# President's Address
# National Conference on Weights and Measures
# Chicago, Illinois
# July 11, 2006

**Dr. William A. Jeffrey**
**NIST Director**

Determining the accurate weight or volume of an object is fundamental to ensuring fair commerce. We all know this; everyone in this room lives this every day. But with the rapidly changing technologies and globalization of the economy, the types of products we will be called on to accurately weigh or measure will soon push our current capabilities to the limits.

So hang on – the future promises to be an exciting and dynamic ride!

But before we jump into the future, let's take a step back and see where all this began. The earliest known uniform systems of weights and measures date back 5000 years – to the Bronze Age and the ancient peoples of Mesopotamia, Egypt, and the Indus Valley.

At that point, the world population was estimated to be between 7 to 14 million – about equal to the current population of the state of Illinois. And not surprising, this period of time also coincided with a period of human progress and enlightenment including the dawn of writing.

The critical importance to society in adopting a uniform set of weights and measures can be demonstrated in that it appears to be a common discovery in virtually all cultures. Further evidence of its importance can be derived from the prominence that fair measures are given in seminal documents such as the Torah, the Bible, the Koran, The Analects of Confucius, and the religious texts in early India.

Most early measurement systems used parts of the body and the natural surroundings. Length was first measured with the forearm, hand, or finger and time was measured by the periods of the sun, moon, and other heavenly bodies.

The cubit is perhaps the oldest and longest-lived example of a standard measurement unit. The oldest documented cubit is the Egyptian royal cubit – traced back to 2750 BC and used for about 3000 years.

And the Egyptians took their cubit seriously. In fact, it has been reported that: *"The death penalty faced those who forgot or neglected their duty to calibrate the standard unit of length at each full moon..."*[1]

To measure volume, people would fill containers with plant seeds which were then counted. When means for weighing were invented, seeds served as standards. For instance, the carat, still used as a unit for gems, was derived from the carob seed.

In China, some 3500 years ago, a system of standard instruments for measuring length, mass, and volume was created. A special organization, *perhaps* the predecessor to NCWM, was established with the responsibility for checking the accuracy of these instruments twice a year.

The Chinese may also have been the first to use an unvarying physical constant as a standard of measure. Similar to the way we now use the distance light travels in a second as a length standard, 2700 years ago the Chinese used the resonance tone of bamboo whistles to ascertain a length standard.

[1] "Metrology – in short" 2nd edition, December 2003; an EU publication

The good news is that every country, region, and city-state recognized the need for a uniform set of weights and measures. The bad news is that virtually every commercial center developed its own *unique* measurement system making commerce between trading centers cumbersome.

The problems and confusion caused by this measurement menagerie did not go unnoticed. The Magna Carta, for example, called for "*one measure for ale, one measure for wine, one measure for corn*."

But the problem continued to grow. France in 1788 had about 800 different names for measures and, taking into account their different values in different towns, resulted in around a quarter of a million different units.

From this chaos, the beginnings of the metric system emerged.

Everyone in this room is aware that the U. S. federal responsibility for uniform weights and measures, was written, first, into the Articles of Confederation and, then, into the Constitution. What you may not know was how much attention this topic received from our top leaders.

George Washington called for uniform measures in his first State of the Union Address. Other early proponents of a uniform measurement system in the United States included Thomas Jefferson, John Adams, James Madison, James Monroe, and Alexander Hamilton.

In 1821, future president and then Secretary of State John Quincy Adams issued a report that described measurements as one of "*the necessaries of modern life*." He likened the metric system to the invention of the printing press and predicted that it would save more human labor than the steam engine.

In 1836, Congress directed that standards be distributed to the states. Two years later Congress directed that the Treasury Department distribute balances to the states to use with those standards.

But serious progress toward uniform weights and measures did not begin until the turn of the century – first with the creation of the National Bureau of Standards (now NIST) and four years later with the first meeting of the National Conference on Weights and Measures.

The second meeting of the Conference, held one hundred years ago fundamentally changed the way this country ensures uniform weights and measures. In 1906, this new organization drafted the outline of a "Model State Weights and Measures Law," which was formalized the following year.

This organization jumped into the breach, addressing an unmet fundamental need that was undermining the performance of the national economy.

There are many stories from that period – each one a telling reminder of the incredibly valuable role that weights and measures operations play.

For example, the proceedings of the 1906 meeting pointed out that the entire salaries of clerks in New York groceries and butcher shops were paid with the money they cheated out of the public – by, in effect, keeping a thumb on the scales.

The inspector's righteous anger was well-founded. Around 1910, NBS staff tested more than 30,000 scales across the United States and found that almost 50 % were significantly off – and, not surprisingly, in favor of the storekeepers.

The annual loss at that time to the consumer in butter alone amounted to more than $8 million.

History repeated itself 90 years later. In 1997, NIST staff assisted a collaboration of 40 states, the USDA, the FDA, and the FTC in investigating school prepackaged milk. They found that 45 % of containers were short filled, at a cost to consumers of nearly $30 million.

The weights and measures system is a key component of the Nation's technical infrastructure. It is basic to the flow of commerce, to the functioning of our economy, and to realizing the Nation's ambitions to remain a leader in technological innovation.

Ken Alder, a history professor at Northwestern University, reasons that our measurement systems are, in fact, a defining characteristic of who we are as a nation. He makes the case eloquently in the prologue of his book, *The Measure of All Things*:

> *"… the use a society makes of its measures expresses its sense of fair dealing. That is why the balance scale is a widespread symbol of justice. . . Our methods of measurement define who we are and what we value."*

Put another way, measurements are about *trust*, *confidence*, and, in the antiseptic terminology of the economist, *transactional efficiency.*

Every commercial transaction has an element of trust. Trust cultivated over time breeds confidence. Reliable, accurate measurements are the vital ingredients of both, but especially in transactions that lack transparency, such as in the sale of fuel.

Thanks to what this organization and NIST have accomplished together, American consumers and businesses can be confident in the quantity of product being purchased – making transactions more reliable and cost effective.

Analyses done in the United States and in other developed economies demonstrate that weights and measures underpin transactions that account for over half of the GDP.

And continual verification of the accuracy is critical. In 1997, a Canadian case study reported that, on average, each weights and measures inspector discovered and corrected about $2 million worth of "measurement inequity."

Unfortunately, we don't have a comparable estimate for the United States. But we do know that in 2002, the median investment in state Weights and Measures operations was about $50,000 a year for each inspector.

If we assume similar levels of performance in the United States as in Canada – about $2 million in benefits per inspector – then a rough estimate of society's rate of return would be 40 to 1 – a phenomenal result.

Not all countries have the same rigor in checking and enforcing their weights and measures. In a 2002 survey, 93 % of U. S. gas meters fully complied with required standards. Compare that with Mexico. Mexico's consumer watchdog agency recently found that pumps at 90 % of the country's gas stations dispense less than indicated – on average, about 1 liter less for every 20 liters sold. This rigging of gas pump meters cheats the Mexican consumer out of about $1 billion per year[2].

With the advance of technology and the growth of the global economy and its increasing interdependencies, accurate weights and measures will become even more important. And like most components of the Nation's technical infrastructure, the system will be challenged to do better – and to do more.

Clearly we must keep up with the quickening pace of innovation. New technologies can transform the marketplace and consumer expectations. And as these new technologies arrive in the marketplace, we must be able to continue instilling the level of trust in the transaction that members of NCWM have been doing for the past century.

For example, anyone who owns a car or pays an electric bill understands why the government is aggressively pursuing new forms of energy. Biofuels are already established in some countries and will likely see increasing demand in the United States requiring new tests for purity and volume. Since many different processes can convert biomass into fuel, we need to have a variety of tests and procedures at the ready to meet the demand.

[2] Source: *Los Angeles Times*, June 13, 2006

Slightly longer term, the Nation is committed to exploiting hydrogen to fuel the economy. Almost every stage of hydrogen production, distribution, and sale will require new measurement tests and methodologies to establish confidence in the transaction. Today when we drive to a gasoline station, we don't worry because we know the fuel pump reads accurately to better than 0.1 %.

But what happens in the future when we drive to the service station to buy a tank of hydrogen? The infrastructure to measure hydrogen fuel accurately does not exist. Anecdotal evidence from current demonstration facilities indicates that we're at about 8 % accuracy. This is equivalent to over or undercharging about 20 to 25 cents per gallon of gasoline-equivalent.

NIST is committed to working with the Department of Energy and state and local officials to ensure that the required tests are established in a timely fashion so as not to impede the development of the hydrogen economy. In fact we are establishing a program at NIST as part of the American Competitiveness Initiative to accelerate efforts in hydrogen standards.

New technologies will require novel approaches to addressing measurements in the future. To get a feel for the evolving demands in the future, just look at the magnitude of current weights and measurement requirements in today's laboratories – which often foreshadow the requirements in the marketplace.

Researchers at NIST currently have requirements to measure force from picoNewtons to MegaNewtons (18 orders of magnitude). For example, NIST has a 4.4 MegaNewton deadweight machine that is used for testing the strength of bridge abutments. This is the largest such device in the world.

On the small end, we are measuring the force to pull apart a single DNA molecule – 65 picoNewtons – which is equivalent to the momentum imparted from the photons from 6 laser pointers.

And as nanotechnology quickly evolves into a potentially trillion dollar industry over the next decade, the requirements for measuring mass and size at the smallest scales will become critical. We are not yet ready for the amazing potential that nanotechnology offers, so NIST – again as part of the American Competitiveness Initiative – is also accelerating its efforts in the development of nanometrology.

NIST is committed to work with the Conference to ensure that the requisite weights and measures methodologies are developed before the consumer demands them. Supporting this mission is one of NIST's oldest – and remains one of our most important – functions.

In this year's State of the Union address, President Bush outlined the American Competitiveness Initiative, which is designed to enhance the Nation's capacity to innovate and remain globally competitive. As part of this initiative, NIST's core budget will be increased, while most of the federal Government's non-defense discretionary budget experiences a decrease. This is a tremendous recognition of the importance of the NIST mission and the recognition of the role that weights and measures plays in keeping the United States economically strong.

For over a century, NIST and the Conference have been strong partners. Going forward, we must build on our shared accomplishments. The world is smaller, trade is global, and technology is international. Weights and measures must keep up with the changes.

NCWM can benefit from NIST's technical expertise, its experience with standards development, and its position in the international measurement system.

NIST can benefit from NCWM's forum for bringing all stakeholders together, their ability to reach many jurisdictions simultaneously, and their ability to influence state and local programs.

While it's impossible to predict where the future will lead, it's likely that it will require the NCWM, NIST, and our weights and measures system to reach new heights, address new needs, and build new capabilities – including some that may even appear alien to our shared experience over the last century.

NIST looks forward to working with NCWM over the next century in making this all possible. Thank you.

# Chairman's Address
# National Conference on Weights and Measures
# Chicago, Illinois
# July 11, 2006

**Don Onwiler**
**Nebraska Department of Agriculture/Weights & Measures**

Thank you, Dr. Jeffrey, for your support of the important work of the National Conference on Weights and Measures and the NIST Weights and Measures Division, as exemplified by your presence here today and your comments. The pulse rate of volunteer organizations, government agencies, and private industries may weaken from time to time under the influence of economic constraints, but the necessity of the work we do does not waiver. It is in our mutual best interest to assist each other in strengthening our abilities to meet our respective charges that are so frequently for the benefit of common stakeholders.

Thank you, NCWM, for what has proven to be a journey beyond my expectations of serving as your Chairman. Never did I expect to receive so many offerings of assistance and support. It makes serving all the more an honor, knowing such fine professionals are at one's side to assure success.

Never did I expect the magnitude of professional growth offered by serving in this capacity. Had I known a year ago what I know now, there are a few things I would do differently, but there are no regrets.

Never did I expect to be so sorry, yet so grateful, to see it come to an end. It will be good to get back full time to my duties at home, but this has been a wonderful year and I am excited with the prospects for the future of NCWM.

Our theme this year has been *Back to Basics as Stepping Stones to our Future*. In all of our activities, I have done my best to ensure that we are implementing those basic elements that have proven successful in the past in helping us reach our objectives. It has not been my goal to make a mark or leave a legacy except that we would be on the right track in all of our endeavors.

One of those endeavors has been to continue revitalizing our working relationship between the NCWM and NIST. We faced a potential setback when, just prior to assuming my Chairmanship, we learned that Henry Oppermann was leaving his position as Chief of the NIST Weights and Measures Division. The selection of Carol Hockert as the new Chief put any of my anxieties to rest. Carol has demonstrated a commitment to continue working effectively with NCWM toward goals of mutual benefit. Carol's understanding of weights and measures in the United States is only surpassed by the level of energy she brings to everything she does. Carol, I congratulate you and wish you every success.

One of the difficulties faced by field officials and the NCWM has been in finding an effective and responsible method of addressing software in weighing and measuring systems. To address this problem, the NCWM has implemented the National Type Evaluation Technical Committee approach. Also known as "sectors," these groups have been most successful in the past in dealing with device-related issues. As we discussed yesterday, the Software Sector is up and running. Our thanks go to Jim Truex for his willingness to serve this sector as its Chair. As a side note, Jim and I were amused to have so many software engineers in one room, yet none of them had a definition for software. He mentioned at the CWMA meeting this spring that we defaulted to a definition from a 1970 dictionary sitting on a shelf back in Nebraska. Judy Cardin was quick to point out that in Nebraska software is defined as a no-starch cotton shirt with bib overalls.

Another focus has been to conduct our first NCWM marketplace survey, targeting inspection of random-weight meat and poultry packages wrapped and labeled for sale at retail. We started with joint planning between the Board of Directors and NIST Weights & Measures Division. Soon, we were carrying out our respective roles to ensure its success. Roger Macey of the California Division of Measurement Standards stepped up to manage this initial

survey. Thank you, Roger, for your assistance and, Mike Cleary, for sharing the talents of your staff with us. This survey has been a fine example of the cooperative spirit within our system.

With the preparation and field inspections completed, we will proceed with data entry and begin analyzing that data. Our goals for this survey are simple. This marketplace snapshot should demonstrate a difference in levels of compliance between those jurisdictions with a regulatory presence and those jurisdictions without a regulatory presence in the discipline of package testing. The data may aid jurisdictions in securing adequate funding for these activities, especially where funding has been limited primarily to device inspections. We will also examine our ability to use this type of survey data to gain stronger public awareness and appreciation for weights and measures regulatory activities.

A basic element to the success of NCWM is a large and diverse membership base and strong participation at our meetings. We understand that two things must happen as we recover from the economic stresses of the past five years. First, we must provide real value in membership. Second, we must have a method of outreach to prospective members, the stakeholders whom we affect. As an organization becomes less effective, members find less benefit in participation. A downward spiral ensues to the point where the organization can no longer support its mission. Conversely, as an organization becomes stronger and provides increased benefit for membership, current and prospective members can see value in participation. Under this scenario, the organization increases its pool of experts and volunteers. It becomes easier for the organization to take on difficult issues with methodical proficiency.

This is the direction I believe our organization is moving. We must improve in providing meaningful benefits to membership while we increase efforts to market our organization to these prospective members. Success will be measured not only by numbers, but more importantly, by our agility in addressing the difficult issues that are brought to our table.

Most of you have had an opportunity to participate in a survey to help us fully understand where we can improve. Based on the responses to that survey, a team within the Board of Directors has developed marketing strategy options designed to promote membership and participation in NCWM. The Board was presented with these options this week. Some improvements you will soon see include on-line meeting registration and on-line membership renewal capabilities on our website.

There are many interesting dynamics in serving the NCWM as its Chairman. Ultimately, I would say effective communication is the key in everything we do. As an example of communication barriers, I'll share a story. During a break at the NEWMA meeting this spring, Mark Coyne of Brocton, Massachusetts, said to me, "All this increase in ethanol use must be really good for the con business in Nebraska." I said, "Excuse me?" I did <u>not</u> appreciate Mark characterizing the ethanol business in Nebraska as some sort of scam. He said, "The con business must be really good in Nebraska right now with all the ethanol." At this point, I was beside myself, when Bob McGrath came to the rescue. Bob said, "The <u>corn</u> business, Don." Now, it's not that Bob speaks any differently than Mark. Bob's from Massachusetts, too. But Bob and I have served on the Board together and, as scary as it may be, I can actually understand the man.

Just the week before, I was attending the Milestones in Metrology Congress in The Netherlands. If I can have difficulty communicating with a guy I've known for years right here in my own country, imagine how difficult it can be communicating with people from various parts of the world whom I'm meeting for the first time. The words we use may be taken very differently than intended. We have to overcome this and communicate more effectively and more frequently. In the process, we will begin to know and understand each other.

It was suggested to me by one of the attendees at the Milestones meeting that because the United States is the largest economic power in the world, we have the attitude that it's our way or no way when it comes to weighing and measurement standards. I was surprised by this comment considering all the efforts and progress we've made toward harmonization over the past several decades. I simply smiled and told him many of my colleagues in the United States say the same thing about the European Union. We both found this amusing, realizing that the combination of attitudes and limited communication can go a long way in supporting barriers to progress.

Thank you, Pieter van Breugel, Director of NMi in The Netherlands for being here this week to learn more about the NCWM. It is another step toward gaining mutual understanding in the international community. Thank you also, Pieter, for the opportunity you gave me to speak, listen, and learn at the Milestones meeting. The primary purpose for NCWM presence was to help the rest of the world understand our system and our approach to the Mutual Acceptance Arrangements for OIML, but it also provided me a much greater understanding of the dynamics in play in the international community. It was a terrific exercise in communication.

Of course, the NCWM has long recognized the need to work together with outside interests toward harmonization and mutual recognition. NCWM and Measurement Canada have collaborated for many years. We have learned through this cooperative effort that it is not necessary for our standards to be identical, yet we can still allow for a single type evaluation to serve both countries' type approval needs. In 1994, the NCWM and Measurement Canada broke new ground by forming a Mutual Recognition Agreement that allowed sharing of type evaluation data for the purpose of administering our respective type approval programs. This early agreement was for scales up to 500 kilograms in capacity and for electronic indicators used for scales. In 2002, we initiated a pilot program, expanding the Mutual Recognition Agreement to include retail motor-fuel dispensers. These Mutual Recognition Agreements signify our desire to work together for the betterment of our organizations and our stakeholders in North America. It is my honor at this time to invite Alan Johnston, President of Measurement Canada, to join me in signing a renewal of the Mutual Recognition Agreement for retail motor-fuel dispensers, expanding it from a two-year term to a five-year term.

(Signing of the MRA)

For several decades, the NCWM has recognized the benefit to industry that international harmonization would provide. Our partners at NIST have been diligent in representing the United States at the international table so that harmonization can take place on both sides for better and more uniform standards for everyone. As we have learned from our experience with Canada, it is possible to collaborate in type evaluation even though our respective standards are not identical.

Now we find ourselves again breaking new ground in international recognition agreements in legal metrology by entering into the Mutual Acceptance Arrangement for OIML R 60, load cells. Under this arrangement, NCWM will accept type evaluation data from participating laboratories in other countries for the purpose of issuing NTEP certification. Chuck Ehrlich and Steve Cook of NIST and Steve Patoray, our NTEP Director, have been instrumental in helping NCWM reach this point. They have represented U. S. and NCWM interests in international meetings and provided great assistance to the NTEP Committee and Board of Directors as we formed our decisions.

Today, I will sign two more documents on behalf of NCWM. The first is the Acceptance Form indicating we accept all participants in the agreement. The second is the Document of Mutual Confidence, or DoMC. This is the formal document entering the NCWM and the United States into the Mutual Acceptance Arrangement for R 60 load cells. We have the added honor today of witnessing Alan Johnston sign the DoMC entering Canada into the MAA for R 76 and Pieter Van Breugle signing the DoMC entering The Netherlands into the MAA for R 60. So now, it is my privilege to invite Regine Gaucher, BIML, to present these documents for signature. Alan and Pieter, please join me as we celebrate in the signing of these documents. I also invite Chuck Ehrlich, Steve Cook, and Steve Patoray to join us in recognition of their dedicated efforts to make this event possible for the NCWM.

(Signing of the MAA)

The NCWM has continued to move forward through difficult challenges thanks to the hard work of many people and organizations, including our partners at NIST, our colleagues from across the ocean, our neighbors in Canada, the staff at Management Solutions, and of course, all of you within NCWM who volunteer your time, talent, and expertise. There is a reason why we present awards of recognition each year during our opening ceremony. In the course of the history of NCWM since 1905, volunteerism has been the key to our success. We celebrate you.

Thank you.

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# New Chairman's Address
# National Conference on Weights and Measures
# Chicago, Illinois
# July 13, 2006

**Michael Cleary**
**California Department of Agriculture/Weights & Measures**

Thank you, Don, and hello to everyone. And thank you all for being here. I know you are all probably anxious to return home to your families. I promise I won't keep you too long. I am truly honored and privileged to stand here today as your Chairman.

I want to thank everyone for the many expressions of congratulations and offers of assistance that I have received – not only this past week but in the last year as I made my rounds as your Chair-Elect.

I would also like to express my thanks and appreciation to all those past officers, committee members, chairmen, and industry representatives who, through their diligence, commitment and long hours, have ensured the continuation and maintenance of our wonderful conference.

I consider our conference to be one of the best examples in the world of a time-tested consensus organization comprised of government, industry and consumer interests working together towards our collective common goals – consumer protection, equity in the marketplace which results in a level playing field for everyone to do business.

That having been said, I would like to tell you what my theme for this year is and why I have chosen the phrase, "United by common purpose we can and shall prevail in all that we do." First of all because it sounds cool, and I've always wanted to use the word 'prevail' in a sentence. But in all seriousness, more now than any other time it is imperative that we find ways to work closely with our partners to achieve success. Now more than ever we have to realize how, in the words of Thomas Freidman, "The World is flat and getting flatter by the day." The global marketplace is a reality, and we must face that challenge head on.

Considering our existing agreements with our partner nation Canada and our upcoming OIML agreement on R 60, we have started to face that challenge, but there is more work to be done. Whether it be in the USA, Asia, Europe or anywhere else in the world our many partnerships take us, our collective mission remains the same – equity, quality, fairness, and, when at all possible, uniformity.

This next year we will continue to work to enhance our partnership with NIST WMD, our closest and most-valued federal partner. I very much look forward to working with Dr. Jeffery, Belinda Collins and Carol Hockert as this long-time, mutually beneficial partnership continues to evolve and improve. I feel our collective success depends on our mutual reciprocity. And by partnership I do mean full partnerships with all those we work with. We, the NCWM, will not follow; we will not and cannot afford to wait to be led.

Our national marketplace survey is an example of how we must seize opportunities as they occur and lead when necessary. We have to be proactive and anticipate the changes that will most certainly occur in this modern global economy. Working together we can and will accomplish wonderful things and make investments in our future. One example of this is how our PDC committee is working in partnership with our regional associations in order to improve the competency of our membership through training and certification. Another is how our L&R and S&T committees, along with our sector groups, are working diligently and in the true spirit of due process and disclosure with all those concerned.

This professional effort has resulted in some of the most comprehensive and well thought-out proposals in the history of this conference. I will continue to support any and all recommendations on how to improve that process.

But know this, I have confidence and trust in the standing committees, and I am secure in the talent we have to do the work we need to do. I promise not to get in the way.

Will there be challenges? Of course! We will need to address issues within the conference itself such as the recruitment and mentoring of new talent for leadership in this organization. We also need to concentrate on the recruitment of new members in general, retain current membership and improve this conference in order to increase the overall value to our members.

We must also make sure to take every opportunity to get our message of value out to the public at large. This is a big challenge, I know, but I am confident that, working together, we shall and will prevail in all these areas of concern.

In closing I would again like to thank you all for this opportunity to serve, and for your trust in me and your Board of Directors. At this time I would like to make the following appointments to the standing committees:

To the BOD to fill the vacancy caused by Judy Cardin's advancement to Chair-Elect, I have recommended to the Board, and they have voted in the affirmative, Steve Malone from Nebraska.

To the L&R Committee, I have re-appointed Joe Benavides for another term.

To the S&T Committee, I have appointed Kristin Young from Colorado.

To the PDC, I have appointed Stacy Carlson, Marin County, California; John L. Sullivan, Mississippi; and Ross Andersen, New York.

Nominating committee:
Thomas Geiler
Ross Andersen
Steven Malone
Dennis Ehrhart
Maxwell Gray
Jim Truex

Chaplain:
Mike Belue

Parliamentarian:
Lou Straub

Credentials Committee:
Raymond Johnson

## NCWM 2006 Annual Meeting Honor Award Recipients

| Full Name | Organization | State | No. of Years |
|---|---|---|---|
| Steven Cook | NIST, Weights & Measures Division | MD | 10 |
| Clark Cooney | Oregon Department of Agriculture | OR | 10 |
| Rodney Cooper | Actaris Neptune | SC | 10 |
| Chuck Ehrlich | NIST, Weights & Measures Division | MD | 10 |
| Dennis Johannes | California Div. of Measurement Standards | CA | 10 |
| Vincent Orr | ConAgra Foods | NE | 10 |
| Cary Woodward | Hamilton County Weights & Measures | IN | 10 |
| Richard Suiter | NIST, Weights & Measures Division | MD | 20 |
| Aves D. Thompson | Alaska Div of Measurement Standards/CVE | AL | 20 |
| James Truex | Ohio Department of Agriculture | OH | 25 |
| Charles Carroll | Massachusetts Division of Standards | MA | 25 |
| Thomas Geiler | Town of Barnstable | MA | 30 |

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