number of 47.0 as determined by ASTM Standard Test Method D 613.

(c) Low Temperature Operability – A cold flow performance measurement which meets the ASTM D 975 tenth percentile minimum ambient air temperature charts and maps by either ASTM Standard Test Method D 2500 (Cloud Point) or ASTM Standard Test Method D 4539 (Low Temperature Flow Test, LTFT). Low temperature operability is only applicable October 1 - March 31 of each year.

(d) Thermal Stability – A minimum reflectance measurement of 80 percent using a green filter in the Octel America's Test Method No. F21-61 (180 minutes, 150 °C).

(e) Fuel Injector Cleanliness – A Coordinating Research Council (CRC) rating of 10.0 or less and a flow loss of 6.0 percent or less as determined by the Cummins L-10 Injector Depositing Test.

1. When a fuel uses a detergent additive to meet the requirement, upon the request of the Director, the fuel marketer shall provide test data indicating the additive being used has passed the Cummins L-10 Injector Depositing Test requirements when combined with Caterpillar 1-K (CAT 1-K) reference fuel. The Director may also request records or otherwise audit the amount of additive being used to ensure proper treatment of fuels according to the additive manufacturer's recommended treat rates.

1.1. Upon the request of the Director, the fuel marketer shall provide an official "Certificate of Analysis" of the physical properties of the additive.

1.2. Upon the request of the Director, the fuel supplier shall provide a sample of detergent additive in an amount sufficient to be tested with CAT 1-K reference fuel in a Cummins L-10 Injector Depositing Test. The regulatory agency requesting the sample shall be responsible for all costs of testing.

2. When a fuel marketer relies on the inherent cleanliness of the diesel fuel to pass the Cummins L-10 Injector Depositing Test or if the fuel requires a lower detergent additive level than the amount required when the additive is used with the CAT 1-K reference fuel, the fuel marketer shall provide, upon the request of the Director, annual test results from an independent laboratory that confirms the fuel meets the requirements of 2.2.1. (e). The time of fuel sampling and testing shall be at the Directors discretion. The Director may witness the sampling of the fuel and the sealing of the sample container(s) with security seals. The Director may request confirmation from the testing laboratory that the seals were intact upon receipt by the laboratory. The final test results shall be provided to the Director. All costs for sampling, transporting, and testing shall be the responsibility of the fuel supplier. If the annual test complies, any additional testing at the request of the Director shall be paid for by the regulatory agency.
(Added 1998) (Amended 1999)

2.3. Aviation Turbine Fuels shall meet the most recent version of ASTM D 1655, "Standard Specification for Aviation Turbine Fuels."

2.4. Aviation Gasoline shall meet the most recent version of ASTM D 910, "Standard Specification for Aviation Gasoline."

2.5. Fuel Oils shall meet the most recent version of ASTM D 396, "Standard Specification for Fuel Oils."

2.6. Kerosene (Kerosine) shall meet the most recent version of ASTM D 3699, "Standard Specification for Kerosene."

2.7. Ethanol intended for blending with gasoline shall meet the most recent version of ASTM D 4806, "Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel."

2.8. Liquefied Petroleum (LP) Gases shall meet ASTM D 1835, "Standard Specification for Liquefied Petroleum (LP) Gases."
Note: Also reference Gas Processors Association 2140, "Liquefied Petroleum Gas Specification and Test Methods."

2.9. Compressed Natural Gas (CNG) shall meet the most recent version of SAE J 1616, "Recommended Practice for Compressed Natural Gas Vehicle Fuel."

2.10. E85 Fuel Ethanol shall meet the most recent version of ASTM D 5798, "Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines."
(Added 1997)

2.11. M85 Fuel Methanol shall meet the most recent version of ASTM D 5797, "Standard Specification for Fuel Methanol M70-M85 for Automotive Spark Ignition Engines."
(Added 1997)

2.12 Oil Products for Use in Internal Combustion Engines shall not be sold or distributed for use in an internal combustion engine unless the product conforms to the following specifications:

(a) It shall meet the engine oil requirements established by the latest revision of the Automotive Society of Testing and Materials (ASTM) Standard D 4485 or the Society of Automotive Engineers Standard (SAE) Recommended Practice SAE J183 and the latest revision of the American Petroleum Institute (API) Publication 1509 *Engine Oil Licensing and Certification System.*

(b) It shall identify the API service category or categories that it meets. API Publication 1600 shall be used for current category descriptions and SAE Recommended Practice SAE J183 shall be used for obsolete categories.

(c) It shall meet the engine oil viscosity requirements established in SAE Recommended Practice SAE J300.

(d) Any engine oil that is represented to meet SAE engine oil performance and engine service classification SA must have a neutralization number as measured by ASTM method D-974 of 0.20 maximum.

(e) Any engine oil that is represented, as "energy conserving" shall meet the requirements established by the latest revision of the Society of Automotive Engineers Recommended Practice SAE J1423.

Exemptions - Prediluted Oil. – Prediluted oil intended only for mixture with gasoline or other motor fuel in a two-cycle engine is exempt from the following requirements:

(a) Flash Points for the Various SAE Classifications;
(b) Service Classifications SAE J183;
(c) Viscosity Grade Classification Number;
(d) SAE/API Service Classification Markings on Containers.

2.13. Products for Use in Lubricating Manual Transmissions, Gears, or Axles shall not be sold or distributed for use in lubricating manual transmissions, gears, or axles unless the product conforms to the following specifications:

(a) It meets the service requirements contained in the latest revision of the SAE Information Report on axle and manual transmission lubricants SAE J308 and lubricant service designations described in API Publication 1560.

(b) The viscosity grade classification number shall be the same as the latest published Society of Automotive Engineers Standard SAE J306 when tested in accordance with the latest method published by the American Society for Testing and Materials (ASTM).

(b) It shall be free from water and suspended matter when tested by means of centrifuge, in accordance with the standard test ASTM D-2273.

2.1.4. Products for Use in Lubricating Automatic Transmissions which are sold without limitation as to type of transmission for which it is intended shall meet all automotive manufacturers' recommended requirements for transmissions in general use in the state. Automatic transmission fluids that are intended for use only in certain transmissions, as disclosed on the label of its container, shall meet the latest automotive manufacturers' recommended requirements for those transmissions. Any material offered for sale or sold as an additive to automatic transmission fluids shall be compatible with the automatic transmission fluid to which it is added, and the resulting mixture shall not fall below the minimum specifications for automatic transmission fluids as established by the department.

Section 3. Classification and Method of Sale of Petroleum Products

3.1. General Considerations

3.1.1. Documentation. – When gasoline; gasoline-oxygenate blends; reformulated gasoline; M85 and M100 fuel methanol; E85 and E100 fuel ethanol; liquefied petroleum (LP) gases; compressed natural gas; liquefied natural gas; biodiesel; diesel fuel; kerosene; aviation gasoline; aviation turbine fuels; or, fuel oils are sold, an invoice, bill of lading, shipping paper or other documentation, must accompany each delivery other than a retail sale. This document must identify the quantity, the name of the product, the particular grade of the product, the applicable automotive fuel rating, and oxygenate type and content (if applicable), the name and address of the seller and buyer, and the date and time of the sale. Documentation must be retained at the retail establishment for a period not less than 1 year.

3.1.2. Retail Dispenser Labeling. – All retail dispensing devices must identify conspicuously the type of product, the particular grade of the product, and the applicable automotive fuel rating.

3.1.3. Grade Name. – The sale of any product under any grade name that indicates to the purchaser that it is of a certain automotive fuel rating or ASTM grade shall not be permitted unless the automotive fuel rating or grade indicated in the grade name is consistent with the value and meets the requirements of Section 2, Standard Fuel Specifications.

3.2. Automotive Gasoline and Automotive Gasoline-Oxygenate Blends

3.2.1. Posting of Antiknock Index Required. – All automotive gasoline and automotive gasoline-oxygenate blends shall post the antiknock index in accordance with applicable regulations, 16 CFR Part 306 issued pursuant to the Petroleum Marketing Practices Act, as amended.

3.2.2. When the Term "Leaded" May Be Used. – The term "leaded" shall only be used when the fuel meets specification requirements of paragraph 2.1.5.

3.2.3. Use of Lead Substitute Must Be Disclosed. – Each dispensing device from which gasoline or gasoline oxygenate blend containing a lead substitute is dispensed shall display the following legend: "Contains Lead Substitute." The lettering of this legend shall not be less than 12 mm (1/2 in) in height and the color of the lettering shall be in definite contrast to the background color to which it is applied.

3.2.4. Nozzle Requirements for Leaded Fuel. – Each dispensing device from which gasoline or gasoline oxygenate blends that contains lead in amounts sufficient to be considered "leaded" gasoline, or lead substitute engine fuel, is sold shall be equipped with a nozzle spout having a terminal end with an outside diameter of not less than 23.63mm (0.930 in).

3.2.5. Prohibition of Terms. – It is prohibited to use specific terms to describe a grade of gasoline or gasoline-oxygenate blend unless it meets the minimum antiknock index requirement shown in Table 1.

3.2.6. Method of Retail Sale. – Type of Oxygenate Must be Disclosed. -- All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold, at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read, "Contains ethanol" or "with MTBE." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 percent of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (2 in) in height, 1.5 mm (1/16 in) stroke (width of type).
(Amended 1996)

3.2.7. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase "contains MTBE or other ethers". In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending. (Amended 1996)

3.3. Diesel Fuel

3.3.1. Labeling of Grade Required. – Diesel Fuel shall be identified by grades No. 1-D, No. 1-D (low sulfur), No. 2-D, No. 2-D (low sulfur), or No. 4-D. Each retail dispenser of diesel fuel shall be labeled according to the grade being dispensed except the words "low sulfur" are not required.

3.3.2. Location of Label. – These labels shall be located on the upper 50 percent of the dispenser front panel in a position clear and conspicuous from the drivers position, in a type at least 12 mm (1/2 in) in height, 1.5 mm (1/16 in) stroke (width of type).

3.3.3. Labeling Properties of Premium Diesel – All retail dispensers identified, as premium diesel must display either:

1. A label that includes all qualifying parameters as specified in 2.2.1. Premium Diesel Fuel affixed to each retail dispenser. The label shall include a series of check blocks clearly associated with each parameter. The boxes for the parameters qualifying the fuel must be checked. All other boxes shall remain unchecked. The marketer may check as many blocks as apply, or

2. A label that includes only the parameters selected by a marketer to meet the premium diesel requirements as specified in § 2.2.1. Premium Diesel Fuel. In either case, the label must display the following words:

- "Premium Diesel Fuel" in a type at least 12 mm (2 in) in height by 1.4 mm (1/16 in) stroke (width of type).

When applicable, as determined by the label option and qualifying parameters chosen by the marketer, the label must also display the following information and letter type size:

- The words "Energy Content," "Cetane Number," "Low Temperature Operability," "Thermal Stability," and "Fuel Injector Cleanliness" in a type at least 6 mm (1/4 in) in height by 0.75 mm (1/32 in) stroke (width of type).

- A declaration of the minimum Energy Content (minimum 38.65 MJ/ L gross [138,700 BTU/gallon]), if energy content is chosen as a qualifying parameter, in type at least 3 mm (1/8 in) in height by 0.4 mm (1/64 in) stroke (width of type).

- The minimum cetane number guaranteed (at least 47.0) if cetane number is chosen as a qualifying parameter, in a type at least 3 mm (1/8 in) in height by 0.4 mm (1/64 in) stroke (width of type).

- The date range of low temperature operability enhancement, (e.g., October- March,) along with the qualifying test method (ASTM D 4539 or ASTM D 2500), if low temperature operability is chosen as a qualifying parameter, in a type at least 3 mm (1/8 in) in height by 0.4 mm (1/64 in) stroke (width of type).

For Example:

Table 1. Minimum Antiknock Index Requirements

Term	Minimum Antiknock Index	
	ASTM D 4814 Altitude Reduction Areas IV and V	All Other ASTM D 4814 Areas
Premium, Super, Supreme, High Test	90	91
Midgrade, Plus	87	89
Regular Leaded	86	88
Regular, Unleaded (alone)	85	87
Economy	--	86

(Table Amended 1997)

Premium Diesel Fuel	
High Energy Content	☐
Cetane Number, 47.0 min	☐
Low Temperature Operability (Oct.-Mar., LTFT)	☐
Thermal Stability	☐
Fuel Injector Cleanliness	☐

Or

Premium Diesel Fuel	
Cetane Number, 47.0 min	☐
Low Temperature Operability (Oct.-Mar., LTFT)	☐
Thermal Stability	☐

- The label must be conspicuously displayed on the upper-half of the product dispenser front panel in a position that is clear and conspicuous from the driver's position.

(Added 1998) (Amended 1999)

3.3.4. Delivery Documentation – Before or at the time of delivery of premium diesel fuel, the retailer or the wholesale purchaser-consumer shall be provided on an invoice, bill of lading, shipping paper, or other documentation, a declaration of all performance properties that qualifies the fuel as premium diesel fuel as required in § 2.2.1.
(Added 1998) (Amended 1999)

3.4. Aviation Turbine Fuels

3.4.1. Labeling of Grade Required. – Aviation turbine fuels shall be identified by Jet A, Jet A-1, or Jet B.

3.4.2. NFPA Labeling Requirements Also Apply. – Each dispenser or airport fuel truck dispensing aviation turbine fuels shall be labeled in accordance with the most recent edition of National Fire Protection Association NFPA

407, "Standard for Aircraft Fuel Servicing." NFPA 407, 1990 Edition: Section 2-3.18 Product Identification Signs. Each aircraft fuel-servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least 75 mm (3 in) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (NOTE: Refer to the most recent edition.)

3.5. Aviation Gasoline

3.5.1. Labeling of Grade Required. – Aviation gasoline shall be identified by Grade 80, Grade 100, or Grade 100LL.

3.5.2. NFPA Labeling Requirements Also Apply. – Each dispenser or airport fuel truck dispensing aviation gasoline shall be labeled in accordance with the most recent edition of National Fire Protection Association (NFPA) 407, "Standard for Aircraft Fuel Servicing."

NFPA 407, 1990 Edition: Section 2-3.18 Product Identification Signs. Each aircraft fuel-servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least75 mm (3 in) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (NOTE: Refer to the most recent edition.)

3.6. Fuel Oils

3.6.1. Labeling of Grade Required. – Fuel Oil shall be identified by the grades of No. 1, No. 2, No. 4 (Light), No. 4, No. 5 (Light), No. 5 (Heavy), or No. 6.

3.7. Kerosene (Kerosine)

3.7.1. Labeling of Grade Required. – Kerosene shall be identified by the grades No. 1-K or No. 2-K.

3.7.2. Additional Labeling Requirements. – Each retail dispenser of kerosene shall be labeled as 1-K Kerosene or 2-K. In addition, No. 2-K dispensers shall display the following legend:

3.7.2.1. "Warning - Not Suitable For Use In Unvented Heaters Requiring No. 1-K."

3.7.2.2. The lettering of this legend shall not be less than 12 mm (1/16 in) in height by 1.5 mm (1/16 in) strokes; block style letters and the color of lettering shall be in definite contrast to the background color to which it is applied.

3.8. Fuel Ethanol

3.8.1. How to Identify Fuel Ethanol. – Fuel ethanol shall be identified by the capital letter E followed by the numerical value volume percentage. (Example: E85)

3.8.2. Retail Dispenser Labeling. – Each retail dispenser of fuel ethanol shall be labeled with the capital letter E followed by the numerical value volume percent-denatured ethanol and ending with the word "ethanol." (Example: E85 Ethanol)

3.8.3. Additional Labeling Requirements. – Fuel ethanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.9. Fuel Methanol

3.9.1. How Fuel Methanol is to Be Identified. – Fuel methanol shall be identified by the capital letter M followed by the numerical value volume percentage of methanol. (Example: M85)

3.9.2. Retail Dispenser Labeling. – Each retail dispenser of fuel methanol shall be labeled by the capital letter M followed by the numerical value volume percent and ending with the word "methanol." (Example: M85 Methanol)

3.9.3. Additional Labeling Requirements. – Fuel methanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.10. Liquefied Petroleum (LP) Gas

3.10.1. How LPG is to Be Identified. – Liquefied petroleum gases shall be identified by grades Commercial Propane, Commercial Butane, Commercial PB Mixtures or Special-Duty Propane (HD5).

3.10.2. Retail Dispenser Labeling. – Each retail dispenser of liquefied Petroleum gases shall be labeled as "Commercial Propane," "Commercial Butane," "Commercial PB Mixtures," or "Special-Duty Propane (HD5)."

3.10.3. Additional Labeling Requirements. – Liquefied Petroleum Gas shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.10.4. NFPA Labeling Requirements also apply. (Refer to the most recent edition of NFPA 58.)

3.11. Compressed Natural Gas

3.11.1. How Compressed Natural Gas Is to Be Identified. – For the purposes of this regulation, compressed natural gas shall be identified by the term "Compressed Natural Gas" or "CNG."

3.11.2. Retail Sales of Compressed Natural Gas Sold as a Vehicle Fuel

3.11.2.1. Method of Retail Sale. – All compressed natural gas kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be in terms of the gasoline L equivalent (GLE) or gasoline gallon equivalent (GGE).

3.11.2.2. Retail Dispenser Labeling

3.11.2.2.1. Identification of Product. – Each retail dispenser of compressed natural gas shall be labeled as "Compressed Natural Gas."

3.11.2.2.2. Conversion Factor. – All retail compressed natural gas dispensers shall be labeled with the conversion factor in terms of kg or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement "1 Gasoline L Equivalent (GLE) is equal to 0.678 kg of Natural Gas" or "1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lb of Natural Gas" consistent with the method of sale used.

3.11.2.2.3. Pressure. – CNG is dispensed into vehicle fuel containers with working pressures of 16 574 kPa, 20 684 kPa, or 24 821 kPa. The dispenser shall be labeled 16 574 kPa, 20 684 kPa, or 24 821 kPa corresponding to the pressure of the CNG dispensed by each fueling hose.

3.11.2.2.4. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA 52.)

3.11.3. Nozzle Requirements for CNG. – CNG fueling nozzles shall comply with ANSI/AGA/CGA NGV 1.

3.12. Liquefied Natural Gas

3.12.1. How Liquefied Natural Gas Is to Be Identified. – For the purposes of this regulation, liquefied natural gas shall be identified by the term "Liquefied Natural Gas" or "LNG."

3.12.2. Labeling of Retail Dispensers of Liquefied Natural Gas Sold as a Vehicle Fuel

3.12.2.1. Identification of Product. – Each retail dispenser of liquefied natural gas shall be labeled as "Liquefied Natural Gas."

3.12.2.2. Automotive Fuel Rating. – LNG automotive fuel shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.12.2.3. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA 57.)

3.13. Oil – Each sign or label shall have in letters or numerals plainly visible the viscosity grade classification as determined in accordance with the Society of Automotive Engineers' (SAE) latest standard for engine oil viscosity classification SAE J300 or manual transmission and axle lubricant's viscosity classification SAE J306, as applicable, and shall be preceded by the letters "SAE".

In addition the label of each container of motor oil products shall contain the American Petroleum Institute (API) Service Classification, as defined in ASTM D 4485 and SAE J183, in letters not less than 3.18 mm (1/8 in) in height.

It is unlawful for any person to sell or distribute engine oil or axle and manual transmission lubricant unless the API Service Classification is conspicuously marked on each container. Each container of engine oil with a volume of one gallon or less shall bear a plainly visible statement indicating generally the automobile model years or condition of service for which the engine oil is suitable for gasoline engines as described in SAE J183.

3.14. Automatic Transmission Fluid – Automatic transmission fluid shall be deemed to be mislabeled if any of the following occurs:

(1) The container does not bear a label on which is printed the brand name, the name and place of business of the manufacturer, packer, seller, or distributor, the words "Automatic Transmission Fluid", and the duty type classification.

(2) The container does not bear a label on which is printed an accurate statement of the quantity of the contents in terms of liquid measure.

(3) The labeling on the container is false or misleading.

3.14.1. Documentation of Claims made upon Product's Label – Any manufacturer or packager of any product subject to this article and sold in this State shall provide, upon request to duly authorized representatives of the department, documentation of any claim made upon their product's label.

Section 4. Retail Storage Tanks

4.1. Water in Gasoline-Alcohol Blends, Aviation Gas, and Aviation Turbine Fuel. – No water phase greater than 6 mm (1/4 in) as determined by an appropriate detection paste, is allowed to accumulate in any tank utilized in the storage of gasoline-alcohol blend, aviation gasoline, and aviation turbine fuel.

4.2. Water in Gasoline, Diesel, Gasoline-Ether, and Other Fuels. – shall not exceed 50 mm (2 in) in depth when measured with water indicating paste in any tank utilized in the storage of biodiesel, diesel, gasoline, gasoline-ether blends, and kerosene sold at retail except as required in section 4.1.

4.3. Product Storage Identification

4.3.1. Fill Connection Labeling. – The fill connection for any petroleum product storage tank or vessel supplying engine-fuel devices shall be permanently, plainly, and visibly marked as to the product contained.

4.3.2. Declaration of Meaning of Color Code. – When the fill connection device is marked by means of a color code, the color code shall be conspicuously displayed at the place of business.

4.4. Volume of Product Information. – Each retail location shall maintain on file a calibration chart or other means of determining the volume of each regulated product in each storage tank and the total capacity of such storage tank(s). This information shall be supplied immediately to the Director.

Section 5. Condemned Product

5.1. Stop Sale Order at Retail. – A stop sale order may be issued to retail establishment dealers for fuels failing to meet specifications or when a condition exists that causes product degradation. A release from a Stop Sale order will be awarded only after the director has agreed upon final disposition. Confirmation of disposition shall be submitted in writing on form(s) provided by the Director and contain an explanation for the fuels' failure to meet specifications. Upon discovery of fuels failing to meet specifications, meter readings and physical inventory shall be taken and reported in confirmation for disposition. Specific variations or exemptions may be made for fuels designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

5.2. Stop Sale Order at Terminal or Bulk Plant Facility. – A stop sale order may be issued when products maintained at terminals or bulk plant facilities fail to meet specifications or when a condition exists that may cause product degradation. The terminal or bulk storage plant shall immediately notify all customers that received those product(s) and make any arrangements necessary to replace or adjust to specifications those product(s). A release from a Stop Sale order will be awarded only after the Director has agreed upon final disposition. Confirmation of disposition of products shall be made available in writing to the Director. Specific variations or exemptions may be made for fuels used for blending purposes or designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

Section 6. Product Registration

6.1. Engine Fuels Designed for Special Use. All engine fuels designed for special use that do not meet ASTM specifications or standards addressed in Section 2 shall be registered with the director on forms prescribed by the director 30 days prior to when the registrant wishes to engage in sales. The registration form shall include all of the following information:

6.1.1. Business name and address or addresses.

6.1.2. Mailing address if different than business address.

6.1.3. Type of ownership of the distributor or retail dealer, such as an individual, partnership, association, trust, corporation, or any other legal entity or combination thereof.

6.1.4. An authorized signature, title, and date for each registration.

6.1.5. Product brand name and product description.

6.1.6. A product specification sheet shall be attached.

6.2. Registration is subject to annual renewal.

6.3. Re-registration is required 30 days prior to any changes in Section 6.1.

6.4. The director may decline to register any product, which actually or by implication would deceive or tend to deceive a purchaser as to the identity or the quality of the engine fuel.

6.5. The registration is not transferable.

Section 7. Test Methods and Reproducibility Limits

7.1. ASTM Standard Test Methods referenced for use within the applicable Standard Specification shall be used to determine the specification values for enforcement purposes.

7.1.1. Premium Diesel -The following test methods shall be used to determine compliance with the applicable premium diesel parameters:

(a) Energy Content - ASTM D 240

(b) Cetane Number - ASTM D 613

(c) Low Temperature Operability - ASTM D 4539 or ASTM D 2500 (according to marketing claim)

(d) *Thermal Stability - Octel America F21-61 (180 minutes, 150 EC)

(e) *Fuel Injector Cleanliness - The most recent edition of the Cummins L-10 Injector Depositing Test as endorsed by the ASTM L-10 Injector Depositing Test Surveillance Panel.

*Upon ASTM approval of standard test methods that are derived from the above referenced methods, the ASTM standard test methods shall be used to determine compliance with the applicable premium diesel parameter.
(Amended 1999)

7.2. Reproducibility Limits

7.2.1. AKI Limits. -- When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in ASTM D 4814 Appendix X1 shall be acknowledged for enforcement purposes.

7.2.2. Reproducibility. --The reproducibility limits of the ASTM standard test method used for each test performed shall be acknowledged for2`` enforcement purposes, except as indicated in 7.2.1.

7.2.3. Dispute Resolution. -- In the event of a dispute over a reported test value, the guidelines presented in the most recent version of ASTM D 3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

Appendix B

Interamerican Metrology System (SIM) Report on 2001 Packaging and Labeling Seminar

Technical Standards Activities Group (TSAG), the Office of Weights and Measures, and the Global Standards and Information Program (GSIP) worked with Mr. Cesar Luis da Silva, Chairman of the Legal Metrology Working Group (LMWG) of SIM to present a two-day Interamerican Workshop on Packaging and Labeling in Miami on December 9-10, 2001. More than 50 participants from the Americas and Europe attended the workshop and shared a wide variety of information on labeling requirements and packaging experiences.

The three offices cooperated to develop a labeling requirements survey for the workshop. The Spanish language Survey of Labeling Requirements was distributed to SIM member states and a wide variety of responses were received. Among the information collected were the various requirements of the member states for declaring the net quantity, identity, and responsibility on packages intended for consumers. The first draft of the survey was discussed at the meeting and additional efforts will be made to ensure all of the information is up to date and complete so that the survey results can be posted on the SIM web site.

One of the significant issues discussed at the meeting involved the use of the comma and the period as decimal markers in net quantity declarations. Some countries, including the U.S., want to permit either to be used so that manufacturers do not have to maintain different packaging for each market, but many countries want to permit only the comma to be used as the decimal marker. The pros and cons of each approach were exhaustively discussed but no agreement could be obtained. One position was that the comma is specified as the decimal marker in SI; therefore, it isn't necessary to discuss this point since the LMWG recommends that the SI system of measurement be used. Another comment was that a recent discussion at the International Bureau of Legal Metrology (BIPM) indicated that the decimal point might be recognized there as the preferred symbol as the decimal marker (for English language publications). Another comment reported that both the comma and the period are in use and should be allowed, since to reject package labels on this one point would disrupt trade. One participant suggested that the LMWG could not recognize both the comma and the period because it would be inconsistent with the recommendation to use SI. Mr. J. F. Magana, Director of International Bureau of Legal Metrology (BIML), reported that Europe encourages the use of SI, but understands that flexibility is needed. He stated that the BIPM suggests that both the comma and the period be accepted as decimal markers. Further efforts to resolve this issue will be made at future meetings of the LMWG. The SIM Legal Metrology Working Group held a meeting immediately following the workshop and issued the following resolutions and decisions:

Packaging and Labeling

The LMWG agreed to:

- encourage each OIML member country to adopt international Recommendations OIML R 79 and R 87 and collaborate in their revision. The LMWG encouraged OIML to consider procedures for small lot sizes and packages with low counts.

- recommend that information required on package labels be in the language of the country in which the product is sold.

- simplify the net content statement on packages. For example, only the measurement units that are relevant to the consuming market need to be translated into that country's language.

- encourage exclusive use of the SI System for package labeling.

- ask SIM for financial support to develop and provide training progs on labeling subjects (e.g., metrication, net content testing procedures and labeling requirements of OIML R 87 and OIML R 79).

- recommend that a project be undertaken to identify and suggest standardization of reference temperatures used to determine the net quantity of contents of liquids in the Americas.

- Request that SIM create a database containing each country's legal metrology regulations (e.g., labeling, net contents testing, contact information, etc.) and that it be made available on the Internet.

- Solicit, update, correct and complete the P&L survey responses of each country in their region so the survey can be posted on the SIM web site. This work should be finalized by March 1, 2002.

Other Items

The LMWG also agreed to:

- Request that SIM create a list server for discussion of issues on the SIM web site for the LMWG to exchange information, establish priorities for harmonization, and other purposes.

- Establish an ongoing forum for industry to bring labeling issues and problems to the SIM LMWG for discussion and possible resolution (e.g., harmonization of requirements or ensuring full disclosure). SIM LMWG representatives will coordinate through e-mail or personal contacts to develop the issues and bring the information to the Group for further discussion and resolution. It was also agreed that the sub regions of SIM implement the above resolutions on a local basis.

Report of the Committee on Specifications and Tolerances

Mark P. Coyne, Chairman
Sealer
City of Brockton, Massachusetts

Introduction

This is the final report of the Committee on Specifications and Tolerances (S&T) for the 87th Annual Meeting of the National Conference on Weights and Measures (NCWM). The report is based on the 87th Interim Report offered in NCWM Publication 16, "Committee Reports," the Addendum Sheets issued at the Annual Meeting, and actions taken by the membership at the Voting Session of the Annual Meeting.

Table A identifies the agenda items in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are indicated with a **"V,"** or if the item was part of the consent calendar by the suffix **"VC"** after the item number. Items marked with an **"I"** after the reference key number are information items. Items marked with a **"D"** after the key number are developing issues. The developing designation indicates an item has merit; however, the item is returned to the submitter to develop further before any action is taken at the national level. The Committee withdrew items marked with a **"W."** Items marked with a **"W"** generally will be referred to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient Committee support to bring them before the NCWM. Table B lists the Appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

The attached report contains many recommendations to revise or amend National Institute of Standards and Technology (NIST) Handbook 44, 2002 Edition, "Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook are shown in **bold face print** by ~~crossing out~~ text to be deleted, and underlining information to be added. Requirements that are proposed to be nonretroactive are printed in *italics*. Entirely new paragraphs or sections proposed for addition to the handbook are designated as such and shown in **bold face print.**

Note: The policy of the National Institute of Standards and Technology is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Table B
Appendices

Table B
Appendices (continued)

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
300 (Consent Calendar)	All Yeas	No Nays	All Yeas	No Nays	Passed
320-1A	33	0	81	3	Passed
320-1B	22	11	61	17	Returned to Committee
330-4	23	10	29	57	Returned to Committee
331-1	21	12	53	25	Returned to Committee
300 (Report in its Entirety Voice Vote)	All Yeas	No Nays	All Yeas	No Nays	Passed

Details of all Items Follow in Numerical Order

310 General Code

310-1 I G-S.1. Identification; Software Based Devices, and Appendix D; Definition of Built-for-Purpose Device

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector and Weighing Sector

Recommendation: The Committee reviewed the following two proposals, one submitted by the NTETC Measuring Sector and one submitted by the NTETC Weighing Sector to address the identification of software-based devices.

NTETC Measuring Sector proposal:

Add the following note to the end of paragraph G-S.1.:

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

Note: For software-based devices not built-for-purpose the required markings may be shown on the display screen provided the required information is either displayed continuously or by pressing a single key or a series of keys. When a series of key strokes is required, clear instructions for accessing the marking information must be provided.

Add the following new definition to Appendix D:

built-for-purpose device. Any main element which was manufactured with the primary intent that it be used as or as part of a weighing or measuring device or system.

NTETC Weighing Sector Proposal:

Modify paragraphs G-S.1. and G-S.7. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

The required markings may be shown on the display screen provided the required information is displayed either continuously or by an operator action (such as keyboard entries, touch pad, etc). Clear instructions for accessing the information shall be provided, as a minimum, on the Certificate of Conformance unless the information is continuously displayed during normal operation.

The manufacturer and model designation shall either be continuously displayed or permanently marked on the device.

G-S.7. Lettering. - All required markings and instructions shall be distinct and easily readable and shall be of such character that they will not tend to become obliterated or illegible.

The required markings may be shown on the display screen provided the required information is displayed either continuously or by an operator action (such as keyboard

entries, touch pad, etc). Clear instructions for accessing the information shall be provided, as a minimum, on the Certificate of Conformance unless the information is continuously displayed during normal operation.

Discussion: At the 2002 NCWM Annual Meeting, the Gasoline Pump Manufacturers Association (GPMA) indicated strong support for the proposal submitted by the NTETC Measuring Sector. The SMA supports the item. One official stated that information on an NTEP Certificate of Conformance only is not sufficient and that a model and serial number needs to be permanently displayed or on screen at all times. The Committee agreed that NIST Handbook 44 is not intended to create specific design criteria; however, the proposal needs to specify that access through any keystroke(s) must be clearly identifiable. The Committee recognizes that space is a premium on retail motor-fuel dispensers and that many parts are not permanently attached. The Committee has not heard that other device manufacturers have similar concerns about the space available for marking requirements. The Committee stresses the importance of both the Weighing and Measuring Sectors reaching a consensus on a proposal since this requirement affects all types of device technology and work together to develop a proposal acceptable to both sectors.

Background: At its 2001 meeting the Measuring Sector discussed marking requirements for software-based devices, such as an electronic cash register (ECR) or control console, connected to a liquid measuring device. In some cases, the indicator for the system is a generic computer monitor. If the required markings are placed on the monitor at the time of installation and then at some future time the monitor is replaced, the required markings may be lost. The Measuring Sector agreed that a real time display of the model and software version information on the display screen is preferable. The Measuring Sector also agreed that the information could either be displayed continuously or by pressing a single key or a series of keys. If a series of keystrokes is necessary to display the information, then instructions for access must be clearly provided. The Measuring Sector agreed to forward a proposal to modify G-S.1. to allow real time display of the model and software version number for software-based systems to the NCWM S&T Committee.

At its 2001 meeting the Weighing Sector supported the concept of the Measuring Sector proposal, but did not support the language proposed by the Measuring Sector. The Weighing Sector discussed the need for readily accessible physical markings of the make, model, and serial number information. The Weighing Sector agreed that the proposal needs further development and noted that the proposed provision should encompass other required marking information. The Weighing Sector also felt that the proposal should not apply only to "built-for-purpose" devices. The Weighing Sector asks the NCWM to consider its alternate proposal as either a developmental or information item.

At the 2002 NCWM Interim Meeting, the Committee heard comments that some systems such as LMD consoles and ECRs are already in the field with some required marking information displayed on screen. Comments were made that on-screen markings could be applicable to built-for-purpose devices. The Committee believed that built-for-purpose devices or elements need to be physically marked with at least a make, model, and serial number. The Committee asked that the NTETC Measuring Sector and Weighing Sector review both proposals and attempt to agree on a single proposal that is acceptable to all parties. The NIST Office of Weights and Measures (OWM) provided the Committee with a written position statement for this item. OWM supports the concept of recognizing information displayed "on screen" to satisfy marking requirements of G-S.1.; however, OWM does not support the proposal as currently written. OWM recommends the item remain as an information item to allow further study and development of the proposal. The Committee agreed to give the item information status to allow further input and development from the NTETC Sectors.

310-2A VC Examples of Manufactured, Repaired, and Remanufactured Devices and Elements

(This item was adopted.)

(During the 2002 Interim Meeting, Item 310-2 was separated into two parts, 310-2A and 310-2B, to facilitate review of the issues.)

Source: NCWM S&T Committee (This item was developed by the Remanufactured Devices Task Force and first appeared on the Committee's 2001 agenda as Appendix A to Item 310-1A.)

Recommendation: Post the following examples of Manufactured, Repaired, and Remanufactured Devices and Elements on the Internet where it is accessible to the weights and measures community for access, input, and updates.

Discussion: The Committee recommended that an alternate table of proposed guidelines and examples of Manufactured, Repaired, and Remanufactured Devices and Elements be posted on a web site such as ncwm.net or nist.gov/owm so that the guidelines are accessible to the weights and measures community. The Committee encouraged input from members of the weights and measures community and other interested parties on the latest version of the table and its recommendation on where to make the examples available.

The Committee reviewed the Task Force's proposed table and alternate proposals from the Gasoline Pump Manufacturers Association (GPMA), NIST Office of Weights and Measures (OWM), and the Scale Manufactures Association (SMA). The alternate proposals differed from the Task Force's proposal because the activities were regrouped into weighing or measuring device types. The activities were modified or expanded to include new activities which fall under Section III (devices no longer traceable to an NTEP Certificate of Conformance), and text was added to clarify the examples. The Committee recommended that the OWM version, which incorporates examples that are similar to those recommended by GPMA and SMA, be posted for review and input on OWM's web site at nist.gov/owm. The OWM table included questions, new activities because an example applied to both weighing and measuring types of devices, and editorial changes that were intended to clarify several guidelines. Additionally, the OWM table reassigned several activities from Section II to Section III because of the extensive nature of changes to that device. The Committee asked for the National Type Evaluation Technical Committee (NTETC) Sector members' input on the activities under their respective areas of expertise. The Committee also recommended that the Sectors should be responsible for maintenance and updates of the guidelines.

At the 2002 NCWM Annual Meeting, the Committee agreed that the revision of the original Task Force's proposal shown below represents a consensus of all parties affected by General Code paragraph G-S.1.1. Remanufactured Devices and Remanufactured Main Elements marking requirements and the table is a good start at guidelines. Due to the opposition to OWM's proposed changes, the Committee returned to the original Task Force proposal. The table shown below replaces the version that appeared in NCWM Publication 16, "Committee Reports for the 87th Annual Meeting." The Committee agreed that this alternate table is consistent with the Original Task Force's language and represents a good response to concerns about recent changes to the Task Force's original guidelines that were expressed at the 2002 Central and Northeastern Weights and Measures Associations Annual Meetings. Several jurisdictions cautioned that there may be legal loopholes with phrases such as "complete disassembly" and official duties may move in the direction of enforcing civil law rather than regulating device accuracy. The Committee believes that the guidelines should supplement NIST Handbook 44, but should not become part of the Handbook. Consequently, the Committee concluded that it is more appropriate to post the guidelines on either the NCWM or NIST web site or possibly publish them in NIST Handbook 112, "Examination Procedure Outlines for Commercial Weighing and Measuring Devices, A Manual for Weights and Measures Officials."

The following tables of guidelines developed by the Remanufactured Devices Task Force contain examples of repaired/remanufactured devices and elements. The tables shown below replace the versions that appeared in NCWM Publication 16, "Committee Reports for the 87th Annual Meetings." The tables are consistent with the original Task Force's language and reflect concerns expressed at the 2002 Central and Northeastern Weights and Measures Associations Annual Meetings over changes to the Task Force's original text. The Task Force's guidelines are shown in **bold** text. Any text the Committee proposed to add to the examples is underlined. Any text the Committee recommended deleting from the examples is shown ~~crossed out~~. Weighing and measuring activities were separated into two different activities. The Committee noted there were instances where an activity applied to both weighing and measuring devices, but the Task Force only listed the example once. Activities that apply to more than one activity now appear in both the weighing and measuring portion of each table.

Section I
Examples of Repaired Devices/Repaired Elements (no metrological change)

	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
Weighing Activity				
~~I.A. -1-W Disassembly of~~ A scale that is disassembled for the purpose of cleaning and repairing pivots and bearings this activity covers cleaning and packing bearings.	No	No	Yes	No
~~I.C. -2-W Any~~ device in which the electronic components have been changed on site using original manufacturer's factory components parts or NTEP traceable replacement parts.	No	No	Yes	No
~~I.D. –3-W Any~~ A weighing ~~or measuring~~ element that is replaced on site with original manufacturer's factory parts or NTEP traceable replacement parts. This docs not prohibit repairs by other than the original manufacturer.	No	No	Yes	No
~~I.E. -4-W Section adjustment (mechanical or electronic) on~~ A class III L scales in which a section adjustment (mechanical or electronic) is made and ~~with~~ some disassembly is required.	No	No	Yes	No
~~I.F. -5-W Adjustment of a nose iron on~~ A mechanical scales in which a nose iron is adjusted and ~~with~~ some disasscmbly is required.	No	No	Yes	No
~~I.H. -6-W~~ Replacement of Liquid Crystal Display (LCD) or non-metrological computer boards or chips.	No	No	Yes	No

Section I Examples of Repaired Devices/Repaired Elements (no metrological change)				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
~~I.J.~~ -7-W Replacement of pivots and bearings on mechanical scales. Note: Pivots and bearings would have to meet the original manufacturer's specifications for the scale to operate correctly.	No	No	Yes	No
~~I.N.~~ -8-W ~~A service agency replaces~~ Replacement of ~~2 of 8~~ some or all load cells with load cells identical (same manufacturer, make and model) to those removed.	No	No	Yes	No
~~I.P.~~ -9-W ~~Substitution~~ Replacement of some or all load cells with metrologically equivalent (n_{max} v_{min} etc.) load cells from a different manufacturer, provided the load cells are of the same basic type that have an NTEP CC and can be replaced without modification to the basic design of the load cell mounting assembly.	No	No	Yes	No
~~I.Q.~~ -10-W Replacement of all ~~analog~~ load cells of a particular technology (analog, digital, and hydraulic) in a scale system with approved and compatible digital load cells that have an NTEP CC provided the cells can be replaced without any modification to the basic design of the load cell mounting assembly.	No	No	Yes	No
Measuring Activity				
~~I.B.~~ -1-M Disassembly of a motor fuel dispenser for the purpose of replacing a meter gasket.	No	No	Yes	No
~~I.C.~~ -2-M Any device in which the electronic components have been ~~changed~~ replaced on site using original manufacturer's factory components parts or NTEP traceable replacement parts.	No	No	Yes	No
~~I.D.~~ -3-M Any ~~weighing or~~ measuring element that is replaced on site with original manufacturer's factory parts or NTEP traceable replacement. This does not prohibit repairs by other than the original manufacturer.	No	No	Yes	No
~~I.G.~~ -4-M Replacement of nozzles on gasoline dispensers.	No	No	Yes	No

Section I Examples of Repaired Devices/Repaired Elements (no metrological change)				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
~~I.H.~~ -5-M Replacement of LCD or non-metrological computer boards or chips.	No	No	Yes	No
~~I.I.~~ -6-M Adjustment of ranger gears on meters (some disassembly required). This activity applies to meters calibrated with a range of gears rather than an adjustor.	No	No	Yes	No
~~I.K.~~ -7-M A service ~~firm~~ agency replaces a meter that cannot be brought into the proper calibration with a used meter (at the service station) of the same model and the meter is recalibrated.	No	No	Yes	No
~~I.L.~~ -8-M A used equipment dealer replaces a meter that cannot be brought into the proper calibration with a used meter (in their shop) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
~~I.M.~~ -9-M A remanufacturer disassembles a dispenser to replace a meter that cannot be brought into the proper calibration with a used meter (in their plant) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
~~I.O.~~ -10-M A service agency partially disassembles a motor fuel dispenser, cleans the dispenser and replaces the meter with a meter identical (same manufacturer, make and model) to that removed.	No	No	Yes	No

Section II Examples of Remanufactured Devices/Remanufactured Elements (no metrological change)				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
Weighing Activity				
II.A. ~~-1-~~W Disassembly of a scale, checking for worn parts, cleaning the scale and replacing some or all of the ~~device's~~ scale's 8 load cells with remanufactured load cells provided the load cells are ~~(~~remanufactured by the original manufacturer or are remanufactured metrologically equivalent (n_{max}, v_{min}, etc.) load cells with an NTEP CC~~)~~ and are identical to those removed.	No	Yes – Load Cells No – Weighing Element	Yes	Yes – (Load Cells) No –~~(~~Weighing Element Original markings meet requirement)
II.~~C.~~ -2-W A service ~~firm~~ agency replaces a digital indicating element of a floor scale with the same model indicator remanufactured by a firm other than the original manufacturer of the scale. Note: The remanufacturer made no design change to the indicator.	No	Yes – Indicating Element No – Weighing Element	Yes	Yes ~~(~~Indicating Element only)
II.~~D.~~ -3-W A ~~company~~ service agency completely disassembles a counter computing scale in their shop, checks for worn parts and replaces all worn ~~elements~~ parts (without replacing the load cell(s)) with remanufactured ~~elements~~ parts (not original manufacturer but no design change), replaces other parts as needed, cleans and reassembles the scale for sale.	Yes	Yes	Yes	Yes
II.~~I.~~ -4-W A ~~weight classifier scale~~ device or element is sent back to the original equipment manufacturer. The device is disassembled, checked for wear, parts are replaced or fixed as necessary, and the device is reassembled as and made to operate like a new scale of the same type.	Yes	No	Yes	No (Original markings meet requirement)

Section II - Examples of Remanufactured Devices/Remanufactured Elements (no metrological change)				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
II.~~J~~, 5-W A ~~weight classifier scale~~ device or element is sent to a ~~scale~~ company (not the original manufacturer). The device is disassembled, checked for wear, parts are replaced with Original Equipment Manufacturer (OEM) parts or fixed as necessary, and the ~~scale~~ device or element is reassembled and made to operate like a new ~~scale~~ device or element of the same type.	Yes	No	Yes	Yes
Measuring Activity				
II.~~B~~, -1-M Complete disassembly of a motor fuel dispenser, checking for worn parts, cleaning the dispenser and replacement of all badly worn parts with parts identical (same manufacturer, make, and model) to those removed.	Yes	No	Yes	Yes
II.~~F~~, -2-M A service ~~firm~~ agency replaces a meter on site that cannot be brought into the proper calibration in a dispenser ~~(at the service station)~~ with the same model meter remanufactured by a firm other than the original manufacturer of the dispenser. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II.~~H~~, -3-M A service ~~firm~~ agency replaces a meter ~~register~~ mechanical indicating element with the same model ~~register~~ mechanical indicating element remanufactured by a firm other than the original manufacturer of the ~~register~~ mechanical indicating element. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II.~~I~~, -4-M A ~~weight classifier scale~~ device is sent back to the original equipment manufacturer. The device is disassembled, checked for wear, parts are replaced or fixed as necessary, the device is reassembled and made to operate like a new device or element of the same type.	Yes	No	Yes	No (Original markings meet requirement)
II.~~E~~, -5-M A company completely disassembles a motor fuel dispenser in their shop, checks for worn parts and replaces all worn elements with remanufactured elements (not original manufacturer but no design change), cleans and reinstalls the dispenser.	Yes	Yes	Yes	Yes

Section II - Examples of Remanufactured Devices/Remanufactured Elements (no metrological change)				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
II.~~G.~~ -6-M A dispenser remanufacturer completely disassembles a motor fuel dispenser, replaces a meter that cannot be brought into the proper calibration with the same model meter remanufactured by another firm, fixes and/or replaces all other parts as needed, reassembles the dispenser for sale as a remanufactured dispenser.	Yes	Yes	Yes	Yes
II.~~K.~~ -7-M A company brings a motor fuel dispenser in their shop, fixes any leaks, replaces any meter which cannot be calibrated with a remanufactured meter which can be calibrated (not original manufacturer but no design change). Replaces other non functioning parts with new, used, or repaired parts which function, cleans, installs new graphics, and sends the dispenser out for installation. Note: The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II.~~J.~~ -8-M A ~~weight classifier scale~~ device is sent to a ~~scale~~ company (not the original manufacturer). The device is disassembled, checked for wear, parts are replaced with OEM parts or fixed as necessary, and the ~~scale~~ device is reassembled and made to operate like a new ~~scale~~ device of the same type.	Yes	No	Yes	Yes

Section III Examples of Remanufacturing/Repairs/Modifications that Constitute a Metrological Design Change or a Violation of NTEP Policy				
	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
Weighing Activity				
III. ~~A.~~ ~~-1-~~W A company disassembles a scale, cleans the scale and checks for worn parts, then replaces hydraulic load cells with shear beam load cells. Note: Requires different mounting due to different type of cells.	Not Applicable	Not Applicable	No	Yes*
III. ~~B.~~ ~~-2-~~W A metrological change to Original Equipment Manufacturer (OEM) design of a weighing ~~or measuring piece of equipment~~ device or element.	Not Applicable	Not Applicable	No	Yes*
III. ~~C.~~ ~~-3-~~W Structural modifications to weighbridges. Scale changes that do not comply with UR. 4.3. Scale Modification	Not Applicable	Not Applicable	No	Yes*
III. ~~D.~~ ~~-4-~~W Replacing a lever system with load cells.	Not Applicable	Not Applicable	No	Yes*
III.E. -5-W Substitution of a load cell or cells in a scale when the replacement cells were not repaired or remanufactured by the original manufacturer or authorized agent of the original manufacturer. The remanufactured load cell(s) does not have an NTEP CC. (NTEP Policy, see NCWM Pub. 14)	Not Applicable	Not Applicable	No	Yes*
III ~~II.~~D. ~~-6-~~W A company completely disassembles a counter computing scale in their shop, checks for worn parts and replaces all worn ~~elements~~ parts with remanufactured ~~elements~~ parts (not the original manufacturer but no design change) and load cell without an NTEP CC, replaces other parts as needed, cleans and reassembles the scale ~~for sale~~.	~~Yes~~ Not Applicable	~~Yes~~ Not Applicable	~~Yes~~ No	Yes*

Measuring Activity				
III.B. ~~-1-~~ M A metrological change to the Original Equipment Manufacturer (OEM) design of a ~~weighing or~~ measuring ~~piece of equipment~~ device or element.	Not Applicable	Not Applicable	No	Yes*
III.~~F.~~ 2-M A dispenser remanufacturer adds temperature compensation to a dispenser, which was never approved for temperature compensation.	Not Applicable	Not Applicable	No	Yes*

*The Committee agreed that devices in Section III should be marked. The Task Force indicated that remanufactured marking requirements do not apply to Section III activities. The Committee noted that devices in Section III require the following:

- must be reevaluated
- must be marked with new manufacturer's identity
- must be marked with new NTEP CC number
- must meet paragraph G-S.1. Identification

S&T-15

The Committee agreed that it was historically important to include in the report the following NTEP Policies that are the basis for placing examples in Section III (activities that represent a metrological change or violation of current NTEP Policy).

III-1-W The 2000 edition of NCWM Publication 14 Weighing Devices Checklist for Load Cells Section A Program Description 5. Substitution of Metrologically Equivalent Load Cells in Scales states that metrologically equivalent load cells from the same or a different manufacturer may be substituted into a scale provided that the substituted load cells can be placed in the scale without any modification to the design of the load cell mounting assembly.

III-2-W The 2001 edition of NCWM Publication 14 Administrative Policy Section M. Policy on Remanufactured and Repaired Devices specifies that a device is no longer covered by an NTEP Certificate of Conformance if a company or individual makes changes to a device to the extent that the metrological characteristics are changed.

III-3-W Devices that fall under this activity are not covered by a CC unless the device complies NIST Handbook 44 paragraph UR.4.3. Scale Modification. Devices that meet UR.4.3. require approval by the weights and measures authority having jurisdiction over the device.

III-4-W The 2000 edition of NCWM Publication 14 Checklist for Digital Electronic Scales Section E. Modification of Type 1. Replacing the Lever System with Load Cells specifies that changing a scale from a lever system scale to a full electronic scale is considered a modification of type. The total replacement of any levers in a mechanical scale is a modification of type that is not covered by the original CC without additional testing.

III-5-W The 2000 edition of NCWM Publication 14 Weighing Devices Checklist for Load Cells Section A. Program Description 4. Repaired or Remanufactured Load Cells specifies that the original Certificate of Conformance (CC) no longer applies to a repaired load cell if that load cell is repaired by other than the original manufacturer or its authorized agent.

III-6-W The 2000 edition of NCWM Publication 14 Weighing Devices Checklist for Load Cells Section A. Program Description 5. Substitution of Metrologically Equivalent Load Cells in a Scale states that load cells from the same or a different manufacturer may be substituted into a scale provided that the load cells to be substituted have been evaluated separately and have a CC.

III-1-M NIST Handbook 130, Uniform National Type Evaluation Regulation Section 4. Prohibited Acts and Exemptions (9) Repaired Device and (10) Remanufactured Device and the 2001 edition of NCWM Publication 14 Administrative Policy Section M and the Checklist for Liquid-Measuring Devices Section K. Policy on Remanufactured and Repaired Devices specify that if a company or individual repairs or remanufactures a device, they are obligated to repair or remanufacture the device consistent with the manufacturer's original design. Otherwise, that specific device is no longer traceable to the NTEP CC.

III-2-M Handbook 130, Uniform National Type Evaluation Regulation Section 4. Prohibited Acts and Exemptions (9) Repaired Device and (10) Remanufactured Device and the 2001 edition of Publication 14 Administrative Policy Section J.2 Re-evaluation to Expand an Existing Certificate of Conformance. A type with a valid CC may be re-evaluated in order to encompass additional features such as expanding the kinds of commodities that may be measured. See also Publication 14 Administrative Policy Section M. Policy on Remanufactured and Repaired Devices, and Section K. Evaluation of New Technology.

Background: The Committee recognized that this issue is complex and that there will be instances where field officials will need guidance to determine when a device is remanufactured. The Committee agreed that are several examples in the table provided by the Remanufactured Devices Task Force required further review and clarification. For instance, one example is not clear was as to whether there was some significance to the *number* of load cells removed and replaced with identical cells. The Committee asked would the number of load cells substituted be the factor used to decide that a device is metrologically changed or is only considered a remanufactured device. The Committee carried over the Table of Guidelines as an item on the 2002 January NCWM Interim Agenda. The Committee agreed to consider a recommendation to add the table as an Appendix to a later edition of Handbook 44 when 310-1A and 310-1B were adopted by the NCWM.

At the 2001 Western Weights and Measures Association (WWMA) Technical Conference, members heard comments that the SMA planned to comment on specific examples in Section III. WWMA members noted that the Task Force did not require markings for Section III devices that were modified to a point they were no longer covered by a Certificate of Conformance. This appears to be in conflict with the recently adopted remanufactured marking requirements. The Task Force indicated that *remanufacturer's* markings were not required for these Section III devices since they are no longer covered by a CC and considered a modification to the original type. The WWMA was concerned that Section III devices still require marking under Handbook 44 although they are no longer covered by a CC.

The WWMA recommended this item remain informational to allow sufficient time for SMA and other interested parties to provide recommendations to the tables. The WWMA suggested that Section III be amended so that any device that is modified to the extent that it is no longer covered by a CC shall be marked as manufactured by the party that did the modification. Additionally, a column could be added to the table that states that a new CC is required for these devices.

During the April 2002 Central Weights and Measures (CWMA) Annual Meeting, members acknowledged the Committee's intent to post the examples for a review by the weights and measures community. CWMA members opposed changes to the Task Force's original proposal since the table represented a consensus. CWMA members agreed the NTETC Sectors should maintain the table after they are adopted by the NCWM.

The Southern Weights and Measures (SWMA) received comments that SMA and GPMA have planned to comment on specific items. The SWMA recommended this item remain informational to allow sufficient time for SMA, GPMA, and other interested parties to provide recommendations to the tables.

During its May 2002 Annual Meeting, Northeastern Weights and Measures Association (NEWMA) members recommended the NCWM S&T Committee return to the Task Force's original examples published in NCWM Publication 15. NEWMA agreed with the separation of weighing and measuring activities and all non-controversial editorial changes to the text. NEWMA believed that the item should move forward in July 2002 for vote to determine where the table will appear. NEWMA believed the tables should be posted on the NCWM and NIST web sites. NEWMA was unable to reach a consensus on whether the NCWM S&T Committee or the NTETC Weighing and Measuring Sectors should be responsible for updates to the guidelines.

For additional background information refer to the 1997 through 2001 S&T Final Reports.

310-2B VC Appendix D; Definition of Element

(This item was adopted.)

(During the 2002 Interim Meeting, Item 310-2 was separated into two parts, 310-2A and 310-2B, to facilitate review of the issues.)

Source: NCWM S&T Committee

Recommendation: Add the following new definition to NIST Handbook 44.

element. A portion of a weighing or measuring device or system which performs a specific function and can be separated, evaluated separately, and is subject to specified full or partial error limits.

Discussion: After its review of the 2001 Remanufactured Device Task Force guidelines, the Committee recommended adding a new definition of "element" to NIST Handbook 44 to clarify the use of the term when used to describe components of weighing and measuring devices. The Task Force placed examples of elements and parts that are either remanufactured, repaired, or modified throughout the guidelines. The Committee was not certain if it was important to make a distinction between work performed on an element versus work performed on a part. The Committee agreed with an OWM recommendation to include a definition for element in Handbook 44 that harmonized with OIML requirements. The proposed definition of "element" was derived from the current OIML R 76 definition of "module." The Committee intended for an element to be a separable unit that can be distinguished from a part because it not only has a specific function, but also can be evaluated based on a set of criteria and performance requirements. The Committee recommended the proposed definition for a vote. However, the Committee asked for input from weight and measures officials, device manufacturers and remanufacturers, the service industry, and NTETC Sector on the proposed definition prior to the 2002 NCWM Annual Meeting because of past questions about the clarity of the guidelines. The Committee heard no additional comments on this item.

320 Scales

320-1A V S.6.1. Nominal Capacity, S.6.5. Railway Track Scales, Table S.6.3.a. Marking Requirements, and Table S.6.3.b. Notes

(This item was adopted.)

(Item 320-1 was separated into two parts, 320-1A and 320-1B, during the 2002 Interim Meeting to facilitate review of the issues.)

Source: Carryover Item 320-4. *(This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the Committee's Agenda in 2001.)*

Recommendation: Modify paragraph S.6.1., Tables S.6.3.a., and Table S.6.3.b. as follows:

S.6.1. Nominal Capacity; Vehicle, ***and*** ***Axle-Load,*** ~~***, and Livestock***~~ ***Scales. – For all vehicle*** ***and axle-load,*** ~~***, and livestock***~~ ***scales, the marked nominal capacity shall not exceed the concentrated load capacity (CLC) times the quantity of the number of sections in the scale minus 0.5.***

As a formula, this is stated as:
nominal capacity ≤ CLC x (N – 0.5)
where N = the number of sections in the scale.
(See N.1.3.4. and T.N.3.1.)
[Nonretroactive as of January 1, 1989.]

[Note: When the device is used in a combination railway track and vehicle weighing application, the above formula shall apply only to the vehicle scale application.]

Add new paragraph S.6.5. as follows:

S.6.5. Livestock Scales. – A livestock scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to the identification or nomenclature plate that is attached to the indicating element of the scale. ***The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity*****.**

*[*Nonretroactive as of January 1, 2003]*

Modify notes 9, 12, and 14 in Table S.6.3.b. as follows:

9. For vehicle and axle-load ~~and livestock~~ scales only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]

12. Required on the indicating element *and the load-receiving element* of vehicle and axle-load ~~and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC."* [*Nonretroactive as of January 1, 1989.]*

14. Required on ~~the indicating element of~~ livestock scales and railway track scales ~~only~~. When marked on vehicle and axle-load ~~and livestock~~ scales manufactured before January 1, 1989, it may be used as the CLC. For livestock scales manufactured between January 1, 1989 and January 1, 2003, required markings may be either CLC or section capacity. [*Nonretroactive as of January 1, 2003].*

Add a reference to new note 22 to Table S.6.3.a. as follows:

Table S.6.3.a.
Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in same housing or covered on the same CC[1]	Indicating element not permanently attached to weighing and load-receiving element or covered by a separate CC	Weighing and load-receiving element not permanently attached to indicating element or covered by a separate CC	Load cell with CC (11)	Other equipment or device (10)
. . .					. . .
Concentrated Load Capacity CLC (12) (20) *(22)*		x	x (9)		
. . .					. . .
Section Capacity (14) (20) *(22)*		x	x		

For applicable notes see Table S.6.3.b.

Add the following new Note 22. to Table S.6.3.b.

22. Combination vehicle/livestock scales must be marked with both the CLC for vehicle weighing and the section capacity for livestock weighing. All other requirements relative to these markings will apply. [Nonretroactive January 1, 2003.]

Discussion: The Committee received numerous proposals for marking requirements and test procedures under Item 320-1. The Committee heard that there were too many separate issues in Item 320-1. The Committee agreed that all issues were relevant to livestock scales but addressed separate areas. Consequently, the Committee agreed to split Item 320-1 into two separate voting items, 320-1A and 320-1B to facilitate review of the issues. Item 320-1A was originally a proposal to modify paragraphs S.6.1. and S.6.4. and Tables S.6.3.a. and S.6.3.b. to address marking requirements for livestock scales. Item 320-1B began as a proposal to modify paragraphs N.1.3.4. and N.1.3.8. and add new paragraphs N.1.3.4.1. and N.1.3.4.2 to the Scales Code to address the test pattern and loading of livestock scales during test procedures.

At the 2002 NCWM Interim Meeting, a member of the railroad industry recommended an alternate new paragraph S.6.1. which derives the nominal capacity of vehicle scales on the current CLC formula in Handbook 44. The proposed formula limited railway track scales nominal capacity on a section capacity formula, and required that the nominal capacity of livestock scales does not exceed twice the section capacity. The Committee was reminded that the proposal started as a requirement for capacity markings for livestock scales. The Committee agreed to separate the livestock scale capacity marking requirements from the test notes for livestock scales test procedures as shown in the Weighing Sector's recommendation above and Item 320-1B.

At the 2002 NCWM Annual Meeting, the Committee further modified the proposal to clarify that the enforcement dates differ for livestock and railway track scales. Consequently, the Committee developed new marking requirement, paragraph S.6.5. as shown in the recommendation above, to address the location of capacity markings and the acceptable maximum nominal capacity for livestock scales. The Committee believes that the proposed changes to notes 12, 14, and 22 clarify the specific marking requirement and corresponding enforcement dates for those markings. The Committee would like to see all devices immediately comply; however, it realizes that is not practical. The Committee notes that the current language applies until January 1, 2003. Therefore, devices manufactured before 2003 or that are either new or used and placed into commercial service before 2003 comply if marked with CLC. The Committee notes that devices in service prior to 2003 that comply with the latest requirement by having the section capacity markings also meet the intent of the requirement.

Background: The Weighing Sector recognized that the typical maximum test load pattern for a concentrated test load on a vehicle scale and a livestock scale are not the same. Animals do not follow any prescribed pattern when they are loaded on the scale platform. The Sector considered changes to several paragraphs and tables in the Scales Code and the definition of CLC to ensure that the capacity and markings requirements were appropriate for livestock scale applications. During its review the Sector also considered changes which would relate livestock scale capacity to United States Department of Agriculture guidelines for maximum loading. Changes were made to delete any reference to livestock scales from requirements for CLC ratings because livestock applications would now be addressed under the proposed section capacity marking requirements.

Since January 2001, the Committee has worked with Weighing Sector proposals to address the maximum loading pattern and marking requirements for livestock scales. The proposal was modified (1) for consistency with current NIST Handbook 44 rounding practices and code references to concentrated load capacity (CLC), (2) to create separate livestock scale requirements from vehicle scale test patterns, and (3) to include shift test patterns.

During the 2001 NCWM Annual Meeting, the Committee heard from the Weighing Sector Technical Advisor and private and public Sector members that the proposal needed further modification to separate livestock scale requirements from other applications. Therefore, the Committee gave the item information status and referred the item back to the Weighing Sector for additional development.

At its August 2001, the Western Weights and Measures Association (WWMA) Technical Conference, the WWMA recommended that this item remain informational pending recommendations from the Weighing Sector.

Discussions at the 2001 Central Weights and Measures Association Interim Meeting focused on the following issues: (1) not limiting the test pattern, (2) weight carts that may not fit the footprint of the proposed test pattern, (3) keeping the vehicle scale and livestock scale test patterns separate, and (4) the need to consider safety when stacked weights are required to stay within a footprint.

The SWMA received no comments at its October 2001 Annual Meeting and recommended that this item has move forward as a voting item.

NEWMA at its October 2001 Interim Meeting recommended the item remain informational until the Weighing Sector meeting results are available.

During its October 2001 Meeting, the Weighing Sector modified the proposal to ensure consistency with other marking requirements in Section 2.20. Since the marked nominal capacity for livestock scales is no longer based on the CLC rating, the Weighing Sector modified the proposal by removing all references to "livestock scale" from paragraph S.6.1. The Weighing Sector also modified proposed paragraph S.6.4. to require maximum capacity markings for each section on livestock scales and designated the shift test patterns in a clockwise pattern.

For additional background information refer to the 2001 S&T final report.

320-1B V N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales With More Than Two Sections, N.1.3.4.1. Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales, N.1.3.4.2. Prescribed Test Pattern and Test Loads for Livestock Scales and Combination Vehicle/Livestock ScalesWith More Than Two Sections and N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers, and Appendix D; Definition for Concentrated Load Capacity (CLC)

(This item did not pass or fail; therefore it returns to the Committee.)

(Item 320-1 was separated into two parts, 320-1A and 320-1B, during the 2002 Interim Meeting to facilitate review of the issues.)

Source: Carryover Item 320-4. *(This item originated from the National Type Evaluation Technical Committee (NTETC) Weighing Sector and first appeared on the Committee's Agenda in 2001.)*

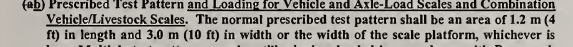
Recommendation: Modify paragraph N.1.3.4. and add new paragraph N.1.3.4.1. as follows:

N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales ~~With More Than Two Sections~~

N.1.3.4.1. Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales –

(a) Minimum Shift Test. At least one shift test shall be conducted with a minimum test load of 12.5% of scale capacity and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. ~~(Two section livestock scales shall be tested consistent with N.1.3.8.)~~ (Combination Vehicle/Livestock scales shall also be tested consistent with N.1.3.4.2.)

~~(a)~~(b) Prescribed Test Pattern and Loading for Vehicle and Axle-Load Scales and Combination Vehicle/Livestock Scales. The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and 3.0 m (10 ft) in width or the width of the scale platform, whichever is less. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b) (c), (d), or (e) as applicable.



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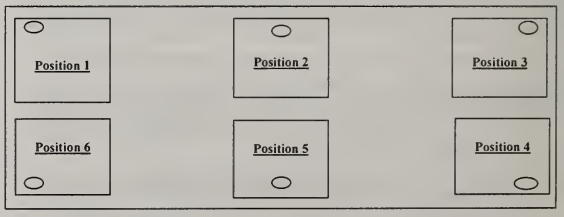
(bc) ~~Maximum~~ Loading Precautions *for Vehicle, Axle-Load Scale, and Combination Vehicle/Livestock Scales*. When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the concentrated load capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) *x 3.0 m (10 ft) or* the width of the scale *platform whichever is less*; for test patterns less than 1.2 m (4 ft) in length the maximum loading shall meet the formula: [(wheel base of test cart or length of test load divided by 48 in) x 0.9 x CLC]. The maximum test load applied to each test pattern shall not exceed the concentrated load capacity of the scale. When the test pattern exceeds 1.2 m (4 ft), the maximum test load applied shall not exceed the concentrated load capacity times the largest "r" factor in Table UR.3.2.1. for the length of the area covered by the test load. For weighing elements installed prior to January 1, 1989, the rated section capacity may be substituted for concentrated load capacity to determine maximum loading. An example of a possible test pattern is shown ~~below~~ above.

(cd) Multiple Pattern Loading. To test the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use.

(de) Other Designs. Special design scales and those that are wider than 3.7 m (12 ft) shall be tested in a manner consistent with the method of use but following the principles described above.

Add a new paragraph N.1.3.4.2 as follows:

N.1.3.4.2. Prescribed Test Pattern and Test Loads for Livestock Scales and Combination Vehicle/Livestock Scales with More Than Two Sections. - Test load is one-quarter nominal capacity not to exceed one-half of the rated section capacity, centered as nearly as possible, successively over each main load support as shown in the diagram below. For livestock scales manufactured between January 1, 1989 and January 1, 2003, the required loading shall be no greater than one-half CLC. (Two-section livestock scales shall be tested consistent with N.1.3.8.)



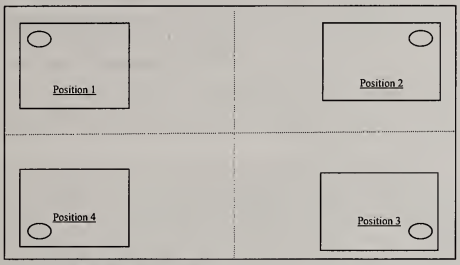
= Load Bearing Point

Modify paragraph N.1.3.8. as follows:

N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. – A shift test shall be conducted using the following prescribed test loads and test patterns. ~~with a half-capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element, or~~

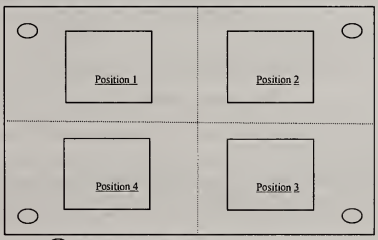
~~with a quarter-capacity test load centered, as nearly as possible, successively over each main load support.~~ For livestock scales the shift test load shall not exceed one-half the rated section capacity.

(a) A shift test load shall be conducted using a one-quarter nominal capacity test load centered as nearly as possible, successively over each main load support as shown in the diagram below, or



= Load Bearing Point

(b) A shift test load shall be conducted using a one-half nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the diagram below.



= Load Bearing Point

Modify the definition of Concentrated Load Capacity in Appendix D as follows:

concentrated load capacity (CLC). A capacity rating of a vehicle, ~~or axle-load or livestock~~ scale, specified by the manufacturer, defining the maximum load ~~concentration~~ applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet for which the weighbridge is designed. ~~In the case of vehicle and axle-load scales, it is the maximum axle-load concentration (for a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet) for which the weighbridge is designed as specified by the manufacturer.~~ The concentrated load capacity rating is for both test and use. **[2.20]**

Discussion: The Committee agreed to split Item 320-1 into two parts, 320-1A and 320-1B, to facilitate the review of the marking requirements and test procedures for livestock scales. The Committee recognized that the proposal in the recommendation above now documents the shift test and loading patterns already followed for livestock and vehicle scales, although not specified in NIST Handbook 44. The Committee agreed that the reference to livestock scales should be removed from the current definition of CLC because the rating was developed based on a typical tandem axle vehicle's footprint and intended to apply to vehicle scale applications. The Committee modified the Sector's original proposal by removing loading precautions from proposed new paragraph N.1.3.4.2. because they were too restrictive for tests conducted with weight carts. The Committee also removed the reference for testing two-section livestock scales consistent with paragraph N.1.3.8. from paragraph N.1.3.4.1.(a) that lists the minimum shift test requirements because N.1.3.4.1.(a) no longer applies to livestock scales.

The Committee considered comments and several alternate proposals for testing livestock, vehicle, and railway track scales. Fairbanks Scales opposed the use of the term "combination livestock/vehicle scales." Fairbanks indicated that it is not appropriate to limit a device to specific applications, as long as the scale is designed to meet the most stringent weighing application of the two and to meet minimum load requirements. Fairbanks recommended that current Handbook 44 paragraph N.1.3.8. already addresses the shift test procedure for two-section livestock scales. Fairbanks proposed an alternate new paragraph which would restrict the maximum loading of the scale to no greater than half the section capacity, when conducting a shift test on a livestock scale with more than two sections. The Committee acknowledged that current NTEP policy may require the manufacturer to incur additional costs for an evaluation to expand a vehicle scale application to cover livestock weighing operations. The Committee agreed that it is appropriate and consistent with other loading requirements to include a precaution not to exceed one-half the section capacity when performing a shift test on a livestock scale. The Committee also reviewed a proposal for conducting an increasing-load test where the test load is evenly distributed on the deck; however, the Committee agreed that more data is needed to compare the results of current increasing-load tests procedures with a proposed procedure where loads are evenly distributed. The Committee agreed that the proposal shown in the recommendation above provides adequate marking requirements, test patterns and loading guidelines for livestock scales.

For additional background on this item see Item 320-1A.

320-2 W UR.1.X. Remote Display; Class III L Vehicle Scales

(This item was withdrawn.)

Source: Carryover Item 320-6. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's Agenda in 2001.)

Discussion: The Committee agreed that current NIST Handbook 44 paragraphs G-UR.2.2. Installation of Indicating or Recording Element and G-UR.3.3. Position of Equipment adequately address any installation or weighing operation where the buyer's or seller's view of the indicating element is obstructed or the indicating element may not be positioned for a reasonably clear view.

The Committee considered the current Maryland Weights and Measures policy, a Western Weights and Measures Association (WWMA) proposal, and work by the Scale Manufacturers Association (SMA) Technical Committee which address visibility of remote display indications and further define direct sale operations. The Committee appreciates the work by SMA to develop language that addresses concerns about remote display indications. SMA recommended an alternate definition of direct sale that recognizes weighing operations where the driver represents both the seller and buyer and receives a net weight. The Committee agreed that each alternate proposal met the specific needs of the submitter, but

might not fully address all parties that participate in direct sale operations. The Committee also agreed that the proposals did not clarify size and location requirements of displays in all installations and possible weighing applications. Therefore, the Committee agreed to withdraw this item.

Background: The Committee considered the following SWMA proposals for a new paragraph UR.1.X. and modifications to the definition of "direct sale" to address the suitability of the design and location of remote displays in Class III L vehicle scale applications:

> UR.1.X. Remote Display, Class III L Vehicle Scales. – A vehicle scale that is equipped with a digital indicating element and used in direct sales shall have a remote display with digits at least 10 cm (4 in) in height. The display shall be so positioned that its zero indication and indications during the weighing operation can be viewed from the driver's position in the vehicle. The remote display must adequately identify the unit of measure.
>
> direct sale. A sale in which both parties or their agents are present when the quantity is being determined. An unattended automated or customer operated weighing or measuring system is considered to represent the device/business owner in transactions involving an unattended device. [1.10]

The proposed language was intended to require displayed values in vehicle scale applications to clearly indicate that they represent net, gross, or zero indications. Scoreboard displays do not always identify all values. The submitter asked for public and private sector input to ensure that the proposed language clarifies which values represents net, gross, or zero indications. The requirement was not intended to apply to weighing operations seldom used in direct sales applications.

The Committee heard concerns about the effects of size requirements on existing equipment, the effect of the proposed changes on weighmaster regulations, and the lack of similar provisions for mechanical indicating elements.

Initially, SMA opposed design specifications to Handbook 44 and found the modifications to the definition of "direct sale" ambiguous. Later the SMA agreed to provide alternate language based on Maryland's policy related to remote displays. The Committee encouraged Florida as the submitter of the original proposal to work with SMA to develop language that is acceptable to all parties.

At its August 2001 Technical Conference, the WWMA heard recommendations to remove the Class III L designation from the proposal so that the requirement would also apply to unmarked vehicle scales. The WWMA noted there are situations where it cannot be determined if an "agent" is authorized by the buyer to represent the buyer's interests. For example, a fast food restaurant employee may or may not serve the interests of the owner when a delivery of liquid carbon dioxide is being made. A truck driver hired to transport a shipment may or may not be acting on behalf of the buyer. It was also noted that many transactions involve more than two parties. A weight certificate from a rock quarry may be the basis of payment for the hauler, assessments for removal of material, and for sale of the rock.

The WWMA recommended that this item remain informational until the SMA proposes alternate language and that consideration be given to removing "Class III L" from the proposed language. The WWMA also submitted the following alternate language for the definition of direct sale.

> direct sale. A sale where ~~both~~ all interested parties are present when the quantity is being determined. An agent may be designated by, and to act on behalf of, one or more of the interested parties. An unattended automatic or customer operated weighing or measuring system is considered to represent the device/business owner in transactions involving an unattended device. [1.10]

Discussion at 2001 Central Weights and Measures Association (CWMA) Interim Meeting focused on (1) making the item a non-retroactive requirement, (2) remote displays for vehicle traffic traveling in both directions, and (3) the rationale for making the proposal a requirement that applies to scales with digital indications, but does not apply to scales with dial or beam indicating elements.

The SWMA recommended this item remain an information item pending additional input from the jurisdiction that originally submitted the proposal.

During the 2001 Northeastern Weights and Measures Association (NEWMA) Interim Meeting members questioned whether this would be a retroactive requirement. The majority of members agreed that this would be an item that would, in principle, be supported when fully developed. NEWMA recommended that all regional associations review any language that addresses unmarked devices and the size of digits on remote displays.

All regional associations were interested in any alternate language from the SMA.

For additional background information refer to the 2001 S&T Final Report.

320-3 I UR.1.6. Average Net Load; Class III Scales

Source: Central Weights and Measures Association (CWMA)

Recommendation: Add new paragraph UR.1.6. Average Net Load – Class III Scales and Table as follows:

UR.1.6. Average Net Load – Class III Scales. – To be suitable for its application, a class III scale shall have a division such that the requirements of the following table are satisfied for the minimum and average loads weighed on the scale.

Range of Scale Capacities	*Average Net Load **
Capacities up to and including 1000 kg (2500 lb)	*Average net load ≥ 100d*
Capacities greater than 1000 kg (2500 lb)	*Average net load ≥ 500d*

[Nonretroactive as of January 1, 2003]

**** See Table 8 for recommended minimum load.***

Discussion: The Committee acknowledged that device suitability for particular applications is a recurrent issue on the S&T Agenda and generates many questions in the weights and measures community. The Committee discussed factors such as the size of the purchase, the size of the scale division, and the commodity price and how these factors effect the magnitude of scale error. The determination of the average net load is assessed by weights and measures officials, which occurs after purchase and installation of the device. At that point, business owners may already have invested in equipment that is not suitable for an application.

Industry noted concern about inconsistencies in applying a mandatory minimum load requirement. Sales of the same commodity within the same establishment might take place on different scales with different average net loads due to different sizes of scale divisions. For example, a customer might purchase coffee beans weighed on the store coffee shop scale where the net load is suitable because of a small division size, or decide instead to make the same purchase at the point-of-sale scale where a larger division size requires a larger average net load. Industry also expressed concern about environmental factors that affect devices with high resolution. Several Committee members noted that many regions did not have the opportunity to review the proposal. Consequently, the Committee gave this item information status to allow additional time for input from weights and measures officials and industry and to review current international practices for determining device suitability.

The Committee believes that the proposal requires some modification to better define how to determine when a device is suitable for use to weigh a particular commodity. The Committee has concerns about the burden that the determination of an average net load places on the weights and measures field official. The Committee plans to review Measurement Canada's "Weights and Measures Regulation Installation and Use 68." The Canadian Regulation includes corresponding tables that establish the limits of error for commodities based on the weight of the commodity compared to the minimum increment of the scale. Measurement Canada indicated that the recommendation is used to assist vendors in their

selection of a suitable weighing device for a particular application. Canada noted that "Installation and Use 68" is very successful in ensuring that a device is suitable for the service in which it is used.

Background: In 1994, the NCWM adopted a guideline for average net load requirements when determining suitability of Class III scales. The NCWM decided that the average net load could be determined based on sales receipts or by observing transactions. The number or length of time necessary to gather transaction information was left to the weights and measures official's discretion. However, since the item was only adopted as a guideline, it was not published in NIST Handbook 44. This guideline has been actively implemented in Nebraska and has been an effective enforcement tool for determining suitability of weighing equipment in applications such as coffee shops selling coffee from bulk and aluminum can recyclers weighing cans in sacks for purchase from area residents. By requiring a higher degree of precision in such scales, the monetary error that is associated with scale error is minimized.

This proposal is intended to incorporate the guideline into a Handbook 44 requirement. The CWMA notes that service companies, device distributors, and many weights and measures officials are unaware of the guideline because the guideline is only found in the 1994 S&T Final Report. By placing the guideline in the Handbook, all parties will know in advance how to determine the suitability of Class III scales for a particular application.

At the September 2001 CWMA Interim Meeting, some jurisdictions stated that they consider this requirement unenforceable since it does not appear in Handbook 44. The proposed language will provide for more effective enforcement of suitability requirements for Class III scales.

CWMA members also expressed concern about the possible additional cost of devices that weigh in 0.001-lb or 0.005-lb divisions. The CWMA questioned whether or not checkout systems with a 0.01-division size (1.00 lb minimum average net load) would meet the proposed requirement. CWMA noted that in most cases this would not affect grocery stores because their average net load would be higher given the many and varied items they weigh. CWMA stated that Class F weights would not be appropriate for testing scales with 0.001-lb or 0.005-lb divisions, therefore, the additional cost of appropriate test weights must be considered. CWMA intends for the proposal to be a nonretroactive requirement.

The CWMA recommended this item move forward for a vote.

320-4 I S.1.12. Manual Gross Weight Entries and UR.3.9. Use of Manual Gross Weight Entries

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph S.1.12. as follows:

S.1.12. Manual ~~Gross~~ Weight Entries. – A device shall accept an entry of a manual ~~gross~~ weight value only when the scale is at gross load zero and the scale gross or net weight indication is at zero ~~in the gross weights display mode~~. Recorded manual weight entries:

(a) 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." or "Manual Tare," or MAN Tare." The use of a symbol to identity 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.

(b) on recorded representations containing gross, tare, and net weight values at least two of the values shall be identified.

[Nonretroactive as of January 1, ~~1993~~ 200X.]

During the August 2001 WWMA Technical Conference, the WWMA recommended the following proposal to address concerns about the use of manual weight entries as a user requirement:

UR.3.9. Use of Manual Gross Weight Entries. – Manual gross weight entries are permitted for use in the following applications only: (1) when credit is given for a weighed item on point-of-sale systems interfaced with scales, or when an item is pre-weighed and marked with the correct net weight; (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 and vehicle scale systems generate weight tickets to correct erroneous tickets.

During the October 2001 SWMA Annual Meeting, the SWMA recommended the following alternate proposal, a user requirement to clarify that manual weight entries are intended for use in specific applications:

UR.3.9. Use of Manual Gross Weight Entries. – Manual gross weight entries are permitted for use in the following applications only: (1) point-of-sale systems interfaced with scales when credit is being given for a weighed item, or when an item is pre-weighed and marked with the correct net weight and, if applicable, the unit price and total price; (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 and vehicle scale systems that generate weight tickets to correct erroneous tickets.

Discussion: The Committee recommended a more complete assessment of the field use of manual weight entries since not all involve gross weights. Manual weights are permissible in some situations as long as they are identified and recorded. The Committee reviewed several proposals to modify paragraph UR.3.9. Use of Manual Gross Weight Entries that were developed to address specific manual weight entry applications encountered in weighing operations. The Committee agreed that the use of manual weight entries occurs with both gross and net weight packages, therefore, the proposals to modify paragraph UR.3.9. as worded did not address all instances where manual weight entries occur. In the past, there was concern about allowing manual weight entries at vehicle scale applications; however, the 2000 NCWM voted to modify paragraph UR.3.9. to permit the practice in vehicle scale applications to correct erroneous tickets. The Committee agreed to consider an alternate proposal to modify paragraph S.1.12. as shown in the recommendation above that more adequately addresses all of the various manual weight entries that occur in weighing operations.

The Committee recommended that changes were also necessary to paragraph UR.3.9. to ensure that the requirement is consistent with the proposed modifications to paragraph S.1.12. The Committee agreed that both the WWMA and SWMA proposals to modify paragraph UR.3.9 should be considered as possible language for corresponding changes to the related user requirement (UR.3.9.). Consequently, the item title was changed to reflect the Committee's position and the proposal in this report includes recommendations as shown above to modify paragraph S.1.12. and the WMMA and SWMA proposals for changes to paragraph UR.3.9.

Background: The WWMA developed a proposal to modify paragraph UR.3.9 to address a large national retail grocery company's concerns about the use of manual weight entries. The company was informed by the scale company that installed their new point-of-sale (POS) systems that manual weight entries were illegal, except to issue a credit to customers. The retailer was surprised to learn of this requirement and believed it would prevent them from using a business practice they routinely followed for years.

Many times retailers need to manually enter weights into a POS system in order to compute the price and complete a transaction for a customer. This happens most often when an item exceeds the capacity of the typical POS scale system (e.g., watermelons, turkeys, roasts, etc.) or when the scanner system cannot read the Universal Product Code, but the weight and price per pound are readable. The WWMA agreed this is a reasonable business practice.

Businesses periodically need to manually enter weight and price information and use the POS system as a calculator. Often, items are weighed on other commercial scales within the store and marked with that item's weight. The WWMA believes this is a common practice and one that should be recognized as a legal use of a POS system. The WWMA also noted that paragraph S.1.12. Manual Gross Weight Entries specifies that a device shall accept an entry of a manual gross weight value only when the scale is at gross load zero and the scale indication is at zero in the gross weight display mode.

Paragraph S.1.12. requires that manual weight entries be identified on the printed receipt. Restricting manual weight entries to instances where the load-receiving element is empty and requiring identification of manual weight entries on receipts provides adequate information to the customer that a manual weight entry was performed, thereby providing adequate protection against fraudulent practices.

The WWMA heard no comments opposing its proposal to modify paragraph UR.3.9. and, therefore, recommended the item to the NCWM S&T Committee for a vote.

After reviewing the WWMA proposal, the SWMA suggested that the proposal remain an information item. The SWMA also suggested that an alternate proposal be considered along with the WWMA proposal as shown in the recommendation above.

320-5 I Appendix D; Definition of Substitution Test and Substitution Test Load

(This item was changed from a voting item to an information item at the 2002 NCWM Annual Meeting.)

Source: Carryover Item 320-8 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda as Item 320-6.)

Recommendation: The Committee recommends that the following definitions for "substitution test" and "substitution test load" with some modification be added to NIST Handbook 44:

substitution test. A scale testing process used to quantify the weight of unknown material or objects for use as a known test load. In the process, the unknown material or objects are substituted for known test weights, or a combination of known test weights and previously quantified material or objects, using the scale under test as a comparator. Additional test weights or other known test loads may be added to this known test load to evaluate higher weight ranges on the scale. Tolerances are applied to the scale based on the entire known test load.

substitution test load. The sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods.

Discussion: Since 2000, the Committee reviewed several different proposals to define "substitution test" and other related terms.

At the 2002 NCWM Interim Meeting, the Committee reviewed an alternate proposal from the NIST Office of Weights and Measures (OWM). OWM noted that the substitution test procedures were developed in 1965 prior to the widespread use of electronic scales. Consequently, OWM proposed separate definitions of substitution tests for mechanical and electronic scales that were intended to recognize the differences in scale technology and performance. For electronic scales, the OWM proposal permitted substitution of materials to within plus or minus a given percent of the known test weights; however, for mechanical scales materials were substituted to the exact amount of known test weight. OWM also recommended a modified version of the current definition of strain-load test with all procedural text removed from the language.

The Committee also reviewed an alternate definition of substitution test from Ross Andersen, New York Bureau of Weights and Measures, which is shown in the recommendation above. The Committee believes that Mr. Andersen's alternate proposed definitions adequately describe the test load and test procedure and relevant tolerances without being too restrictive or documenting the details of field procedures. The Committee also agreed with New York's modification of the proposed definition of test load to clarify that the term applies to the substitution process. The Committee wishes to thank Ross Andersen for his timely work to provide the Committee with the results of New York's study on the Uncertainties in Vehicle Scale Testing. The New York definition leaves the choice of the appropriate test procedure to the field official's discretion with the expectation that the uncertainty of the process does not exceed NIST Handbook 44 Fundamental Consideration Testing Apparatus 3.2. Tolerances for Standards.

At the 2002 NCWM Annual Meeting, the Committee agreed that the proposed definition of "substitution test" shown above has merit. The Committee acknowledged that substitution to the exact indication is not always practical; however, some factors should be developed to set acceptable limits for the variation between the scale indications for known test weight and the substitution load. Prior to the voting session, NCWM members from the CWMA and SWMA were not able to reach a consensus on the definition and discussed shortening the definition to "a scale testing process used to quantify the weight of unknown material or objects for use as a known test load" to eliminate any procedural text. Consequently, the Committee changed the item from voting to information status. The Committee believes this will give the regional associations sufficient time to work through any final issues they may have with the latest definition.

Background: In September 1999, the Committee began work to define "substitution test" and to clarify that the amount of substituted weight is adjusted to the same amount of error as the known weight. Discussions also focused on the lack of a definition for the term "test load" described in Footnote 2 of Table 4 Minimum Test Weights and Test Loads that makes reference to a substitution test.

During the July 2000 NCWM Annual Meeting, the Metrology Subcommittee reported to the Committee its concern about the total additive uncertainties in the test process and their effect on the Handbook 44 Fundamental Consideration requirement for standard errors.

Several alternate definitions of "substitution test" were explored. Some opposition was expressed over the idea of bringing the substituted material load exactly to the known test weight. Concerns were also expressed that substituting materials in amounts other than the known test weights changes the test to a strain load test.

Other options were explored to develop definitions for terms such as "build-up test," "substitution test," and "strain load test" which appear in the Examination Procedure Outlines. Concerns also surfaced about requirements to follow rigid procedures once definitions appear in NIST Handbook 44.

During the January 2001 NCWM Interim Meeting, the Committee agreed with comments from industry and weights and measures officials that the following proposed definition for "substitution test," first developed by the WWMA, needed further work before it could be added to NIST Handbook 44. The Committee believed it was more appropriate to develop procedures for testing rather than including them in the definition. The Committee acknowledged that substitution test procedures for a field test vary, for example, from the controlled conditions of an NTEP test, where it is necessary for laboratories to verify more than a scale's linear performance. The Committee reiterated its July 2000 recommendation that test notes be included in Handbook 44 to address substitution tests on vehicle, livestock, railway track scales, and hopper scales, and on other applications such as automatic bulk weighing devices.

> substitution test. The test of a scale in which material, product, or other objects are substituted in amounts equal to the known test weights on the load-receiving element of the scale for known test weights, and then the known test weights are placed on the load-receiving element again. This process shall not be repeated more than three times. It permits the scale to be tested to a load greater than the amount of known test weights available. The tolerances for the substitution test are the tolerances for the entire test load developed using the substitution test procedure.
>
> test load. The sum of the combination of field test standard test weights and any other applied load used in the conduct of a test using substitution test methods.

At the January 2001 NCWM Interim Meeting, Mr. Ross Andersen, New York Bureau Weights and Measures, provided an update on a study he was conducting on the uncertainties in vehicle scale testing procedures. Mr. Andersen reported that environmental factors contribute more than other factors to the uncertainties in the process. Mr. Andersen recommended that the definition not include test methods. Mr. Andersen noted that scales which are nonlinear fail to comply during the increasing load test. Mr. Andersen continued to gather data on uncertainties and did concur with the conclusion of the Metrology Subcommittee about the accumulation of uncertainties during substitution tests.

During the August 2001 WWMA Technical Conference and the October 2001 Southern Weights and Measures (SWMA) Annual Meeting, Mr. Andersen reported on the progress on the State of New York's development of specific procedures and cautioned the associations to look carefully at the accumulation of uncertainties. The WWMA received comments

from a scale manufacturer supporting the following 2000 WWMA recommendation for the definition of substitution test. Additionally, Mr. Andersen also recommended that the statement of repeating the procedure no more than three times be deleted from the definition and be placed in the procedures.

The WWMA and SWMA recommended this item remain informational pending New York's findings on substitution test procedures. The WWMA expressed continued support for the following alternate language:

> substitution test. The test of a scale in which material, product, or other objects are substituted for the known test weights on the load-receiving element of the scale, and then the known test weights are placed on the load-receiving element again. This process shall not be repeated more than three times. It permits the scale to be tested to a load greater than the amount of known test weights available. The tolerances for the substitution test are the tolerances for the entire test load developed using the substitution test procedure.
>
> substitution test load. The sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods.

At the May 2002 Central Weights and Measures Association (CWMA) Annual Meeting, the CWMA could not reach a consensus on the voting item before the NCWM S&T Committee. The CWMA had lengthy discussion about the confusion over terms such as "build-up test," "step-test," and "known test load," which are not defined in the proposal. The CWMA has concerns that the proposed definition does not represent a substitution test because the weight of the materials or objects is not quantified in amounts equal to the known standards. Therefore, the CWMA recommended the NCWM S&T Committee change the status of this item from voting to information until these issues can be addressed.

During its May 2002 Annual Meeting, NEWMA heard no negative comments on this item and recommended it move forward for a vote at the July 2002 NCWM Annual Meeting.

For additional background information on this item refer to the 2000 and 2001 Final Reports of the S&T Committee.

321 Belt-Conveyor Scale Systems

321-1 VC S.1.4.1. Recording Elements and Recorded Representations; Automatic and Semi-Automatic Zero Load Tests and UR.3.2.(f) Maintenance; Zero Load Reference Information, Appendix D; Definition of Zero Load Reference (belt-conveyor scale) and Zero-Setting Mechanism (belt-conveyor scale)

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 1 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Add the following new paragraphs to the Belt-Conveyor Scale Code:

> ***S.1.4.1. The belt-conveyor scale system shall be capable of recording the results of automatic or semi-automatic zero load tests. *****
> ***[**Nonretroactive as of January 1, 2004.]***
>
> **UR.3.2.(f) Zero Load Reference Information. - When zero load reference information is recorded for a delivery the information must be based upon zero load tests performed as a minimum both immediately before and immediately after the totalized load.**

Add the following new definitions to Appendix D:

> automatic zero-setting mechanism (belt-conveyor scale). A zero setting device that operates automatically without intervention of the operator after the belt has been running empty. [2.21] *(Consistent with OIML R-50)*
>
> zero-load reference (belt-conveyor scales). A zero-load reference value represents no load on a moving conveyor belt. This value can be either: a number representing the electronic load cell output, a percentage of full scale capacity, or other reference value that accurately represents the no load condition of a moving conveyor belt. The no load reference value can only be updated after the completion of a zero load test. [2.21]
>
> zero-setting mechanism (belt-conveyor scale). A mechanism enabling zero totalization to be obtained over a whole number of belt revolutions [2.21]. *(Consistent with OIML R-50)*

Discussion: At the 2002 NCWM Interim Meeting, the Committee agreed that a nonretroactive enforcement date of January 1, 2004, provides sufficient time for manufacturers to equip systems with the ability to record the results of automatic or semi-automatic zero load tests. The proposal to add new paragraph UR.3.2.(f) was modified to clarify the minimum points in the delivery when the zero load reference information must be recorded. The Committee agreed that the modified proposal shown in the recommendation above should move forward for a vote.

At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

Background: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to amend paragraph S.1.4.:

> *S.1.4. Recording Elements and Recorded Representations. - The value of the scale division of the recording element shall be the same as that of the indicating element. The belt-conveyor scale system shall record the initial indication and the final indication of the master weight totalizer*, the quantity delivered*, the unit of measurement (i.e., kilograms, tonnes, pounds, tons, etc.), the date, and time. A zero reference number shall be recorded before and after any complete weighing cycle **. This information shall be recorded for each delivery*.*
> *[Nonretroactive as of January 1, 1986.]*
> *[*Nonretroactive as of January 1, 1994.]*
> *[**Nonretroactive as of January 1, 200X.]*

The proposal was intended to ensure that the buyer and seller are informed that a zero condition is established at both the start and end of each transaction. The NCWM S&T Committee noted that there are no provisions to adequately address belt-conveyor scales systems when the zero change exceeds the allowable range of the zero setting mechanism. The Committee recognized there are accuracy issues when zero and span move concurrently, but wanted industry input about how widespread these inaccuracies are before supporting proposals to change NIST Handbook 44.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study belt-conveyor scale developing issues on the S&T agenda and related issues of national interest. The workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector. The workshop participants noted that the no load reference value must be recorded after a zero-load test. Consequently, the participants developed an alternate proposal to add new paragraphs S.1.4.X. and UR.X to clarify that the system must be capable of recording zero load information. The participants also developed new definitions for belt-conveyor scales, automatic zero-setting mechanism, zero-load reference, and zero-setting mechanism to clarify how these mechanisms must function in dynamic systems.

At its August 2001 Technical Conference, the WWMA noted its appreciation for the work by the workshop participants and concurred with the recommendations proposed during the workshop. The WWMA modified the definition of zero-load reference to clarify that it applies only to belt-conveyor scales. The WWMA recommended this item with the amendments proposed during the Belt-Conveyor Scale Technical Workshop move forward as a voting item.

During the 2002 NCWM Interim Meeting, the Committee heard concerns about how to define the term "weighing cycle." The Committee decided to replace the term with "delivery" because it more adequately describes the portion of the weighing operation where zero should be tracked.

321-2 VC S.3.1. Design of Zero-Setting Mechanism

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 2 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraph S.3.1. Design of Zero-Setting Mechanism as follows:

> **S.3.1. Design of Zero-Setting Mechanism.** - ***Except for systems that record the zero load reference at the beginning and end of a delivery,*** **the range of the zero-setting mechanism shall not be greater than ±2 percent of the rated capacity of the scale without breaking the security means. Automatic and semi-automatic zero-setting mechanisms shall be so constructed that the resetting operation is carried out only after a whole number of belt revolutions and the completion of the setting or the whole operation is indicated.** ***An audio or visual signal shall be given when the automatic and semi-automatic zero-setting mechanisms reach the limit of adjustment of the zero-setting mechanism*. Systems that record the zero load reference at the beginning and end of a delivery, the range of zero-setting mechanism shall not be greater than ±5 percent without breaking the security means**.***
> ***[*Nonretroactive as of January 1,1990.]***
> ***[**Nonretroactive as of January 1, 2004.]***

Discussion: At the 2002 NCWM Interim Meeting, the Committee acknowledges that expanding the range of the zero setting mechanism allows the system to track changes that contribute to scale inaccuracies which exceed the current limit of ±2 percent. The Committee heard concerns about how to define the term "weighing cycle." The Committee decided to replace the term with "delivery" because it more adequately describes the portion of the weighing operation where zero should be tracked and is consistent with terminology used in paragraph S.1.4. in the Belt-Conveyor Scale Code. The Committee agreed that a nonretroactive enforcement date of January 1, 2004, is appropriate. The Committee also believes that the changes it made to the proposal address all concerns heard during the 2002 NCWM Interim Meeting, based on this the Committee recommends the item for a vote.

At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

Background: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to amend paragraph S.3.1.:

> S.3.1. Design of Zero-Setting Mechanism. - The range of the zero-setting mechanism shall not be greater than ±2 percent ***(±5 percent **)*** of the rated capacity of the scale without breaking the security means. Automatic ~~and semi-automatic~~ zero-setting mechanisms shall be so constructed that the resetting operation is carried out only after a whole number of belt revolutions and the completion of the setting or the whole operation is indicated. *An audio or visual signal shall be given when the automatic ~~and semi-automatic~~ zero-setting mechanisms reach the limit of adjustment of the zero-setting mechanism.**
> ***[*Nonretroactive as of January 1,1990.]***
> ***[**Nonretroactive as of January 1, 200X.]***

The proposal was intended to retroactively restrict a belt-conveyor scale system's zero-setting mechanism to only automatic means and to expand and clarify the allowable range of the zero-setting mechanism. Some companies expressed concerns about conflicts between the proposed language and current OIML requirements that permit a

semi-automatic zero-setting mechanism. Other comments indicated that devices in the marketplace are equipped with only a semi-automatic zero-setting mechanism for adjusting zero. The proposal expanded the zero-setting mechanism range from ±2 percent to ±5 percent to ensure that most of the factors that contribute to scale error such as belt wear are tracked. It was noted the belt wear, by itself, could account for a 1.5 percent zero change in less than six months. Breaking the security means to readjust for zero often requires "Official Material Tests" every six months. Industry comments indicate that the warning indications that the zero has exceeded the allowable 2 percent are often ignored and/or disabled.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study this and other belt-conveyor scale developing issues on the S&T agenda and related issues of national interest. Workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

During the workshop, concern was raised about allowing a larger zero range because it would reduce the incentive for proper belt conveyor scale maintenance. One participant suggested that a sliding zero range of 4 percent rather than ± 2 percent could be considered as a possible solution. This option would result in a zero that is constantly adjusted for belt wear, thus a true zero. Another participant noted that if adequate zero data were available, the operator could make the necessary maintenance and corrections without needing to break the security means. Another suggestion was to allow the zero range to be extended, but to retain the requirement for an alarm at the ±2 percent range. Additionally, the master weight totalizer could be programmed to not print any tickets if zero exceeded the ±2 percent range. One manufacturer noted that the zero reference value is recorded in the audit trail information when the zero range exceeds ±2 percent.

The workshop participants agreed to a compromise proposal that would permit a system to have a zero range greater than ±2 percent provided the system prints the zero information at the beginning and end of each weighing cycle. The workshop proposal as written does not prohibit semi-automatic zero-setting mechanisms, but allows for different ranges depending on the type of zero-setting mechanism.

At its August 2001 Technical Conference, the WWMA agreed with the Belt-Conveyor Scale Technical Workshop's amendments to the WWMA's proposal and recommends the proposal move forward as a voting item.

321-3 VC N.1. General and N.3.2. Material Tests

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 5 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraphs N.1. General and N.3.2. Material Tests and remove paragraph N.3.2. (g) as follows:

N. Notes

N.1. General. – Belt-conveyor scales are capable of weighing bulk materials accurately. (See Tolerances.) However, their performance can be detrimentally affected by the conditions of the installation. (See User Requirements.) The performance of the equipment is not to be determined by averaging the results of the individual tests. The results of all tests shall be within the tolerance limits.

N.3.2. Material Tests. Material tests should be conducted using all actual belt loading conditions. These belt loading conditions shall include but are not limited to conducting materials tests using different belt loading points, all types and sizes of products weighed on the scale, at least one other belt speed, and in both directions of weighing.

On initial verification, at least three individual tests shall be conducted. On subsequent verifications, at least two individual tests shall be conducted. The results of all these tests shall be within the tolerance limits.

~~**Use bulk material, preferably that material for which the device is normally used.**~~ **Either pass a quantity of pre-weighed material over the belt-conveyor scale in a manner as similar as feasible to actual loading conditions, or weigh all material that has passed over the belt-conveyor scale. Means for weighing the material test load will depend on the capacity of the belt-conveyor scale for the test and the availability of a suitable scale for the test. To assure that the test load is accurately weighed and determined, the following precautions shall be observed.**

(a) The containers, whether railroad cars, trucks or boxes, must not leak, and shall not be overloaded to the point that material will be lost.

~~**(g) On initial verification, at least three individual tests shall be conducted. On subsequent verifications, at least two individual tests shall be conducted. The performance of the equipment is not to be determined by averaging the results of the individual tests. The results of all these tests shall be within the tolerance limits.**~~

Background/Discussion: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to amend paragraph N.3.2.

N.3.2. Material Tests.

(g) On initial verification, at least three individual materials tests shall be conducted. On subsequent verifications, at least two individual materials tests shall be conducted. The performance of the equipment is not to be determined by averaging the results of the individual tests when one or more sources of material or top-size is used in the weighing process. The results of all these materials tests shall be within the tolerance limits.

The proposal was intended to require test of a belt-conveyor scale "as used" when there is more than one source or size of material for the material test. The proposal clarifies that the material test results must not be averaged when there are multiple sources and sizes of material. During its 2000 Technical Conference review of the proposal the WWMA commented that the repeated use of the term "material test" is unnecessary and that the term "top size" is confusing and requires defining.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study this and other belt-conveyor scale developing issues on the S&T agenda and related issues of national interest. The workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

The workshop participants agreed that different materials, including different material sizes, behave differently when loaded onto the belt. The participants noted that changes in the product flow rate can effect the product free fall. The impact of product on the belt varies based on change in the amount and rate of product free fall. Changes in product free fall can affect belt tension and belt contact with scale idlers. The direction that product travels across the scale can also affect belt tension and belt contact with scale idlers because there are changes to the length of belt being pulled from the scale to the drive pulleys.

The participants in the Belt-Conveyor Scale Technical Workshop agreed that a list of examples of the different "conditions of installation" should be included in the Notes section of the Belt-Conveyor Scale Systems Code to identify significant factors that affect a system's performance. Factors such as the use of multiple loading points, material types and sizes, and variable belt directions should be demonstrated during the material test. The participants also concluded that the existing language should be reorganized to clarify that all test results shall be within the tolerance limits for all official tests and that no test results can be averaged.

At its August 2001 Technical Conference, the WWMA recommended this item, with the amendments proposed during the Belt-Conveyor Scale Technical Workshop, move forward as a voting item.

At the 2002 NCWM Interim Meeting, the Committee heard comments that the proposal was too wordy. However, the Committee believes that the text is necessary since many officials infrequently inspect belt-conveyor scale systems and can benefit from the more detailed language. The Committee believes that material tests should be conducted using all anticipated actual belt loading conditions including the most extreme conditions rather than only the conditions available at the time of the test. Consequently, the Committee modified paragraph N.3.2. to include these belt loading conditions during a material test.

At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

321-4 VC N.3.1. Zero Load Tests, N.3.1.1. Zero Load Tests; Determination of Zero, N.3.1.2. Initial Stable Zero, N.3.1.3. Test of Zero Stability, and N.3.1.4. Zero Load Tests; Check for Consistency of Belt Weight

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 6 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraph N.3.1. as follows:

N.3. Test Procedures.

~~**N.3.1. Zero Load Tests. – If a belt-conveyor scale system has been idle for a period of 2 hours or more, the system shall be run for not less than 30 minutes when the temperature is above 5 °C (41 °F). When the temperature is below 5 °C (41 °F), additional warm-up time, depending upon conditions, is required before beginning the zero-load tests. The variation between the beginning and ending indication of the master weight totalizer shall not be more than +/– 1 scale division when the instrument is operated at no load for a period of time equivalent to that required to deliver the minimum totalized load of 1000 scale divisions.**~~

~~**The zero-load test shall be conducted over a whole number of belt revolutions, but not less than three revolutions or 10 minutes' operation, whichever is greater.**~~

~~**During any portion of the zero-load test, the totalizer shall not change more than three scale divisions from its initial indication.**~~

A zero-load test shall be conducted to establish that the belt scale system (including the conveyor) is capable of holding a stable, in-service zero.

Add modified new paragraphs N.3.1.1., N.3.1.2., N.3.1.3., and N.3.1.4. as follows:

N.3.1.1. Determination of Zero. A "Zero-Load Test" is a determination of the error in zero, expressed as an internal reference, a percentage of the full scale capacity, or a change in a totalized load over a whole number of complete belt revolutions. For belt-conveyor scales with electronic integrators, the test must be performed over a period of at least 3 minutes and with a whole number of complete belt revolutions. For belt-conveyor scales with mechanical integrators, the test shall be performed with no less than three complete revolutions or 10 minutes operation, whichever is greater.

N.3.1.2. Initial Stable Zero. The conveyor system shall be run to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero-load tests shall be carried out until three consecutive zero-load tests each indicate an error which does not exceed +/- 0.06 % of the full-scale capacity or +/- one division, whichever is less. No adjustments can be made during the three consecutive zero-load test readings.

N.3.1.3. Test of Zero Stability. The conveyor system shall be run to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero-load tests shall be carried out immediately before the simulated or materials test until the three consecutive zero-load tests each indicate an error which does not exceed +/- 0.06% of the full-scale capacity or +/- one division, whichever is less. No adjustments can be made during the three consecutive zero-load test readings.

Immediately after material has been weighed over the belt-conveyor scale during the conduct of the materials test, the zero-load test shall be repeated. The zero error from this test shall not exceed +/- 0.12% of the full-scale capacity or +/- two divisions, whichever is less.

N.3.1.4. Check for consistency of the conveyor belt along its entire length. After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than three scale divisions from its initial indication during one complete belt revolution.

Background/Discussion: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to add a new paragraph T.1.2. Variation in Zero Reference Values to the Belt-Conveyor Scale Systems Code:

T.1.2. Variation in Zero Reference Values. - Variation in a zero reference number on a conveyor system at no load shall not be greater than ±0.25 percent of the rated capacity of the scale when randomly monitored for 95 percent of the zero measurements in all normal operating conditions over an ambient temperature range of up to 12 ^{0}C (54 ^{0}F) in a 24 hour period. [Nonretroactive as of January 1, 2002.]

Environmental factors such as wind, moisture, dust, and temperature, affect a belt-conveyor scale system's zero under no-load condition. This proposal was intended to establish acceptable variations in the zero value over specific temperature intervals.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study belt-conveyor scale developing issues on the S&T agenda and other items of national interest. The workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

During the August 2001 WWMA Technical Conference, the NIST Workshop Technical Advisor reported that the existing requirement for a minimum of three belt revolutions and 10 minutes, whichever is greater, was originally based on mechanical integrator technology. The justification for changing the minimum time and belt revolution requirements was that belt-conveyor scales that electronically integrate the weight of material being conveyed and time can adequately determine the zero reference in one complete belt revolution. Although the alternate language submitted by the Belt-Conveyor Scale Workshop participants pertains to a minimum number of belt revolutions and a shorter minimum time, these minimums are not appropriate for belt-conveyor scales with mechanical integrators. The NIST Workshop Technical Advisor noted that there may still be mechanical devices in legal-for-trade applications and recommended that the WWMA add language to the proposal to specifically address these devices. This recommendation for the shorter zero-load test is also consistent with OIML R 50, Continuous Totalizing Automatic Weighing Instrument (belt weighers).

The WWMA agreed with the amendments and recommendations proposed during the Belt-Conveyor Scale Workshop. The WWMA also modified paragraph N.3.1.1. to address electronic and mechanical integrators.

The Committee made several further modifications to the WWMA proposal. The Committee increased the length of the zero test from 1 minute to 3 minutes because the longer time period may be necessary for some systems to complete a belt

revolution. Permissible errors are now expressed in divisions as well as percentages since integrators are capable of registering in either or both values. The paragraph that required a material test after a 4-hour period or temperature change of not less than 5 °C was removed because it does not provide essential data on the system's performance and is burdensome to the operator/owner. The Committee modified new paragraph N.3.1.4. to include the appropriate unit of measurement because the changes in the master weigh totalizer register occur in divisions rather than percentages of a scale capacity.

At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

321-5 VC UR.2.2. (a) Conveyor Installation

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 7 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraphs UR.2.2. (a) Conveyor Installation as follows:

> **UR.2.2. Conveyor Installation. - The design and installation of the conveyor leading to and from the belt-conveyor scale is critical with respect to scale performance. The conveyor may be horizontal or inclined but, if inclined, the angle shall be such that slippage of material along the belt does not occur. Installation shall be in accordance with the scale manufacturer's instructions and the following:**
>
> **(a) Installation General. - A belt-conveyor scale shall be so installed that neither its performance nor operation will be adversely affected by any characteristic of the installation, including but not limited to, the foundation, supports, covers, or any other equipment.**

Background/Discussion: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to amend paragraph UR.2.2.:

> UR.2.2. Conveyor Installation. - The design and installation of the conveyor leading to and from the belt-conveyor scale is critical with respect to scale performance. The conveyor may be horizontal or inclined but, if inclined, the angle shall be such that slippage of material along the belt does not occur. The belt-conveyor shall be protected from any precipitation. Installation shall be in accordance with the scale manufacturer's instructions and the following:
>
> (a) Installation General. - A belt-conveyor scale structure shall be so installed that neither its performance nor operation will be adversely affected by any characteristic of the weighed material, foundation, supports, covers (when present), or any other equipment.
>
> (b) Live Portions of Scale. - All live portions of the conveyor scale structure shall be protected by appropriate guard devices. On incline belt-conveyors, scale structure and surrounding supports shall have a minimum clearance of 10 percent above the top-size of the material (but not to exceed 3 inches) to prevent accidental interference with the weighing operation.

The proposal was intended to prevent belt-conveyor scales in a "no load" condition from indicating an incorrect zero when there are environmental or physical factors that adversely affect the system.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study belt-conveyor scale developing issues on the S&T agenda and other items of national interest. The workshop participants included belt-conveyor scale

manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

In their review of installation requirements, workshop participants made no distinction between scales installed by the manufacturer or scales installed by someone other than the manufacturer. The participants considered provisions to protect only the portions of the system within the scale area from environmental factors.

Workshop participants noted that it was unrealistic and cost prohibitive to completely protect the entire belt-conveyor system from environmental factors such as rain, dust, wind, and ice. Participants noted that UR.2.1. Protection from Environmental Factors already establishes provisions for protecting the indicating elements, lever system, or load cells from environmental factors. Additionally, General Code paragraph G-UR1.2. Environment requires that equipment be suitable for the environment which includes, but is not limited, to the effects of wind, weather, and RFI. Therefore, the participants agreed that the proposal should be amended to remove any wording that requires protecting the entire conveyor from any precipitation.

A majority of the workshop participants agreed that the term "structure" is too broad and inappropriate. The 3-inch clearance limit was intended as a safety consideration. Although safety is paramount during the operation and inspection of devices, NIST Handbook 44 deals primarily with device specifications, tolerances, and other technical requirements.

Consequently, the Belt-Conveyor Scale Technical Workshop participants recommended that the WWMA amend the developmental item by (1) removing any language from the proposal that requires protecting the belt conveyor outside of the scale area from precipitation, (2) deleting the term "structure" from the proposal, and (3) removing the proposed language in paragraph UR.2.2.(b) that requires minimum clearances solely as a safety measure rather than a necessary structural design requirement. The workshop developed an alternate proposal that provides the weights and measures official and the device user with guidelines for the proper installation and protection of portions of the scale that could adversely affect the system's performance.

At its August 2001 Technical Conference, the WWMA agreed that this item, with the Belt-Conveyor Scale Workshop's amendments to its proposal, move forward as a voting item.

At the 2002 NCWM Interim Meeting, the Committee heard no opposition to the proposal. Consequently, the Committee recommends this item for a vote. At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

321-6 VC UR.3.2. (b) Maintenance

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 8 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraph UR.3.2.(b) as follows:

UR.3.2. Maintenance

(b) Simulated load tests or materials tests, and zero load tests shall be conducted at periodic intervals between official tests to provide reasonable assurance that the device is performing correctly.

The action to be taken as a result of the material tests or simulated load tests is as follows:

Background/Discussion: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to amend paragraph UR.3.2.(b):

UR.3.2. Maintenance

(b) Simulated load tests or materials tests shall be conducted at periodic intervals between official ~~tests~~, certification, after the scale system runs under a no-load condition for at least (XX) minutes to provide reasonable assurance that the device is performing correctly.

A materials test may be performed under any environmental conditions and in any ambient temperature range.

The action to be taken as a result of materials test error is as follows:

The proposal was intended to prevent any party from benefiting from the zero bias of a belt-conveyor scale system.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study belt-conveyor scale developing issues on the S&T agenda and other items of national interest. The workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

The intent of the proposal was to encourage users to perform materials tests and simulated load tests under any environmental condition that reflects the scale's normal use and to verify the zero-load condition of the system. The workshop participants noted that the proposal as written only instructs the operator to run the belt empty before conducting the periodic tests, but does not require the operator to perform a zero-load test. A zero-load test is the only means to verify the no-load condition of the belt.

Workshop participants commented that the proposal to require testing at any ambient temperature is not necessary because tests under conditions of normal use are already addressed in paragraph N.2. Conditions of Tests. The participants agreed that adding the term "official certification" was not necessary since the code already references "official test." The participants recommended that the WWMA amend the proposal by removing the instructions for the belt to be run empty during the periodic tests between official certifications. Running the belt empty is not sufficient to verify the no-load condition of the belt, verification of that condition requires a zero-load test. The participants also recommended removing the statement about conducting the test at any ambient condition.

At its August 2001 Technical Conference, the WWMA recommended that this item, with the amendments proposed during the Belt-Conveyor Scale Technical Workshop, move forward as a voting item.

During the 2002 NCWM Interim Meeting, the Committee heard an industry comment to support the recommendation to use the results from either material or simulated load tests because they essentially provide the same performance data. The Committee heard no opposition to the proposal. Consequently, the Committee recommended this item for a vote. At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

321-7 VC UR.3.2. (e) Maintenance; Records

(This item was adopted.)

Source: This item originated from the Western Weights and Measures Association (WWMA) and first appeared as part of Appendix C (Item 360-3) Item 9 Developing Issues on the Committee's 2000 agenda. The item's status was moved from the list of Developing Issues because the regional association that originally submitted this proposal indicated it was ready for national review.

Recommendation: Modify paragraph UR.3.2. Maintenance (e) as follows:

UR.3.33. ~~Maintenance~~ Retention of Maintenance, Test, and Chart Recorder Information. -
~~(e)~~ Records of calibration and maintenance, including conveyor alignment, chart recorder, zero-load test and material test data shall be maintained on site for at least the three

concurrent years ~~to develop~~ as a history of scale performance. Copies of any report as a result of a test or repair shall be mailed to the official with statutory authority as required. The current date and correction factor(s) for simulated load equipment shall be recorded and maintained in the scale cabinet.

Background/Discussion: The 2002 NCWM S&T Committee Interim Report Developing Issues listed the following modified WWMA proposal to modify paragraph UR.3.2.(e):

UR.3.2. Maintenance

(e) Records of calibration and maintenance, including conveyor alignment, chart recorder, auto-zero tracking and materials test data shall be maintained on site for at least ~~three~~ seven current years to develop a history of scale performance. Copies of any report as a result of a test or repair shall be mailed to the official with statutory authority as required. The current date and correction factor(s) for simulated load equipment shall be recorded and maintained in the scale cabinet.

The intent of this proposal was to provide the weights and measures official, the device user, and the customer, records of maintenance and testing. This information could be used by the weights and measures official to verify that the belt-conveyor scale operator conducts tests according to the performance requirement in paragraph UR. 3.2.(b) Maintenance for belt-conveyor scales and idler maintenance and service. The retention of the chart recorder data, zero-load test data, and the performance of periodic test documents the scale's zero condition in the event of a transaction dispute.

In May 2001, NIST sponsored a technical workshop on belt-conveyor scales to study belt-conveyor scale developing issues on the S&T agenda and other issues of national interest. The workshop participants included belt-conveyor scale manufacturers, weights and measures officials, an independent testing agency, the NTETC Belt-Conveyor Scale Sector Chairman, and the NIST Technical Advisor to the Sector.

The proposal is intended to require the operator to retain the three most recent years of required information. Originally, a 7-year retention period was recommended as necessary in the event of a transaction dispute. Participants agreed that although 7 years of records have value, the changes to belt-conveyor scale systems during that period might make the information outdated. The participants also noted that records retained from alternate or some other schedule of years rather than concurrent years would provide an incomplete picture of the system's performance. The workshop participants developed an alternate proposal as shown in the recommendation above to address those comments and concern about the length of the retention period.

After the workshop, the NIST Technical Advisor noted that the information retained is not exclusively maintenance records. The Technical Advisor recommended that the WWMA consider renumbering paragraph "UR.3.2. Maintenance (e)" to a new paragraph, "UR.3.3. Records."

At its August 2001 Technical Conference, the WWMA agreed that this item, with the amendments proposed during the Belt-Conveyor Scale Technical Workshop and by the Technical Advisor, should move forward as a voting item. The WWMA further modified the title to reflect all of the information that is required to be retained.

During the 2002 NCWM Interim Meeting, the Committee heard no opposition to the proposal. Consequently, the Committee recommended this item for a vote. At the July 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

322 Automatic Bulk Weighing Systems

322-1 I Tolerances

Source: Northeastern Weights and Measures Association

Recommendation: Delete paragraphs T.1.4., T.2., T.2.1, T.3.2. and T.3.3.; renumber paragraphs T.3. and T.3.1.; add new paragraphs T.2.2, T.2.3., and T.2.3.1. and Table 1 and Table 2; and add a new footnote to Section 2.20 Scales Table 1.1.1. as follows:

~~**T.1.4. To Tests Involving Digital Indications or Representations. – To the tolerances that would otherwise be applied, there shall be added an amount equal to one-half the value of the scale division. This does not apply to digital indications or recorded representations that have been corrected for rounding using error weights.**~~

~~**T.2. Minimum Tolerance Values. – The minimum tolerance value shall not be less than half the value of the scale division.**~~

~~**T.2.1. For Systems used to Weigh Construction Materials. – The minimum maintenance and acceptance tolerance shall be 0.1 percent of the weighing capacity of the system, or the value of the scale division, whichever is less .**~~

~~**T.3.2. For Systems used to Weigh Grain. – The basic maintenance tolerance shall be 0.1 percent of test load.**~~

~~**T.3.3. For all Other Systems. – The basic maintenance tolerance shall be 0.2 percent of test load.**~~

Renumber paragraphs T.3. and T.3.1. as follows:

T.3.2. Basic Tolerance Values.

T.3.2.1. Acceptance Tolerance. -The basic acceptance tolerance shall be one-half the basic maintenance tolerance but never less than 1 division.

Add new paragraphs T.2.2, T.2.3., and T.2.3.1. and Table 1 and Table 2 as follows:

T.2.2. General. - The tolerance applicable to devices not marked with an accuracy class shall have the tolerances applied as specified in Table 1. below.

Table 1. Tolerance for Unmarked Scales

Type of Device	Tolerance	Decreasing Load Multiplier	Other applicable Requirements
Grain Hoppers	Class III, T.2.3 (table 2)	1.0	T.2.1., T.2.3.1
Other Systems	Class III L, T.2.3 (table 2)	1.0	T.2.1., T.2.3.1

T.2.3. Tolerances Applicable to Devices Marked III or III L.

T.2.3.1. Maintenance Tolerance Values - The maintenance tolerance values are specified in Table 2 below.

Table 2. Maintenance Tolerance for Marked Scales (All values in this table are in scale divisions) Tolerance in scale divisions				
	1	2	3	5
Class	Test Load			
III	0 - 500	501 - 2000	2001 - 4000	4001 +
III L	0 - 500	501 - 1000	(Add 1d for each additional 500d or fraction thereof)	

Add a new footnote to Section 2.20 Scales Code Table 1.1.1. Tolerances for Unmarked Scales as follows:

[X]Automatic bulk weighing systems see Section 2.22 for specifications and tolerances.

Discussion: NEWMA recommends changing the prescribed tolerances for automatic bulk weighing systems from a percentage basis to division values which are based on the device's accuracy class. NEWMA believes this change will align tolerances in the Automatic Bulk Weighing Systems Code and Scales Code.

New York indicated that asphalt and cement plants use hopper scales that are considered automatic bulk-weighing systems because they are capable of weighing single or multiple loads. Some jurisdictions classify these plant scales as automatic bulk weighing systems and others will classify them as hopper scales which are then held to different tolerances. Scales Code Section 2.20 Table T.1.1, does not list automatic bulk-weighing systems in the table of tolerances for unmarked device types. In an effort to determine the appropriate tolerance for an automatic bulk weighing system, the system might be classified an either a "hopper scale" (other than grain, Class lll L) or "all other scales" (Class III). To avoid confusion about where to classify automatic bulk weighing systems a footnote should be added to table T.1.1. as shown in the recommendation above.

During the 2002 NCWM Interim Meeting, the Committee heard opposition to the proposal. The proposal was opposed because the recommended step tolerances, unlike current percentage tolerances, increases the likelihood for accumulating scale error into the increasing load test. The Committee also noted that the tables may need editorial work to clarify how to reference other related requirements. The Committee was also interested in USDA, Grain Inspection Packers and Stockyard Administration (GIPSA) input. Consequently, the Committee gave the proposal information status.

The Committee believes there is confusion over which weighing systems fall under the Automatic Bulk Weighing Systems Code. Many systems may meet some of the criteria that define an automatic bulk weighing system, but are generally not used to weigh large numbers of successive drafts. The Committee encourages work by the NIST Technical Advisors to develop training materials that clarify which weighing systems can be classified as Automatic Bulk Weighing Systems. GIPSA and the National Grain and Feed Association indicated concern about inconsistent application of the proposed tolerances and losses that may result from any increase in tolerances. The Committee recommended the Technical Advisors develop the materials in time for presentations to the fall regional weights and measures association meetings. Consequently, the Committee kept this an information item.

324 Automatic Weighing Systems

324-1 I Tentative Status of the Automatic Weighing Systems Code

Source: Southern Weights and Measures Association

Recommendation: Change the status of the Automatic Weighing Systems Code from tentative to permanent

Discussion: The Automatic Weighing Systems Code was added to the 1996 edition of NIST Handbook 44, as a Tentative Code. Prior to the 2002 NCWM Interim Meeting, the Committee had not received any unfavorable comments or recent requests for extended studies of the Automatic Weighing Systems Code. Weights and measures officials and industry

representatives indicated that there is a need for a permanent set of code requirements for commercial automatic weighing systems.

During the 2002 NCWM Interim Meeting, the Committee received comments from industry to postpone any action to change the status of the Automatic Weighing Systems (AWS) Code. The Scale Manufacturers Association and the Maryland NTEP Participating Laboratory asked that the AWS Working Group meet one final time to resolve some remaining issues with the Code. The Committee heard that there are some issues with several NTEP test criteria which are based on the code requirements. NTEP accepts for test and issues Certificates of Conformance for devices that comply with requirements even though the code has tentative status. The Committee was also advised that the USDA Food Safety and Inspection Service (FSIS) is interested in having a permanent code since FSIS published their final ruling that requires an NTEP device. FSIS would also like to see in place code requirements that apply to field devices as well as devices evaluated by NTEP. Tentative codes have a trial or experimental status and are not intended to be enforced.

The Committee agreed that there should be no change in the status of the code until the AWS Work Group meets on October 2-3, 2002, in Annapolis, Maryland. Consequently, the item remains information to allow time for the Work Group to resolve any remaining issues. All parties interested in this meeting should contact Steve Patoray (NCWM) by telephone at 828-859-6178 or by email at spatoray@mgmtsol.com or Steve Cook (NIST) by telephone at 301-975-4003, by fax at 301-926-0647 or by email at steven.cook@nist.gov.

330 Liquid-Measuring Devices

330-1 VC S.3.2.(b) Exceptions

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraph S.3.2. as follows:

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

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

~~(b) other devices, when all discharge outlets designed to operate simultaneously are 3.8 cm (1.5 in) in diameter or larger.~~

Background/Discussion: At the May 2001 NTEP Participating Laboratory Meeting, one of the laboratories expressed concern with the exemption in paragraph S.3.2. (b) for outlets larger than 3.8 cm (1.5 in). The laboratory found loading racks with multiple delivery outlets serviced by the same meter. These systems can facilitate fraud because both outlets could be activated to deliver product at the same time. Paragraph S.3.2. (b) was added to NIST Handbook 44 in 1982. The 1982 final report of the NCWM S&T Committee includes no explanation of why the exception for outlets which are 3.8 cm (1.5 in) in diameter or larger was allowed. The Laboratories agreed with the provisions of S.3.1. Diversion of Measured Liquid and S.3.2. (a); however, there does not appear to be a need to allow exemptions that are based on the discharge outlet size. At its September 2001 Meeting, the Measuring Sector agreed to forward the proposal to the S&T Committee as written.

At the 2002 NCWM Interim Meeting, the Committee heard no opposition to the proposal and consequently, recommended deleting paragraph S.3.2. (b). as shown in the proposal above.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

330-2 W N.4.1.2. Repeatability

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA)

Discussion: At the 2002 Interim Meeting, the Committee considered the following proposal to modify paragraph N.4.1.2.

> N.4.~~1.~~24. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.2. Repeatability Tests.

The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts. The Committee decided to withdraw this item from its agenda.

Background: At its August 2001 Technical Conference, the WWMA reviewed a proposal to modify paragraph N.4.1.2. as shown below to allow less than three consecutive tests to determine compliance with repeatability tolerances. The WWMA agreed that if the device is clearly out of tolerance on the first or second test draft the inspector should not be required to perform additional tests. The WWMA was concerned; however, that the proposed language would allow the determination of repeatability with only two tests. The WWMA also noted that test note N.4.1.2. could be considered as requiring repeatability tests since it is a subparagraph of "Normal Tests." The WWMA felt that renumbering N.4.1.2. as N.4.4. makes it clear that repeatability is not a mandatory part of normal or special tests. Consequently, the WWMA amended the proposal as shown in the discussion above to address these concerns.

> N.4.1.2. Repeatability Tests. - Tests for repeatability should *be* ~~include a minimum of three consecutive test drafts~~ of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

At its August 2001 Technical Conference, the SWMA reviewed the WWMA proposal and received comments from the Gasoline Pump Manufacturers Association (GPMA), the Meter Manufacturers Association (MMA), Belue Associates, other meter manufacturers and several weights and measures officials that a minimum of three consecutive tests are appropriate in determining compliance or noncompliance with repeatability tolerances. The SWMA withdrew this item from its agenda and recommended similar action by the NCWM S&T Committee.

330-3A VC Tolerances, Table T.2. Accuracy Classes for Liquid-Measuring Devices

(This item was adopted.)

(Item 330-3 was separated into three parts 330-1A, 330-1B, and 331-3 during the Interim Meeting to facilitate review of the issues.)

Source: Carryover Item 330-1B. (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 1999 agenda as Item 330-1.)

Recommendation: Add a new Table T.2. to Section 3.30. Liquid-Measuring Devices (LMD) and delete paragraphs T.2.1.through T.2.3.3. Paragraph T.2.3.4. Repeatability Tests is renumbered to T.3. and paragraph T.2.3.5. Automatic Temperature Compensating Systems is renumbered to T.4.

[Note: The Committee is also proposing the addition of this Table to Section 3.31. Vehicle-Tank Meters. See item 331-3 for details.]

Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance
0.3	Petroleum products including large capacity motor fuel devices (flow rates over 115 L/min (30 gpm))**, heated products at or greater than 50 °C asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	Asphalt at temperatures greater than 50 °C	0.3 %	0.3 %	0.5 %
0.5*	Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min (30 gpm))** motor-fuel devices, agri-chemical liquids, and all other applications not shown.	0.3 %	0.5 %	0.5%
1.1	Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm and devices designed to deliver less than one gallon.	0.75 %	1.0 %	1.25%

*The maintenance tolerances on normal and special tests for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances on normal and special tests are 3 cubic inches and 5.5 cubic inches.

** Flow rate refers to designed or marked maximum flow rate.

T.2. Tolerance Values. Maintenance, Acceptance, and Special Test Tolerances shall be as shown in Table T.2.

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

~~T.2.1.1. Devices Indicating in Metric Units.~~

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

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

~~(c) The tolerance applied to a 19 liter draft shall be that tolerance applicable to a 20 liter draft.~~

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

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

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

~~T.2.1.3. Repeatability. — When multiple tests are conducted at approximately the same flow rate and t size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.2.~~

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

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

~~Table 2.~~
~~Tolerances for Slow-Flow Meters~~

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

~~T.2.3. Wholesale Devices.~~

~~T.2.3.1. Measurement of Agri-Chemical Liquids. – Acceptance tolerances and maintenance tolerances shall be 0.3 percent and 0.5 percent, respectively.~~

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

	~~Acceptance~~	~~Maintenance~~	~~Special Test~~
~~Asphalt below at 50 °C or below~~	~~0.2 %~~	~~0.3 %~~	~~0.5 %~~
~~Asphalt above 50 °C~~	~~0.3 %~~	~~0.3 %~~	~~0.5 %~~

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

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

T.~~2.3.4.~~3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system. See also N.4.1.2.

~~*T.2.3.5.*~~*4. Automatic Temperature Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature compensating system activated shall not exceed:*

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

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

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
[Nonretroactive as of January 1, 1988.]

Discussion: At the 2002 NCWM Interim meeting the Committee agreed with the 2001 WWMA proposal to remove paragraphs T.2.1. through T.2.3.3. from NIST Handbook 44, Section 3.30. The Committee further modified the proposal to: (1) specify the normal and special test tolerances for 5-gallon and 10-gallon drafts for small capacity meters, (2) state that the flow rate for each application applies to the equipment's designed maximum flow rate rather than the flow rate obtained at an installation, and (3) clarify the accuracy class for devices designed with flow rates less than 1 gpm. The NIST Office of Weights and Measures (OWM) provided the Committee with a written position statement for this item. OWM recommends the proposed tolerance tables be adopted for NIST Handbook Section 3.30. Liquid-Measuring Devices along with the recommendations from the 2001 WWMA Technical Conference. Following the 2002 NCWM

Interim Meeting, members of the Committee recognized that the proposed 0.5 percent special test tolerances will impact retail motor-fuel dispensers in truck refueling applications. The special test tolerance proposed in Table T.2. will expand the applicable tolerance for a slow-flow test to 0.5 percent from the current acceptance tolerance in paragraph T.2.1.2. of approximately 0.2 percent for a 25- or 50-gallon test draft. However, the Committee believes there is an advantage to harmonizing the tolerances for similar applications and did not received input opposing the proposal as written. Consequently, the Committee recommended the modified accuracy table for Section 3.30. for a vote in July.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

Background: In 1999, the S&T Committee received a proposal to modify the definition of a retail device. The Committee received input indicating that additional code changes beyond changing the definition were needed. Since 1999 the regional associations have continued to develop and expand the original proposal. During the 2001 NCWM Annual Meeting, the Committee discussed the impact of percentage tolerances when using 5-gallon and 10-gallon test measures. The Committee recognized that 0.5 percent of 5 gallons is 5.78 in^3, 0.3 percent of 5 gallons is 3.46 in^3, 0.5 percent of 10 gallons is 11.55 in^3, and 0.3 percent of 10 gallons is 6.93 in^3. The Committee also recognized that the uncertainty in the measurement process when using 5-gallon and 10-gallon test measures is high; therefore, the Committee concluded that the current tolerances for 5-gallon or 10-gallon test drafts expressed in whole cubic inch values are appropriate and should be retained. The Committee believed that applying the tolerances listed in the proposed accuracy class tables across different meter technologies is more appropriate because those meters are used in similar applications. The Committee asked the gasoline pump manufacturers, regional associations, and weights and measures officials to verify, prior to the 2002 NCWM Annual Meeting, that the proposed tolerances in the tables are appropriate.

At its August 2001 Technical Conference, the WWMA recommended this item be split into two parts. The WWMA recommended that Table T.X. for NIST Handbook 44 Sections 3.30. and 3.31. be moved forward for a vote and that Table T.X. for Section 3.32. though 3.38. remain informational to allow for additional study and development.

The WWMA also reviewed the references to "retail" in both the LMD and Vehicle-Tank Meter (VTM) codes and determined that the adoption of the proposed tolerance tables do not conflict with existing references to "retail." The WWMA noted that existing agri-chemical tolerances are different in the LMD and VTM Codes. The proposal to add Tables T.X. to Section 3.30. and 3.31. will make the tolerances uniform in both codes.

The WWMA also recommended deleting paragraphs T.2.1. through T.2.3.3. and Table 2. in NIST Handbook 44, Section 3.30. and renumber the remaining "Tolerance" paragraphs accordingly. The WWMA also recommended that Table T.X. Class 1.1 include language for "devices designed primarily to deliver less than one gallon."

The WWMA also recommended deleting paragraphs T.3. Tolerance Values on Meters Used for the Measurement of Agri-Chemical Liquids, and Tolerance Tables 1, 3, and 4, and including the Accuracy Class 1.5 for vehicle mounted water meters in Table X.X in the VTM Code. Additionally, the WWMA recommended the definition for slow-flow meters be amended to correct for the conversion for the SI units to inch/pound units and to remove any references to retail devices as follows:

> slow-flow meter. A ~~retail~~ device designed for the measurement, at very slow rates (less than 4.0 L (~~10~~ 1.0 gal) per hour), of liquid fuels at individual domestic installations. [3.30]

The definition for slow-flow meter was editorially corrected in Handbook 44 2002 Edition.

At the September 2001 Central Weights and Measures Association (CWMA) Interim Meeting, there was little support for the tables. Some members did not believe the tables should be included in each liquid-measuring device code. The CWMA believed that there is no need for the both a definition of "retail device" and the revisions to the tolerances and agreed that the item needs further development.

At its October 2001 Meeting, the Southern Weights and Measures Association (SWMA) recommended that "devices designed to primarily deliver less than one gallon" be included in Table T.X. Class 1.1 which covers devices with flow rates less than one gallon per minute. Additionally, the SWMA agreed that Table T.X. is sufficiently developed to move forward as a voting item.

At the October 2001 Northeastern Weights and Measures Association (NEWMA) Interim Meeting, NEWMA expressed support for this item. NEWMA supports the revisions proposed at the 2001 WWMA Technical Conference. NEWMA also supports a separate table for the 3.30. and 3.31. codes for adoption and continued study of the remaining codes 3.32. through 3.38. to see if there are any major conflicts with this format. NEWMA again expressed the desire for the continued efforts of the NIST Handbook 44 working group to reorganize NIST Handbook 44. NEWMA believes that adoption of this item will enhance that effort.

For more background information, refer to the 1999, 2000, and 2001 S&T Final Reports.

330-3B I Tolerances, Table T.X. Accuracy Classes for Sections 3.32. Through 3.36 and Section 3.38

Source: Carryover Item 330-1B. (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 1999 agenda as Item 330-1.)

Recommendation: The Committee recommends that the various Accuracy Classes and Tolerances in Table T.X. be added to NIST Handbook 44 Sections 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices, 3.33. Hydrocarbon Gas Vapor-Measuring Devices, 3.34. Cryogenic Liquid-Measuring Devices, 3.35. Milk Meters, 3.36. Water Meters, 3.37. Mass Flow Meters, and 3.38.Carbon Dioxide Liquid-Measuring Devices – Tentative Code as follows: As an option the entire table could be added as an appendix to these codes.

Table T.X. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Sections 3.32 through Section 3.36 and Section 3.38

Accuracy Class	Application		Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance*
1.0	Anhydrous ammonia, LP gas (including vehicle tank meters)		0.6 %	1.0 %	1.0 %
1.5	Water	Overregistration	1.5 %	1.5 %	1.5 %
		Underregistration	1.5 %	1.5 %	5.0 %
2.0	Compressed natural gas as a motor fuel		1.5 %	2.0 %	2.0 %
2.5	Cryogenic products; liquefied compressed gases other than LP gas		1.5 %	2.5 %	2.5 %
3.0	Gases at low pressure (LP vapor)	Overregistration	1.5 %	1.5 %	
		Underregistration	3.0%	3.0%	

*where applicable

Background/Discussion: At the 2002 NCWM Interim Meeting, the Committee agreed with the WWMA recommendation to split item 330-1 into items 330-1A and 330-1B. The Committee also made 330-1B an information item to allow further study on the effect of the proposed tolerances for devices covered by Section 3.32. through Section 3.38. The background and rational for this item are outlined in the S&T Agenda Item 330-3A that address the proposed changes to Section 3.30 and 3.31.

At the 2002 NCWM Annual Meeting, the Committee heard no comments on the item. The Committee recommends that the regional associations continue to review the table to identify any negative impact it would have on the affected codes in Handbook 44.

330-4 V UR.1.2. Nozzle Requirements

(This item did not pass or fail; therefore it returns to the Committee.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new paragraph to NIST Handbook 44, Section 3.30. as follows:

UR.1.2. Nozzle Requirements for Diesel. Any hose from which diesel fuel is sold shall have a nozzle with an outside diameter of not less than 23.6 mm (0.93 in).

Background/Discussion: At the August 2001 WWMA Technical Conference, Idaho Weights and Measures reported receiving complaints from consumers who accidentally put diesel fuel into a gasoline-powered vehicle. All complaints were investigated and inspectors found that the pumps were properly labeled, but people still made the mistake. The proposed user requirement would help to prevent this unfortunate mix-up. Idaho reported that retail motor fuel dispenser manufacturers follow the minimum size specification in the Society of Automotive Engineers (SAE) Recommended Practice, #J285, revised September 1992. The 1992 date for J285 indicates that automotive manufacturers have been recommending that fueling components meet this specification for some time. Originally Idaho's proposal included a requirement for marking the nozzle with the word "DIESEL" so that it is visible to the user from a normal fueling position. A representative of a major fuel distributor indicated that the word "DIESEL" on the nozzle can not be maintained as a permanent marking because the lettering/label is subject to wear and exposure to fuel; however, an acceptable alternative is to use color coding to distinguish the nozzles. The WWMA agreed with the industry representative and decided to forward the item to the NCWM S&T Committee including only the recommendation for size and color-coding of the nozzles. WWMA recommended that the item be informational to allow input from the other regional associations.

At its October 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) recommended that the proposed nozzle size requirement be retroactive and the nozzle color-coding proposal by the WWMA be struck from the text and that the item move forward as a voting item.

At the NCWM 2002 Interim Meeting, the Committee heard several comments opposing the use of color-coding for nozzles. GPMA indicated that replacing the words "dispensing devices" in the proposal with the term "hose" is appropriate because of multi-hose and multi-product dispensers. The Committee amended the proposal based on comments received at the Interim meeting recommending that the phrase "dispensing devices" be changed to "hose" and that the requirement for color-coding be removed from the proposal because there is no standard color used by the petroleum industry for identifying diesel fuel. At the time of the Interim Meeting two regional associations had not reviewed the item but were scheduled to meet prior to the NCWM Annual Meeting which provided them with the opportunity for study and comment at the Annual Meeting. Based on the comments received and the support for the size requirement the Committee recommended the item as amended for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, no comments were received during the Committee's open session; however, several officials spoke to the Conference during the voting session. One official indicated a concern for a potential liability shift from the service station to the jurisdiction if the requirement is in place and a consumer puts diesel fuel into a gasoline-powered vehicle because the nozzle spout has not been changed. Another official stated that this is a situation where the consumers can protect themselves without weights and measures intervention or regulation. Still another official indicated that this is not a technical issue and does not belong in Handbook 44. Several officials supported the item indicating that the problem occurs frequently and is very costly for the consumer. One stated that he believes weights and measures can provide a significant benefit consumers without costing industry a lot of money. A representative from ChevronTexaco Corporation stated that their company already requires dealers to have larger nozzle spouts on diesel dispensers.

330-5 VC Appendix D; Definition of Contract Sale

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Amend the definition of "contract sale" in NIST Handbook 44 as follows:

> contract sale. ~~A sale where there is a written agreement stating the price as either a fixed price, a price above cost, or an adjustment from the posted price.~~ A sale where a written agreement exists, prior to the point of sale, in which both buyer and seller have accepted pricing conditions of the sale. Examples include, but are not limited to: e-commerce, club sales, or pre-purchase agreements. Any devices used in the determination of quantity must comply with NIST Handbook 44. [3.30]

Background/Discussion: At its 2001 Technical Conference, the WWMA agreed that the availability of fuel at reduced prices through e-commerce or the use of club cards necessitates a broader and more generic definition of "contract sale" to meet the needs of the modern marketplace. Many jurisdictions exempt keylock or cardlock systems, from several of the liquid-measuring device code sections in NIST Handbook 44. Those jurisdictions consider the use of keylock or cardlock systems to be a form of contract sale in applications where the customer receives a monthly billing. Currently, systems used for contract sales are exempt from several requirements in the Liquid-Measuring Device Code including Paragraphs S.1.6.4.1.(b) Unit Price., S.1.6.5.(a) Money-Value Computations., S.1.6.5.4., Selection of Unit Price., S.1.6.7. Recorded Representations., UR.3.2. Unit Price and Product Identity., and UR.3.3.(a) Computing Device.

Many existing cardlock contracts only stipulate the agreement for receiving the card. Although the contracts make no reference to the price of fuel, they do meet the existing NIST Handbook 44 definition for contract sales. In most cardlock contracts, the price is adjusted daily and the customer may either call or log on to a Web Site to and check the fuel price on that particular day. Additionally, the above exemptions provided for contract sales are necessary in e-commerce transactions such as fuel purchases through PriceLine.com where each customer submits a bid for the fuel price that they are willing to pay. Another example is the use of the increasingly popular club cards that provide a discount from the posted price. The WWMA recommended that the definition of "contract sale" in NIST Handbook 44 be amended as follows:

> contract sale. ~~A sale where there is a written agreement stating the price as either a fixed price, a price above cost, or an adjustment from the posted price.~~ A sale where an agreement exists, prior to the point of sale, in which both buyer and seller have accepted conditions of the sale. Examples include, but are not limited to: e-commerce, club sales, or pre-purchase agreements. [3.30]

At its October 2001 Annual Meeting, the SWMA modified the WWMA proposal to clarify that contracts must include pricing conditions such as a club member discount or an e-commerce transaction price. The SWMA is concerned that devices designed for non-commercial applications are sometimes installed in keylock or cardlock systems and believes that devices used for contract sales must still comply with other NIST Handbook 44 requirements. The SWMA recommended that the proposal move forward as a voting item.

At the NCWM 2002 Interim Meeting, the Committee heard support for the SWMA proposed definition of contract sale and agreed with the SWMA that devices used for contract sales must comply with NIST Handbook 44. The Committee recommended the SWMA proposal as shown in the recommendation above for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

330-6 VC Appendix D; Definitions of Dry Hose, Wet Hose, and Wet-Hose Type

(This item was adopted.)

Source: National Type Evaluation Technical Committee Measuring Sector

Recommendation: Modify the definitions for dry hose, wet hose, and wet-hose type as follows:

dry hose. A discharge hose intended to be completely drained at the end of each delivery of ~~liquid~~ product. [See "dry-hose type."][3.30, 3.31]

wet hose. A discharge hose intended to be full of ~~liquid~~ product at all times. [See "wet-hose type."][3.30, 3.31]

wet-hose type. A type of device designed to be operated with the discharge hose full of ~~liquid~~ product at all times. [See "wet hose."][3.30, 3.32, 3.34, 3.37, 3.38]

Background/Discussion: At its September 2001 Meeting, the Measuring Sector noted that Compressed Natural Gas dispensers use mass flow meters, dispense product in a vapor state, and typically have a valve at the end of the discharge line. However, NIST Handbook 44, Section 3.37. Mass Flow Meters, Paragraph S.4.4. Discharge Valves, only allows a valve at the end of a discharge line if the system is of the wet-hose type. The NIST Handbook 44 definition for wet-hose type refers only to a device that has a discharge hose containing liquid. The definitions for dry hose and wet hose also refer to hoses containing liquid. Because some products such as compressed natural gas are not liquids, the definitions do not address those applications. The Measuring Sector recommended changing the definitions to cover gaseous products as well as liquids.

At the 2002 NCWM Interim Meeting, the Committee heard no opposition to the proposal and agreed to recommend the proposed changes for a vote as written.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

330-7 I Appendix D; Definition of Retail Device

Source: Carryover Item 330-1A (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 1999 agenda as Item 330-5.)

Recommendation: Modify the definition of retail devices as follows:

retail device. A liquid-measuring device primarily used for non-resale use.

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

~~retail deliveries of motor fuels to individual highway vehicles, or~~

~~single deliveries of liquefied petroleum gas for domestic use and liquefied petroleum gas or liquefied anhydrous ammonia for nonresale use.~~
[3.30, 3.31, 3.32, 3.37]

Background/Discussion: During the 2001 NCWM Annual Meeting, the Committee considered several proposals that define retail devices as those that deliver product to the final user. The Committee agreed that these proposals change devices, previously classified as wholesale devices, to retail devices that are held to a smaller tolerance.

The NIST Office of Weights and Measures (OWM) provided the Committee with a written position statement for this item. OWM recommends that this item *only* move forward for a vote if agenda items 330-3A and 330-3B are adopted.

Consequently, the Committee decided to change the status of this item to information while it reviewed the suitability of the proposed definition and the table of tolerances for retail devices that is proposed in Agenda Items 330-3A and 330-3B.

At its 2001 Technical Conference, the WWMA commented that the word "primarily" is ambiguous and recommended removing the word from the proposal. The WWMA recommended this proposal be left informational because, if the tables of tolerances in Item 330-3 are adopted, changes to the definition are unnecessary.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) supported the item as written.

At its October 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) recommended that this remain an information item pending development the proposed new table of tolerances.

At its October 2001 Interim Meeting, the Northeastern Weights and Measures Association (NEWMA) continued support of the new tables of tolerances for all measuring devices proposed in item 330-3 and related items. If these tolerances are adopted, NEWMA believes that changes to the definition are unnecessary.

At the 2002 NCWM Interim meeting, the Committee agreed that if Items 330-3A, 330-3B, and 331-3 are adopted, changes to the definition are unnecessary and will withdraw this item from its agenda.

At the 2002 NCWM Annual Meeting, the Committee heard no comments on the item.

For more background information, refer to the 1999, 2000, and 2001 S&T Final Report.

330-8 VC S.4.4.1. Discharge Rates and S.4.4.2. Location of Marking Information

(This item was adopted.)

(The submitter of this item agreed it was ready for national review at the 2002 Interim Meeting; however, the item was inadvertently listed as a developing issue in the Appendix B of the Committees 2002 NCWM Publication 15, Interim Meeting Agenda)

Source: Carryover Item 360-4, Appendix H (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2001 agenda.)

Recommendation: Rename and renumber paragraph S.4.4. and add the following new paragraph S.4.4.2. Location of Marking Information to the Liquid-Measuring Devices Code.

S.4.4. Retail Devices.

S.4.4.1. Discharge Rates. - On a retail device with a designed maximum discharge rate of ~~100~~ 115 L (~~25~~ 30 gal) per minute or greater, the maximum and minimum discharge rates shall be marked on an exterior surface of the device and shall be visible after installation. The minimum discharge rate shall not exceed 20 percent of the maximum discharge rate. [Nonretroactive as of January 1, 1985.]

S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:

(a) Placement of this information shall not be on a removable or interchangeable portion of the device.

(b) The information shall appear 24 to 60 inches from the base of the dispenser when placed on the outside of the device.

(c) When placed behind an access door or panel the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. The use of a dispenser key shall not be considered a tool separate from the device.

[Nonretroactive as of January 1, 2003]

Background/Discussion: The proposal is intended to ensure that required marking information is placed in an easily accessible location on a retail motor-fuel dispenser (RMFD). This issue was originally addressed in a developing item that proposed modifying paragraph G-S.1. Identification to specify placement of required marking information. During the 2001 NCWM Interim Meeting, NEWMA, which submitted the original developing item, provided an alternate proposal that was device specific. NEWMA's alternate proposal suggested adding a new paragraph S.4.X. Location of Marking Information to the Liquid-Measuring Devices Code.

The Committee considered other options for marking information such as Canada's requirement for legible information that is reasonably accessible to the operator and customer under conditions of normal use, duplicate markings on separate components, or electronic information on the display. NEWMA did not intend to require duplicate marking information on RMFDs although NIST Handbook 44 does not prohibit this practice.

The Committee was uncertain how maintenance practices or environmental factors might affect RMFD marking information. Retail motor-fuel dispensers are considered an enclosed system and marking information is not required on each system component. Manufacturers questioned the permanence of dispenser door panels that are removable for maintenance and interchangeable on similar dispenser types.

The Committee acknowledged concerns about the proposal's enforcement date and creating an exemption that accepts locating the information behind a key-locked panel door. The S&T Committee made a concession when G-S.1. Identification was amended in 1985 to permit information to be located behind a panel that does not require a key. The Committee asked for input from manufacturers and weights and measures officials affected by this proposal.

During their fall 2001 meetings, the Western Weights and Measures Association (WWMA), the Southern Weights and Measures Association (SWMA), and NEWMA considered the following alternate language developed by the Gasoline Pump Manufacturers Association (GPMA):

> S.4.X. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. may be placed on the framework of the dispenser behind an access door or panel. The use of a dispenser key shall not be considered a tool separate from the device.

The WWMA heard concern from weights and measures officials about safety hazards when it is necessary to kneel in a traffic lane in order to read the required marking information. The WWMA also heard from RMFD manufacturers who indicate that there are limited permanent locations on a dispenser in which to include the identification information. Many weights and measures officials stated they do not want to search for access keys that are frequently not available or open a dispenser to look for identification information. The WWMA also recommended that existing NIST Handbook 44 language be considered (i.e. G-S.1. Identification, The required information shall be so located that it is readily observable without the necessity of disassembly of a part requiring the use of any means separate from the device, and G.S.7. Lettering). The WWMA recommended the proposal should be a nonretroactive requirement.

The Central Weights and Measures Association (CWMA) developed the following alternate proposal:

> *S.4.X. Location of Marking Information; Retail Motor-Fuel Dispensers. – The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:*
>
> *(a) The information shall appear 24 to 60 inches above the ground when placed on the outside of the device or*

(b) The information shall appear 24 to 60 inches above the ground in an outwardly facing position when placed behind an access door or panel. The use of a dispenser key shall not be considered a tool separate from the device.

The CWMA recommended that the proposed paragraph be a nonretroactive requirement.

The SWMA reviewed the proposals. The SWMA opposed the GPMA alternate language shown above because the information is only available on the inside of the dispenser. The SWMA agreed the proposal should include a requirement for placing marking information in a readily observable location on an outside panel that cannot be easily removed.

Both the WWMA and the SWMA recommended this item remain a developing issue and encouraged NEWMA, the NTETC Measuring Sector, and GPMA work together for a solution.

NEWMA agreed that its alternate proposal in the recommendation above fully addresses its original concerns about the location of RMFD marking information. NEWMA's proposal provides a specific dimensional location for the information. NEWMA intended the proposal as a nonretroactive requirement with an effective date of January 1, 2003.

During the 2002 Interim Meeting, NIST/OWM noted that dispenser keys are currently considered as tools or means separate from the device and the necessity of their use does not comply with requirement for readily accessible marking information in paragraph G-S.1. Identification. The Committee recognized that a key locked panel adds one more level to accessing basic identification information that should be readily available. However, the Committee also recognized that Examination Procedure Outlines (EPO) 21 and 22 instruct field officials to access the lower portion of dispensers as part of the safety notes, and to inspect equipment and verify security seals. If field officials follow the EPOs, keys to the dispenser locks must be readily available.

The Committee also examined language that required the information to face outward when located behind a door panel. The Committee decided that the term outwardly facing position is subjective and allows the required markings to be placed in locations that may make the information difficult to read. The Committee agreed that the direction that the markings face is not as important as having the information clear and easily readable. The Committee agreed to present the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, a comment was made during the open hearing that almost any portion of a dispenser could be removed or interchanged. Several officials voiced strong support for the item. The Committee modified the proposal to include flow rates that are consistent with those referenced in Item 330-3A a proposal to add new Table T.2. Accuracy Classes for Liquid Measuring Devices Covered to NIST Handbook 44 Section 3.30. The Committee also modified the proposed new paragraph S.4.4.2. The Committee believes that its modifications to new paragraph S.4.4.2. will clarify that the information must be on a portion of the device that can only be removed by use of a tool.

331 Vehicle-Tank Meters

331-1 V Recognition of Temperature Compensation

(This item did not pass or fail; therefore it returns to the Committee.)

Source: Carryover Item 331-1 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda as Item 331-1.)

Recommendation: Modify the Vehicle-Tank Meters Code (VTM) to recognize temperature compensation as follows:

S.2.4. Automatic Temperature Compensation for Refined Petroleum Products.

S.2.4.1. Automatic Temperature Compensation for Refined Petroleum Products. - A device may be equipped with an automatic means for adjusting the indication and registration of the

measured volume of product to the volume at 15 °C (60 °F), where not prohibited by State Law.

S.2.4.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, and record if it is equipped to record, in terms of the uncompensated volume.

S.2.4.2.1. Gross and Net Indications – A device equipped with automatic temperature compensation shall indicate and record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. If both values cannot be displayed or recorded for the same test draft, means shall be provided to select either the gross or net indication for each test draft.

S.2.4.3. Provision for Sealing Automatic Temperature Compensating Systems. – 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 automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system.

S.2.4.4. Temperature Determination with Automatic Temperature Compensation. - For Test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

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

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

S.5.6. Temperature Compensation for Refined Petroleum Products. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recording representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

N.4.1.3. Automatic Temperature Compensating Systems for Refined Petroleum Products. - On devices equipped with automatic temperature compensating systems, normal tests shall be conducted;

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

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

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.

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

T.2.1. Automatic Temperature Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature compensating system activated shall not exceed:

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

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

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.

UR.2.5. Temperature Compensation for Refined Petroleum Products.

UR.2.5.1. Automatic.

UR.2.5.1.1. When to be Used. In a State that does not prohibit, by law or regulation, the sale of temperature compensated product a device equipped with an operable automatic temperature compensator shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

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

UR.2.5.1.2. Invoices.

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

Discussion: At the 2002 NCWM Interim Meeting, the Committee agreed with a NEWMA recommendation to change the words "In a State permitting by law" in paragraphs S.2.4.1. and UR.2.5.1.1. to "In a State that does not prohibit, by law or regulation" and that the proposal apply only to petroleum products. The NIST Office of Weights and Measures (OWM) provided the Committee with a written position statement for this item. OWM believes that requirements for the use of temperature compensation should be added to the vehicle-tank meters code; however, it should be supported by method of sale requirements for commodities, when metered by the gallon using a vehicle-tank meter. The proposal should make it mandatory that temperature compensation is automatic, be required on all similar devices within a firm, and is operational anytime the device is used. To promote uniformity throughout the marketplace the requirement needs to apply to the entire industry in all states. OWM also recommended that the issue of temperature compensation for vehicle-tank meters remain an information item until 2003. OWM plans to work with the states to collect information relative to current practices in the marketplace for the distribution of petroleum products. OWM will also provide an analysis of the impact of temperature compensation on industry and consumers at various levels of the distribution chain.

The Committee also heard several comments supporting the item because the language does not require the use of temperature compensation. The item provides specifications, tolerances, test notes, and user requirements if a temperature compensated device is used. The Committee did hear some opposition to the proposal; however, the committee concluded that the opposition had no technical merit. The Committee agreed to present the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard from one official that states that allow temperature compensation for vehicle-tank meters need a standard to follow. The official also stated that some courts have found that since the Vehicle-Tank Meters Code does not provide requirements relative to temperature compensation the use of compensated meters is legal. Another official expressed the opinion that most petroleum products delivered through a vehicle-tank meter are sold in the winter months and the seller has an advantage if temperature compensation is used

because the consumer will be charged for a greater quantity of product delivered if the quantity delivered is correct to a higher temperature than the actual temperature of the product delivered.

The Committee modified the proposal because some devices do not have the capability to indicate and record both a gross and net value when in the test mode. Consequently, the language was modified to specify that devices shall indicate "and/or" record both gross and net volume.

Background: At its August 2001Technical Conference, the WWMA heard comments supporting the NEWMA recommendations that were submitted to the NCWM S&T Committee prior to its 2001 Annual Meeting. Additionally, the WWMA recommended alternative text in paragraphs S.2.4., S.2.4.1., S.5.6., N.5., and UR.2.5. to clarify that the application of automatic temperature compensation is limited to refined petroleum products and corrections must be to a standard reference temperature of 60 ^{0}F. The WWMA recommended this proposal move forward for a vote with the NEWMA recommendations that the language addressing ATC in the Vehicle-Tank Meters Code of NIST Handbook 44 as permissive for States that allow this method of sale.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) heard comments that the L&R Committee needs to adopt language in the Method of Sale Regulation to recognize Temperature Compensation for products sold using vehicle-tank meters to promote uniformity.

At its October 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) agreed with the 2000 NEWMA recommendations to add a new paragraph S.2.4.1 and alternative paragraph UR.2.5.1.1. and supported the 2001 WWMA amendments to the proposal.

At its October 2001 Interim Meeting, NEWMA reiterated its support of the language developed at the 2000 NEWMA Annual Meeting, and submitted to the S&T Committee.

For additional background on this item see the NCWM 2000 and 2001 S&T Final Reports.

331-2 W N.4.1.2. Repeatability

(This item was withdrawn.)

Source: **Western Weights and Measures Association (WWMA)**

Discussion: The Committee reviewed the following proposal to modify paragraph N.4.1.2.

> N.4.~~1.~~24. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.2. Repeatability Tests.

The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts. The Committee decided to withdraw this item from its agenda.

Background: The background for this issue is outlined in the S&T Agenda Item 330-2 that addressed the proposed changes to Section 3.30. Paragraph N.4.1.2.

331-3 VC Tolerances, Table 1. Accuracy Classes for Vehicle-Tank Meters

(This item was adopted.)

(Item 331-3 was created when Item 330-3 on the Interim Agenda was divided into separate parts.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Delete existing Tolerance Tables 1, 3, and 4, add a new Table 1, amend paragraph T.2., and renumber paragraph T.4., to Section 3.31 Vehicle-Tank Meters (VTM).

Table 1 Accuracy Classes for Vehicle-Tank Meters Covered in NIST Handbook 44 Section 3.31.

Accuracy Class	Application		Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance
0.3	Petroleum products including large capacity motor fuel devices (flow rates over 115 L/min (30 gpm))**, heated products at or greater than 50 °C asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal)		0.15 %	0.3 %	0.45 %
0.3A	Asphalt at temperatures greater than 50 °C		0.3 %	0.3 %	0.5 %
0.5*	Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min (30 gpm))** motor-fuel devices, agri-chemical liquids, and all other applications not shown		0.3 %	0.5 %	0.5 %
1.1	Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm and devices designed to deliver less than one gallon		0.75 %	1.0 %	1.25 %
1.5	Water	Overregistration	1.5 %	1.5 %	1.5 %
		Underregistration	1.5 %	1.5 %	5.0 %

*The maintenance tolerances on normal and special tests for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances on normal and special tests are 3 cubic inches and 5.5 cubic inches.

** Flow rate refers to designed or marked maximum flow rate.

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. – Maintenance, ~~and~~ acceptance, and special test tolerances shall be as shown in Tables 1, and 2, ~~3, and 4~~.

~~T.3. Tolerance Values on Meters Used for the Measurement of Agri-Chemical Liquids. The maintenance tolerance on normal and special tests shall be 1 percent of the indicated quantity. The acceptance tolerance on a normal test shall be 0.5 percent of the indicated quantity and on special tests, 1 percent of the indicated quantity.~~

T.43. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.4.1.2.

~~Table 1.~~
~~Tolerances for Vehicle-Tank Meters Except for Vehicle-Mounted Milk Meters, Agri-Chemical Meters, and Water Meters~~

	~~Normal tests~~		~~Special tests~~
~~Indication~~	~~Maintenance tolerance~~	~~Acceptance tolerance~~	~~Maintenance and acceptance tolerance~~
~~(Gallons)~~	~~(Cubic inches)~~	~~(Cubic inches)~~	~~(Cubic inches)~~
~~50~~	~~50~~	~~25~~	~~50~~
~~Over 50~~	~~Add 1/2 cubic inch per indicated gallon over 50~~	~~Add 1/4 cubic inch per indicated gallon over 50~~	~~Add 1 cubic inch per indicated gallon over 50~~

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication	Maintenance	Acceptance
gallons	gallons	gallons
100	0.5	0.3
200	0.7	0.4
300	0.9	0.5
400	1.1	0.6
500	1.3	0.7
Over 500	Add 0.002 gallon per indicated gallon over 500	Add 0.001 gallon per indicated gallon over 500

~~Table 3. Tolerances for Vehicle-Mounted Water Meters~~
~~Normal Tests~~

~~Meter size (inches)~~	~~Rate of flow (gal/min)~~	~~Maximum Rate~~		
		~~Meter indication~~		~~Tolerance on over- and under-registration~~
		~~gal~~	~~Ft^3~~	
~~5/8~~	~~15~~	~~50~~	~~5~~	
~~3/4~~	~~25~~	~~50~~	~~5~~	
~~1~~	~~40~~	~~100~~	~~10~~	
~~1 1/2~~	~~80~~	~~300~~	~~40~~	~~1.5%~~
~~2~~	~~120~~	~~500~~	~~40~~	
~~3~~	~~250~~	~~500~~	~~50~~	
~~4~~	~~350~~	~~1 000~~	~~100~~	
~~6~~	~~700~~	~~1 000~~	~~100~~	

Table 4. Tolerances for Vehicle-Mounted Water Meters Special Tests									
Meter size (inches)	Intermediate rate				Minimum rate				
	Rate of flow (gal/min)	Meter indication		Tolerance on over- and under-registration	Rate of flow (gal/min)	Meter indication		Tolerance	
		gal	ft^3			gal	ft^3	Under-registration	Over-registration
5/8	3	10	1		¼	5	1		
¾	3	10	1		1/2	5	1		
1	4	10	1		3/4	5	1		
1 ½	8	50	5	1.5%	1 1/2	10	1	5.0%	1.5%
2	15	50	5		2—	10	1		
3	20	50	5		4—	10	1		
4	40	100	10		7—	50	5		
6	60	100	10		12—	50	5		

Discussion: At the 2002 NCWM Annual Meeting the Committee was concerned that the proposed accuracy table of tolerances would significantly increase the acceptance and special test tolerances for 0.3 Accuracy Class devices. The Committee considered changing the tolerance to 0.15 percent acceptance and 0.4 percent special test tolerance. During the open hearing, the Committee heard that the Meter Manufacturers Association (MMA) had a concern with devices meeting the proposed new special test tolerances of 0.4 percent especially when conducting a split compartment test. The MMA noted that 0.16 percent acceptance, 0.32 percent maintenance, and 0.43 percent special test tolerances represent current tolerances. The Committee considered the MMA recommendation and proposed alternate tolerances of 0.15 percent acceptance, 0.3 percent maintenance, and 0.45 percent special test tolerances which it believes were attainable and closer to existing tolerances.

Background: At the 2002 NCWM Interim Meeting The Committee agreed with the WWMA proposal to remove paragraph T.3., and Tables 1, 3, and 4 from Section 3.31. The Committee further modified the proposal to: (1) specify the special test tolerances for 5-gallon and 10-gallon drafts, (2) state that the flow rate for each application applies to the equipment's designed maximum flow rate rather than the flow rate obtained at an installation, and (3) clarify the accuracy class for devices designed with flow rates less than 1 gpm. The Committee also added a new Accuracy Class 1.5 for vehicle-mounted water meters as recommended by WWMA. The NIST Office of Weights and Measures (OWM) provided the Committee with a written position statement for this item. OWM recommended the proposed tolerance tables be adopted for NIST Handbook Section 3.31. Vehicle-Tank Meters along with the recommendations from the 2001 WWMA Technical Conference. The Committee recommended the modified accuracy table for Section 3.31. for a vote in July.

Additional background information for this item is outlined in the S&T Agenda Item 330-3A, which address proposed changes to Sections 3.30. and 3.31.

332 LPG and Anhydrous Ammonia Liquid-Measuring Devices

332-1 W N.4.1.2. Repeatability

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA)

Discussion: The Committee reviewed the following proposal to modify paragraph N.4.1.2.

N.4.~~1.24~~. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.2. Repeatability.

The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts. The Committee decided to withdraw this item from its agenda.

Background: The background for this issue is outlined in the S&T Agenda Item 330-2, which addressed the proposed changes to Section 3.30 Paragraph N.4.1.2.

332-2 I UR.2.3. Vapor-Return Line

Source: Southern Weights and Measures Association (SWMA)

Recommendation: No specific recommendation was submitted to address the use of vapor return lines during metered deliveries of liquefied petroleum gas (LPG) at loading rack and shipping (bulk) terminal locations.

Background/Discussion: At its September 2001 Annual Meeting, the SWMA heard a concern from Tennessee that vapor-return lines are commonly used at LPG loading rack terminals where large capacity transports are loaded for distribution to bulk LPG dealers. At least some of the companies operating terminals are applying industry derived factors that are used to credit customers for metered product that is returned as vapor to the sellers' storage tanks. Paragraph UR.2.3. (a) provides an exception for abnormal conditions, such as high pressure in the receiving tank, which prevents delivery without the use of a vapor return line. The SWMA questions whether or not bulk terminal locations fall under this exemption. The terminals where vapor-return lines are being used have insufficient pumping ability to fill the large vessels that are used to distribute LPG to bulk dealer facilities without using a vapor return line; however, when pumping capacity becomes an issue the condition can be remedied by installing new pumping and metering equipment which is capable of filling the large pressure vessels without a vapor-return line. Additionally, many terminals have the option of weighing the product rather than metering it. These conditions exist at LPG terminals in all regions of the United States and is not a unique situation affecting the State of Tennessee.

SWMA agreed with Tennessee that the following points should be reviewed to remove any ambiguity about the appropriateness of vapor return lines in various LPG filling operations:

1. Allow loading rack terminals to use vapor-return lines and review a proposal from industry on applying the vapor factor to credit the purchaser. A mean credit value may be adequate, although it has been determined that the vapor returned is not always consistent from delivery to delivery.
2. Allow a vapor meter to be installed between the receiving vessel and the seller's tanks, then convert the vapor measurements to liquid quantities and credit the purchaser.
3. Provide a consensus opinion that bulk terminal loading-rack installations meet the exception contained in paragraph UR.2.3.(a) and no action is needed by weights and measures officials.
4. Provide a consensus opinion that bulk terminal loading rack installations do not meet the exception noted in paragraph UR.2.3.(b) and weights and measures official should require terminals currently unable to load vessels without vapor-return lines to take corrective action to comply with NIST Handbook 44.

The SWMA recognized the concerns of the State of Tennessee and agreed to forward this item to NCWM, but recommends it remain an information item to allow time for the submitter to develop specific language.

At the 2002 NCWM Interim Meeting, the Committee recognized the concerns of the SWMA and gave the item informational status to allow the submitter time to develop a specific proposal.

At the 2002 NCWM Annual Meeting the Committee received no comments on this item. The Committee agreed to allow additional time for the submitter to develop a specific proposal.

333 Hydrocarbon Gas Vapor-Measuring Devices

333-1 VC N.4.1.2. Repeatability Tests and T.2. Repeatability

(This item was adopted.)

Source: Carryover item 333-1 (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's agenda in 2001.)

Recommendation: Add a new paragraph N.4.1.2. and a new paragraph T.2 to NIST Handbook 44 Hydrocarbon Gas Vapor-Measuring Devices Code as follows:

N.4.1.2. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

T.2. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 0.9 percent and the results of each test shall be within the applicable tolerance. *See also N.4.1.2.*

Discussion: At the 2002 NCWM Interim Meeting, the Committee agreed the 0.9 percent repeatability tolerance in the 2001 WWMA proposal because it provides a reasonable approach for handling the difference in basic tolerances allowed for underregistration and overregistration. The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.2. Repeatability Tests.

He Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.4.1.2. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

Background: At its 2001 Technical Conference, the WWMA reviewed the alternate proposal shown below submitted by the California Division of Measurement Standards. The alternate proposal recognizes that the NIST Handbook 44 Hydrocarbon Gas Vapor-Measuring Devices Code specifies tolerances that are different depending on whether the error is in the direction of overregistration or underregistration. The repeatability tolerance in most other liquid-measuring device codes is based on 40 percent of the absolute value of the maintenance tolerance. The WWMA wanted to simplify the repeatability tolerance value to equal 40 percent of one half the sum of the overregistration tolerance of 1.5 percent and the underregistration tolerance of 3.0 percent. For hydrocarbon gas vapor-measuring devices 40 percent of 2.25 percent equals 0.9 percent. Using a formula as an example the proposed repeatability tolerances for hydrocarbon gas

vapor-measuring devices is [(1.5 + 3.0) + 2] x 0.40 = 0.9 percent. Acceptance and maintenance tolerances are the same in the hydrocarbon gas vapor-measuring devices code.

> T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.9 percent, and the results of every test shall be within applicable tolerance.
>
> N.4.1.2. Repeatability Tests. - Tests for repeatability *be* ~~should include a minimum of three consecutive test drafts~~ of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

The WWMA also reviewed a proposal to modify paragraph N.4.1.2. as shown above to allow less than three consecutive tests to determine compliance with repeatability tolerances. The WWMA agreed that if the device is clearly out of tolerance on the first two test drafts the inspector should not be required to perform additional tests. The WWMA was concerned; however, that the proposed language would allow the determination of repeatability with only two tests. The WWMA also noted that test note N.4.1.2. could be considered as requiring repeatability tests since it is a subparagraph of "Normal Tests." The WWMA felt that renumbering N.4.1.2. as N.4.3. makes it clear that repeatability is not a mandatory part of normal or special tests. The WWMA amended the proposal as shown below to address these concerns.

The WWMA recommended for a vote the following alternate language to simplify the tolerances in paragraph T.X.X. and clarify the number of required tests in paragraph N.4.1.2.

> T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.9 percent, and the results of every test shall be within applicable tolerance.
>
> N.4.3. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

At its September 2001 Meeting, the NTETC Measuring Sector reviewed the 2001 WWMA recommendations outlined above and agreed to forward a recommendation to the NCWM S&T Committee to add the proposed WWMA repeatability tolerance language above to NIST Handbook 44. The Measuring Sector agreed that repeatability tests should only be conducted under the same conditions as specified for a normal test.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) heard concerns about whether or not the proposed repeatability tolerances were realistic. The CWMA wanted device manufacturers to provide data indicating that their devices can meet the proposed tolerances.

At its October 2001 Annual Meeting, the SWMA supported the recommendations of the WWMA and the 2001 NTETC Measuring Sector and further recommended that this item move forward for a vote.

At its October 2001 Interim Meeting, the Northeastern Weights and Measures Association (NEWMA) received no comments on this item.

For additional background on this item see the NCWM 2001 Final Report of the S&T Committee.

334 Cryogenic Liquid-Measuring Devices

334-1 VC Recognize Mass Units of Measurement

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify paragraphs S.1.1.2. Units, S.1.1.3. Value of Smallest Unit, and S.2.4. Automatic Temperature or Density Compensation to recognize mass units of measurement as follows:

S.1.1.2. Units. - A device shall indicate and record, if equipped to record, its deliveries in terms of: kilograms or pounds; liters or gallons of liquid at the normal boiling point of the specific cryogenic product; cubic meters (cubic feet) of gas at a normal temperature of 21 °C (70 °F) and an absolute pressure of 101.325 kPa (14.696 psia); or decimal subdivisions or multiples of the measured units cited above.

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) 1 L**
- **(2) 0.1 gal**
- **(3) ~~0.1 m³ of gas~~1 kg**
- **(4) ~~10 cubic feet of gas~~ 1 lb**
- **(5) 0.1 m^3 of gas**
- **(6) 10 cubic feet of gas**

(b) for large delivery devices
- **(1) 10 L**
- **(2) 1 gal**
- **(3) ~~1 m³ of gas~~ 10 kg**
- **(4) ~~100 ft³ of gas~~ 10 lb**
- **(5) 1 m^3 of gas**
- **(6) 100 ft^3 of gas**

S.2.4. Automatic Temperature or Density Compensation. - A device shall be equipped with automatic means for adjusting the indication and/or recorded representation of the measured quantity of the product, to indicate and/or record in terms of: kilograms or pounds; or liters or gallons of liquid at the normal boiling point of the specific cryogenic product; or the equivalent cubic meters (cubic feet) of gas at a normal temperature of 21 °C (70 °F) and an absolute pressure of 101.325 kPa (14.696 lb/in^2 absolute). ***When a compensator system malfunctions, the indicating and recording elements may indicate and record in uncompensated volume if the mode of operation is clearly indicated, e.g., by a marked annunciator, recorded statement, or other obvious means.****

[*Nonretroactive as of January 1, 1992.]

Background/Discussion: In 1994 the NCWM agreed make Section 3.37 Mass Flow Meters a permanent code in NIST Handbook 44. At that time it also agreed to remove the allowance for indications in units of mass from all other liquid-measuring device codes. At its September 2001 Meeting, the Measuring Sector heard comments from a manufacturer of cryogenic liquid measuring devices indicating that mass units continue to be used as an industry standard for measurement of cryogenic liquids. The Sector also received letters from two distributors of cryogenic liquids stating that units of mass are commonly used for sales of cryogenic liquids. Cryogenic liquids, such as oxygen, nitrogen, hydrogen and argon, are pure products each having consistent densities at a defined reference temperature. The Sector

agreed that it is appropriate to return mass units to NIST Handbook 44, Section 3.34. Cryogenic Liquid-Measuring Devices Code.

At the 2002 NCWM Interim Meeting, the Committee heard no opposition to the proposal. Consequently the Committee recommended the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

334-2 W N.5.1.1. Repeatability

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA)

Discussion: The Committee considered the following proposal to modify paragraph N.5.1.1.

> N.5.~~1.~~13. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.5.1.1. Repeatability Tests.

The Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.5.1.1. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

Background: The background for this issue outlined in the S&T Agenda Item 330-2, which addressed the proposed changes to Section 3.30 Paragraph N.4.1.2.

335 Milk Meters

335-1 VC N.4.1.1. Repeatability Tests and T.3. Repeatability

(This item was adopted.)

Source: Carryover item 335-1 (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's agenda in 2001.)

Recommendation: Add new paragraphs Repeatability Tests N.4.1.1. and T.3. Repeatability to the NIST Handbook 44 Milk Meters Code as follows:

> **N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.**

T.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. *See also N.4.1.1.*

Discussion: The Committee considered the NTETC Measuring Sector and the WWMA proposals for milk meter repeatability tolerances and test procedures. The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.1. Repeatability Tests.

The Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.4.1.1. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

The Measuring Sector Technical Advisor reported that no negative comments had been received from the milk meter manufacturer contacted. The Committee heard no unfavorable comments on its original proposal; therefore, the Committee recommends the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

Background: At its August 2001Technical Conference, the WWMA reviewed the following alternate proposal for paragraph N.4.1.1. Repeatability Tests. submitted by the California Division of Measurement Standards. The alternate proposal would allow less than three consecutive tests to determine compliance with repeatability tolerances.

N.4.1.2. Repeatability Tests. - Tests for repeatability should *be* ~~include a minimum of three consecutive test drafts~~ of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

The WWMA agreed that if the device is clearly out of tolerance on the first or second test draft the inspector should not be required to perform additional tests. The WWMA was concerned; however, that the proposed language would allow the determination of repeatability with only two tests. The WWMA also noted that test note N.4.1.2. could be considered as requiring repeatability tests since it is a subparagraph of "Normal Tests." The WWMA felt that renumbering N.4.1.2. as N.4.4. makes it clear that repeatability is not a mandatory part of normal or special tests. The WWMA amended the proposal to address these concerns.

The WWMA recommended for a vote the following alternate language to simplify the tolerances in paragraph T.X. and clarify the number of required tests in paragraph N.4.4.

N.4.4. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as, temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. *See also N.4.4.*

No representatives of milk meter manufacturers attended the September 2001, (NTETC) Measuring Sector Meeting. The Sector agreed that test for repeatability should only be conducted under "normal test" conditions. The Sector asked its

Technical Advisor to contact milk meter manufacturers to provide input directly to the S&T Committee regarding the ability of their devices to meet the proposed repeatability tolerance of 40 percent of the absolute value of the maintenance tolerance. Prior to the 2002 NCWM Interim Meeting the Technical advisor contacted the only milk meter manufacturer with NTEP CC's for their devices. The manufacturer agreed to review the proposed repeatability tolerances and forward and concerns to the S&T Committee.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) heard concern as to whether or not the tolerances were realistic. The CWMA wanted device manufacturers to provide data indicating the ability of their devices to meet the proposed tolerances.

At its October 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) recommended that this item be moved forward pending information from device manufacturers on the ability of their devices to meet the repeatability tolerances.

For additional background on this item see the NCWM 2001 Final Report of the S&T Committee.

336 Water Meters

336-1 VC A.1.; Application, S.1.1.1. General, N.4.1. Normal Tests, Table 1. Tolerances for Water Meters Normal Tests, and Table 2. Tolerances for Water Meters Special Tests

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify Section 3.36 Water Meters as follows.

A. Application

A.1. - This code applies to devices used for the measurement of water; generally applicable to, but not limited to, utilities type meters installed in ~~homes~~, residences, or business establishments and meters installed in batching systems.

S. Specifications

S.1.1.1. General. – A water meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element. Such elements shall be visible at the point of measurement or be stored in non-volatile electronic memory. The display may be remotely located provided it is readily accessible to the customer.

N.4.1. Normal Tests. The normal test of a meter shall be made at the maximum discharge rate developed under conditions of the installation. Meters with maximum gallon per minute ratings higher than Table 1 values may be tested up to the meter rating, with meter indications no less than those shown.

Modify Table 1. Tolerances for Water Meters, Normal Tests as follows:

Table 1. Tolerances for Water Meters Normal Tests				
Meter Size (inches)	Rate of flow (gal/min)	Maximum Rate		
		Meter indication		Tolerance on over- and under-registration
		Gal	ft.^{3}	
Less than 5/8	8	50	5	
5/8	15	50	5	
3/4	25	50	5	
1	40	100	10	
1 1/2	80	300	40	1.50%
2	120	500	40	
3	250	500	50	
4	350	1000	100	
6	700	1000	100	

Modify Table 2. Tolerances for Water Meters, Special Tests as follows:

Table 2. Tolerances for Water Meters Special Tests									
Meter Size (inches)	Intermediate Rate				Minimum Rate				
	Rate of Flow (gal/min)	Meter indication		Tolerance on over- and under-registration	Rate of Flow (gal/min)	Meter indication		Tolerance	
		gal	ft^3			gal	ft^3	Under-registration	Over-registration
Less than or equal to 5/8	2	10	1		1/4	5	1		
3/4	3	10	1		1/2	5	1		
1	4	10	1		3/4	5	1		
1 1/2	8	50	5		1 1/2	10	1		
2	15	50	5	1.50%	2	10	1	5.0%	1.50%
3	20	50	5		4	10	1		
4	40	100	10		7	50	5		
6	60	100	10		12	50	5		

Background/Discussion: At its August 2001Technical Conference, the WWMA reviewed a proposal to recognize additional meter sizes in the tolerance tables of NIST Handbook 44, Section 3.36 Water Meters. The proposed tolerances are intended to address meters used in sub-metering applications. The WWMA heard general support for the proposal and recommended this item move forward to a vote.

At its September 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) heard about installations where the primary indications are in remote locations separate from the measuring element [in applications other than utility submetering]. SWMA noted that allowing remote indications in the water meters code would conflict with requirements for customer readability in other codes. The SWMA recommended that this proposal be made a developing item to enable these concerns to be addressed and resolved.

The Committee supports the proposal to address sizes of water meters not previously recognized by NIST Handbook 44. The Committee notes that paragraph G-UR.2.2. Installation of Indicating and Recording Element allows remote indications provided there is convenient and permanently installed means for direct oral or visual communication between the measuring element and the indicating or recording element. The Committee agreed that primary indications may be remotely located as long as they are readily accessible to the customer. Consequently, the Committee recommended this item for a vote.

At the 2002 NCWM Annual Meeting, the Committee modified the proposal to satisfy concerns about the accessibility of the indications to the customer. The Committee further modified the proposal to include the term "residence" because it encompasses various types of dwellings where meters are installed in submeter applications.

336-2 VC N.4.1.1. Repeatability Tests and T.1.1. Repeatability

(This item was adopted.)

Source: Carryover item 336-1 (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's 2001 agenda.)

Recommendation: Add new paragraphs N.4.1.1. Repeatability Tests and T.1.1 Repeatability to the NIST Handbook 44 Water Meters Code as follows:

> **N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.**
>
> **T.1.1. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6 percent for tests performed at the normal and intermediate flow rates, and 1.3 percent for tests performed at the minimum flow rate, and each test shall be within the applicable tolerance.**

Discussion: The Committee did not hear any unfavorable comments on this proposal. The Committee agreed that the WWMA alternate proposal for paragraph T.X.X. better corresponds to current the difference in underregistration and overregistration tolerances for water meters rather than a single tolerance for all test results. Therefore, the Committee modified the proposal as shown in the recommendation above to include repeatability tolerances values of 0.6 percent and 1.3 percent for underregistration and overregistration, respectively. The Committee also agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.1. Repeatability Tests.

The Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.4.1.1. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

Background: At its 2001 meeting, the WWMA reviewed the alternate proposal shown below submitted by the California Division of Measurement Standards. The alternate proposal recognizes that the NIST Handbook 44 Water Meters Code specifies special test tolerances that are different depending on whether the error is in the direction of overregistration or underregistration. For normal and intermediate flow rate test the tolerance is the same for overregistration or underregistration. The repeatability tolerance in most other liquid-measuring device codes is based on 40 percent of the absolute value of the maintenance tolerance. The WWMA wanted to simplify the special test repeatability tolerance value to equal 40 percent of one half the sum of the overregistration tolerance of 1.5 percent and the underregistration tolerance of 5.0 percent. Using a formula as an example the proposed repeatability tolerances for hydrocarbon gas vapor-measuring devices is $[(1.5 + 5.0) \div 2] \times 0.40 = 1.3$ percent. For normal and intermediate flow rate tests the tolerance is ±1.5 percent, 40 percent of the absolute value of 1.5 percent equals 0.6 percent. Acceptance and maintenance tolerances are the same in the water meters code.

> T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6 percent for tests performed at the normal and intermediate flow rates, and 1.3 percent for tests performed at the minimum flow rate, and each test shall be within the applicable tolerance.

The WWMA also reviewed the following alternate language submitted by the Division of Measurement Standards to modify paragraph N.4.1.1. to allow less than three consecutive tests to determine compliance with repeatability tolerances.

> N.4.1.1. Repeatability Tests. - Tests for repeatability *be* ~~should include a minimum of three consecutive test drafts~~ of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

The WWMA agreed that if the device is clearly out of tolerance on the first or second test draft the inspector should not be required to perform additional tests. The WWMA was concerned; however, that the proposed language would allow the determination of repeatability with only two tests. The WWMA also noted that test note N.4.1.1. could be considered as requiring repeatability tests since it is a subparagraph of "Normal Tests." The WWMA felt that renumbering N.4.1.1.as N.4.4. makes it clear that repeatability is not a mandatory part of normal or special tests. The WWMA amended the proposal to amend paragraph N.4.1.1.as shown below to address these concerns.

The WWMA recommended for a vote the following alternate proposal to clarify the number of required tests in paragraph N.4.4. and simplify the tolerances in paragraph T.X.X.

> N.4.4. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.
>
> T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6 percent for tests performed at the normal and intermediate flow rates, and 1.3 percent for tests performed at the minimum flow rate, and each test shall be within the applicable tolerance.

At its September 2001 Meeting, the NTETC Measuring Sector reviewed the 2001 WWMA recommendations outlined above and agreed to forward a recommendation to the NCWM S&T Committee to add the proposed WWMA repeatability tolerance language above to NIST Handbook 44. The Measuring Sector agreed that repeatability tests should only be conducted under the same conditions as specified for a normal test.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) heard concerns as to whether or not the tolerances were realistic. The CWMA wanted device manufacturers to provide data indicating the ability of their devices to meet the proposed tolerances.

At its October 2001 Annual Meeting, the SWMA supported the recommendations of the WWMA and the 2001 NTETC Measuring Sector and further recommended that this item be moved forward for a vote.

For additional background on this item see the NCWM 2001 Final Report of the S&T Committee.

337 Mass Flow Meters

337-1 VC S.4.1. Diversion of Measured Product

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify NIST Handbook 44, Section 3.37, paragraph S.4.1. as follows:

S.4.1. Diversion of Measured Product. - No means shall be provided by which any measured product can be diverted from the measuring instrument. However, two or more delivery outlets may be permanently installed and operated simultaneously, provided that any diversion of flow to other than the intended receiving receptacle cannot be readily accomplished or is readily apparent. Such means include physical barriers, visible valves or indications that make it clear which outlets are in operation, and explanatory signs if deemed necessary.

A manually controlled outlet that may be opened for purging or draining the measuring system ~~shall be permitted.~~ or for recirculating product if recirculation is required in order to maintain the product in a deliverable state shall be permitted. Effective means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.

Background/Discussion: Mass flow meters have been used in applications to measure products that must periodically be recirculated to prevent product separation or settling of particles in suspension. Section 3.37 of NIST Handbook 44 does not permit recirculation of product or recognize the need to recirculate product in certain applications. At its September 2001 Meeting, the Measuring Sector agreed to forward the above recommendation to the NCWM S&T Committee and recommends a review of all NIST Handbook 44, liquid-measuring device codes for inclusion of similar language.

The Committee recognizes that there are metered products that must be recirculated to maintain a proper suspension and believes the proposed change to paragraph S.4.1. will allow for recirculation without facilitating fraud. At the 2002 NCWM Interim Meeting the Committee made one editorial change to the proposed new language. The Committee will review other NIST Handbook 44 liquid-measuring device codes as suggested by the Measuring Sector to determine if similar changes are necessary.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

337-2 W N.6.1.1. Repeatability Tests

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA)

Background/ Discussion: The Committee considered the following proposal to modify paragraph N.6.1.1.

N.6.~~1.1~~3. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to

the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.6.1.1. Repeatability Tests.

The Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.6.1.1. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

Background: The background for this issue is outlined in the S&T Agenda Item 330-2, which addressed the proposed changes to Section 3.30 Paragraph N4.1.2.

338 Carbon Dioxide Liquid-Measuring Devices

338-1 VC Tentative Status of the Carbon Dioxide Liquid-Measuring Devices Code

(This item was adopted.)

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Change the status of the Carbon Dioxide Liquid-Measuring Devices Code from "tentative" to "permanent."

Background/ Discussion: The Carbon Dioxide Liquid-Measuring Devices Code was added to the 1997 edition of NIST Handbook 44, as a Tentative Code. No unfavorable comments have been submitted on the Carbon Dioxide Liquid-Measuring Devices Code and no requests have been received to conduct extended studies prior to its adoption as a permanent code. Weights and measures officials and industry representatives indicate that there is a need for a recognized set of code requirements for commercial carbon dioxide liquid-measuring devices. At its September 2001 Meeting, the SWMA agreed to recommend to the NCWM S&T that the code be adopted as a permanent code.

During the 2002 NCWM Interim Meeting, the Committee heard no unfavorable comments on this item. Consequently the Committee recommended the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

338-2 VC N.4.1.1. Repeatability Tests and T.2.3. Repeatability

(This item was adopted.)

Source: Carryover item 338-1 (This item originated from the National Type Evaluation Technical Committee (NTETC) Measuring Sector and first appeared on the Committee's 2001 agenda.)

Recommendation: Add the following new paragraphs N.4.1.1. Repeatability Tests and T.2.3. Repeatability to the NIST Handbook 44 Carbon Dioxide Liquid-Measuring Code:

> **N.4.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.**

T.2.3. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. *See also N.4.1.1.*

Discussion: The Committee considered the NTETC Measuring Sector and WWMA proposals for repeatability tolerances and test procedures for carbon dioxide liquid-measuring devices. The Committee agreed that a repeatability test is not required as part of a routine inspection. If the result of an individual test is at or near the tolerance limit, at least one more test should be considered to verify the device can replicate the previous result. If the range of error for two tests is at or near the repeatability tolerance limits, then a repeatability test should be conducted. If a repeatability test is conducted, then a minimum of three tests is required under the test conditions listed in paragraph N.4.1.1. Repeatability Tests.

The Committee did not include the WWMA proposal to amend the Committee's recommendation of proposed paragraph N.4.1.1. Repeatability Tests. The Committee understands that an inspector should have the flexibility to perform fewer tests if a device is clearly out of tolerance; however, the Committee was concerned that the WWMA proposal could be interpreted to indicate that a test for repeatability could routinely be conducted with only two test drafts.

The Measuring Sector Technical Advisor reported that a manufacturer of a carbon dioxide liquid-measuring device intended to present data to the Committee to show that the proposed repeatability tolerances would not pose a problem his company. That manufacturer was unable to attend the 2002 NCWM Interim Meeting, but provided the data prior to the 2002 NCWM Annual Meeting. The Committee heard no unfavorable comments on its original proposal; therefore, the Committee recommended the item for a vote at the 2002 NCWM Annual Meeting.

At the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on the item.

Background: At its August 2001 Technical Conference, the WWMA reviewed the following alternate proposal for paragraph N.4.1.1. Repeatability Tests submitted by the California Division of Measurement Standards. The alternate proposal would allow less than three consecutive tests to determine non-compliance with repeatability tolerances.

N.4.1.1. Repeatability Tests. - Tests for repeatability should *be* ~~include a minimum of three consecutive test drafts~~ of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

The WWMA agreed that if the device is clearly beyond accuracy tolerances on the first two test drafts the inspector should not be required to perform additional tests. However, the WWMA was concerned that the proposed language would allow the determination of repeatability with only two tests. The WWMA also noted that test note N.4.1.1. could be considered as requiring repeatability tests since it is a subparagraph of "Normal Tests." The WWMA felt that renumbering N.4.1.2.as N.4.5. makes it clear that repeatability is not a mandatory part of normal or special tests.

The WWMA amended the proposal as shown below to address these concerns.

N.4.5. Repeatability Tests. - Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as, temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

T.X. Repeatability. - When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. *See also N.4.5.*

At the September 2001 NTETC Measuring Sector Meeting, a manufacturer of a carbon dioxide liquid-measuring device expressed support for the proposal; however, he had no data available to show that the proposed repeatability tolerance would not pose a problem for his company. The Sector asked the technical advisor to contact manufacturers of carbon dioxide liquid-measuring devices and ask that they provide input directly to the S&T Committee regarding the effect of the proposed repeatability tolerance of 40 percent of the absolute value of the maintenance tolerance on their equipment. The Sector also agreed that tests for repeatability should only be conducted under the same conditions as specified for a normal test.

At its September 2001 Interim Meeting, the Central Weights and Measures Association (CWMA) heard concerns about whether or not the proposed repeatability tolerances were realistic. The CWMA wanted device manufacturers to provide data indicating that their devices can meet the proposed tolerances.

At its October 2001 Annual Meeting, the Southern Weights and Measures Association (SWMA) recommended that this item be moved forward for a vote with the expectation that device manufacturers will provide information that indicate their devices can meet the proposed repeatability tolerances.

357 Near-Infrared Grain Analyzers

357-1A VC Tentative Status of the Near-Infrared Grain Analyzers Code

(This item was adopted.)

(Item 357-1 was separated into two parts, 357-1A and 357-1B, during the 2002 Interim Meeting to facilitate review of the issues.)

Source: NTETC Near-Infrared (NIR) Grain Analyzer Sector

Recommendation: Change the status of the Near-Infrared Grain Analyzers Code from tentative to permanent.

Background/Discussion: The Near-Infrared Grain Analyzer Code was added as a Tentative Code to the 1995 edition of NIST Handbook 44. Prior to the 2002 NCWM Interim Meeting, the Committee had not received any unfavorable comments on the Code or received any requests for extended studies. Weights and measures officials and some industry representatives indicate that there is a need for a permanent set of code requirements for commercial near infrared grain analyzers.

The following background information was excerpted from the August 2001 NIR Sector meeting summary. At the Sector's August 2001 meeting, several grain industry representatives objected to recommending that the tentative code be made permanent unless the code is applied only to wheat protein. From their viewpoint, constituent based trading in other grains is still a work in progress with the majority of transactions based on contractual agreements between buyer and seller, often involving the use of proprietary calibrations and grain with specific genetic traits. High-oil corn and high-lysine corn were mentioned as two grains that were being traded in this manner.

Some Sector members claimed that trade practices are not being considered by the weights and measures community. Some members indicated that NTEP calibrations are "generic" and are not intended to apply to specialty crops traded under contracts that specify the use of a proprietary calibration. Weights and measures members were concerned about the growing number of producer-to-elevator trades that involve the payment of a premium (or involve a dockage) based on specific constituent concentration. Soybeans were mentioned as one commodity traded on an oil basis in the State of Missouri. Contracts are not the norm in trades based on constituent concentration.

To clarify the Sector's intent and to address the concerns expressed by grain trade representatives, the Sector agreed that the scope section of the Tentative Code should be modified to specify that NTEP grain oilseed calibrations should apply to fungible commodities; not to specialty crops traded under contract. Additionally, NTEP NIR analyzers may be used on specialty crops with proprietary calibrations provided the calibrations and the results are clearly differentiated. The Sector also recommended that field evaluation of NIR Analyzers should be conducted only on the NTEP grain and oil seed calibrations.

The Committee reviewed the following language to add a new paragraph A.3.2.1. Calibrations that would be listed on National Type Evaluation Certificates of Conformance to address the grain industry's concerns about specialty crops.

> A.3.2.1. Calibrations listed on National Type Evaluation Certificate of Conformance are applicable to fungible commodities and are not intended to apply to specialty crops traded under contracts specifying the use of proprietary calibrations. Proprietary calibrations applicable to specific specialty crops may be used on NIR Analyzers provided the calibration and its results are clearly differentiated from results obtained using calibrations listed on the CC. Field evaluation of NIR Analyzers will be conducted only on calibrations applicable to fungible commodities.

During the 2002 NCWM Interim Meeting, the Sector Technical Advisor informed the Committee that the above language was part of a discussion and was not intended as a proposal to change the NIR Code. The Committee acknowledged that the Near Infrared Grain Analyzer Code is ready for a change in status from tentative to permanent. The Committee considered the Sector's proposal to modify the Applications, Specifications, and Notes Sections of the NIR Code that included an exemption for specialty crops using proprietary calibrations from the entire NIR Code (See Item 357-1B). The Committee also heard NIST Office of Weights and Measures (OWM) support for giving the code, as written, permanent status. OWM recognized industry's concern about how to address specialty crops, but has a number of concerns about the Sector's proposed language. OWM indicated there is no definition of specialty crop, although NIST Handbook 44 includes provisions for applications not addressed in the specific codes. OWM also noted that commercial applications are subject to Handbook 44 requirements, whether or not the commercial application is part of a contract sale. The Committee did not see any technical merit for allowing an exemption from the entire NIR Code for specialty crops purchased under contractual agreement.

During the 2002 NCWM Annual Meeting, the Committee heard no unfavorable comments on this item.

357-1B I S.1.2. Selecting Grain Class and Constituent

(Item 357-1 was separated into two parts 357-1A and 357-1B during the 2002 Interim Meeting to facilitate review of the issues.)

Source: NTETC Near-Infrared (NIR) Grain Analyzer Sector

Recommendation: Amend paragraph S.1.2. as follows:

> ***S.1.2. Selecting Grain Class and Constituent. – Provision shall be made for selecting, and recording the type or class of grain and the constituent(s) to be measured. The means to select the grain type or class and constituent(s) shall be readily visible and the type or class of grain and constituent(s) selected shall be clearly and definitely identified in letters (such as HRWW, HRSW, etc. or PROT, etc.). A symbol to identify the display of the type or class of grain and constituents(s) selected is permitted provided that it is clearly defined adjacent to the display. Minimum acceptable abbreviations are listed in Table S.1.2. Meters shall have the capability (i.e., display capacity) of indicating the grain type using a minimum of four characters in order to accommodate the abbreviations listed in Table S.1.2. If more than one calibration is included for a given grain type, the calibrations must be clearly distinguished from one another.***
> ***[Nonretroactive as of January 1, 2003]***

Discussion: The Committee discovered that the Sector's proposal in Publication 15 should have read as follows:

> A. Application
>
> A.4. This code does not apply to NIR grain analyzers when testing specialty crops traded under contracts specifying the use of proprietary calibrations.

A.4.5. – See also Sec. 1.10.; General Code requirements

S. Specifications

S.1.2.1. Proprietary Calibrations. – Proprietary calibrations applicable to specific specialty crops may be used on NIR Analyzers provided the calibration and its results are clearly differentiated from results obtained using calibration for the grain types listed in Table S.1.2.

N. Notes

N.1.3. Grain Types and Constituents for Inspection. Field inspection of NIR devices will be conducted only on calibrations for those grain types and constituents listed in the Table N.1.1.

The Committee opposed the NIR Sector's proposal to exempt specialty crops from the entire code. The proposal would set a precedence for anyone wanting to gain exemptions simply because they operate on a contractual basis. Additionally, there is no definition for specialty crop.

The Committee heard comments from NIST OWM that opposed the Sector's proposal to exempt specialty crops from the NIR Code. The OWM had a number of concerns about the Sector's proposed language. The OWM indicated there is no definition of specialty crop, although NIST Handbook 44 includes provisions for applications not addressed in the specific codes. The OWM also noted that commercial applications are subject to Handbook requirements, whether or not the commercial sale is part of a contract sale. The OWM recognized industry's concern about how to address specialty crops and recommended an alternate proposal that modifies paragraph S.1.2. to allow more than one calibration for crops (specialty or other) when calibrations are clearly distinguished from one another.

The Committee agreed with the OWM proposal to add new text to current paragraph S.1.2. as shown in the recommendation above to address specialty crop transactions where industry is concerned about the proprietary nature of calibration information.
During the 2002 NCWM Annual Meeting, the Committee heard that the NIR Sector plans to discuss this item at its August 2002 meeting. The Committee asks for the Sector's input on this issue.

358 Multiple Dimension Measuring Devices

358-1 I Tentative Status of the Multiple Dimension Measuring Devices Code

(This item was changed from a voting item to an information item at the 2002 NCWM Annual Meeting.)

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Change the status of the Multiple Dimension Measuring Devices Code (MDMD) from tentative to permanent.

Discussion: The Multiple Dimension Measuring Devices Code was added as a Tentative Code to the 1996 edition of NIST Handbook 44. Prior to the 2002 NCWM Interim Meeting the Committee had not received any unfavorable comments on the Code or received any requests for extended studies. Weights and measures officials and some industry representatives indicated that there is a need for a permanent set of code requirements for commercial multiple dimension measuring devices.

At its September 2001 Annual Meeting, the SWMA agreed that the code was ready for permanent status.

During the 2002 NCWM Interim Meeting, several scale manufacturers indicated that the National Type Evaluation Program (NTEP) has not evaluated a device using the Code requirements. The Committee noted that Canada has been evaluating (MDMD) devices for some years using requirements which are very similar to the requirements in the

Handbook 44 MDMD tentative code. The Committee was also informed that a device will shortly be type evaluated in Canada and will be held to the more stringent of the US/Canadian requirements; thus, there may be harmonization issues yet to be identified.

The Committee acknowledged that currently there is no multiple dimension measuring device that has an NTEP Certificate of Conformance. The Committee agreed that the lack of devices with Certificates is not sufficient justification to delay changing the Code status to permanent. Consequently, the Committee recommended this item move forward for a vote.

At the 2002 NCWM Annual Meeting, the Committee acknowledged there has not been sufficient input from field officials that have used the code. To date, NTEP has conducted only one type evaluation using the code requirements. The Committee also heard that there are issues regarding the interpretation of some requirements, in part, because the code predates electronic technology currently in use. Therefore, the Committee changed the item status to information pending a Work Group meeting where these issues can be resolved.

360 Other Items

360-1 I Revise NIST Handbook 44

Source: Carryover Item 360-1 (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 1999 agenda as Item 360-1.)

Background/Discussion: This item is included in the S&T Committee agenda to provide interested parties with information on work affecting NIST Handbook 44. A work group was appointed in 1999 by then NCWM Chairman Wes Diggs to review and revise Handbook 44 to simplify its language and format.

During the 2001 NCWM Interim Meeting, work group Chairman Murdock reported that the Work Group completed a draft reorganization of the Liquid-Measuring Device (LMD) Code. The work group asked for input from the NCWM membership on the proposed reorganization of the LMD Code.

During the 2001 Western Weights and Measures Association Technical Conference, the WWMA supported the recommendation of the NCWM S&T Committee that the NCWM Board of Directors (BOD) provide funding for working group meetings in conjunction with other weights and measures meetings.

Discussions at the 2001 Central Weights and Measures Association Interim Meeting included questions about whether or not the anticipated benefit of the work is worth the cost. Comments were also made indicating that the work on this item needs much more research.

At its October 2001 Technical Conference, SWMA agreed that this is a worthwhile item and recommends that a new chairman be selected due to Ron Murdock's commitment as Chairman to the NCWM.

During the 2001 Northeastern Weights and Measures Association (NEWMA) Interim Meeting, some members questioned whether the revision of Handbook 44 would help field inspectors better understand the Handbook. NEWMA members indicated that moving the language around may create a more user-friendly format, but does not solve their concerns that the Handbook has become too technical for the average field inspector. Some members commented that a better approach is to return to publications such as NBS Handbook 94, "The Examination of Weighing Equipment, A Manual for State and Local Weights and Measures Agencies" this manual gave examples of how weighing equipment is to be tested applying Handbook 44 standards. NEWMA supports funding the work group and recommends that the work group ask other regional associations if they have the same concerns as NEWMA.

At its 2002 NCWM Interim Meeting, the Committee encouraged the BOD to fund the efforts of the working group to revise NIST Handbook 44.

During the 2002 NCWM Annual Meeting, the Committee asked where is the BOD on this item since there have been several changes in the chairmanship of the working group.

For additional information on the Work Group's efforts to revise Handbook 44 see Board of Directors Agenda Item 101-11.

360–2 I International Organization of Legal Metrology (OIML) Report

A report on OIML activities prepared by the NIST Technical Standards Activities Group (TSAG) is included as part of the NCWM OIML Board of Director's 2002 Interim Report Item 106 Program, International Organization of Legal Metrology.

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international activities are within the purview of the S&T Committee. Additional information on OIML activities is available on the OIML web site at http://www.oiml.org/.

During the 2002 NCWM Annual Meeting open hearing session, the Committee received an update on OIML activities from Mr. Ken Butcher, Mr. Ralph Richter, Dr. Ambler Thompson, and Dr. Charles Ehrlich, NIST Technical Standards Activities Group, Weights and Measures Division. This report is included in Appendix A of the NCWM Board of Directors 2002 Final Report.

For more information on OIML activities for weighing devices and taximeters, contact Ken Butcher, OWM, by telephone at 301-975-4859 or by e-mail at kenneth.butcher@nist.gov. For more information on measuring devices contact Wayne Stiefel, TSAG, by telephone at 301-975-4011, or by e-mail at s.stiefel@nist.gov. For more information on electronic measuring devices and grain moisture meters contact Dr. Ambler Thompson, TSAG, by telephone at 301-975-2333 or by e-mail at ambler@nist.gov. For more information on R 117 Measuring Systems for Liquids Other Than Water and R 105 Measuring Systems for Quantities of Liquids, and Gas Meters contact Ralph Richter, TSAG, by telephone at 301-975-4025 or by e-mail at ralph.richter.@nist.gov. Mr. Butcher, Mr. Stiefel, Mr. Richter, and Dr. Thompson can also be reached by postal mail at NIST, 100 Bureau Drive-STOP 2150, Gaithersburg, MD 20899-2150 or by fax at 301-975-5414.

360–3 D Developing Issues

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing issues have not received sufficient review by all parties affected by the proposals or may be insufficiently developed to warrant review by the NCWM S&T Committee. The developing issues listed are currently under review by at least one regional association or technical committee.

The developing issues are listed in the following appendices according to the specific NIST Handbook 44 Code Section under which they fall:

Appendix A – Scales
Appendix B – Liquid-Measuring Devices
Appendix C – Grain Moisture Meters
Appendix D – Other Items

The S&T Committee encourages interested parties to examine the proposals included in the appendices and send their comments to the contact listed in each item.

The Committee asks that the regional weights and measures associations and NTETC Sectors continue their work to fully develop each proposal. Should an association or Sector decide to discontinue work on a developmental item, the Committee asks that it be notified. When the status of an item changes because of input from the submitter, the item will be listed in the table below. For more details on items that are moved from the developing issues list to the Committee's main agenda, refer to the new reference number in the main agenda.

Old Reference Number	Old Title of Item	New Reference Number	New Title of Item	Status Change
360-3 Appendix B Item 1	S.4.X. Location of Marking Information	330-8	Not Applicable	January 2002- upgrade by Submitter

-360-4 V NCWM Publication 3, National Conference on Weights and Measures Policy, Interpretations, and Guidelines; 3.2.15. Field Standard Test Weights – Weight Carts

(This item was adopted.)

Source: Southern Weights and Measures Association (SWMA) (This item was referred to the Specifications and Tolerances (S&T) Committee from the Laws and Regulation Committee because it is more appropriate that the S&T Committee address guidelines for standards used in field testing operations.)

Recommendation: Modify NCWM Publication 3 Policy, Interpretations, and Guidelines Section 3, Subsection 2, 3.2.15. as follows:

Section 3 – Specifications, Tolerances, and Device Inspection

Subsection 2 – Scales and Weighing

3.2.15. Field Standard Test Weights – Weight Carts

Interpretation

Field standard test weights (weight carts) are being used to test vehicle scales. ~~These~~ Some carts are electrically powered and many of these weight carts are powered by liquid fuel which is consumed during the conduct of the test. Following recommended methods for calibration and use will enhance their use as field standards. In 1980, the adopted NCWM Policy stated that these carts were inappropriate as standard weights. The proliferation of weight cart use has provided data on which to demonstrate that the benefits of weight cart use outweigh the disadvantages associated with their potential instability for use in scale testing. ~~It is impossible to maintain these devices within the tolerance limits (1/10 000) as required by Handbook 105-1 or within one-third of the smallest tolerance applicable as required by Handbook 44 and are therefore inappropriate as standard weights.~~

Discussion: A member of the NIST Working Group on Weight Carts provided the Committee with an update on the status of NIST Handbook 105-8, Specifications and Tolerances for Field Standard Weights (Weight Carts), Standard Operating Procedures (SOP) for calibration of weight carts, and guidelines for use of weight carts. The group posted the information on the NIST OWM metrology web site (www.nist.gov/owm) for comment.

OWM supports the revision of the NCWM position to recognize the use of weight carts in official testing, consistent with the criteria and guidelines developed by the NIST Working Group on Weight Carts. OWM believes the guidelines should be readily available and plans to post the information on its web site as an alternative to hard copy publications.

The Committee supports revising the policy stated in NCWM Publication 3, "Policy, Interpretations, and Guidelines," Section 3.2.15. to recognize the use of weight carts as standards during field tests. The Committee also recommended that use of weight carts in official testing be consistent with the criteria and guidelines developed by the NIST Working Group on Weight Carts. The Committee recommends the revised policy be readily available to weights and measures officials, service companies, and other interested parties. The Committee concurs with the OWM plan to post this information on the OWM web site to provide access to this information for the weights and measures community, since there are no immediate plans for updating Publication 3. Committee members noted that weights and measures administrators, program managers, and metrologists are all interested in Handbook 105-8 and the related criteria and guidelines.

The Committee replaced the term "dollie" with "cart" at the recommendation of the Metrologist Subcommittee. The Committee also modified the proposal to differentiate between electric powered and liquid motor-fuel powered carts. Prior to the start of the voting session, the Committee modified the proposal to delete any reference to NIST Handbook 105-8.

Background: Weight carts are currently being used by both public and private agencies to test large capacity scales. Weight carts provide a safe and efficient means to position larger field standard weights when testing scales. Use of weight carts during the test of large capacity scales reduces the wear on mass standards and more closely simulates the practice of loading a scale during actual use.

Using weight carts to test scales conflicts with the current language in NCWM Publication 3 Section 3.2.15. which states that weight carts are inappropriate to test scales. In 1980, the NCWM adopted Section 3.2.15. to address of the use of weight carts powered by liquid fuel. The NCWM noted that these weight carts consumed fuel during the test and, in most instances, it was impossible for the weight cart to maintain the tolerance for standards described in NIST Handbook 105-1, "Specifications and Tolerances for Field Standard Weights (NIST Class F)" and NIST Handbook 44, "Fundamental Considerations, Testing Apparatus, Tolerances for Standards." Consequently, the NCWM took the position that weight carts were inappropriate as standard weights.

Currently, there is no technical document that specifically addresses weight cart standards. When weight carts are properly designed, calibrated, maintained, and used, they can be an appropriate standard, even though they are not considered a Class F standard. In 1998, the Metrology Subcommittee recognized the widespread use of weight cart standards and the need for specifications, tolerances, calibration user requirements, and controls for their use. The NIST Working Group on Weight Carts was established in 1998 and is working to develop new Handbook 105-8, "Specifications and Tolerances for Field Standard Weights (Weight Carts)," a recommended standard operations procedure for calibration of weight carts, and an examination procedure outline for weight cart users.

The Working Group acknowledges that weight carts are unlike most standards because they have mechanical parts and fluids which contribute to error. Accuracy of the scale test procedures is dependent on the field official's attention to detail and maintenance of the weight cart standard.

Mark Coyne, City of Brockton, Massachusetts, Chairman

Clark Cooney, Oregon
Jack Kane, Montana
Craig VanBuren, Michigan
Richard W. Wotthlie, Maryland

Ted Kingsbury, Canada, Technical Advisor
Richard Suiter, NIST, Technical Advisor
Juana Williams, NIST, Technical Advisor

Committee on Specifications and Tolerances

Appendix A (Item 360-3)
Developing Issues – Scales

Item 1 D Counting Feature; Pharmacy Scales

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Amend NIST Handbook 44 Section 2.20 Scales to recognize the counting feature in a pharmacy scale as a legal for trade application.

Discussion: NIST Handbook 44 does not presently recognize the counting feature as legal for trade. However, if appropriate tolerances, test procedures, and user requirements can be developed, counting features might be well suited to pharmacy applications. The SWMA recommends this proposal be given developmental status. Parties interested in developing specifications and tolerances for pharmacy scales with counting features are encouraged to contact Mr. Stan Jankowski, McKessen Automation Systems, by telephone at 724-695-7724.

Appendix B (Item 360-3)
Developing Issues – Liquid-Measuring Devices

(This item was withdrawn.)

Item 1 W S.4.X. Location of Marking Information

(This item was inadvertently given developing status in Publication 15, Interim Meeting Agenda, even though the submitter agreed it was ready for the S&T Committee to consider for review at the 2002 Interim Meeting. The item was revised and renumbered 330-8 in the Committee's main agenda.)

Appendix C (Item 360-3)
Developing Issues – Grain Moisture Meters

Item 1 D Recognize Indications and Recorded Representations of Test Weight per Bushel

Source: This item originated from the National Type Evaluation Technical Committee (NTETC) Grain Moisture Meter (GMM) Sector and first appeared on the S&T Committee's 2000 agenda as Item 360-3, Developing Item Appendix D.)

Recommendation: Modify 5.56(a) Grain Moisture Meter Code Section in NIST Handbook 44 to recognize indications and recorded representation of test weight per bushel as follows:

Amend the following paragraphs:

A.1. – This code applies to grain moisture meters; that is, devices used to indicate directly the moisture content of cereal grain and oil seeds. The code consists of general requirements applicable to all moisture meters and specific requirements applicable only to certain types of moisture meters. Requirements cited for "test weight per bushel" indications or recorded representations are applicable only to devices incorporating an automatic test weight per bushel measuring feature.

S.1.1. Digital Indications and Recording Elements.

(c) Meters shall be equipped with a communication interface that permits interfacing with a recording element and transmitting the date, grain type, grain moisture results, test weight per bushel results and calibration version identification.

(d) A digital indicating element shall not display and a recording element shall not record any moisture content values or test weight per bushel values before the end of the measurement cycle.

(e) Moisture content results shall be displayed and recorded as percent moisture content, wet basis. Test weight per bushel results shall be displayed and recorded as pounds per bushel. Subdivisions of ~~this~~ these units shall be in terms of decimal subdivisions (not fractions).

(f) A meter shall not display or record any moisture content or test weight per bushel values when the moisture content of the grain sample is beyond the operating range of the device, unless the moisture and test weight representations includes a clear error indication (and recorded error message with the recorded representation).

S.1.3. Operating range. – A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded. The operating range shall specify the following:

(c) Moisture Range of the Grain or Seed. The moisture range for each grain or seed for which the meter is to be used shall be specified. ~~A moisture~~ Moisture and test weight per bushel values may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded.

S.1.4. Value of Smallest Unit. – The display shall permit ~~constituent~~ moisture value determination to both 0.01 percent and 0.1 percent solution. The 0.1 percent resolution is for commercial transactions; the 0.01 percent resolution is for type evaluation and calibration purposes only, not for commercial purposes. Test weight per bushel values shall be determined to the nearest 0.1 pound per bushel.

S.2.4.1. Calibration Version. – A meter must be capable of displaying either calibration constants, a unique calibration name, or a unique calibration version number for use in verifying that the latest version of the calibration is being used to make moisture content and test weight per bushel determinations.

S.2.6. Determination of Quantity and Temperature. – The moisture meter system shall not require the operator to judge the precise volume or weight and temperature needed to make an accurate moisture determination. External grinding, weighing, and temperature measurement operations are not permitted. In addition, if the meter is capable of measuring test weight per bushel, determination of sample volume and weight for this measurement shall be fully automatic and means shall be provided to ensure that measurements of test weight per bushel are not allowed to be displayed or printed when insufficient sample volume is available to provide an accurate measurement.

S.4. Operating Instructions and Use Limitations. – The manufacturer shall furnish operating instructions for the device and accessories that include complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining a moisture content. Operating instructions shall include the following information:

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

N.1.1. Transfer Standards. - Official grain samples shall be used as the official transfer standards with moisture content and test weight per bushel values assigned by the reference methods. The reference methods for moisture shall be the oven drying methods as specified by the USDA GIPSA. The test weight per bushel value assigned to a test weight transfer standard shall be the average of 10 test weight per bushel determinations using the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

N.1.2. Minimum Test. - A minimum test of a grain moisture meter shall consist of tests: ~~(a)~~with samples ~~(need not exceed three)~~ of each grain or seed type (need not exceed three) for which the device is used, and for each grain or seed type shall include the following:

(a) tests of moisture indications, ~~(b)~~ with samples having at least two different moisture content values within the operating range of the device, , and if applicable,

(b) tests of test weight indications, with at least the lowest moisture samples used in (a) above.

T.2. Air Oven Reference Method. – Maintenance and acceptance tolerances shall be as shown in Table T.2.1. Tolerances for moisture measurements are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance. Tolerances for test weight per bushel are (+) positive or (-) negative with respect to the value assigned to the official grain sample.

UR.1.1. Value of the Smallest Unit on Primary Indicating and Recording Elements. – The resolution of the moisture meter display shall be 0.1 percent moisture and 0.1 pounds per bushel test weight during commercial use.

UR.3.4. Printed Tickets

(b) **The customer shall be given a printed ticket showing the date, grain type, grain moisture results, test weight per bushel and calibration version identification. The ticket shall be generated by the grain moisture meter system.**

Modify Table T.2.1..Acceptance and Maintenance Tolerances Air Oven Reference Method as follows:

Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Reference Method		
Moisture		
Type of Grain or Seed	Tolerance	Minimum Tolerance
Corn, oats, rice, sorghum, sunflower	0.05 of the percent moisture content	0.8 percent in moisture content
All other cereal grains and oil seeds	0.04 of the percent moisture content	0.7 percent in moisture content
Test Weight per Bushel		
Type of Grain or Seed	Tolerance	
Corn, oats	0.8 pounds per bushel	
All wheat classes	0.5 pounds per bushel	
Soybeans, barley, rice, sunflower, sorghum	0.7 pounds per bushel	

Remove the following paragraph:

~~**T.3. For Test Weight Per Bushel Indications or Recorded Representations. — The maintenance and acceptance tolerances on test weight per bushel indications or recorded representations shall be 0.193 kg/hL or 0.15 lb/bu. The test methods used shall be those specified by the USDA GIPSA.**~~

Background: This proposal was developed to provide a broader approach to the tolerances for GMMs and to establish separate requirements covering automatic test weight per bushel (TW) devices with tolerances which address the specific grain types.

To provide input on this proposal, contact the Grain Moisture Meter Sector Chairman Cassie Eigenmann (Dickey-john Corporation) by telephone at 217-438-3371 or by e-mail at ceigenmann@dickey-john.com; Technical Advisor John Barber (J.B. Associates, representing NIST on contract) by telephone at 217-483-4232; or Technical Advisor Diane Lee (NIST) by telephone at 301-975-4405 or by e-mail at gloria.lee@nist.gov.

For additional background information on this issue see the 2000 and 2001 NCWM S&T Final Reports.

Appendix D (Item 360-3)
Developing Issues – Other Items

Item 1 D Update NCWM Publication 3, National Conference on Weights and Measures Policy, Interpretations, and Guidelines; Taximeters vs. Odometers Used for Transporting Fare Paying Passengers

Source: Southern Weights and Measures Association (SWMA) (This item first appeared on the Committee's 2001 Agenda as Item 360-4, Appendix E.)

Recommendation: Add the following interpretation to NCWM Publication 3, Section 3 – Specifications, Tolerances, and Device Inspection, Subsection 5 – Linear Measuring and Other Devices:

3.5.X Taximeters vs. Odometers Used for Transporting Fare Paying Passengers

Interpretation

Taximeters are required for use in transporting passengers and charging on a "distance traveled" basis. Vehicle odometers are not suitable equipment for such use. Odometers are suitable for use in charging "distance traveled" rates in rental vehicles in which customers pay on a "per-mile" basis for the right to operate the vehicle.

NIST Handbook 44 requires that devices must be suitable for their application with regard to their operating abilities, including their capacity, smallest division size, readability, performance, and design.

Handbook 44 General Code, which applies to all devices, requires in paragraph *G-UR. 3.3. Position of Equipment* that a device or system "*used in direct sales shall be so positioned that its indications may be accurately read and the weighing or measuring operation may be observed from some reasonable "customer and operator position."* Reasonable customer positions in taxicabs or other vehicles in which a driver transports passengers includes all passenger seats in a vehicle, both front and back. A properly installed taximeter's indications are easily readable from any position in the vehicle, both in darkness and light. An odometer cannot be read accurately from most positions in a vehicle other than the drivers' seat.

Handbook 44 General Code also requires specific markings on devices including manufacturer's name or trademark, model designation, and a nonrepetitive serial number. All markings must be located so that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device. The code also requires electronic devices to have provisions for applying security seals that must be broken before any changes that affect the accuracy of the device can be made. While taximeters meet these requirements, most odometers do not.

Further supporting the requirement for taximeters over odometers are the tolerances for the two devices prescribed in Handbook 44. Transporting passengers for hire normally involves shorter distances at higher cost-per-distance charges than for rental vehicles. The tolerances for taximeters in the Taximeters Code are *1% for overregistration* (error in favor of the cab) and *4% for underregistration plus 100 feet* (in favor of the customer). The tolerances for odometers in the Odometers Code are *4% for overregistration and underregistration*, allowing 4 times as much error in favor of the operator. As taxi fares are usually much higher than rental car costs on a per mile basis, this allows for unreasonable and unacceptable errors that could be financially injurious to the customer.

It should be noted that no taximeter is required in cases where the charges are based on zones or flat rates, providing that such methods are in compliance with local ordinances and are

conspicuously posted and understandable to customers. When taximeters are used, the rates for distances traveled and any extras must be posted as well.

Background: The SWMA asks the NCWM to consider a proposal to modify NCWM Publication 3 "Policy, Interpretations, and Guidelines" to include an interpretation in Section 3, Subsection 5 specifying that odometers are not suitable equipment for use in transporting passengers and charging on a "distance traveled" basis.

To provide input on this proposal, contact SWMA at the SWMA web site: www.swma.org.

Report of the Committee on Administration and Public Affairs

David C. Frieders, Chairman
Department of Consumer Assurance
San Francisco City and County, California

Reference Key No.

400

The Committee on Administration and Public Affairs (A&P Committee) submits its Annual Report for the 87th Annual Meeting of the National Conference on Weights and Measures. The Report consists of the Interim Report presented in NCWM Publication 16, "Committee Reports," as amended in the Addendum Sheets issued during the Annual Meeting. The Committee considered communications it received prior to and during the Annual Meeting in developing this report.

Table A identifies items contained in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Presented below is a list of informational items, which are indicated by the suffix **I**. Table B lists the Appendices to the report, and Table C provides a summary of the results of the voting on the report in its entirety.

Table A
Index to Reference Key Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
400 (Report in Its Entirety) Voice Vote	All	None	Majority	1	Passed

Details of all Items Follow in Numerical Order
(In order by Reference Key Number)

401 **Program Management**

401-1 I Voluntary Program Assessment Working Group

Committee Discussion: At the Interim Meeting of the Northeast Weights and Measures Association (NEWMA), the State of Vermont requested clarification of the term "as required" in the Retail Motor-Fuel Assessment Checklist. The Committee addressed the intent of the phrase and agreed that in all instances "as required" should be interpreted, "as required by your jurisdiction."

The Voluntary Program Assessment Working Group (VPAW) did not meet prior to the Interim Meeting since it was decided at the meeting prior to the 86th Annual Meeting that no further checklists would be developed until jurisdictions had an opportunity to use and comment on the existing checklists.

The A&P Committee reviewed the status of the VPAW program and decided that four areas needed to be addressed: (1) the name of the program, (2) greater participation in the program, (3) participant feedback, and (4) the review team.

As of the Interim Meeting only seven jurisdictions submitted checklists for evaluation. The Committee discussed the reason for poor participation and decided that the name "VPAW" did not reflect the true intent of the program, that being to promote quality assurance in a weights and measures program. Therefore, the Committee decided that the name "Voluntary Quality Assurance Assessment (VQAA)" more accurately defined the intent of the program.

The Committee discussed ways to promote the program within the weights and measures community to achieve greater participation. The Committee decided that greater participation would be gained if each of the State Directors had the three checklists (small-capacity scales, vehicle scales, and retail motor-fuel dispensers) in hand. A cover letter to highlight the benefits of participation was developed to accompany the distribution of the checklists to the State Directors.

Each State Director should encourage participation at the local level. The checklists are also available on the NCWM Internet website in Adobe Acrobat PDF format.

Prior to the Interim Meeting, participants were recognized for completing an assessment, but they received no feedback as to the content. The Committee decided that without feedback from the reviewer, completing the assessment lacked validation. Therefore, a response letter was developed that the reviewer will complete and return to the submitter.

Anticipating greater participation, the Committee expanded the review team to include Ross Andersen, Mike Sikula, Steve Hadder and Jerry Flanders, representatives from NEWMA and the Southern Weights and Measures Association (SWMA), respectively. As the program expands, future review teams will include representatives from the Central Weights and Measures Association (CWMA) and the Western Weights and Measures Association (WWMA).

Committee Recommendation: The A&P Committee recommends changing the name of the Voluntary Program Assessment to Voluntary Quality Assurance Assessment to more accurately denote the program's original intent.

The following jurisdictions were recognized for participating in the Voluntary Quality Assurance Assessment during fiscal year 2001-2002:

• Colorado Measurement Standards Section	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Connecticut Department of Consumer Protection	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Louisiana Department of Agriculture & Forestry	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Minnesota Department of Commerce	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Mississippi Bureau of Regulatory Services	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Montana Bureau of Weights & Measures	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• New York Bureau of Weights & Measures	Vehicle Scales
• Pennsylvania Bureau of Rides & Measurement Standards	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales
• Vermont Consumer Assurance Division	Retail Motor-Fuel Dispensers, Small-Capacity Scales, Vehicle Scales

Certificates were awarded to these jurisdictions for their participation in the program.

401-2 I Safety Information

The Southern Weights and Measures Association (SWMA) and the Central Weights and Measures Association (CWMA) both reported a change in its safety liaison officer, as noted below. In the future safety report submissions will be attached as an appendix to the Final Report.

The Regional Safety Liaisons are:

Western Weights and Measures Association:

Craig Leisy, Supervisor Weights and Measures
Seattle Licenses and Consumer Affairs
805 South Dearborn Street
Seattle, WA 98134
Tel: (206) 386-1129
Fax: (312) 386-1129
Email: craig.leisy@ci.seattle.wa.us

Northeastern Weights and Measures Association:

Michael J. Sikula, Assistant Director
New York Bureau of Weights & Measures
Building 7A State Campus
Albany NY 12235-0001
Tel: (518) 457-3452
Fax: (518) 457-2552
Email: msikula@agmkt.state.ny.us

Central Weights and Measures Association:

Agatha Shields, Inspector
Franklin County Weights and Measures
373 S. High Street, Auditor's Office
Columbus, OH 43215-7380
Tel: (614) 462-7380
Fax: (614) 462-3111
Email: aashield@co.franklin.oh.us

Southern Weights and Measures Association

Steve Hadder, Trainer/Investigator
Florida Department of Agriculture
3125 Connor Boulevard
Tallahassee, FL 32399-2634
Tel: (850) 487-2634
Fax: (850) 922-6655
Email: hadders@doacs.state.fl.us

At the Interim Meeting the A&P Committee met with Charles Gardner, the A&P Committee's Safety Liaison to the NCWM, to discuss safety reports and issues that had been forwarded to him. Mike Sikula presented two articles to Mr. Gardner regarding safety accidents. One article reported that a driver's foot accidentally slipped from the brake of a front-end loader onto the gas pedal and pinned two men between the bucket and a wall, killing one man and seriously injuring the other. The second article reported a technician suffered severe burns when vapors from a container of gasoline blew up in his face at a gas station. While Mr. Gardner has not received any information from jurisdictions on safety presentations, issues or accident reports at the regional level in the past year, he stressed the importance of reporting incidents in order to focus on specific dangers, not to report on who was involved or where the incidents occurred. Mr. Gardner also reminded the Committee of its responsibility to encourage the regional safety representatives to report safety information to the A&P Committee.

The NCWM Board of Directors asked the A&P Committee to submit articles pertinent to the interests of the inspector for the *NCWM•NEWS*. The Committee discussed which issues might interest the inspector and what the title of the article should be. The articles will appear in a section of the newsletter called "*The Inspector's Corner*," and some articles will be based on safety information.

401-3 I NCWM Internet Home Page

Committee Decision: The Committee agrees that the most efficient way to disseminate information to the weights and measures community is through use of the NCWM website and, therefore, respectfully recommends to the Board of Directors the following information be placed on the NCWM website and made available to all jurisdictions:

(1) A list of States and the training materials they have updated (see Item 402-1);
(2) list of trainers;
(3) Service Personnel Training Course (developed by GPMA); and
(4) AMC Training Funds Time Line for request, apportionment, use, and reimbursement of funds.

The Committee also recommends that the training materials be placed in a section on the website entitled "Training."

402 Education

402-1 I National Training Program

Source: NCWM Board of Directors

Committee Discussion: This item is carried over from item 403-1 in the A&P Committee's Report to the 86th National Conference on Weights and Measures, 2001. At the 2001 Interim Meeting, the Committee was directed by the NCWM Board of Directors to develop basic criteria needed for a field inspector to perform his/her inspection duties. The A&P Committee reviewed the basic training criteria for inspectors of small-capacity scales that were developed prior to the 86th Annual Meeting and determined that more substance needed to be added for the basic criteria to be effective. The criteria were refined to indicate criteria for both the entry level and advanced inspectors. For each criterion, the learning outcome, the resources needed, and the assessment method are outlined. These criteria will serve as a template for other disciplines. A copy of these criteria is appended to this report as Appendix A.

The Committee also discussed the status of the National Training Program (NTP). The major problems with the NTP are that the modules are out of date and the lack of funds and resources prohibits their update. Realizing that a lot of material

in the modules is still applicable, plus consideration for the cost originally expended to develop the modules, the Committee will conduct an assessment to find out which modules have been updated by jurisdictions that are involved in training. The following assessment, represented by the column headings shown below, will be directed to state jurisdictions to identify which training modules and materials are being used to train inspectors. Jurisdictions are asked to share updated training materials with other jurisdictions. Since the material will not be reviewed by the NCWM, the updated training material will not be endorsed or approved by the NCWM. This information, when compiled, will be placed on the NCWM Internet website.

Module	Don't use or provide training for this topic	Use as is without any changes	Use as is with added written comments	Use as is with added printed material or sections	Use partially or completely revised module	Replaced module with new material

402-2 I Associate Membership Scholarship Fund

Committee Discussion: The Associate Membership Committee (AMC) has been very generous to the Conference and its membership by providing training funds for jurisdictions throughout the United States. Jurisdictions must utilize all AMC training funds by the end of each fiscal year (September 30).

The A&P Committee was notified by the AMC that training funds would be available for distribution to jurisdictions for fiscal year 2002. A report of the distribution of allocated funds is contained in Appendix B of the A&P Committee Final Report 2002.

The Committee also discussed the time constraints to request, approve, and disburse AMC training funds once the A&P Committee is notified of the availability of such funds. In concert with the AMC, the management company, and the A&P Committee, the following time lines have been established:

- The Associate Membership Committee (AMC) will inform the NCWM Board of Directors (BOD) of the proposed amount available for training as soon as the September 30 balance is identified.
- The AMC will notify the NCWM A&P Committee of the proposed amount when the BOD approval is given.
- The A&P Committee will send out letters soliciting requests for training funds to the jurisdictions by October 31.
- The AMC will confirm available funds after year-end audit and notify the A&P Committee.
- The A&P Committee must receive requests from the jurisdictions for training funds by December 31.
- The A&P Committee will approve requests for training at the Interim Meetings and notify jurisdictions by January 31.
- At the Annual Meeting the A&P Committee will track disbursements for training and, to help ensure use of the approved funds, the A&P Committee will remind jurisdictions that have been approved, but have not requested reimbursement, of the August 31 deadline.
- Training should be completed and the original receipts for training reimbursement must be received by the NCWM by August 31.
- Payment for training will be completed by September 30.
- Funds approved, but reimbursement not requested for payment by August 31, will be used to pay jurisdictions for training costs in excess of the amount approved and/or will be carried over to the following year.

The A&P Committee decided that participation in the Voluntary Quality Assurance Assessment should be considered when appropriating training funds.

Committee Recommendation: At the 2000 Interim Meeting, the AMC notified the Committee that AMC training funds could be used by jurisdictions for any training purpose, not specifically "scholarships" as had been specified in the past. Therefore, based on that notification, the Committee recommends that the name of the Item in the Agenda be changed to "Associate Membership Training Funds."

Committee Discussion: The A&P Committee discussed the requirements necessary to become a certified instructor and the criteria for re-certification. The Committee has not received any applications for certified trainers since July 2000. After a review of the "certified" instructors list, the Committee determined that many of the instructors have not applied for re-certification as adopted at the 84th Annual Meeting. Reasons for an instructor not seeking re-certification may be a result of the lack of updated training modules and the dissolution of the National Training Registry.

The Committee also discussed the concept of Educational Units (EUs) and agreed that the issuance of EUs was inappropriate since most classes that are being taught are a variation of the original modules. Issuance of EUs for completion of mini courses or variations of the modules was not authorized.

Committee Recommendation: It is the recommendation of the A&P Committee that the NIST Weights and Measures Division maintain a list of instructors who have successfully completed the NIST-sponsored training classes and that the States be responsible for tracking the training offered through their organizations. The Committee determined that the list of "certified" instructors in the Final Report should be discontinued, and a list of trainers will be maintained on the NCWM website as a resource for the weights and measures community.

402-4 I Education Sessions – 2002 Conference

Committee Discussion: The A&P Committee invited suggestions for technical sessions to be presented at the 87th NCWM Annual Meeting. The Committee requested that the NCWM contact the U.S. Office of Consumer Affairs regarding a speaker to address the consumer's perception of the role of weights and measures officials in meeting the consumers' needs. This subject was compatible with Chairman Ronald Murdock's theme for the year.

Technical sessions presented at the 2002 Annual Meeting were:

- NCWM Budget Overview;
- Issues and Trends in Legal Metrology;
- Update on OWM Weights & Measures Benchmark Study;
- Using the Media to Your Advantage.

402-5 I Service Personnel Training

Committee Discussion: This item is carried over from item 403-5 in the A&P Committee's Report to the 86th NCWM 2001. The Gas Pump Manufacturers' Association (GPMA) developed a 1-day course (6 hours) entitled "Service Technicians and Weights and Measures Requirements" and provided this course to the Committee at the 86th Annual Meeting 2001, in both electronic and hard copy formats.

The A&P Committee sincerely thanks the GPMA for its hard work and significant contribution to jurisdictions in the training of service technicians. While, according to the GPMA, the original intent of the course was not to be used as a training mechanism for service companies, the course does provide an excellent tool for a jurisdiction if it wants to implement a Service Personnel Training Program.

The Committee discussed the best method for distributing the course and recommends to the Board of Directors that the course be made available to all jurisdictions by placing it on the NCWM website.

403 Public Affairs

403-1 I Weights and Measures Week

Committee Discussion: At the 86th Annual Meeting of the NCWM 2001, the Committee decided on the theme for Weights and Measures Week 2002. ***"Meeting Consumers' Needs through Weights and Measures"*** is a theme that is timeless, and the possibilities for promoting the event are endless. The Committee discussed ways to bring this event to the public's attention.

The A&P Committee decided that consumers' needs might best be served by stressing the requirement for Indirect Sale of Random Packages (NIST Handbook 130, Packaging and Labeling Regulation, Section 11.1.1) that was adopted at the 86th Annual Meeting. The Committee drafted a letter to be sent to E-tailers to apprise these marketers of the newly adopted regulations. The Committee recommends that all jurisdictions conduct a "surf" day on the Internet during Weights and Measures Week to notify E-tailers of possible violations of the law. Many E-tailers are not aware that such regulations for indirect sale exist, and consumers are best served when E-tailers know and abide by the existing laws.

The theme for Weights and Measures Week 2003 was discussed at the 87th Annual Meeting.

Dave Frieders, San Francisco City and County, California, Chairman

J. Flanders, Georgia
S. Hadder, Florida
M. Sikula, New York
C. Bennett, Michigan

Associate Membership Committee Representative: Chip Kloos, Colgate-Palmolive Company
C. Gardner, Suffolk County, New York, Safety Liaison

L. Sebring, NIST, Technical Advisor

Committee on Administration and Public Affairs

Appendix A

Knowledge Requirements
Electronic Retail Computing Scales
Less than or = to 100 lb

INTRODUCTION

The following information is intended for weights and measures officials who are already familiar with:

1. Applicable laws and regulations;
2. Established enforcement procedures and policies; and
3. Organization and use of NIST Handbook 44

This information is designed to establish a list of subject areas in which an inspector should be competent before working independent of supervision. The following may be expanded to include requirements for officials who already have entry-level skills and are ready for advanced training. Any training program or final exam could be based on any one or more of these subjects.

PREREQUISITES

1. Basic Components and Operation

Learning outcome: Upon completion of this section the participant should be able to demonstrate an understanding of the basic components and operation of an electronic retail computing scale. The participant should be able to describe the operation of and locate the following components:

- Basic Weighing Technology
  - ⇒ Load sensing element
  - ⇒ Analog/Digital conversion
  - ⇒ Memory, computation and display
  - ⇒ Operating Controls
- Printer/label requirements
- Level indicating means
- Marking Requirements
- Category of device and methods of sealing
  - ⇒ Category 1
  - ⇒ Category 2
  - ⇒ Category 3

Resources Needed: Access to at least one type of actual device, plus pictorial representations of a variety of other systems with different configurations.

Assessment Method: Practical work and observation by trainer
Written exercises
Oral questions & discussions

2. Basic Definitions

Learning Outcome: Upon completion of this section, the participant should have a good understanding of the following:

- Accuracy class
- Computing scale
  - ⇒ Net weight
  - ⇒ Total price
- Counter or bench scale
- Multi-range scale
- Nominal capacity
- Scale division (d)
- Load cell verification interval (v_{min})
  - ⇒ Relationship between the "Load Cell Verification Interval" and the "Scale Division"

$$v_{min} \leq \frac{d}{\sqrt{N}}$$ where N = the number of load cells

- Verification scale division (e)
- Physical seal
- Audit trail
  - ⇒ Remote configuration
  - ⇒ Event counter
  - ⇒ Event logger
- Weight classifier
  - ⇒ Definition
  - ⇒ Basic operation
- Zero load balance
- Zero setting mechanism (manual, semiautomatic or automatic)

Resources Needed: Actual device and/or appropriate visual aides

Assessment Method: Written exercises
Oral questions and discussion

3. National Type Evaluation Program (NTEP)

Learning Outcome: Upon completion of this section, the participant should have a good understanding of the following:

- Purpose and program description
- Certificate of Conformance (CC)

Resources Needed: NCWM Publication 14
A sample Certificate of Conformance (CC)

Assessment Method: Written exercises

4. Professionalism

Learning Outcome: Upon completion of this section, the participant should know the expected conduct while performing their duties.

- Appropriate dress
- Appropriate credentials
- Appropriate approach to owner/manager
  - ⇒ Introduces him/herself to management
  - ⇒ Invites management to accompany him or her during testing
  - ⇒ Reviews testing results with management

Resources Needed: Appropriate visual aides

Assessment Method: Role play
Oral discussion

PRE-TEST DETERMINATIONS

1. Type Approval (NTEP CC)

Learning Outcome: Upon completion of this section, the participant should know the procedure to determine the NTEP status of a device and how to obtain a CC for a particular device.

Resources Needed: If possible, a computer with access to the NTEP website
NTEP file (e.g. list, book, database)

Assessment Method: Written exercises

2. Application of Maintenance or Acceptance Tolerance

Learning Outcome: Upon completion of this section, the participant should be able to identify which tolerance to apply to the device in various situations.

- Recently installed devices
- Devices ordered repaired
- Devices moved from other locales

Resources Needed: NIST Handbook 44

Assessment Method: Written exercises
Oral questions and answers

3. Equipment Required

Learning Outcome: Upon completion of this section, the participant should be able to identify what equipment is needed prior to arrival at test site. The participant should also be able to assess the need for special equipment and/or assistance.

- Test weights
- Safety equipment
- Hand tools (screwdriver, wire cutters, etc.)
- Security seals and inspection stickers
- Other

Resources Needed: Actual equipment (see above)

Assessment Method: Oral questions and answers

4. Marked and Unmarked Devices

Learning Outcome: Upon completion of this section, the participant should be able to identify whether the device is marked or unmarked and which table in NIST Handbook 44 applies.

- Differences in testing and tolerances

Resources Needed: NIST Handbook 44
Pictorial representations of marked and unmarked devices or actual devices

Assessment Method: Written exercises
Practical work and observation

5. Assessment of Associated Equipment; Point-of-Sale (POS) Systems

Learning outcome: Upon completion of this section, the participant should be able to identify the integral components (see examples below):

- Scanner
- Printer
- Indicating element(s)

Resources Needed: Pictorial representations
Field observation

Assessment Method: Practical work and observation

INSPECTION

1. Suitability

Learning Outcome: Upon completion of this section, the participant should be able to take into account variables such as commodity cost, average net load, frequency of application, environmental conditions, etc.

Resources Needed: Practical examples

Assessment Method: Written exercises

2. Location/Support

Learning Outcome: Upon completion of this section, the participant should be able to evaluate factors that could influence the performance of a device.

- Customer observation

Resources Needed: Practical examples

Assessment Method: Field observation

Learning Outcome: Upon completion of this section, the participant should be able to evaluate value of division units, capacity indication, price computation, etc.

Resources Needed: Pictorial representations or actual devices

Assessment Method: Written exercises or field observation

3. Maintenance/Level Condition

Learning Outcome: Upon completion of this section, the participant should know the owner's responsibilities.

Resources Needed: Access to actual device(s)

Assessment Method: Practical observation

4. Marking Requirements

Learning Outcome: Upon completion of this section, the participant should be able to determine compliance with marking requirements provided in NIST Handbook 44.

- Weighing element
- Indicator
- Load cell

Resources Needed: NIST Handbook 44

Assessment Method: Written exercises

TESTING

Learning Outcome: Upon completion of this section, the participant should be able to competently perform the following tests:

- Increasing load test
  ⇒ Test points (State Policy)
- Decreasing load test
- Shift test
- Special Tests
  ⇒ Sensitivity
  ⇒ Over Capacity
  ⇒ RFI

Resources Needed: Test equipment
Actual device(s)

Assessment Method: Practical observation
Written exercises

POST TEST PROCEDURES

1. Completing the Test Report

Learning Outcome: Upon completion of this section, the participant should be able to accurately and completely fill out the test report.

Resources Needed: Actual test report

Assessment Method: Written exercises
Practical observation

2. Sealing

Learning Outcome: Upon completion of this section, the participant should know the appropriate sealing policies.

Resources Needed: Sealing equipment
Actual device

Assessment Method: Practical observation

3. Official Actions

Learning Outcome: Upon completion of this section, the participant should know which of the following actions to use at the completion of the test.

- Approval
- Repair order
- Stop use
- Condemnation

Resources Needed: Official action notices

Assessment Method: Written exercises

4. Policy regarding Emotional, Aggressive or Otherwise Confrontational Individuals

Learning Outcome: Upon completion of this section, the participant should know the official policy of his/her jurisdiction.

Resources Needed: Oral discussion
Role play

Assessment Method: Oral questions and answers

Name _____

Description	Entry Level	Date	Advanced	Date
Applicable Laws and Regulations	Basic			
			All	
Established Enforcement Procedures and Policies	Basic		Thorough	
Organization and Use of NIST Handbook 44	Basic			
Basic Weighing Technology				
Load sensing element	Basic		All	
Analog/Digital conversion	Basic		Thorough	
Memory, computation, and display	Basic			
Operating Controls	Basic			
Printer/Label Requirements	Basic		Thorough	
Level Indicating Means	Thorough		Thorough	
Marking Requirements	Basic		Thorough	
Category of Device and Methods of Sealing				
Category 1	Basic		All	
Category 2	Basic		Thorough	
Category 3	Basic			
Basic Definitions:				
Accuracy class	Thorough		All	
Computing scale			Thorough	
Net weight	Thorough			
Total price	Thorough			
Counter or bench scale	Thorough			
Multi-range scale	Thorough			
Nominal capacity	Thorough			
Scale division (d)	Thorough			
Load cell verification interval (v)	Basic			
Verification scale division (e)	Basic			
Physical seal	Thorough			
Audit trail				
Remote configuration	Basic			
Event counter	Basic			
Event logger	Basic			
Weight classifier				
Definition	Basic			
Basic operation	Basic			
Zero load balance	Thorough			
Zero setting mechanism (manual, semi-automatic, or automatic)	Basic			
Professionalism:				
Appropriate dress	Thorough		All	
Appropriate credentials	Thorough		Thorough	
Appropriate approach to owner/manager:				
Introduces him or herself to management	Thorough			
Invites management to accompany him or her during testing	Thorough			
Reviews testing results with management	Thorough			
Type Approval (NTEP CC)	Basic		Thorough	

Application of Maintenance or Acceptance Tolerance:			All	
Recently installed devices	Thorough		Thorough	
Devices ordered repaired	Thorough			
Devices moved from other locales	Thorough			
Equipment Required:				
Test weights	Basic		All	
Safety equipment	Thorough		Thorough	
Hand tools (screwdriver, wire cutters, etc.)	Thorough			
Security seals and inspection stickers	Thorough			
Other				
Marked and Unmarked Devices				
Differences in testing and tolerances	Basic		Thorough	
Assessment of Associated Equipment; Point-of-Sale (POS) Systems:			All	
Scanner	Basic		Thorough	
Printer	Basic			
Indicating element(s)	Basic			
Suitability	Basic		Thorough	
Location/Support	Basic		Thorough	
Primary Indications and Functions	Basic		Thorough	
Maintenance/Level Condition	Thorough		Thorough	
Marking Requirements	Basic		Thorough	
Increasing Load Test				
Test points (State Policy)	Thorough		Thorough	
Decreasing Load Test	Thorough		Thorough	
Shift Test	Thorough		Thorough	
Special Tests:				
Sensitivity	Basic		All	
Over Capacity	Basic		Thorough	
RFI	Basic			
Completing the Test Report	Basic		Thorough	
Sealing	Thorough		Thorough	
Official Actions:				
Approval	Thorough		All	
Repair order	Basic		Thorough	
Stop use	Basic			
Condemnation	Basic			
Policy regarding Emotional, Aggressive or otherwise Unsatisfied Individuals	Thorough		Thorough	

APPENDIX B

Associate Membership Committee Training Funds 2001 - 2002

JURISDICTION	INTENDED USE	AMOUNT GRANTED
Arizona	Library for Trainers	$ 1420
Arkansas	Training	360
Colorado	Training	125
Connecticut	Conference Training	600
Florida	Training	430
Massachusetts	Digital Camera	125
Michigan	Training	125
Mississippi	Training	125
New York	Training	360
Ohio	Power Point Projector/Training	285
Oregon	Training	1520
Pennsylvania	Training	125
South Dakota	Digital Camera	125
TOTAL		$ 5725

Report of the Committee on the National Type Evaluation Program (NTEP)

Louis Straub, Chairman
Chief
Maryland Weights and Measures

Reference
Key Number

500 Introduction

The NTEP Committee submits its Report for the 87th National Conference on Weights and Measures (NCWM). This consists of the Interim Report presented in NCWM Publication 16 as amended in the Addendum Sheets issued during the Annual Meeting that was held July 14-18, 2002 in Cincinnati, Ohio. The Committee considered communications received prior to and during the 87th Annual Meeting that are noted in this report.

Table A, identifies all of the items contained in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Committee's Interim Meeting Report. Voting items are indicated with a "V" or, if the item was part of the consent calendar, by the suffix "VC" after the item numbers. Items marked with an "I" after the reference key number are information items. An item marked with a "W" means that item has been withdrawn. Items marked with a "W" generally will be referred to the regional weights and measures associations or other groups because they either need additional development, analysis, and input, or they do not have sufficient Committee support to bring them before the NCWM. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

The attached report may contain recommendations to revise or amend NCWM Publication 14, Administrative Procedures, Technical Policy, Checklists, and Test Procedures or other documents. Revisions proposed by Committee members are shown **in bold face print** by ~~crossing-out~~ information to be deleted and underlining information to be added. New items proposed for addition to NCWM Publication 14 or other documents are designated as such and shown in **bold face print.**

Table A – Agenda Items

Table B
Appendices

Table C
Voting Results

Reference Key Number	House of Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
500 (Report in Its Entirety) Voice Vote	All Yeas	No Nays	All Yeas	No Nays	Passed

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

501-1 I International Organization of Legal Metrology (OIML) Certificate Project

Source: Carryover Item 501-1

Background: This item is included on the Committee's agenda to provide an update on NTEP's work to issue OIML R 60 and R 76 Certificates. The status of NTEP activities in these areas is outlined below.

OIML R 60, Metrological Regulation for Load Cells: Since announcing R 60 test capability in April 1997, NTEP has received three applications for R60 testing. The first OIML Certificate was issued to Mettler-Toledo, Inc. in early 1999, and the second to Revere Transducers, Inc. shortly thereafter. Following additional testing, a third R 60 Certificate was issued to expand the capacities listed on the original Revere Certificate. At both the 2002 NCWM Interim and Annual Meetings, NTEP Director Steve Patoray and NTEP Committee Chairman Louis Straub reported that no additional applications for R 60 testing have been submitted to NTEP since the Committee's 2001 report.

OIML R 76, Non-Automatic Weighing Instruments: NTEP announced R 76 test capability in July 1998. In early 1999, NTEP received its first application for an R 76 test; a second application was received shortly thereafter. The first R 76 OIML Certificate was issued to Hobart Corporation in early 2000. Since October 2000, NTEP has received one additional application for R 76. This application, which was for a separate component of a weighing device, was subsequently withdrawn since the separate testing of components under R 76 is not presently recognized by OIML. At both the 2002 NCWM Interim and Annual Meetings, NTEP Director Steve Patoray and NTEP Committee Chairman Louis Straub reported that no additional applications for R 76 testing have been submitted to NTEP since the Committee's 2001 report.

At the 2001 Annual Meeting, the Committee discussed reports from manufacturers concerning the acceptance of NTEP-issued OIML Certificates by other countries and ways in which the acceptance of the certificates might be increased. Among the approaches being considered by the Committee is the establishment of mutual acceptance agreements with other countries as described in Item 501-2.

At the 2002 Annual Meeting, Dr. Charles Ehrlich, NIST Technical Standards Activities Group (formerly Technical Standards Activities Program) updated the Committee on the following pending changes to the OIML certificate system:

1. A new annex will be added that elaborates on the requirements of Issuing Authorities that use OIML Certificates.
2. OIML certificates would have to include the documentation provided by the manufacturer at the time an application is submitted.

501-2 I Test Data Exchange Agreements

Source: Carryover Item 501-2

Background/Discussion: In April 1998, representatives of the NCWM, NIST Technical Standards Activities Program (TSAP), NIST Office of Weights and Measures (OWM), and other OIML countries met to discuss the development of arrangements for mutually accepting type evaluation test data among participating OIML countries. Under such an arrangement, manufacturers would be able to submit their equipment to any of the participating countries for testing to OIML recommended requirements. The resulting test data would be accepted by other participants, as a basis for issuing each country's own type approval certificate. The following is a report on the three types of test data exchange agreements.

Mutual Acceptance Arrangement (MAA): An OIML working group established to develop the framework for an arrangement has met a number of times since that initial April 1998 meeting and has developed eight successive drafts of the MAA. At the 2002 NCWM Interim Meeting, Dr. Charles Ehrlich, TSAP, updated the Committee on the following MAA Work Group Activities. Copies of the eighth draft were distributed to working group members and interested parties in September 2001. Comments were due to the Secretariat November 15, 2001. The Secretariat (the United States and the International Bureau of Legal Metrology (BIML)) reviewed the comments and the votes received on the eighth draft. Fourteen members voted in favor of the eighth draft and eight members voted in opposition to it. While most members support the eighth draft, the results do not indicate an overwhelming majority. The eighth draft eliminated the option of self-assessment because some members mistakenly understood the term "self-assessment" to mean "self-declaration." There still appear to be concerns in the area of evaluating the testing laboratories, particularly related to the use of laboratory intercomparisons to demonstrate laboratory competence. To address these concerns, the Secretariat developed a ninth draft that includes two methods for laboratories to demonstrate competence: peer review (which includes an on-site assessment of the laboratory by a group of peers from participant countries) and formal

laboratory accreditation. Laboratory intercomparisons were included in the ninth draft; however, they were included as a component of peer review rather than as a separate option.

At the 2002 NCWM Annual Meeting, Dr. Ehrlich updated the Committee on the status of the vote on the ninth draft MAA. Thirteen members voted in favor of the ninth draft and seven members voted in opposition. The ninth draft failed by one vote since the vote at the TC/SC level must pass by at least a 2/1 margin. Discussions will be held at the upcoming CIML Meeting in October with members of the sub-committee that voted to oppose the ninth draft, abstained from voting, or failed to vote to discuss how a more favorable vote can be obtained. The NTEP Committee continues to closely follow the development of the draft and encourages interested parties to provide comments to the Secretariat.

Bilateral Agreements: At the 2001 NCWM Annual Meeting, the NTEP Committee reported that Germany's Physickalisch-Technische Bundesanstalt (PTB) has approached NCWM with a proposal to establish a bilateral agreement between NTEP and PTB in the area of load cells and non-automatic weighing instruments. Dr. Manfreid Kochsiek met with the NCWM BOD and NTEP Committee following the BOD's agenda review session during the 2001 Annual Meeting, during which time the Committee briefly discussed possible approaches for establishing an agreement. The Committee agreed that additional work is needed to prepare a memorandum that would indicate the scope of the agreement. Work is also needed to identify the differences between the OIML requirements and the NIST Handbook 44 requirements for these device types. During discussions with Dr. Kochsiek, the NCWM also raised the question of whether or not PTB might provide training to the NTEP labs on the OIML requirements. The NCWM has asked Dr. Charles Ehrlich, TSAP, to continue his role as liaison between PTB and NCWM for these activities.

NTEP representatives visited the Nederlands Meetinstituut (NMi) in the Netherlands and the National Weights and Measures Laboratory (NWML) in the United Kingdom several years ago to discuss the possibility of establishing bilateral agreements to mutually recognize type evaluation test data. NMi contacted the NCWM in the latter part of 2001 and expressed an interest in re-visiting these discussions and in establishing a bilateral agreement with NTEP. The NCWM Board of Directors believes that other countries may express a similar interest. The Board remains open to the possibilities of establishing agreements with these and other countries to mutually recognize type evaluation test data. The Board does not wish to establish exclusive agreements and is willing to consider working with any interested country.

Once comparisons of relevant OIML Recommendations and Handbook 44 requirements have been made, the Board hopes that a test protocol can be developed which would facilitate the review and acceptance of tests to OIML and Handbook 44 requirements. Such a protocol would facilitate the establishment of test data exchange agreements and could be used by any country interested in working with NTEP.

At the 2002 NCWM Interim Meeting, the Committee reiterated that work to establish any bilateral agreements is still in the very early stages of development; no decisions have been reached by the BOD or PTB relative to these discussions. A number of questions, both technical and administrative must be addressed prior to establishing agreements with PTB or any other countries. Citing the successes and ongoing work to establish the agreements between NTEP and Canada as an example, the Committee plans to begin work with a narrow area of devices, such as load cells, before pursuing agreements involving devices with more variables.

During the 2002 NCWM Interim Meeting, the Committee met with representatives of the NIST Mass and Force Group and other interested parties. The purpose of this meeting was to review questions that had been raised by the Mass and Force Group, OWM, and TSAP related to establishing the framework necessary to support an agreement, which would involve load cell testing. During the discussions, the group identified a number of questions to be posed to PTB concerning the details of how such an arrangement might be structured. NCWM Headquarters will prepare a summary of that meeting and circulate it to participants in preparation for continuing discussions with PTB.

During the 2002 NCWM Annual Meeting, Stephen Patoray, NTEP Director, reported that he has been in contact with Germany's PTB to discuss questions raised during the meeting with the NIST Mass and Force Group.

NTEP-Canada Mutual Recognition Program: At the 2002 NCWM Interim Meting, NTEP Director Steve Patoray reported that NTEP plans to move ahead in its work with Canada to expand the current NTEP-Canada Mutual Recognition Program to include retail motor-fuel dispensers. Mr. Patoray explained that when the program is put in place, a manufacturer can submit equipment to Canada for testing to both NTEP and Canadian requirements. The resulting test data can be submitted to NTEP to use as a basis for issuing NTEP Certificates of Conformance. Because NTEP does not

have testing facilities to conduct testing to the Canadian requirements, a manufacturer will not be able to request testing to Canadian requirements through an NTEP laboratory. Mr. Patoray reported that NTEP considered directing *all* retail motor-fuel dispenser testing to Canada under this program; however, U.S. manufacturers report that not all equipment is intended for both the U.S. and Canadian marketplace. Consequently, NTEP plans to maintain its current NTEP laboratories for testing retail motor-fuel dispensers to NTEP requirements. Mr. Gilles Vinet, Measurement Canada, reported that Canada is planning to adopt OIML R 117 Measuring Systems for Liquids Other Than Water when current revisions to R 117 are complete.

At the 2002 NCWM Annual Meeting, NTEP Chairman Louis Straub announced that an agreement was reached by NCWM and Canada to expand the NTEP-Canada Mutual Recognition Program to include retail motor-fuel dispensers. The agreement is a two-year pilot program that recognizes test data collected at the Canadian NTEP Participating Laboratory for use in issuing an NTEP Certificate of Conformance.

501-3 I Adoption of Uniform Regulation for National Type Evaluation by States

Source: Carryover Item 501-3

Background/Discussion: At the 2002 NCWM Interim Meeting, Mr. Tonini, Scale Manufacturers Association (SMA) ,gave an update on the State Directors' NTEP breakfasts, which have been sponsored by the SMA. These breakfasts were designed to enable jurisdictions to share information about adopting and implementing NTEP in their respective jurisdictions. They help to encourage non-NTEP jurisdictions to adopt the regulation and allow current NTEP jurisdictions to share ideas on how to make enforcement more effective and uniform among the States. The SMA sponsored NTEP breakfasts also provide NTEP management with information relative to areas in which the operation and implementation of the program can be improved. Mr. Tonini reported that the breakfasts continue to be successful and well received and noted that the results of all breakfasts from 1997 to 2001 are posted on SMA's web site at http://www.scalemanufacturers.org.

In 2001, the BOD asked SMA to supplement the format of the SMA-sponsored NTEP breakfasts to provide training sessions on NTEP implementation. During the sessions conducted at the 2001 regional weights and measures association meetings, participants discussed the SMA compilation of responses to questions that have been discussed at past breakfasts. The responses were tabulated to indicate the degree of uniformity attained with NTEP enforcement by region and for the United States. The elements of the SMA Production Meets Type Program for conformance with Handbook 44 Scales Code paragraph T.N.8. Influence Factors were also presented at the 2001 regional meetings. Mr. Tonini noted that the sessions were well received by participants and generated good discussion. He also noted that SMA has selected topics for the 2002 cycle of SMA-sponsored NTEP breakfasts and looks forward to another productive round of discussions.

Mr. Tonini also reported that SMA would be sharing information on two new standards for weighing devices being developed by SMA. The standards are intended to promote uniformity in audit trail information and RFI/EMI test procedures. The first standard addresses the access of audit trail information. Mr. Tonini noted that this standard would be available early in May 2002 to any manufacturer who might be interested in adopting a standard method of accessing audit trail information. The second standard addresses RFI/EMI Field Test Procedures. About 20 years ago, SMA developed a document outlining RFI/EMI Test Procedures; however, this document was based on the technology in place at that time. SMA is in the process of updating the procedures to reflect current technology. SMA hopes to raise the level of understanding and interest in both these standards at the 2002 regional weights and measures meetings.

At the 2002 NCWM Interim Meeting, Daryl Tonini updated the NTEP Committee on the status of SMA's drive to assist States to adopt the Uniform Regulation for National Type Evaluation (URNTE) and the Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies (VRR).

Mr. Tonini reported that Alaska has adopted a registered service agency program, as of January 2002, supplementing its current regulation requiring commercial devices to be tested under the National Type Evaluation Program. No change occurred in the status of Kentucky's and Vermont's adoption of the regulations due in part to changes in the weights and measures organizations in these jurisdictions. There have been no activities in North Dakota relative to adopting either regulation. New Mexico continues to indicate an interest in adopting NTEP requirements; however, it has been unable to

proceed further with these efforts at this time. Mike Pinagel, Michigan, reported that Michigan was in the final stages of adopting changes to their weights and measures regulation, including the adoption of URNTE and VRR. At this time, Michigan is functioning as an NTEP jurisdiction for weighing devices under an interpretation of the Michigan weights and measures laws by the State Attorney General's office. Mr. Tonini noted that SMA called upon representatives of other NTEP States to assist those jurisdictions considering adoption of the regulations. He referenced a meeting scheduled during the Interim Meeting with Stephen Pahl, Director Texas Weights and Measures, scale industry representatives, and Aves Thompson, Alaska, to discuss the advantages of adopting the URNTE.

At the 2002 NCWM Annual Meeting, Mr. Tonini, updated the Committee on the information presented at the 2002 Interim Meeting. He reported that the State of Michigan has adopted the Uniform Regulation for Voluntary Registration of Service Persons and Service Agents (VRR). Randy Wise, Kentucky, reported that the process for the adoption of the Uniform Regulation for National Type Evaluation has been completed with a tentative implementation date of July 1, 2003. Mr. Tonini also noted that a copy of an updated map depicting adoption of the URNTE and VRR would be provided to the Committee. A copy of this map is included in Appendix A.

The Committee expressed its appreciation for SMA's continued efforts to encourage the adoption and uniform implementation of NTEP.

501-4 I NTEP Policy: Challenges to a Certificate of Conformance and Verification that Production Meets Type

Source: Carryover Item 501-4

Background/Discussion: Since 1998, the NCWM has worked to address 1) the issue of assuring that weighing and measuring devices produced for the marketplace are the same as the model or type of the device that was evaluated by NTEP; and 2) resolve challenges to NTEP Certificates of Conformance. The NTEP Business Plan Work Group developed several proposals for a conformity assessment component for NTEP. In January 2001, the Work Group's activities were put on hold during the transition of NTEP management from NIST to NCWM and while the NCWM Board of Directors (BOD) continued its work to develop a conformity assessment program. The BOD also discussed restructuring the Work Group to be more of an advisory group. The BOD intended the group to meet when needed to provide the BOD with an outside perspective on selected issues related to the administration of NTEP and to provide general feedback on NTEP operation.

During the development of procedures to address conformity assessment, the NTEP Committee heard a number of comments supporting the concept of conformity assessment. The Committee also heard some concerns over whether or not the proposed approach of examining the manufacturer's production processes would be adequate to address the challenges before the Committee. The Committee will consider these comments as it proceeds with its work on conformity assessment.

At the 2001 NCWM Annual Meeting, the Committee reported that the August 2001 Edition of the NCWM Publication 14 Administrative Policy now provides the framework for conformity assessment. Future work on the conformity assessment process will build on this framework. The Committee noted that NTEP conformity assessment is based on evaluating the manufacturer's quality system and on statistical sampling. The Committee also received copies of a document describing a conformity assessment program developed by the Scale Manufacturers Association. NTEP Director Steve Patoray reported that the SMA provided him with the opportunity to observe a beta site audit for their conformity assessment program.

At the January 2002 NCWM Interim Meeting, Mr. Patoray reported that a Work Group was being formed by the NCWM to develop and propose a detailed process to implement a conformity assessment system to satisfy NTEP requirements. The NTEP Administrative Policy would be used as the framework for the system. Three work group members had been confirmed. The two representatives from NIST will contribute expertise on conformity assessment systems and on the type evaluation and field enforcement process. Mr. Patoray was waiting for a response from three others. An update on preliminary work by the Work Group is planned prior to the Board of Directors meeting in April 2002. The group targeted the July 2002 NCWM Annual Meeting to present its findings to the BOD.

At the 2002 Annual Meeting, Mr. Patoray reported that the Work Group was formed and included Dennis Krueger (NCR), Bill West (Ohio NTEP lab), Steve Cook (NIST Technical Advisor), Joe Dhillon (NIST Conformity Assessment Advisor), Ray Bales (Weigh-Tronix and Scale Manufacturers Association member), and Frank Rusk (First Weigh), with additional input from Rich Tucker (Tokheim and Gasoline Pump Manufacturers Association member). The Work Group met twice and developed a preliminary outline for an NTEP Conformity Assessment Program. Mr. Patoray discussed the ideas and possible direction during a presentation to the BOD. The BOD requested that Mr. Patoray present the outline to other interested parties during the conference and provide the BOD with additional feedback.

501-5 I NTEP Participating Laboratories and Evaluations Reports

Source: Carryover Item 501-6

Background/Discussion: At the 2002 NCWM Interim and Annual Meetings, NTEP Director Steve Patoray updated the Committee on NTEP laboratory and administrative activities since October 2, 2000. A report of NTEP Laboratory Activities is included in Appendix B.

The NTEP Weighing and Measuring Laboratories held a joint meeting in June 2001 in Annapolis, MD. Mr. Patoray reported that, in addition to technical issues, this meeting covered a number of administrative topics related to the transition of NTEP to NCWM management. The next laboratory meeting is planned for June 9-12, 2002, in Albany, NY. The agenda topics for this meeting will focus heavily on technical training issues for the laboratories. The NTEP Weighing Laboratories also met following the October 2001 meeting of the Weighing Sector in Albany, NY. The NTEP Measuring Laboratories met prior to the October 2001 annual meeting of the Measuring Sector in Lexington, KY. Mr. Patoray reported that he conducted three NTEP laboratory audits in 2001. He noted that Steve Cook and Diane Lee, NIST OWM, participated in two of these audits, to provide assistance in the assessment of the laboratories' technical test capabilities and quality systems. He expressed appreciation for their assistance. He also noted that he is making plans for visits to other laboratories in 2002.

Mr. Patoray reported that NTEP is considering adding test capability for some new device types such as multiple dimension measuring devices in the near future. He also reported that Larry Turberville, AL, has assumed new duties within the AL Department of Agriculture and Industry and, as a result, will be unable to continue in his role as an NTEP participating laboratory.

At the 2002 NCWM Annual Meeting, Mr. Patoray provided the Committee a summary of the 2002 NTEP Weighing and Measuring Laboratories meeting held in Albany, NY, in June 2002. Mr. Patoray reported that this meeting covered technical issues with an emphasis on a simulated demonstration of performance testing on vehicle scales and technical issues regarding liquid-measuring devices. The joint labs meeting included presentations by Richard Suiter and Diane Lee (NIST Technical Advisers) on measurement uncertainty and an update on the quality manual template based on ISO Guide 17025. Additionally, NIST Technical Advisor Steve Cook provided the weighing laboratories with an update on the status of the weighing devices laboratory intercomparison and a review on draft laboratory instructions.

One of the administrative items discussed at the joint 2002 Weighing and Measuring Devices Laboratories meeting dealt with the upcoming effective date for the requirement to mark the Certificate of Conformance (CC) number on commercial weighing and measuring devices that have NTEP CCs. Manufacturers have expressed concerns that the delay between the date an evaluation was completed and the date CC numbers were assigned would hold up production and distribution of devices even though the evaluation is complete. Mr. Patoray reported that a plan has been proposed to the Gasoline Pump Manufacturers Association and Scale Manufacturers Association for their review and comment that would expedite the process for issuing a CC after a device completes a successful evaluation. In summary, the proposed plan requires an applicant and NTEP to agree upon the testing to be performed and the contents of a draft CC prior to the start of an evaluation. The final CC and number would be ready for signature and distribution at the conclusion of a successful evaluation. The proposed plan will also be discussed at the upcoming NTETC Sectors and BOD meetings. It is anticipated that this policy will be in effect by January 1, 2003, for NTEP applicants that desire the expedited CC process.

501-6 I NTETC Sectors Reports

Source: Carryover Item 501-6

Background: Outlined below is a brief summary of recent National Type Evaluation Technical Committee Sector activities, including information presented at the 2002 NCWM Interim meeting. During this discussion, NTEP Director Steve Patoray noted that the process for incorporating Sector recommendations in NCWM Publication 14 has changed from previous years. The NTEP Committee will now review and approve the changes prior to incorporating them into Publication14.

Mr. Patoray noted that an issue on the Weighing Sector's agenda concerning the sleep/screen saver mode would not be included in the next edition of Publication 14. After two ballots on proposed language for Publication 14 on this topic, the Weighing Sector was unable to reach a consensus and there is not agreement among the NTEP laboratories on the issue. Consequently, the issue will be brought before the Weighing Sector for resolution at its next meeting.

Belt-Conveyor Scale Sector: The NTETC Belt-Conveyor Scale Sector last met in October 1998. A request for agenda items was distributed to the Sector in July 2000. Sector members were again polled in April 2001 during a NIST OWM Technical Session on belt-conveyor scales. As was the case in 1999, insufficient items were received to warrant a 2000 or a 2001 meeting. The NIST Technical Advisor will distribute a request for items in Spring 2003 and, after consulting with the Sector Chairman and NTEP Director, will determine the need for a meeting in 2003. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Steven Cook, NIST OWM. Mr. Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by e-mail at stevenc@nist.gov or in writing at NIST, 100 Bureau Drive – Stop 2600, Gaithersburg, MD, 20899-2600.

Grain Moisture Meter and NIR Protein Analyzer Sectors: The Grain Moisture Meter and NIR Protein Analyzer Sectors held a joint meeting in Kansas City, MO, on August 22-24, 2001. A summary of these joint meetings was distributed to Sector members in October 2001. The summary was also provided to the Committee at the 2002 NCWM Interim Meeting and is included in Appendices C and D. The next meeting of the Grain Moisture Meter and NIR Protein Analyzer Sectors is scheduled for August 21-24, 2002 in Kansas City, MO. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisors, Ms. Diane Lee, NIST OWM, or Mr. Jack Barber, J.B. Associates. Ms. Lee can be reached by telephone at 301-975-4405, by fax at 301-926-0647, by e-mail at diane.lee@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2600, Gaithersburg, MD, 20899-2600. Mr. Barber can be reached by telephone at 217-483-4232, by fax at 217-483-3712, by e-mail at jbarber@cityscape.net, or in writing at J.B. Associates, 10349 Old Indian Trail, Glenarm, IL, 62536.

Measuring Sector: The NTETC Measuring Sector met September 28-29, 2001, in Lexington, KY. A summary of that meeting was distributed to Sector members in early January 2002. The summary was also provided to the NTEP Committee at the 2002 NCWM Interim Meeting and is included in Appendix E. The next meeting of the Measuring Sector is scheduled for October 11-12, 2002, in Richmond, VA in conjunction with the Southern Weights and Measures Association's Annual Meeting. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Richard Suiter, NIST OWM. Mr. Suiter can be reached by telephone at 301-975-4406, by fax at 301-926-0647, by e-mail at rsuiter@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2600, Gaithersburg, MD, 20899-2600.

Weighing Sector: The Weighing Sector met October 14-16, 2001, in Albany, NY. A draft summary was distributed to Sector members in early December 2001. The final meeting summary was provided to the Committee at the 2002 NCWM Interim Meeting and is included in Appendix F. Attachments to the summary are available upon request from the technical advisor. The next Weighing Sector meeting is scheduled for September 29 – October 1, 2002, in Annapolis, MD. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor, Steven Cook, NIST OWM. Mr. Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by e-mail at stevenc@nist.gov, or in writing at NIST, 100 Bureau Drive – Stop 2600, Gaithersburg, MD, 20899-2600.

Automatic Weighing Systems Working Group (AWS): The BOD reconvened the AWS Working Group for one meeting in response to remaining issues related to a change in the status of the tentative AWS Code in NIST Handbook 44. The

Work Group will deal with several items related to the current NCWM Publication 14 NTEP Draft Checklist and Test Criteria. The meeting of the Working Group has been scheduled for October 2-3, 2002 in Annapolis, MD, following the meeting of the NTETC-Weighing Sector. Contact Stephen Patoray, NTEP Director, or NIST OWM Technical Advisor, Steve Cook to submit items for the meeting. Mr. Patoray can be reached by email at spatoray@mgmtsol.com. Steve Cook can be reached by telephone at 301-975-4003, by fax at 301-926-0647, by email at steven.cook@nist.gov, or in writing at NIST, 100 Bureau Drive-Stop 2600, Gaithersburg, MD 20899-2600.

Canadian Vehicle Scale Evaluation Work Group: Darrell Flocken, Mettler-Toledo, reported that Canada has formed a Vehicle Scale Evaluation Work Group and that they are interested in using existing NCWM Publication 14 type evaluation policies and procedures. Mr. Flocken recommended that future amendments to Publication 14 consider the Canadian feedback and positions and work to improve existing policies and procedures that are considered unclear and ambiguous.

NTETC Sector Summaries: At the 2002 Annual Meeting, Mr. Straub discussed the need to publish the NTETC Sector Summaries as part of the Interim Agenda and Committee Reports. The summaries currently account for more than one third of the size of the referenced publications (103 pages). He proposed that the BOD and NTEP Committee continue to receive copies of the summaries at the NCWM Interim Meeting for their review and approval. Additionally, future Interim Agendas and Committee Reports will state that the NTETC Sector Summaries are available upon request from NCWM and NIST. The NTETC Sector Summaries will continue to be included as appendices in the NCWM Annual Reports.

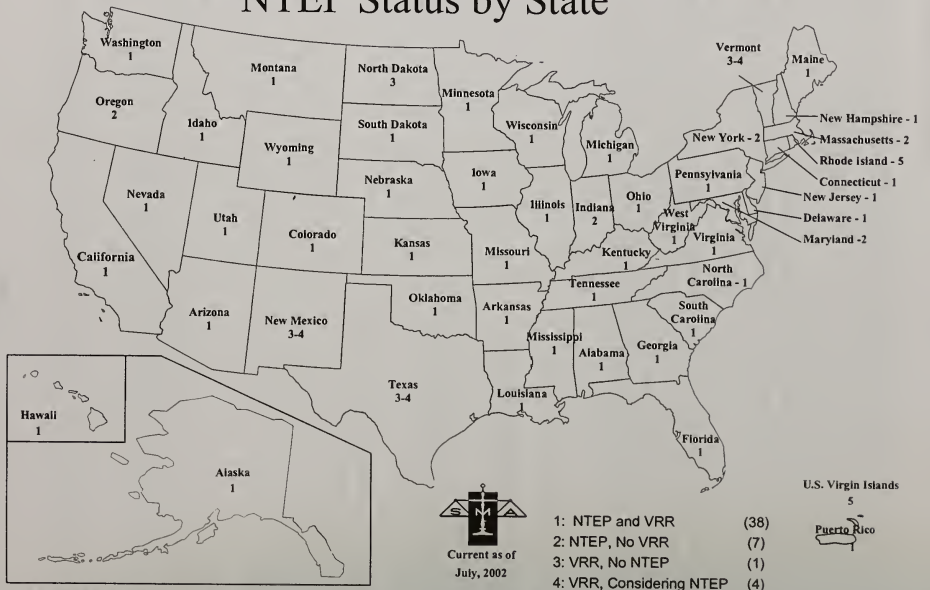
L. Straub, Maryland, Chairman

R. Murdock, North Carolina, NCWM Chairman
R. Andersen, New York, NCWM Chairman-Elect
D. Onwiler, Nebraska
G. Shefcheck, Oregon

NTEP Technical Advisor: S. Patoray, NTEP Director
NIST Technical Advisor: S. Cook, NIST OWM

National Type Evaluation Program Committee

NTEP Status by State



NTEP: Uniform Regulation for National Type Evaluation

VRR: Uniform Regulation for Voluntary Registration of Service Persons and Service Agents

Appendix B
NTEP Participating Laboratories and Evaluations Report

NTEP Application Statistics 10/02/00 – 01/02/02			
	Previous Quarter	Current Quarter	Total to Date
	10/02/00-12/31/00	10/01/01-12/31/01	10/01/00 – 01/02/02
Applications Processed (Reactivations)	34	83(11)	333(32)
Applications Completed	21	24	196
New Certificates Issued (New)	18	24	296
Certificates Distributed to State Directors		24	271
Certificates Posted to Web site		22	1670
Active NTEP Certificates		24	1519
Average Time for NCWM to assign an evaluation	14.4 days		
Average Time for NCWM to review a Draft Certificate	9.9 days		
Average Time for complete evaluation (Completed NCWM assignments)	88.0 days		

NTEP Application Statistics 10/01/01 – 06/20/02		
Total Applications Processed (Reactivated)	229 (15)	
Applications Completed	170	
New Certificates Issued	193	
Certificates Distributed to State Directors	187	
Certificates Posted to Web Site	1104	
	Average	Median
Time for NCWM to assign an evaluation	12 days	8 days
Time for NCWM to review a Draft Certificate	9 days	6 days
Time for complete evaluation (Complete NCWM assignment)	104 days	65 days

Appendix C
National Type Evaluation Technical Committee (NTETC)
Grain Moisture Meter (GMM) Sector
August 22-23, 2001 - Kansas City, MO

Meeting Summary

Agenda Items

☆ 1. New Sector Chairman Appointed by NCWM, Inc.
☆ 2. Report on NCWM, Inc.
   a) Plans to Reduce Number of State Public Sector Members Eligible for Travel Reimbursement
   b) Registration Fees for Non-NCWM Members Attending Sector Meetings
3. Report on Proposed Revisions to OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds"
4. Update on Field Evaluation of Proposed Test Weight per Bushel Tolerances
5. Review Latest Draft of Evaluation Procedure Outline (EPO) and Test Procedures for the Field Evaluation of NTEP GMM Devices (air-oven method)
6. Review Results of Air-Oven Collaborative Study
☆ 7. Criteria for Like Type
8. Report on the 2001 NCWM Interim and Annual Meetings
9. Update on NTEP Type Evaluation and OCP (Phase II) Testing
6. Definitions of Recently Introduced Terms
☆ 11. Time and Place for Next Meeting

Note 1: Because of common interest, items marked with a star (☆) were considered in a joint session of the NIR Protein Analyzer and the Grain Moisture Meter Sectors.

Note 2: See the end of the NIR Protein Analyzer Sector Summary for the combined Grain Moisture Meter and NIR Protein Analyzer Sectors meeting attendance list.

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1. New Sector Chairman Appointed by NCWM, Inc.

In late March 2001, Richard "Will" Wotthlie asked to be replaced as Chairman of the NTETC Grain Moisture Meter and Near Infrared Protein Analyzer Sectors. Diane Lee, representing NIST/OWM and Jack Barber, Sector Technical Advisor, recommended Cassie Eigenmann-Pierson for this post. Subsequently, Wes Diggs, who at the time was Chairman of the NTEP Committee, sent Cassie a formal letter of appointment. Steve Patoray, NTEP Director, explained to the Sector that since the transfer of the National Type Evaluation Program (NTEP) from NIST OWM to the NCWM, Inc., NCWM administrative procedures have been revised. The new procedures stipulate that NTETC Sector Chairs are appointed by the NTEP committee chair and serve for an indefinite term. At the 2001 Annual Meeting of NCWM, Inc., Louis Straub, Maryland Department of Agriculture, became the new NTEP committee chair.

2. Report on NCWM, Inc.

2.a. Plans to Reduce Number of NTETC State Public Sector Members Eligible for Travel Reimbursement

At a recent NCWM, Inc. NTEP Lab meeting, Lou Straub reported that NCWM, Inc., as a cost reduction measure, plans to limit the number of NTETC State public sector members that will be reimbursed for travel expenses incurred in connection with participation in Sector meetings. Present State public sector members may continue as voting GMM/NIR Sector members, but reimbursement for travel expenses will be limited to two or three people per meeting.

2.b. Registration Fees for Non-NCWM Members Attending Sector Meetings

NCWM, Inc is now charging a $75.00 registration fee to all non-NCWM members who attend a Sector meeting.

Steve Patoray, NTEP Director, reminded the Sector that the NCWM is now incorporated and should be referred to as NCWM, Inc. He explained that annual maintenance fees on Certificates of Conformance (CCs) are the main source of funding for Sector meetings, training, etc. These funds are limited. The need to keep expenditures in line with income is the driving force behind the changes mentioned in agenda items 2.a. and 2.b.

Mr. Patoray explained how the National Type Evaluation Program is administered. NCWM, Inc. now issues all certificates of conformance. The NCWM, Inc. Board of Directors is the policy-making body of NCWM, holding responsibility for the overall operation of the organization. Additionally, an ad *hoc* committee, called the NTEP Advisory Committee, advises the NTEP Committee, making recommendations on policy and long range planning. The NTEP Committee is responsible for the operation of NTEP. It ratifies NTEP policy and procedures; resolves policy, technical and appeals issues; sponsors technical subcommittees (NTETC Sectors) to develop technical test procedures and evaluation criteria; and it oversees the activities of the NTEP Director. NCWM, Inc. has no paid employees. They have hired a management company, Management Solutions, to handle administrative details. Mr. Patoray is employed by Management Solutions and serves as NTEP Director. The NTEP Director is responsible for the day-to-day management of NTEP. His duties include: reviewing Sector agendas before they are distributed; recommending procedures developed by Sectors; training NTEP evaluators; authorization of NTEP Labs; reviewing and recommending CC's; and managing conformity assessment.

The NTEP Sector meetings are open to all NCWM members and to registered non-members. Issues before the Sector are decided by general consensus or by formal vote. Voting rights depend on the type of NCWM membership held by the individual. These are summarized below:

- Associate Membership (Industry, Association and Academic members):
  - one vote per parent company/organization/institution
- Active Membership (State and Municipal members):
  - one vote per jurisdiction
- NCWM non-member:
  - no voting rights
  - nominal registration fee per meeting
- Federal Agencies (other than NIST):
  - one vote per agency, if they choose
- NIST/OWM:
  - one vote per agency, if they choose
- Foreign Agencies:
  - no voting rights

Mr. Patoray reported that all active CC's are now available for downloading from the NCWM, Inc. web site: http://www.ncwm.net. Information on the current NTEP fee structure can also be found on the web site.

3. Report on Proposed Revisions to OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds"

Background: [Additional information on OIML, can be found at the OIML web site http://www.oiml.org.]
The International Organization of Legal Metrology (OIML) was established in 1955 in order to promote the global harmonization of legal metrology procedures. Since that time, OIML has developed a worldwide technical structure that provides its Members with metrological guidelines for the elaboration of national and regional requirements concerning the manufacture and use of measuring instruments for legal metrology applications. OIML is an intergovernmental treaty organization whose membership includes Member States, countries that participate actively in technical activities, and Corresponding Members, countries that join OIML as observers. OIML develops model regulations, International Recommendations (identified as an IR or R and an associated number, i.e., R 60), which provide Members with an internationally agreed-upon basis for the establishment of national legislation on various categories of measuring instruments. Given the increasing international implementation of OIML guidelines, more and more manufacturers are referring to OIML International Recommendations to ensure that their products meet international specifications for metrological performance and testing.

An international consensus in the legal metrology community is reached through the technical committees, the composition of which includes representatives from Member States, international standardization and technical

organizations, manufacturers' associations and regional regulatory bodies. Under the coordination of a secretariat, experts establish international technical guidelines for the metrological performance and testing procedures of measuring instruments subject to legal controls. Cooperative agreements are established between OIML and certain institutions, such as International Organization for Standards (ISO) and International Electrotechnical Commission (IEC), with the objective of avoiding contradictory requirements; consequently, manufacturers and users of measuring instruments, test laboratories, etc. may apply simultaneously OIML publications and those of other institutions. OIML Draft Recommendations and Documents are developed by technical committees (TC) or subcommittees (SC) that are formed by the Member States. Certain international and regional institutions also participate on a consultation basis.

The Technical Standards Activities Program (TSAP) at NIST is responsible for U.S. participation and representation in the technical activities of the International Organization of Legal Metrology (OIML). TSAP received the 1st Committee Draft Revision of OIML Recommendation IR59 "Moisture Meters for Cereal Grains and Oilseeds" from the Peoples Republic of China. As Secretariat of OIML Technical Committee 17/Subcommittee 1 (TC17/SC1) China circulated the draft for review and comment by the member states of the subcommittee. To ensure that U.S. manufacturers and other interested parties had an opportunity to participate in this effort, TSAP established a U.S. National Working Group (NWG) to solicit comments and to assist in conducting a technical review of this document. The U.S. comments to the document from China were primarily editorial in nature to improve the language, but it was apparent that a significant change in direction of the document was necessary for the U.S. to support a new IR59 and bring it in line with U.S. practice.

Report on OIML TC17/SC1 Meeting of June 22, 2001:

OIML TC17/SC1 met at the Physikalisch-Technische Bundesanstalt (PTB), Berlin, Germany on June 22, 2001 for further review of the draft revision. Representatives of China, Germany, United Kingdom, Japan, Poland, France, the USA and BIML were in attendance. Dr. Ambler Thompson, NIST/TSAP and U. S. Technical Advisor to OIML TC 17, Dr. David Funk, GIPSA/FGIS, and Dr. Peter Huang of the NIST CSTL represented the U.S.

Dr. Thompson briefed the Sector on the U.S. position and the outcome of the meeting. To overcome the shortcomings of the draft document, the U.S. put forth the following series of proposals for consideration at the meeting:

Document Purpose – The purpose of the revision of IR59 is to define technical and metrological requirements for type approval and verification of measuring instruments using physical principles to determine the moisture content of cereal grains and oil seeds. These type-approved instruments are intended to be used for moisture measurements in commercial transactions.

Document Application – This document is to be developed for implementation in the OIML Certificate System, therefore necessitating an internationally agreed test procedure and test report format.

Document Direction – The document should be developed for fully automatic direct indicating moisture meters. This means instruments for which all necessary measurements are internal and are self-calculating. Directions for dealing with instruments of comparable accuracies but a lesser degree of automation would be contained in an annex. This would define a direction for future instruments without precluding existing instruments.

Maximum Permissible Errors (MPES) – The testing of the instruments should be carried out with naturally occurring grain samples and the evaluation of instrument errors will be conducted statistically. Grain samples have a large degree of natural variability due to region and climate. A statistical evaluation accounts for this natural variability and is consistent with the U.S. NTEP program.

Moisture Reference Method – The state-of-the-art in grain moisture reference methods has not reached international consensus and application on the best method. The U.S. uses a documented GIPSA air oven reference method and several other methods exist and are utilized internationally. All of these methods suffer to some extent in their absolute accuracy. The U.S. believes that it would be best to separate the international type approval of instruments from the definition of the reference method. The U.S. also proposes that the reference method should be established by the national legal metrology authority in that country and that manufacturers submitting for type approval in that country should take into account the national reference in the calibration of the type approved instrument.

The U.S. proposals were well received, in particular by France, the previous Secretariat, and Germany. Dr. Gunter Scholtz of the PTB, who chaired the meeting, asked the USA to prepare an OIML draft based on the U.S. NTEP program for review by an IWG composed of France, Germany, Poland, China and the USA. The U.S. agreed to this. Dr. Thompson will prepare the draft and will consult with the NTEP committee before forwarding electronic copies of the U.S. documents to the IWG.

4. Update on Field Evaluation of Proposed Test Weight per Bushel Tolerances

Background: At the Sector's September 1999 meeting, tolerances of 0.8 pounds per bushel for corn and oats; 0.5 pounds per bushel for all classes of wheat; and 0.7 for soybeans, barley, rice, sunflower, and sorghum were proposed for further study. At the Sector's August 2000 meeting, several state metrology representatives agreed to participate in a field evaluation of the proposed tolerances and test methods. States that agreed to participate include:

Arkansas	North Carolina
Illinois	Maryland
Nebraska	Missouri

Subsequently, Darryl Brown of the Iowa Department of Agriculture, Bureau of Weights and Measures also expressed interest in participating in the field evaluation.

The Field Evaluation of Tolerances project was to be conducted in two phases:

Phase 1. Standardization of Quart Kettle Test Weight Apparatus -
To initiate the study, the USDA/Grain Inspection Packers and Stockyards Administration (GIPSA) sent one portion of a hard red winter wheat HRW standardizing sample to each of the participating State Laboratories. Participating laboratories were asked to verify that the quart kettle used in the standard test weight per bushel (TW) apparatus met the requirements spelled out in GIPSA's volume test. They were also to verify that the apparatus was set up according to GIPSA standards before testing the HRW standardizing samples. Test results on standardizing samples were to be returned to GIPSA no later than 5 days after they had been received by the participating laboratory.

Wheat samples were sent to the states in late September 2000. With the exception of one State, the test weight apparatuses were within tolerance. GIPSA has since worked with the State to correct the test weight apparatus that was out of tolerance.

Current Status of Phase 1: Dr. Charles Hurburgh, Jr., ISU Agricultural Extension Service, supplied GIPSA with corn and soybean samples that were to be split and tested by GIPSA on their standard quart kettle test weight per bushel apparatus before being sent to the participating laboratories. The purpose of this round of samples is to obtain base-line performance data on the standard quart-kettle test method for corn and soybeans. Dr. Richard Pierce, GIPSA, has prepared the corn and soybean samples, and will be sending them to participants by the end of September 2001 with a brief description of the Phase I study and a worksheet for recording the corn and soybeans test weight results. Tests are to be run on each State's standard quart kettle TW apparatus and on any NTEP model Grain Moisture Meter with TW capability that the State may have in its laboratory. It is not intended that these samples be used for field-testing. Participants are urged to promptly return completed worksheets to Rich Pierce.

Phase 2. Field Tests of Test Weight per Bushel Capability -
Participating laboratories will be responsible for obtaining their own samples for this test. Samples must be stable and dry. The participating laboratory will make an initial determination of the test weight per bushel of each sample portion with the standard quart kettle apparatus before sending it to the field. The surface condition of these samples will have an effect on the TW measurements. To minimize surface effects, the following was recommended: 1) do NOT refrigerate samples, and 2) test no more than 20 instruments with each sample portion. Tests should be run on both the facility's grain moisture meter and on the kettle test weight apparatus used at that facility. The operator who normally makes test weight per bushel determinations at that location should perform the kettle test. No instruction should be given to the operator on how to perform the test. The participating laboratory will make a final determination of test weight per bushel when the sample is returned to the lab. Data is to be collected on as many meters as possible in the designated time period.

Current Status of Phase 2: The Sector reviewed the data sheet and set of instructions that had been drafted by Diane Lee. It was suggested that the sample volume for Phase 2 tests should be increased to 1500 – 2000 grams. Revised instructions and data sheets were sent to the seven states that agreed to participate in the field test on October 9, 2001. Field test data is to be returned to Diane Lee at NIST no later than November 15, 2001.

5. Review Latest Draft of Evaluation Procedure Outline (EPO) and Test Procedures for the Field Evaluation of NTEP GMM Devices (air-oven reference method)

Background: At the March 1998 GMM/NIR Sector meetings three working groups were established to develop Examination Procedure Outlines (EPOs) and Field Evaluation Test Procedures (Inspection Procedures) for GMM and NIR devices to provide guidance to States on implementing NIST HB 44 as it applies to these devices. Templates were developed to assist the working groups with their assignments in documenting the EPOs and field evaluation test procedures. The output of the working groups was first reviewed at the Sector's September 1999 meeting.

At the Sector's August 2000 meeting Revised drafts of the Grain Moisture Meter (GMM) Field Evaluation Test Procedures for the air oven reference method and the meter-to-meter method were distributed for review. Because of time limitations, only the meter-to-meter method was reviewed in detail. The latest draft of the GMM EPO was not available at that meeting.

Discussion: In the latest round of editing, the GMM Inspection Procedure – Air-oven Reference Method has been split into two separate procedures. The first procedure is based on NIST Handbook 44 (HB44), §5.56(a), which is applicable to all NTEP meters as well as any meters manufactured or placed into service after January 1, 1998. The second is based on HB44, §5.56(b), which is applicable to all other meters. A similar change was made in the corresponding EPOs.

The latest drafts (dated May 2001) of the GMM EPO and Inspection Procedure based on HB44, §5.56(a) were reviewed by the Sector.

Conclusion: Sector members were in agreement that the May 2001 draft EPO should be re-worked and re-organized into a more "user friendly" form. Specific suggestions included:

- Remove all references to requirements that cannot be tested or determined in the field.
- Separate items to be checked on initial examination of a device from those to be routinely checked in subsequent examinations of the same device.
- Express requirements in the form of simple questions (e.g., G-S.7. Are markings and instructions distinct and easily readable?)
- Arrange requirements in a logical sequence, not necessarily in Handbook 44 order.
- Place "Safety" requirements in a separate document. Include it in the EPO by reference.

Rich Pierce, GIPSA, was concerned that requirements for grain temperature limits would not be checked in the field. He believed that this is the one parameter most likely to be extended, although to do so (at least for some meters) requires that a security seal be broken and new parameters be downloaded (via modem or direct connection) from a computer equipped with the appropriate software and communication package. Because a security seal is provided for, most of the devices do not employ audit trails.

Sector members were asked to submit marked up copies of the draft EPO to Diane Lee by the end of the meeting, identifying items that: 1) should be checked on initial examination, 2) should be checked on subsequent examinations, and 3) should never be checked (or tested) in the field. She will use this information in preparing a new draft.

The Sector had the following comments on the draft Inspection Procedure:

§6.x.x - Add requirement to check samples against all meter types in the lab, selecting as official samples only those for which the maximum difference between the air oven moisture and the moisture indicated by the lab meters does not exceed 0.3 percent in moisture.
[Selection of samples is needed to prevent failing a properly functioning meter by using an atypical sample.]

§6.1.7. – Test Weight. Remove this item. It does not apply to grain moisture testers. (Also remove §3.1.12 required by this test.)

§6.2.4. – Change to read: A minimum test of a grain moisture meter shall consist of tests with samples (~~typically in pint glass jars~~— need not exceed three) of each grain or seed for which the device is used an with samples having at least two different moisture content values within the operating range of the device. Samples shall be of sufficient size to test any type meter that may be in place in the jurisdiction.

[Some meters require more than one pint of sample for measurement.]

Ms. Lee mentioned that it was NIST/OWM's intention to develop "Field Manuals" which would include the information in the EPOs and the Field Test Procedures. Several members questioned why the Sector was spending time reviewing EPOs and Test Procedures instead of working directly on a Field Manual.

[Note: OWM has discussed formatting for EPOs considering what would be best for field inspectors. During these discussions it was noted that EPOs are in outline form so that an inspector has a quick reference to code requirements while testing is being performed, therefore an EPO should remain relatively short. In contrast to EPOs, field manuals will contain more detail to include more instructions for testing and pictures of the device. A field manual will be very useful as a teaching tool.]

6. Results of Air-Oven Collaborative Study

Background: Under the NTEP program for grain moisture meters, calibrations are based on USDA/GIPSA air ovens while field inspection is based on State air ovens. For the program to be effective, procedures must be in place to assure that State oven results (and manufacturers' oven results) agree with the USDA/GIPSA air oven, which is, considered the standard. NIST-OWM's laboratory measurement traceability program requires that laboratories participate in interlaboratory and other collaborative experiments. This requirement has been met by one of two methods: 1) individual laboratories independently send samples to GIPSA for air oven analysis, and subsequently compare their results to those obtained by GIPSA; or 2) a structured collaborative study where every lab, including GIPSA, measure the same sample. A structured collaborative air oven study was last conducted following the1995 harvest. Results of that study were reported at the Sector's March 1996 meeting.

Discussion: A structured collaborative study has at least two advantages over independent submission of samples to GIPSA by individual laboratories: 1) in addition to a check against the "standard", it provides information on how individual labs compare with each other; 2) it allows GIPSA to plan for a known work load. A proposal to initiate another structured air-oven collaborative study appeared on the Sector's August 2000 agenda, but because of time limitations, this item was not discussed. Subsequent to the August 2000 Sector meeting John Fecht of the Nebraska Public Service Commission and Charles Hurburgh of Iowa State University offered to provide and distribute samples for an air-oven collaborative. NIST, OWM agreed to cover the cost of shipping the samples. In response to an e-mail announcement sent to the States by Diane Lee of NIST, OWM, 17 States, GIPSA and Iowa State University agreed to participate in the air oven collaborative (intercomparisons). Wheat samples provided by John Fecht were shipped to participants in December 2000. Charles Hurburgh shipped the corn and soybean samples to 18 Laboratories on July 5, 2001.

Results of the Study:

Corn and Soybeans – As of the date of the Sector meeting, 14 labs had provided corn data and 11 labs had provided soybean data. Dr. Hurburgh, who had compiled the data, reported that within-laboratory precision, as measured by the standard deviation across replicates, was very good for all labs in both grains. Interlaboratory agreement is measured by the standard deviation across laboratories on individual samples. The generally accepted value for this statistic is 0.2 percentage points; this group of laboratories was significantly better.

The interlaboratory agreement in 2001 was better than that reported in 1996, in a similar study. In the 1996 study, the interlaboratory standard deviation, for 3 samples each of corn and soybeans tested by 17 labs was 0.25 percent and 0.20

percent for corn and soybeans, respectively. This compares to 0.12 percent and 0.11 percent, respectively, in the 2001 study.

In corn, the USDA GIPSA values were extremely close to the average of all labs. In soybeans, it appeared that USDA GIPSA was getting slightly (about 0.1 percent) lower moisture results than the average of all labs. This is not a large difference, although in terms of typical tolerance levels for moisture meters, it is detectable.

There was some variation in laboratory conditions. The reported differences were not large enough to cause significant moisture measurement errors; the oven method is relatively insensitive to environmental parameters (as opposed to test procedure parameters like oven temperature or time).

Wheat – As of the date of the Sector meeting, 14 labs had provided wheat data. Diane Lee, NIST, reported separately on the low moisture and high moisture sample results that had been compiled by Richard Gonzales, Oklahoma Weights and Measures Laboratory.

For the low moisture samples, all laboratory air oven results with the exception of one were within 2 standard deviations. Excluding the outlier, the standard deviation across laboratories was 0.05 percent. Review of test information that was provided by the State whose result exceeded 2 standard deviations, revealed that the time for the laboratory oven to reach the designated temperature after the samples were inserted was 14 minutes. This time frame was at least twice the time reported by most of the States, and the oven used by this State was of a different brand than that used by most of the other laboratories.

For the high moisture samples, all laboratory air oven results with the exception one result were within 2 standard deviations. The standard deviation across laboratories was 0.08 percent excluding the outliers. The laboratory whose result exceeded 2 standard deviations on the high moisture wheat sample, ran the sample twice but did not run the second test for over a week after the sample had been stored in the laboratory. This sample lost moisture. The same laboratory, whose results exceeded 2 standard deviations for the low moisture wheat, was close to exceeding 2 standard deviations for the high moisture wheat result. Again, the time for the laboratory oven to reach the designated temperature after the samples were inserted was at least twice the time reported by most of the States (see note below).

The recent results compare favorably with the collaborative sturdy conducted in 1996. In that study, the standard deviation of the state air oven results for wheat was 0.10 percent.

[Note: During the sector meeting it was reported that two laboratories exceeded the 2 standard deviation limits for high moisture wheat. It was also noted that for the low moisture wheat more than one laboratory appeared on the graph to be outside the 2 standard deviation limit lines. Upon further review of the data it was found that the 2 standard deviation limit lines were incorrectly recorded on the graphs. The corrected graphs are attached.]

7. Criteria for Like Type

[Note: This item first appeared on the Sector's August 2000 agenda, but because of time limitations it was not discussed at that time.]

Background: A National Type Evaluation Program (NTEP) Certificate of Conformance (CC) represents conformance of a designated model (or models) to a single type or pattern. NCWM Publication 14 defines "Type" as:

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

When a manufacturer introduces a new model which is similar to a type for which a CC has been issued, a decision must be made as to whether the new device is subject to a full evaluation, or whether it can be considered as a "like type" to the existing unit and, thus, eligible to be added to the existing CC without testing. Publication 14 offers the following guidelines for making this decision:

1. Superficial Differences Between Devices
   Types that are identical in design, materials, and components used, and measurement ranges, but that differ superficially in their enclosures, detailed size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) will usually be submitted to a single evaluation.

2. Component Variations
   Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.

If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations will generally be required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

Discussion: The Sector addressed the following questions in response to a request from Dr. Charles Hurburgh, Jr., Iowa State University - Agricultural Extension Service:

1. What constitutes like type (the criteria for being like type) for NTEP CC purposes?
2. If data from non-like type devices (or non-approved and approved devices) were combined into a new calibration, how would GIPSA, NTEP, and State Weights and Measures officials treat the new calibration? (e.g., Is the new calibration permissible if it passes the tests?)
3. Is the Official GIPSA system bound by the same definitions of like type as NTEP? (e.g., Will the Official system consider instruments equal and interchangeable even if NTEP has separate CCs because they were judged not to be of like type?)

Dr. Hurburgh reported that these questions arose from the recent introduction of modifications to NIR instruments that may make them not of like type, even though they use the same calibrations or use a calibration derived from a database containing data from both original and modified instruments. The trend to worldwide neural networks and local regression databases may result in the development of calibrations based on data from instruments that are not of like type. He cited the new Foss Infratec 1241, submitted as a separate unit from the Infratec 1227 and 1229 units (which are both listed on Certificate 95-063A4) as a case in point. He expressed the belief that more specific guidance is needed to determine when a new instrument is or is not of "like type" to an existing instrument.

Some Sector members were of the opinion that existing guidelines were very clear in what constituted "like type" for NTEP CC purposes. In their view, although a calibration is a metrologically significant element, the fact that two devices use the same calibration has no bearing on determining if the devices are of "like type." Conversely, if the two devices use different calibrations, they cannot be considered to be of "like type." If other metrologically significant elements of a new device are significantly mechanically or physically different from those in an earlier model, then the device must be evaluated as a new type even if both devices use the same calibration.

Steve Patoray, NTEP Director, explained that manufacturers normally determine what is metrologically significant. If they have any questions, they can consult with the NTEP Laboratory.

Rich Pierce, GIPSA, representing the NTEP Laboratory, said the question is not, "Do they provide equivalent results?" but rather, "Can they be expected to pass NTEP tests?" He pointed out that NTEP is designed around testing a *type* to a *specification*. It involves testing to a performance specification, not to equivalence of results.

Addressing the question, "Is the Official GIPSA system bound by the same definitions of like type as NTEP?" Dave Funk, GIPSA, reminded the Sector that NTEP and GIPSA are separate entities. GIPSA's criteria for "like type" will be based on the needs of the Official System and may or may not be different from NTEP's.

Grain Industry representatives stressed that it was important that NCWM not take any action that would preclude the commercial system from using devices of the type or types used in the Official System. This came out of concern over what would happen to a grain elevator using a device of a type, still used by the Official System, if the manufacturer

allowed the CC to lapse for that type. Weights and Measures members pointed out that under present rules, the older device may continue to be used as long as it passes field inspection.

Conclusion: The Sector supported the concept that the NTEP Laboratory should make the final determination of like type (subject to the NTEP appeal process.) When a manufacturer submits a request to have a model added to a certificate, if there is any doubt whether or not the changes are metrologically significant, the device should be tested.

8. Report on the 2001 NCWM Interim and Annual Meetings

The Committee on Specifications and Tolerances (S&T) reviewed four items of interest to the GMM Sector at the NCWM Interim Meeting January 14-17, 2001:

S&T Item 356(a)-1:	N.1.1. Transfer Standard and N.1.2. Minimum Test, Footnote 1
Source:	GMM Sector
Recommendation:	Delete all references to Footnote 1 from the Grain Moisture Meters Code 5.56.(a) paragraphs N.1.1. and N.1.2.
S&T Item 356(a)-2:	Recognize Meter-to-Like-Type Meter Method Transfer Standards
Source:	GMM Sector
Recommendation:	Modify 5.56(a) Grain Moisture Meter Code to recognize Meter-to-Like-Type Meter Method Transfer Standards and add table of maintenance and acceptance tolerances for Meter-to-Like-Type Meter Method
S&T Item 356(b)-1:	N.1.1. Transfer Standard, Footnote 1
Source:	GMM Sector
Recommendation:	Delete all references to Footnote 1 from the Grain Moisture Meters Code 5.56.(b) paragraph N.1.1.
S&T Item 356(b)-2:	Recognize the Meter-to-Meter Method Transfer Standards
Source:	Central Weights and Measures Association
Recommendation:	Modify 5.56(b) Grain Moisture Meter Code to recognize Meter-to-Like-Type Meter Method Transfer Standards and add table of maintenance and acceptance tolerances for Meter-to-Like-Type Meter Method.

With the exception of item 356(b)-2, which was withdrawn, the S&T Committee forwarded these items as voting items for the 2001 Annual Meeting, July 22-26, 2001, where they were subsequently accepted by the Conference. They will appear in the next issue of Handbook 44 and will become effective January 1, 2001. For additional background on these items refer to *Committee Reports for the 86th Annual Meeting*, NCWM Publication 16, April 2001.

Discussion: Following the Interim Meeting, OWM studied the Sector's recommendation, Item 356(b)-1, to remove Footnote 1 from section 356(b) of Handbook 44. Footnote 1 outlines the criteria for a meter to like-meter test program and emphasizes that such a program should not be operated without the necessary calibration support. Section 5.56(b) addresses non-NTEP meters for which there is no on-going calibration program. Therefore, OWM proposed that the footnote should be amended rather than removed from NIST Handbook (HB) 44 Section 5.56(b) and solicited comments from Sector members on proposed re-wording. Comments on the proposal were generally negative, saying that the Sector had not had an opportunity to discuss revising the footnote, so OWM decided to allow Item 356(b)-1 to go forward as originally recommended by the Sector. At this Sector meeting, members were asked if wording needed to be added to Section 5.56(b) to indicate that meter to like-meter testing cannot be used unless it is traceable to the national system. One Sector member expressed the opinion that this would eventually become a non-issue as the population of non-NTEP meters was decreasing each year.

Conclusion: The Sector decided to stand by its decision of the previous meeting recommending that Footnote 1 be removed from section 356(b)-1 and not amended.

9. Update on NTEP Type Evaluation and OCP (Phase II) Testing

Rich Pierce of the Grain Inspection, Processors and Stockyards Administration (GIPSA, formerly FGIS), the NTEP Participating Laboratory for Grain Moisture Meters, reported that draft certificates for the 2001 crop year had been sent to all manufacturers for review about three weeks prior to the Sector meeting, and, with one exception, manufacturers have completed their reviews. Two certificates have been forwarded to NCWM, Inc.

Phase II calibration data are being collected for 2001 crop samples on the following five meter types.

DICKEY-john Corporation	GAC2000NTEP, GAC2100, GAC2100A
Foss North America, Inc.	Infratec 1227, Infratec 1229
Foss North America, Inc.	Infratec 1241
Motomco, Ins.	919E, 919E-S
The Steinlite Corporation	SL 95

Seedburo Equipment Company has withdrawn the GMA-128 from the on-going calibration program for 2001 and will allow their CC to become inactive.

With only five types in the OCP (Phase II), the cost to manufacturers has dropped from last year's $5,250 per type to $3,600 per type. Billing statements have been prepared and will be forwarded to the USDA National Finance Center (NFC) around September 1, 2001. NFC will then bill for participation in the calibration program. The Type Evaluation Laboratory will send a summary of billing information to contact individuals listed on respective certificates of conformance when billing statements are sent to NFC.

Dr. Pierce expressed concern that he was not receiving information back from manufacturers in a timely manner. Steve Patoray, NTEP Director, cautioned manufacturers that NCWM, Inc. would not be chasing them to get their applications and information in on time.

10. Definitions of Recently Introduced Terms

Discussion: The Sector reviewed several new terms that had been used in its recent proposals to determine if definitions of these terms [see list below] should be recommended for addition to Appendix D of NIST Handbook (HB) 44. A letter from Don Onwiler, Nebraska Dept. of Agriculture, Weights & Measures Division, pointed out that the changes to HB44 Grain Moisture Meter Code §5.56(a) adopted in July 2001 by NCWM, Inc. adequately defined "air-oven reference method" and "meter-to-like-meter method." Additionally, a proposal, which might have included the term "National Sample Set," was withdrawn by the Specifications and Tolerances (S&T) Committee so the term does not appear in HB44. He suggested that the term "like-type" has been used for years in reference to NTEP and was commonly understood to refer to devices covered by a common NTEP Certificate of Conformance.

air-oven reference method. [Sometimes referred to as: air-oven method.] A method for the field evaluation of Grain Moisture Meters in which grain samples are used as the official transfer standards with moisture content values assigned by the oven drying methods specified by the USDA GIPSA.

meter-to-like-type-meter method. [Sometimes referred to as: meter-to-like-meter method or, simply, meter-to-meter method.] A method for the field evaluation of Grain Moisture Meters in which properly standardized field standard meters using National Type Evaluation Program approved calibrations are used as transfer standards with grain samples as a comparison medium. This test method is valid only when the field standard meter and the meter under test are of like-type. In this method, precise knowledge of the air-oven moisture content of the grain samples used for field-testing is not required.

like-type. Grain Moisture Meters are considered to be of like-type if they are covered by the same National Type Evaluation Program (NTEP) Certificate of Conformance (CC). See NCWM Publication 14 for further definition of "Type."

National Sample Set. Grain samples used in Phase II (On-Going Calibration Review) of the NTEP Grain Moisture Meter (GMM) program. To maintain an "active" NTEP Certificate of Conformance, grain moisture

meters must be evaluated annually using data collected on grain samples from the three most recent crop years. These samples represent wide diversity with respect to geographical source, kind, class, moisture content, maturity, etc.

Conclusion: The Sector agreed unanimously with Don Onwiler's comments and does not recommend adding the definitions to HB44.

11. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 19, 2002 in the Kansas City, MO area. Meetings will be held in one of the meeting rooms at the NOAA Weather Training Center if available. A tentative schedule is shown below.

Wednesday, August 21	1:00 p.m. - 5:00 p.m.	GMM Sector Meeting
Thursday, August 22	8:00 am - 12:00 noon	GMM Sector Meeting
Thursday, August 22	1:00 p.m. - 5:00 p.m.	joint session GMM & NIR Analyzer
Friday, August 23	8:00 am - 12:00 noon	NIR Protein Analyzer Sector Meeting

Appendix D
National Type Evaluation Technical Committee (NTETC)
Near Infrared (NIR) Protein Analyzer Sector
August 23-24, 2001 - Kansas City, MO

Meeting Summary

Agenda Items

☆ 1. New Sector Chairman Appointed by NCWM, Inc
☆ 2. Report on NCWM, Inc.
   a. Plans to Reduce Number of State Public Sector Members Eligible for Travel Reimbursement
   b. Registration Fees for Non-NCWM Members Attending Sector Meetings
☆ 3. Criteria for Like Type
4. Report on the 2001 NCWM Interim and Annual Meetings
5. Type Evaluation Issues
   a. Basic Instrument Tests
   b. Sample Temperature Sensitivity
   c. Accuracy, Precision, and Reproducibility Requirements
6. Criteria for Phase II Testing – On-going Calibration Review
☆ 7. Time and Place for Next Meeting

Note 1: Because of common interest, items marked with a star (☆) were considered in a joint session of the NIR Protein Analyzer and the Grain Moisture Meter Sectors.

Note 2: See the end of the NIR Protein Analyzer Sector Summary for the combined Grain Moisture Meter and NIR Protein Analyzer Sectors meeting attendance list.

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1. New Sector Chairman Appointed by NCWM, Inc.

In late March 2001, Richard "Will" Wotthlie asked to be replaced as Chairman of the NTETC Grain Moisture Meter and Near Infrared Protein Analyzer Sectors. Diane Lee, representing NIST/OWM and Jack Barber, Sector Technical Advisor, recommended Cassie Eigenmann-Pierson for this post. Subsequently, Wes Diggs, who at the time was Chairman of the NTEP Committee, sent Cassie a formal letter of appointment. Steve Patoray, NTEP Director, explained to the Sector that since the transfer of the National Type Evaluation Program (NTEP) from NIST OWM to the NCWM, Inc., NCWM administrative procedures have been revised. The new procedures stipulate that NTETC Sector Chairs are appointed by the NTEP committee chair and serve for an indefinite term. At the 2001 Annual Meeting of NCWM, Inc., Louis Straub, Maryland Department of Agriculture, became the new NTEP committee chair.

2. Report on NCWM, Inc.

2.a. Plans to Reduce Number of NTETC State Public Sector Members Eligible for Travel Reimbursement

At a recent NCWM, Inc. NTEP Lab meeting, Lou Straub reported that NCWM, Inc., as a cost reduction measure, plans to limit the number of NTETC State public sector members that will be reimbursed for travel expenses incurred in connection with participation in Sector meetings. Present State public sector members may continue as voting GMM/NIR Sector members, but reimbursement for travel expenses will be limited to two or three people per meeting.

2.b. Registration Fees for Non-NCWM Members Attending Sector Meetings

NCWM, Inc is now charging a $75.00 registration fee to all non-NCWM members who attend a Sector meeting.

Steve Patoray, NTEP Director, reminded the Sector that the NCWM is now incorporated and should be referred to as NCWM, Inc. He explained that annual maintenance fees on Certificates of Conformance (CCs) are the main source of

funding for Sector meetings, training, etc. These funds are limited. The need to keep expenditures in line with income is the driving force behind the changes mentioned in agenda items 2.a. and 2.b.

Mr. Patoray explained how the National Type Evaluation Program is administered. NCWM, Inc. now issues all certificates of conformance. The NCWM, Inc. Board of Directors is the policy-making body of NCWM, holding responsibility for the overall operation of the organization. Additionally, an ad *hoc* committee, called the NTEP Advisory Committee, advises the NTEP Committee, making recommendations on policy and long range planning. The NTEP Committee is responsible for Operation of NTEP. It ratifies NTEP policy and procedures; resolves policy, technical and appeals issues; sponsors technical subcommittees (NTEPTC Sectors) to develop technical test procedures and evaluation criteria; and it oversees the activities of the NTEP Director. NCWM, Inc. has no paid employees. They have hired a management company, Management Solutions, to handle administrative details. Mr. Patoray is employed by Management Solutions and serves as NTEP Director. The NTEP Director is responsible for the day-to-day management of NTEP. His duties include: reviewing Sector agendas before they are distributed; recommending procedures developed by Sectors; training NTEP evaluators; authorization of NTEP Labs; reviewing and recommending CC's; and managing conformity assessment.

The NTEP Sector meetings are open to all NCWM members and to registered non-members. Issues before the Sector are decided by general consensus or by formal vote. Voting rights depend on the type of NCWM membership held by the individual. These are summarized below:

- Associate Membership (Industry, Association and Academic members):
  - one vote per parent company/organization/institution
- Active Membership (State and Municipal members)
  - one vote per jurisdiction
- NCWM non-member:
  - no voting rights
  - nominal registration fee per meeting
- Federal Agencies (other than NIST):
  - one vote per agency, if they choose
- NIST/OWM:
  - one vote per agency, if they choose
- Foreign Agencies:
  - no voting rights

Mr. Patoray reported that all active CC's are now available for downloading from the NCWM, Inc. web site at http://www.ncwm.net. Information on the current NTEP fee structure can also be found on the web site.

3. Criteria for Like Type

[Note: This item first appeared on the Sector's August 2000 agenda, but because of time limitations it was not discussed at that time.]

Background: A National Type Evaluation Program (NTEP) Certificate of Conformance (CC) represents conformance of a designated model (or models) to a single type or pattern. NCWM Publication 14 defines "Type" as:

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

When a manufacturer introduces a new model which is similar to a type for which a CC has been issued, a decision must be made as to whether the new device is subject to a full evaluation, or whether it can be considered as a "like type" to the existing unit and, thus, eligible to be added to the existing CC without testing. Publication 14 offers the following guidelines for making this decision:

1. Superficial Differences Between Devices
Types that are identical in design, materials, and components used, and measurement ranges, but that differ superficially in their enclosures, detailed size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) will usually be submitted to a single evaluation.

2. Component Variations
Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.

If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations will generally be required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

Discussion: The Sector addressed the following questions in response to a request from Dr. Charles Hurburgh, Jr., Iowa State University - Agricultural Extension Service:

1. What constitutes like type (the criteria for being like type) for NTEP CC purposes?
2. If data from non-like type devices (or non-approved and approved devices) were combined into a new calibration, how would GIPSA, NTEP, and State Weights and Measures officials treat the new calibration? (e.g., Is the new calibration permissible if it passes the tests?
3. Is the Official GIPSA system bound by the same definitions of like type as NTEP? (e.g., Will the Official system consider instruments equal and interchangeable even if NTEP has separate CCs because they were judged not to be of like type?)

Dr. Hurburgh reported that these questions arose from the recent introduction of modifications to NIR instruments that may make them not of like type, even though they use the same calibrations or use a calibration derived from a database containing data from both original and modified instruments. The trend to worldwide neural networks and local regression databases may result in the development of calibrations based on data from instruments that are not of like type. He cited the new Foss Infratec 1241, submitted as a separate unit from the Infratec 1227 and 1229 units (which are both listed on Certificate 95-063A4) as a case in point. He expressed the belief that more specific guidance is needed to determine when a new instrument is or is not of "like type" to an existing instrument.

Some Sector members were of the opinion that existing guidelines were very clear in what constituted "like type" for NTEP CC purposes. In their view, although a calibration is a metrologically significant element, the fact that two devices use the same calibration has no bearing on determining if the devices are of "like type." Conversely, if the two devices use different calibrations, they cannot be considered to be of "like type." If other metrologically significant elements of a new device are significantly mechanically or physically different from those in an earlier model, then the device must be evaluated as a new type even if both devices use the same calibration.

Steve Patoray, NTEP Director, explained that manufacturers normally determine what is metrologically significant. If they have any questions, they can consult with the NTEP Laboratory.

Rich Pierce, GIPSA, representing the NTEP Laboratory, said the question is not, "Do they provide equivalent results?" It is, "Can they be expected to pass NTEP tests?" He pointed out that NTEP is designed around testing a *type* to a *specification*. It involves testing to a performance specification, not to equivalence of results.

Addressing the question, "Is the Official GIPSA system bound by the same definitions of like type as NTEP?" Dave Funk, GIPSA, reminded the Sector that NTEP and GIPSA are separate entities. GIPSA's criteria for "like type" will be based on the needs of the Official System and may or may not be different from NTEP's.

Grain Industry representatives stressed that it was important that NCWM not take any action that would preclude the commercial system from using devices of the type or types used in the Official System. This came out of concern over what would happen to a grain elevator using a device of a type, still used by the Official System, if the manufacturer

allowed the CC to lapse for that type. Weights and Measures members pointed out that under present rules, the older device may continue to be used as long as it passes field inspection.

Conclusion: The Sector supported the concept that the NTEP Laboratory should make the final determination of like type (subject to the NTEP appeal process.) When a manufacturer submits a request to have a model added to a certificate, if there is any doubt whether or not the changes are metrologically significant, the device should be tested.

4. Report on the 2001 NCWM Interim and Annual Meetings

At the NCWM Interim Meeting held January 14-17, 2001, the Committee on Specifications and Tolerances (S&T) forwarded the following item as a voting item for consideration at the 2001 NCWM Annual Meeting, July 22-26, 2001. The Sector's recommendations were accepted by the Conference. This change to the tentative code will appear in the next issue of Handbook 44. For additional background information refer to *Committee Reports for the 86th Annual Meeting*, NCWM Publication 16, April 2001.

S&T Item 357-1 Near-Infrared Grain Analyzers, Indication of Additional Constituent Values

Source: Near-Infrared (NIR) NIR Protein Analyzer Sector (carryover item 357-2 from the S&T Committee's 1999 agenda.)

Recommendation: Modify the Tentative NIR Grain Analyzers Code to include requirements for corn protein, oil, and starch; barley protein; and soybeans protein and oil; and to add criteria for moisture basis.

Discussion: Sector members reviewed this issue with the intent of deciding if any changes should be made (such as removing retroactive dates) before forwarding a recommendation that the tentative code be made permanent. Grain industry representatives were not in favor of recommending that the tentative code be made permanent unless it applied only to wheat protein. From their viewpoint, constituent based trading in other grains is still a work in progress with the majority of trades based on contractual agreements between buyer and seller, often involving the use of proprietary calibrations and involving grain with specific genetic traits. In their view, regulation of devices was not necessary as the system was "working just fine." High-oil corn and high-lysine corn were mentioned as two grains that were being traded in this manner. A seed company geneticist expressed concern that proprietary genetics would be put at risk by allowing the code to become permanent, fearing that they would be asked to provide samples and release pedigree information on proprietary genotypes. One Sector member, speaking in support of the grain industry position, said that wheat was the only commodity that had an established constituent value program. He believed the NTEP objective should be to NOT do anything that restricts commercial use.

It was pointed out by other Sector members that NTEP calibrations are "generic" and are not intended to apply to specialty crops traded under contracts specifying the use of a proprietary calibration. Dave Funk, GIPSA, assured geneticists that GIPSA was not going to be requesting proprietary pedigree information for use in GIPSA calibrations. As for samples, he explained that GIPSA normally obtained samples from grain in the marketing stream. This is normally co-mingled grain. Recently, however, there have been instances where seed companies have volunteered samples of their new hybrids to ensure that GIPSA calibrations would not tag samples their new product as "outliers." Weights and Measures members were concerned about the growing number of farmer-to-elevator trades that involved the payment of a premium (or involved a dockage) based on specific constituent concentration. Soybeans traded on an oil basis were mentioned as one example in Missouri. Contracts are not the norm in these trades.

Dave Funk made a case for moving to permanent code that would allow the National Type Evaluation Program (NTEP) to apply to NIR analyzers. The purpose of the NTEP is to increase confidence in marketing channels. It does this by:

- increasing producers' confidence that they are getting fair value for their products
- increasing users' confidence that the device they have purchased is appropriate for the intended use
- increasing manufacturers' confidence that they are designing and building to a defined target

Conclusion: To clarify the Sector's intent and to address the concerns expressed by grain trade representatives, the Sector agreed that the scope section of the Tentative Code should be modified to make it clear that:

1. NTEP grain and oilseed calibrations are applicable to fungible commodities and are not intended to apply to specialty crops traded under contracts specifying the use of proprietary calibrations.
2. Proprietary calibrations applicable to specific specialty crops may be used on NTEP NIR Analyzers provided the calibration and its results are clearly differentiated from results obtained using corresponding NTEP calibrations. For example, when oil content in maize is being measured, it must be clear to both buyer and seller that a proprietary Hi-Oil Corn calibration is being used instead of the NTEP Corn calibration.
3. Field evaluation of NIR Analyzers will be conducted only on the NTEP grain and oil seed calibrations.

The Sector's Technical Advisors were asked to develop specific wording to reflect the above points. Sector members will be asked by means of a letter ballot to approve the amended scope of the Tentative Code and to recommend that the amended Tentative Code be made permanent.

5. Type Evaluation Issues

Background: At its September 1997 meeting, the Sector decided that priority should be given to modifying the Tentative Code to cover additional grains. This decision was based on the facts that: (1) an increasing number of NIR analyzers were being used commercially for grains not presently covered by the code; and (2) the certification date for the NTEP Lab had been delayed for an indefinite period of time. Consequently, work on the draft of the Publication 14 checklist for NIR Analyzers was brought to a standstill until Code issues could be settled and until GIPSA received certification as the NTEP Laboratory for NIR Analyzers.

GIPSA is now certified as the NTEP Laboratory for wheat protein analyzers, and samples are available for evaluating devices as NIR wheat protein analyzers. Dr. Richard Pierce, GIPSA, indicated that the Lab is currently looking at the standardization (sloping) process described in Publication 14. Specifically, sets of 20 samples are to be used to slope and bias prototype instruments to the GIPSA CNA reference method. In subsequent accuracy tests, instrument predictions, the bias tolerance to CNA is 0.12 percent protein. This tight tolerance is dictating a rigorous process for selecting/matching slope and accuracy sample sets.

The current version (June 2001) of the Publication 14 checklist for NIR Analyzers has not been fully revised to cover the additional grains and constituents proposed by the Sector. Acceptance by NCWM, Inc. of voting item 357-1 at the 2001 Annual Meeting requires that major revisions be made to the checklist to include testing for additional grain types and to correct other deficiencies.

5.a. Basic Instrument Tests

Discussion: As described in the June 2001 version, basic instrument tests (Power Supply, Storage Temperature, Leveling, Warm-up, Humidity, and Instrument Stability) are conducted using only HRW wheat samples and a calibration for HRW protein. This implies that an instrument designed for use on only one of the other grains (e.g., only for oil in soybeans) must also have a wheat protein calibration (at least for the basic instrument tests). In this regard, the Sector considered the following questions:

1. For devices designed for use on a single grain (other than HRW wheat), should basic instrument tests be allowed (in lieu of requiring a wheat calibration) or be required to be conducted with the grain intended for use?
2. Is a wheat protein calibration mandatory for instruments used only on barley or one of the other added grains or would a wheat moisture calibration be adequate?
3. Are devices required to have calibrations for all the constituents listed in the code for a given grain (e.g., if a device provides a calibration for oil in corn, must it also provide calibrations for protein and starch)?

It was pointed out that constituent values of test samples are more stable for wheat protein (expressed on a constant moisture basis) than for moisture. This allows the tolerances on basic instrument tests to be more stringent for NIR Analyzers measuring wheat protein than for NIR devices measuring moisture. Furthermore, wheat protein can be determined more precisely than constituents in most other grains.

Conclusion: Because of the above facts, the Sector decided:

1. [Editor's note: Although not discussed at the Sector meeting, the heading immediately above the section on Basic Instrument Tests should be changed, as shown, below to reflect added grain types and to be consistent with the wording in the title of Section2, Chapter 7.]

   Type Evaluation Test Procedures and Tolerances
   Near-Infrared ~~Wheat Protein~~ Grain Analyzers

2. Hard red winter wheat will be used for the Basic Instrument Tests. All NIR analyzers must be supplied with a hard red winter wheat calibration.

3. The following note will be removed from the Basic Instrument Tests of the NIR

   ~~*At the discretion of the NTEP Participating Laboratory, successful completion of the Basic Instrument Tests specified in NCWM Pub. 14, Grain Moisture Meters Code may be accepted in lieu of actual tests, as evidence that the device meets the Basic Instrument Test requirements of the Near-Infrared Analyzer Code. This exception is intended to reduce the need to perform Basic Instrument Tests two times on an instrument that has previously been submitted for NTEP evaluation as a Grain Moisture Meter or on an instrument that is submitted for simultaneous approval as a Grain Moisture Meter and as a Near Infrared Analyzer.*~~

5.b. Sample Temperature Sensitivity

Discussion: The June 2001 version of the checklist applies only to wheat protein, with tests made on samples representing three protein ranges and two moisture ranges. The protein range is listed for each Class of Wheat in a table in Part III, *Accuracy, Precision, and Reproducibility Requirements,* of the checklist. Expanding the Sample Temperature Sensitivity test to cover additional grains and constituents requires that constituent ranges, moisture levels, and tolerances be added for each new grain type and its corresponding constituent.

Conclusion: The Sector agreed to add tables showing Constituent Ranges for Type Evaluation and Applicable Tolerances and to modify paragraph 2 of the Sample Temperature Sensitivity test as shown below. Table 2 will also be used to list tolerances for accuracy, repeatability, and reproducibility tests [see agenda item 5.c.]

[Note: Tolerances for grains other than wheat and tolerances for oil seeds are under investigation and will be considered by the Sector at its next meeting.]

Testing will be conducted using two sample sets from each ~~of the six wheat classes~~ grain type representing the low ~~(10%-11%)~~ and high ~~(13%-14%)~~ moisture ranges shown in Table 1. Each moisture set will consist of three samples, one from each of three ~~protein~~ constituent concentration ranges (the upper third, the middle third, and the lower third of the ~~protein~~ constituent concentration range for the ~~class~~ grain type). Separate bias analyses will be made for the low and high moisture sets. When high moisture samples are not available for any ~~protein~~ constituent concentration range in any ~~class~~ grain type, testing may be conducted using tempered (artificially moistened) samples. Three analyses will be made for each sample at room temperature, the hot temperature extreme, and the cold temperature extreme. The average ~~protein~~ constituent concentration for the 9 observations in each moisture set (1 moisture level x 3 ~~protein~~ constituent concentration levels x 3 replicates) run at each temperature extreme must agree with the average ~~protein~~ constituent concentration obtained for the room temperature runs within ~~± 0.35~~ the applicable tolerances shown in Table 2.

[Note: The Tables 1 and 2 represent an addition to the checklist. Underscoring has been eliminated to enhance legibility.]

Table 1. Constituent Ranges for Type Evaluation				
Grain Type	Constituent	Constituent Range (%) at Moisture Basis (M.B.) Shown	Low Moisture Range	High Moisture Range
Durum Wheat	Protein	10 – 18 at 12% M.B.	10% - 11%	13% - 14%
Hard Red Spring Wheat	Protein	10 – 19 at 12% M.B.		
Hard Red Winter Wheat	Protein	8 – 18 at 12% M.B.		
Hard White Wheat	Protein	9 – 16 at 12% M.B.		
Soft Red Winter Wheat	Protein	9 – 12 at 12% M.B.		
Soft White Wheat	Protein	8 – 15 at 12% M.B.		
"All Class" Wheat Calibration	Protein	8 – 19 at 12% M.B.		
Two-rowed Barley	Protein	8 – 17 at 0% M.B.	10% - 11%	13% - 14%
Six-rowed Barley	Protein	8 – 17 at 0% M.B.		
"All Class" Barley Calibration	Protein	8 – 17 at 0% M.B.		
Corn	Protein	8 – 12 at 0% M.B.	12% - 13%	15% - 16%
	Oil	3 – 9 at 0% M.B.		
	Starch	67 – 73 at 0% M.B		
Soybeans	Protein	30 – 40% at 13% M.B.	10% - 11%	15% - 16%
	Oil	16 – 21% at 13% M.B.		

Table 2. Tolerances					
Grain Type	Constituent	Sample Temperature Sensitivity Test Tolerance	Accuracy Tolerance	Repeatability Tolerance	Reproducibility Tolerance
Durum Wheat	Protein	± 0.35	± 0.30	± 0.15	± 0.20
Hard Red Spring Wheat	Protein				
Hard Red Winter Wheat	Protein				
Hard White Wheat	Protein				
Soft Red Winter Wheat	Protein				
Soft White Wheat	Protein				
"All-Class" Wheat Calibration	Protein				
Two-rowed Barley	Protein	± t.b.d.	± t.b.d.	± t.b.d	± t.b.d
Six-rowed Barley	Protein				± t.b.d
"All-Class" Barley Calibration	Protein				± t.b.d
Corn	Protein	± t.b.d.	± t.b.d.	± t.b.d.	± t.b.d
	Oil	± t.b.d.	± t.b.d.	± t.b.d.	± t.b.d
	Starch	± t.b.d.	± t.b.d.	± t.b.d.	± t.b.d
Soybeans	Protein	± t.b.d.	± t.b.d.	± t.b.d.	± t.b.d
	Oil	± t.b.d.	± t.b.d.	± t.b.d.	± t.b.d

5.c. Accuracy, Precision, and Reproducibility Requirements

Discussion: As presently worded, this section applies only to wheat protein. Major editing is required to add additional grain types and constituents. The Sector also re-considered the intended purpose of Phase I Accuracy, Precision, and Reproducibility tests (see also Agenda item 6, *Criteria for Phase II Testing – Ongoing Calibration Review.*) It was suggested that the purpose of these tests should be to determine that the devices have a quality calibration; that scatter

will be within acceptable limits; and that they can be set to the correct slope and biased so like types give the same results.

Conclusion: The Sector decided that the bias test could be eliminated. Standardization against GIPSA standards will be required at time of installation. The Accuracy, Precision, and Reproducibility Requirements were modified as shown below. [See also **Table 2, Tolerances** in agenda item 5.a.]

III. Accuracy, Precision, and Reproducibility Requirements

~~Wheat protein~~ Grain analyzers will be tested for accuracy, repeatability (precision), and reproducibility over the applicable ~~protein~~ constituent concentration ranges shown in Table 1 ~~for Hard Red Winter, Hard Red Spring, Soft Red Winter, Durum, Hard White, and Soft White Wheat~~. Instrument and calibration performance will be individually tested for each ~~class of wheat~~ grain type and constituent.

~~Protein Ranges for Type Evaluation~~	
~~Grain Type~~	~~Protein Range at 12% Moisture Basis~~
~~Durum Wheat~~	~~10 - 18~~
~~Hard Red Spring Wheat~~	~~10 - 19~~
~~Hard Red Winter Wheat~~	~~8 - 18~~
~~Hard White Wheat~~	~~9 - 16~~
~~Soft Red Winter Wheat~~	~~9 - 12~~
~~Soft White Wheat~~	~~8 - 15~~
~~"All Class" Wheat Calibration~~	~~8 - 19~~

Two instruments will be tested using test sets consisting of no less than 50 samples for each ~~wheat class~~ grain type to be used on the instrument submitted for type approval. (Note: In cases where grain types have multiple constituent calibrations, more than 50 samples may be required to satisfy the range requirements for each constituent associated with that grain type.) The sample set will be screened using the ~~FGIS~~ GIPSA official ~~wheat protein~~ instrument model and reference method. Samples where the official instrument model disagrees from the reference method by more than the Handbook 44 acceptance tolerance will be deleted and another sample selected to replace it. No sample set will be used where the standard deviation of the differences between the ~~FGIS~~ GIPSA official instrument model and the reference method exceeds ~~0.30 (~~one-half the Handbook 44 acceptance tolerance applied to individual samples~~)~~. Finally, any sample result not within three standard deviations of the mean for the test instrument will be dropped before analysis of the data.

Three replicates will be run on each instrument for each sample, resulting in a ~~total~~ minimum of 300 observations per ~~wheat class~~ constituent calibration (2 instruments x 50 samples-minimum x 3 replicates).

Accuracy. The first replicate for each sample will be used to calculate the Standard Error of Performance (SEP) for each instrument with respect to the reference method. Each instrument will be tested individually.

$$Bias \frac{\sum^{n}(x - r)}{\text{delete formula}}$$
$$n$$

~~where;~~

~~x_i = predicted protein for sample I (replicate 1)~~

~~r_i = reference protein for sample I~~

~~n = number of samples in the test set (n=50)~~

$$SEP = \sqrt{\frac{\sum_{i=1}^{n}(y_i - y)^2}{n-1}}$$

where,

y_i = x_i - r_i (see above)

y = average predicted constituent concentration ~~protein~~ minus average reference constituent concentration ~~protein~~

n = number of samples in the test set for constituent calibration being evaluated (n=50, see Note 1 below regarding "all-class" calibrations.)

The tolerance for SEP is ~~one-half the Handbook 44 acceptance tolerance applied to individual~~ samples shown in Table 2. ~~Specifically, the tolerance is 0.30 for all classes of wheat. The tolerance for bias is 0.20 times the Handbook 44 acceptance tolerance applied to individual samples (± 0.12).~~

If requested by the Applicant, data from ~~A~~ a 20-sample slope set will be ~~used to slope adjust and bias~~ provided for adjusting calibration slope and bias ~~instruments~~ prior to the start of type evaluation testing. No further ~~bias~~ standardization adjustments will be made during type evaluation testing.

Note 1: "All-class" calibrations will be tested using full test sets for all included classes (50 x number of classes). In addition to meeting accuracy requirements (SEP) for the tests sets of each individual class, "all class" calibrations must meet the accuracy requirements (SEP) when the data from all included classes is pooled.

Note 2: *A single slope and bias will be used for all-class calibrations.*

Repeatability. The Standard Deviation (SD) of the three replicates will be calculated and pooled across samples for each class. Each instrument will be tested individually. The equation used to calculate SD is:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}\sum_{j=1}^{3}(P_{ij} - P_i)^2}{2n}}$$

where,

Pij = predicted ~~protein~~ constituent concentration for sample I and replicate j

Pi = average of the three predicted ~~protein~~ constituent concentration values for sample I

n = number of samples in the test set for constituent calibration being evaluated (n=50, see Note below regarding "all-class" calibrations)

The tolerance for repeatability is ~~0.25 x the Handbook 44 acceptance tolerance applied to individual samples~~ shown in Table 2. ~~Specifically, the tolerance is 0.15 for each class of wheat.~~

Note: "All-class" calibrations will be tested using full test sets for all included classes. "All class" calibrations must meet the repeatability requirements (SD) for the tests sets of each individual class

Reproducibility. The results for each of the three replicates obtained for samples in the test set will be averaged for each instrument and the Standard Deviation of the Differences (SDD) between instruments will be calculated using the following equation:

$$SDD = \sqrt{\frac{\sum_{i=1}^{n}(d_i - d)^2}{n-1}}$$

where,

$d_I = P1_I - P2_I$

$P1_I$ = average of three replicates for sample I on instrument 1

$P2_I$ = average of three replicates for sample I on instrument 2

d = average of the d_i

n = number of samples in the test set for constituent calibration being evaluated (n=50, see Note below regarding "all-class" calibrations)

The tolerance for ~~repeatability~~ reproducibility is ~~one-third the Handbook 44 tolerance applied to individual samples~~ shown in Table 2. ~~Specifically, the tolerance is 0.20 for each class of wheat.~~

Note: "All-class" calibrations will be tested using full test sets for all included classes. "All class" calibrations must meet the reproducibility requirements (SDD) for the tests sets of each individual class

6. Criteria for Phase II Testing – On-going Calibration Review

Background: This item first appeared on the Sector's agenda for its September, 1994 meeting. It was discussed again at length at two meetings in 1995, and again at the March 1996 meeting. In 1997, considering the fact that: (1) an increasing number of NIR analyzers were being used commercially for grains not covered by the code; and (2) the certification date for the NTEP Lab had been delayed indefinitely, the Sector decided to give priority to modifying the Tentative Code to cover additional grains. Deciding how to handle type approval was postponed indefinitely.

Although agreeing that participation in a monitoring program of some sort should be mandatory for NTEP instruments, the Sector had difficulty in reaching a consensus on the exact details of such a program. The Sector did agree that whatever program was finally decided upon, it should be reviewed at the end of each year to assess its value and to determine if it should be continued, modified, or abandoned.

To minimize annual costs to manufacturers, an on-going monitoring program that, to the greatest extent practical, could take advantage of GIPSA 's procedures for monitoring the official system's performance over time was proposed. To that end, the Sector approved the addition of the following paragraph to Publication 14, Chapter 7, at the end of part IV. *Tolerances for Calibration Performance:*

For the on-going review of calibrations, instrument protein results and calibration data will be collected on 100 samples per class each year on each model in the NTEP program. Eighty of these samples will be selected from the 100 calibration verification (C/V) samples on which GIPSA has obtained spectral data. The additional twenty will be selected from moisture survey samples. Existing combustion-nitrogen-analyzer (CNA) protein values will be used for the 80 C/V samples. CNA analysis will be obtained for the 20 moisture survey samples. Instruments will be required to simultaneously provide predicted proteins and spectral data. The required data will be collected over time as samples, instruments, and operators become available with the goal of providing optical and chemical data, along with a summary report comparing predicted protein values to the CNA reference analyses, to manufacturers by January 1 of each year.

At the Sector's March 1996 meeting, some Sector members were of the opinion that if a performance problem was addressed through a calibration change, a common, independent validation set (not part of the calibration set) should be used to verify that the desired objective had been achieved. One Sector member had suggested that manufacturers be allowed to contribute "golden" samples to the validation set. Another suggested that the validation set contain samples that had historically shown poor agreement with the CNA protein values.

Although originally recommending that recalibration of NTEP instruments be done using (as a minimum) data obtained on samples selected from the same sample pool from which GIPSA/FGIS selected samples for calibrating the Official instrument, it was later determined that this would not be possible in cases where GIPSA had used "historical" samples which now exist only as spectral data (obtained on the GIPSA Official instrument) and not as physical samples.

[Note: As used above, "monitoring" applies to tests performed on the instruments in the NTEP lab and not to devices in the field. "Recalibration" means derivation of a new set of calibration coefficients. Slope and bias adjustments are not considered "recalibration".]

After considering the practical aspects of obtaining the necessary samples and the cost of a validation program to manufacturers the Sector distilled the issue to the simple question of, "How should the NTEP lab evaluate a calibration change?" The Sector agreed that the answer was simply, "The same way they evaluated the calibration initially." The Sector also agreed that spectral and CNA data would be made available to manufacturers for re-predicting the results of calibration changes.

Discussion: With the exception of the final paragraph, Part IV, *Tolerances for Calibration Performance,* in the Near Infrared Grain Analyzers chapter of Publication 14, consists of information copied directly from the Grain Moisture Meter chapter of Publication 14. Section IV, which deals mostly with an on-going calibration review program, requires major revisions before it can be used. Because many of the Sector's earlier decisions regarding validation and monitoring were based on devices measuring only wheat protein, and because it had been suggested that the rapid evolution of calibration techniques, such as artificial neural networks, might materially change the way a maintenance program should be set up, the Sector reviewed its earlier decisions on this subject to see if they were still applicable. The earlier decisions included:

- Participation in a monitoring program of some sort should be mandatory for NTEP NIR analyzers.
- Data should be collected (and made available to manufacturers) annually by the NTEP laboratory on instruments in an on-going calibration review and maintenance program for NIR grain analyzers.
- Only reference method constituent data (corrected to the standard moisture bases specified in HB44) and basic instrument data (spectra, calibration IDs, and predicted values) would be provided (i.e., no moisture data would be provided).
- No more than 100 samples per year per grain type would be required for calibration review or monitoring purposes.
- The problem of capturing new crop problems in local areas would be up to the manufacturer to address [and need not be part of the monitoring program].
- The accuracy limits used for NTEP approval should also apply to the annual review of NTEP calibrations.
- Note: As presently worded, the tolerance for Standard Error of Performance (SEP) is one-half the Handbook 44 acceptance tolerance applied to individual samples, and the tolerance for bias is 0.20 times the Handbook 44 acceptance tolerance applied to individual samples. For type approval testing, data for these tests are collected on a specially selected sample set, and any sample result not within three standard deviations of the mean for the test instrument is deleted before analysis of the data. Although three replicates are run on each instrument for each

sample, only the first replicate is used to calculate SEP and bias for each instrument. The suggested tolerances may be overly restrictive when applied to data collected on a random set of samples in an on-going monitoring program.

The Sector wrestled with the question of whether the purpose of Phase II was to acquire additional calibration data, to validate existing calibrations, or to align the system for National consistency. It was argued that the collection of additional calibration data was not an appropriate NTEP function. If a system was needed to acquire calibration data, it could be arranged as a contractual service possibly provided by GIPSA. In the case of grains with multiple constituent calibrations, it was pointed out that 100 samples might not exhibit sufficient range in value for all constituents to provide a meaningful test of all the calibrations. As for aligning the commercial system with the Official system, it was noted that the Tentative Code provides for adjustments of bias using Standard Reference Samples (SRS) traceable to GIPSA Master Instruments (see §UR.2.8. Slope and Bias Adjustments.) Differences between Grain Moisture Meters (GMM) and Near-Infrared (NIR) Grain Analyzers were cited as additional reasons that an on-going monitoring program (other than normal field evaluations) would not be needed for NIR Grain Analyzers: 1) The GMM program requires an on-going calibration review because the calibrations are unstable with time, while NIR calibrations are much more stable; 2) The GMM code does not allow bias adjustments, while the NIR Analyzer code provides a means for controlled bias adjustments.

Conclusion: The Sector agreed that a Phase II On-Going Calibration Review program would not be established for Near-Infrared Grain Analyzers. Changes to calibrations (other than slope and bias) will be considered metrologically significant and will require re-examination by the NTEP Laboratory and issuance of an amended CC. The degree of examination will depend on the nature of the change. In the simplest case, the manufacturer may be permitted to re-predict constituent results using spectral data from the original evaluation. In more complex cases, it may be necessary for the Manufacturer to re-submit the device for whatever testing is deemed appropriate by the NTEP Laboratory. Part IV, *Tolerances for Calibration Performance,* in the Near Infrared Grain Analyzers chapter of Publication 14, is to be deleted in its entirety.

7. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 19, 2002 in the Kansas City, MO area. Meetings will be held in one of the meeting rooms at the NOAA Weather Training Center if available. A tentative schedule is shown below.

Wednesday, August 21	1:00 p.m. - 5:00 p.m.	GMM Sector Meeting
Thursday, August 22	8:00 am - 12:00 noon	GMM Sector Meeting
Thursday, August 22	1:00 p.m. - 5:00 p.m.	joint session GMM & NIR Analyzer
Friday, August 23	8:00 am - 12:00 noon	NIR Protein Analyzer Sector Meeting

Attendance List
NTETC Grain Moisture Meter & NIR Protein Analyzer Sector Meetings
August 22-24, 2001, Kansas City, MO

Name	Affiliation	August 2001		
		22	23	24
Jack Barber	JB Associates	x	x	x
Randy Burns	Arkansas Bureau of Standards	x	x	x
Sidney Colbrook	Illinois Department of Agriculture	x	x	x
Bob Davis	Illinois Department of Agriculture	x	x	x
Cassie Eigenmann Pierson	DICKEY-john Corp.	x	x	x
Arnold Eilert	Bran+Luebbe	x	x	x
Rich Flaugh	GSF Inc.	x	x	x
David Funk	GIPSA	x	x	x
Victor Gates	Shore Sales	x	x	
Andrew Gell	Foss North America	x	x	x
Charles Hurburgh, Jr.	Iowa State University Agricultural Engineering Dept.	x	x	x
David Krejci	Grain Elevator & Processing Society	x	x	x
G. Diane Lee	Natl. Institute of Stds. & Technology Office of Weights and Measures	x	x	x
Steve Modiano	Monsanto Co.	x	x	x
Tom O'Connor	National Grain & Feed Association	x	x	x
Steve Patoray	NCWM, Inc.	x	x	x
Richard Pierce	GIPSA	x	x	x
James Rampton	GIPSA	x	x	
Cheryl Tew	North Carolina Dept. Of Agriculture & Consumer Services Standards Division	x	x	x
Ambler Thompson	NIST	x	x	
Diane Wise	Colorado Dept. of Agriculture Measurement Standards Section	x	x	x
Robert Wittenberger	Missouri Dept. of Agriculture Div. of Weights and Measures	x	x	x

Appendix E
National Type Evaluation Technical Committee
Measuring Sector Annual Meeting
September 28-29, 2001, Lexington, Kentucky
Meeting Summary

Carry-over Items

1. Recommendations to Update to NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Background: The 86th National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2002 Edition of NIST Handbook 44 and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector of the NCWM actions and recommend changes to NCWM Publication 14.

Recommendation: The Sector was asked to review and, if acceptable, recommend to the NTEP Committee adoption of the following changes to Publication 14 based on changes to NIST Handbook 44.

a) Remanufactured Devices and Elements – Marking Requirements and Definitions

Background: There will be occasions where a Certificate of Conformance does not cover remanufactured dispensers, measuring elements, or meters. It should be made clear in Publication 14 that remanufactured devices submitted for type evaluation shall comply with all applicable retroactive and nonretroactive requirements in Handbook 44.

Recommendation: Amend the Liquid-Measuring Devices, Technical Policy, Section K, as follows:

K. Policy on Remanufactured and Repaired Devices

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

2. If companies or individuals repair or remanufacture a device, they are obligated to repair or remanufacture it in a manner that is consistent with the manufacturer's original design; otherwise, that specific device is no longer traceable to the NTEP CC.

3. Applicants submitting remanufactured liquid-measuring devices are reminded that any device submitted for evaluation shall comply with all applicable requirements in Handbook 44, including nonretroactive requirements, as if it were a newly manufactured device. All references to "device(s)" are considered to include remanufactured device(s).

Discussion: The Sector heard comments that for the purpose of type evaluation manufacturers and remanufacturers should be considered the same. There was general consensus that this issue should be addressed in the Administrative Policy of Publication 14 rather than in Section K.

Conclusion: The Sector agreed that Section K should remain in its current form and recommends that the NTEP Committee address the issue of requirements for the NTEP Evaluation of a remanufactured device in the Administrative Policy Section of NCWM Publication 14.

b) G-S.1. Identification: Certificate of Conformance

Recommendation: A Certificate of Conformance Number will not be available during type evaluation; however, provisions must be available for such a marking. Add the following paragraph to the "Marking" sections in all of the Publication 14, Section 2, Chapters, 9, 10, and 11 Checklists:

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC number is not part of an identification plate, note its intended location and how it will be applied. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval." These terms may be followed by the word "Number" or an abbreviation for the word "Number". The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.). (Effective January 1, 2003) Code Reference G-S.1.(g). Location

Discussion: The Sector heard comments that in many cases the manufacturer of a device will begin production of a model before the CC number is issued. In some cases there may be devices in the field before the CC number is issued. Some manufacturers are concerned with the cost and responsibility for applying CC numbers to devices already in use in the field. The Sector generally agreed that language in the checklist relative to the Handbook 44 requirement for a CC number to be marked on the device is appropriate as long as the NTEP laboratories accept the demonstration of a designated area for the marking or a sample marking.

Conclusion: The Sector agreed to recommend the following proposal to the NTEP Committee for addition to NCWM Publication 14.

The Sector recommends that the underlined language below be included in the Marking Section of all of the NCWM Publication 14, Section 2, Chapters 9, 10, and 11 Checklists,

1. General.

Code Reference: G-S.1. Identification

All equipment shall be clearly and permanently marked on an exterior surface that is visible after installation with the following information (***prefix lettering may be initial capitals, all capitals, or all lower case***):

1.1. Name, initials, or trademark of the manufacturer. Yes ☐ No ☐ NA ☐

1.1.1. The manufacturer's designation that positively identifies the pattern or design. Yes ☐ No ☐ NA ☐

1.1.2. The Model designation shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or Mod." (Effective January 1, 2003). Yes ☐ No ☐ NA ☐

1.1.3. A unique serial number. Yes ☐ No ☐ NA ☐

1.1.4. The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). Yes ☐ No ☐ NA ☐

1.1.5. [Code Reference G-S.1.(g), Effective January 1, 2003]

The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have (or will have) a CC. The number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation for the word "Number." The abbreviation shall, as a minimum, begin with the letter "N" (e.g., No or No.).

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC number is not part of an identification plate, note its intended location and how it will be applied. Yes ☐ No ☐ NA ☐

Location of CC Number if not located with the identification information:

_____

_____

1.2 The identification badge must be visible after installation Yes ☐ No ☐ NA ☐

c) G-S.1. Identification: Abbreviation of the Term Model

Recommendation: Make the following modifications to all applicable paragraphs in Publication 14, Section 2, Chapters 9, 10, and 11 Checklists.

The name, initials, or trademark of the manufacturer or distributor. A remote display is required to have the manufacturer's name or trademark and model designation. The model designation shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) (Effective January 1, 2003). The abbreviation for the word "Model" shall be "Mod" or "Mod.". (Code Reference G-S.1.)

Discussion/Conclusion: The Sector reviewed the proposal and agreed to recommend to the NTEP Committee that the proposed language be added to Publication 14 as written.

d) Repeatability

Recommendation: Amend the appropriate paragraphs of Publication 14, Section 2, Chapters 10 and 11 Checklists as follows:

Chapter 10 Liquid-Measuring Devices

Permanence Test Procedures for Meters

A. Field Evaluation and Permanence Test of New-Design Meters in Retail Motor Fuel Dispensers

All new-design meters are subject to a permanence test. If a meter is the same as one in a previously tested dispenser, a permanence test is not required unless a problem has been detected.

Initial Examination

3. Repeatability - When consecutive multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

   Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Discussion: The Sector agreed with the proposal except that for NTEP evaluations it is appropriate to require a minimum of three consecutive tests before repeatability tolerances are applied and the word "should" needs to be "shall" as follows:

> NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

e) Repeatability on Wholesale Meters (Code Reference T.2.3.3.)

Recommendation: Amend Code Reference T.2.3.3. Repeatability on Wholesale Meters as follows:

> When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.
>
> Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Discussion: The Sector agreed with the proposal except that for NTEP evaluations it is appropriate to require a minimum of three consecutive tests before repeatability tolerances are applied and the word "should" needs to be "shall" as follows:

> NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

f) Repeatability on Vehicle-Tank Meters (Code Reference T.4.)

Recommendation: Amend Code Reference T.4. Repeatability on Vehicle-Tank Meters as follows:

> When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Discussion: The Sector agreed with the proposal except that for NTEP evaluations it is appropriate to require a minimum of three consecutive tests before repeatability tolerances are applied and the word "should" needs to be "shall" as follows:

NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

g) **Repeatability on LPG & NH_3 Meters (Code Reference T.3.)**

Recommendation: Amend Code Reference T.3. Repeatability on LPG & NH_3 Meters as follows:

When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Note: Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results.

Discussion: The Sector agreed with the proposal except that for NTEP Evaluations it is appropriate to require a minimum of three consecutive test before repeatability tolerances are applied and the word "should" needs to be "shall" as follows.

NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

h) **Repeatability for Mass Flow Meters (Mass Flow Meters Code Reference T.3.)**

Recommendation: Amend Code Reference T.3. Repeatability on Mass Flow Meters as follows:

When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed:

~~1. 0.2 percent for retail liquid motor fuel devices; and~~

~~2.~~ 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance ~~for all other devices listed in Table T.2. of the Mass Flow Meters Code~~.

Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Note: The normal test of a mass flow metering system shall be made at the maximum discharge rate developed under the conditions of the installation. Any additional tests conducted at flow rates down to and including the rated minimum discharge flow rate shall be considered normal tests. (Code reference N.6.) Special test tolerances shall apply to tests such as a split compartment test conducted to develop operating characteristics of the measuring systems.

Additional Considerations for Testing Mass Flow Meters Dispensing Compressed Natural Gas (CNG):

4. The repeatability of the test results must be within 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Discussion: The Sector agreed with the proposal except that for NTEP evaluations it is appropriate to require a minimum of three consecutive tests before repeatability tolerances are applied, and the word "should" needs to be "shall" as follows:

NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

Chapter 11 Cryogenic Liquid-Measuring Devices

E. ~~Repeatability on Wholesale Meters (General Code Reference G-A.3. and Liquid-Measuring Devices: CodeReference T.2.3.3.)~~

F. ~~Repeatability on Vehicle-Tank Meters (General Code Reference G-A.3. and Vehicle Tank Meters Code Reference T.4.)~~

When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance, and the results of each test shall be within the applicable tolerance.

Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

Discussion: The Sector agreed with the proposal except that for NTEP evaluations it is appropriate to require a minimum of three consecutive tests before repeatability tolerances are applied, and the word "should" needs to be "shall" as follows:

NTEP tests for repeatability ~~should~~ *shall* include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors,

such as temperature, pressure, and flow rate, are reduced to the extent that they will not affect the results obtained.

Conclusion: The Sector agreed to forward the modified proposal to the NTEP Committee with the recommendation that it be added to Publication 14.

2. Change Pages for 2001 Edition of NCWM Publication 14

Background: The following table lists the changes that were recommended for the 2001 Edition of NCWM Publication 14 and will be available as change pages for the 2000 Edition. The change pages will be distributed at the Sector Meeting. No Sector action is needed.

Electronic Cash Registers Interfaced with Retail Motor Fuel Dispensers			
Section Number	**Amendment/Editorial Change**	**2000 Edition Page Number**	**Source**
Electronic Cash Registers Interfaced with Retail Motor Fuel Dispensers , Part B. Section 1, Identification	Added language that clarifies the model designation prefix.	9-7 9-8	Section G-S.1(c) Effective 1/03

Liquid-Measuring Devices			
Section Number	**Amendment/Editorial Change**	**2000 Edition Page Number**	**Source**
NTEP Technical Policy for Liquid-Measuring Devices Part B, Tolerance Application	"Per" changed to "Based on" NIST Handbook 44	10-14	10/00 MS Agenda Item 4
NTEP Technical Policy for Liquid-Measuring Devices Part C, Product Families for Positive Displacement Meters	Editorial – destiny to density. Editorial – added missing end quote to August 1999" Deleted "centipoise" footnote 1 Added new footnote 1 stating the table is not limiting. Added new footnote 3 clarifying that oxygenates are accepted in gasoline products.	10-16	Editorial 10/00 MS Agenda Item 4 10/00 MS Agenda Item 5
NTEP Technical Policy for Liquid-Measuring Devices Part D, Product Families for Mass Flow Meters	Added new language stating the table is not limiting. Deleted statement that NTEP does not evaluate heated products	10-16	10/00 MS Agenda Item 4

NTEP Technical Policy for Liquid-Measuring Devices Part I, Guidelines for Requiring Serial Numbers on Devices	Editorial - "its is" to "it is"	10-18	Editorial
NTEP Technical Policy for Liquid-Measuring Devices Part O, Loading Rack Meter Controllers	Deleted item "1" and renumbered remaining items.	10-19	10/00 MS Agenda Item 2
NTEP Technical Policy for Liquid-Measuring Devices	Added new section "R. Vehicle-Mounted" and Stationary Applications of the Meter"	10-20	10/00 MS Agenda Item 14
Liquid-Measuring Devices Part 1, Identification.	Added language that clarifies the model designation prefix.	10-22	Section G-S.1(c) Effective 1/03
Liquid-Measuring Devices Part 5, Indications.	Added language regarding the width of the index of an indicator.	10-33	Section 3.30, S.1.5.3. Effective 1/02
Liquid-Measuring Devices Part 40	Added title for "Additional Checklist and Procedures" for retail LMD to indicate a change from mass flow meter checklist and procedures.	10-80	Editorial
Liquid-Measuring Devices - Field Evaluation and Permanence Tests for Metering Systems, Section H	Added language that clarifies the conditions necessary to apply repeatability tolerances.	10-88	10/00 MS Agenda Item 10
Liquid-Measuring Devices, Field Evaluation and Permanence Tests for Metering Systems, Section L	Added additional language for the testing and use of reference scales in the testing of mass flow meters.	10-91	10/00 MS Agenda Item 13

Discussion/Conclusion: The change pages were distributed to the Sector Members present. No Sector action was required.

3. Update to NCWM Publication 14 Administrative Policy

Background: Steve Patoray (NTEP Director) updated the Sector on changes to the NCWM Publication 14 Administrative Policy and Procedures.

Discussion/Conclusion: Steve Patoray (NTEP Director) will update Sector on changes to the NCWM Publication 14 Administrative Policy and Procedures. No Sector action was required.

4. Meter Sizes and Products to be Evaluated for Vehicle and Stationary Applications of the Same Meter

Source: NIST/OWM, NTEP Laboratories

Background: At its October 2000 meeting, the Sector agreed with the NTEP Laboratory proposal that a meter successfully evaluated as a vehicle-mounted application may also be covered as a stationary application under the same resulting Certificate of Conformance. To add vehicle-mounted applications to a Certificate of Conformance for a meter evaluated for stationary applications only requires full evaluation in a vehicle-mounted application. The Sector asked the

NTEP Laboratories to address the questions relating to additional size(s) and/or different products in vehicle-mounted applications being added to a CC for a meter evaluated only for stationary applications.

Recommendation: The Laboratories agreed to forward to the Measuring Sector for review the following proposal to add a new paragraph in Section R. Vehicle-Mounted and Stationary Applications of the Technical Policy for Liquid-Measuring Devices in Publication 14.

> **R. Vehicle-Mounted and Stationary Applications of the Same Meter**
>
> If a meter is successfully tested in a vehicle-mounted application, both vehicle-mounted and stationary applications can be covered on the resulting Certificate of Conformance without additional testing in a stationary application. If a meter has only been tested in a stationary application, testing must also be conducted on the meter in a vehicle-mounted application in order to cover both applications on the CC.
>
> If an additional meter size or a new product is successfully tested in a vehicle-mounted application, both vehicle-mounted and stationary applications can be covered on the resulting Certificate of Conformance without additional testing in a stationary application. If an additional meter size or additional product has only been tested in a stationary application, testing must also be conducted on the meter in a vehicle-mounted application in order to cover both applications on the CC.

Discussion/Conclusion: The Sector reviewed the proposal. One of the members stated that Certificates of Conformance exist that include vehicle-mounted applications based on the testing of a stationary installation. Another member stated that in that case the approval for vehicle-mounted installations should not be taken away. The Sector agreed with the proposal as written. The Sector also noted that the policy should not be applied retroactively to existing Certificates of Conformance.

5. Testing of Single Compartment vs. Split Compartment Test for Vehicle Tank Meters

Background: At its September 1999 meeting, the Sector was asked to determine if there are applications where it is appropriate to eliminate the split-compartment test (sometimes referred to as the product depletion test) for vehicle-tank meters. Will Wotthlie (MD) questioned whether or not vehicle-mounted mass flow meters require a split-compartment test if the manufacturer intended that the meter be used on vehicles with a single compartment. One Coriolis mass flow meter manufacturer stated that Coriolis mass flow meters, unlike other device technologies, can track the density of the product in the meter. If the system is correctly configured, when air enters the meter, the mass flow meter transmitter recognizes the density drop and sends a signal to stop pumping and registering product.

The Sector agreed that even a single compartment vehicle tank could run dry and introduce air into the supply lines, resulting in overregistration. The only way to conclusively determine that a system effectively prevents vapor and air from passing through the meter, resulting in erroneous indications, is to conduct a product depletion test. Consequently, the Sector agreed that, before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, *all* vehicle-mounted meters must pass a split-compartment test. The Sector agreed that specific test procedures were needed and asked the NTEP labs to develop these procedures. In the meantime, testing was to be conducted using the same *ad hoc* procedures as used in past evaluations. The Sector agreed that this policy will apply to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The Sector agreed that both the initial test and the permanence test still apply, including the required throughput with a duration of at least 20 days. The Sector agreed that, ideally, this test would be performed with a multiple-compartment vehicle; however, if a multiple-compartment vehicle is unavailable, a single- compartment vehicle may be used to simulate the split-compartment test by running the tank empty.

At their April 2000 meeting, the NTEP Laboratories agreed to develop a procedure for review by the Measuring Sector at its next meeting. The draft procedure was not completed as of the Sector's October 2000 meeting. Consequently, this item was carried-over to the agendas of the 2001 NTEP Laboratory and Measuring Sector Meeting.

Recommendation: Modify Publication 14, Liquid-Measuring Devices, Section C. Field and Permanence Test For Vehicle-Tank and Wholesale Meters as follows.

C. Field Evaluation and Permanence Test for Vehicle-Tank and Wholesale Meters

The following tests are considered to be appropriate for vehicle-tank metering systems:

- Three tests at the maximum discharge rate.
- Three intermediate flow tests.
- Three slow-flow tests.
- Three vapor or air eliminator (product depletion) tests.

Note: 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. (Code reference N.4.1.)

Only one meter is required for the initial test, and after the test the meter will be placed into service for the permanence test. The following minimum throughput criterion is recommended for these meters:

Maximum rated flow rate x 2000

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

~~Split Compartment~~ **Product Depletion Test**

Before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, the meter must pass a ~~split compartment~~ product depletion test. This policy applies to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The permanence test still applies and must include the throughput with a duration of at least 20 days. Ideally, this test should be performed with a multiple-compartment vehicle; however, if a multiple-compartment vehicle is unavailable, a single-compartment vehicle may be used to simulate the ~~split-compartment~~ product depletion test by running the tank empty.

Purpose: A product depletion test verifies the proper operation of air elimination means when the storage tank for the product being measured is pumped dry. This test is necessary for meters that may drain a tank completely, such as a vehicle tank meter.

Test Procedure: For a multi-compartment tank:

1. Begin the test from a compartment (ideally the largest compartment) containing an amount of fuel equal to or less than one-half the nominal capacity of the prover being used. Operate the meter at the normal full flow rate until the compartment is empty. There are several methods for determining that the compartment is empty. There may be a significant change in the sound of the pump. Someone may visually watch for the compartment to run dry. The meter may stop entirely or may begin to move in jumps (pause, resume running, then pause, then run again.)
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter stops for 10 seconds or more, proceed to step 4. If the meter indication fails to stop entirely for a period 10 seconds, continue to operate the system for 3 minutes.
3. Close the valve from the empty compartment, and then close the nozzle or valve at the end of the delivery hose. Open the valve from another compartment containing the same product. Carefully open the valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the prover. Appropriate eye protection is required, but caution is still necessary.
4. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the nominal capacity of the prover.
5. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
6. Compare the meter indication with the actual delivered volume in the prover.

7. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

Test Procedure: For a single-compartment tank:

The test of a single-compartment tank is easier to accomplish if there is a quick-connect hose coupling between the compartment valve and the pump that supplies product to the meter. If the system does not have a quick-connect coupling between the compartment and the meter, an additional source of sufficient product at the test site is required.

Without a quick-connect coupling:

1. Begin the test with the compartment containing an amount of fuel equal to or less than one-half the nominal capacity of the prover being used. Operate the meter at the normal full flow rate until the supply tank is empty. There are several methods for determining that the tank is empty. There may be a significant change in the sound of the pump. Someone may visually watch for the tank to run dry. The meter may stop entirely or may begin to move in jumps (pause, resume running, then pause, then run again).
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter stops for at least 10 seconds, proceed to step 3. If the meter indication fails to stop entirely for at least 10 seconds, continue to operate the system for 3 minutes.
3. Close the delivery nozzle or valve and the compartment valve. Stop the pump and load sufficient product from the alternate source into the supply compartment for the meter being tested. Allow the product to stand in the compartment for a brief time to allow entrained vapor or air to escape.
4. Open the compartment valve and restart the pump without resetting the meter to zero. Carefully open the nozzle or valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the prover. Appropriate eye protection is required, but caution is still necessary.
5. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the nominal capacity of the prover.
6. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
7. Compare the meter indication with the actual delivered volume in the prover.
8. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

With a quick-connect coupling:

1. During a normal full flow test run, close the compartment valve at approximately one-half of the nominal prover capacity. Then slowly and carefully disconnect the quick-connect coupling allowing the pump to drain the supply line.
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter fails to stop entirely for at least 10 seconds, continue to operate the system for 3 minutes.
3. If the meter stops for at least 10 seconds or after 3 minutes, close the delivery nozzle or valve at the end of the delivery hose.
4. Reconnect the quick-connect coupling and open the compartment valve.
5. Carefully open the nozzle or valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the prover. Appropriate eye protection is required, but caution is still necessary.
6. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the prover's nominal capacity.
7. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
8. Compare the meter indication with the actual delivered volume in the prover.
9. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

Discussion: The Sector reviewed the proposal. One member indicated that the 10 seconds in step "2" was too long. Others disagreed and one NTEP Laboratory stated that based on field experience 10 seconds was appropriate. The Sector heard comments that it was not necessary to conduct multiple product depletion tests - one test during the initial

evaluation and one test after the permanence period were sufficient. A member stated that if product splashed out of the prover, the test should start over. The Sector generally agreed that "Wholesale Meters" should be removed from the heading.

Conclusion: The Sector agreed to the proposal with the following changes and recommended that the NTEP Committee add the procedure to NCWM Publication 14.

C. Field Evaluation and Permanence Test For Vehicle-Tank and Wholesale Meters

The following tests are considered to be appropriate for vehicle-tank metering systems and except for the vapor or air eliminator test are considered appropriate for wholesale meters:

- Three tests at the maximum discharge rate.
- Three intermediate flow tests.
- Three slow-flow tests.
- ~~Three~~ One vapor or air eliminator (product depletion) tests.

Note: 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. (Code reference N.4.1.)

Only one meter is required for the initial test, and after the test the meter will be placed into service for the permanence test. The following minimum throughput criterion is recommended for these meters:

Maximum rated flow rate x 2000

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Product Depletion Test

Before vehicle-mounted applications are listed on an NTEP Certificate of Conformance, the meter must pass a product depletion test. This policy applies to all meter technologies (e.g., Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The permanence test still applies and must include the throughput with a duration of at least 20 days. Ideally, this test should be performed with a multiple-compartment vehicle; however, if a multiple-compartment vehicle is unavailable, a single-compartment vehicle may be used to simulate the product depletion test by running the tank empty.

Purpose: A product depletion test verifies the proper operation of air elimination means when the storage tank for the product being measured is pumped dry. This test is necessary for meters that may drain a tank completely, such as a vehicle tank meter.

Test Procedure: For a multi-compartment tank:

1. Begin the test from a compartment (ideally the largest compartment) containing an amount of fuel equal to or less than one-half the nominal capacity of the prover being used. Operate the meter at the normal full flow rate until the compartment is empty. There are several methods for determining that the compartment is empty. There may be a significant change in the sound of the pump. Someone may visually watch for the compartment to run dry. The meter may stop entirely or may begin to move in jumps (pause, resume running, then pause, then run again.)
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter stops for 10 seconds or more, proceed to step ~~4~~ 3. If the meter indication fails to stop entirely for a period 10 seconds, continue to operate the system for 3 minutes.
3. Close the valve from the empty compartment, and if top filling, then close the nozzle or valve at the end of the delivery hose. Open the valve from another compartment containing the same product. Carefully open the valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the

prover. The test results may not be valid if product is splashed out of the prover. Appropriate eye protection is required, but caution is still necessary.
4. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the nominal capacity of the prover.
5. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
6. Compare the meter indication with the actual delivered volume in the prover.
7. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

Test Procedure: For a single-compartment tank:

The test of a single-compartment tank is easier to accomplish if there is a quick-connect hose coupling between the compartment valve and the pump that supplies product to the meter. If the system does not have a quick-connect coupling between the compartment and the meter, an additional source of sufficient product at the test site is required.

Without a quick-connect coupling:
1. Begin the test with the compartment containing an amount of fuel equal to or less than one-half the nominal capacity of the prover being used. Operate the meter at the normal full flow rate until the supply tank is empty. There are several methods for determining that the tank is empty. There may be a significant change in the sound of the pump. Someone may visually watch for the tank to run dry. The meter may stop entirely or may begin to move in jumps (pause, resume running, then pause, then run again).
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter stops for at least 10 seconds, proceed to step 3. If the meter indication fails to stop entirely for at least 10 seconds, continue to operate the system for 3 minutes.
3. Close the compartment valve and the delivery nozzle or valve if top filling. Stop the pump and load sufficient product from the alternate source into the supply compartment for the meter being tested. Allow the product to stand in the compartment for a brief time to allow entrained vapor or air to escape.
4. Open the compartment valve and restart the pump without resetting the meter to zero. Carefully open the nozzle or valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the prover. The test results may not be valid if product is splashed out of the prover. Appropriate eye protection is required, but caution is still necessary.
5. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the nominal capacity of the prover.
6. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
7. Compare the meter indication with the actual delivered volume in the prover.
8. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

With a quick-connect coupling:
1. During a normal full flow test run, close the compartment valve at approximately one-half of the nominal prover capacity. Then slowly and carefully disconnect the quick-connect coupling, allowing the pump to drain the supply line.
2. Continue the test until the meter indication stops entirely for at least 10 seconds. If the meter fails to stop entirely for at least 10 seconds, continue to operate the system for 3 minutes.
3. If the meter stops for at least 10 seconds or after 3 minutes, close the delivery nozzle or valve at the end of the delivery hose if top filling.
4. Reconnect the quick-connect coupling and open the compartment valve.
5. Carefully open the nozzle or valve at the end of the delivery hose. Pockets of vapor or air may cause product to splash out of the prover. The test results may not be valid if product is splashed out of the prover. Appropriate eye protection is required, but caution is still necessary.
6. Continue delivering product at the normal full flow rate until the liquid level in the prover reaches the prover's nominal capacity.

7. Close the delivery nozzle or valve, stop the meter, allow any foam to settle, then read the prover sight gauge as quickly as practical.
8. Compare the meter indication with the actual delivered volume in the prover.
9. Calculate the meter error, apply special test tolerance, and determine whether or not the meter error is acceptable.

6. Review of Section "O" of LMD Technical Policy

Background: At its last meeting the Sector agreed that the entire Section "O" should be reviewed. Section "O" was added to Publication 14 as a result of discussions at the October 1994 Measuring Sector Meeting. At the 1994 Measuring Sector Meeting, some members were concerned whether or not sequential blending systems could meet all of the requirements in Section "O". The Sector was also concerned that during an NTEP evaluation the actual blend ratio may not be verified. The actual blend can only be determined through laboratory analysis of the final product. Some members felt that these concerns still need to be resolved. The Sector agreed that the Technical Advisor, Dick Suiter, should work with volunteers to review the checklist and identify proposed changes for consideration by the Sector at its next meeting. Those interested in participating in this review should contact Dick Suiter by March 1, 2001.

To date no volunteers have agreed to review Section "O" for possible update. The Sector was asked to determine if Section "O" should be removed from Publication 14 or if it should be retained in its present form.

Discussion/Conclusion: No information was received prior to the meeting. No actual problems with the policy have been reported. The Sector agreed to retain Section "O" in its present form.

7. Return of Mass to Units of Measure in Handbook 44 Section 3.34. Cryogenic Liquid Measuring Devices

Source: NIST/OWM

Background: In accordance with the 1994 decision on item 337-4A of the NCWM S&T Committee agenda, the allowance for units of mass was removed from Handbook 44, Section 3.34. Cryogenic Liquid-Measuring Devices, Paragraph S.1.1.2. Units in 1998. Since that time it has been determined that the industry standard for displayed units of measurement continues to be in terms of mass. Placing mass units back into the cryogenics code as an approved measurement unit may be appropriate; however, if that is done, there should be a standard reference value associated with the expression of mass units. Since products covered by the cryogenic code are pure products, the reference density at 70 °F may be appropriate. Another option would be to reference the density at the Normal Boiling Point for a product. At its October 2000 Meeting, the Sector agreed to carry this item forward to the agenda of the next Sector meeting provided industry supplies information to the Technical Advisor demonstrating a need for returning mass units to the Cryogenic Code. The Technical Advisor contacted Jeff Kelly (Hoffer Flow Controls Inc.), who agreed to collect information from industry representatives and report back to the Sector.

Discussion: Mr. Kelly reported that units of mass are still considered an industry standard. Many contracts including government contracts require the quantity delivered to be stated in mass units. The Technical Advisor presented letters received from Airgas and Linde supporting units of mass for product deliveries.

Conclusion: The Sector agreed to recommend to the NCWM S&T Committee that units of mass be returned to NIST Handbook 44, Section 3.34. Cryogenic Liquid-Measuring Devices, S.1.1.2. Units. The following recommendation for modification of S.1.1.2. will be forward to the NCWM S&T Committee.

S.1.1.2. Units. - A device shall indicate and record, if equipped to record, its deliveries in terms of: kilograms or pounds; liters or gallons of liquid at the normal boiling point of the specific cryogenic product; cubic meters (cubic feet) of gas at a normal temperature of 21 °C (70 °F) and an absolute pressure of 101.325 kPa (14.696 psia); or decimal subdivisions or multiples of the measured units cited above.

8. Review and Update Product Family Tables for PD Meters

Source: NIST/OWM

Background: There are some product groups such as food products that are routinely measured with both positive displacement and mass flow meters. When the tables were developed, only those products, which were typically submitted for NTEP evaluation, were addressed. As discussed in Item 4A above, the Sector did not intend to preclude the addition of other families or subgroups. NTEP is periodically asked to evaluate meters used to measure food products such as fructose and liquid yeast; however, the table does not presently include categories for these products. At its October 2000 Meeting, the Sector agreed that a work group should be formed to discuss the Product Families for Positive Displacement Meters. The consideration of additional products should be included in the work group discussions and recommendations. Following the meeting Robert Traetino (Liquid Controls LLC) agreed to chair the work group. Mr. Traetino provided a report at the September 2001 Meeting of the Sector on the progress of the work group.

Discussion: Melvin Hankel (MCH Engineering Associates, Inc.) presented a revised Family Products Table for positive displacement meters. The table presented had a new product family for Edible Products that included only vegetable oils. The Sector agreed that edible oils should be included with the product family for fuel, lubricant, and oil products with "edible vegetable oils" as a subgroup. The Sector also agreed that "compressed gases liquefied" should be changed to "liquefied compressed gases."

Conclusion: By a vote of 14 members in favor, 1 opposed, and one abstaining, the Sector agreed to recommend that the NTEP Committee replace the current Publication 14 Family Products Table for Positive Displacement Meters with the following table presented by Melvin Hankel (MCH Engr. Assoc. Inc.) and modified by the Sector at its September 2001 meeting.

Product Family	Product Subgroup	Typical Products[1]	Viscosity (Centipoise)	Specific Gravity[2]	% Abrasive Solids
~~Petroleum Products~~ Fuel Lubricant, Oil Products and Edible Oil Products	Refined ~~Petroleum~~ Products	Diesel Fuel, Distillate, Gasoline[3], Fuel Oil, Kerosene, Light Oil, Spindle Oil, Lubricating Oils, SAE Grades Bunker Oil, 6 Oil Crude Oil, Asphalt, Vegetable Oil, etc.	0.3 to ~~150~~ 2500	0.68 to 1.1	None
	Aviation Fuels	AVgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, etc.	0.4 to 3.6	0.68 to 0.85	None
	~~Lubricating Oils~~	~~SAE Grades~~	~~28 to 2150~~	~~0.75 to 1.0~~	~~None~~

	~~Heated Products~~	~~Bunker Oil, 6 Oil, Crude Oil, Asphalt~~	~~25 to 2420~~	~~0.8 to 1.1~~	~~None~~
	Vegetable Oils	Cooking Oils, Sunflower Oil, Soy Oil, Peanut Oil, Olive Oil, etc.			None
Solvents	Solvents General	Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc.	0.3 to 7	0.6 to 1.6	None
	Solvents Chlorinated	Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, Etc.	0.3 to 7	0.6 to 1.6	None
Alcohols & Glycols	Alcohols, Glycols, & Water Mixes Thereof	Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc.	0.3 to 7	0.6 to 1.6	None
Water	Water	Tap Water, Deionized, Demineralized, Potable	1.0	1.0	None
Liquified Compressed Gases; ~~Liquefied~~	~~LPG~~ Fuels & Refrigerants	LPG, Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc.	0.1 to 0.5	0.3 to 0.65	None
	NH_3	Anhydrous Ammonia	0.1	0.56 to 0.68	None
Agricultural Liquids - Fertilizers	Clear Liquids				None
	Fertilizers, ~~Clear Liquid N-P-K~~	Nitrogen solutions 28%, 30%, 32%, 20% Aqua-Ammonia Urea: Ammonia Nitrate N-P-K solutions: 10-34-0; 4-10-10; 9-18-9; etc.	10 to ~~30~~ 400	1.0 to ~~1.3~~ 1.45	
	Crop Chemicals	Herbicides: Round-up, Touchdown, Banvel, 2,4-D, Brontier, Treflan, Paraquat, Prowl, etc.	4 to 400	0.7 to 1.2	None
		Fungicides, Insecticides Adjuvants, Fumigants	0.7 to 100	0.7 to 1.2	None

	Flowables Crop Chemicals	Dual, Bicep, Marksman, Broadstrike, Doubleplay, Topnotch, Guardsman, Harness, etc. Fungicides Micronutrients	20 to 900	1 to 1.2	Nil to 3%
	~~Fertilizers, Nitrogen Solutions~~	~~20% Aqua-Ammonia; 28%, 30% or 32% Nitrogen Solution; Urea; Ammonia Nitrate; etc.~~	~~10 to 30~~	~~1.0 to 1.35~~	~~None~~
	Suspensions Fertilizers~~; Suspensions~~	3-10-30; 4-4-27; etc.	20 to ~~200~~ 900	~~1.0~~ to 1.~~65~~	Nil to 4%
	Liquid Feeds	Molasses plus Phos Acid and/or Urea; etc.	10 to 50,000	1.2 to 1.5	Nil to 4%
~~Agricultural Liquids - Herbicides~~	~~Herbicides, Thin Liquids~~	~~Eradicane, Lorox, Princep, Round-up, Sencor, Sutan, Sutazine, Treflon, etc.~~	~~18 to 65~~	~~0.9 to 1.2~~	~~Nil~~
	~~Herbicides, Viscous Liquids~~	~~Dual, etc.~~	~~26 to 144~~	~~0.9 to 1.2~~	~~Nil~~
	~~Herbicides, Flowables~~	~~Atrex, Atraxine, Bicep, Bladex, etc.~~	~~106 to 912~~	~~0.9 to 1.2~~	~~3%~~
~~Agricultural Liquids - Liquid Feeds~~	~~Liquid Feeds~~	~~Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc.~~	~~10 to 50 000~~	~~1.2 to 1.5~~	4%
Chemicals	Chemicals	Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc.	1.0 to ~~2~~96 300	1.1 to 1.85	None

[1] ~~centipoise (cP) - unit of dynamic viscosity. 1 N-s/m^2 = 1 kg/m.s = 1000 (cP) - 10 P~~ Note: *The Typical Products listed in this table are not limiting or all-inclusive; there may be other products and product trade names which fall into a product family and product subgroup.*

[2] The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 C (or 20 C) and 1 atm. The ~~destiny~~ density of water at standard conditions is approximately 1000 kg/m^3 (or 998 kg/m^3).

[3] Gasoline includes oxygenated fuel blends.

Source for some of the viscosity value information is in the Industry Canada - Measurement Canada "Liquid Products Group, Bulletin V-16-E (rpv. 1), August 3, 1999."

9. New Product Family Tables for Turbine Meters

Source: NIST/OWM

Background: When the current product family tables for positive displacement meters and mass flow meters were developed, turbine meters were not included. Performance data for that technology was not provided to the Sector which suggests appropriate families and subgroups of products. At the October 2000 Measuring Sector Meeting, no representative of turbine meter manufacturers were represented. The Sector members at the October 2000 Meeting agreed that, if manufacturers of turbine meters are interested in having product family criteria for turbine meters, they should form their own group and develop a proposal for consideration at a future Measuring Sector meeting. Following the October 2000 Meeting, the Technical Advisor asked Jeff Kelly (Hoffer Flow Controls Inc.) to contact other turbine meter industry representatives to assist in the development of product family criteria for turbine meters. Mr. Kelly will provide a report to the Sector at the September 2001 Sector Meeting, regarding the progress on this task.

Discussion/Conclusion: Jeff Kelly (Hoffer Flow Controls Inc.) reported that, while work on product family tables for turbine meters has begun, they are not ready for consideration by the Measuring Sector. The Sector agreed that the item would be dropped from the agenda until the turbine meter manufacturers submit a proposed table for Sector consideration.

10. Repeatability Tolerances for Hydrocarbon Gas Vapor-Measuring Devices, Milk Meters, Water Meters, and Carbon Dioxide Liquid-Measuring Devices

Background: At its last meeting the Sector agreed to forward a proposal to the NCWM S&T Committee that makes all repeatability tolerances for the device under test (DUT) in all Liquid-Measuring Device Codes of NIST Handbook 44 uniform. This repeatability tolerance should be based on 40 percent of the absolute value of the maintenance tolerance. The S&T Committee agreed with the proposal for all codes that currently have a requirement for repeatability, and the NCWM adopted that proposal. The S&T Committee recommended that code sections that currently do not have a tolerance for repeatability should remain informational. The item was returned to the Sector for further review of the appropriateness of the requirement and to allow manufacturers the opportunity to provide input on the ability of their devices to meet the proposed requirement. Input has been received from one water meter manufacturer recommending that water meters be exempt from a repeatability tolerance requirement unless the required draft size is increased to improve the repeatability of the DUT. The current acceptance and maintenance tolerances for Hydrocarbon Gas Vapor-Measuring Devices are 3 percent on overregistration and 1.5 percent on underregistration. Repeatability tolerances for those devices will need to be developed with that in mind.

Recommendation: The Sector was asked to reconsider the addition of repeatability tolerances to those codes which presently have no repeatability requirement and make a recommendation to the S&T Committee to pursue adding repeatability tolerances to those codes or to withdraw the item from the S&T Committee agenda at Interim Meeting of the NCWM in January 2002.

Discussion/Conclusion: The Sector reviewed the recommendations from the August 2001 Meeting of the WWMA for repeatability tolerances for Hydrocarbon Gas Vapor-Measuring Devices and Water Meters. The Sector agreed to forward the following recommendation to the NCWM S&T Committee for addition to NIST Handbook 44.

Add the following to NIST Handbook 44, Section 3.33. Hydrocarbon Gas Vapor-Measuring Devices:

> **T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.9%, and the results of every test shall be within applicable tolerance.**
>
> **N.4.3. Repeatability Tests. - Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that**

they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

Add the following to NIST Handbook 44, Section 3.36. Water Meters.

T.X.X. Repeatability. – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6% for tests performed at the normal and intermediate flow rates, and 1.3% for tests performed at the minimum flow rate, and each test shall be within the applicable tolerance.

N.4.4. Repeatability Tests. - Tests for repeatability shall include a minimum of three consecutive test drafts of approximately the same size and conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Non-compliance may be determined with less than three consecutive tests.

No representatives of milk meter manufac urers attended the Measuring Sector's September 2001 Meeting and no data were available from tests conducted on Carbon Dioxide Liquid-Measuring Devices. The Sector asked the Technical Advisor, Dick Suiter, to contact manufacturers of these two devices and suggest that they provide input directly to the S&T Committee regarding the ability of their devices to meet the proposed repeatability tolerance of 40 percent of the absolute value of the maintenance tolerance. The Sector also agreed that tests for repeatability should only be conducted under normal test conditions.

New Items

11. Test Criteria for a Mass Flow Meter without existing Certificate Displaying Only Units of Volume

Source: Steve Patoray NTEP Director

Background: At present Publication 14 requires all mass flow meters be tested initially using gravimetric methods. Section "Q" on page 10 - 20 of the Checklist For Liquid – Measuring Devices, Chapter 10, Publication 14, 2000 Edition does not provide any testing criteria for a manufacturer requesting only units of volume on a Certificate of Conformance. Section "Q" allows the required testing to be done either volumetrically or gravimetrically. Section "L" on page 10 – 90 requires that mass flow meters be tested using gravimetric methods. Typically meters dispensing liquid products are tested with an open top or pressurized closed vessel (prover).

Recommendation: Modify Sections "Q" and "L" as follows:

Q. New Certificates for Mass Flow Meter (MFM) indicating only in Units of Volume or Adding Volume Measurement to existing Mass Flow Meter Certificates

The NTEP laboratory must test a mass flow meter with products as outlined in the family of products table to include volume units of measurement on a mass flow meter Certificate of Conformance. This policy applies regardless of whether or not the meter is covered by an existing CC for mass units. It would result in re-testing products in the volume mode that were previously tested in the mass mode.

Testing for a mass flow meter indicating only in units of volume or to add volumetric units to a MFM Certificate of Conformance can be done volumetrically or gravimetrically using applicable test procedures outlined in Publication 14. The volume indication of the meter shall be based on the mass measurement and an automatic means to determine and correct for changes in product density. The method used to determine product density for gravimetric tests will be reviewed by NTEP on a case-by-case basis to allow the manufacturer flexibility in determining density for various product types and applications. Testing will not result in an approval of the density indication feature on the CC. (Note: ~~Each test will consist of only an initial test and will not include a subsequent test.~~ To add volume units, the test of only one meter size is required to cover the whole family of

meter sizes listed on the original CC.) Only an initial test is required for each new product. A subsequent permanence test is not required. The Certificate for a meter tested with only one measurement unit will cover only that unit of measure and will be noted in the application section of the Certificate.

L. Permanence Tests for Mass Flow Meters

The following tests are considered to be appropriate for mass flow meters:

Type evaluation. The gravimetric test method shall be used for type evaluation for meters indicating only in units of mass and may be used for meters indicating in units of volume. Meters indicating in only units of volume may be tested using a volumetric standard.

Gravimetric Standard. The combined error of the standard used for testing measuring instruments shall not exceed 20 percent of the maximum permissible error to be applied. Using known weight (primary standard), determine the error present in the weighing instrument over the weighing range that will be used in the test. The inherent error, if present, is to be factored out of the measurement. The scale will then be used as a transfer standard.

Test Drafts. Any test draft shall be equal to at least the quantity that is delivered in one minute at the maximum flow rate. The test drafts shall be equal in quantity regardless of the rate of flow. Establish proper flow meter calibration conditions (steady state conditions) at each flow rate. Collect the test data for the selected flow rates. The indication shall be on the basis of apparent mass.

Test Data. Meters tested in a laboratory environment will be tested five times at each of four different flow rates. Use the product available in the laboratory for both the initial and the follow-up evaluation to establish "baseline" data for the meter's performance. A Certificate of Conformance may be issued for the product(s) tested in the laboratory; however, additional products will not be included until testing is completed with these products. After a "baseline" is obtained, products can be included on the Certificate of Conformance by performing three tests at each of four different flow rates in the field for both the initial and follow-up evaluation. If a meter is tested in the field without first determining a "baseline," the meter must undergo five tests at each of four different flow rates; this criteria applies for both the initial and follow-up test.

Following the initial test, the meters will be placed into service for the permanence test. The minimum throughput criterion recommended for these meters is 60 days, or 2000 x maximum flow rate achieved in the installation, whichever comes first. Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

Testing to add Volume Units to existing Certificates Covering Mass Units. In order to add volumetric indications to an existing NTEP Certificate of Conformance (CC) ~~for a meter~~ which already covers mass indications for a meter, the following criteria relative to meter sizes to be covered on the CC must be met:

- At least one meter size must be tested in the volumetric mode.
- If the meter size(s) selected for testing is not already covered on the existing CC, then the request is treated as a submission to add a new meter size (i.e., a permanence test is required and testing must be performed in both the mass and the volume modes of operation).

Discussion/Conclusion: One member suggested that if an application was for only units of volume, then the device should be evaluated using the LMD code. It was pointed out that A.2. of the LMD code states that the code does not apply to mass flow meters. The Sector discussed the proposal and agreed that as long as appropriate physical properties for the product used for an evaluation are available and used, either gravimetric or volumetric test procedures can provide accurate measurement results. The Sector agreed to recommend to the NCWM S&T Committee that Publication 14 Section "Q" and "L" be modified as proposed.

12. Add Recirculation of Product to Handbook 44, Section 3.37., Mass Flow Meters Similar to S.3.1. in 3.30. Liquid Measuring Devices Code

Source: NIST/OWM

Background: Metering systems have been installed using mass flow meters to measure product that must periodically be recirculated to prevent unintentional product separation or settling of particles in suspension. Section 3.37 of NIST Handbook 44 does not currently recognize the need to or allow provision to recirculate product.

Recommendation: Modify NIST Handbook 44, Section 3.37, Paragraph S.4.1. as follows:

S.4.1. Diversion of Measured Product. - No means shall be provided by which any measured product can be diverted from the measuring instrument. However, two or more delivery outlets may be permanently installed and operated simultaneously, provided that any diversion of flow to other than the intended receiving receptacle cannot be readily accomplished or is readily apparent. Such means include physical barriers, visible valves or indications that make it clear which outlets are in operation, and explanatory signs if deemed necessary.

~~A manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the measuring system.~~

A manually controlled outlet that may be opened for purging or draining the measuring system or for recirculating product in suspension shall be permitted only when the system is measuring products which may separate or not remain in suspension. Effective means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.

Discussion/Conclusion: The Sector reviewed the proposed changes. A member suggested that product with particles in suspension may not be the only reason for needing to recirculate product. The Sector concurred and agreed to forward the following proposal to the NCWM S&T Committee and recommended that all NIST Handbook 44 liquid-measuring device codes be reviewed for adoption of similar language.

Modify NIST Handbook 44, Section 3.37, Paragraph S.4.1. as follows:

S.4.1. Diversion of Measured Product. - No means shall be provided by which any measured product can be diverted from the measuring instrument. However, two or more delivery outlets may be permanently installed and operated simultaneously, provided that any diversion of flow to other than the intended receiving receptacle cannot be readily accomplished or is readily apparent. Such means include physical barriers, visible valves or indications that make it clear which outlets are in operation, and explanatory signs if deemed necessary.

~~A manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the measuring system.~~

A manually controlled outlet that may be opened for purging or draining the measuring system or for recirculating product if recirculation is required in order to maintain the product in a deliverable state shall be permitted. Effective means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.

13. Add Test Criteria for Minimum Measured Quantity (MMQ) for Mass Flow Meters in Publication 14

Source: Maryland NTEP Laboratory

Background: At the May 2001 NTEP Laboratory Meeting, Will Wotthlie, (MD) expressed concern that, even though mass flow meters are required to have an MMQ marked on the device, there is no test procedure or performance criteria in either Handbook 44 or Publication 14 for evaluation of performance of a mass flow meter when delivering an amount equal to the MMQ. Will stated that during type evaluation if the MMQ is less than an amount equal to the marked minimum flow rate, it is very difficult, if not impossible, to deliver the actual MMQ without severely restricting the normal system flow. Mass flow meters are the only measuring devices required to be marked with an MMQ. The laboratories discussed the problem and determined that, as long as the performance of the meter submitted for evaluation is acceptable at the minimum flow rate, a test of an MMQ less than the amount delivered by the meter in 1minute at the marked minimum flow rate is of little value and probably not necessary. For example, if a meter is marked with an MMQ of 100 lbs and the marked flow rate is from 300 lbs per minute to 3000 lbs per minute, it may not be practical to test a delivery of only 100 lbs. The scale being used for the evaluation may not be suitable for weighing a test draft of only 100 lbs. Presently Section "L" on page 10-90 of Publication 14, Section 2, Chapter 10, Liquid-Measuring Devices states, "Any test draft shall be equal to at least the quantity that is delivered in 1minute at the maximum flow rate. The test drafts shall be equal in quantity regardless of the rate of flow." Handbook 44, Section 3.37. Mass Flow Meters, UR.1.2. allows the MMQ for an installation to be determined by the weights and measures authority and to be greater than the marked MMQ.

Recommendation: Modify Section "L" to include a test of the MMQ as follows:

> **L. Permanence Tests for Mass Flow Meters**
>
> The following tests are considered to be appropriate for mass flow meters:
>
> **Type evaluation.** The gravimetric test method shall be used for type evaluation.
>
> **Gravimetric Standard.** The combined error of the standard used for testing measuring instruments shall not exceed 20 percent of the maximum permissible error to be applied. Using known weight (primary standard), determine the error present in the weighing instrument over the weighing range that will be used in the test. The inherent error, if present, is to be factored out of the measurement. The scale will then be used as a transfer standard.
>
> **Test Drafts.** Any test draft (except a test draft for testing the MMQ) shall be equal to at least the quantity that is delivered in one minute at the maximum flow rate. The test drafts shall be equal in quantity regardless of the rate of flow. Establish proper flowmeter calibration conditions (steady state conditions) at each flow rate. Collect the test data for the selected flow rates. The indication shall be on the basis of apparent mass. A test draft for the test of the MMQ shall be a draft of at least one minute's flow at the marked minimum flow rate for the meter being evaluated.

Discussion/Conclusion: The Sector reviewed the proposed changes. Members were concerned that one minute's flow at the marked minimum flow rate could be greater than the MMQ and therefore not a valid test of the MMQ. The Sector agreed to recommend that the NCWN NTEP Committee modify Section "L" to include a test of the MMQ as follows:

> **L. Permanence Tests for Mass Flow Meters**
>
> The following tests are considered to be appropriate for mass flow meters:
>
> **Type evaluation.** The gravimetric test method shall be used for type evaluation.
>
> **Gravimetric Standard.** The combined error of the standard used for testing measuring instruments shall not exceed 20 percent of the maximum permissible error to be applied. Using known weight (primary standard), determine the error present in the weighing instrument over the weighing range that

will be used in the test. The inherent error, if present, is to be factored out of the measurement. The scale will then be used as a transfer standard.

Test Drafts. Any test draft (except a test draft for testing the MMQ) shall be equal to at least the quantity that is delivered in one minute at the maximum flow rate. The test drafts shall be equal in quantity regardless of the rate of flow. Establish proper flowmeter calibration conditions (steady state conditions) at each flow rate. Collect the test data for the selected flow rates. The indication shall be on the basis of apparent mass. A test draft for the test of the MMQ shall be made with a draft size equal to the MMQ at the marked minimum flow rate for the meter being evaluated.

The Sector also asked the NTEP Laboratories to review the requirement that all test drafts except a test draft for testing MMQ be equal to at the least the quantity that is delivered in one minute at the maximum flow rate and if appropriate make recommendations for changes for consideration by the Sector its next meeting.

14. Change Handbook 44 Definition of Dry Hose and Wet Hose to include Gaseous Products

Source: NIST/OWM

Background: Compressed Natural Gas Dispensers typically have a valve at the end of the discharge line. Handbook 44, Section 3.37. Mass Flow Meters, Paragraph S.4.4. Discharge Valves, only allows a discharge valve if the system is of the wet-hose type. The Handbook 44 definitions for wet hose and dry hose both refer to the hose containing "liquid". Compressed natural gas obviously does not fit well into that definition.

Recommendation: Modify the definitions for wet hose and dry hose as follow:

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

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

Discussion/Conclusion: The Sector reviewed the proposal. A member pointed out that the definition for wet-hose type should also be changed. The Sector agreed to forward the recommended change to the definition for dry hose and wet hose to the NCWM S&T Committee along with a recommended revision to the definition for wet-hose type as follows.

wet-hose type. A type of device designed to be operated with the discharge hose full of ~~liquid~~ product at all times. [See "wet hose."][3.30, 3.32]

15. Remove G.4. Vapor Elimination Test from Publication 14 Field Evaluation and Permanence Test For LPG and Cryogenic Meters (page 10-88 June 2000 edition)

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories expressed concern with the requirement for conducting a vapor elimination test on LPG and cryogenic meters. The laboratory felt that the test was unnecessary because of other equipment design factors, such as the installation of differential pressure valves. The laboratory also expressed concern that conducting a vapor elimination test on an LPG meter could cause damage to the pump by allowing the pump to run dry for a period of time. The other participating laboratories agreed and recommended a modification to Section G. on page 10-88 of Publication 14 be submitted for consideration by the Measuring Sector at its next meeting.

Recommendation: Modify Publication 14, Chapter 10 Liquid-Measuring Devices, page 10-88 Section G. as follows:

G. Field Evaluation and Permanence Test For LPG and Cryogenic Meters

As adopted at the 1985 NCWM, the following tests are considered to be appropriate for metering systems on LPG and cryogenic meters:

1. Three tests at the maximum discharge rate.
2. Three intermediate flow tests.
3. Three slow-flow tests.
4. ~~Three vapor or air eliminator tests.~~

Discussion/Conclusion: The Sector reviewed the proposal and voted with 9 members in favor, 2 opposed, and 4 abstentions to recommend to the NCWM NTEP Committee that Publication 14 be amended as proposed.

16. Remove S.3.2. (b) from Handbook 44 Section 3.30. Liquid-Measuring Devices

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories expressed concern with S.3.2. (b). Fuel loading racks and fructose load-outs have been found with more than one truck filling outlet serviced by the same meter. Both outlets could be activated at the same time. The systems could facilitate fraud. S.3.2. (b) was added to NIST Handbook 44 at the 67th National Conference on Weights and Measures in 1982. The final report of the S&T Committee from that conference has no discussion explaining the exception for outlets that are 3.8 cm (1.5 in) in diameter or larger. The Laboratories agreed that with the provisions and allowances of S.3.1. and S.3.2. (a) there does not appear to be a need for S.3.2. (b). The laboratories agreed to forward a proposal to the Measuring Sector for consideration at its next meeting.

Recommendation: Modify Handbook 44, Section 3.30., S.3.2. as follows:

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

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

~~(b) other devices, when all discharge outlets designed to operate simultaneously are 3.8 cm (1.5 in) in diameter or larger.~~

Discussion/Conclusion: The Sector reviewed the proposal and agreed to forward the recommendation to the NCWM S&T Committee

17. On-Screen Display of Model and Version Number for Software

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, the laboratories discussed marking requirements for software-based devices, such as an electronic cash register (ECR) or control console connected to a liquid measuring device. In some cases the indicator for the system is a generic computer display. If the required markings are placed on the display at the time of installation and then at some future time the display is replaced, the required markings may be lost. The laboratories agreed that a real time display of the model and software version information on the display screen is preferable. The laboratories also agreed that the information could either be displayed continuously or by pressing a single key or a series of keys if instructions for access are clearly provided when a series of keystrokes is required. The laboratories agreed to forward to the Measuring Sector for consideration at its next meeting a proposal to modify G-S.1. to allow real time display of the model and software version number for software-based systems.

Recommendation: Modify Handbook 44, Section 1.10. General Code, G-S.1. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive January 1, 2003] (Added 2000)
[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

(e) the serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device. For software-based devices the model and software version number may be shown on the display screen provided the required information is either displayed continuously or by pressing a single key or a series of keys. When a series of keystrokes is required clear, instructions for accessing the marking information must be provided.

Discussion: The Sector reviewed the proposal. Ted Kingsbury (Measurement Canada) stated that Canada has a similar requirement for specifications relating to metrological software used in software-based measurement systems. The requirements do not apply to software in devices that are built-for-purpose. Built-for-purpose is defined in the specification.

Conclusion: The Sector agreed to forward the following recommendation to the NCWM S&T Committee for addition to NIST Handbook 44. The Sector also agreed that the Technical Advisor should develop and ballot the Measuring Sector Members on a definition for "built-for-purpose device," based on the Canadian definition for the same, to be included in the recommendation to the S&T Committee. The result of the ballot was 12 affirmative votes, no negative votes, and 1 member abstained.

Recommendation: Modify Handbook 44, Section 1.10. General Code, G-S.1. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive January 1, 2003] (Added 2000)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

(e) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(f) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

Note: For software-based devices not built-for-purpose the required markings may be shown on the display screen provided the required information is either displayed continuously or by pressing a single key or a series of keys. When a series of keystrokes is required clear, instructions for accessing the marking information must be provided.

Add the following Definition to the Definitions section of NIST Handbook 44:

built-for-purpose device. Any main element which was manufactured with the primary intent that it be used as, or as part of, a weighing or measuring device or system.

18. Testing Required for an Electronic Indicator with a CC Interfaced With a Measuring Element with a CC not previously Evaluated Together

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories asked for input regarding what testing should be required if the manufacturer of an indicator wanted the CC to recognize the indicator for use with different types of measuring devices, such as PD meters, turbine meters, and mass flow meters. Dan Reiswig (CA NTEP Laboratory) agreed to provide a draft of changes to the Liquid-Measuring Devices Checklist and Procedures that included requirements for indicators intended to be used with more than one device type. Copies of the draft changes were provided to the Committee as an appendix to the Sector's Meeting Agenda; copies of the document are available upon request from NIST Office of Weights and Measures.

Discussion/Conclusion: Dan Reiswig was not able to attend the September 2001 Measuring Sector Meeting. The Sector agreed to carry this item forward to the agenda for its next meeting. The following groups and individuals agreed to provide input: the NTEP Measuring Laboratories, Measurement Canada, RichTucker (Tokheim representing GPMA), John Skuce (FMC – Smith Meter representing MMA), Mike Keilty (Micro Motion), and David Hoffman (Toptech).

19. Evaluation Required if a Manufacturer Changes an Audit Trail from Category 2 to Category 1 or 3

Source: NTEP Measuring Laboratories

Background: At the May 2001 NTEP Laboratory Meeting, one of the participating laboratories expressed concern with the impact of the change to Handbook 44, Section 3.30. Liquid-Measuring Devices, Category 2 of Table S.2.2. Beginning January 1, 2005, a device with remote configuration capability must meet the sealing requirements outlined in Category 3. If a manufacturer of a device with Category 2 sealing capability applies for and receives a CC prior to January 1, 2005, that manufacturer is required to change to a Category 3 sealing capability for any devices of the same type manufactured after January 1, 2005. This change would need to be noted on a CC addendum. The laboratories determined that as a minimum the change would require at least an initial evaluation of the device with Category 3 sealing capability in either the laboratory or in the field.

Recommendation: Add a new Section "S" to Publication 14, Section 2, Chapter 10, Liquid-Measuring Devices, Technical Policy as follows:

> **S. Changing the Device Category for Devices Sealed with an Audit Trail**
>
> If a manufacturer with a CC for a device that uses an audit trail to meet the sealing requirements wants to change the device category for the audit trail, the CC for the device must be addended and the device will be subject to at least a partial initial evaluation. Performance testing is not required. Based on the results of the initial evaluation, NTEP may determine that further evaluation is required.

Discussion/Conclusion: The Sector reviewed the proposal and agreed to recommend the proposed addition to Publication 14 to the NCWM NTEP Committee.

Additional Items Added at the Meeting

20. Tolerance for Product Depletion Test

Source/Background: During the discussion of agenda item 5 a member suggested that it would be appropriate to have separate tolerances for a product depletion test. The Sector agreed to discuss that as a separate agenda item if time permitted.

Discussion: During further discussion of the need for specific tolerances for a product depletion test, a member pointed out that the present criteria is affected by the test draft size. It is possible for a meter to fail at particular draft size; and by sufficiently increasing the draft size for a subsequent test, the same meter could pass without any repairs or adjustments being made. Ross Anderson (NY) indicated that NEWMA at one point had developed a proposal to the tolerance for a product depletion test on the rated maximum flow rate for the meter. That proposal was not available for review.

Conclusion: The Sector agreed to include the discussion of a product depletion test tolerance on the agenda for the next Sector meeting. Ross Anderson will prepare a proposal for Sector consideration at that meeting.

21. Next Meeting

Conclusion: The Sector generally agreed that the next meeting should be held immediately prior to and at the same location as the next SWMA Annual Meeting.

22. Modify NCWM Publication 14, Paragraph 7.17 on page 10-37

Source/Background: A member questioned the correctness of the wording of paragraph 7.17 which presently states that at the conclusion of a transaction a dispenser must continue to display the unit price for the transaction until payment is

settled or the start of the next transaction by movement of the operating mechanism to the "on" position, or "Authorized/Approved" by the console operator, whichever occurs first.

Discussion/ Conclusion: The member stated that in many stations the next transaction may begin before payment for the previous transaction is settled. He suggested that the words "payment is settled or" be removed from the paragraph. The Sector agreed to recommend to the NCWM NTEP Committee that paragraph 7.17. on page 10-35 of NCWM Publication 14 be modified as follows:

> 7.17. The selected unit price displayed at the dispenser prior to the delivery of product must be continuously displayed at the conclusion of the delivery (operating mechanism moved to the "off" position) until ~~payment is settled or~~ the start of the next transaction by movement of the operating mechanism to the "on" position, or "Authorized/Approved" by the console operator, whichever occurs first.

Attendance List
NTETC Measuring Sector
September 28-29, 2001, Lexington, Kentucky

Name	Company/Agency	Address	Telephone #	E-Mail Address
Ross Andersen	State of New York Wts & Meas	1 Winners Circle - Albany NY 12235	518-457-3146	ross.andersen@agmkt.state.ny.us
Dennis Beattie	Measurement Canada	400 St Mary Ave - WPEG MB R3C 4K5 Canada	204-983-8910	beattie.dennis@ic.gc.ca
Mike Belue	Belue Associates	1319 Knight Dr - Murfreesboro TN 37128	615-867-1010	bassoc@aol.com
Randy Byrtus	Measurement Canada	Stds Bldg Tunney's Pasture - Ottawa Ontario K1A OC9	613-952-0631	byrtus.randy@ic.gc.ca
Steven Cook	NIST/OWM	Stop 2350 100 Bureau Dr - Gaithersburg MD 20878	301-975-4003	steven.cook@nist.gov
Rodney Cooper	Schlumberger Neptune	1310 Emerald Rd - Greenwood SC 29646	864-942-2226	rcooper@greenwood.rms.slb.com
Maurice Forkert	Tuthill Transfer Systems	8825 Aviation Dr - Ft Wayne IN 46809	219-747-7529	mforkert@Tuthill.com
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Steve Hadder	St of Florida Bureau of Petro Insp	3125 Connor Blvd - Tallahassee FL 32311	850-487-2634	hadders@doacs.state.fl.us
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Jeffery Kelly	Hoffer Flow Controls	107 Kitty Hawk Lane - Elizabeth City NC 27909	252-331-1997	jkelly@hofferflow.com
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John Skuce	FMC - Smith Meter	1602 Wagner Ave Box 10428 - Erie PA 16514	814-898-5405	john.skuce@fmcti.com
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Robert Traettino	Liquid Controls	105 Albrecht Dr - Lake Bluff IL 60044	847-283-8300	Btraettino@lcmeter.com
Rich Tucker	Tokheim	P.O. Box 360 - Ft Wayne IN 46801	219-470-4010	Richard.Tucker@Tokheim.com
James Walker	Endress & Hauser	2350 Endress Place - Greenwood IN 46143	317-535-1431	james.walker@us.endress.com
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Action Items Measuring Sector September 28-29, 2000 Meeting, Lexington, KY			
Agenda Item	Task	Responsible Party	Due Date
1 – Recommendations to Update NCWM Publication 14	Update NCWM Publication 14 as Sector agreed	Sector Technical Advisor NTEP Technical Advisor	12/7/01 1/1/02
2 – Changes Pages for NCWM Publication 14 Liquid Measuring Devices Technical Policy	No Sector Action Required.	None	N/A
3 – Update to NCWM Publication 14 Administrative Policy	No Sector Action Required	None	N/A
4 – Meter Sizes and Products to be Evaluated for Vehicle and Stationary Applications of the Same Meter	Add a new paragraph in Section R. Vehicle-Mounted and Stationary Applications of a Meter Forward proposal developed during Sector Meeting to the NTEP Committee	Sector Technical Advisor NTEP Administrator	12/7/01 1/1/02
5 – Testing of Single Compartment vs. Split Compartment Tests for Vehicle-Tank and Wholesale Meters	Modify Section C. Field and Permanence Test For Vehicle-Tank and Wholesale Meters Forward proposal developed during Sector Meeting to the NTEP Committee	Sector Technical Advisor NTEP Administrator	12/7/01 1/1/02
6 – Review of Section "O" of LMD Technical Policy	No action required		
7 – Return Mass Units of Measure to NIST Handbook 44 Section 3.34 Cryogenic Liquid-Measuring Devices	Forward proposal developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/01
8 – Update Product Family Tables for PD Meters	Modify Family Product Tables for PD Meters in Publication 14 Forward proposal developed during Sector Meeting to the NTEP Committee	Sector Technical Advisor NTEP Administrator	12/7/02 1/1/02
9 – New Product Family Tables for Turbine Meters	Drop from Agenda for Next Year	Sector Technical Advisor	8/1/02

10 – Repeatability Tolerances for Hydrocarbon Gas- Vapor Measuring Devices, Milk Meters, Water Meters, and Carbon Dioxide Liquid-Measuring Devices	Technical Advisor to contact an industry representatives for Milk Meters and Carbon Dioxide Liquid-Measuring Devices	Sector Technical Advisor	1/1/02
	Forward proposal for Hydrocarbon Gas Vapor-Measuring Devices and Water Meters developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/01
11 – Test Criteria for a Mass Flow Meter Without Existing Certificate Displaying Only Units of Volume	Modify Publication 14, Section Q and L	Sector Technical Advisor	12/7/01
	Forward proposal developed during Sector Meeting to the NTEP Committee	NTEP Administrator	1/1/02
12 – Add Recirculation of Product to Handbook 44, Section 3.37. Mass Flow Meters	Forward proposal developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/01
13 – Add Test Criteria for Minimum Measured Quantity (MMQ) for Mass Flow Meters in Publication	Modify Section "L" to include a test for MMQ	Sector Technical Advisor	12/7/01
	Forward proposal developed during Sector Meeting to the NTEP Committee	NTEP Administrator	1/1/02
13a – Requirement for all drafts to be equal to one minutes flow at maximum flow rate	Develop new language for next years agenda to recognize different draft sizes when more than one suitable scale is available	NTEP Laboratories	8/1/02
14 – Change Handbook 44 Definition of Dry Hose and Wet Hose to Include Gaseous Products	Forward proposal developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/01
15 – Remove G.4. Vapor Elimination Test from Section "G" for LPG and Cryogenic Meters	Modify Publication 14, Section "G" to eliminate Vapor Elimination Test for LPG and Cryogenic Meters	Sector Technical Advisor	12/7/01
	Forward proposal developed during Sector Meeting to the NTEP Committee	NTEP Administrator	1/1/02
16 – Remove S.3.2. (b) from Handbook 44 Section 3.30.	Forward proposal developed during Sector Meeting to the S&T Committee	Sector Technical Advisor	11/1/01
17 – On Screen Display of Model and Version Number for Software	Ballot Members on definition for Not-Built-For Purpose	Sector Technical Advisor	10/19/01
	Forward proposal developed during Sector Meeting and proposed definition to the S&T Committee	Sector Technical Advisor	11/1/01

18 – Testing Required for an Electronic Indicator with a CC Interfaces With a Measuring Element with a CC not Previously Evaluated Together	Carry forward to next years agenda	Rich Tucker, John Skuce, David Hoffman to provide input to Measuring Laboratories Measuring Laboratories to develop proposal for next Sector Meeting	4/1/02 8/1/02
19 – Evaluation Required if a Manufacturer Changes an Audit Trail from Category 2 to Category 1 or 3	Add a new Section "S" to Publication 14, Section 2, Chapter 10, Liquid-Measuring Devices Forward proposal developed during Sector Meeting to the NTEP Committee	Sector Technical Advisor NTEP Administrator	12/7/01 1/1/02
20 – Tolerances for Product Depletion Test	Develop proposal for consideration at next Sector Meeting	Ross Andersen (NY)	8/1/02
21 – Next Meeting	Arrange to be immediately Prior to SWMA	NTEP Administrator	1/1/02
22 – Modify Publication 14, Paragraph 7.17 on Page 10-37	Modify Paragraph 7.17 Forward proposal developed during Sector Meeting to the NTEP Committee	Sector Technical Advisor NTEP Administrator	12/7/01 1/1/02

Appendix F
Type Evaluation Technical Committee
Weighing Sector Annual Meeting Final Summary
October 14-16, 2001, Albany, NY
Agenda Items

Note: The following attachments were distributed to Sector Members for review and discussion of related items during the Sector Meeting. Copies of these attachments are available upon request from the NIST Office of Weights and Measures.

Reference Item	Attachment Description
Agenda Item 1	Table of 2001 Amendments and Editorial changes to Publication No. 14
Agenda Item 2	Draft Publication 14 Procedures for Double Wide and Side-by-Side Vehicle Scales

Agenda Item 5 Darrell Flocken (Mettler-Toledo) Recommendation to Modify Shift Test Procedure
Agenda Item 8 Draft Outline for Weighing Devices by Type
Agenda Item 9 Nigel Mills (Hobart Corp) Effect of Load Cell Cable Resistance on Span Variation
Agenda Item 15 Draft Publication 14 Procedures - Self Service ECR/POS Systems Interfaced with Scales
Agenda Item 18 Examples of Zero and Tare Indications on Multiple Deck Systems

Carry-Over Items

1. 2001 Edition Publication 14 Change Pages

Background: A table listing the changes that were recommended for the 2001 Edition of NCWM Publication 14 has been developed. The change pages for the 2000 Edition will be distributed at the Sector meeting. No Sector action is required. See Attachment for Item 1.

Discussion: The change pages were distributed to the sector members in attendance. Stephen Patoray, NTEP Director, indicated that the 2002 Edition of Publication 14 would be published in the first quarter of 2002.

Conclusion: The Sector made no recommendations on this item.

2. Double-Wide and Narrow Decks

Background: At its October 1998 meeting, the Weighing Sector agreed that the NTEP Laboratories should use the test procedure presented at that meeting on an *ad hoc* basis. The Sector asked the laboratories to make recommendations for changes to the procedure. In early 1999, the Ohio laboratory conducted an evaluation using the *ad hoc* procedure and made recommendations for modifications to the procedure. Dave Quinn (Fairbanks Scale) also provided input on this topic. At its October 1999 meeting, the Sector discussed the proposed changes and asked the Scale Manufacturers Association (SMA) Technical Committee to review the present Handbook 44 definition of CLC and, if necessary, submit a proposal that addresses the loading patterns on double-wide scales. The Technical Committee was also asked to propose appropriate NTEP test procedures for the loading patterns on double-wide scales. The Sector also agreed that NTEP should continue to use *ad hoc* procedures for any applications received for an NTEP evaluation of a double-wide scale. At their spring 2000 meeting, the NTEP Laboratories formed a work group to develop test procedures for scale platform widths greater than 12 feet. The Sector was asked to review input from both groups and decide how to proceed.

At its September 2000 meeting, the Sector reviewed a definition for concentrated load capacity (CLC) (developed by SMA), which was forwarded to the NCWM S&T Committee for consideration as an addition to Handbook 44. At the July 2001 NCWM Annual Meeting, the S&T Committee recommended that the status of NCWM S&T Agenda Item 320-4 remain "Informational" pending further development of modifications to related test notes and marking requirements.

The Sector asked the NTEP Laboratories to develop an *ad hoc* loading pattern for vehicle scales wider than twelve feet. The laboratories were also asked to discuss safety concerns when testing to 90 percent of the rated CLC with the required test load placed in a 4 ft x 10 ft area on the scale platform. The SMA Technical Committee was asked to develop test methods/criteria for larger CLC ratings, perhaps similar to the American Association of Railroads (AAR) methods of engineering analysis of the scale design scale submitted for NTEP testing.

The Sector also asked that the *ad hoc* procedure for testing vehicle scales wider than twelve feet be distributed to Sector members within six months for review. Sector members will be asked to review the proposed procedure in preparation for discussion at the next Sector meeting. The Sector also agreed that when two vehicle scales, which have an NTEP Certificate of Conformance (CC) for installation as a single platform are placed side-by-side, the CLC rating of the resulting scale should not be double that of one platform. The CLC for the system will be the CLC listed on the original CC for the individual scale platforms used. The maximum capacity for the system will be determined by the capacity of the load cells and the number of sections in the installation.

Based upon testing by Bill West (OH) and Larry Turberville (AL), the *ad hoc* procedures were further refined. They were distributed to the participating laboratories for review and comment at their June 2001 meeting.

Discussion: The Sector reviewed the test procedures described in the attached document for Extra–Wide and Double-Wide Vehicle Scales (Attachment for Item 2). Some of the vehicle scale manufacturers were concerned that the proposed procedures were not consistent with the SMA recommendations that were submitted in August 2000. SMA recommended that vehicle scales designed to weigh off-road vehicles be tested in the field as used to the satisfaction of the local jurisdiction.

There was also a comment regarding the examples of shift test positions in the test procedures for extra-wide scales. More specifically, Example 2 (representing a single axle of a vehicle as wide as the scale) is not representative of off-road or extra heavy highway vehicles that require overload permits. One of the labs questioned if all the test positions in the diagram need to be conducted and noted concern that there may be other possible vehicle positions not listed in the diagrams. The NIST Technical Advisor noted that the examples in the diagrams for the extra-wide scales were intended to represent the most severe application of test loads.

Manufacturers felt that these test positions are better suited for initial and subsequent inspections by to local weights and measures jurisdictions. The field officials should examine those scales as if they were "one-of-a-kind" devices. It was noted by officials that these devices are not "one-of-a-kind devices" according to NIST Handbook 130 and NCWM Publication 14 definitions. Additionally, it is easier to obtain sufficient weights for the higher test loads during type evaluation (if only to verify that the device is capable of performing to the stated capacities). Local jurisdictions can require sufficient test weights be brought to the scale, but may not have time to conduct the proper tests. One manufacturer suggested a more appropriate designation for these devices might be "special use."

There was also concern about NTEP's ability to safely conduct tests on devices with large test loads in the prescribed test pattern. Other Sector members responded that substitution or strain tests performed with empty and loaded vehicles might be a safer option.

Ross Anderson (New York) and Stephen Patoray (NTEP Director) stated that NTEP evaluates very few extra-wide or extra-heavy vehicle scales. However, there is justification for evaluating side-by-side vehicle scales since it is likely that the vehicle load is applied down the centerline of each scale.

There were also discussions about limiting the capacity of devices NTEP would evaluate. Many Sector members felt that some applicants would inflate the capacity of the scale in order to circumvent NTEP evaluation. It was also suggested that NTEP limit the scope for evaluations in an effort to evaluate scales used to weigh only legal highway loads. Since NIST Handbook 44 does not limit the CLC rating, the only thing NTEP could limit is the test load used during NTEP evaluations to verify the stated CLC.

The NIST Technical Advisor noted (during the drafting of the sector summary) that in 1986, the SMA reported that vehicle scales were being submitted for NTEP evaluation with large nominal capacities that exceeded the traditional practice of establishing the nominal capacity as a function of the section capacity. Manufacturers however, would only guarantee the scale for weighing "Legal for Highway Loads." At that time, NTEP vehicle scale evaluations required a minimum of 40 000 lb (or the rated sectional capacity, whichever was less) to test sections on vehicle scales. The NCWM adopted a proposal to make the nominal capacity a function of the "concentrated load capacity." To avoid the concern that manufacturers would overstate the CLC, the CC would only list CLC ratings that were verified to at least 90 percent of the rated CLC during type evaluation. Should the amount of weight used to verify the CLC rating be limited to a maximum amount, some manufacturers may again overstate the CLC just as section capacities were overstated in the past.

There was no discussion on the amended procedures for "standard" vehicle scales and the draft procedures for "double-wide" vehicle scales described in the attachment for agenda item 2.

Conclusion: The Scale Manufacturers Association will submit their 1999 recommendation to the NTEP Committee. The Sector requests guidance from the NTEP Committee as to the direction to take for the evaluation of vehicle scales with nominal capacities exceeding 200 000 lb. The NIST Technical advisor, Stephen Patoray, Ed Luthy, Jim Truex, and Darrell Flocken will draft language regarding the scope and NTEP evaluation procedures for vehicle scales

(including extra-wide vehicle scales) with large capacities based upon the NTEP Committee's response. A ballot with the proposed language will be sent to the Sector members in March 2002. If the Sector supports the draft procedures, the language will be submitted to the NTEP Committee at their next meeting.

Additionally, the Sector recommends the amended test procedures 65. (A). Performance and Permanence Tests for "Single Load Receiving Element" Legal Highway Vehicle Scale and Permanently-Installed Axle-Load Scale Weighing Elements and the new test procedures 65. (C). Performance and Permanence Tests for "Side-by-Side" Modular and Non-Modular Vehicle Scales (full electronic or electromechanical) in the attachment for agenda item 2 are included the 2002 Edition of Publication 14.

3. Update on Minimum Test Load for Combination Vehicle/Railway Track Scales

Background: At its October 1998 meeting, the Weighing Sector asked the Scale Manufacturers Association (SMA) to review the minimum amount of known test standards required in Publication 14 for the NTEP evaluation of railway track scales. The Sector noted that manufacturers are requesting NTEP evaluations on railway track scales with very large capacities (e.g., 700 000 lb); however, NTEP test criteria do not specify minimum test loads relative to scale capacities.

At its October 1999 meeting, the Sector agreed to adopt the SMA recommendation for a 90 000 lb minimum test weight load for evaluating CLCs on combination vehicle/railway track scales. The Sector asked Lou Cerny, (American Association of Railroads (AAR)), with the assistance of AAR members, railway track scale manufacturers, and USDA Grain Inspection Packers and Stockyards Administration (GIPSA), to develop a recommendation for minimum strain load testing requirements.

At the 2000 Weighing Sector meeting, Lou Cerny reviewed the discussion he had with Dick Phorr (GIPSA) on this issue. GIPSA was attempting to get another test car, which could be dedicated to NTEP evaluations. Bill Bates (GIPSA) reported that the purchase of another test car is dependent on the availability of additional funding.

One of the problems with current NTEP criteria for railway track scales is that procedures do not specify a minimum weight for the strain load test. An additional concern during NTEP evaluations is the inability to apply an appropriate amount of strain load weight to a two-section railway track scale because of the limited length of the scale platform.

At the 2000 Weighing Sector meeting, the Sector agreed to modify the technical policy in Publication 14 to establish a minimum strain load criteria of 200 000 lb for single-platform scales with a length of 35 feet or greater and for multiple-platform scale systems designed to weigh railroad cars in a single draft. The Sector discussed the issue of placing a limit on the capacity for railway track scales; however, the Sector did not reach a conclusion on this issue. The Sector encouraged GIPSA to obtain a larger test car with sufficient test weight to test to a higher capacity on railway track scales.

At the 2001 NCWM Annual Meeting, the NCWM adopted capacity requirements for railway scales based upon section capacities. The nominal capacity of a scale with two sections would be limited to the rated section capacity. The nominal capacity of a scale with more than two sections would be limited to no greater than two times the rated section capacity.

Additionally, the following underlined text was added to Publication 14 and is included in the change pages that were distributed during the Sector meeting.

Test Considerations for all Railroad Track Scales

1. The minimum amount of test weights needed for the initial test is 100 000 lb in test weights.
2. The minimum load for the strain load test in the initial test is at least 200 000 lb for single-platform scales 35 feet or greater and for multiple-platform systems.
3. The maximum number of scale divisions for a scale cannot exceed the lesser of the number of divisions for which the load cells and indicator were evaluated separately (i.e., if the load cells have an NTEP Certificate for a maximum of 10 000 divisions and the indicator has an NTEP Certificate for 8000 divisions, then the scale is limited to a maximum of 8000 divisions).

Note: Combination Modular Vehicle/Railroad track scale shall have separate capacity ratings for railroad weighing and vehicle weighing. Additionally, there will be a CLC rating for the vehicle and a section capacity rating for railroad portions of the scale system.

Discussion: Bill Bates reported that GIPSA was not able to purchase the new test car in 2001. GIPSA will continue with plans to purchase another test car. Mr. Bates will update the Sector on GIPSA's efforts at the next meeting

Conclusion: No action is recommended by the Sector.

4. **CLC on Livestock Scales**

Background: For additional background information, refer to the September 2000 Weighing Sector Summary.

At its 2000 meeting, the Sector agreed that the NIST Technical Advisor should develop wording to address this similar to wording that existed when the term "section capacity" applied to livestock scales. The proposed changes to Handbook 44 were distributed to the Sector members along with a ballot on October 17, 2000. The ballot results indicated Sector support of changes to Handbook 44 for submission to the S&T Committee.

In November 2000, a proposal was submitted to the NCWM S&T Committee. The S&T Committee agreed with the proposal to modify paragraph N.1.3.4. and further modified the loading pattern in paragraph N.1.3.4. to be consistent with current rounding practices for equivalent SI and inch-pound values in Handbook 44. During the NCWM 2001 Interim Meeting, the Committee considered an SMA recommendation to remove the term "livestock" from paragraph N.1.3.4. because CLC ratings are not suitable for livestock scales. The SMA indicated livestock scales should have a separate requirement that addresses the appropriate test pattern. The Committee also heard that paragraph N.1.3.8. "All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers and Portable Axle-Load Weighers" was not intended to apply to devices with more than two sections. The S&T Committee recognized that any prescribed test pattern should address the placement of adequate test weights in the corners of livestock scales as recommended by GIPSA. Therefore, the Committee recommended developing adequate shift test procedures with GIPSA's input for livestock scales with more than two sections in paragraph N.1.3. Shift Test. Following the 2001 Interim Meeting, the S&T Technical Advisors developed proposed shift test patterns for livestock scales that agree with recommended GIPSA test procedures.

The S&T Committee made additional changes to the proposal, based on OWM recommended language, to ensure the language is consistent with all other Handbook 44 references to livestock scales. The S&T Committee modified the definition of CLC to delete any reference to livestock scales because livestock applications would now be addressed under the proposed section capacity marking requirements. The Committee further modified Table S.6.3.b. Note 14. to clarify section capacity markings required for livestock scales. The modified wording in Note 14 also clarifies the status of scales manufactured between 1989 and the nonretroactive January 1, 2002 effective date.

At the July 2001 NCWM Annual Meeting in July 2001, the S&T Committee heard from the Sector Technical Advisor and private and public Sector members that the proposal modified to separate the livestock scale requirements from other applications needed further development. Therefore, the Committee gave the item informational status and referred the following proposal back to the Weighing Sector for additional development.

Item 320-4 N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales with More Than Two Sections; Table S.6.3.a. Marking Requirements, Table S.6.3.b. Notes, and Appendix D; Definition for Concentrated Load Capacity

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

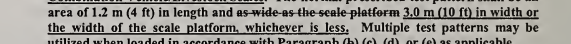
Recommendation: Modify paragraph N.1.3.4. as follows:

N.1.3.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales

N.1.3.4.1. Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales –

(a) At least one shift test shall be conducted with a minimum test load of 12.5% of scale capacity and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below. (Combination Vehicle/Livestock scales shall also be tested consistent with N.1.3.4.2.) (Two-section livestock scales shall be tested consistent with N.1.3.8.)

(b) Prescribed Test Pattern and Loading for Vehicle and Axle-Load Scales and Combination Vehicle/Livestock Scales. The normal prescribed test pattern shall be an area of 1.2 m (4 ft) in length and ~~as wide as the scale platform~~ 3.0 m (10 ft) in width or the width of the scale platform, whichever is less. Multiple test patterns may be utilized when loaded in accordance with Paragraph (b) (c), (d), or (e) as applicable.



(bc) ~~Maximum~~ Loading Precautions *for Vehicle and Axle Load Scale and Combination Vehicle/Livestock Scales*. When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the concentrated load capacity or test load before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) *x 3.0 m (10 ft) or* the width of the scale *whichever is less*; for test patterns less than 1.2 m (4 ft) in length the maximum loading shall meet the formula: [(wheel base of test cart or length of test load divided by 48 in) x 0.9 x CLC]. The maximum test load applied to each test pattern shall not exceed the concentrated load capacity of the scale. When the test pattern exceeds 1.2 m (4 ft), the maximum test load applied shall not exceed the concentrated load capacity times the largest "r" factor in Table UR.3.2.1. for the length of the area covered by the test load. For weighing elements installed prior to January 1, 1989, the rated section capacity may be substituted for concentrated load capacity to determine maximum loading. An example of a possible test pattern is shown ~~below~~ above:

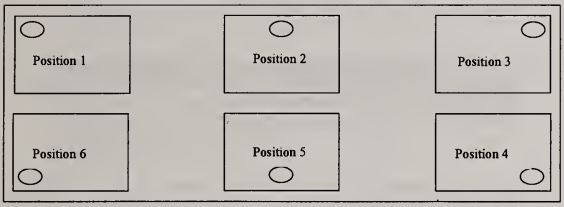
(ed) Multiple Pattern Loading. To test the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use.

(de) Other Designs. Special design scales and those that are wider than 3.7 m (12 ft) shall be tested in a manner consistent with the method of use but following the principles described above.

(Amended 1988)

N.1.3.4.2. Livestock Scales and Combination Vehicle/Livestock Scales with More Than Two Sections

(a) Prescribed Test Pattern and Test Loads For Livestock Scales With More Than Two Sections: Test load is one-quarter nominal capacity not to exceed one-half of rated section capacity, centered as nearly as possible, successively over each main load support as shown in the diagram below.



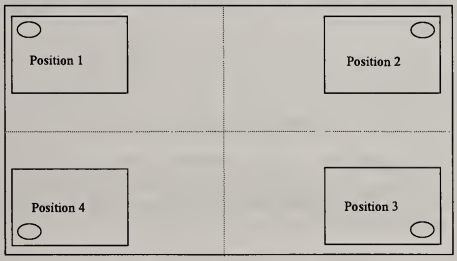
◯ = Load Bearing Point

(b) *Loading Precautions for Livestock Scales. When loading the scale for testing, one side of the test pattern shall be loaded to no more than half of the test load as specified in the prescribed test patterns above before loading the other side. The area covered by the test load may be less than 1.2 m (4 ft) x 3.0 m (10 ft) or the width of the scale whichever is less. If the width of the test pattern is less than one half the width of the scale the maximum test load applied to each test pattern shall not exceed one-half the section capacity of the scale. For livestock scales manufactured between January 1, 1989 and January 1 2002, the required loading shall be no greater than one-half CLC.*

Modify paragraph N.1.3.8. as follows:

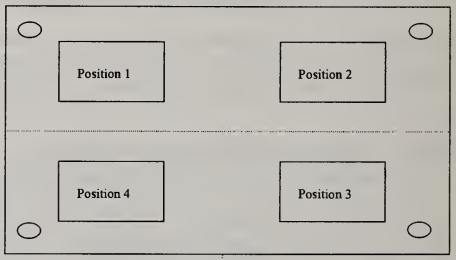
N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. – A shift test shall be conducted using the following prescribed test loads and test patterns. ~~with a half-capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element, or with a quarter-capacity test load centered, as nearly as possible, successively over each main load support.~~ For livestock scales the shift test load shall not exceed one-half the rated section capacity.

(a) **A shift test load shall be conducted using a one-quarter nominal capacity test load centered as nearly as possible, successively over each main load support as shown in the diagram below, or**



◯ = Load Bearing Point

(b) A shift test load shall be conducted using a one-quarter nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the diagram below.



◯ = Load Bearing Point

Modify Table S.6.3.a. as follows:

Table S.6.3.a.
Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in same housing	Indicating element not permanently attached to weighing and load-receiving element	Weighing and load-receiving element not permanently attached to indicating element	Load cell with CC (11)	Other equipment or device (10)
. . .					. . .
Concentrated Load Capacity CLC (12) (20) (22)		x	x (9)		
. . .					. . .
Section Capacity (14) (20) (22)		x	x		

For applicable notes see Table S.6.3.b.

Modify the following paragraphs 9, 12, and 14 in Table S.6.3.b. as follows:

9. For vehicle, and axle-load, ~~and livestock~~ scales only. The CLC shall be added to the load-receiving element of any such scale not previously marked at the time of modification. [Nonretroactive as of January 1, 1989.]

12. Required on the indicating element *and the load-receiving element* of vehicle, and axle load, ~~and livestock~~ scales. *Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC."* [*Nonretroactive as of January 1, 1989.]*

14. Required on ~~the indicating element of~~ *livestock scales* and* railway track scales ~~only~~. When marked on vehicle and axle-load ~~and livestock~~ scales manufactured before January 1, 1989, it may be used as the CLC. For livestock scales manufactured between January 1, 1989 and January 1, 2002, required markings may be either CLC or section capacity. *[*Nonretroactive as of January 1, 2002].*

Add the following new paragraph 22 to Table S.6.3.b.

22. Combination vehicle/livestock scales must be marked with both the CLC for vehicle weighing and the section capacity for livestock weighing. All other requirements relative to these markings will apply. [Nonretroactive January 1, 2002.]

Modify the Appendix D definition of Concentrated Load Capacity as follows:

concentrated load capacity (CLC). A capacity rating of a vehicle, or axle load ~~or live stock~~ scale, specified by the manufacturer, defining the maximum load ~~concentration~~ applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet apart (or a test pattern of 4 by 10 feet or the width of the scale whichever is less) and for which the weighbridge is designed. ~~In the case of vehicle and axle-load scales, it is the maximum axle-load concentration (for a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet) for which the weighbridge is designed as specified by the manufacturer.~~ The concentrated load capacity rating is for both test and use [2.20]

Discussion: The Sector reviewed the above proposal as amended by NIST-OWM, and provided additional comments, and recommended additional language.

The Sector noted that the shift test load proposed in subparagraph N.1.3.8.(b) (Shift Test for All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers) is incorrect and the test load should be one-half nominal capacity instead of one-quarter nominal capacity. Additionally, existing Handbook 44 paragraph *S.6.1. Nominal Capacity; Vehicle, Axle-Load, and Livestock Scales* makes reference to livestock scales being marked with the CLC. If the NCWM adopts the proposal shown above, paragraph S.6.1. should also have all references to livestock scales removed and added to existing Handbook 44 paragraph S.6.4. Railway Track Scales (section capacity marking requirements) as shown below.

Several Sector members noted that it is inappropriate to incorporate the shift test "prescribed test pattern" into the definition of CLC. There is confusion among some vehicle scale manufacturers and others that the CLC is a test pattern. The CLC is actually a capacity rating designated by the manufacturer used in the design of a vehicle scale as a scale's ability to support groups of axles in actual use. Incorporating test patterns in the definition promotes confusion about the intent of the definition and may encourage some manufacturers to establish high CLC ratings based upon testing criteria instead of design. The "prescribed test pattern" in Handbook 44 was established to provide guidance for the maximum weight loads and minimum area that test loads may be applied while conducting a shift test (See Report to the 73rd NCWM, 1988 page 244).

There was also a recommendation from one of the Sector members that the nominal capacity of a livestock scale should be related to the section capacity and the number of sections. The proposed wording includes livestock scales manufactured between 1989 and 2003 may have either a CLC or section capacity markings in paragraph "S.6.4. Railroad Track Scales."

Conclusion: There was general support for the proposal with the recommendations shown below. The Sector requests that Cary Ainsworth (GIPSA) seek the GIPSA position on this item. The NIST Technical advisor will distribute the position paper to the sector members and the S&T Committee.

The Sector also recommends the following changes to the proposal currently before the 2002 S&T Committee NCWM S&T agenda (Item 320-4).

S.6.1. Nominal Capacity; Vehicle, and Axle-Load, ~~and Livestock~~ Scales. *– For all vehicle and axle-load, ~~and livestock~~ scales, the marked nominal capacity shall not exceed the concentrated load capacity (CLC) times the quantity of the number of section sin the scale minus 0.5. As a formula, this is stated as:*

$$\text{nominal capacity} \leq CLC \times (N - 0.5)$$

where N = the number of sections in the scale.
(See N.1.3.4. and T.N.3.1.)
[Nonretroactive as of January 1, 1989.]

[Note: When the device is used in a combination railway track and vehicle weighing and livestock and vehicle weighing applications, the above formula shall apply only to the vehicle scale application.]
(Added 1988) (Amended 1999) (Amended 2002)

S.6.4. Livestock and Railway Track Scales. – ~~A~~ Livestock and railway track scales shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale. ***The nominal capacity of a scale with more than two sections shall not exceed twice its rated sectional capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity.*** **For livestock scales manufactured between January 1, 1989 and January 1, 2003, required markings may be either CLC or section capacity*.**
[Nonretroactive January 1, 2002.]
[* Nonretroactive January 1, 2003.]

N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. – A shift test shall be conducted using the following prescribed test loads and test patterns. ~~with a half-capacity test load centered, as nearly as possible, successively at the center of each quarter of the load-receiving element, or with a quarter-capacity test load centered, as nearly as possible, successively over each main load support.~~ For livestock scales the shift test load shall not exceed one-half the rated section capacity.

(a) A shift test load shall be conducted using a one-quarter nominal capacity test load centered as nearly as possible, successively over each main load support as shown in the diagram below, or

(b) A shift test load shall be conducted using a one-half~~quarter~~ nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the diagram below.

Modify the Appendix D definition of Concentrated Load Capacity as follows (consistent with 2001 S&T Agenda Item 320-4 as presented in Publication 16):

concentrated load capacity (CLC). A capacity rating of a vehicle, or axle load ~~or live stock~~ scale, specified by the manufacturer, defining the maximum load ~~concentration~~ applied by a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet apart for which the weighbridge is designed. ~~In the case of vehicle and axle-load scales, it is the maximum axle-load concentration (for a group of two axles with a centerline spaced 4 feet~~

~~apart and an axle width of 8 feet) for which the weighbridge is designed as specified by the manufacturer.~~ The concentrated load capacity rating is for both test and use **[2.20]**

4(a) **NCWM Publication 14, Technical Policy E, Modification of Type, - Conversion of a Vehicle Scale to a Livestock Scale**

Background: NCWM Publication 14, Technical Policy E, Modification of Type, - Conversion of a Vehicle Scale to a Livestock Scale requires the device manufacturer to request on the NTEP application that a Certificate of Conformance (CC) cover both a vehicle and livestock scale application. The evaluation must include an NTEP test of the livestock scale if this is a new application. To include the livestock application on an existing CC, NTEP requires at least a "one time" test to 90% of the CLC rating. The livestock scale application must be listed on the CC. The Sector acknowledges that the S&T Committee is reviewing an item that removes the CLC marking requirements and adds section capacity markings for livestock scales. If this proposal is adopted, a vehicle scale used for weighing livestock would also be required to have a section capacity marking. A livestock scale used to weigh vehicles would also have to have a CLC marking.

Stephen Patoray, NTEP Director, noted problems with this policy in the following areas:

1. There is no difference in testing between vehicle scales and livestock scales with more than 2-sections other than the performance test of AZSM, motion detection, and other operations and features of the indicating element.
2. The policy does not address the modification of a livestock scale to a vehicle scale.
3. Section 64.3.1. states that only test loads, which have been applied using a method representative of the scales, intended use can be counted for permanence testing. This statement applies to both vehicle scale and livestock scale permanence tests.
4. There is no permanence testing required for applications to add the livestock scale option to an existing vehicle scale CC.

Mr. Patoray asked if there was a special performance or design justification to explain why NTEP requirements when converting a vehicle scale to a livestock scale. He also questioned why the 90% CLC test requirement is repeated if it was already performed during the original evaluation. Mr. Patoray noted that evaluation of indicating element accounted for the main differences in the evaluation of livestock scales and vehicle scales.

Discussion: This subject was discussed at the November 1996 NTETC Weighing Sector meeting (Agenda Item 4). The Sector concluded that there were differences between the two types of applications, especially with the digital indicator portion of the checklist. Therefore, if a manufacturer wants to use a vehicle scale as a livestock scale: (1) the request must be on the application when it is submitted for type evaluation, (2) the evaluation needs to include evaluation for livestock scales, and (3) the application as a livestock scale must be listed on the CC. Agenda Item 9 specified amended test criteria for performance and permanence test for livestock scales.

This subject was again discussed at the November 1997 NTETC Weighing Sector meeting (Agenda Item 17). The Sector agreed to add the following policy to the Technical Policy Section of the Scales Checklist in Publication 14:

> If a vehicle or axle load scale is tested according to the livestock scale criteria, including weights placed over both section and mid-section, then both vehicle and livestock applications can he included on the CC. (This assumes that the amount of weight is equal to at least 90 percent of the CLC.) If a vehicle scale is to be used for livestock applications, then additional testing as specified in Section 63 (currently Section 64). Performance and Permanence Tests for Livestock Scales must be performed. The Sector agreed that this would be a one-time test (i.e., no permanence test); however, NTEP reserves the right to conduct a permanence test if the initial test results warrant the additional testing.

One of the public sector members stated that Publication 14, Section E used to be more restrictive in that permanence testing was required to add the livestock scale option to a vehicle scale CC.

There were no references to permanence testing for livestock scales in the 1996 Edition of Publication 14 and were not added until the 1998 Edition. The changes were made to the 1998 Edition and still exist in the 2000 Edition. The statement that "Only loads which have been applied using a method representative of the scales intended use can be counted for permanence testing" was added to the permanence testing for both livestock and vehicle scales in the 1998 Edition of Publication 14. In summary, shift tests for livestock scales with more than 2-section are identical to shift tests described for vehicle scales except that:

1. During the first set of section tests, the test weights are to be removed from the scale and zero readings are taken before going on to the next section.
2. In the second set of shift tests, weights are moved from one section to the next without unloading the scale with several readings taken as the weights are removed.
3. Increasing/decreasing load tests are conducted with the test load distributed over the platform.

The private sector members indicated that scales built to weigh livestock cannot weigh vehicles (highway); however weighing small trailers is acceptable. Additionally, they believed that the "Application" portion of the CC is limiting if it does not indicate the device is for "general purpose (Class II, III, or III L) weighing" applications.

One of the public sector members indicated that the permanence test for livestock scales is more stringent in that "livestock on the hoof" apply loads on the scale that are not similar to weighing vehicles. The member was also concerned about the violent forces animals can induce on a scale. Vehicle scales are designed for longitudinal forces along the length of the scale whereas livestock introduce lateral forces. The dead load of the scale is increased with the addition of stock racks (and barriers), which may cause additional deck deflection.

The scale manufacturers indicated that the addition of stock racks (and barriers) would not increase deflection between sections or the overhang off the end of the scale. The added weight may actually improve the deflection characteristics by strengthening the weighbridge. The increased dead load would also have no effect because the live load plus the dead load of a vehicle scale is 60 % to 70 % of the total load bearing capacity of the load cells used in the scales. Additionally, vehicle scale manufacturers reported that they are not aware at the time the scale is manufactured, if installers or users are going to add additional dead load to the scale. The addition of dead load to the extent that exceeds the total capacity of the scale, without lowering the usable capacity, would be considered a modification of the type to the extent that the original manufacturer may determine the specific device is no longer covered by the CC.

The NIST Technical Advisor contacted some vehicle scale manufacturers after the Sector meeting to ascertain the typical load cell capacities and dead load for vehicle scales. A 100 ton, 70' x 10', 4-section scale, with 8-50 000 lb load cells, has a typical dead load of 70 000 lb for a concrete deck (approximately 1000 lb per linear foot). A user would have to add 130 000 lb of barriers and stock racks before overloading the designed capacity of the scale.

The scale manufacturers also stated that only 4400 lb of livestock could fit in the "prescribed test pattern" (110 lb per sq. ft. x 40 sq. ft.). The standard CLC rating for most vehicle scales is 20 to 30 tons. Therefore, a vehicle is likely to provide more side-to-side shock than livestock. (The lowest capacity 2-section vehicle scale that is permitted by Handbook 44 would have a CLC rating of 6667 lb.)

Some of the public sector members reported experiencing higher rejection rates during distributed load tests for vehicles scales that were used to weigh cattle. These scales also experience shorter life spans possibly due to the scales exposure to different types of "punishment."

Conclusion: No consensus was reached on the item. Cary Ainsworth (GIPSA) will seek the GIPSA position on the use of vehicle scales for weighing livestock. Don Onwiler (Nebraska) will draft a position paper on this item and submit it to Mr Patoray, N. Mills (NTETC Weighing Sector Chairman) and Steve Cook, (NIST Technical Advisor). The NTEP Director will also seek guidance on Publication 14, Section E from the NTEP Committee.

If S&T Item 320-4 is adopted during the July 2002 NCWM Annual Meeting, and livestock scales are removed from the CLC marking requirements, existing NTEP technical policies and testing requirements will need to be amended. Additionally, the technical policy for Section E in Publication 14 will have to be rewritten to specifically address combination vehicle/livestock scales and the modification of type from one application to another.

5. Shift Test Procedures

Source: Darrell Flocken (Mettler-Toledo)

Background: At the Weighing Sector's 2000 meeting Darrell Flocken (Mettler-Toledo) agreed to put together a paper on the procedures used for shift tests in the U.S., Canada, and OIML.

Mr. Flocken's paper is included for consideration by the Sector members. The paper recommends adding a fifth (center) position to the current Shift Test procedure. This fifth position test point is taken with test weights equal to ½ scale capacity placed in the center of the platform or platter. The weight indication for the center position will then be used as the reference weight value for the conduct of the Shift Test. The weight readings from the four remaining weight positions are compared to this reference value and the differences determine the actual performance error (See examples below).

According to Mr. Flocken, the proposed procedures are in the process of being submitted to OIML to amend OIML R-76-1 (3.6.2 Eccentric Loading) and R-76-2 (Report Page 2 of 12) for Nonautomatic Weighing Instruments

Essentially, the paper recommends that shift test results must agree with the result of the center test load position within acceptance tolerance. There would be occasions where shift test results would be within acceptance tolerances, but not agree with the center position results within the proposed tolerance. Conversely, shift test results could exceed acceptance tolerances, but comply with the proposed tolerance.

Example 1 – (F)ailed existing tests but (P)assed proposed tests.

15.00 lb Test Weight Applied To Position	Actual Scale Reading (Unchanged) Existing H-44	Actual Error Value for Shift Test (proposed) (Center – Actual)	Acceptance Tolerance (in lb)
Zero	0.000		
Center	15.006		
1	15.006 (P)	0.000 (P)	+/- 0.01
2	15.011 (F)	0.005 (P)	+/- 0.01
3	15.005 (P)	0.001 (P)	+/- 0.01
4	15.002 (P)	0.004 (P)	+/- 0.01

Example 2 – (P)assed existing tests but (F)ailed proposed tests.

15.00 lb Test Weight Applied To Position	Actual Scale Reading (Unchanged) Existing H-44	Actual Error Value for Shift Test (proposed) (Center – Actual)	Acceptance Tolerance (in lb)
Zero	0.000		
Center	15.006		
1	15.006 (P)	0.000 (P)	+/- 0.01
2	15.010 (P)	+0.004 (P)	+/- 0.01
3	15.005 (P)	-0.001 (P)	+/- 0.01
4	14.994 (P)	-0.012 (F)	+/- 0.01

Discussion: The Sector reviewed the proposal. See Attachment for Item 5 for additional details and background information.

The Sector agreed that the proposal is technically correct because it eliminates the effects of linearity errors that are accumulated when trying to conduct a shift test. Mr. Flocken stated that load cell manufacturers must make load cells with greater linearity than is required in order to pass current shift test procedures. Additionally, there is concern that some service agencies are correcting shift test errors by adjusting the overall span calibration or linearity compensation instead of determining the actual cause (i.e. load cell, load cell mounting, overload stops, and etc.).

The NTEP Director indicated that all other influence factors are to be eliminated when testing for a single influence factor however, R-76 is not clear that testing for off-center loading or eccentricity errors during test is or is not considered an influence factor.

Some of the public sector participants were concerned that the proposal as written would allow a device to exceed Handbook 44 acceptance tolerances and pass the shift test tolerances. Device users may take advantage of the allowable errors by purposefully placing items on the scale in positions that favor the user. Public members noted that Handbook 44 tolerances do not distinguish between linearity and eccentricity errors and that, unless otherwise specified, current Handbook 44 tolerances encompass many factors that contribute to error.

Mr. Flocken indicated that the proposed procedures and tolerances would be limited to NTEP evaluations and that this item is also under consideration for the next Edition of OIML R-76.

The NIST Technical Advisor indicated that an amendment to Handbook 44 is needed to support the proposed NTEP test tolerances.

Conclusion: Mr. Flocken recommended that this item be withdrawn from consideration by the Sector. He will resubmit the item if it appears that OIML will be amending shift test procedures (or plan to clarify existing procedures) in the next Edition of OIML R-76. No further action is recommended by the Sector.

6. Recorded Representation of Count Items on Electronic Cash Register (ECR) Systems

Source: NTEP Participating Laboratories

Background: Prior to the 1999 meeting of the NTEP laboratories, Maryland Weights and Measures reported finding instances of ECR receipts with items by count were expressed in a decimal format with as many as three places to the right of the decimal. At the 1999 NTEP laboratory meeting, other laboratories indicated finding similar receipts. Paragraph 3.7 on page 9-11 of Pub 14, ECRs/Retail Motor-Fuel Dispensers (RMFD), states that decimal expressions of count are acceptable. The Checklist for ECRs Interfaced with Scales does not refer to using a decimal format for items by count on the receipt. The Laboratories agreed that language should be added to Pub 14 to indicate that a decimal expression of count on the receipt from an ECR interfaced with a scale is not appropriate. Andrea Buie (Maryland) agreed to draft language for Sector consideration.

At the October 1999 Weighing Sector meeting the Sector Technical Advisor, Dick Suiter (NIST) showed an example of 3.000 @ 3/1.00 for items being sold by count. Tom Ahrens (NIST), then NIST Technical Advisor to the Measuring Sector, stated that the Measuring Sector reviewed this issue at its meeting on September 24-25, 1999. The manufacturers present at the Measuring Sector meeting did not think eliminating the trailing zeros would cause a problem.

Dennis Krueger (NCR) stated that the problem began with ECR's in service stations. The software was written to print to a resolution of 0.001 gallon. When the system applications expanded into deli operations, the same software routines were continued. Mr. Krueger noted that prohibiting decimal expressions of count would not be a problem for NCR; however, he indicated he could not speak for other manufacturers. Other members agreed that it would not be a problem for their companies. Sector members agreed that other potentially affected parties should be made aware of the proposed change before the Weighing Sector recommends a change to Publication 14. The Sector decided that the NIST Technical Advisor, Dick Suiter, should develop specific language for changes to Publication 14 and a proposal for the S&T Committee for changes to Handbook 44.

The Weighing Sector agreed to ask the Measuring Sector to consider removing the following language relative to trailing zeroes for items sold by count from the ECR-RMFD checklist as follows:

Modify Publication 14, ECRs/Retail Motor-Fuel Dispensers, 3.7.:

3.7. The quantity representation of an item sold by count must be expressed in whole units. ~~An expression of count with a decimal point and trailing zeros, (e.g., 2.00 items) is acceptable~~

~~provided that fractions of a whole unit can not be expressed.~~

At its October 2000 Measuring Sector meeting, one member recalled that originally the Measuring Sector agreed to allow trailing zeros to accommodate the software of ECRs interfaced with retail motor-fuel dispensers in convenience stores. The three decimal places were necessary for printing the quantity of fuel dispensed. When the sale of other items was recorded, the technology available at the time required that the trailing zeros also be printed for those transactions. Several Measuring Sector members felt the average consumer would recognize that "3.000 items" represented a count of three items without being confused. Some manufacturers stated that, while the software in the systems they manufacture allows printing receipts without trailing zeros for items sold by count that may or may not be true for all software suppliers.

The Measuring Sector opposed removing the sentence relating to trailing zeros by a vote of 12 to 2.

Discussion: At its October 2001 meeting, the Weighing Sector discussed the recommendations to harmonize the differences between the two ECR Publication 14 checklist procedures.

Mr. Krueger indicated that this problem is a carry over from software developed several years ago and will be very expensive to correct. The NIST Technical advisor reported that in past evaluations, decimal entries of units may also have been necessary to enter measurements from devices that were not interfaced with the weighing or measuring device. The entries of linear measurements for bulk sales of fabric, wire, or rope are examples of applications that may want to enter measurements from devices that are not interfaced with the ECR.

Conclusion: The Weighing Sector concluded that the requirements in the two checklists should be as close as possible since ECRs and other components are interchangeable for use in both weighing and liquid-measuring applications. The Sector felt that the ECR/Scales checklist could be modified to mirror the language in the ECR/LMD checklist except that language be added to discourage the use of trailing zeros to the right of the decimal point for item sold by count.

The Sector recommends the following underlined text for incorporation into the 2002 Edition of Publication 14 Checklist for Electronic Cash Registers Interfaced with Scales.

Publication 14 Section 2, Chapter 8, Checklist for Electronic Cash Registers Interfaced with Scales, Page 8-18

10. Nonweighed Items

Code Reference: G-S.5.1

10.1.	Yes ☐ No ☐ NA ☐
10.2.	Yes ☐ No ☐ NA ☐
10.3. The quantity representation of an item sold by count must be expressed in whole units. Whenever practical, it is preferred to use whole integers. An expression of count with a decimal point and trailing zeroes (e.g., 2.00 items) is acceptable provided that fractions of a whole unit cannot be expressed.	Yes ☐ No ☐ NA ☐

11. Recorded Representation Point-of-Sale Systems

Code Reference S.1.8.4., and G-S.5.1.

Customer receipts shall include specific information and be printed in a format that clearly distinguishes between the many recorded values. A zero shall appear ahead of the decimal point if the weight value is less than one pound. The quantity representation of an item sold by count must be expressed in whole units. Whenever practical, it is preferred to use whole integers. An expression of count with a decimal point and trailing zeroes (e.g., 2.00 items) is acceptable provided that fractions of a whole unit cannot be expressed. A zero is not required before the decimal point if the item price is less than $1.00.

11.5. The sales receipt format must be clear and understandable. It is recommended that the receipt have three basic columns similar to the examples of acceptable formats shown below. Other examples may be acceptable.

Center column contains unit price preceded by @ symbol. The quantity representation of an item should be expressed in whole units. An expression of count with a decimal point and trailing zeroes is acceptable.

2 @ 5/.85 .34 apple
1.00 lb @ 2.00 lb/3.00 1.50 PR

Left column contains weight or count information, product name or code number

2 apple @ 5/.85 .34 apple

2.00 lb @ 2 lb/.85 .85 apple
2.00 lb @ 2 lb/.85 .85
35v6
2.00 lb @ .85/lb 1.70 peach

Right column contains total price, product, or dept. code

peach 1.70 2.00 lb @ .85/lb	2.00 lb @ .85/lb 1.70 peach

11.5.1. Yes ☐ No ☐ NA ☐
11.5.2. Yes ☐ No ☐ NA ☐
11.5.3. Yes ☐ No ☐ NA ☐

7. Power Voltage Variation Tests for Automatic Weighing Systems (AWS)

Source: Maryland NTEP Laboratory & NIST OWM

Background: Section 44. Power Voltage Variations of the draft AWS checklist stipulates that the supply voltage be reduced to the minimum specified and increased to the maximum specified in Handbook 44. Paragraph T.7.3.1. of Handbook 44, 2.24. Automatic Weighing Systems requires that devices perform within tolerance values over the line voltage range of 100 V to 130 V or 200 V to 250 V rms as appropriate. To date, all AWS systems submitted for NTEP evaluation have used a single voltage source for the entire system.

Recently, NTEP received an application for an AWS system that uses normal 110/115 VAC single-phase 60 Hz power for the indicator and 440 V three-phase power for the drive motors. In this case an *ad hoc* decision was made to vary only the voltage to the indicator. The Sector was asked to discuss this situation and determine if changes to the voltage variation tests are necessary.

At its September 2000 Meeting, the Sector considered a recommendation to modify T.7.3.1. The Sector generally agreed that variations in the supply voltage for drive motors will not affect device accuracy in the same manner as it might affect the indicator. If different supply voltages are used for the drive motors and the indicator, only the indicator supply needs to be varied during evaluation. One member stated that changing the frequency of the supply power rather than the voltage usually controls the speed of the belt for these systems.

The Sector forwarded the proposal to modify Handbook 44 Scales Code Paragraph T.7.3.1. to the S&T Committee for consideration after the SMA Technical Committee provided input. The Sector also agreed that the issue of "frequency variation" needs to be addressed and asked the NTEP laboratories and the SMA Technical Committee to review the issue and provide input to the Sector for consideration at the next Sector meeting.

44. Power Voltage Variations T.7.3.1.(a)

The purpose of varying the power supply voltage is to determine the performance and operating characteristics of the equipment under test at different voltage levels found in the field under normal operating conditions. This requirement applies only to metrologically significant voltage supplies.

44.1 Test equipment needed:
- Variable power source
- Voltmeter
- Load cell simulator if applicable

Discussion: The proposal to amend NIST Handbook 44 was adopted at the July 2001 NCWM Annual Meeting. The Sector reviewed the underlined text above. There was general support for the item as written except that the Sector questioned if the NCWM S&T Committee intended the requirement to apply to frequency and recommended that "frequency" be included in the proposed language. Juana Williams, Technical Advisor to the NCWM S&T Committee, was able to confirm that the S&T Committee intended that the requirement apply to any power source that has a metrological effect on the system (i.e. voltage and frequency). There was some discussion that frequency testing is not performed by NTEP.

Conclusion: The Sector recommends the following underlined text for incorporation into the 2002 Edition of Publication 14 Checklist for Automatic Weighing Systems.

44. **Power Voltage Variations T.7.3.1.(a)**

The purpose of varying the power supply voltage is to determine the performance and operating characteristics of the equipment under test at different voltage levels found in the field under normal operating conditions. This requirement applies only to metrologically significant voltage and frequency.

44.1 Test equipment needed:
- Variable power source
- Voltmeter
- Load cell simulator if applicable

The NTEP Participating Laboratories will discuss the reasoning for not conducting frequency variation tests at their next NTEP Spring Laboratory meeting.

8. Families of Scales with Capacities Above and Below 30 000 lb

Source: NIST OWM

Background: NTEP frequently receives applications for a family of Class III L vehicle and/or livestock scales with a range of capacities that go well below 30 000 lb at the low end of the family of capacities. The NTEP Technical Policy for scales has separate criteria for scales with capacities above and below 30 000 lb; however, there is a question of whether or not Publication 14 Section B.2. criteria for scales less than 30 000 lb capacity should be applicable to these types of devices.

There also is a question about establishing a lower capacity limit for Class III L devices. For example, on-board weighing systems can be classified as Class III or III L devices at 30 000 lb capacity. Handbook 44, 2.20 Scales, Table 7b. Applicable to Devices not Marked With a Class Designation requires unmarked Animal Scales to have a division value of 1 lb or less. Table 7a. Typical Class or Type of Device for Weighing Operations places Livestock Scales in Accuracy Class III L an Animal Scales as Class III. A Class III L livestock scale with a capacity of 10 000 lb and a division size of 1 lb has a larger tolerance than a Class III floor scale with the same capacity and division size.

At its September 2000 meeting, the Sector agreed that scales used in the applications outlined in Scales Code Table 7a. are restricted to the accuracy classes specified in the table or a higher accuracy class. While "typical" is in the title, the note in the table precludes the use of a *lower* accuracy class scale than that specified in the table; however, a *higher* accuracy class than specified may be used. For example, a Class III L scale cannot be used in a single animal scale application, but a Class III scale could be used in a vehicle scale application.

Because of the questions raised at the meeting, the Sector suggested that the NTEP laboratories further discuss this issue to determine whether or not changes should be proposed to Handbook 44 to clarify how to apply the appropriate accuracy class for a specific weighing application or scale type. Should the laboratories feel that changes to Handbook 44 are warranted, they are asked to submit the proposed change to the Sector for consideration at its 2002 meeting.

This issue was discussed at the June 2001 Spring NTEP Participating Laboratory meeting as part of a larger issue regarding the definition of "type." The laboratories compared the device types listed in Handbook 44 and the definition of "type" in NIST Handbook 130. There are an increasing number of instances where weighing devices are considered different types of devices in Handbook 44 but are physically identical to each other. Handbook 44 divides weighing devices separate "types" based upon the commodity being weighed with test procedures in place to simulate actual use.

The NTEP Participating Laboratories and NIST Technical Advisor were assigned to create an outline of device types based upon accuracy class, special use (e.g., vehicle, livestock, etc.), and physical design. Refer to Attachment to Item 8 for a complete draft copy of the outline.

The outline may be useful in helping to identify device types based on physical properties and weighing application. The second and third levels of the outline could be the terminology used in the upper left hand box of a CC (which describes the type, model, Accuracy Class and other parameters) to provide uniform device designation for use in the NTEP database search engine. The fourth and higher levels of the outline could be used to further define the type (mechanical/electronic) and the application (e.g., in-motion railroad). Handbook 44 and Publication 14 test procedures in some instances need to be modified to accommodate the proposed classifications. For example, position test may need to be conducted to verify agreement of all load-bearing points on livestock scales or combination livestock/vehicle scales.

This item was separated into two items.

Item 8(a) concerns the submission of devices for evaluation where the family of capacities is above and below 30 000 lb.

Item 8(b) concerns the broader issue as to whether NTEP should provide "application" or "suitability" information by the NTEP Director and Certificate of Conformance.

8(a) Family of capacities is above and below 30 000 lb.

Discussion: NTEP Policy requires two devices must be submitted for evaluation if the family consists of capacities below 30 000 lb while only one if the entire range of capacities is above 30 000 lb. Originally, NTEP determined the limiting factor would be 30 000 lb capacity based upon the difficulties in testing such as testing in outdoor environments and availability of test weights.

There was consensus among the Sector members that the "30 000 lb rule" needs some flexibility since it is a guideline in Publication 14 and a requirement in Handbook 44. There was a suggestion that the determination of what had to be submitted to NTEP could be based upon Handbook 44 Accuracy Class; however, that suggestion was not pursued.

Ross Anderson (New York) suggested that the determination of how many devices to submit for evaluation are determined based upon the capacities of the majority of the scales in the family.

The NIST Technical advisor researched the origin of the 30 000 lb guideline after the Sector meeting. In 1983, some of the NTEP documents referred to medium capacity scales as having capacities up to 30 000 lb and that vehicle and axle-load scales were considered heavy capacity scales.

Conclusion for Item 8(a): The Sector concluded that the 30 000 lb capacity used for the cut off in determining the family of devices to be submitted to NTEP was selected arbitrarily, therefore, there should be some flexibility in the selection process. The determination will be based upon the capacities where most of the devices in the family lie. The NIST Technical Advisor will draft language to amend Publication 14, Part B, sections 7 and 8 (platform scales below and above 30 000 lb). The Sector was balloted on the specific language in December 2001. The Sector voted (11 in favor, 2 against and 3 votes abstain) to recommend the following underlined language and amendments

proposed by the NIST Technical Advisor for NCWM Publication 14 Technical Policies Part B, Section 7 and 8 for platform scales below and above 30 000 lb. (Please note that this language does not include the Sector recommendations in Agenda Item 22. NTEP Technical Policy Change the Platform Area to Length and Width.) The results of the ballot were 11 votes if favor, 2 votes against and 3 votes abstain.

B. Certificate of Conformance Parameters

7. ~~Other~~ Platform Weighing Systems, Scales or Weighing Elements of 30 000 lb Capacity or Less

Note: When submitting a family of devices that has capacities above and below the 30 000 lb, the average of the highest and lowest capacities listed on the application will be determined. If the average is at or below 30 000 lb, the guidelines in Section 7 will be used as the selection criteria. If the average is above 30 000 lb, the guidelines in Section 8 will be used as the selection criteria. Scale families that are evaluated under Section 7 guidelines cannot extend the maximum capacity of the family without further evaluation. The applicant may request that Section 8 criteria be applied to take advantage of the 50 percent to 135 percent capacity range (8.1.a.) provided all other requirements of Sections 8 and 8.1 are met. The applicant should be aware of the differences in the selection criteria and what can be covered on the Certificate of Conformance based upon the applicable criteria.

The models to be submitted for evaluation shall be those having:

a. the lowest capacity and the highest capacity
b. the largest platform area for each of the capacities submitted
c. the most resolution (highest number of scale divisions)
d. the smallest scale division value (d).

A CC will apply to all models that:

a. are within the range of capacities,
b. have platform areas up to but not larger than that evaluated at each capacity; with lengths or widths no greater than 125 percent of either dimension tested (i.e. If a 5' x 5' scale is tested and passes evaluation, then a 6' x 4' scale would be included on the CC. A 3' x 8' scale could not be included without additional testing),
~~c. have platform lengths or widths not larger than 125 percent of the length or width evaluated at each capacity;~~
c d. have the same number of scale divisions or fewer,
d e. are within the range of the values of the scale division,
e f. have a platform construction with material similar to that of the equipment evaluated.

8. ~~Other~~ Platform Weighing Systems, Scales or Weighing Elements Greater than 30 000 lb Capacity

Note: When submitting a family of devices that extends above and below the 30 000 lb guideline for selection criteria, the average of the highest and lowest capacities listed on the application will be determined. If the average is above 30 000 lb, the guidelines in Section 8 will be used as the selection criteria. If the average is at or below 30 000 lb, the guidelines in Section 7 will be used as the selection criteria. Scale families that are evaluated under these guidelines are limited to the division size of the device submitted for evaluation. The applicant may request that Section 7 selection criteria be applied to take advantage of allowable division sizes if the range of capacities is less than or equal to 2:1, provided all other requirements of Section 7 are met. The applicant should be aware of the differences in the selection criteria and what can be covered on the Certificate of Conformance based on the applicable criteria.

A CC will apply to models:

a. that have **scale division** values equal to or greater than the value of the scale division used in the scale that was evaluated.

b. that have number of divisions (n_{max}) the number of scale divisions that would exist for scales included in the range of capacities provided it does not exceed the n_{max} of the load cells and indicator for the installed system. A manufacturer of a vehicle scale should strive to have the scale with the largest number of scale divisions tested for type evaluation.

c. with load cell assemblies limited to the type evaluated. The manufacturer may choose to submit a special hybrid design that contains more than one type of load cell assembly. The resulting Certificate of Conformance will cover all type submitted if the evaluation is successful.

d. (when applicable) with concentrated load capacities (CLCs) of 50 percent of the CLC of the tested scale to the maximum CLC evaluated; the minimum CLC rating shall not be less than 80 percent of the capacity of one cell but not exceeding twice the capacity of one load cell (the dead load of the weighbridge must be considered);

e. with platform construction and materials similar to that of the equipment evaluated.

8(b) Handbook 44 Categories of Device Types and Scope of the Certificate of Conformance.

Discussion: The Sector reviewed the draft outline (see Attachment for Item 8). There are more than 55 weighing device classifications in Handbook 44 and 24 weighing device classifications listed in the NTEP CC database, with most of the weighing device types established prior to the adoption of device accuracy classes. The draft outline contains 11 different weighing device categories and requires further development.

Some of the manufacturers stated that there should be no classification for "electro-mechanical" or "levertronic" devices. These terms essentially identify devices where a load cell or cells have been incorporated into the mechanical design to allow the interface of the weighing element with an electronic indicating element. NTEP no longer makes a distinction as to the kind of indicating element that can be interfaced with a weighing and load receiving element other than it must be "compatible."

A representative of the railroad industry reported that their industry considers "modular railroad track scales" as "standard" and offered to work with the NIST Technical Advisor on railroad scale terminology.

One of the public members also indicated that the term "in-motion monorail scale" is incorrect and should be "dynamic monorail scale" to match the terminology used in Handbook 44.

Further discussions dealt with the issue of device suitability and NTEP Certificates of Conformance (CC). Mr. Anderson, New York reported that this is an important issue for the NCWM Board of Directors. Mr. Anderson questioned whether NTEP determines field applications. NTEP should evaluate the design of a device against the specifications and tolerances in Handbook 44 and issue a report of what was evaluated and how it was tested. Additionally, the CC should contain enough information for the inspector to determine if the device in the field is traceable to the CC, information about the location of the identification information, provisions for sealing, and any special testing requirements or device descriptions. Mr. Anderson stated that a distinction should be made between the NTEP evaluation and initial verification performed by the local jurisdiction. The official with statutory authority determines if a device is suitable for the actual installation. For example, a computing scale in a jewelry store is inappropriate and does not comply with Handbook 44 paragraph G-UR.1. Selection Requirements. and Table 7a and 7b). That computing scale is not in violation of the NTEP CC or device specifications or tolerances applicable to the device. NTEP is a testing service similar to Underwriters Laboratories (UL). UL does not tell enforcement officials (i.e. fire marshals) what device is appropriate.

Some of the public sector members indicated that there are still application driven device types in Handbook 44. For example, a device submitted as a Class II device (prescription scale) can't be used for grain test scale unless an evaluation has verified compliance with grain-test scale requirements. The NIST Technical Advisor researched grain-test scale requirements in Handbook 44 to verify that there are no grain test scale specifications or tolerances. Paragraph UR.1.4. Grain-Test Scales: Value of the Scale Divisions: states that the division size shall not exceed 0.2 g for loads through 500 g and 1 g for loads above 500 g to 1000 g for scales used in grain-testing applications. Additionally, Publication 14 for Digital Electronic Scales does not list any code references in Section 37. Grain Test Scales.

Mr. Anderson indicated that most of the "device types" in Handbook 44 were created before the 1986 adoption of Table 3 Parameters for Accuracy Classes, Table 7a. Typical Class or Type of Device for Weighing Operations, and Table 8. Recommended Minimum Load. These tables should be referenced with other Handbook 44 user requirements to help the field official determine that a device is suitable for the specific installation.

The public sector members also noted that the public frequently seeks suitability information by searching for a listing of scales by device type. It is easy to go to the NCWM NTEP CC database and print a list of devices by type. Device purchasers frequently call weights and measures to confirm that a device has a CC but do not always provide enough information about the weighing application. It is difficult for weights and measures officials to tell the owner of a new device that it cannot be tested and sealed because it is not suitable for the specific installation, especially, if the owner had already verified that the device has a CC with the local weights and measures office. One suggestion heard to remove the application section from the CC will only make this scenario worse.

Conclusion: The NIST Technical Advisor will continue to work on the hierarchy of scales in the outline format. An updated outline will be distributed to the Sector by January 2002.

There was no consensus on the scope of the Certificate of Conformance and whether the Certificate should list the manufacturers intended application. It appears that this is an open-ended topic and that future discussions are required.

9. Load Cell CC Limited to Six Wire Design

Source: NIST

Background: Typically, when load cells are submitted for evaluation they are evaluated in a 4-wire configuration. The subsequent CC may cover both 4-wire and 6-wire options based on the test of the 4-wire design. The Sector had previously considered the 4-wire design the "worst case" for testing purposes.

A manufacturer had submitted a 6-wire design for evaluation and requested that the CC include both 6-wire and 4-wire designs as options. The testing was successful when the cell was connected in a 6-wire configuration but failed when connected in a 4-wire configuration. The manufacturer then requested to have the CC issued for only the 6-wire design. Handbook 44 and Publication 14 have no requirements for marking load cells with restrictions such as "6 wire only."

At its September 2000 meeting, the Sector agreed to carry this item over until next year. Sector Chairman, Nigel Mills (Hobart Corporation), Steve Patoray (NTEP Director), and Quenton Olson (Tedea Huntleigh) agreed to develop a paper to address the technical aspects of 4-wire vs. 6-wire design load cells and to propose a policy to address this in NTEP evaluations (see Attachment for Item 9).

Mr. Mills wrote a paper titled "Effect of Load Cell Cable Resistance on Span Variation with Temperature" (see attachment for Item 9). The following discussion is excerpted from the paper. The paper concludes that a load cell must be calibrated for the intended mode (4-wire or 6-wire) and that use and performance tests must also be performed in the same mode. Unless a manufacturer presents data indicating that the load cell cable is negligible, load cells must be compensated, tested, and used as intended (most industrial cells with 30 ft or longer cables have significant cable resistance). A 6-wire load cell cannot meet the intended specifications when tested or used as a 4-wire cell. The cable of a 6-wire cell can be any length and need not be in the temperature-varying environment of the load cell. A 4-wire load cell cannot be tested or used as a 6-wire cell. A 4-wire cell must be tested with a fixed length cable in the temperature-varying environment.

Discussion: There were four scale manufacturers present that also manufacture NTEP load cells and concern was expressed that no "load cell only" manufacturers were present at the Sector meeting. However, the load cell manufacturers listed as sector members and past participants were provided a copy of the agenda and attachments prior to the meeting.

The Sector reviewed the paper and discussed the conclusions and recommendations.

The manufacturers stated that scales with multiple load cells should not contain a combination of 4-wire and 6-wire load cells. Additionally, 6-wire load cells should not be wired to an indicating element as if it were a 4-wire design (all 6-wires connected to a compatible indicating element without cutting the sense wires or combining them with the excitation wires).

The manufacturers also indicated that there are different model designations for 4-wire or 6-wire designed load cells. The NTEP Director noted that the CC only lists the basic series designation for load cells and that suffix designations representing 4-wire or 6-wire design are not specifically listed. Additionally, the NTEP Director noted that load cell manufacturers should be able to demonstrate that they can properly compensate for both types of designs.

Another private sector member reported that there has been no problem in the past and questioned the change in policy. The NTEP Director responded that the only way to determine if the wiring of the load cell caused a problem, would be to test the load cell under laboratory conditions (or on hot and cold days).

The current NTEP policy states that both the 4-wire and 6-wire design load cells will be covered on the CC if a 4-wire is submitted for evaluation. If a 6-wire design load cell is submitted for evaluation, then the CC covers only the 6-wire design. Many of the manufacturers felt that this was an inconsistency in the publication that should be corrected. One manufacturer suggested that the applicant should be able to test 6-wire to get both.

The existing policy was predicated on the opinion that the 4-wire design load cell is more difficult to correctly build. All load cell manufacturers present disagreed with that assumption. Neither test is more severe but just a different way to design the load cell.

The NTEP Director stated that NTEP testing verifies that a manufacturer knows how to properly build load cells and the NTEP CC should reflect what is tested. Additionally, OIML Certificates only covers the 4-wire or 6-wire design that was submitted and passed evaluation.

One of the sector members asked if two load cells would normally be submitted because the range of the family was greater that 10:1 or the n_{max} was 5000 divisions or greater. In this instance, must the load cells submitted include at least one of each wire design, or do two load cells of each wire design have to be submitted for each capacity tested? The Sector responded that a 4-wire and 6-wire load cell must be evaluated for each capacity tested.

After the meeting, the Sector Chairman and the NTEP Director reconsidered the sector position and felt that a load cell manufacturer has adequately demonstrated their ability to compensate both types of wire design if one cell of each wire design is submitted to NTEP. It is not necessary that 4-wire and 6-wire load cells of every capacity be submitted for evaluation. The NIST Technical Advisor also reported the policy regarding load cells with 5000 divisions or greater was originally established because it was more difficult to consistently build load cells with the higher n_{max} and the submission of additional load cells would demonstrate that the manufacturer could consistently build load cells with similar temperature compensation, repeatability, linearity, hysterisis, and creep characteristics. Both the NTEP Director and the Sector Chairman agreed that the 4-wire and 6-wire only affected temperature compensation for zero and span and did not affect load characteristics such as repeatability, linearity, hysterisis and creep.

It was also noted that Publication 14 for Load Cells Section H, 2. Load Cell Marking (page 5-15), requires that a load cell must be marked for 6-wire use (if applicable). Handbook 44 marking requirements do not support this statement in Publication 14 and that it should be removed from Publication 14.

Conclusion: The Sector recommends:

1. Amend the Digital Electronic Scale Checklist, Technical Policy on the Substitution of Load Cells to reflect the sector position on substitution of 4-wire and 6-wire load cells.
2. The Publication 14 requirement for marking 6-wire load cells be removed from the load cell checklist as shown below.
3. Both 4-wire and 6-wire design load cells must be submitted in order for both designs to be included on the CC. This change in technical policy would be nonretroactive and effective upon approval by the NCWM Board of Directors.

The Sector recommends the following underlined text for incorporation into the 2002 Edition of Publication 14:

Publication 14 for Digital Electronic Scales, D. Substitution of Load Cells (page 1-17)

Metrologically equivalent load cells from the same or a different manufacturer may be submitted into a scale provided that the load cells to be substituted:

(1-6 remain unchanged):

7. are of the same wiring configuration as the cells being replaced without adding jumper wires, connecting sense wires to excitation wires, or by removing the sense leads.

Publication 14 for Load Cells, D. Load Cells to be Submitted for Test (page 5-15)

Load cells with essentially the same design will be considered to be part of the same family on a CC. If load cells within a family are made from different materials (e.g. aluminum, alloy steel, and stainless steel), then all material types must be submitted for evaluation. The policy applies to all applications for new or amended Certificates of Conformance received after January 31, 2002. This policy is non-retroactive for Certificates of Conformance issued prior to February 1, 2002.

If a system "upgrades" a load cell above the accuracy class or the number of scale divisions for which the load cell has been separately tested, then the load cell and indicator must be type-evaluated together. The tolerance is 0.7 times the tolerance for the complete scale. In the case of scale conversions from weighbeam or dial indicators to a digital indicator with a load cell, then the "modified portion" of the scale, that is, the load cell and the indicator, must be tested together and must meet the new requirements.

The manufacturer of a system that "upgrades" a load cell must specify how the device is to be repaired in the event that one component requires replacement. Since the indicator and load cell may match in performance and the matching may have been done based upon laboratory tests, it may be that both components of the system must be replaced in the event that one fails in the field. If the manufacturer has a method for assuring that the replacement of only one part will result in continued system compliance with the influence factors requirements, then the manufacturer must specify how this is achieved.

To determine which cell(s) to submit for testing, the manufacturer should submit a drawing of each capacity load cell to substantiate that they are of the same basic design. If a family of load cells may be used in both tension and compression, a complete set of data must be submitted for each direction of loading.

1. The manufacturer must provide the following information with a request for evaluation:

   a. Load cell capacities.
   b. Quality or accuracy class.
   c. Number of scale divisions (n_{max}) requested.
   d. Minimum verification scale division (v_{min}).
   e. Drawings for each cell.
   f. The type of metal(s) from which the load cells are made.
   g. As applicable, outline dimensions and general description sketch of special equipment (loading fixtures, interconnections boxes, etc.) that are intended to accompany the load cell submittal.
   h. A complete set of test data on the load cells submitted for evaluation. (Test data is required only for the cells submitted for type evaluation; test data is not required for each cell capacity in the family.)
   i. The technology used in the load cell: e.g., strain gauge (analog or digital), hydraulic, vibrating wire or crystal, or other. Applicants for analog strain gauge load cells must indicate on the application whether 4-wire, or 6-wire, (or both) design load cells are requested.

   The manufacturer may market load cells with a smaller maximum number of scale divisions (n_{max}) and with larger v_{min} values than those listed on the CC; however, the load cells must be marked with the appropriate n_{max} and v_{min} for which the load cell may be used.

2. The actual number of load cells and load cell capacities to be tested will be decided by NTEP in discussions with the manufacturer. The data are evaluated strictly on a pass/fail basis with respect to the NTEP requirements. However, if the test data is marginal, then NTEP may require that additional load cells be tested before a Certificate is issued.

   The following factors will be considered when determining which cells and the number of cells that will be tested:

   a. Which cell can be conveniently tested.
   b. Which cell is expected to be the most popular.
   c. What the manufacturer or importer has available for test.
   d. The range of capacities.
   e. Differences in the cell design within a family.
   f. The number of scale divisions for which the cell is to be tested.
   g. The availability of 4-wire or 6-wire design for analog strain gauge load cells.

3. General guidelines to determine the number and the capacities of cells to be tested are given below:

   a. Single- and Multiple-cell Applications. One cell at one capacity will usually be tested for single-cell applications unless the request is for both 4-wire and 6-wire analog strain gauge load cells. In this case, both designs must be submitted for evaluation. For multiple cell applications, two load cells at the same capacity will be tested. If both 4-wire and 6-wire designs are requested, then one cell must be submitted as a 4-wire design and the other submitted as a 6-wire design.

   b. Range of Capacities. If the range of capacities is relatively small, (e.g., the range of capacities does not exceed 10:1), then cells at only one capacity will usually be tested unless the request is for both 4-wire and 6-wire analog strain gauge load cells. In this case, both designs must be submitted for evaluation.

      Typically, a ratio of 10:1 in cell capacities will be covered, based upon the test of a single cell. The tested cell should be approximately mid-range of capacities to be covered and generally not more than a 4:1 ratio from any other cell capacity within the load cell family (unless NTEP test considerations justify a deviation from this rule).

      If the range of cell capacities significantly exceeds a 10:1 ratio, an additional capacity load cell will be tested. The guideline in (D.3.a.+) for single-and multiple-cell (including 4-wire and 6-wire) applications applies to each capacity cell that is tested.

      If the capacity range of the load cell family overlaps the range of capacities that can be tested by NTEP, the submitter shall consult with a representative from the NTEP program at NIST/OWM before selecting the capacities of cells to be tested.

      If a mid-range cell cannot be tested due to lack of NTEP test capability, then one cell from the low end of the capacities requested and one cell from the high end of the capacities requested must be submitted. The total range requested must not exceed a range of 10:1.

   c. Large Number of Divisions. If a large number of divisions (e.g., Class III, single cell, 5000 divisions and greater; or Class III L, single cell, 5000 divisions or greater) is requested, one more cell capacity or more cells at the same capacity will be tested. This criteria applies independently of capacities selected to satisfy the range of capacities requirements listed in part D.3.b.

      If both 4-wire and 6-wire designs are requested, then at least one cell must be submitted as a 4-wire design and at least one cell submitted as a 6-wire design.

For example, consider a Class III L, Single, 5000 division application with capacities ranging from 1000 lb to 10 000 lb. To satisfy the range of capacity requirements, the manufacturer selects a 5000-lb capacity cell for test. The 5000-lb capacity cell is mid-range between the 10:1 range of capacities requested and nearly 4:1 from either extreme (NTEP does not have the ability to test a 4000-lb cell). Under the large number of divisions requirements, two 5000-lb capacity cells may be submitted. Alternatively, one 5000-lb capacity cell and another cell from the capacity range between 1000 lb and 10 000 lb may be submitted.

As a second example, consider a Class III L, Single, 5000 division application with capacities ranging from 1000 lb to 100 000 lb. To satisfy the range of capacity requirements, the manufacturer selects a 5000-lb capacity cell and a 40 000-lb capacity cell for test. The 5000-lb capacity cell is mid-range between the 10:1 range of 1000 to 10 000 lb and nearly 4:1 from either extreme (NTEP does not have the ability to test a 4000-lb cell); the 40 000-lb capacity cell is mid-range between the 10:1 range of 10 000 lb and 100 000 lb and within 4:1 from either extreme. Under the large number of division requirements, two of each cell capacity are required. Alternatively, the manufacturer may select one mid-range capacity cell and an additional cell of a different capacity from within each 10:1 range.

(Note: This paragraph has been moved and is renumbered as paragraph 2.) ~~The actual number of load cells and load cell capacities to be tested will be decided by NTEP in discussions with the manufacturer. The data are evaluated strictly on a pass/fail basis with respect to the NTEP requirements. However, if the test data is marginal, then NTEP may require that additional load cells be tested before a Certificate is issued.~~

Companies desiring an OIML test to the requirements of OIML Recommendation 60 (R60) on a load cell should note that there are significant differences between NTEP criteria and OIML criteria. The NTEP scale accuracy classification (III L), the extra tolerance step in the Class III tolerances, and the tolerances for single and multiple load cell system (0.7 and 1.0 times the scale tolerance) require different data analyses to be performed. Companies may submit cells for evaluation to with either NTEP criteria, OIML criteria, or both by marking the appropriate selection on the application form. Companies should note that additional capacities of cells other than those specified for NTEP tests alone may be required for the OIML tests.

d. Adding a digital option. If a manufacturer submits an application to add a digital option to a family of load cells, with analog output, and covered by a single CC, they may do so provided:

1. The A/D conversion board is an internal component of the cell and is the same for models and capacities with the option to be listed on the CC.
2. At least one additional cell is submitted for full testing.

If the digital cell(s) submitted for testing perform better than the analog cells originally submitted for testing, the manufacturer may not request a change to decrease the v_{min} or increase the n_{max} values on the CC unless additional analog cell(s) are submitted for full testing.

~~3. If a load cell is available in both 4-wire and 6-wire design, it is sufficient to test the 4-wire design only and cover both the 4-wire and the 6-wire designs based upon that test.~~

Publication 14, Load Cells, Page 5-16

H. Marking Requirements

2. Load Cell Marking

In addition to **G-S.1. Identification**, a load cell shall be marked with the following:

Code Reference: Table S.6.3.a. Marking Requirements and Table S.6.3.b. Notes for Table S.6.3.a.

a. Accuracy class;
b. Temperature limits if other than -10 °C to 40 °C;
c. Maximum number of scale divisions, n_{max};
d. Identification of "S" or "M" for single or multiple cell applications;
e. Direction of loading if not obvious;
f. Minimum dead load;
g. Maximum load cell capacity;
h. Safe load limit; and
i Load cell verification interval, v_{min}; and.
j For 6-wire use only (if applicable).

10. Policy for Initial Test Only vs. Full Evaluation when a Modification is Made which Requires Testing

Source: NIST OWM

Background: Frequently, when a device is submitted for evaluation to expand the parameters on an existing Certificate of Conformance (CC), the manufacturer will ask if full testing is required or if only an initial test is sufficient. In most cases, NTEP requires full evaluation. The Sector discussed the item to determine if policies could be established that list the specific modifications that require full evaluation and which modifications require only an initial test. In the case of an initial test only, NTEP should reserve the right to require full evaluation if the results of the initial test are marginal.

The Sector generally agreed that a policy for determining when a full evaluation is not required would be beneficial.

At its September 2000 meeting, the Sector asked that the Scale Manufacturers Association (SMA) Technical Committee, the NTEP Laboratories, and the NTEP Director provide input for review at the next Sector meeting.

Discussion: The SMA submitted a survey of their members regarding the "Policy for Initial Tests Only vs. Full Evaluations When a Modification is Made Which Requires Testing." This is a working document and does not represent an official position by the SMA. The survey indicated disagreement among manufacturers. Some of the comments indicated that the determination of a significant metrological modification appears too subjective. There were also some comments that the terms "full" and "partial" evaluations should be defined. There are also modifications that may not require any additional evaluation.

The participating laboratories indicated a need for flexibility in the determination if any or all of the criteria may apply. They also recognize that it is a major expense to the applicant when field-testing is required.

John Elengo (consultant) submitted the following language for consideration:

> NTEP Policy: When a metrologically significant modification is to be applied to a device with an existing CC, the manufacturer and NTEP shall agree upon the extent that reevaluation might be required before such modification is applied. In the event of a disagreement, a full reevaluation shall take place.
>
> Guidelines: Guidelines such as those presented in the SMA document may be recognized by the Sector as guidelines, but not as policy. These guidelines shall be considered by NTEP as it makes its decision.

Conclusion: All Sector members agree that future guidelines will be hard to outline because of the difficulty in listing all possible modifications to a device type. The Sector members suggested that the applicant for a modification agree in advance with the NTEP Director, and if possible, the Participating Laboratory that performed the original evaluation on devices that may be submitted and testing to be performed. A full evaluation will be required if no agreement can be reached.

The Participating Laboratories will review the SMA survey document. The labs will develop draft language for typical modifications and degrees of reevaluation based on the survey and survey comments for review during the NTEP Laboratory meeting in June 2002. The labs will then report on their progress at the 2002 Sector meeting.

11. NCWM Publication 14 Administrative Procedures

Source: NCWM

Background: With the transfer of NTEP administration to the NCWM the task of updating the Administrative procedures was also transferred.

At the 2000 Weighing Sector meeting, NTEP Committee Chairman Wes Diggs provided an update of the progress on the Publication 14, Administrative Policies and Procedures. The draft Administrative Procedures were distributed at the 2001 NCWM Interim Meeting for comment. A revised draft was completed and approved by the NTEP Committee at the 86th Annual Meeting in Washington, D.C.

Discussion: The NTEP Director reported that it has been one year since the transition. All active NIST Certificates of Conformance have been converted to NCWM Certificates of Conformance and are on a searchable database on the NCWM web site www.ncwm.net. More than 260 applications have been received this year and approximately 270 CCs have been issued. The 2000 Edition of NCWM Publication 14 Technical Policy, Checklists, and Test Procedures was published in four sections; Weighing Devices (including Multiple Dimension Measuring Devices), Measuring Devices (including Taximeters), Grain Moisture Meters, and the NTEP Administrative Policy. The 2002 Edition of Publication 14 is scheduled to be published in the first quarter of 2002. NTETC Weighing Sector membership and voting procedures were reviewed.

Conclusion: This item appears on the agenda only as an information item for Sector members; therefore, no action is required by the Sector.

New Items

12. Review of Changes to Publication 14, 2002 Edition to Reflect 2001 NCWM Changes to Handbook 44

Source: NIST OWM

Background: The following items ("a" thru "h") represent amendments to NIST Handbook 44 requirements based on changes accepted at the July 2001 Annual NCWM Meeting. Recommendations from the Sector will be submitted the NTEP Committee for consideration to amend NCWM Publication 14 Technical Policy, Checklists, and Test Procedures.

12(a) Remanufactured Devices and Elements – Marking Requirements and Definitions

Background: There will be occasions where a Certificate of Conformance does not cover remanufactured scales, weighing/load receiving elements, and load cells. It should clearly stated in NCWM Publication 14 that remanufactured devices and load cells submitted for type evaluation shall comply with all applicable retroactive and nonretroactive requirements in Handbook 44.

Discussion: The NIST Technical Advisor reported that the NTETC Measuring Sector also reviewed similar language and recommended that it be located in NCWM Publication 14 Administrative Procedures. One of the public sector members indicated that the Report of the Remanufactured Device Task Force Table of Examples of Repaired and Remanufactured Devices, "Section III – Modifications That Constitute a Metrological Design Change or a Violation of NTEP Policy" should be part of Publication 14 when the table is finally adopted.

Conclusion: The Sector recommends the following underlined text for incorporation into the 2002 Edition of Publication 14.

For Digital Electronic Scales (page 1-9)

A. Models to be Submitted for Evaluation

(Add the following after the first paragraph. Similar statements would be added to the applicable technical policies in the Belt-Conveyor Scale, AWS, ECR with Scales, MDMD, and ABWS checklists.)

Applicants of remanufactured weighing devices and load cells are reminded that any device submitted for evaluation shall comply with all applicable requirements in Handbook 44, including nonretroactive requirements, as if it were a newly manufactured device. All references to "device(s)" are considered to include remanufactured device(s).

12(b) G-S.1. Identification: Certificate of Conformance

Background: After January 1, 2003, all commercial weighing and measuring devices that have an NTEP Certificate of Conformance (CC) Number shall be marked with the CC number based on new requirements in NIST Handbook 44 paragraph G-S.1. Identification. Adopted during the July 2001 NCWM annual meeting. The CC number can either be the initial CC number or the number of the addendum (e.g., 88-XXX or 88-XXXA1).

Discussion: The NTEP Director reported that there was concern during the NTETC-Measuring Sector because devices are shipped prior to the issuance of a CC number. He is looking for suggestions on how to handle this scenario since CC numbers are not issued until all administrative procedures are completed.

There were questions regarding permanence requirements for the marking since the marking may be a pressure sensitive label separate from the plate of label for other G-S.1. Identification. The NIST Technical Advisor confirmed that the intent of the NCWM S&T was that the same permanence requirements apply to the label for the CC marking. It was suggested that the proposed language be amended to state that additional samples of CC label material may need to be submitted if the CC information and other required marking information are not part of the same label or are listed on separate labels or badges.

Conclusion: The Sector reviewed the proposed language in the agenda and recommends the following underlined text for incorporation into the 2002 Edition of Publication 14, "Marking" Sections in the following checklists:

Complete Scales
Load Cells *
Indicating Elements
Weighing Elements
Multiple Dimension Measuring Devices (MDMD)
ECRs Interfaced with Scales
Automatic Weighing Systems
Automatic Bulk-Weighing Systems
Belt-Conveyor Scales

The device must have an area, either on the identification plate itself or on the device suitable for the application of the Certificate of Conformance Number (CC) and shall comply with "Permanence of Lettering" or Permanence of Attachment of Badge" criteria. If the area for the CC number is not part of an identification plate, the manufacturer must note its intended location and how it will be applied. The location of the information shall be readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval". These terms may be followed by the word "Number" or an abbreviation for the word "Number". The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.). (Effective January 1, 2003) Code Reference G-S.1.(g).

Note: If the Certificate of Conformance information is a label separate from the identification plate (i.e. pressure sensitive appliqué) a representative sample of the material used shall be submitted and tested for permanence.

Location: _____

(Note: The NIST Technical Advisor may make non-substantial editorial changes to the above language if it appears that some of the language may be redundant. For example, the checklist for Digital Electronic Scales already contains paragraphs that state that "G-S.1. Identification" markings must be permanent and references the procedures outlined in section 1 for "Permanence of Lettering.")

* The NIST Technical Advisor to the Weighing Sector has requested that the NIST Technical Advisor ask the NCWM Specification and Tolerances Committee for clarification whether the CC information is required to be physically marked on the load cell or may be listed an accompanying document (See Handbook 44 Scales Code Table S.6.3.b. Notes for Table S.6.3.a., Note 11).

12(c) G-S.1. Identification: Abbreviation of the Term "Model"

Background: Handbook 44 General Code paragraph G-S.1. (c) was amended to clarify the acceptable abbreviations of terms "Number," and "Mod" or "Mod." for the word "Model."

Discussion: There was no additional discussion on the item.

Conclusion: The Sector reviewed the proposed language in the agenda and recommends the following underlined text for incorporation into the 2002 Edition of Publication 14, "Marking" Sections in the following checklists:

Complete Scales	ECRs Interfaced with Scales	MDMD
Load Cells	Automatic Weighing Systems	
Indicating Elements	Automatic Bulk-Weighing Systems	
Weighing Elements	Belt-Conveyor Scales	

The name, initials, or trademark of the manufacturer or distributor. A remote display is required to have the manufacturer's name or trademark and model designation. The model designation shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) (Effective January 1, 2003). The abbreviation for the word "Model" shall be "Mod" or "Mod.". (Code Reference G-S.1.)

12(d) Table S.6.3.a. Marking Requirements

Background: At the July 2001 Annual Meeting, the NCWM adopted the following changes to the Scales Code:

Table S.6.3.a.
Marking Requirements

Weighing Equipment To Be Marked With	Weighing, load-receiving, and indicating element in the same housing or covered on the same CC[1]	Indicating element not permanently attached to weighing and load-receiving element or covered by a separate CC	Weighing and load-receiving element not permanently attached to indicating element or covered by a separate CC	Load cell with CC (11)	Other equipment or device (10)
...					
Section Capacity (14)(20)		x	X		

Footnote 1 to Table S.6.3.a. to read as follows:

[1]Weighing/load receiving elements and indicators which are in the same housing or which are permanently attached will generally appear on the same CC. If not in the same housing, elements shall be hard wired together or sealed with a physical or an electronic link. This

requirement does not apply to peripheral equipment that has no input or effect on device calibrations or configuration.

Add the following new definition to Appendix D:

electronic link. An electronic link between the weighing/load receiving element and indicating element where one recognizes the other and neither can be replaced without calibration.

Discussion: There were no comments on the language submitted in the agenda.

Conclusion: The Sector reviewed the proposed language in the agenda and recommends the following underlined language be added to applicable paragraphs in the Electronic Weighing Devices checklists. Additionally, the Sector is encouraged to develop a procedure for an "electronic link" to determine how the indicating element cannot be replaced without recalibration. This may include the applicant submitting a second indicating element and/or manufacturer's instructions regarding the ability to program a replacement indicating element.

1. **Marking – Complete Scales** (Page 1-19)

1.21 If the device submitted for evaluation has the primary indicating element separate form the weighing/load receiving element, the indicating element be evaluated as part of a complete scale provided that it complies with one of the following:

1.21.1	The indicator is hard wired to the weighing/load-receiving element.	Yes ☐ No ☐ NA ☐
1.21.2	The indicator is physically sealed to the weighing/load-receiving element.	Yes ☐ No ☐ NA ☐
1.21.3	The indicator is electronically linked to the weighing/load-receiving element and cannot be replaced without calibration.	Yes ☐ No ☐ NA ☐

2. **Marking - Indicating Elements** (Page 1-24)

Code References: **S.6., Table S.6.3.a., and Table S.6.3.b.**

Weighing/load receiving elements and indicators that are:

1) in the same housing, or
2) permanently hard wired together, or
3) sealed with a physical seal or an electronic link,

shall have markings that comply with section "1 Markings – Complete Scales". This does not apply to indicating elements that have no input or effect on weighing/load-receiving element calibrations or configurations.

12(e) N.1.3.4. (a). Vehicle Scales, Axle-Load Scales, and Livestock Scales With More Than Two Sections

Background/Recommendation: Paragraph N.1.3.4.(a) was amended to limit the width of the CLC test pattern to no more than 10 feet. Publication 14, Digital Electronic Scales, Section 65 Performance Tests for Vehicle Scales does not address the specific size of the CLC test pattern; therefore no change is recommended to Publication 14.

Conclusion: This item was provided as an information item to make the Sector aware of changes to NIST Handbook 44. No further action is recommended on this item.

12(f) T.N.3.8. Dynamic Monorail Weighing System

Background/Recommendation: This paragraph was amended to clarify that type evaluation tolerances are one-half maintenance tolerances. NCWM Publication 14, Digital Electronic Scales, Section 69, Performance Tests for Dynamic

Monorail Scales, does not address the specific tolerance that is applies to these devices; therefore, no change is recommended to Publication 14.

Conclusion: This item was provided as an information item to make the Sector aware of changes to NIST Handbook 44. No further action is recommended on this item.

12(g) T.7.3.1. (a) Power Supply, Voltage, and Frequency: Alternating Current

Background/Recommendation: (See Carry-Over Item 6)

Conclusion: No further action is recommended on this item.

12(h) S.6.4. Railway Track Scales

Background/Recommendation: Paragraph S.6.4. was amended to specify that the maximum nominal capacity for railway track scales shall not exceed the rated section capacity for two section scales and twice the section capacity for scales with more than two sections. The sector reviewed new language added to the Railroad Track Scale and Modular Railroad Track Scale Application and Analysis sheets in Publication 14, Application No. 1 for Scales.

Discussion: The Sector accepted the suggested language without comment.

Conclusion: The Sector recommends the following new text for and modifications to the 2002 Edition of Publication 14 Railroad Track Scale and Modular Railroad Track Scale Application and Analysis Sheets.

> Note X: The nominal capacity of a two-section scale shall not exceed the rated section capacity.
> Note X: The nominal capacity of a scale with more than two-sections shall not exceed twice the rated section capacity.
>
> Insert a column listing the section capacity in the Railroad Track Scale Application and Analysis Sheet.

13. Multiple Weighing Elements Attached to One Indicator

Source: NTEP Participating Laboratories

Background: An application has been submitted for an indicator with the capability to display the weight reading for up to 32 weighing elements. The Digital Electronic Scales Checklist, Section 34 (page 1-56) lists the criteria for evaluation of a single indicator connected to two or more weighing elements. Currently, indicating elements have been connected with up to four weighing elements with the ability to continually monitor or display each one. It is not clear how the operator will be able to monitor 32 scales connected to the indicator. Additionally, it is not clear how the technology actually performs its task. NCWM Publication 14 does not specify how many weighing elements must be simulated and or/submitted for type evaluation.

Discussion: The Sector discussed this issue and reviewed Canadian procedures, which do not limit the number of weighing elements, but require an independent AZSM or a center of zero indication for each weighing element. Prior to the Sector meeting, the participating laboratories met and discussed potential test criteria for indicating elements that contain multiple cards. The Sector explored the option of testing the indicator with one card full of inputs, the second card with at least two inputs, then as many other cards as available with at least one input per card.

Publication 14 already has procedures for multiple weighing elements connected to a single indicating element, but the procedures were primarily developed for no more than four to six weighing elements. These locations include applications such as redemption centers where weighing elements not intended to be summed together for scales, or CAT scales that indicate both non-commercial axle-load weights and the legal summed weight of all scales.

During the Sector discussion, one of the private sector members was concerned about the power supply. He suggested that the test should include the use of at least one weighing element or load cell simulator and "dummy" loads on the remaining inputs. This would demonstrate the devices ability to adequately power all channels and that the power

distribution among all channels did not affect the channels that were connected to a weighing element or simulator. This test would only be suitable if the power supply were contained within the indicating element. The weighing elements could however be powered locally on a network installation. Depending on the type of technology used for the interface (summing analog or digital signals), different testing procedures would be required.

There was also discussion on the intended application when an indicating element is interfaced with a large number of weighing elements. Some of the private sector members indicated that most of the applications would be for non-commercial applications such as process control, mixing, and prepackaging by weight. Commercial applications could include tank farms and shipping applications.

One of the public sector members asked the question if the device were capable of simultaneously displaying all weight indications, then these indications would be the first indication of the final amount the transaction was based and NTEP would stop evaluations at this point. Some of the public sector members responded that this might be the case in some applications, however, most of these devices do not simultaneously display all weight indications and frequently sum all or some of the indications for the final determination of weight that a transaction is based.

There was no discussion on the topic that NTEP or Handbook 44 should limit the number of weighing elements can be connected with a separable indicating element.

Conclusion: There appeared to be a consensus that the number of weighing elements interfaced with a single indicating element should not be limited by NTEP. However, there was no consensus on specific recommendations for type evaluation procedures. The Ohio Participating Laboratory was requested to evaluate the device in question with all load inputs connected to the indicating element. The inputs should include a combination of at least two scales and simulated power loads on the remaining inputs. The Ohio Participating Laboratory will then draft suggested test procedures for review at the next NTEP laboratory meeting in June 2002. The draft procedures and any additional concerns will be submitted to the Weighing Sector during the 2002 Sector meeting for review and comment.

14. Weight Display With a Disconnected Load Cell

Source: NTEP Participating Laboratories

Background: One of the participating laboratories discovered that if a load cell was disconnected from the indicating element, the device would retain and display a stable weight reading that could be printed or stored. The NIST Technical Advisor had noted in some earlier evaluations that an indicating element would display an error condition but may be incorrectly configured to send weight information to the printer or memory. This has the potential to facilitate fraud if the indicator appears to be operating normally.

Discussion: The Sector considered the following new language for Publication 14 "Section 11. Indicating and Recording Elements – General" to address its concerns about the retention of weight information.

11.17. If the indicating or recording element has the ability to disconnect the load cell(s) or weighing element input(s), any weight indication or other information (error codes) that remains on the display shall not be interpreted or stored in memory as a valid weight and cannot be printed. This should be tested and verified by disconnecting the load cell(s) or weighing element(s) during:

a negative gross weight or error condition,
a zero load condition,
a positive gross weight, and
an overload condition.

There were comments from the manufacturers that this proposal should only apply to indicating elements that have the ability to mechanically disconnect the load cell cable without the use of a tool or breaking a seal. One of the participating laboratories reported an evaluation where an unused load cell input (or weighing element) caused erroneous indications that could be interpreted as weight values. Another participating laboratory indicated that a power interruption while an input was disconnected also resulted in usable weight indications.

Conclusion: There was consensus among the Sector that a procedure should be included in Publication 14 to determine that such a condition exists and recommends that the NIST Technical Advisor amend the language to indicate that this procedure should not be performed if the weight input is "hard wired" into the indicating element. The amended language was balloted to the Sector in December 2001.

11.18. In the event the indicating or recording element can be disconnected from the load cell(s) or weighing element input(s) without the use of a tool or breaking a security seal, any weight indication or other information (error codes) that remains on the display shall not be interpreted, printed, or stored in memory as a valid weight. This should be tested and verified by disconnecting the load cell(s) or weighing element(s) while the indicating element is displaying: a negative gross weight or error condition, a zero load condition, a positive gross weight, and an overload condition.

11.18.1. First remove power from the indicating element, disconnect the load cell input or weighing element, then reapply power to the indicating element. The indicating element should display an error code or other meaningless information that cannot be interpreted, printed or stored as a correct weight.

Perform the test with the display at a gross load zero indication. Yes ☐ No ☐ NA ☐

Repeat the test with the indicator displaying the following conditions prior to removal of the load cell input.

A negative gross weight or behind zero error indication. Yes ☐ No ☐ NA ☐
A positive gross weight. Yes ☐ No ☐ NA ☐
An overcapacity indication. Yes ☐ No ☐ NA ☐

Reconnect the load cell. The display should indicate the correct weight or an error code or other meaningless information that cannot be interpreted, printed, or stored as a correct weight. Yes ☐ No ☐ NA ☐

11.18.2 Repeat the procedure described in 11.18.1, except the load cell input or weighing element should be disconnected with the indicating element connected to normal power supplies. The indicating element should display an error code or other meaningless information that cannot be interpreted, printed or stored as a correct weight.

Perform the test with the display at a gross load zero indication. Yes ☐ No ☐ NA ☐

Repeat the test with the indicator displaying the following conditions prior to removal of the load cell input.

A negative gross weight or behind zero error indication. Yes ☐ No ☐ NA ☐
A positive gross weight. Yes ☐ No ☐ NA ☐
An overcapacity indication. Yes ☐ No ☐ NA ☐

Reconnect the load cell. The display should indicate the correct weight, or an error code, or other meaningless information that cannot be interpreted, printed, or stored as a correct weight. Yes ☐ No ☐ NA ☐

15. Cash/Coin Acceptors for Self-Service ECR-POS Systems

Source: NTEP Participating Laboratories

Background: At the June 2001 Participating Laboratory meeting, one of the participating laboratories wanted clarification about cash acceptors criteria in the Liquid-Measuring Devices (LMD). There was consensus that the term "coin" should be included with the term "cash" when describing cash/coin acceptors on retail motor-fuel devices in Publication 14, Section 17 of the Liquid-Measuring Devices checklist. During the meeting it was noted that ECR-POS Systems interfaced with scales are now capable of accepting cards, cash, and coins at self-service checkout stands in supermarkets. There are no equivalent type evaluation procedures in the ECR Interfaced With Scales checklist. The existing checklist for cash acceptors are directed at cash activated applications that are different than self-service checkout systems. The emphasis of the existing LMD checklist is on accurately recording the coin/cash inserted into the system, consequences of a power interruption or deactivation, insufficient receipt paper, and provisions for returning cash/coin should the customer decide not to complete the transaction.

Discussion: The Sector discussed if procedures were needed in the ECR Interfaced with Scales checklist. The technical advisor modified the language for incorporation into the "ECRs Interfaced with Scales" test procedures using underlined for new text and ~~strikeout~~ of text to be removed. See Attachment to Item 15 for a copy of the cash acceptor test procedures from the LMD checklist modified for the ECRs Interfaced with Scales checklist.

Dennis Krueger (NCR Corporation) reported that the checklist referenced in Publication 14 for Liquid-Measuring Devices is intended for; unattended installations and was written to ensure that product was delivered, and provide information on how to receive change or refunds for product not delivered. For self-service checkout lanes in supermarkets, there is always an attendant to assist the customer. Additionally, there were no manufacturers of self-service checkout stands represented at this sector meeting that could provide additional input on the proposed checklist addition. Therefore, the proposed checklist addition should not be incorporated into Publication 14.

One of the participating laboratories indicated that they had evaluated a cash acceptor as a peripheral device at the request of the applicant in order for the cash acceptor to be listed on the CC.

Conclusion: The Sector recommends that the participating laboratories use the draft procedures on a one-year trial basis and report back to the NIST Technical Advisor with their comments. Additionally, the NIST Technical Advisor will attempt to contact the effected manufacturers of self-service checkout systems interfaced with scales for their comments on the proposed checklist addition.

16. On Screen display of required Table S.6.3. Markings and Version Number for Weighing Systems.

Source: NTEP Measuring Sector Participating Laboratories

Background: At the May 2001 NTEP Laboratory meeting, the Measuring Sector Laboratories discussed marking requirements for "software-based" devices such as electronic cash registers or "smart recording elements" interfaced with devices. In some cases, the indicator for the system is a generic computer display. If the required markings are placed on the display at the time of installation and then at some time future time the display is replaced, the required markings may be lost. The laboratories agreed that a real time or "software-based" display of the model, capacity, unit of measurement, and other required markings on the display are preferable. The laboratories also agreed that the information could either be continuously displayed or displayed by pressing a single key (a series of keystrokes could be permitted with on-screen prompts and directions). The laboratories agreed to forward a proposal to the Measuring Sector for consideration at its 2002 meeting. The intent of the proposal is to modify Handbook 44 paragraph G-S.1.1 to allow a real time display of the required marking information for software-based systems.

The Measuring NTEP Participating Laboratories recommended adding the following language to the last paragraph of G-S.1. Identification:

> For software-based devices the model and software version numbers may be shown on the display screen provided the required information is displayed either continuously or by pressing single key or

a series of keys. Clear instructions for accessing the identification information shall be provided when a series of keystrokes is required.

The Weighing Sector has permitted this on ECR systems and "smart recording elements" based on the interpretation that software-based markings were more permanent (and practical) than physical markings on compatible generic hardware not supplied by the OEM.

Discussion: The NIST Technical Advisor reported on the discussion and conclusion of the September 2001 NTETC Measuring Sector meeting. The Measuring Sector recommended the following language for submission to the NCWM S&T Committee:

> For software-based, not built for purpose devices, the required markings may be shown on the display screen provided the required information is displayed either continuously or by pressing single key or a series of keys. Clear instructions for accessing the identification information shall be provided when a series of keystrokes is required.

The NTETC-Measuring Sector also drafted a definition for "built-for-purpose" devices that was based on the Canadian definition (the definition was not available for review by the weighing sector at the time of their meeting).

The Weighing Sector supports the concept of allowing many of the required markings to be displayed in real time by the device however, felt that the markings should not be limited to "not made for purpose" devices and G-S.1. Identification information.

There were also concerns raised that the information could be overridden in the software and questions about whether NCWM would consider the information on a display as permanent. Some of the private sector members felt that as a minimum, there still needs to be physical markings on the hardware whether or not the device is "Made for Purpose."

Gary Lameris (Hobart Corporation) reported that Scale Manufacturers Association (SMA) is working on a uniform method for displaying marking information. Mr. Lameris will be presenting a proposal at the SMA meeting in November 2001.

Conclusion: The Weighing Sector could not support the language proposed by the Measuring Sector. The Weighing Sector supports the concept of the proposal; however, it feels that the language needs further development, should encompass other required markings, and should not be limited to "not built for purpose" devices.

The Weighing Sector's vote was 9 in favor and 3 opposed on the following alternate language for consideration by the NCWM S&T Committee as either a developing or informational item that modifies the General Code paragraphs G-S.1. Identification" and "G-S.7. Lettering."

> **G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:**
>
> **The required markings may be shown on the display screen provided the required information is displayed either continuously or by an operator action (such as keyboard entries, touch pad, etc). Clear instructions for accessing the information shall be provided, as a minimum, on the Certificate of Conformance unless the information is continuously displayed during normal operation.**
>
> **The manufacture and model designation shall either be continuously displayed or permanently marked on the device.**
>
> **G-S.7. Lettering. - All required markings and instructions shall be distinct and easily readable and shall be of such character that they will not tend to become obliterated or illegible.**

The required markings may be shown on the display screen provided the required information is displayed either continuously or by an operator action (such as keyboard entries, touch pad, etc). Clear instructions for accessing the information shall be provided, as a minimum, on the Certificate of Conformance unless the information is continuously displayed during normal operation.

17. Livestock Scale Capacities

Source: Cardinal Scale Manufacturing Company

Background: There appears to be some confusion regarding the acceptable minimum capacity requirements for on livestock scales. The 2000 Edition of NCWM Publication 14 states in section 64.1.2.1:

> If the capacity of the scale does not equal or exceed 110 lb per square foot, the scale is not suitable for weighing livestock (ref: Packers & Stockyards formula for determining the used capacity of Livestock scales).

Furthermore, at the end of section 64.1.1.1 of the checklist the following note also appears:

> Note: Used capacity should be based on 110 lb per square foot of platform area.

As of September 30, 2000 there were 25 NTEP Certificates of Conformance for Livestock Scales. Of these, 20 certificates listed models that had nominal capacities less than 110 pounds per square foot of platform area. Paragraph 64.1.2.1 appears to suggest that this requirement is based on a Packers & Stockyards Administration requirement.

When contacted, the Packers & Stockyards Administration representative stated that they do not consider the 110 pounds per square foot to be a requirement for weighing capacity but, rather, a value on the load-bearing capacity of the scale platform. Sometime during the 1940's a study was conducted to determine the force per unit area applied by cattle, sheep, and swine. After collecting and analyzing data, the 110 pounds per square foot value was deemed to be appropriate for cattle.

Many of the livestock scales listed on NTEP certificates are used in sales arenas where the scale platforms can be large. Based on the present 110 pounds per square foot requirement, and assuming a n_{max} of 10 000 and a e_{min} of 5 pounds, the largest platform size can be calculated by dividing the maximum capacity of 50 000 pounds by 110 pounds per square foot yielding a maximum platform size of 454.5 square feet. The 454.5 sq ft is too small for many sales arenas.

The maximum nominal capacity of a livestock scale is presently defined in S.6., Table S.6.3.a. and Table S.6.3.b. of Handbook 44 as the concentrated load capacity multiplied by the number of sections less one half (Note: This will change if language is adopted that CLC requirements no longer apply to livestock scales). Is it appropriate to define a minimum nominal capacity beyond the minimum number of divisions allowable for a Class III L scale?

The following is additional information from John Edmonds, GIPSA (formerly Packers and Stockyards Administration.

> **Used Capacity On Livestock Scales**
>
> Several years ago, Packers and Stockyards Programs (P&SP) personnel conducted a study to determine the used capacity of scales used to weigh livestock. The used capacity of livestock scales was determined for cattle, calves, hogs, sheep, and lambs. P&SP determined that in one square foot of usable scale deck, you could reasonably load the deck with 110 pounds of cattle, 70 pounds of calves or hogs, and 50 pounds of sheep or lambs. These weights are not absolute; for example, with very crowded loading of the scale, the 110 pounds per square foot for weighing cattle is slightly greater and the 70 pounds per square foot for weighing hogs is slightly less.
>
> The purpose of determining the used capacity was to reduce the amount of labor, equipment, and time it took to test a livestock scale. Frequently, P&SP found scales with a rated capacity greater than

what it could contain for actual use. For example, a scale marked with a capacity (beam/dial) of 20 000 lb, but the deck size could only accommodate 15 000 pounds of cattle based upon the platform size. In this example, the scale did not need to be tested to 20 000 lb since it could only be used to weigh 15 000 lb of cattle. Testing to 15 000 lb saved time, labor, and equipment needs and still met the testing needs.

P&SP does not have any information from the initial study. We did find the used capacity procedures in Scales and Weighing Memorandum No. 4, "Selection, Installation and Maintenance of Commercial Livestock Scales, dated June, 1967. This procedure is also referenced in, "The Examination of Weighing Equipment," National Bureau Standards, Handbook 94, issued March 1965.

Because the Packers & Stockyards Administration figure pertains only to the scale platform's ability to bear the force of multiple animals in a minimum area, Cardinal Scale Manufacturing Company proposed the following changes to Publication 14 to the Sector for discussion and review:

64.1.1 Performance Tests for Livestock Scales with 2 Sections:

64.1.1.1 If the load bearing ability of the scale platform does not equal or exceed 110 lb per square foot as specified by the manufacturer, the sale is not suitable for weighing livestock (ref: Packers & Stockyards formula for determining the used capacity of Livestock scales).

Conduct two sets of increasing load and shift tests over each corner . . .

~~Note: Used capacity should be based on 110 lb per square foot of platform area.~~

64.1.2 Performance Tests for Livestock Scales with More than 2 sections:

64.1.2.1. If the ~~capacity~~ load bearing ability of the scale platform does not equal or exceed 110 lb per square foot as specified by the manufacturer, the scale is not suitable for weighing livestock (ref: Packers & Stockyards formula for determining the used capacity of Livestock scales).

Discussion: The Sector considered the recommendation and justification provided by Stephen Langford (Cardinal Scale Manufacturing) and the additional information provided by Mr. Edmonds (GIPSA). The proposal as submitted would eliminate the confusion regarding minimum capacities on livestock scales. Further discussions indicated that Publication 14 requirements for 110 lb per square foot is in fact a tool used by Grain Inspection Packers and Stockyards Administration (GIPSA) and weights and measures inspectors to determine the suitability of the scale and determine the minimum amount of test loads that would be applied to the scale during official test.

Many of the public sector members felt that the 110 lb per square foot was a suitability requirement that should not be part of Publication 14. The private sector members also indicated that most livestock scales would have a lower capacity if they were designed with the used capacity of 110 lb per square foot.

It was also noted that Publication 14, "Section 64. Performance and Permanence Tests for Livestock Scales" will need to be amended if the requirement for livestock scale CLC markings is removed from Handbook 44 (See 2001 S&T Item 320-4 footnotes 12 and 14).

Conclusion: The Sector recommends that the 110 lb per square foot reference in NCWM Publication 14 be removed and recommends the following amendments to the Digital Electronic Scales Checklist Section 64.1.1. and 64.1.2.

Digital Electronic Scales Page 1-86

64. Performance and Permanence Tests for Livestock Scales

64.1 Initial Type Evaluation (Field) Performance Tests

64.1.1. Performance Tests for Livestock Scales with 2 Sections:

64.1.1.1. Conduct two sets of increasing load and shift tests over each corner at 1/4 the nominal capacity of the scale. Be careful not to exceed the CLC of a section when loading the weights. Record increasing/decreasing load indications as you add weights to or remove weights from the platform in at least five equal intervals. For the first set, perform this test on each corner and check zero balance before going on to the next corner. For the second set, complete the increasing load build up on one corner and move the weights to the next corner without unloading the scale. For each set when all the weights have been removed, record the return to zero. The scale must return to zero within one-half of a scale division. When analyzing the return to zero, consider the length of time the load was on the scale and for possible temperature changes that may have occurred during the test. Next, conduct an increasing/decreasing load test to the scale nominal capacity or at least to the used capacity by distributing the test load over the platform in at least five equal intervals and record the error for each interval.

~~Note: Used capacity should be based on 110 lb per square foot of platform area.~~

64.1.2. Performance Tests for Livestock Scales with More than 2 Sections:

64.1.1.2. ~~If the capacity of the scale does not equal or exceed 110 lb per square foot, the scale is not suitable for weighing livestock (ref: Packers & Stockyards formula for determining the used capacity of Livestock scales).~~ At least two complete sets of shift tests shall be conducted over each section. . . .

18. Zero and Tare on a Single Indicating Element Interfaced with Multiple Platforms.

Source: Ohio NTEP Participating Laboratory

Background: The Ohio NTEP Participating Laboratory has recently received several applications for indicating elements with multiple displays with the ability to simultaneously display the indication of each weighing element in addition to a summed weight display.

Publication 14 for Digital Electronic Scales, Section 34.7. Multiple Load Receiving Elements states that:

> "There must be a means for setting each weighing element to a zero balance indication. The zero-setting mechanism shall not operate independently on a summed weight indication when values for individual weighing elements can be displayed."

The current wording does not take into account the possibility that one of the two weighing elements may be out of the zero range. Additionally, there are no guidelines for the determination of tare and net weights especially when one of the weighing elements is empty. Ohio has included examples of different acceptable scenarios for both zero and tare. See Attachment for Item 18 for examples using multiple deck systems.

Discussion: The Sector reviewed and discussed the specific scenarios of multiple scale applications with individual and summed weight indications in the attachment to agenda item 18.

The current evaluation procedures in Publication 14 do not adequately address the scenario of zeroing multiple scales when one or more of the scales are out of zeroing range. This scenario raises the question about the operation of the semiautomatic (pushbutton) zero; is the zero setting means intended to re-zero all the scales. Another concern raised is should the summed indication, should the summed indication display an error condition or not zero any of the scales one of the scales is below zero. One of the private sector members noted that it is unreasonable to prohibit the re-zero of some of the scales if the indicator cannot re-zero all of the scales. It is a user requirement for the operator to maintain the zero condition of the scales. Some of the public sector members indicated that allowing the summed weight to be re-zeroed if one or more of the individual scales were out of a zeroing range may result in inaccurate

summed weights. It was reported that this is not the case in all applications. For example, hopper scales used in automatic bulk weighing applications are required to record the no-load reference for each draft. Additionally, "CAT" scales having summing indications for two or more vehicle scales installed end to end where the individual axle groupings rest on each scale. The axle weights are not considered "legal for trade" while the summed gross weight is valid if the summed indication started from a zero reference regardless of the zero condition of the individual scales. Type evaluation cannot anticipate all possible weighing applications. Manufacturers do not always know the intended application at the time they manufacture or sell a device.

There was also a discussion of tare for individual indications and the summed indications. The summed indication may contain weight information from scales with different division sizes. It was suggested that language be developed for this scenario based on the language for tare setting mechanisms on multi-interval/multiple-range scales and that indications and recorded representations of GROSS/TARE/NET are mathematically correct.

Conclusion: The Sector agreed that the examples described in the attachment for item 18 are correct and accurately represent a truthful representation of the loaded condition on each scale. The NIST Technical Advisor, Bill West (Ohio NTEP Laboratory) and Darrell Flocken (Mettler-Toledo) will develop language that incorporates the attached examples into acceptable use of the zero and tare features in a single indicating element interfaced with multiple weighing elements for Publication 14, Section 34.7. The draft language will be sent to the Sector members in attendance for review and comment by January 1, 2002.

19. Screen Savers on Electronic Cash Registers and Point-of-Sale Systems (ECR/POS)

Source: NIST

Background: In the past few years, ECR manufacturers have been adding screen saver features to CRT displays. The function of the screen saver can be metrologically significant because zero information may not be available to the customer and operator at the start of a transaction. Therefore the screen saver feature needs to be evaluated by NTEP to insure compliance to all requirements. This is particularly important if the CRT is also the primary display.

When ECRs with screen savers were first submitted for evaluation, the labs used applicable portions of the scales checklist (section 11.8.4, page 1-36 requires an explanation of dashes) or required that provisions were made that would allow the operator to comply with UR.4.1. Balance Condition. (G-S.5.1. General. - appropriate in design of the indicating element).

This issue was last discussed during the 1999 Weighing Sector. The Sector concluded that it was appropriate to treat a screen saver mode the same as a sleep mode. The same safeguards and requirements should apply. Language was added to the Scales checklist in Publication 14, but nothing was added to the "ECR Interfaced with Scales" checklist that specifically addresses the "screen saver" feature, and therefore, no procedures can be applied consistently to ECRs.

There may also be a problem with different field interpretations of Handbook 44, paragraph S.1.1. Zero Indication (c) since an inspector may expect that weight information or information other than a continuous digital zero indication must be displayed when the ECR is not in a normal operating mode.

The following are examples of screen saver systems are acceptable:

-The "active" weight display floats around a blank screen.

-The screen saver cannot be activated until a transaction has been completed. Once the transaction has been completed and the screen saver activated, the POS system automatically logs off the cashier thus requiring the cashier to log back on, giving the cashier the opportunity to verify zero before starting the next transaction.

-The display cannot enter the screen saver mode if the scale is not at zero, and anytime (if in the screen saver mode) the scale moves off of zero, the screen saver turns off.

Type evaluation should also verify below zero and over-capacity scale conditions in conjunction with the screen saver mode to ensure the performance of the system's screen saver mode is acceptable. The verification is important since

the output of many scales send only an error signal or other flag to the ECR along with below zero and over capacity weight information.

Additionally, screen saver modes may not be appropriate with self-service ECR/POS interfaced with scales without adequate directions for the customer.

Discussion: The Sector discussed the three "screen saver" options listed above. There was some discussion that the second option did not comply with Scales Code Section 2.20., paragraph S.1.1. Zero Indication. Subparagraph (c) in that the scale indication did not return to a continuous zero indication when the scale either drifted or was placed in an out-of-balance condition. Some of the other sector members were of the opinion that Handbook 44 paragraph S.1.1. was intended for devices in the normal mode of operation and not intended for other modes of operation that are not suitable for customer transactions such as the screen saver mode. The sector members agreed that this might not be appropriate for a stand-alone scale, however, when interfaced with an ECR, the system automatically logs off the cashier and requires cashier intervention to return the system to its normal operation where it becomes a user requirement for the operator to maintain the device at zero. There was also a suggestion that the Publication 14 checklist for Digital Electronic Scales be consistent with the ECR Interfaced with Scales Checklist.

Conclusion: The Sector agreed to recommend that the three examples listed in the agenda be incorporated into Publication 14 ECRs Interfaced with Scales checklist, and where applicable, in the Digital Electronic Scales Checklist. The NIST Technical Advisor will develop language for both checklists. The language was circulated and balloted among the sector members in mid-December 2001 with comments and suggestion due by January 4, 2002.

The Sector voted in favor of recommending language proposed by the NIST Technical Advisor for the 2002 Edition of NCWM 14 to the NTEP Committee (9 Affirm, 3 Neg.. 3 Abst. on the language for the Scales checklist and 8 Affirm, 3 Neg., 4 Abst. on the language for the ECR Interfaced with Scales checklist).

20. NTEP Evaluations and User Requirements in the Scale Code

Source: Maryland NTEP Participating Laboratory

Background: There has been some recent discussion that NTEP should not be evaluating devices for user requirements.

User requirements are directed to the owner and the operator of a device. User requirements apply to the selection, installation, use, and maintenance of devices.

Specification requirements relate to the design of equipment. They are directed particularly to manufacturers of devices.

Two user requirements in the Scales Code, paragraphs UR.1.4. Grain-Test Scales: Value of the Scale Division and UR.3.9. Use of Manual Gross Weight Entries, are currently included in NTEP evaluations. A determination should be made as to whether to remove these requirements from NCWM Publication 14 checklist or propose the removal of the items from the user requirements of the scales code and renumber them as device specifications.

One such example where Publication 14 criteria are base on a user requirement is the requirement that percentage calculations may not be displayed unless the value of the scale division is less than or equal to 0.2 g for loads up to 500 g and less than or equal to 0.5 g for loads greater than 500 g and references Scales Code paragraph, U.R.1.4. Grain-Test Scales: Value of the Scale Divisions.

The requirement applies to a specific type of scale. If the paragraph is intended for general-purpose scales used in grain applications, the wording and title should be amended in Handbook 44.

Handbook 44 Scales Code paragraph U.R.3.9. Use of Manual Gross Weight Entries list the suitable uses of manual gross weight entries such as postal scale applications and issuing credits based on weight in a POS system. The manual gross weight feature is a metrological characteristic however it is limited to certain applications.

The Sector also discussed paragraph UR.3.9. at the 2000 Sector meeting. Manual gross weight entry is not allowed in all applications. The Sector agreed the feature should be restricted to the appropriate use or it should be a sealable feature (on or off).

Discussion: The Sector reviewed the reference paragraphs to determine if they should be amended from User Requirements to device Specifications. The Sector noted that Scales Code paragraph "S.1.12. Manual Gross Weight Entries." is a device specification used in conjunction with paragraph "UR.3.9. Use of Manual Gross Weights." It was also noted the Publication 14, Digital Electronic Scales Checklist, Section 17. Manual Gross Weight Entries, does not have any code references listed.

One of the private sector members stated that manufacturers did not have a problem with the specification in paragraph S.1.12., but the suitability of a particular weighing application for manual gross weights is a user requirement and should be a field enforcement issue. However, the public sector members felt that the official will either tell the user not to use manual gross weights or instruct the user to disable the feature, which may require assistance from the manufacturer.

John Elengo (consultant) suggested that language could be included in the Certificate of Conformance that would list the suitable uses for the manual gross weight entry feature.

The NIST Technical Advisor also reported that there is a proposal to the NCWM S&T Committee to amend paragraph UR.3.9. Manual Gross Weight that would allow the entry of net weights determined on a different certified scale.

320-4 U.R.3.9. Use of Manual Gross Weight Entries

UR.3.9. Use of Manual Gross Weight Entries. – manual gross weight entries are permitted for use in the following applications only: (1) point-of-sale systems interfaced with scales when credit is being given for a weighed item, or when an item is pre-weighed and marked with the correct net weight; (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.
(Added 1992) (Amended XXXX)

The participating laboratories agree that NTEP should only evaluate compliance for device specifications and tolerances. They should however be aware of applicable user requirements. If a user requirement is intended to prevent the facilitation of fraud by a device feature, then the applicable Publication 14 sections should include the Handbook 44 reference for the feature and G-S.2. Facilitation of Fraud.

In the case of Publication 14, section 17. Manual Weight Entries, code references should be added to the checklist (Code References: as G.S. 2 and S.1.12.).

Conclusion: The Sector recommends that Steve Cook, NIST Technical Advisor, and Stephen Patoray, NTEP Director, work together and review Publication 14 to verify that all checklist requirements and procedures are referenced to applicable Handbook 44 paragraphs. They will provide a status report to the participating laboratories in June 2002.

Additionally, the Sector recommends the following underlined code references be added to Publication 14, Digital Electronic Scales, Section 17 (page 1-46) and Section 37 (page 1-61).

17. Manual Weight Entries

Code References: G-S.2. and S.1.12

17.1. Manual entries of gross weights are permitted for use in only the following applications: (1) POS systems when giving credit; (2) when generating labels for standard weight packages; (3) postal and package shipping scales when Yes ☐ No ☐ NA ☐

generating manifests for pick-up at a later time; and (4) on livestock scales to correct erroneous tickets.

37. Grain Test Scales

Code References: G-S.2., S.2.1.2., and S.2.3.

Grain test scales are those used for weighing grain samples to determine moisture content, dockage, weight per unit volume, etc. These scales may compute percentages based upon a stored sample weight and a load placed on the scale platform. The scale may also compute a weight per bushel or hectoliter based upon a specified volume of grain placed on the platform.

21. Weight Hold Feature on Indicators

Source: NTEP Participating Laboratories

This item was discussed at the 2000 NTEP Participating Laboratory meeting. A lab had an indicator that had a [Hold Weight] feature as a standard operational function. When it was pressed, the display holds the current weight information for 10 seconds. Afterward, it updated and refreshed the display. The manufacturer also provided a [live] key above the [Hold weight] key to allow the operator to update the display sooner. The device would not print while the display held the weight. The laboratory asked for input about the appropriateness of this feature.

The Participating Laboratories recommended modifying Publication 14, Digital Electronic Scales Checklist Section 19, by including the following language:

19.4 A "hold" feature, that is, a feature that locks a weight value into the primary display or permits the printing of the ticket is not acceptable.

They also recommended that Scales Checklist Section 36.13 for Livestock and Animal Scales Systems should be amended to include the proposed language shown above.

Discussion: The Sector reviewed the proposed wording. There was some discussion on the need for the [hold] weight feature on automatic indicating scales. It was also noted that many NTEP scales have the ability to print tickets or labels thus negating the need for the hold feature. The Sector felt that this feature was primarily intended for clinical (person-weigher) non-commercial applications.

After the meeting, the NIST Technical Advisor questioned whether Section 19, Facilitation of Fraud – Appropriate Design – Power Interruptions was the appropriate location for the language and recommended that the language be incorporated into Section 11, Indicating Elements – General.

Conclusion: The Sector agreed to recommend the following underlined language be incorporated into the next edition of Publication 14, Digital Electronic Scales, Sections 11 (page 1-37) and 36 (page 1-60) and will forward its recommendation to the NTEP Committee for approval.

11. Indicating and Recording Elements - General

Code Reference: G-S.2., G-S.5.1., G-S.5.2.2., and G-S.1.2

11.17 A "hold" feature, that is, a feature that locks a weight value into the primary weight display and permits the printing of tickets, is not acceptable. Yes ☐ No ☐ NA ☐

36. Livestock and Animal Scale Systems

Code References: S.1.1. and G-S.5.6.
Code Reference: G-S.5.1.
Code Reference: G-S.5.6.

Code References: G-S.5.1. and G-S.2.

36.13 A "hold" feature, that is, a feature that locks a weight value into the primary weight display and permits the printing of ~~multiple~~ tickets, is not acceptable ~~permitted~~. However, weight values may be stored into memory for scoreboard, CRT, or other nonadjustable memory if the animals are weighed prior to entering the sales ring and the weight values may be recalled when the animals enter the ring. Yes ☐ No ☐ NA ☐

22. NTEP Technical Policy Publication 14 Section B.5.b. Change Platform Area to Length and Width

Source: Maryland NTEP Participating Laboratory

Background: The Maryland Participating laboratory proposed a change to Publication 14 Section B.5.b Weighing Systems, Scales, or Weighing Elements of 30 000 lb or Less as follows:

b. have platform lengths and widths up to, but not larger *tnan, the device* evaluated at each capacity.

The justification provided was that no data has been presented to indicate that platform sizes larger than 125 percent of the device evaluated will perform accurately.

At its 2000 meeting, the Sector concluded that the present requirement which states that the models to be submitted for evaluation shall be those having the largest platform area and width for each of the capacities submitted is appropriate. The Sector also agreed that B.2. (2nd part b.) be revised as follows:

b. have platform ~~areas~~ *lengths and widths* up to but not larger than *125 percent of the length or width* ~~that~~ evaluated at each capacity,"

During the review of the changes planned for the 2000 Edition of Publication 14, it was noted that the proposed language in the Sector Summary, if taken out of context could be misinterpreted to allow an increase to both the length and width. Stephen Patoray and the NIST technical advisor editorially amended the Sector's recommended language to reflect the intent of the Sector and forwarded to the NTEP Committee the following (2nd part b. remains the same and added c.):

b. have platform areas up to but not larger than that evaluated at each capacity,

c. have platform lengths or widths not larger than 125 percent of the length or width evaluated at each capacity,

Essentially, the statement limiting the platform area to the device submitted for evaluation remains unchanged, and a new statement was added allowing for increased lengths or widths up to the limit of 125 percent. For example: a model with a platform 5 feet x 5 feet (25 ft^2) submitted would allow a model with a platform 4 feet x 6 feet (24 ft^2) to be covered by the CC.

Discussion: The language proposed by the Maryland Participating laboratory came from the Sector report. The amended language submitted to the NTEP Committee and subsequently adopted for Publication 14 had not been distributed to the Participating laboratories.

The NTEP Director reported that the language recommended during the 2000 Sector meeting would allow an applicant to build a 5' x 5' scale based upon the NTEP evaluation of a 4' x 4' scale. Increasing the length *and* width by 25 percent resulted in an increase of the platform area by 64 percent. This was not the Sector's intent at the 2000 Sector meeting. Some of the public members felt the language amended by the NTEP Director and the NIST Technical Advisor was still confusing and suggested the language in b. and c. be combined.

The NTEP Director also noted that there is no guidance in Publication 14 if a manufacturer submitted a 2000-lb capacity 4' x 4' scale and a 10 000-lb capacity 8'x10' scale, would the CC include a 4000 lb capacity, 8' x 10' scale. The question was asked about the sizes of platforms for capacities between the capacities that were submitted

Conclusion: The Sector recommends the following amended language for Publication 14, Digital Electronic Scales Technical Policy Part B Section 7, b. and c. be combined into one statement to clarify the intent of the Sector for acceptable changes to the platform for lengths and widths:

B. Certificate of Conformance Parameters

7. Other Platform Weighing Systems, Scales or Weighing Elements of 30 000 lb Capacity or Less

The models to be submitted for evaluation shall be those having:

a. the lowest capacity and the highest capacity
b. the largest platform area for each of the capacities submitted
c. the most resolution (highest number of scale divisions)
d. the smallest scale division value (d).

A CC will apply to all models that:

a. are within the range of capacities,
b. have platform areas up to but not larger than that evaluated at each capacity; with lengths or widths no greater than 125 percent of either dimension tested (i.e. If a 5' x 5' scale is tested and passes evaluation, then a 6' x 4' scale would be included on the CC. A 3' x 8' scale could not be included without additional testing),
~~c. have platform lengths or widths not larger than 125 percent of the length or width evaluated at each capacity;~~
c d. have the same number of scale divisions or fewer,
d e. are within the range of the values of the scale division,
e f. have a platform construction with material similar to that of the equipment evaluated.

The Sector also asked the SMA technical committee to draft size criteria (for scales less than or equal to 30 000 lb) for capacities that are between the capacities submitted for evaluation.

23. Parcel Shipping Scale Applications

Source: Maryland Participating Laboratory

Background: ***Ad hoc*** decisions have been made on shipping applications. NTEP focused on the response to four separate questions regarding printed and displayed information.

1. Should the shipping label for the packages be included in the evaluation of the system (G-S.5)?
2. What should be the minimum information requirements for the receipt?
3. Should the displays noted above increment in the same scale division as the primary weight display? Should the "package weight" display be marked with a capacity x d statement?
4. Since the system allows manual gross weight entries for initial direct commercial transactions, does this manner of operation comply with HB44?

The Sector reviewed the following laboratory responses for uniform language for shipping scale receipt and display information that could be incorporated into applicable sections of Publication 14 (Scales, MDMD, and AWS):

The shipping label for the package contains the actual weight, package dimensions (when applicable), and other applicable charges or alternatively, a reference number with the applicable information located in a computer file.

Question 1. Should the shipping label for the packages be included in the NTEP evaluation of the system (G-S.5)?

Laboratories Response: No.

Question 2. What should be the minimum information requirements for the customer receipt?

Answer: the minimum information on the receipt should include: actual weight, billed weight, package dimensions (when applicable), dimensional weight (when applicable) and the total price.

A. Are the abbreviations for weight (Wgt), and pounds (lbs) acceptable?

Laboratories Response: The abbreviations are unacceptable.

B. Should we use the terminology defined in the Multiple Dimension Measuring Devices Tentative Code? If not, what terminology should we use?

Laboratories Response: Use the following terminology defined in the Multiple Dimension Measuring Devices Tentative Code.

Information	MDMD Code Reference	Receipt and/or shipping label of DUT	Acceptable Abbreviations??
weight used in the computation of the charge (actual or dimensional)	Billed Weight	Billable Wgt	Billed Wt
actual weight	Scale Weight?	Actual Wgt	Scale Wt, Actual Wt, Scale, Actual, ? Gross?
package dimension	Dimensions	Pkg Dimensions/ DWT	Pkg Dim
dimensional weight	Dim Weight	Billable Wgt	Dim Weight, Dim Wt

Question 3. The "package weight" display (in the service window) and the "Actual Shipment Weight" display (in the detail window) are the actual weight of the package before rounding to the next pound. The value of the scale division in the displays (0.1 lb) is larger than the division of the primary weight display (0.05 lb).

a. Should the displays noted above increment in the same scale division as the primary weight display?

b. Should the "package weight" display be marked with a capacity x d statement?

Laboratories Response: The weight display may round; but it must round to the division in which the rate is determined, and it must be evaluated as a weight classifier. The display must be marked with the capacity x d.

The other scales are accessible in the operator's menus. The operator must select the scale model and communication port to enable an optional scale.

c. Should the additional scale parameters be made sealable or removed?

Laboratories Response: The parameters should be sealable or they should be removed.

Question 4. NIST Handbook 44 notes that manual gross weight entries are permitted for use in shipping applications when postal scales or weight classifiers are generating manifests for packages to be picked up at a later time.

The system allows manual gross weight entries for initial direct commercial transactions. Does this manner of operation comply with Handbook 44?

Laboratories Response: Manual weight entries are referenced in the User Requirements of Handbook 44. NTEP does not evaluate User Requirements.

Discussion: The Sector also discussed the same questions regarding shipping scale applications.

In response to question 1, the Sector agreed that NTEP should not evaluate these systems since this is probably outside the scope of NTEP.

In response to question 2, the private sector members indicated that there would be confusion and complaints among customers with what appears to be two different weights with the actual weight being smaller than the billed (classified) weight. The NCWM S&T Committee should address the subject of minimum receipt information.

There was no additional discussion on question 3.

In response to question 4, the Sector had some discussion that the manual input of dimensions has been accepted in the past. The device (ruler, tape measure and etc.) used to determine the dimensions was not part of the weighing system.

Conclusion: The Sector felt that this is a developing issue and that the participating laboratories should develop specific proposals to amend Handbook 44 and Publication 14 that would facilitate review and discussion of this item to arrive at acceptable printed receipt and display requirements in postal and shipping scale applications.

24. Last Item: Location of Next Meeting

Discussion: Maryland is next on the rotation for meeting locations at the full service participating laboratories. There were no alternate suggestions and the Sector indicated that is flexible with meeting dates from mid September to early October.

Conclusion: No further action is required by the Sector. The NTEP Director will notify the Sector with specific locations and dates.

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October 14-16, 2001
Albany, New York

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Chairman's Acceptance Speech
By Ross J. Andersen
July 17, 2002

I want y'all to know (Ron did I get that right?) that so much happened this week that I had to throw out my first speech and rewrite it. Perhaps this is a good thing. I was so busy I missed my opportunity to speak about weight carts.

The first task of each incoming Chairman is to recognize the outgoing Chairman. It is difficult to put into words what we are all thinking at this time. Ron, it was a great honor to be able to support you through this year as I did. Your courage in the light of great personal adversity has set a shining example for us all. This Certificate is just a small token of the high esteem with which you are held in this organization. Thank you from all of us.

I am feeling many emotions today, particularly the privilege to honor Ron. I follow a long line of men and women who have taken their turn to lead this great organization. I remember clearly the words of former Chairman Allan Nelson who noted that this is a very humbling moment. I know now exactly what he meant. Particularly in these troubled times I hope that I can turn the gavel over to Dennis with the organization even stronger than it is today.

I must of course express my personal appreciation to a few people. First is my family. My wife Carole has helped in so many ways. She has made her contribution by supporting my efforts and sharing me with the Conference. My son Adam also put up with my travel and the many times I couldn't go out and play. I'll go out one of these days and find that he is now ready to beat me on the tennis court.

I must also thank my coworkers at my real job. This includes Mike Sikula, my Assistant Director and all of my office and field staff who are taking up some of the slack. I must also thank my Commissioner and the other members of the Department's executive staff, who have supported my participation.

I would also like to express my appreciation to the NCWM staff. It has been such a pleasure to work with Beth, Bev (who is not here), Grace, Lynn, Linda and the others, just to get ready for today. Please give them a round of applause for their hard work.

Finally I want to thank the many members, both from public and private sector, who have given me encouragement as I prepared for this year.

I would like to make a few Appointments:

- To the NTEP Committee Chair– Lou Straub, Maryland filling in for Ron Murdock
- To the Board of Directors – Dave Frieders, San Francisco, California, replacing Dennis Ehrhart, Chair Elect
- To the L&R Committee – James Cassidy, Town of Cambridge, Massachusetts
- To the S&T Committee – Mike Sikula, New York, replacing Mark Coyne who completed his term
- To the A&P Committee – Ken Deitzler, Pennsylvania, replacing Mike Sikula, and
- Cato Fiksdal, Los Angeles, California, replacing Dave Frieders

In my tour of the regional meetings I tried to express optimism about the future of W&M. That might seem bold in this climate, but that is my nature. I always see the glass as half-full. I have a vision of stronger programs, better-educated inspectors, and a vibrant National Conference on Weights and Measures.

I have a number of important assets this year that will help me as Chairman. By far, the most important is the strategic plan. It is interesting how that changes my role as Chairman. First of all, it's not my plan, it's the NCWM's plan. The priorities are not my priorities, but the Board's priorities. They were selected by our committed Board of Directors to best promote the objectives of the Conference. And I get to implement the plan as a cheerleader, a role I am very pleased to play. Throughout my year as Chairman Elect, I actively promoted the strategic plan and its objectives.

In the plan we are working on some mega issues. These are complicated issues that will require work on a number of fronts all at the same time. This will be a challenge for me and for the Board. However we plan to make it less of a challenge for the volunteers. We have sought to keep the work projects shorter and more focused in direction, making the commitment smaller for our volunteers. Let me mention a few of those projects.

The first is to work toward greater harmonization with OIML. The Board worked the issue here at the Annual Meeting and you will be hearing more as we begin to implement strategies. It is critical to compare the US requirements to OIML. Where we can, we have an obligation to consider them in our deliberations. I believe we have already been doing this. At the same time, we need to be more active in international standards development to promote our position where we believe our approach is better.

The second is to revamp our training program and work towards an inspector and program certification program. There are several projects already in the works by the A&P Committee that have us headed in the right direction. At the same time we will be looking at other work that will tie those all together. I note that we usually speak about "training" our inspectors rather than "educating" them. How can we think of ourselves as professionals if we are always task driven? Without going into a lot of details I will be asking the A&P Committee to rethink and maybe reorganize our training system and look at developing a training plan or training outline that is organized around a group of core competencies. All that would be left at the specific task level are the items that are unique to that discipline. I have had some discussions with some experienced grant writers and believe that we will need to do this if we are to look to fund this by some type of grant, which brings me to the next item.

The third involves the proposal by Aves Thompson to seek federal funding to support development of weights and measures. This is certainly a bold proposal that leads us in a new direction. As I mentioned the other day, we certainly can question whether the federal government is shouldering its fair share in supporting legal metrology here in the US. This is a huge undertaking that will require a great deal of cooperation, but is well worth some effort.

The projects we start now will lay foundation of our future. I hope my successors will be committed to the plan and will bring these great projects to fruition.

The last item that I want to discuss is Change. In this time of rapid changes, our organization needs to be nimble. If we can't keep up we will be run over. The Board will be looking carefully at our organizational structure. We invited all the incoming committee chairs to a leadership training session here on Saturday. It is vital to moving forward on the strategic plan that we disconnect the work of the conference from the program and connect it to the strategic plan. By this I mean disconnecting some of our activities from the interim/annual meeting cycle and allowing them to go on at different rates. This ties in closely with our efforts to form task specific work groups rather than open-ended committees. As a result we move forward more quickly in those areas by not having to wait for the next meeting to get the project finished.

Before I conclude I would like to report some success in plucking some of the low hanging fruit in the strategic plan. We have instituted two list serves and created Hypertext versions of our Handbooks. I encourage you to take advantage of these new member benefits.

We are headed in a positive direction. I have selected the theme of "Moving Strategically into the Future" for the next year. We are working as a team, including our membership, both W&M and industry, our technical advisors both from NIST and from Canada. We have some bold objectives and I am excited to take on this challenge. I pledge to do my best to serve the Conference. I thank you for your support.

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2002 Annual Meeting Attendees

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Marcia Malone
Vendrick L. Massey
Shirley Quinn
Debbie Straub
Phyllis Thompson
Gillian Vormittag
Thomas G. Vormittag
Dawn Beitzel
Becky Carlsen
Cindy Deitzler
Pat Duncan
Penny Fogal
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Judy Kingsbury
Cindy Langford
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