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U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Report of the 63rd National Conference on Weights and Measures 1978



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Report of the

63rd National Conference on Weights and Measures 1978

*Sponsored by the National Bureau of Standards
Attended by Officials from the Various
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Representatives from U.S. Government,
Industry, and Consumer Organizations
Washington, D.C., July 9-14, 1978*

Report Editors: Harold F. Wollin
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Abstract

This is a report of the proceedings (edited) of the Sixty-Third National Conference on Weights and Measures, sponsored by the National Bureau of Standards, held in Washington, DC, July 9-14, 1978, and attended by State, county, and city weights and measures officials, and representatives of the Federal Government, business, industry, and consumer organizations.

Major issues discussed at this Conference included metric conversion in the United States; problems relating to the quantity fill, labeling, and inspection of packaged commodities; requirements covering the design and performance of new weighing and measuring technology; and recommendations for improvement in weights and measures administration.

Key words: Consumer affairs; education; electronic devices; electromagnetic interference; International Organization of Legal Metrology; measurement assurance; metrication; model laws and regulations; national type approval; packaging and labeling; specifications and tolerances; vapor recovery; weights and measures.

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METROLOGY WORKSHOPS

There were three metrologist's workshops scheduled during Conference week. The purpose of these workshops was primarily to train State and local metrologists in laboratory calibration procedures and techniques.

MANUFACTURERS' EQUIPMENT AND PRODUCT DISPLAY

An informal display of new equipment and products by manufacturers and suppliers was held on Monday afternoon from 4:00 to 7:00 p.m. for the education of the Conference delegates.

MONDAY, JULY 10, 1978
and
TUESDAY, JULY 11, 1978

OPEN COMMITTEE HEARINGS

Monday and Tuesday were set aside for hearings of the five Conference standing committees. Notices of these hearings were carried in the Conference Announcement booklet, in all pre-Conference publicity, and in the printed Conference program. Many delegates participated in the committee hearings and presentations were given by representatives of weights and measures, industry, government, and consumer groups. The discussions which took place played an important role in guiding the committees in their deliberations and preparations of their final reports. The final reports of the committees will follow later in this publication and will reflect the discussions that took place and the actions taken by the Conference at the time the final reports were presented to the delegates.



EMI—A PROBLEM OF GROWING CONCERN

Presented by CHARLES K. S. MILLER, EMI and Radiation Hazards
Metrology Section, Electromagnetic Fields Division,
National Bureau of Standards



This paper gives the weights and measures community a non-technical view of electromagnetic energy and it presents a brief overview of the electromagnetic interference (EMI) problem. It suggests some ways in which EMI may be encountered in this community. It discusses some of the mechanisms which cause the EMI problem, and what NBS is doing toward providing tools with which to address the problem.

INTRODUCTION

This paper is intended as a briefing on a new environmental concern, one that is frequently referred to as electromagnetic pollution and is technically or generically referred to as electromagnetic interference or EMI. This type of interference has also been referred to by narrower interests in such terms as TVI (television interference) or RFI (radio frequency interference). The concern stems from the increased use of electromagnetic energy in our sophisticated technological society. As a society, we now generate in localized areas far more electromagnetic energy either intentionally or accidentally than that which is produced by nature. This form of energy can have deleterious effects directly to living organisms or to electronic circuits upon which we are becoming very dependent.

This paper presents a perspective of the EMI problem and describes how it has come to exist. An explanation is given of the mechanisms by which EMI exists to help the uninitiated to grasp the complexity of the problem. Finally, a brief summary is given of the National Bureau of Standards program designed to address the EMI problem.

WHAT IS THE EMI PROBLEM?

First, let it be clearly understood that electromagnetic (EM) energy is a common form of energy and that it has existed since the beginning of the universe. EM energy covers a wide gamut of the spectrum; we feel it as heat, we sense colors and use it to see

with as it bounces off objects (i.e., light), we use it to see into opaque objects when we use x rays, we use it to communicate with when we listen to the radio, watch TV, talk to friends by CB or mobile radio, and so forth. Ultraviolet rays give us sunburn or suntan. EM energy can come in many forms such as radio waves, microwaves, infrared waves (heat), light, x rays, gamma rays, and cosmic rays to name a few.¹

Nature generates EM energy in the form of radio waves, microwaves, infrared waves (heat), light, ultraviolet waves, x rays, gamma rays, and cosmic rays. The sun, for example, generates all those mentioned and possibly more that we do not know about. This type of energy has fed and supported life on earth since the beginning of time.

Man has only recently studied and independently generated this type of energy through his technological achievements. In 1873, James Cavendish, an eminent British scientist, postulated the existence of EM radiation.

This paper addresses EM energy only in the lower frequency (longer wavelength) portion of the electromagnetic spectrum, from electric power through microwave frequencies. This region of the spectrum is referred to as non-ionizing radiation or "safe" radiation as distinguished from x rays, gamma rays, and cosmic rays at much higher frequencies. These longer waves in the lower frequency part of the EM spectrum cannot be smelled, tested, felt, seen, and only in rare cases heard.

Maxwell's theory of electromagnetic radiation was confirmed in 1888 by the German physicist Hertz who produced the first man-made electromagnetic wave. Later scientists and inventors, most notably Marconi, built equipment to send and receive electromagnetic waves, in the radio range of the spectrum. This led to wireless telegraphy and then to voice transmission. The radio industry was born.

Until World War II, the primary use of this lower portion of the electromagnetic spectrum was radio waves. Microwaves were discovered in the 1930's and led to the development of radar during the War. After the War, radar was adapted for a number of civilian

¹The only difference in all these forms is the length of the electromagnetic wave. For example, if we could see an electromagnetic wave it would look something like the wave depicted in figure 1, where the wavelength is the distance from one crest of the wave to the next. On occasions we choose to talk about the frequency of the EM wave; the wavelength and frequency are closely related, that is, the product of frequency (f) and wavelength (λ) is a constant (c). This is also written $f\lambda = c$ where c is the speed of light (which is a fixed value). So as the wavelength gets longer the frequency gets lower and as the wavelength gets shorter the frequency gets higher. Radio waves are very long, having comparatively low frequencies. Light waves are very short and have correspondingly high frequencies.

uses, including tracking of commercial aircraft and long-distance telephone communications.

The post-war era also saw tremendous growth in the broadcasting industry. There were only 6 television broadcasting stations at the end of the War; today there are 993 stations. The number of commercial radio broadcasting stations (both AM and FM) rose from 930 in 1945 to 8,500 today. Between 1971 and 1978 alone there was an 87 percent increase in FM broadcasting stations. There are over 400 million radio receivers and 66 million television receivers in the U.S.

Recent years have seen an enormous growth in private radio communications fields. Citizen Band radios have become the most popular, with approximately 30 million now in use. Two-way mobile radio services (so called land-mobile radios) have also grown as business and industry have seen their value for rapid communication. By 1977 the FCC had authorized over 9 million transmitters.

Along with the growth of all segments of the broadcasting industry has come a revolution in consumer electronic products. Vacuum tubes were replaced by transistors, which were replaced by integrated circuits. The result has been a proliferation of hand-held calculators, electronic watches, sophisticated hi-fi systems, and numerous other products. Electronic items like heart pacemakers have become common in medicine.

On the drawing boards are even more sophisticated uses for electronic controls. The home appliance industry is considering using microprocessors on driers. This change will allow the housewife to select various degrees of drying for clothing to avoid wrinkles, to protect delicate fabrics, to prepare for ironing and so forth. The microprocessor will control the drying cycle based on responses received from various sensors. The housewife will in turn be able to select her choice of dryness by a simple control.

Today, microwave ovens are commonplace in American kitchens. In 1970 there were only 50,000 microwave ovens in use; in 1976 alone 1.6 million ovens were sold. Industry has utilized microwaves and radio waves for a variety of manufacturing processes. There are over 35 million sources of radio frequency waves now in use in industry for manufacturing, processing, sealing, and packaging.

The automobile industry is on the verge of incorporating microprocessors in automobiles to replace controls. This changeover estimated to cost as much as \$1 billion will occur in the early 1980's. Already some select models have begun using microprocessors for such things as fuel injection and spark timing.

Basically there are two facets to the EMI problem. On the one hand, we have those radiating devices where electromagnetic energy is deliberately or accidentally radiated into the environment. On

the other hand, electronics, which is pervading every walk of life, is vulnerable to radiated electromagnetic energy. If either of these elements did not exist there would not be a problem. But both elements exist and have been made economically possible through the semiconductor explosion that is providing greater sophistication of manipulative control functions in smaller and smaller sized packages at lower costs. This growth is increasing and is predicted to reach over 400 billion dollars per year by the late 1980's.

No organization, Federal or otherwise, is chartered with the responsibility for monitoring the EM environment to quantify its degradation and predict its implications for the future. Meanwhile the EMI problem becomes more severe since electronic and electrical products can, and do, emit EM energy and electronic products are susceptible to that same EM radiation. Further, it becomes economically and practically unfeasible to make each electronic product safe from all EM radiation. Consequently, the incidents of interference are on the increase.

For example, the Federal Communications Commission received more than 100,000 consumer complaints in 1975 because of interference caused to radio and television sets. The FCC estimates that over the next year 9 million people will experience TV set interference just from CB radios alone!

In 1975, truck manufacturers turned to electronically-controlled anti-skid brakes, to comply with Department of Transportation regulations concerning the performance of truck braking systems. Eighteen thousand trucks equipped with these brakes had to be recalled because of interference by CB and mobile radios located either in the truck cab or in a passing vehicle. The auto industry is increasing the use of electronic controls in the family car to improve fuel economy, reduce pollution, and increase safety to the occupants.

Imagine the consternation that will be caused if appliance manufacturers fail to safeguard the new microprocessor-controller ovens against electromagnetic interference. Without adequate shielding of the electronics, one may come home in the evening to find a piece of meat either overdone or raw.

The problem of interference can be merely annoying . . . or it can be dangerous. Heart pacemakers, when exposed to electromagnetic energy, can malfunction with serious consequences. That is why warning signs are often seen in establishments where microwave ovens are in use.

Because so many hospital-based life-support systems of today depend on sophisticated electronics, there is concern that electromagnetic interference can jeopardize the life of a patient in critical situations, such as in intensive care units.

But there is a broader medical concern, and that is to define the health consequences of long-term exposure to low-level EM radiation. Although non-ionizing radiation was thought for a long time to be relatively harmless, questions have been raised recently to challenge these views. Because our five senses cannot warn us of the presence of radio and microwaves we cannot avoid them as we would a rock in our pathway. This means we could be unknowingly hurt by them. Research into biological effects and dangers must provide answers but no definite conclusions exist at this time.

MECHANISMS THAT CAUSE THE EMI PROBLEM

To bring this topic into a clearer perspective, consider some situations where you may experience EMI in your daily routines. CB, mobile, and amateur radios are intermittently operated and can therefore cause interference to electronics in an irregular way, while public broadcasting is continuously radiating EM waves. Malfunctions to electronics can appear and disappear; this makes the problem difficult to deal with and hard to track down and correct. Therefore, beware of this likelihood if you use these radios or are in close proximity to those who do. Electronic scale systems at highway weighing stations are a prime target of interference caused by police and truck radio transmitters. Electronic scales in grocery stores could similarly be affected by a passing taxicab with a mobile radio transmitter.

Electronic checkout stands are also a likely target of EMI. Electronic gasoline metering can be affected. Electronic measuring systems for grain, coal, fertilizer, and similar operations can be impacted. Remember that electric motors radiate impulsive EM energy as the brushes spark, and so do arc welders, corona discharges from high-voltage lines and any switch that sparks in its making or breaking an electrical connection. Automobile engines that use a spark to ignite the fuel mixture also radiate a signal characteristic of the spark. All electronics are vulnerable although digital electronic systems are generally a mixture of analog and digital functions and so the problem of protecting such systems is very complex and achieving a high degree of protection can make the system very expensive.

HOW DOES AN ELECTROMAGNETIC WAVE AFFECT THE PERFORMANCE OF THE ELECTRONICS?

Take for example the simple wave of figure 1. Electromagnetic waves have two co-existing parts, an electric field denoted in the figure by the solid line and a magnetic field denoted by a dotted

line; they exist in two planes perpendicular to each other and perpendicular to the direction in which the wave is travelling, denoted by the arrowhead on one end of the wave. The electric and magnetic fields contain the characteristics of the wave.

An electromagnetic wave has many characteristics because the wave can be very complex depending on the way it was generated. These complex characteristics influence the degree to which it can disrupt electronics operation. A simple EM wave can be protected against easily.

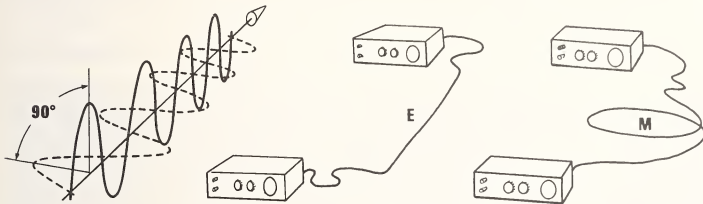
If a straight piece of wire intercepts the EM wave, it will pick up the varying electric field of the wave and induce a varying signal on the wire. The signal placed on the wire by this process will be superimposed on whatever signal the wire was already carrying. Figure 2 shows a straight section of wire connecting two boxes containing electronics where the wire is providing a channel of communication between the boxes. With the superimposed signal on the existing communicating signal, the original communicating signal is distorted, resulting in an electronic malfunction.

Similarly, if a piece of wire forms a loop of some sort with appropriate dimensions to match it with the dimensions of the EM wave, it will intercept and pick up the magnetic field of the electromagnetic wave and in turn impose a varying signal on the wire, figure 3. This signal will also be superimposed on the signal being carried by the wire and in a similar way can cause the electronics to malfunction.

Electronics as used in most general applications have wire connections. Wires bring ac power to the electronics. Wires connect electronics to sensors for information input, to controlling systems, to other pieces of electronics, and to readout or display devices. In semiconductor devices, very small wires are used to make connections for ingoing and outgoing signals into the vital chips themselves. Computers are made of a collection of electronic packages properly connected together to function on demand to perform their varied tasks. Even the electric power transmission lines themselves intercept electromagnetic waves and get the signals of those waves superimposed on the ac power.

The conglomeration of electromagnetic waves travelling in all directions comprises the EM environment. If we are to locate some electronics in a particular EM environment, we should design the electronics to coexist with the environment (if it is not too complex). We should first measure the environment and then design the electronics to function in a good facsimile of that environment. This is called making the electronics compatible. The problem that develops is that the EM environment varies in measurement com-

plexity depending upon the distance away from the radiating sources. Further, the EM environment will vary with the radiating sources being turned on and off. In some locations, where the variations are significant, meaningfully measuring the EM environment is a monumental task. The radiated EM wave changes shape depending upon the distance from the source. Figure 4 indicates three zones. In the zone called the Far Field, the EM wave is far enough from the source that it has essentially become a plane; that is the wave, if you could see it, would look like a sheet moving through space. This is why the shadow of a flying airplane at any altitude



From left to right

FIGURE 1. *An artist's concept of an electromagnetic wave.*

The solid line represents the electric field and the dotted line represents the magnetic field. The arrow indicates the direction of the wave.

FIGURE 2. *Two electronics packages connected by a wire or cable form a communication link between them.*

When the connecting line is straight as in the figure it will intercept the electric field.

FIGURE 3. *The connecting wire or cable between two electronic packages in the shape of a loop; when this happens, it can intercept the magnetic field.*

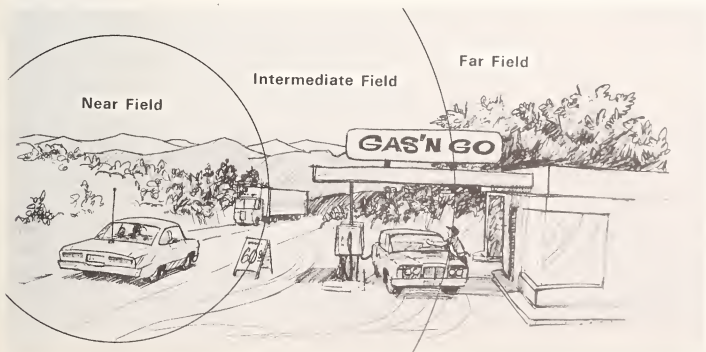


FIGURE 4. *The zones of EM waves typically radiated from an antenna.*

cast onto the earth is the same size as the airplane itself; in this example, the light from the sun is a plane wave and as the airplane breaks the plane wave a shadow (or absence of light) is cast onto the ground. In the zone called the Intermediate Field, the EM wave is an expanding wave as it moves away from the radiating source; these EM waves are like ever increasing spheres. You can see this expanding effect when you cast a finger or hand shadow on the wall of a room and your source of light is a candle flame; the hand breaks the expanding EM wave of light and a large shadow is cast onto the wall. In the zone called the Near Field, the EM wave is not fully developed and the wave of figure 1 has not formed properly so it is very difficult to predict what is happening in this zone at a particular point.

EMI problems differ depending upon which of these three zones you are in from the radiating source. Of course you could easily be in the far field of one source and the near field of a second source. Usually we are exposed to a number of sources simultaneously. We only know how to measure the EM environment in the far field, and if we use equipment designed to measure in the far field in the other two zones we get erroneous results. If a number of objects exist in the path of the EM wave, the wave will bounce around as light does from light colored objects and mirrors. This will disrupt the wave and artificially generate conditions similar to those encountered in the near-field zone which make it difficult to predict the energy at any particular point in space. The complications introduced by shadowing effects, reflecting effects, locating in various zones from the radiating sources, and other phenomena not discussed make contending with interference a difficult problem at best.

The main solutions to the EMI problem are twofold, (1) shield the electronics from the radiating sources, and (2) filter the signals on all connecting wires and cables. To shield the electronics means to protect it from EM waves, usually by using a tight metal box. To filter the signals means to remove all unwanted signals that get onto the wires or cables; this may be very tricky to actually accomplish if either the EM environment is very complex or the wires must carry very small signals or signals with large information content. This approach to solving EMI problems is the only realistic solution, assuming we know (1) what the EM environment is into which the electronics will be placed, (2) that filtering the wires and cables will not destroy the signals that are vital to the operation of the electronics, and (3) that design and testing methods exist that assure the reliability of the electronics and will not result in the electronics becoming prohibitively expensive.

THE NBS EMI EFFORT

The National Bureau of Standards (NBS) has a program, called EMI and Radiation Hazards Metrology, that is designed to address these problems. The program is presently limited in its attack on these problems due to limited resources; however, it is hoped that these restraints will be reduced in the near future.

The program, as it is designed, either is addressing or will address five basic problems.

Measurement methods to characterize the EM environment at any distance from the source for both intentional and unintentional sources are badly needed. NBS has been performing research in this field to develop suitable antennas to probe the EM environment, to get the information out of these antennas with

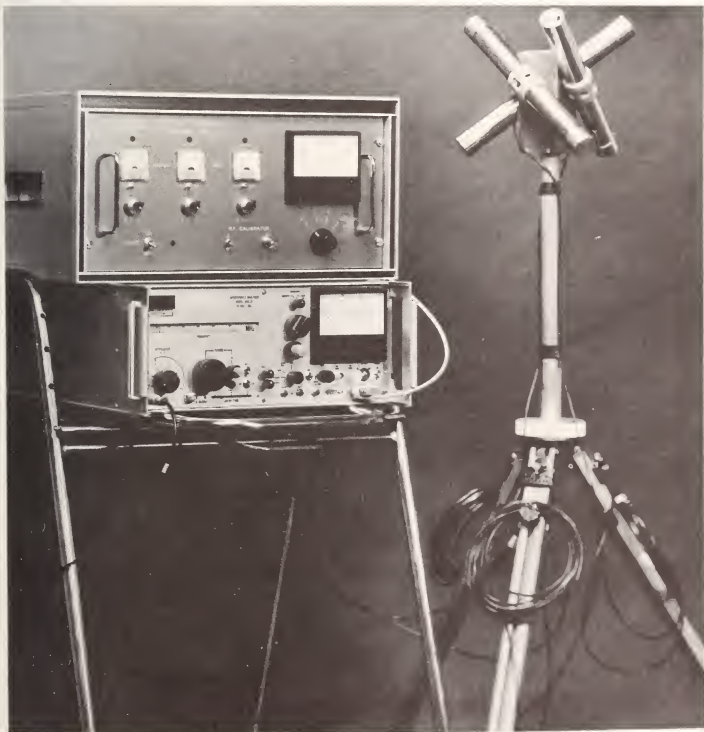


FIGURE 5. *The three cylindrical rods on the stand are perpendicular to each other.*

These rods or dipole antennas are sensors of a probe that are used to measure a limited band of EM waves. These antennas are connected to the electronics by fiber optic lines that serve as invisible (to radio waves) connecting links.

connecting links that will be transparent to microwaves and radio waves, and suitable electronics to convert this data to usable information. Figure 5 shows a probe and its instrumentation which is one result of this type of research; a great deal more progress in this area is needed if all types of EM environments are to be effectively measured.

Once the EM environment can be measured, we will need to be able to simulate it to do testing of electronics and biological effects research. NBS is therefore investigating ways to simulate standard environments for precise testing and typical or measured environments for type testing. Figure 6 shows an anechoic chamber being used for generating standard fields to test NBS probes. When methods exist to simulate environments, then we can develop testing methods for susceptibility (that is to determine the change in operation due to the EMI), and emission measurements of electronics. Figure 7 shows a large transverse electromagnetic (TEM) cell that has been developed for testing the emission and susceptibility characteristics of electronics; further research is still needed to fully exploit this measurement approach. This type of approach is being used for testing in the TV industry, the automotive industry, and in other areas. It has provided repeatable measurements of EMI effects that are a hundred times or more improved from methods currently employed.

NBS also recognizes the need to develop a common language, definitions and terms to describe EMI phenomena since so many technologies are developing ways to address these EMI difficulties separately. There also needs to be special mathematical or statistical descriptors devised to quantify and clarify results of EMI measurements. Describing some of these multidimensional properties is difficult and therefore display methods suited to simplifying the understanding of EMI conditions must be developed.

Later, NBS will address new ways to characterize conducted EMI which are the EMI signals that get onto wires and cables. Here too standards are needed to evaluate the performance of electronics and to predict the effects of signals that do get onto wires and cables.

NBS is not working to develop new ways to shield and/or filter electronics from EM waves. This is because we believe current techniques are well known in industry. We do feel that measurement methods are needed to determine when these shielding and filtering methods are sufficient without having to excessively protect the electronics.

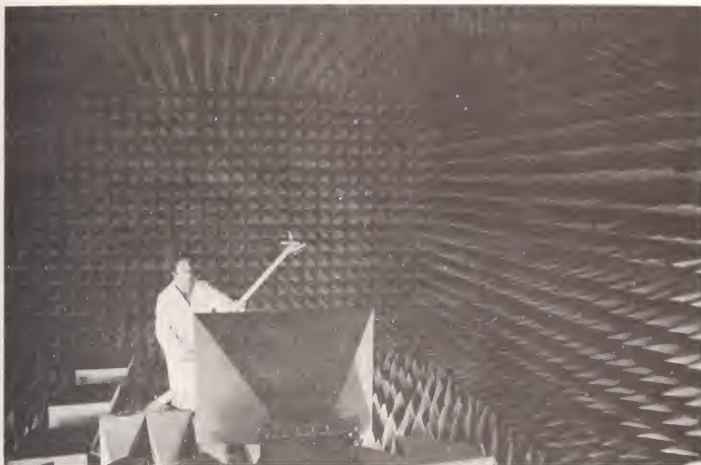


FIGURE 6. *The anechoic room, an electromagnetic wave "quiet room."*
A research model of a probe is being set up for testing.

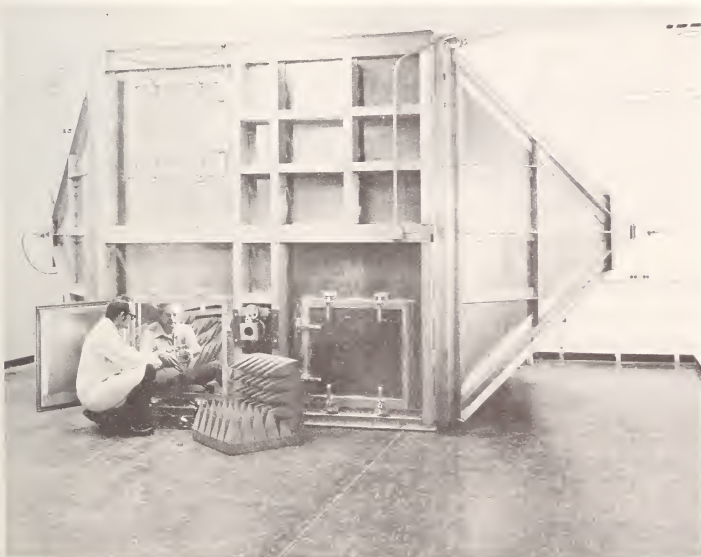


FIGURE 7. A 3-m x 3-m x 6-m TEM cell being prepared for EMI susceptibility testing of some electronics.

NBS is currently working with certain voluntary standards groups and other government agencies, including the FCC to share with them the advances achieved by NBS staff and to become cognizant of their particular EMI problems. NBS is also currently investigating approaches used by international standards groups for EMI testing and approval; some of these standards do not specify measurement methods that will achieve repeatable meaningful results and so subjective latitudes exist by which product lines can be rejected from foreign competition. Where possible we will encourage more objective testing methods that will be replicable by all concerned.

Developing measurement methods will allow electronic designers and builders to test their equipment for various EM environments. This will allow them to optimize the shielding required and the filtering necessary to enable devices to function correctly and reliably at the lowest cost to the public. We will be able to monitor the various EM environments to watch for degradation and identify unsafe conditions for health and safety. Other researchers will be able to evaluate the effects on living organisms. We will be able to decide when to restrict radiating additional EM waves or to monitor misuse, but these decisions will require that social, legal, and political decisions also be made.

SUMMARY

The sources of electromagnetic radiation are increasing in our technological society at a dramatic pace. The use of electronics is growing and is encroaching upon almost every facet of our lives. These two elements cause the EMI problem that will be a major concern to the country as we exploit the use of the airwaves and electronics.

A PRACTICAL APPROACH TO THE EMI/RFI PROBLEM IN THE FIELD

Presented by FREDERICK L. PLATT, Chief Electrical Engineer,
Revere Corporation of America



I would like to express my appreciation to Mr. Harold Wollin and the members of the S & T Committee for inviting me to address you today. It is an honor and a pleasure to represent the Scale Manufacturers Association in introducing the SMA RFI/EMI Field Test Procedures for your review and consideration.

In late 1974, the Technical Committee of the SMA proposed that an RFI Subcommittee be formed to establish field testing procedures for EMI/RFI. This action was initiated by the SMA in response to numerous reports of field interference problems reported by weights and measures officials, brought about by the increasing use of portable and mobile communications equipment. The concern of the SMA was that without established guidelines, uncoordinated testing would take place resulting in improper scale evaluations and unnecessary service.

A subcommittee was subsequently approved by the SMA membership and directed to investigate the RFI problem. Initially, it was believed by our subcommittee that a surplus of technical information existed in the form of military specifications and industrial standards that could be reorganized to our needs. With this in mind, most of the prominent technical societies were solicited for input relative to RFI field evaluation techniques and military standards were obtained. It was discovered after review, however, that all the information obtained relied heavily on sophisticated equipment and experienced RF engineers to both conduct the test and evaluate the data recorded. It was obvious to the subcommittee at this point that a different approach, centered around the technical abilities of weights and measures personnel, and utilizing simple, readily available equipment must be the basis for field evaluations.

With this direction in mind, the subcommittee started procedures to address the assigned task.

In 1975 recommended changes to Handbook 44, addressing the RFI problem, were made by our subcommittee. These changes were proposed to the S & T Committee by the SMA and ultimately

adopted as revisions to Handbook 44.

With the problems of the weights and measures officials at least temporarily addressed by revisions to Handbook 44 identifying the RFI requirement, the subcommittee began compiling data in preparation for a rough-drafted field procedure.

A survey was initiated in the form of a questionnaire to determine frequencies, types of equipment, identity of emission sources, and other specifics to help define the scope and nature of the problem. These questionnaires were submitted to weights and measures officials in all 50 States. Better than 50 percent were returned, most of them containing important information relating to the RFI/EMI problem. In many instances, additional data were provided such as existing test procedures, and field recorded information.

Contact was made with the Federal Republic of Germany, the Ministry of Industry and Research of France, manufacturers of RF test equipment, and other industry organizations serving a similar function as the SMA in another marketplace. Our intent was to take advantage of any existing procedures and, if possible, combine our efforts with those of other committees engaged in the same task. Limited results were uncovered in this investigation.

The data provided by our weights and measures questionnaire and other information collected during the course of investigation provided the subcommittee with enough basic facts to initiate a first draft of the field procedure. After many revisions and refinements, the procedure was finalized, approved by SMA, and submitted to the S & T Committee for their review.

I would like to discuss some of the areas I believe are important concerning the RFI/EMI field test procedures document; first, the procedure makes no grand pretense in dealing with interference evaluation. It has been written specifically for the weights and measures official with the sole purpose of assisting him in evaluating electronic scale performance. To be more specific, I would like to quote from the foreword:

"The subject of Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) and its effects on electronic equipment is extremely complex to predict or evaluate.

"Very comprehensive testing methods exist in both military and commercial documentation, but all of these methods are based on evaluation within a controlled laboratory environment.

"In the process of establishing a field test procedure, we have been cautious in applying simple methods of testing to evaluate complex problems. Acceptable performance of the scale system throughout this test will assure that it is reasonably immune to

EMI/RFI, acknowledging that the test may have been influenced by uncontrolled factors.

"This procedure, therefore, can serve only as a guide to the weights and measures official to help him determine if the scale will perform in the presence of EMI/RFI that may be encountered in normal use, and if not, assist him in identifying the source of the problem."

Paragraph 3.1 titled "Fundamental Consideration" addresses this requirement. By explaining in non-technical terms the origin of potential interference sources and how they can influence the circuitry in an electronic scale, it prepares the official to make an evaluation.

Potential sources of EMI/RFI identified include mobile communications equipment, commercial AM, FM, and TV broadcast transmitters, industrial RF sources, and, in many cases, transient spikes which may be present on the AC primary power lines.

The procedure goes on to identify typical response characteristics of susceptible scale electronics when operating in the presence of EMI and RFI. These include inaccurate weight indication, erroneous printing of records, and malfunction of data processing peripheral equipment.

To further guide weights and measures personnel, criteria for acceptable performance are specified in paragraph 4.0. The limit is "performance to H44." In other words, no opening of the tolerance limits is implied or expected when scale operation is anticipated in an electrically noisy environment. Additional requirements state that no deterioration of performance is acceptable in areas where tolerance values are not applicable. This requirement addresses the overall demand that the scale electronics perform as expected in the absence or presence of interfering noise. As an example, erratic printer operation or incorrect processing of data to peripheral equipment would be cause for rejection.

A major objective of the subcommittee was to not place a heavy cost burden on the regulatory agencies in implementing the test plan. High cost would affect participation which is counterproductive to the SMA goal of universal evaluation techniques. With this in mind, a large portion of the testing is performed using EMI producing equipment *normal* to the scale site as indicated in paragraph 5.2.

In this part of the test, the weights and measures official is requested to apply a load to the scale and operate all electrical equipment in the general area of the scale site. Potential sources of interference such as lighting systems, office equipment, appliances, vending machines, stock handling equipment, relay switching equip-

ment, motors and generators, communications equipment, and closed circuit TV systems should be intermittently switched on and off while observing the performance of the scale.

If the scale is intended for vehicle weighing where the vehicles may be equipped with communications equipment, test should be performed with a vehicle on the scale and the associated radio equipment operated in the "transmit" mode.

Additional evaluation of the vehicle scale in the presence of ignition noise generated by internal combustion engines is specified in 5.2.4 and 5.2.5.

In section 5.3, titled "Testing in the Presence of RFI Sources," two types of radio communicators are specified for testing purposes. In most instances, the units indicated are used by various departments of the State for voice communication purposes and could be made available. If the purchase of units is required, the cost is not excessive and I expect would easily be within the budget of weights and measures departments. Additional utilization of the equipment can also be realized in many instances by providing the capability of two-way radio communication between personnel at the sealing site.

Evaluation of the scale is made while scanning the equipment at a specified distance with both devices. As stated previously, performance to Handbook 44 is the acceptance criterion required.

Overall, in my opinion, the subcommittee produced a workable field procedure that will achieve what is stated in its Purpose, "to serve as a guide for use by weights and measures personnel in the evaluation of electronic scale susceptibility to EMI and RFI, and to provide a means to determine whether or not a *reasonable* confidence exists that the electronic scale equipment being evaluated will perform satisfactorily during normal operation while in the presence of potential EMI/RFI signals."

In conclusion, I would like to propose that you support the recommendation of the S & T Committee to endorse the field test procedure as the primary guideline for electronic scale interference evaluations. Hopefully, with the backing of the National Conference on Weights and Measures, the document will be incorporated into the various State weights and measures field evaluation procedures. Uniform evaluation techniques will provide the common ground necessary for the manufacturer, weights and measures official, and the scale user to address RFI and EMI field problems.

LABORATORY METROLOGY—ITS GOALS AND NEEDS

Presented by RONALD C. EGNEW, Laboratory Supervisor,
Division of Weights and Measures,
State of Kentucky Department of Agriculture



Laboratory Metrology, have we passed the test of time? Have we ventured into the horizon and witnessed the dawning of a new day? For the majority of State laboratories, I am proud to say the answer to these questions is "yes." The State laboratory metrology programs have come a long way since 1967 when the first 10 States received their laboratory packages. It was the goal of dedicated individuals back then to establish competent laboratory facilities among the States in order that they may achieve more uni-

formity in the area of basic tolerance testing and calibrating procedures. Since those early beginnings, the laboratory program has taken giant strides in the advancement of personnel, procedures, and techniques. Programs have ventured down many different avenues and achieved varying degrees of success. The dedicated laboratory program today is no longer limited to expertise in only mass, length, and volume. There is considerable effort in the fields of time, temperature, tuning forks, pressure, frequency, load cells, and meters of all types, to mention just a few.

Laboratory metrology in most cases is a rewarding and challenging field. Most metrologists are well educated, dedicated, independent thinkers who learn quickly and, therefore, can adjust and cope with the ever-changing techniques and procedural problems that arise daily with the modernization of equipment. Gentlemen, there is a wealth of untapped talent in the weights and measures community just right for the picking. We have the facilities, equipment, techniques, and qualified personnel to increase our capabilities tremendously. In order to not let this abundance of resources become dormant, we need to cultivate them. Through the continued direction of OWM, we must keep step with modernization. Continued training seminars along with the LAP Program will help assure that these resources keep up with the extended technology. I cannot stress strongly enough the immediate need for a competent, experienced supervisor for laboratory training and guidance. The need for a central source of information and coordination between the State laboratories is a must. Why should one laboratory go

through the aggravation of trial and error in solving problems that other laboratories have already experienced? Use the resources we have. Extend them to their fullest capabilities. In order for our laboratory metrology programs to become the strong and vibrant force it should be in the weights and measures community, we must extend our goals to reach the horizon and the dawning of the new day.

Every good weights and measures program should have as its cornerstone a good metrology laboratory because without the properly tested standards and equipment, our basic goals of uniformity and equality in the marketplace are nonexistent. We should be proud that we can rely on the accuracy of our standards with which we test all weighing and measuring devices. A good laboratory with properly tested and cared for standards generates strength throughout our entire weights and measures section. A chain is just as strong as its weakest length. Our field personnel derive strength through the confidence that they have in knowing that their standards are accurate. Given the very best trained field inspector and just the hint that his standards might be inaccurate and you have defeated the purpose for which you trained him in the first place. After we have established a strong inner confidence among our State people, we must demonstrate this same competence within the industry people and the private sector. We can no longer get by with running the bluff that we are the Government; therefore, we are right and you are wrong. We have to be able to support our rejections and condemnations with accurate, traceable proof that the standard upon which we based our finding is correct. Therefore, we must spend more time and effort in the building and in the supporting of our cornerstone laboratories. We must make sure that our laboratory personnel are the best qualified persons we can find. The metrology laboratory should be the standard upon which every other weights and measures activity is based.

Another area of concern must be the relationships with neighboring State laboratories. Reciprocity is a must. Industry must be able to rely on the calibration of standards from one State to another. The only way we can accomplish this is through uniformity. Uniformity among State laboratories can best be established through a strong Laboratory Auditing Program. In order for the LAP to survive, we must have support from OWM and the State directors as well as the individual metrology laboratories. We must establish a continual training program with regional seminars along with the workshops during the National Conference. Each regional weights and measures association should conduct workshops and seminars where ideas of common interest can be exchanged and strengthened. Only through this action can we establish the grounds for the

needed reciprocal agreements. Once we have established reciprocity among States, we should turn our attentions to reciprocity among countries. Through the U.S. participation in the International Organization of Legal Metrology (OIML), we are finding a definite need for standardization and uniformity of standards and testing procedures. Standards assume a vital role in international trade. Can we expect to influence standardization and uniformity in international trade without first having those qualities within our own national trade? Through uniformity among State and local weights and measures jurisdictions, we can only enhance our capabilities for future international weights and measures uniformity.

In closing, let me offer these thoughts. We must not rely on past performances. We must go forth into the horizon establishing the groundwork for a more modern, well coordinated, uniform weights and measures community. Given strong laboratory foundations can only result in the very best weights and measures community being built.

NFPA SOLID CONTENT WEIGHT LABELING PROGRAM

Presented by DR. ALLEN W. MATTHYS, Director, Labeling and Food Standards, National Food Processors Association



The NFPA voluntary solid content labeling program has been in operation for 2 years now and much progress has been made. I would like to briefly describe the events leading to this program.

In 1973, Consumers Union petitioned the FDA to require that all foods packed in readily-drainable liquid bear a declaration of the solid contents remaining after draining the liquid.

In 1975, FDA published a drained weight proposal which would have required canned fruits and vegetables packed in a readily-drainable liquid to have the drained weight of the product listed on the principal display panel. This proposal also would have established minimum drained weight for each product based on product, can size and style of pack.

Products included in the 1975 FDA proposal are listed in table I.

TABLE I—*Drained Weight Labeling of Canned Food Products*

Fruit Cocktail	Field Peas
Plums	Black-Eye Peas
Pineapple	Pimientos
Figs	Onions
Grapefruit	Sweet Potatoes
Green Beans	White Potatoes
Corn	Tomatoes
Peaches	Mushrooms
Apricots	Asparagus
Prunes	Lima Beans
Pears	Beets
Grapes	Carrots
Cherries	Leafy Greens
Berries	Okra

As part of NFPA's response to the FDA proposal, an economic impact study was conducted. The results of that study indicated the cost of drained weight labeling to be approximately \$100 million per year. Other consumer studies have shown that the consumers—

when asked to explain what they thought is represented by drained weight—said that drained weight is the amount of product you put in the container. To the canner, this represents the fill-in or solid content weight. Further economic studies determined that a solid content label declaration would cost approximately \$10 million per year, or about one-tenth the cost of drained weight labeling. This program has several advantages over a drained weight program: First, it enables the canner to evaluate his product for label compliance at the time of processing and to make adjustments in fill immediately to assure that the final product will be properly labeled.

Second, it eliminates the costly 30-day holding period required for drained weight compliance determination.

In recognition of this, NFPA, in 1976, petitioned FDA to provide for solid content labeling in lieu of drained weight labeling.

In 1977, the canning industry initiated its voluntary solid content labeling program. FDA's major problem with such a voluntary program is the lack of authority to check certain plant records. Thus, FDA could not determine if a firm's fill weight records were accurate enough to support the declared solid content weight. In order to overcome this problem, NFPA members making solid content declarations have agreed to allow FDA access to their fill weight records.

During the 1977 season, some 46 member canners maintained fill weight records on 33 different products for the purpose of label declaration of solid content weight.

In 1977, FDA conducted an extensive survey of five major product categories (green peas, green beans, peaches, fruit cocktail, and tomatoes) to monitor compliance with solid content weight declarations.

For compliance purposes, FDA uses a sampling frequency of 2 containers per 1,000 containers prior to processing until 12 containers are obtained. These containers are used to determine the solid content weight. A second set of 12 containers is obtained after processing. These are to be held for 30 days before the drained weight is determined.

On December 9, 1977, FDA issued a revised drained weight/fill weight proposal. This proposal includes several options which allow FDA to evaluate the voluntary solid content labeling program for 2 years before making a decision on whether to:

1. Require drained weight labeling with the option to label solid content weight;
2. Require drained weight labeling as described in the 1975 drained weight proposal; or
3. Require solid content labeling.

FDA monitored the solid content labeling program closely, both in 1977 and 1978. As a part of our commitment to the program, NFPA provided FDA with a list of companies participating in the program, together with a list of products and plant locations.

For 1978, a total of 56 member canners are participating in the voluntary solid content labeling program for 1978 and table II lists the products covered by the program.

TABLE II—1978—Solid Content Labeling Program—Products

Plums	Three Bean Salad
Pineapple	Lima Beans
Apples	Beets
Blueberries	Carrots
Apricots	Corn
Cherries	Mixed Vegetables
Grapes	Peas
Fruit Cocktail	Peas and Carrots
Fruits for Salad	Peas and Onions
Peaches (Cling and Freestone)	Sweet Potatoes
Pears	White Potatoes
Squash	Sauerkraut
Rutabagas	Spinach
Chiles	Tomatoes with Okra
Sucotash	Tomatoes with Corn
Onions	Tomatoes with Corn & Okra
Tomatoes	
Asparagus	
Beans (green and wax)	

One major concern of both the industry and the regulatory officials is how the "buyers labels" or private label customers will come into the program. The buyers labels represent the chain stores, supermarkets, etc., who buy from our member canners and have their company labels placed on the product. In order to begin making a solid content declaration on their labels, these companies had to determine (1) that their suppliers would be keeping solid content records, (2) what solid content weight declaration their suppliers could meet, and (3) how long it would take to use up existing label stocks.

Many of the major supermarket chains have begun solid content labeling during 1978. Solid content labeled product is now on the supermarket shelves. This should provide the regulatory agency with the opportunity to see if consumers are actually using this

information and how useful it is to them. I would urge all of you to check for these products in the store and see how far this program has come.

The comment period on the FDA proposal closes July 1, 1979. After that date, FDA will evaluate the comments received and the data they have obtained.

AN INDUSTRY PERSPECTIVE ON PACKAGING REGULATIONS

Presented by RALPH W. MILLER, Vice President, Jewel Companies, Inc., Regulatory Research and Planning and General Counsel, Jewel Food Stores Division



Mr. Chairman, distinguished guests, ladies and gentlemen, it is certainly an honor and a privilege to have a few minutes to share some very deeply held thoughts with you today. To help put these thoughts into perspective for you, and since I am associated with Jewel Companies, I would first like to tell you a little bit about Jewel.

Jewel Companies, Inc. is a diversified retailer operating supermarkets, drug stores, self-service lumber stores, convenience stores, ice cream and sandwich shops, and home delivery routes in over 40 States, with retail sales in excess of 3 billion dollars per year. Our basic philosophy in our selling has recognized that we exist only as we serve the best interests of our customers, and that in bringing goods and services to them, we are in a very real sense buying agents for the consumer. We have attempted to serve our customers' needs by voluntarily initiating such meaningful programs as unit pricing, open dating, prescription price posting, and nutrition labeling (we worked with FDA in its testing for development of its current regulations), among others.

With Jewel, I have worked in a variety of different legal capacities and first became involved in some packaging and labeling law areas about 17 or 18 years ago. This reference to legal background may be as good a place as any to put into what is really its packaging context a quotation that is often referred to concerning establishment of any kind of utopia:

"The first thing we do, let's kill all the lawyers."

Of course, being a lawyer myself, I cannot completely agree with this sentiment, although there are some times when I can almost understand it. The statement should be explained by looking at the rest of its setting—it comes from a Shakespeare play; and, from a packaging and weights and measures standpoint, the words are, appropriately, spoken by a butcher. It follows a series of partly incoherent proposals by a would-be king appealing to a crowd for its support; he said, in part:

“And when I am King, as King I will be, . . . there shall be in England 7 ½ penny loafs sold for a penny . . . the three-hooped pot shall have ten hoops, and I will make it felony to drink small beer and all the realm shall be in common.”

The reference to loaf sizes is fairly clear and the number of hoops refers to the size of a wooden beer mug built like a small barrel, with the measure amounts based upon the number of spaced metal bands required to hold the wooden parts together. These “proposals” not only would have compelled by royal mandate the use of new standard sizes, but they also would have controlled pricing for two basic English staples, bread and beer.

In this example written about a time some 500 years ago, if we look hard enough we can see proposed packaging regulations—or perhaps more correctly, method of sale regulations—to be adopted without input from industry or the weights and measures officials of the day—and with no period for comments, and no cost/benefit analysis, or any other formalities. Perhaps what the butcher was really saying was that in order to implement such a program in the complete absence of any kind of legal safeguards, it would first be necessary to eliminate the lawyers and others who even then were disposed to argue for some form of due process.

Maybe my conclusion is not completely clear from the play; but that does not really matter, since it is clear that weights and measures and packaging regulations and the way they are adopted have been with us as important parts of our individual and our business and professional lives for a long, long time.

Most things have changed considerably since the fifteenth century. In the field of packaging regulations, they have probably changed more dramatically in the last 20 years than in the full five centuries which preceded them. Regulations now come in all sizes and shapes and packages themselves, and they come from all directions. While we deal here at the National Conference on Weights and Measures with some very important segments of the total field—model state laws and regulations for most packaged commodities—there are many, many other requirements directly affecting either packaging or labeling or both—including the Federal Fiber Textile Products Identification Act, the Wool Products Labeling Act, the Fur Products Labeling Act (another FPLA!), Federal Hazardous Substances Act (which originally even had the word “labeling” as part of its title), the Fungicide, Insecticide and Rodenticide Act, Department of Transportation hazard marking regulations and countless others—and even the Food Drug and Cosmetic Act, the Wholesome Meat and Poultry Acts and the Fair

Packaging and Labeling Act—whose labeling requirements are only similar but by no means identical to those of the Model State Laws and Regulations we are most familiar with; to the extent that many State and local requirements are different from the Models, each must be treated as a different regulation to be taken into account by any company which operates as Jewel does in 40 States.

For foods and drugs, proliferation of *non-contents* regulations, in particular, has been more than geometric as a result of the inspired regulatory innovations and expansions unleashed for better or for worse by Mr. Peter Barton Hutt, and others. I have spent as much time as I have on this detailed background concerning regulations in general just to help us remember the fact that comprehensive as the National Conference's areas of jurisdiction are, they are only one tip of one iceberg in the sea of packaging and labeling laws and rules—and, beyond that, even all the packaging and labeling regulations combined are but one very small part of the total web and weight of the governmental rules and regulations which have become such a major part of the operations—and costs—not only of business and industry—but of government and our individual households as well.

And here I must underscore the word *costs* in this discussion. We have all heard “costs” argued through the years in opposition to any variety of regulatory proposals—and some of us have probably become somewhat accustomed to discounting in advance every cost argument which may be raised. Situated as we are at the firing line of the retail level, however, we feel the full brunt of all of the increased costs from every source—and there is no question but that new governmental requirements, as well as taxes, over the past 20 years have accumulated to form a substantial part of the much publicized farm to consumer price spread with respect to foods. Historically, most retailers have shortsightedly treated any types of costs which affected us and our competitors more or less equally as just additional costs of business, which could be passed on to the consumer. Recent developments such as the energy crisis, increased inflation, devaluation of the dollar, and fierce consumer resistance—finally heightened our awareness of the very real fact of life that we do live in a world of limited natural and financial resources: Any dollars spent in one place, every bit of resource consumed for one purpose, every ounce of energy devoted to one goal, is gone forever, and is no longer available to be spent or consumed for, or devoted to, any other need or demand, no matter how urgent.

Each governmental representative in this room is probably more keenly aware than any of the rest of us of the concerns caused by the type of public reaction which produced a Proposition 13. We in the supermarket industry can sympathize fully with these con-

cerns—because we have been there, and are still in the middle of a kind of Proposition 13 of our own. In 1974 after the artificial barriers of price control were finally removed, we were overwhelmed by some 17,000 cost increases for the products that we bought—and attempted to pass these costs on in some 17,000 increases in retail prices. We found, however, in about August of that year that the customer had suddenly changed. The customer was trading down. The customer bought pasta instead of pastry, and beans instead of beef. He or she would buy the sale items, and less of the items from special departments whose space, equipment and personnel had been established based upon past customer demand—and the customer began to buy proportionately less of total food from food stores, apparently electing to use the savings from changed food store buying patterns to eat outside the home. As food store sales growth began to decline, competition for the available dollars increased—and combined with the pressures of the rising costs of wages, taxes, energy, and insurance—and the increasing cost of all forms of governmental regulations—earnings which are the lifeblood for new stores, renovations, and meeting future cost increases, declined. Supermarket earnings average only about 0.8 percent on sales—just 8 cents on \$10.00 (Jewel last year earned 27 million dollars on 3.3 billion dollars in sales)—and regardless of arguments about “return on investment,” the size and comparability of which vary drastically from company to company, 8 cents on \$10.00 just does not leave much room for absorbing cost increases without raising prices.

The point of all of this is that each of us in this room has a very real responsibility, not only for our consumers—who are your taxpayers, but for our own survival, to work together on a day to day basis to minimize the instances of Proposition 13, or of years like 1974, in the future. The National Conference on Weights and Measures with the participation of the National Bureau of Standards and industry and individual associate members have been an extremely valuable and important mechanisms for permitting the type of review which will become more and more important with every passing year. I am a relative newcomer to the Conference and to the Industry Committee on Packaging and Labeling, since I attended my first National Conference in 1966. I remember working with past Chairmen Frank Dierson, George Burditt, Harvey Hensel, John Speers, and Merrill Thompson and with many others on the Industry Committee, and with many of you, directly or through comments from the floor throughout these years. I am always impressed with the dedication and integrity of participants on all sides of the discussions on the many issues which have been dealt with during this time, and I remain impressed with the unique

opportunity the National Conference provides for an exchange of ideas and for mutual understanding; and I do believe the National Conference can play an increasingly essential role in making the kinds of evaluations that will be required for distinguishing between "desirable" or "aesthetic" recommendations and those which are "essential," and, in either case, in weighing the tangible and intangible benefits of new proposals against the direct and hidden costs which will be generated.

At the same time, however, I would not feel I was being as honest with you today as I hope you have always found me to be in the past, if I did not also share with you some sincere concerns. I am concerned when the valuable goal of obtaining the *uniformity* which only a universally adopted model law or regulation can provide is sacrificed, in order to meet specialized desires in new areas of regulation where a consensus does not prevail; I am concerned when significant views and input of associate members appear to be disregarded in adoption by the Conference of positions which can only be opposed by affected industry on a state by state basis; and I am most intensely concerned when procedural changes are proposed and adopted or where action is taken which does or could result in the limitation or stifling of essential input to the deliberations of the Conference, by governmental and associate members alike.

Nevertheless, by working together with a dedicated effort to overcome these areas of concern—and to earnestly begin to take into consideration the mood of the citizens which we all sense, particularly as that mood has been demonstrated by grassroots taxpayer and consumer reactions—I have every hope that we can continue to work with the National Conference on Weights and Measures as a most important tool in the regulatory scheme of things—and that, for each of us, but more importantly, in the best interests of the people of our Nation, we will do everything in our power to see—as stated in the Conference motto—

That Equity May Prevail.

For your time, your attention, and your continued friendship and thoughtful consideration, I thank you.

MEASUREMENTS IN THE UNITED KINGDOM MARKET PLACE

Presented by F. L. N. SAMUELS, Controller, Weights and Measures,
Metrology, Quality Assurance and Standards Division,
Department of Prices and Consumer Protection
United Kingdom

PROLOGUE



While there are lectures from time to time on metrology—the business of measurement—it is rare indeed for an engineer to speak professionally on weights and measures technology and yet there is no better example of technology in the service of society. I have chosen to do this at your Conference because the subject is not only fascinating by virtue of the range and variety of equipment it embraces but also of unparalleled economic interest and concern to us all in that the monetary value of materials and goods de-

termined by measurements made in the market place is considerable; in the UK it runs into many tens of millions of pounds every day. I hope by word and picture to illustrate the UK awareness of the importance of such trade measurements and to dispel the myth that beam scales, brass weights and capacity measures are the extent of weights and measures technology; in so doing I shall say something about UK weights and measures activities.

Metrologists tend to be preachers and being a conformist myself I have chosen the text for my address from the Good Book

Proverbs, Chapter 11, Verse 1

“A false balance is abomination to the Lord: but a just weight is his delight”

Weights and Measures have been with us for a very long time and it is in consequence a subject rich in history; but I do not propose to indulge in metrological archaeology or nostalgia but rather to speak of the present and perhaps speculate about the future.

The title “*Measurements in the United Kingdom Market Place*” poses three questions which must first be answered:

- what is measurement?

- why do we measure?
- where is the market place?

Equipped with this knowledge we can then consider what technical requirements, legislative control, and administrative arrangements are needed to assure that through the design, production, and operation of weighing or measuring equipment fair trade prevails in the market place.

WHAT IS MEASUREMENT?

Measurement is simply the process of determining the magnitude of a quantity. It has two basic ingredients:

- a **unit** which characterizes the quantity being measured (meter, kilogram, volt, kilowatt).
- a **numerical factor** which determines the number of units which constitute the quantity.

These two ingredients are a characteristic of every measurement and a feature of every measuring instrument.

In order that measurements made anywhere shall be coherent and compatible, it is necessary that units of measure shall be

- unambiguously defined
- realized in a practical manner
- disseminated to the workplace.

If units of measure are ill-founded, unco-ordinated and not readily available it will not be possible for contracting parties to agree compliance with a contract specification; whether it be in respect of mating parts made in different places, the quality of a rented transmission link, or the supply of goods in the market place. Such disagreement will inevitably lead to disputes, ill-will, and loss of money.

The role of measurements was acknowledged in the UK at the turn of the century by the establishment of the National Physical Laboratory at Teddington to be the national centre of metrological excellence; defining the units of measure, realizing measurement standards and providing a calibration service to enable units of measure to be available throughout the country. This concept of deriving units of measure from a single national authority is appropriately described as "traceability" and is essential if measurements are to be soundly-based.

WHY DO WE MEASURE?

We measure in order to obtain a definitive statement as to the magnitude of a quantity—the alternative is to resort to guesswork and to accept the ambiguity which arises as a consequence. This is of course totally unacceptable in all but a few circumstances where “guesstimates” are adequate.

The **scientist** must be able to measure both cause and effect otherwise he cannot make the meaningful deductions which are essential to his researches.

The **development engineer** needs to ensure that all the measurements that define his project are properly toleranced to allow it to be produced economically.

The **production engineer** is concerned with measurement accuracy in order that both the rejection of good components and the acceptance of bad components may be minimized; failure to do this costs money and reputation.

The **operations engineer** relies on a vast amount of measured data to optimize the performance of his plant and to observe any operating limits that might be imposed by plant and personnel safety; ill-founded measurements could mean uneconomic operation, infringement of operating conditions, and possible plant damage.

The **communications engineer** forever strives to increase the channel capacity of circuits; better measurements enable design and operating margins to be confidently reduced without degrading the accepted quality of transmission.

The pilot no longer flies “by the seat of his pants” but relies on measured data displayed by his instruments and communicated to him by ground control; measurement inaccuracy in this situation could have dire consequences.

Everyone is engaged in trading transactions whether it be in respect of a pint of ale, a liter of gasoline, a kilogram of flour or a “unit” of electrical energy.

Examples are endless and the cost of being casual or just plain wrong in measurements can be considerable. This is well illustrated by the fact that the annual UK revenue duty collected on oil is currently running at about £2400 million; in this situation measurement accuracy is a matter of the utmost concern to both oil industry and tax collector.

WHERE IS THE MARKET PLACE?

In order to identify the market place and so answer the third question, it is necessary to classify measurement activities under their two natural headings:

industrial metrology

- research and development
- construction
- production
- control

legal metrology

- trade
- health and safety
- revenue duty assessment

The market place in the UK is wherever the measured quantity of a material or product is the basis of a transaction (i.e., where money is rendered for goods). This, of course, embraces not only the traditional weights and measures quantities of mass, length, and capacity but also such other measurable quantities which form the basis of a transaction (e.g., electrical energy, circuit time).

However for the purpose of my talk I have chosen to regard the market place as everywhere there is trading in terms of mass, length, and capacity. In these terms it covers commercial, wholesale, and retail transactions in such commodities as food and drink, oil products and solid materials ranging from coal to gold.

ASSURANCE OF FAIR TRADE

Before introducing you to the wide range of trade measuring equipment in use in the UK and the influence of advancing technology on equipment design I need to say something about the role and organization of the UK Weights and Measures Service and the part it plays in assuring fair trade. Such a service has been in existence for over one hundred years—long before the establishment of the National Physical Laboratory. My predecessors at one period revelled in the gentlemanly title of the Warden of the Standards and were the metrological godfathers of their time. In these more enlightened days I like to feel that autocracy has been displaced by corporate wisdom, knowledge, and understanding; although there are occasions when I envy their authority.

Weights and Measures operates in Britain at both central and local government level. Matters of national policy and those functions which of necessity require central administration and direction (e.g., technical, legislative, financial) are undertaken by central government while those functions, which might be described as field operations and law enforcement are vested in local govern-

ment. This apportionment of work, which is well-suited to Britain, is by no means universal; some administrations find it more effective and convenient to have field operations centrally-controlled.

Weights and Measures in central government, for many years in the Board of Trade, is now vested with the Department of Prices and Consumer Protection (DPCP), who has responsibility for:

- maintaining national measurement standards in the trading parameters (e.g., length, mass, capacity) and providing a nationwide calibration service in order to give credibility and authority to measurement standards in use for trade throughout the country (this is not only comforting to both parties to a transaction but essential for law enforcement officers in the prosecution of offenders); it is not by good luck but by metrological control that the quantity of gasoline representing a gallon is the same whether it is bought in Aberdeen (Scotland), Aberyswyth (Wales), or Abingdon (England).
- specifying measurement standards and testing equipment and thereby ensuring appropriate levels of accuracy in local government weights and measures offices;
- ensuring, by a system of design assessment and certification, that patterns of weighing or measuring equipment are suitable for use for trade; this entails consideration of such features as inherent accuracy, inherent reliability, and freedom from mis-operation either accidental through ambiguity in function, or deliberate in the perpetration of fraud.
- formulating and representing the national viewpoint on legal metrology (EEC, OIML).

Weights and Measures in local government is vested with the Trading Standards Departments of the local authorities who have responsibility for

- maintaining local standards and testing equipment
- verifying initially and inspecting subsequently measuring instruments in use for trade
- enforcing the law.

There are 98 local authorities in Britain employing some 1400 qualified Inspectors of Weights and Measures. The authorities range from a densely-populated urban area such as Greater Manchester to a large rural county such as the Highland Region in Scotland. The work of a Training Standards Department nowadays covers

activities additional to *Weights and Measures* and embraces such other law enforcement work as trades description, consumer credit, food and drugs, and animal diseases.

The law in Britain which bears on trade measuring equipment is enshrined in the Weights and Measures Acts of 1963 and 1976 and the many technical regulations made under these Acts and although time does not permit detailed reference to legal requirements there are one or two aspects of British law which I think you will find interesting and relevant.

- (a) It is an offence to deliver less than the purported quantity and while the law does not require measuring instruments to be used in trading transactions, the seller who did not rely on an accurate measuring instrument would indeed be foolhardy because if he underdelivered he would commit an offence, whereas overdelivery to any degree would eat into his profit margin. This legal and economic constraint assures the use of appropriate instruments and discourages the use of a weighbridge to weigh out smoked salmon!
- (b) Where a measuring instrument is in trade use then that instrument, if prescribed in regulations, is subject to control through the local authority weights and measures inspector who determines by testing and signifies by stamping its fitness for trade use. A prerequisite to this control operation is that the design (pattern) should be approved nationally as suitable for use for trade.
- (c) The national pattern-approving authority is the Department's Weights and Measures Service which is empowered under the Weights and Measures Act 1963 to examine, as it thinks fit and on repayment, patterns of weighing or measuring equipment to determine their suitability for use for trade. National pattern approval has been a feature of UK Weights and Measures Law since 1904.
- (d) A measuring instrument in use for trade must be fair and just; it must not, for example, be biased in its operation even though the practice in a particular trade may require transactions to be conducted on "adjusted" weighing data.
- (e) Where a measuring instrument has an associated price-computing facility (as in the case of modern retail instruments) then its ability additionally to compute and display the correct price corresponding to the quantity measured is also subject to control.

RANGE OF TRADE MEASURING EQUIPMENT

Against this backcloth of administrative arrangements and legislative control, let me now survey, by selective example, the wide range and varied complexity of trade measuring instruments in use in the UK. For technical reasons and administrative convenience, the instruments are sub-divided into four classes:

- non-automatic weighing machines
- automatic weighing machines
- liquid measuring instruments
- miscellaneous measuring instruments.

Non-Automatic Weighing Machines

This class covers the widest range of measuring instruments. The most familiar group within this class are those instruments which are characteristically described as "counter machines" ranging from the traditional street market two-pan scale, through the many variations of the "self indicating weighing machine" with mechanical-indexing and optical projection display systems to the modern price computing instrument employing electronic techniques to generate, process, and display in digital form not only the measured quantity, but also the price-to-pay against a pre-selected unit price; these digital instruments tend nowadays to have in-built cash totalizing facilities and the capability to interwork with such peripheral equipment as labellers, printers, electronic cash registers, and modern terminals for off-site accounting.

The electrical transducer which enables electronic techniques to be employed generally takes the form of either.

- an incremental optical encoder which translates movement into electrical pulses, or
- a vibrating wire device, whose tension and frequency of vibration is representative of the load, or
- a strain gauge, whose electrical properties provide an analogue signal proportional to the load.

Despite these design differences and a variation in styling, electronic counter machines tend to possess the same operational features, reflecting as they do UK weights and measures requirements.

Moving up the capacity range one meets the platform weighing machine and its several variants; such machines with the capability to weigh up to around 1000 kg and generally floor standing are to be found in industrial organizations, food processing plants, and

wholesale premises, weighing out individual items and material in bulk. The principles and techniques employed are similar to those used in the lower capacity counter machines, although they are not likely to have a price computing capability.

Included in this group would be such varied instruments as the airport baggage weigher and the livestock weighing machine.

Still in the non-automatic weighing machine class is the weigh-bridge which can have a weighing capacity of up to several hundred metric tons, although the most extensive application is the static weighing of road vehicles and railwagons with capacities up to some 60 metric tons. Such weighing bridges generally operate on much the same principle as the counter machines—the only difference being either the use of large capacity load cell strain gauges or the introduction of a lever arm system to reduce the force exerted by the load on the weighing platform to a sufficiently small value to operate the indicating mechanism.

More exotic applications of non-automatic weighing machines in trade use are those instruments used in the buying and selling of bullion and the trading in precious stones. The bullion balances at the Bank of England (British Fort Knox) are subject to the same regulatory control as the counter machine in the butcher's shop.

Automatic Weighing Machines

An automatic weighing machine may be defined as one which performs a weighing operation without the intervention of an operator, other than for setting in motion the automatic process. As a class they are rarely seen by the general public and are to be found in industrial organizations, processing plants, and product packaging units where material handling and weighing are complementary operations. If there is a trading transaction then the measuring equipment will come within the purview of the Weights and Measures Acts.

Three categories of automatic weighing machine are recognized in Britain:

- (a) **Continuous totalizing machine.** Such a machine, euphemistically referred to as a "beltweigher", determines the mass of material in bulk as it moves continuously over a weighing element. Applications are typically the loading or unloading of ships and the conveying of coal from pithead to nearby generating station of which the Longannet complex in Scotland is a prime example.

- (b) **Discontinuous totalizing machine.** This category of machine, as the name suggests, weighs material in bulk by filling, weighing, and discharging a series of hoppers; the weighing process itself is discrete and discontinuous, although the product flow is continuous in the system.
- (c) **Gravimetric filling machine.** This type of machine weighs and discharges automatically into a packet, bag, or sack a predetermined load; it is used extensively in the pre-packing of products. Familiar examples are bags of sugar, sacks of flour, packets of potato crisps. Rapid filling of containers with a pre-determined quantity entails a fast feed to within a lower range limit followed by a final dribble feed to bring the quantity to within the permitted tolerance. While this is a straightforward measurement and control operation when free-flowing granular type material (e.g., sugar) is being packaged, the bagging of irregular sized items such as coal, potatoes and potato crisps presents a problem as the permitted tolerance on the measured quantity determines the largest size of item that can be handled.

Liquid Measuring Instruments

Of the various measuring instruments dispensing liquids, the most familiar is the gasoline pump, which is something of a misnomer as the measuring instrument which stands on the garage forecourt nowadays is more than just a manually-operated plunger moving in a cylinder and displacing a known volume for each completed stroke. From this simple concept has evolved the modern instrument comprising:

- an electrically driven pump
- an air separator
- a rotary piston meter
- a computing and display unit
- a nozzle control

together with the necessary control valves to ensure correct functioning.

From the earliest single stroke pump we have passed through the era of the clock face pump registering quantity only (still in evidence in Britain) through the age of the mechanical price-computing unit and rotating drum indicators registering quantity and price-to-pay to the modern electronic liquid measuring instrument

with extensive facilities and features. The pump population in Britain is currently about 120,000, of which 10,000 are now electronic. Self-service operation is widespread and this has encouraged the development of sophisticated kiosk control equipment.

Positive displacement flowmeters are invariably used to meter liquid fuels in bulk; the most familiar example in the market place being the vehicle-mounted instrument metering the delivery of heating oil to domestic, commercial, and industrial premises. Bulk delivery of gasoline by road tanker to the garage forecourt presents a special measurement problem because of the hazard involved in handling low flash point fuel in a place where the public have access. The quantity delivered has traditionally been determined by a calibrated dipstick but the inherent inaccuracy which attends "partial compartment" deliveries, coupled with the high operator involvement in the measuring process suggests that this is not a wholly satisfying method of dispensing a high-valued product. Such gasoline deliveries are not metered in Britain because the law governing the conveyance of dangerous liquids does not permit the vehicle engine to be run during discharge to provide the power take-off for driving a vehicle-mounted pump and meter unit. Electronic dipstick systems are now being developed which automatically determine the volume of fuel by accurately sensing the level of the free surface of the liquid in the compartment; this is achieved in one particular development by the liquid acting as a variable di-electric in a capacitance probe.

Comment on liquid measuring instruments would be incomplete without making a brief reference to intoxicating liquor. In law, draught beer and cider and certain spirits have to be sold in prescribed quantities, using either capacity measures or liquid measuring instruments. Although such measurements cannot be said to employ high technology, the pint of beer is an emotive subject which generates much froth and fervour, but then with beer at around 38p/pint one is trading in a liquid which is in excess of £3.00/gallon and four times as expensive as gasoline!

Miscellaneous Measuring Instruments

The miscellany of trade instruments not covered by the three classes of equipment already described include density and length measuring instruments, as typified by the alcohol hydrometer, which is used for determining the alcoholic strength of liquids for control and revenue duty purposes and the taximeter, of which electronic versions are now appearing.

THE IMPACT OF ADVANCING TECHNOLOGY

The application of electronic techniques to trade measuring equipment is as extensive as it is dramatic and no address on this subject would be complete without particular reference to it. The introduction of electronics has given rise to

- improved measurement accuracy
- enhanced equipment reliability (although some EEC Member States would have us believe otherwise)
- greater operational flexibility
- more extensive facilities

but these benefits have to be tempered by

- equipment susceptibility to electrical interference, both radiated and wire borne
- design identification difficulties especially where software engineering is a feature of the design (important for approval purposes)
- clarity problems of electronic indicators

Uncertainty in some minds as to the reliability of modern electronic equipment and its immunity to electrical interference has raised the spectre of "self checking" as the only means of ensuring system security in trade measuring instruments and equipment. There is no doubt that the market place can be a very hostile environment both in terms of equipment abuse and interference exposure but whether continuous test routines, "signature" testing, dual channel working with parity checking and other design features that constitute "self checking" are a necessary requirement is a matter of debate—as it currently is between EEC Member States.

I would like by way of conclusion to refer briefly to some specific examples and applications which illustrate the impact of electronics on weighing or measuring equipment.

- (a) **Gyroscope force balancing system.** A totally new weighing concept using the gyroscope has appeared in the last decade; the force necessary to balance and thereby determine the magnitude of a load is derived from a spinning gyroscope, the precessional speed of which is made proportional to the load. Precessional speeds of $\frac{1}{2}$ to 2 revolutions per second corresponding to the weighing range, are measured to a high resolution by gating an electronic MHz clock. This feature, together with an almost total immunity of the gyroscope

from temperature effects and the non-movement of the lever arm system coupling the weigh table to the gyroscope under load, adds up to a measuring instrument of high inherent accuracy. Early applications have been to weighbridges and several are already in service in Britain; but there is no reason why this principle should not be applied to smaller capacity weighing machines and to other force balancing systems (e.g., "beltweighers").

- (b) **In-motion weighing.** The operational difficulties of statically weighing individual wagons in a goods train has prompted the development and successful introduction in Britain of "in motion weighing". Coal trains operating continuously between pithead and generating station can now be weighed while on the move with enormous savings in time. System control in this application has been made possible by the use of electronic techniques which allow identification of wagons, averaging and integrating of axle loads and monitoring of qualifying conditions (e.g., train speed). Weighing speeds, which were initially limited to about 5 miles per hour, are now being raised up to about 20 miles per hour. This technique has not yet been successfully extended to tank wagons containing liquid because of load transfer between axles due to "slurping."
- (c) **Nuclear weighing.** Another interesting development is nuclear weighing where the quantity of material moving along a belt is determined by the amount of screening the material affords to gamma rays emitted by a radio-active source. While this system does not as yet possess the inherent accuracy of gravimetric weighing methods, the absence of moving parts other than the transport system itself makes this form of mass determination ideally suitable for use in hostile environments.
- (d) **Fuel dispensing systems.** The garage forecourt has become the scene of some of the most advanced developments. The integrated circuit and now the microprocessor has enabled pump manufacturers to develop and traders to seek a range of operational facilities hitherto not contemplated:
- more sophisticated self-service operation with improved kiosk monitoring and control;
 - money preset facilities which terminate a delivery when the preset amount is reached (motorists are increasingly buying petrol in money's worth);

- coin and currency note prepayment systems for unattended sites;
- credit card control and accounting;
- local and remote monitoring of management information.

The fluid nature of the design of the electronic gasoline pump is perhaps best illustrated by the fact that since its arrival in 1971, some 21 designs have been approved—a testimony not only to the flexibility of electronics and ingenuity of designers but also to the highly competitive business of petrol retailing in Britain. However 21 different designs in 7 years will be seen as something of a nightmare by pump service managers and local authority inspectors.

EPILOGUE

I hope that in the time available to me I have given some brief insight into UK weights and measures activities. Advancing technology is dramatically influencing our trading habits. As we move towards a cashless and self-serving society, we are losing the simple concept of a trading transaction, where the buyer and the seller agree to the terms of a sale and money is exchanged for a declared quantity of goods measured on a self-contained instrument. Credit card purchases at an unattended garage mean that the transaction cannot be “agreed” because one party is not present and money is not then exchanged for gasoline received. If off-site reference is necessary to validate credit prior to a purchase and the remotely-held account is debited as a consequence of the transaction, then the metrological authority may find itself questioning the fidelity and security of the data processing unit and transmission links. These questions are now exercising our minds as I am sure they are yours.

[Editor's Note: Mr. Samuels' most interesting and informative presentation included the showing of a large number of slides.]

FOOD LABELING—THE NEXT STEP

Presented by ELLEN WILLIAMS, Associate Commissioner, Office of Policy and Coordination, Food and Drug Administration



It is an honor for me to appear here today as the personal representative of FDA Commissioner Donald Kennedy, and to convey his greetings to this 63rd National Conference on Weights and Measures.

The history of consumer product legislation is closely intertwined with that of standardized weights and measures, and both are expressed in what is still the principal regulatory tool of the Food and Drug Administration. The very earliest food laws in the English colonies relied on what was then the

only universally accepted standard of fairness: Correctly expressed weights. For example, the General Court of Massachusetts Bay Colony in 1646 stated that, "... henceforth every Baker shall have a distinct mark for his Bread, and keep the true assizes, . . ." and this general statement was followed by a table clearly showing what a penny loaf of three qualities of bread—white, wheat, and household—should weigh when wheat was selling at specified prices.

The penalty for short weight was equally explicit, tough and direct: Forfeiture of the product, with one-third going to the enforcing officer and the rest to the poor.

Since that time, over three and a third centuries ago, standard explicit weights and measures have served the consumer as a major guarantee of value; and the label has served the dual function of informing consumers, and of providing a legal basis for action should the information on the label violate the law. Of course, labeling has continued to evolve in both quality and complexity of information. One reason is that there is much more to know about foods today, so much so that some food labels make a virtue out of telling the consumer what is *not* in the food. In addition, consumers are also more educated, more concerned, and are asserting as never before their right to know what is in the food they purchase.

As a result, labels are more informative than they have ever been. In addition to the three basic and mandatory items of information (product name, net contents or net weight, name and place of business of manufacturer, packer, or distributor) labels now usually contain all or most of the following:

. . . List of ingredients

- . . . Nutrition information
- . . . "Imitation" disclosure
- . . . Common or usual name
- . . . Grades as set by the U.S. Department of Agriculture or by State agencies
- . . . Open dating, including pack date, pull or sell date, expiration date, freshness date
- . . . Code dating
- . . . Universal product code
- . . . Special symbols, such as "R" for registered trademark; "C" for protection by the copyright laws; and ethnic and religious markings.

Despite this formidable list, which one would think would demand a course in speed reading in order to get out of a food store in anything under 2 hours, a growing number of consumers are telling FDA that they are not happy with the information they are getting. Initially, this discontent was focused on specific concerns, notably the declaration of sugar content on food labels, and particularly ready-to-eat cereals. Other significant specific issues involving labeling also emerged, such as salt, fat, and potassium content.

As these and yet other issues were identified by either FDA acting on its own initiative, or by consumers in their meetings with Agency officials, or both, Commissioner Kennedy decided that, rather than dealing with the individual trees, it would be far more effective to look at the forest in its entirety. Keep in mind that, while labeling has evolved in quality and quantity of information since the first Federal food and drug law in 1906, the basic concepts with respect to food labeling have remained static in the face of enormous advances in food technology.

As a result, Commissioner Kennedy challenged both FDA and consumers generally to work together to devise a total food labeling policy. This cooperative effort was subsequently extended to include the two other Federal agencies with major responsibilities for food labeling and food advertising: The Department of Agriculture and the Federal Trade Commission. It was decided that a major effort be undertaken to gather consumer views from individual consumers, by means of public hearings, not only here in Washington but also throughout the country.

This initiative resulted in a multi-stage plan, now in advanced stages of execution:

Stage one consisted of a major meeting with national and Washington-based consumer groups held by FDA in January of this year, and chaired by Commissioner Kennedy. The agenda for this meeting consisted of five food-related issues, divided into product and food labeling issues.

Stage two involved a review, the following month, of the issues by FDA's National Advisory Food and Drug Committee.

Stage three consisted of an evaluation and refinement of the issues and the Advisory Committee's comments by a task force consisting of representatives from the FDA, USDA, and FTC. The result was a spectrum of seven major issues. These are: Ingredient labeling, nutrition labeling and other dietary information; Open date labeling; The total food label; Safe and suitable ingredients; Imitation and substitute foods; Food fortification.

Stage four, currently underway, consists of meetings on the district level, which are designed to provide an additional review of the issues, with emphasis on local and regional concerns. We hope that these district reviews will help "get out the vote" for the hearings themselves.

All of this is leading up to the *fifth* stage, the public hearings, which are scheduled to take place in the late summer and early fall at five sites.

The five sites and the hearing dates are:

Wichita, Kansas, August 22-23

Little Rock, Arkansas, September 18-19

Washington, D.C., September 27-28

San Francisco, California, October 12-13

Boston, Massachusetts, October 25-26

Let me now turn to the issues themselves. All issue papers were published in the *Federal Register* on June 9. In keeping with President Carter's concern, which is fully shared by Secretary Califano and Commissioner Kennedy, that *Federal Register* notices be written in a language that bears at least a family resemblance to English, the issue papers are extraordinarily clear and concise, and provide not only background information but specific questions for each topic. References to pertinent statutory provisions, regulations and judicial decisions have been kept to an absolute minimum, and to aid in understanding food labeling terminology, illustrative examples of food labels are included as well.

To borrow a term from the Junior Senator from California, I am going to walk down the "abstraction ladder" and make all this more meaningful by focusing on but one of the seven issues, open dating, which Harold Wollin indicated was of particular interest to you.

I am going to quote extensively from the *Register* notice to illustrate how the issue is being presented, and the kinds of questions—but, let me emphasize, we do not intend to foreclose other, consumer-initiated questions—that have been most commonly raised in regard to this issue.

The issue paper begins by pointing out that "... open dating is voluntary under Federal law, but mandatory for perishable foods in a few local jurisdictions. Some manufacturers voluntarily provide open date labeling.

"With limited exception, the open date does not have to be accompanied by prefixes such as 'Sell by,' 'Use by,' or 'Better if used by' that tell the consumer its meaning. The exception relates to meat and poultry food products covered by the Federal Meat and Poultry Inspection Acts, which represent 25 to 30 percent of the food sold in grocery stores. Under regulations administered by USDA's Food Safety and Quality Service, if a calendar date is shown on the label of a meat or poultry food product, it must be explained in terms of 'Packing' date, 'Sell by' date, or 'Use before' date.

"Alternatively, USDA allows processors to label meat and poultry products with statements such as 'Full freshness 10 days beyond date shown, when stored at 40 °F or below.' However, such labeling must be supported by test data that show that the statement is true. USDA also requires frozen or refrigerated meat and poultry products to be labeled 'Keep frozen' or 'Keep refrigerated.'

"Four types of open dates are in common use:

1. Pack Date—The date of final packing.
2. Pull Date—The last recommended day of retail sale that allows for sufficient home storage and use time.
3. Quality Assurance Date—The date after which the product is not likely to be at peak quality, e.g., 'Sell by (date).'
4. Expiration Date—The last day the product should be used for assured quality, e.g., 'Do not use after (date).'

Then follows an example of an actual label, showing a container of low fat milk with a "Sell by" date. This, in turn, is followed by a list of pertinent questions for which consumer input is solicited:

- "1. Should open dating be required for all foods, only perishable foods, or only selected perishable foods?

2. Should an explanation of the date shown be required?
3. Which of the four common types of open date labeling is most meaningful? Should different products have different types of open date labeling, such as pull dates for perishables and pack dates for canned food? Should certain products have two dates, such as the pull date and the expiration date?
5. Should all open dates be uniform with respect to label placement and application techniques, i.e., ink marked or pressure embossed?
6. Is an alpha-numeric (April 18) date more acceptable than a numeric (4-18) date?
7. Is open dating of more value than other information on the label? Which information? Are you willing to pay more for products that have open dating? How much more per week?
8. How often are foods thrown out because the open date on the package is considered to be a throwout date?
9. Would a labeling sticker that changed color, say from white to red, when temperature or time had affected the product be a more meaningful way of informing about the freshness of a food product?
10. Do you favor allowing retailers to sell 'out of date products' (such as day old bread)?"

This is the approach being taken for each of the other six issues. Some, such as nutrition labeling and other dietary information, are quite extensive. No matter what their length or subject matter, each issue, as expressed in the notice, shares a common approach: Nothing is assumed; nothing is precluded; everything is open to question.

Earlier, as I walked you through the evolution of these hearings, I was describing a multi-stage plan. My description stopped abruptly after the fifth stage. Some of you no doubt noticed that I did not say "Fifth and final stage." There is a simple explanation for my omission: We don't know how many stages beyond stage #5 will be necessary to reach the "final" stage. To be sure, there will be at least a sixth stage: The analysis and evaluation of the fruits of our hearings.

Personally, I anticipate at least one more stage, consisting of implementation and achievement, by whatever means are most appropriate; perhaps an overhaul of existing regulations, perhaps new legislative initiatives. Right now, our attention is focused on that crucial next step.

I see this entire process as an inspiring—and sincere—effort at democracy in regulation. We want labels to serve consumers, not as we think consumers want to be served, or should be served, but as consumers themselves want to be served. We understand that this process cannot succeed unless consumers understand clearly the nature of the problems involved, both legal and conceptual; we do our very best to explain those problems in this notice.

I believe that this entire process will be beneficial to the Nation, not only in the narrow sense of transforming labeling into a real consumer tool, but more importantly in providing a demonstration of how regulation by and of the people, as well as for the people, should proceed.

MEASUREMENT ASSURANCE—THE FUTURE OF LEGAL METROLOGY

Presented by DR. ARTHUR O. MCCOUBREY, Associate Director for
Measurement Services, National Measurement Laboratory,
National Bureau of Standards



Perhaps if I had written my talk before selecting my title, I would have inverted the order of measurement assurance and legal metrology. Or, perhaps I would have selected an entirely different title.

In any case, what I really want to do is say something about a portending change in the scope of legal metrology. Then I want to emphasize the importance within the context of legal metrology, of looking beyond the limited control of characteristics of measurement devices toward a broader concept of

measurement assurance.

Finally, I want to suggest, or in fact even assert, that the role of State metrology laboratories should not be limited to the support of *enforcement activities* within the marketplace alone but, rather, they should develop greater technical capability to support a wider range of legal metrology demands.

Indeed, I also feel that State metrology laboratories should play a greater role in the world of engineering metrology for industry.

THE CHANGING NATURE OF LEGAL METROLOGY

Legal metrology is defined to be that part of metrology which deals with measurement units, methods and instruments in relation to the mandatory technical and legal requirements which have the object of ensuring a public guarantee of security and of the appropriate accuracy of measurements.

The scope of legal metrology varies widely from nation to nation depending upon the role of government and the role of private institutions in the economy.

Responsibility for the administration of legal metrology also varies, reflecting the differences in the structure of government. In the United States, the Constitution, in Article I—Section 8, endows the Congress with the limited power to “fix the Standard of Weights and Measures.” This is done by the realization and conservation of National Standards at the National Bureau of Standards. The Tenth Amendment to the Constitution reserves to the States all the powers not specifically delegated to the Federal Government.

As one result of this provision, the responsibility for deciding what lies within the realm of legal metrology and the related administration of legal metrology is, as you know well, the business of each of the individual State governments. Thus, our system of legal metrology is a distributed system with no formal statutory requirement for centralization.

Machinery in the form of this National Conference on Weights and Measures has evolved to harmonize the independent actions of State governments through consensus procedures. The remarkable success of this process is a tribute to those who have participated in the National Conference throughout the past 73 years.

The traditional scope of legal metrology in the United States has been primarily focused upon equity in the exchange of goods with particular emphasis upon the retail marketplace. While we have legislation dealing with the economics of bulk distribution in intra-state and interstate commerce, the mandatory requirements placed upon measurements and measuring devices in this area seem to be less far reaching and pervasive.

Equity in such commerce is often realized through the private contractual arrangements between the parties engaged in business and the results seem to be reasonably adequate. In any case, I am not aware of intensive demands for reform.

In contrast to many nations, we, in the United States, do not have legislation which places mandatory requirements upon engineering metrology as it relates to industrial quality control; instead we rely upon the enlightened response of our private enterprise to the forces of the marketplace. In this case, too, the results seem to be adequate and I am not aware of any experience elsewhere which demonstrates that a highly structured legal system of engineering metrology is necessary to quality control, at least in the case of healthy private enterprise.

THE CHANGING DIMENSIONS OF LEGAL METROLOGY

While the traditional role of legal metrology as the basis for equity in the marketplace has been well established in the United States, it is not generally recognized that a wide range of new legislative acts place demanding mandatory requirements upon measurements. These are the regulations that relate to *health, public safety, safety in the workplace*, and the *protection of the environment*.

The formulation and promulgation of such legislation is in the hands of a number of special, but familiar, Federal agencies, some State government agencies, and in many important cases, *local* government agencies.

These regulations are measurement intensive. The responsibility for enforcement, in some cases, is assigned to special Federal agencies for important and well recognized reasons. However, in many other cases, the burden of enforcement falls upon State and local governments.

Our capabilities at all levels of government for providing a basis for adequate measurement accuracy in these new and important areas falls short of the legislated need. In fact, our institutionalized metrology services do not extend into these areas to a sufficient degree.

A BROADER CONCEPT OF MEASUREMENT ASSURANCE

While legal metrology throughout the United States and in other countries tends to focus upon the enforcement of controls affecting the *devices* used for measurements, it is important to remind ourselves that the purpose of such controls is assurance, for those who require it, that measurements necessary to fair transactions in the marketplace are adequate.

In the larger context, the purpose of legal metrology should be the assurance that measurements required for all regulated activities in our society are adequate for the intended purpose.

In our country, we have always valued the principle that the necessary functions of government, that is the necessary regulation of our activities, should be accomplished with a minimum cost in terms of administrative procedures and public expense. Indeed, all of you are well aware of the increasingly high priority assigned to this principle by the voting taxpayers at the present time.

With this in mind, I want to emphasize the importance of measurement assurance as *the significant objective* for our efforts to meet future needs in the expanding world of legal metrology. In this connection, there are important opportunities for innovation, not only involving the use of advancing technologies, but also involving the use of more systematic procedures.

Today, I cannot go into all of the detailed aspects or the deeper considerations of *Measurement Assurance* as a principle focus for metrology services. However, I want to emphasize that the results of *any steps* we take to directly determine the quality of measurements at the point of use will not only reflect the properties of the devices used in making the measurements. They also reflect the quality of the methods used and they reflect the possibly adverse effects of the conditions prevailing during measurements.

Measurement Assurance Programs also provide evidence of the adequacy of all of the steps involved in the realization of *traceability* to National Reference Standards.

Moreover, the results of Measurement Assurance Programs, when properly analyzed and fed back into the measurement system, pro-

vide a basis for internally generated self correcting actions when significant departures from adequate performance exist. You will recognize that information feedback to reduce imperfections in response is a principle well known to the designers of active systems.

OPPORTUNITIES FOR MORE EFFECTIVE SERVICES

Recognizing that legal metrology is increasing in scope and that there may be important benefits to be realized from Measurement Assurance Programs which look beyond the traditional administration of controls on the properties of measuring devices, it is important to think about the possibilities and opportunities for the implied increases in capabilities for metrology service delivery.

In principle, one might expect that new demands for accurate measurements traceable to National Reference Standards all be satisfied by increased services from NBS. This is *not* realistic. Indeed, it might be hoped that government, either at the Federal level or the State level, would put in place a complete institutional network to provide for each new measurement need growing out of each new regulation directed toward the environment, toward public safety, and other urgent needs.

We all know that this is also not realistic and we must seek new ways to extend and adapt the capabilities of our existing institutions utilizing, as much as possible, the resources we have.

Personally, I am convinced that, in the United States, our best opportunities for increased measurement quality on a national scale are to be found within the metrology laboratories of States.

The first step in a response to the new demands for legal metrology is an *increased technical capability* easily accessible to those who have responsibility for enforcement. Thus, in these terms, the case can be made for broadened technical capabilities in State metrology laboratories. In addition, the case can be made for new liaisons between these laboratories and the agencies having administrative responsibilities in new measurement intensive fields.

I would hope, therefore, that we can look forward to the time when the skills to be found in State metrology laboratories will extend well beyond those which relate to the measurement of such basic quantities as mass, length, and volume and extend into the measurement of:

- temperature
- pressure
- acoustic radiation
- ionizing radiation
- optical radiation

and the various forms of electromagnetic radiations which are subject to increasing regulatory attention because of their potential for adverse effects. These skills might also be increased beyond existing levels in the area of chemical measurements which relate to the safety of the workplace and which relate to the quality of the environment. Many new tools and techniques of analysis should be available to enforcement officials throughout the country if the needs are to be adequately met.

COLLATERAL BENEFITS

If and when the capabilities in State metrology laboratories broaden to meet the needs of expanding legal metrology, it will also become possible to provide for traceability to National Reference Standards as required to meet many of the needs of industry indigenous to States in a much more satisfactory manner than that now possible.

To an increasing extent, it is becoming impractical for industrial firms to seek service directly from NBS. There is clearly a larger role possible for State metrology laboratories as essential elements of the National Measurement System.

At the present time, I know of several States which very effectively support industrial needs for calibrations in the case of mass and volume. There would be a very considerable benefit to industrial quality control if frequently needed calibration services, traceable to NBS, were also available on a reasonably proximate basis in the case of:

- dimensional quantities
- electrical quantities
- electromagnetic quantities
- acoustic quantities
- radiation quantities
- materials characterization

Developments along this line would make it possible to concentrate NBS resources more effectively upon essential metrology research, and upon the quality of traceability services for the State metrology laboratories, and upon the need for the more unusual levels of measurement accuracy in special cases of engineering metrology.

OPPORTUNITIES FOR REGIONAL INTERSTATE ACTION

It is not realistic to expect that the Metrology Laboratories of all the 50 States should each have the same range of capabilities cover-

ing all the requirements of commercial metrology, regulatory metrology, and engineering metrology. This would constitute an unnecessary duplication of effort and an unwise use of limited resources.

Moreover, it is important to recognize that the needs of different States vary. While all States may have a common need for capabilities in basic marketplace metrology, the needs for traceability in regulatory metrology depend upon the particular regulatory responsibilities prevailing; and the needs for traceability in engineering metrology depend upon the characteristics of indigenous industry.

Thus, it may be expected that the capabilities within different State metrology laboratories should evolve along different lines with emphasis reflecting priorities.

With this in mind, it would seem desirable to look forward to close cooperative arrangements among the metrology laboratories of neighboring States which would minimize duplication of effort.

In effect, it would be desirable for extended capabilities to develop on a regional basis taking advantage of the special capabilities which might exist or which might be appropriately developed in individual State laboratories.

Indeed, each of the State members of a regional consortium might provide pivotal capabilities in different technical areas. In any case, the prudent use of resources demands consideration of cooperative arrangements and economies of scale.

I might point out that States have combined forces effectively on a regional basis in order to address specific urgent problems. In particular, I have in mind, for example, the Southern States Energy Board and the Western Interstate Energy Board. There are also other important regional action groups at the State level that address a number of common needs.

INTER-INSTITUTIONAL COLLABORATION

While I am on the subject of cooperation, I also want to emphasize the importance of possibilities for inter-institutional collaborations which take advantage of special capabilities that are in short supply and difficult to acquire.

In view of the increasing technical complexity of the broadening metrology needs of the future, I have in mind the universities throughout our country, and, I also have in mind private industry.

As some of you may know, at NBS we have, for several years, had a very productive joint program with the University of Colorado, which is concerned with basic research in the field of metrology. This cooperation is a major factor contributing to the recognition of the United States as the country most productive in metrology research in the world. We also have other cooperative arrangements with universities, all of which are very productive.

I suggest that opportunities also exist for State metrology laboratories to take advantage of the outstanding technical capabilities of nearby universities, particularly in the engineering disciplines. I point out that these possibilities are potentially synergistic, considering the importance of metrology in the curriculum of industrial engineering education. Indeed, some universities and technical schools have already recognized such opportunities in their search for greater social relevance.

INITIATIVE

If we are to realize greater capability throughout our National Measurement System in order to solve the increasingly complex metrology problems of the future it is essential that initiative must be developed at critical points.

I suggest that State metrology laboratories individually and in concert are in a key position to come forward with well conceived problem solving proposals. I recognize that the present climate is not favorable to new allocations of tax revenues. Indeed, we all face constraints in this connection.

Nevertheless, the resources which will be available to all of us will depend upon the quality and ingenuity of our initiatives, their relevance to urgent needs, and their intimate coupling to those who are responsible for practical problem solving in the field.

It is not sufficient for the Federal government, in general, or for NBS, in particular, to take the initiative in bringing forth the new capabilities required for modern measurement intensive problems.

We can make a much more convincing case for the benefits to be realized by adding our NBS support to initiatives which are rooted near the points of need reflecting the broadest possible base of application.

With this in mind, I emphasize again the importance of well conceived regional action. In this regard, it seems logical to me that this National Conference on Weights and Measures might consider appropriate steps to focus upon the changing role of State metrology laboratories with the view to plan and propose new competencies such as those I have mentioned. You have, over the years, brought the NCWM to a position of prominence as an effective forum for problem solving. I urge you now to consider using this forum to bring together the varied Government, industry, and educational interests necessary to evolve a larger and more effective role for your metrology laboratories. I would welcome the opportunity to work with you in this endeavor.

EXPERIENCE IN PROGRAM EVALUATION

Presented by DARRELL GUENSLER, Assistant Chief,
Division of Measurement Standards,
California Department of Food and Agriculture



Good afternoon, Ladies and Gentlemen. I appear before you today with mixed emotions. It is always a pleasure to address the National Conference on Weights and Measures. Indeed it is an honor. However, the only reason I am up here right now is because your Committee Chairman, Bill Korth, couldn't be here today. And I know how much he wanted to be here. If it was at all possible, he would be here.

Bill's absence is a direct result of a thing called the California Jarvis-Gann Initiative.

You may have heard of it. It is also called Proposition 13, or California's Property Tax Limitation Initiative.

I thought before I got to program evaluation, you might be interested in hearing a little bit about what has happened to California's weights and measures programs, as a result of Proposition 13.

I guess you could say that right now California programs are generally in a holding or circling pattern while we wait and see what really happens to us. There is much uncertainty right now.

Generally most of our local jurisdictions, our counties, are incurring between a 10 and 15 percent cut in their programs. That is this year, and that is only because there was a rather large State surplus available for diversion to local government which assisted them through the current situation. That is not necessarily going to be around next year, and we expect to face much larger cuts then.

Some of the extreme examples that we faced are as follows: Bill Korth's county of Ventura had about 10 people working in Weights and Measures. They now have one man and Bill for 6 months, with the charge to find alternative funding means. If he doesn't find such funding, I assume that he will have nothing at the end of 6 months. That leaves Ventura County essentially with no weights and measures program in this budget year.

San Mateo County is another extreme example. It has incurred approximately a 75 percent reduction. It is now down to a sealer and one man from a staff of about nine inspectors.

In Los Angeles County, our largest county, we expect somewhere around a 36 percent budget cut. They may lose as many as 20

people out of that organization. The final decision in Los Angeles won't be made until after August 1st.

You can see another example here at the Conference. We thought California might even catch up to Indiana in Conference attendance as we had 14 people at the last Conference. However, we have only 5 here at this Conference. That is about 65 percent less than it was.

We think this is only the beginning, in California, for economic programs such as weights and measures. It may be that this is only the beginning for all weights and measures programs across the Nation. That of course we don't know.

We expect more cuts, even though, in California, the weights and measures per capita cost is approximately 45 cents. That includes all general weights and measures programs as well as the quality control of petroleum products. We expect more cuts even though the benefits of weights and measures programs far outweigh the costs and even though weights and measures programs are basic to our society and always have been.

So you can look at it in a somewhat positive manner and say that we have some major challenges facing us in the future. New innovative ideas are needed. Responsibility and burden must shift some from where it is now.

I guess you could say that California has taken the Conference theme to heart; changing directions and dimensions in measurements is sure what we are doing whether we like it or not.

But what does all this have to do with program evaluation? I think it has everything to do with program evaluation. Program evaluation may very well be the most important part of our program. Without program evaluation any new or existing program cannot be properly measured.

If we are to have any say in our destiny, we have to know where we are. And to do that we have to be able to measure our programs. What program evaluation means to me is measuring the effectiveness of a program. I class evaluations as either internal or external. An internal evaluation is one that is conducted by the organization that is being evaluated. An external evaluation is conducted by an outside or parent organization, such as a State evaluating a local jurisdiction.

It may take various forms from a management study to a hands on, technical, inspection type survey.

In California we began running program evaluations approximately 18 years ago. We were running external type program evaluations where the State was evaluating the local programs.

In the beginning there was no criterion for evaluation. We had to build that as we went along. Our initial criteria were based on comparison of compliance data from county to county. Over the

years we developed and refined a statewide compliance average for comparative purposes. Our basic program was to evaluate the standards or test equipment that the counties were using, their frequency of inspection and procedures, both test procedures and enforcement procedures, for appropriateness.

Our process was to go into the county, take a random selection of establishments, go to those establishments and inspect them. When problems were located, we then sought to identify the cause. Once we had identified this cause we reported it to the local jurisdiction. They used this report as a tool to improve their policies and procedures, or to make necessary equipment changes or to reallocate manpower as necessary; whatever the report indicated was necessary.

We conducted these evaluations on a biennial basis in our more highly populated counties and progressively less often in our smaller counties. The maximum frequency, in the smallest counties, was about once every 10 years. Such a frequency appeared sufficient for evaluating test equipment and some procedures, but it was certainly not appropriate for evaluating the on-going effectiveness of programs.

So in the early 1970's we began to change this program to more of an on-going type of evaluation. As we progressed into new types of inspection procedures, such as variable frequency of inspection and similar programs, it became evident that we needed to be able to react more rapidly to our problems. The on-going type of evaluation seemed to better meet these needs.

We conduct this type of evaluation by utilizing our State field personnel who routinely work with the counties to be evaluated. Their work assignment now includes evaluation work, where they take random selections and go into the field with the county officials to inspect the conditions.

In addition, we urge local jurisdictions, especially those that are embarking on new inspection frequency programs, to develop their own internal evaluation programs.

As we progress, our priorities are beginning to change also. In the past one of our major concerns was verifying the accuracy of weighing or measuring devices. We were primarily evaluating how well this process took place in the local jurisdiction.

Our priority now is shifting more to verifying that the device is also being used correctly. We are not abandoning the accuracy of the device, but we are placing a higher than before emphasis on the end result. For instance in past evaluations of a buyer of aluminum cans, we would have concentrated primarily on the accuracy of the weighing device. Now part of our process would be to monitor a sale of aluminum cans and verify the accuracy of the transaction.

What are the benefits of program evaluation? I think that some of these benefits that I am going to outline are part of the reason why I say it is going to become a major or most important part of our program.

First of all, of course, it gives you measures of effectiveness which you can use to monitor existing, new, or experimental programs. The resulting information will assist you in making necessary management decisions about these programs.

It provides you with somewhat unbiased data to use for budgeting purposes. It is getting more and more important for you to have cost effectiveness measures and data to back up your budget request.

It provides a system for monitoring inspector performance especially if the evaluations are conducted by supervisory personnel. Random inspections take you into some establishments that were inspected shortly before by one of your inspectors. You are therefore given an opportunity to monitor the effectiveness of the work he has done.

It provides a system of unpredictable and unannounced inspections. This is valuable because it is not too difficult for most establishments to predict your pattern of inspection in most any program. This is especially critical in a variable frequency program. It is necessary for you to have some kind of a program which makes every establishment subject to at least one inspection on a random basis through any period of time. Once the establishments know that they are subject to random inspection, the incentive to take advantage of your frequency of inspection is not nearly so great.

The benefits of program evaluation are many and the drawbacks are few. I hope that these brief comments have given you some ideas to consider.

In conclusion, I think the Committee on Education, Administration, and Consumer Affairs should be commended for their effort in this area of program evaluation, and especially in their work toward development of nationwide criteria. I think it is timely and needed. I urge that they continue with the development. Thank you.

COST-BENEFIT PERFORMANCE AUDITING—A TOOL FOR WEIGHTS AND MEASURES PROGRAM IMPROVEMENT

Presented by CHARLES H. VINCENT, Director,
Department of Consumer Affairs, Dallas, Texas



As many of you know, the Department of Consumer Affairs of the City of Dallas was organized in 1972 as an expansion of the then-existing Weights and Measures Department of the City. As a result of that incorporation in a larger department charged with broad consumer protection responsibilities, our weights and measures program has been strengthened significantly.

After almost 6 years of functioning as part of an expanded department, our Weights and Measures Division continues to be regarded

as the basic component of the City's overall consumer protection effort. And, we in the department feel that no other activity in the Department of Consumer Affairs is more fundamentally important to the citizens of Dallas than weights and measures. In addition, we continue to feel that weights and measures yields a higher return on investment than any of our other consumer protection functions.

In spite of our subjective assessments, determining the value of weights and measures enforcement in terms of quantifiable public benefits has been a source of considerable frustration to all of us in the profession through the years. For purposes of budget justification, we have been inclined to rely on our own estimates, which have often tended to be less than fully persuasive.

However, I am pleased to report to you that we in Dallas are now in a position to speak of the general effectiveness of weights and measures in much more specific and more persuasive terms as a result of a comprehensive performance audit which was conducted in 1977. That audit was carried out by performance auditors of the City Auditor's Office to assess the public impact of weights and measures enforcement and to determine the overall effectiveness and efficiency of program activities. Because of the comprehensive nature of that audit and the broad expertise of the auditors who were involved, we feel we are now able to assess the general cost-effectiveness of the weights and measures program in the most precise and valid terms which have yet become available. And, as far as we can determine, the audit of our Weights and Measures Division was the most highly structured and thorough audit of its type which has yet been conducted in a jurisdiction by an outside agency.

As a result of the audit, it was concluded that the overall City weights and measures program yields a return on investment of 1,414 percent; an amount which exceeds our own previous estimates significantly.

In terms of program justification, I think this figure speaks for itself, and proves that weights and measures is a highly useful function of government.

Along with a credible assessment of the public value of weights and measures enforcement which was developed by our auditors, we also now have a definitive outside perspective of our needs for program improvement. In this connection, I should stress that the auditors' assessment of areas where our program effectiveness could be strengthened essentially coincided with our own assessment in the department. As a result, we are proceeding to develop added program efficiencies within the context of an enforcement effort which was identified as being basically efficient and well managed.

In addition to providing effective tools to program management for the development of service improvements, our performance audit has suggested methods of analysis which we feel can ultimately be applied nationally for quantifying the public value of weights and measures enforcement and for developing resource allocation guidelines which could be applied in all jurisdictions. It is our intention to work closely with the Committee on Education, Administration, and Consumer Affairs of this Conference to combine the methodology used in our performance audit with similar information which is available elsewhere to finally develop a useable resource allocation model for weights and measures jurisdictions. Such a model would provide means for optimizing program effectiveness on a systematic basis rather than relying on tradition or judgment in determining what resources should be applied to specific inspection or testing areas.

I should stress that we are in the beginning stages of our analytical model development at present and that we are finding the endeavor to be quite challenging. We do hope, however, to initially develop more specific cost-benefit criteria for program planning. And, ultimately, we hope to come up with an analytical model that will be useful to all jurisdictions in assuring that the tax dollars which are invested in their programs yield maximum public benefit.

I would now like to introduce to you Mr. Robert L. Lockridge, Assistant City Auditor of the City of Dallas, who will discuss our recent performance audit and some of the things we hope to accomplish in the future.

COST-BENEFIT PERFORMANCE AUDITING—A TOOL FOR WEIGHTS AND MEASURES PROGRAM IMPROVEMENT

Presented by ROBERT LOCKRIDGE, Assistant City Auditor,
City of Dallas, Texas



My presence here today requires some explanation. Unlike my predecessors at this podium, I am in no sense an expert in the field of weights and measures. Nor am I an experienced administrator of consumer affairs. I must speak to you as an outsider, if an interested and involved one. Therefore, I will not presume to tutor you regarding the technical aspects of your professional work. What I want to briefly share with you are general concepts regarding public sector management in general and management of weights and measures programs in particular. These concepts will be presented in the context of my own professional practice, with special reference to an engagement with the weights and measures program of the city of Dallas.

To begin, I would like to discuss the kind of work I do. My perspective is that of an auditor, but of a special kind of auditor. I do not limit myself to checking the figures in accounting records to verify that they are valid, or to rendering opinions regarding financial statements. I have people on my staff who do these things, but in the context of a much broader approach to audit work.

This "broad scope" approach to audit work was first clearly articulated in 1972 when the United States General Accounting Office (GAO) published a small yellow pamphlet entitled "Standards for Audit of Government Organizations, Programs, Activities, and Functions." The GAO "Standards" state, in essence, that traditional financial auditing—while it has its place—really does not go far enough. We want to know whether the books balance, but that in itself is inconclusive. Taxpayers and citizens are primarily interested in two other things:

FIRST, is the government spending money effectively? That is, are goals and objectives being achieved?

SECOND, is the government spending money efficiently? That is, are we getting the best possible results for each dollar invested?

In addition, this "broad scope" approach to auditing assumes that effectiveness and efficiency should be achieved through con-

scious planning and direction. Specifically, it is a manager's responsibility to define his business, develop realistic and relevant objectives, plan to achieve those objectives, and monitor operations in order to control achievement. Therefore, audit work should include a review of the management system to ensure that it provides the capacity for continued achievement.

This sort of auditing has been called management auditing, operations auditing, productivity auditing, and program evaluation—to name a few—but none of these do justice to its comprehensive nature or to its underlying concepts. In Dallas, we call it performance auditing—because, in a very real sense, effectiveness, efficiency, and management procedures are all aspects of overall management performance. As performance auditors, it is our responsibility to assure the City Council that management is fulfilling its responsibilities.

In regard to Dallas' weights and measures program, we were pleased to be able not only to provide such assurance, but to report that we have our hands on a real bargain. I would now like to be more specific about how we did this. I will discuss how we approached the audit, how we did the work, and what we concluded. I would then like to comment on what I believe our approach and findings can mean to your profession as a whole.

I have already explained briefly the general performance audit approach of measuring effectiveness and efficiency in the context of general management practices. I would like to elaborate by saying that the way we apply this approach assumes a certain hierarchy of values. Peter Drucker, the famous writer on management theory and practice, says that effectiveness is doing the right things; efficiency is doing things right. It follows that as auditors we begin with effectiveness—because if a manager is doing the wrong things, it really does not matter how well he does them.

We began, then, by asking a simple question: "What is your business?" Interviews with Dallas weights and measures personnel, correspondence with other experts, and general research gave us this tentative answer:

"The business of a weights and measures program is to carry out activities which achieve fair, accurate, and uniform standards in the exchange of goods and services in the market place."

This seemed logical, appeared to be acceptable to the profession, and was consistent with relevant laws. Our next step was to find out if this was what the Dallas program was doing.

First, we found out what the profession considered to be the attributes of a good program. These attributes included such things as ratio of inspectors to population, per capita program costs, various measures of level of effort, and the comprehensiveness of the pro-

gram, among others. By conducting a survey of other locally administered programs, we could check Dallas' standing by these normative, generally-accepted criteria. We found our program to be, on the whole, cheaper and better.

By this time, we had also discovered the high esteem enjoyed by the Dallas program nation-wide. We were familiar with the long and distinguished history of the program (since 1909), and had reviewed the management system and found it to be quite sound. Finally, we were impressed with the sound legal underpinnings of the program.

All of this was very compelling evidence. However, being auditors, we were not yet satisfied. We knew that Dallas had a good weights and measures program, relative to others. But that didn't tell us whether it was worthwhile in an absolute sense. All management is involved in the allocation of scarce resources among infinite possibilities. Why should we spend \$200,000 a year on weights and measures rather than on sanitation, or parks, or social services?

We felt that in order to answer the general question, we needed to explore two more specific ones:

FIRST, why should the taxpayer invest money in achieving "fair, accurate and uniform standards in the exchange of goods and services in the marketplace" at all?

The key to answering this question is implied in the statement of "what our business is." "Marketplace" means "economy," and a weights and measures program must be evaluated in an economic context. The taxpayer wants a fair return on his investment. He wants to keep from getting "ripped off," either by accident or on purpose.

SECOND, why do we need a local (as opposed to a State) program?

The answer to this is based on managerial economics. Specifically, any enterprise is expected to "add value" to the resources expended. The local program should therefore produce superior results.

It all really boiled down to the seminal question faced by any investor: which, of all possible opportunities for investment, will afford me the highest return relative to risk? Since the taxpayer has no choice but to invest in government programs, his representatives must make that choice for him. In so doing, they must realize that if a government program cannot show a return greater than other investments, it represents an opportunity loss to the taxpayer and a net economic drain on the productive capacity of the community. And it should be abandoned.

Our problem, then, became that of measuring the return on investment provided by the Dallas weights and measures program.

We knew that the answer could not be precise. But we believed that by carefully structuring our research design and maintaining rigorous control over its execution, we could develop a convincing argument.

What we did was this:

First, we selected the activities to be evaluated. These were (1) commercial scale testing, (2) gasoline pump testing, and (3) package reweighing. Altogether, these made up about 70 percent of the weights and measures program.

Second, we tested Dallas vendors, selected through random sampling techniques.

Third, we chose a Texas city which has no local weights and measures program. We selected districts which matched our Dallas districts on social, economic, and demographic variables, and tested randomly-selected vendors within those districts.

Finally, we compared the tests. The difference in degree of compliance showed us the "value added" by the local Dallas program. Using estimated base commodity prices and sales statistics, we calculated the dollar value of the difference. Finding return on investment was then a simple matter of relating program costs to this value.

The results were significant. The taxpayer is spending about 18 cents each year for the weights and measures benefits he receives. This produces an astronomical return of over one thousand percent! Our first reaction was, "Where can we buy some more to this?" And the temptation is for management to rest on its laurels.

This leads directly into my final point. We are convinced that weights and measures programs are a good investment for the taxpayer. However, we also believe that the return can be improved, if management focuses on doing the right things, and on doing them right.

First of all, the economic aspect of the program needs emphasis. Certainly, there are intangible benefits, and we noted these in our audit report; but by their very nature, intangible benefits cannot be measured and cannot therefore be used to set objectives for the program or to justify its continued existence. Return on investment can serve these purposes.

Second, use the return on investment measure as the principal basis for allocating your resources. If you're getting 98 percent compliance on gas pumps, pull back and do something else, and spread that powerful deterrence factor around. A carefully structured random check at the gas stations, compared against an established tolerance line, will allow you to monitor compliance there without blindly tying up your inspectors.

Finally, use return on investment as a way to establish a "bottom-line" management system. Train your inspectors to appreciate that their ultimate contribution is economic. Develop an information system which allows them to gauge their own performance, and turn them loose! Reward them according to their results, and such control devices as quota systems will become unnecessary.

In closing, let me reiterate that Dallas' weights and measures program has proved to be an excellent investment to the taxpayer; I assume that most other locally-administered programs follow the same pattern. There is, however, a need to prove this to the taxpayer to avoid arbitrary budget cuts in this age of tax revolt. Finally, there is a need for management to focus on the measurable economic benefits afforded by their activities in order to realize the full potential of their programs.

APPLICATION OF QUANTITY OF CONTENTS REQUIREMENTS TO PACKAGED SEAFOODS

Presented by DR. IRVING D. SACKETT, JR., Director,
Inspection Services, Seafood Quality and Inspection Division,
National Marine Fisheries Service, National Oceanic
and Atmospheric Administration



In the next few minutes I want to do three things. First, I want to give you a brief description of the seafood inspection program conducted by the National Marine Fisheries Service so you will have an appreciation for its capabilities and its limitations. Second, I want to make you aware of our concerns about the determination of quantity of contents of packaged seafoods, and some special problems they present. And finally, I would like to make a recommendation for consideration by your organization.

The National Marine Fisheries Service of the Department of Commerce's National Oceanic and Atmospheric Administration conducts a fishery products inspection and grading program authorized by the Agricultural Marketing Act of 1946, as amended. The use of any of the program's services by the seafood industry, State or local purchasing agencies, commercial purchasers, or other interested parties is strictly voluntary, and any party using the services must reimburse the National Marine Fisheries Service for its cost of providing them. Fish and fishery products are not subject to mandatory Federal inspection as are meat, poultry, and eggs by the Department of Agriculture. They, as do all food products not mandatorily inspected by the Department of Agriculture, fall under the cognizance of the Food and Drug Administration, which is responsible for enforcing the Federal Food, Drug and Cosmetic Act, and the Fair Packaging and Labeling Act. These Acts are applicable to all seafoods introduced, or delivered for introduction, into interstate commerce. They apply to seafoods produced in establishments which voluntarily participate in the National Marine Fisheries Service inspection program, as well as to products produced elsewhere, including those from foreign countries. The National Marine Fisheries Service must enforce the provisions of these Acts and their implementing regulations when rendering its inspection and grading services. Products found by the National Marine Fisheries Service to be in violation of the Acts and regulations cannot be permitted to be released into com-

mercial channels. Since the National Marine Fisheries Service has no regulatory authority outside the physical confines of participating processing plants, the inspection service notifies the appropriate Federal Food and Drug Administration office should any violative product leave the premises of a participating plant. This arrangement has been made through a formal memorandum of understanding between the two agencies.

You should be aware that the voluntary nature of the National Marine Fisheries Service inspection program permits a participating firm to designate the items it desires inspected. The entire plant must meet prescribed sanitation standards, and the processing of unsafe, unwholesome, or adulterated products is not permitted regardless of whether they have been designated as under inspection. Otherwise, products exempted from inspection will not be examined for any purpose, including compliance with quantity of contents requirements. Simply put, products produced in plants under the inspection program can be assured of having been Federally inspected only if they bear an official Department of Commerce inspection mark or U.S. grade mark, or if they are accompanied by an official Department inspection certificate.

The National Marine Fisheries Service currently provides inspection service to 87 processing plants—about 5 percent of the total number in the United States, its possessions and territories. About 30 percent of seafood processed in this country is being inspected under the program. In 1977, 600 million pounds were inspected. From these figures it can be readily seen that most seafood products consumed in this country receive no Federal inspection on a regular basis. The Food and Drug Administration, because of budget and manpower constraints, must place priorities on the use of its resources. It is logical and proper, therefore, that it places a higher priority on food safety and wholesomeness than on short net weight or substandard fill of container. The latter are violations of an economic nature; and although they will affect the pocketbook—adversely for the buyer, favorably for the seller—they will not have any appreciable effect on the consumers' health or well-being. This is not to say that the Food and Drug Administration does no checking for compliance with quantity of content requirements, or that they will not take action when violations are found. They do check and will take action when appropriate—particularly on seafood items packaged for the retail market. However, they seldom, if ever, check the quantity of contents of institutionally packed products.

Some governmental purchasing agencies, i.e., Federal, State, and local, and some commercial purchasers of seafood products regularly check the quantity of contents of shipments upon receipt.

Some do not, or do so on a sporadic basis. We have reason to believe that most do little, if any, checking. Perhaps some feel confident that somewhere along the line a government agency is watching out for their interests.

Seafood processors join the inspection program for various reasons, all of which, I dare say, have the same common denominator—increased sales. Processors which pack products primarily for the retail market believe that consumers have more confidence in products packed under Federal inspection. Packers of institutional products are often required to be under inspection to supply certain markets. No processor feels he should be penalized or placed in a non-competitive position because of his decision to pay the Federal Government for scrutinizing his operation on a daily basis. However, at times users of these voluntary inspection services are forced to decide whether they can afford to participate in light of economic cheating by their competitors.

This happens when situations arise in the industry which seem to provide a reasonably safe opportunity for some processors to relax their zeal for honesty. The excessive breaching and/or battering of fish sticks, fish portions, and shrimp, and the use of chemicals to retain product moisture, without proper label declaration, are common practices that have been followed by some for years. Recently, the abuse of the long-standing industry practice of glazing certain seafoods has come to our attention.

Glazing is the coating of some seafoods with a layer of ice to protect them from dehydration or freezer burn during storage. By protecting the product from air contact it effectively lengthens the storage life. Products routinely glazed include crab legs, crab claws, individually frozen fillets and steaks, and whole and dressed fish. Other individually frozen items including raw peeled and deveined shrimp may also be glazed. Although there is a practical limit to the amount of glaze which may be added to these products, there is no legal limit. It may vary widely between processors and products, and between lots of the same products packed by the same processor. Needless to say, the weight of the ice cannot legally be included in the declared net weight on the product container. It must be removed to determine the net content of product in the container.

Another product form which is commonly coated with a layer of ice to delay the onset of surface dehydration is the block form of frozen crab meat, and peeled cooked shrimp. The determination of net contents of these products cannot be determined simply by removing the surface glaze because water is added to the product during processing. The net contents in this instance is actually the drained weight of the blocks, not the deglazed weight as is the case

with the individually frozen items. Therefore, a different method of determining the net contents must be used.

Large quantities of glazed seafood products are packed and sold for institutional use. We have been advised by program participants that it is common industry practice to use a standard deduction for glaze rather than to actually determine the average percent glaze for each production lot based upon actual analysis of samples. This apparently works to the advantage of the processor or distributor, not the purchaser. Some processors would have us believe it to be an accepted premise that buyers of these products are aware of this practice, and make allowance for it in settling on a price for the merchandise. In any event, it is a violation of the Fair Packaging and Labeling Act when the product is shipped in interstate commerce. As pointed out earlier, the Food and Drug Administration does not have the manpower or funds to routinely check these products for economic violations, particularly products packed for the institutional market. They will, however, take appropriate action when presented with documented evidence of products in violation of the Act.

As we see it, the problem can be resolved only by presenting test weight results of specific shipments of these products to the Food and Drug Administration, or having State or local regulatory officials sample and test products, then take appropriate action when violations are found. It is vital, of course, that the quantity of contents be determined by using officially recognized methods.

With this in mind, Mr. James Brooker, of our staff, discussed the problem with Mr. Wollin, your Executive Secretary, in December 1977. At Mr. Wollin's invitation he outlined the problem to your Conference committee in January 1978. Since then, we have recommended to the National Bureau of Standards that Handbook 67 be modified to include a section on glazed raw and cooked seafoods, and that two methods for determining the quantity of contents of these products be incorporated therein. The methods recommended are given in section 18, "Fish and other Marine Products," of the Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC). Under that section, three methods are provided:

1. 18.001 (a) Net Contents of Frozen/Glazed Seafoods
2. 18.016 Drained Weight (5)—Official first action (Applicable to frozen shrimp and Alaska King crabmeat)
3. 18.018 Alaska King Crab Marketing and Control Board Method

Our experience has shown that method 18.001 (a) works very well for glazed frozen raw seafood products such as shrimp, fillets, fish steaks, smelt, etc. However, it does not work very well for frozen glazed cooked seafoods such as cooked peeled shrimp, King crabmeat and frozen cooked lobster tail meat, particularly when these products are block frozen and the crevices are filled with water to preserve the quality and integrity of the product.

Also, based on our experience, method 18.018 works best for determining net content/drain weight of glazed cooked seafoods because thawing is achieved under stable conditions (not running water) and the loss of small particles is minimized.

We have recommended method 18.001 (a) for frozen raw shrimp, lobster, and fillets; and method 18.018 for cooked shrimp and lobster for inclusion in international standards. These methods have been accepted by the Codex Alimentarius Commission. Specifically, these methods are:

For frozen raw seafood and fish products, AOAC method 18.001(a):

Remove package from low temperature storage, open immediately, and place contents under gentle spray of cold water. Agitate carefully so product is not broken. Spray until all ice glaze that can be seen or felt is removed. Transfer product to circular No. 8 sieve, 8 inches (20 cm) in diameter for net weights less than or equal to 2 pounds (0.9 kg) and 12 inches (30 cm) for net weights greater than 2 pounds. Without shifting product, incline sieve at angle of 17-20° to facilitate drainage and drain exactly 2 minutes (stop watch). Immediately transfer product to tared pan (B) and weigh (A). Weight of product = A — B.

For cooked seafood, AOAC method 18.018:

Weigh bare block free of all wrappings and record weight. Place block in bowl containing amount of fresh potable water at 80 °F (27 °C) equal to 8 times the declared weight. Leave block in water until all ice is melted. Turn block over several times during thawing. The point at which thawing is complete can be determined by probing block apart. Pour entire thawed sample onto tared 8 inches (20 cm) No. 8 sieve. Incline screen to aid drainage, drain exactly 2 minutes and weigh. Subtract tare weight of sieve for thawed drained weight of sample.

Percent drained weight

= (thawed drained weight × 100)/declared net weight.

In summary, we recommend:

- (1) Handbook 67 be modified to include a section on glazed raw and cooked seafoods.
- (2) Two methods be incorporated fully or by reference:
 - (a) 18.001 (a) raw glazed seafood products
 - (b) 18.018 cooked glazed seafood products

The modification will (1) promote fair trade in these products; (2) provide standardized procedures for use by all regulatory officials, and will require all seafood processors to uniformly comply with quantity of contents declaration on labels of their products; (3) assure that regulatory officials and the National Marine Fisheries Service will be using the same methods, thus avoiding disputes between State and Federal officials about the quantity of contents of these products; and (4) provide a basis for cooperative agreement between National Marine Fisheries Service and State weights and measures officials to recognize National Marine Fisheries Service inspected and shielded products as meeting the requirements of Handbook 67.

We seek your support. Thank you.

PRESSURE MEASUREMENT—A NEW ACTIVITY FOR WEIGHTS AND MEASURES

Presented by Dr. CHARLES R. TILFORD, Group Leader,
Pressure and Vacuum Measurement, Thermophysics Division,
National Bureau of Standards



Increasing requirements for pressure measurement and a corresponding increase in demand for pressure calibration have prompted attempts to improve the availability of pressure calibrations. One mechanism for doing this could be the establishment of pressure calibration facilities at weights and measures laboratories. NBS is exploring the possibility of cooperating with a few States in establishing such a program on a trial basis.

Pressure measurement plays an increasingly important role in our society. Applications range from the everyday to the sophisticated; from proper tire inflation and air filter maintenance to aircraft altimetry and electric power generation. Pressure is an important parameter in a who's who list of industrial and scientific activities; including petrochemical refining, air transport, semiconductor processing, pipeline monitoring, thermophysical properties of materials, freeze drying, metal forming.

A number of factors are causing an increasing demand for more and better measurements, often in areas where measurement requirements were almost nonexistent a few years ago. These factors include the extension of large scale industrial processes into pressure ranges, both high and low, that were formerly considered exclusively research areas; the demand for better process control to obtain an improved product and/or lower energy usage; increasing use of automated control; and government regulations intended to promote public safety, improve fuel economy, and reduce pollution. Meeting these new demands on the pressure measurement system will undoubtedly require changes in the system. Those changes are best considered from a perspective of how the present system works.

Many measurements must be accurate, that is, they must be related to other physical quantities within a known uncertainty. Others only require reproducibility, but long term reproducibility requires reference to unchanging physical quantities. In most cases reproducibility then becomes synonymous with accuracy. There are two common types of primary pressure standards, illustrated in

figures 1 and 2. The liquid manometer used primarily at lower pressures, balances the unknown pressure against the measured displaced height of a liquid of known density. The piston gage (also called a pressure balance, piston manometer, or deadweight tester) balances the unknown pressure with a known force applied to a known area. The use of piston gages overlaps with manometers at pressures near atmospheric and continues on up to higher pressures. These primary standards are sometimes incorporated di-

LIQUID MANOMETER

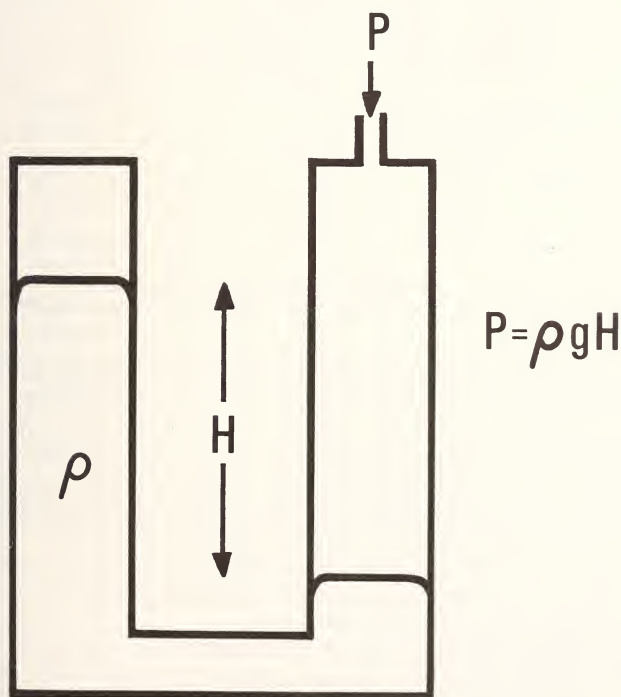


FIGURE 1. The pressure, P , applied to one side of a liquid manometer is balanced by the pressure $\rho g H$ generated by a liquid column of height H and density ρ in a gravitational field g .

This is an absolute measurement in terms of mass, length, and time and with great care can be made with an uncertainty as small as a few ppm.

PISTON GAGE PRINCIPLE

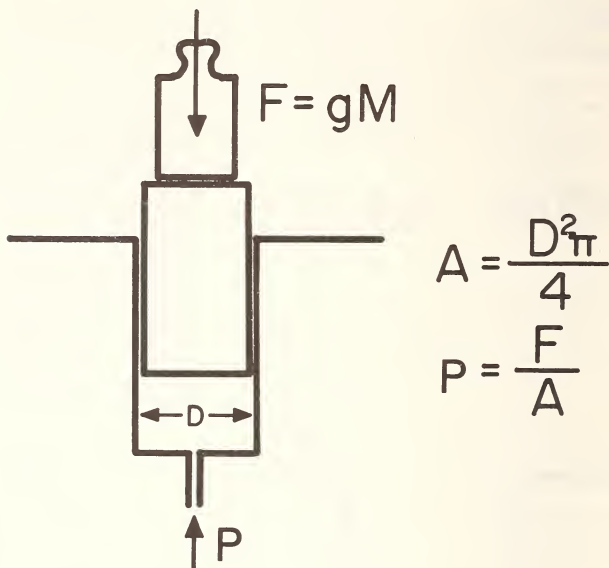


FIGURE 2. The pressure P applied to a deadweight piston gage is balanced by the force of a mass M in a gravitational field g applied to an effective area A .

This is an absolute measurement in terms of mass, length, and time and with great care can be done with an uncertainty as small as 25 ppm near atmospheric pressure. Piston gages are widely used at high pressures (above 10^6 Pa) where it is not feasible to use liquid manometers.

rectly in end-use applications; however the skill and time required for their proper operation as balanced against the improving capabilities of electromechanical pressure transducers, and increasing demands for automatic data acquisition are making transducers increasingly important. Of course, transducer accuracy or reproducibility can only be obtained by reference back to primary standards, which requires a calibration capability and a program for assuring measurement accuracy.

The National Bureau of Standards Pressure and Vacuum Measurement Group maintains primary pressure standards over more than 10 decades of pressure. Routine calibrations are performed over the range shown in table 1. Efforts are being made to extend this range, particularly at the lower end, and improve the accuracy of some existing standards. Although some end users with critical accuracy requirements come directly to NBS for calibrations, most

users obtain their calibrations through an existing system of subsidiary calibration laboratories with the top end of the calibration chain anchored at NBS. NBS calibrations are performed for literally hundreds of calibration laboratories operated by instrument manufacturers, government agencies, research laboratories and a host of high technology industries. They in turn perform calibrations for their customers or subsidiary standards labs and end users within their organization. A typical calibration chain operated by an electric utility to calibrate pressure gages and switches at 20 nuclear reactors is shown in figure 3. The structure of this chain is dictated in part by technical requirements, in part by regulatory requirements.

TABLE 1.—*Range and Uncertainties of NBS Pressure Standards*

	Pressure (Pa)	Uncertainty (ppm)
Medium Vacuum	10^0	1000
Low Vacuum	10^2	100
Atmospheric Pressure	10^4	25
Industrial pneumatics	10^6	40
Industrial hydraulics	10^8	100
Research	10^{10}	1000

NOTE: Somewhat arbitrary designations are given to the left of the pressure range. Note that 10^5 Pa is approximately 1 atmosphere or 15 psi.

The sole purpose of the primary standards and the calibration chain is to help assure that the required level of accuracy is obtained for the end-use measurements. The large size and increasing complexity of the pressure measurement system has necessitated NBS efforts to improve the measurement delivery system. These efforts include training courses, informal consultations, characterization of pressure transducers for use as transfer standards, and measurement auditing systems to help assure the delivered measurement accuracy. An additional step now contemplated would be the establishment of subsidiary calibration laboratories

that are open to the general public and have close ties to NBS and a well-defined mechanism for assuring measurement accuracy. This step is prompted by the limited availability of competent pressure measurement laboratories to users outside of large organizations.

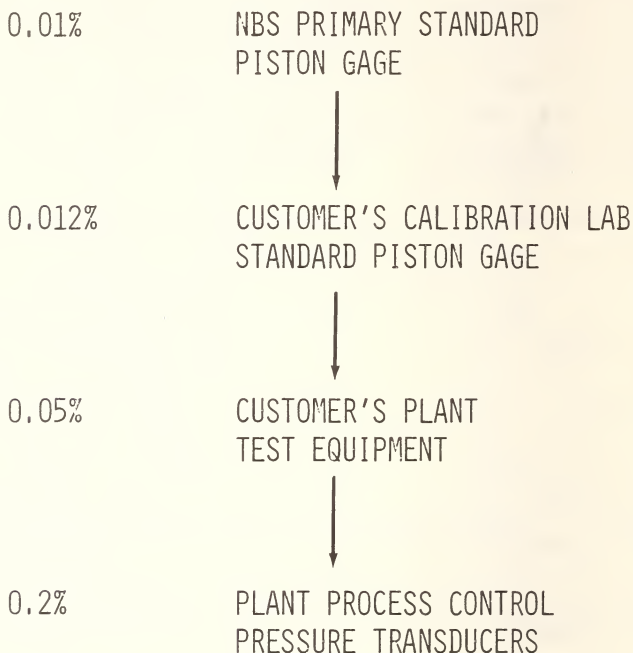


FIGURE 3. *Typical calibration system and associated uncertainties operated by electric utility to maintain hydraulic pressure transducers and switches at nuclear power plants.*

Each of the 16 plants in the system will have approximately 250 analog pressure transducers and 250 pressure switches with required uncertainties as small as 0.2 percent.

Most government and industrial standards labs will not take outside work as a matter of policy. Those that do are often difficult to locate, may offer only a limited range of services, and may change their policy without warning. Moreover, a user without technical resources of his own cannot obtain an independent assurance of the measurement quality of these laboratories, which can vary from excellent to poor. The result is that a large number of smaller industries, laboratories, and government agencies are left without access to reliable, reasonably-priced pressure calibrations.

That number may dramatically increase with the introduction of pressure measurement requirements in consumer applications. A good example of this is the developing use of pressure transducers in automotive engines. The allowed measurement uncertainties in this application are as small as 0.1 percent and may be required by regulation as well as by operating considerations.

One result of the poor availability of pressure calibration services is a growing number of requests to NBS for calibrations with lower accuracy requirements. While we wish to be accommodating we are not set up to perform such services at an economical cost and do not have the resources to develop that capability. We would prefer to see that capability established in other publicly accessible, technically competent metrology organizations. To this end we are interested in working with a limited number of States in establishing a pressure measurement and calibration capability on a trial basis. We feel that such a program should aim to provide second and third tier calibration services over the most-used ranges (10^4 to 10^8 Pa) at an economical cost and in a manner that will give the customer confidence that technical as well as legal requirements for measurement accuracy are met. We would propose to cooperate closely with participating organizations, offering technical advice in designing the measurement system, training personnel, calibrating standards, and operating a measurement auditing system.

It could be anticipated that the services of such a pressure calibration lab would be used to some extent in the traditional weights and measures area of commodity transfer. Another involvement would be in public safety. Probably the greatest use would be in support of a large variety of industrial activities. A 2 to 3 year initial effort, particularly if operated on a regional basis, should suffice to clarify the requirements for and effectiveness of such a program.

ADDRESS BY CONFERENCE CHAIRMAN

Presented by JAMES F. LYLES, Supervisor, Weights and Measures,
Department of Agriculture and Consumer Services,
State of Virginia



Ladies and Gentlemen and Honored Guests, It is my pleasure to welcome you to the 63rd annual meeting of the National Conference on Weights and Measures. I am pleased that so many have brought guests. I want to extend a special welcome to our distinguished group of speakers and to our foreign visitors. Our foreign visitors provide the broad base in which international legal metrology is founded. The Conference appreciates the continued interest of our foreign visitors; you are welcome anytime.

As you know, in 1980, the U.S. will host the sixth international meeting of the Organization of Legal Metrology in Washington, D. C. I am sure you will be hearing more about this later in the week including the plan to hold the National Conference during the week just after this international meeting.

It is indeed an honor to have served as your Chairman for the past year. This has been a real milestone in my career and I appreciate the confidence you placed in me. I hope that I have lived up to your expectations. In addition to it being an honor for me, it has been an honor for the Virginia Weights and Measures Program, the Virginia Department of Agriculture and Consumer Services and for the Commonwealth of Virginia. One does not realize the time and effort involved in being Chairman of the National Conferences on Weights and Measures and therefore, many in my organization have shared by responsibility during the past year. I want to thank them and the Commonwealth of Virginia for providing me this opportunity.

Some time ago, I was researching the history of the Virginia Weights and Measures Program in Virginia's Archives and came across this letter which I would like to read:

His Excellency,
The Governor of Virginia,
Richmond, Virginia,

Sir:

Referring to our former correspondence concerning the proposed convention of State Sealers of Weights and Measures in this city about April 15th of

this year, I have to state that for several reasons it now seems best to postpone this meeting until September or October.

While more than a sufficient number of favorable answers were received to insure a successful meeting in April, several States were forced to decline the sending of representatives because the early date proposed did not allow sufficient time in which to make the necessary arrangements. This, together with the fact that our own arrangements will be more complete by fall, leads us to suggest the later date. You will be notified as to the exact date of the meeting and we trust that your State will be represented.

Respectfully,
S. W. Stratton, Director
National Bureau of Standards

The date of this letter is March 29, 1904. This was the beginning of the National Conference. My records are not clear if a meeting was held in 1904; however, the Conference did have its beginning in 1905 at the request of the Director of the National Bureau of Standards. Therefore, it is fitting and appropriate for the Director of NBS to be the Conference President.

The State weights and measures representatives were called together "to bring about uniformity in the State laws referring to Weights and Measures and also to effect a close cooperation between the State Weights and Measures Inspection Services and the National Bureau of Standards." From the inception, the National Bureau of Standards has sponsored the Conference as a means of promoting uniformity around the world in Weights and Measures laws, regulations, methods, and testing equipment that comprise legal metrology. This sponsorship is exercised under authority of that portion of the Organic Federal Act under which the Bureau of Standards is authorized to undertake "cooperation with the States in securing uniformity in Weights and Measures laws and methods of inspections within limitations of available funds." (Within limitations of available funds is a phrase we are all familiar with.) The Bureau over these many years has been supplying technical information, guidance and secretariat services through the Chief of the Office of Weights and Measures and his excellent staff. In the past couple of years, I feel that many of us thought that NBS/OWM would play a lesser role in the future, particularly with the reorganization of the Bureau. In discussions that I have had with Dr. Ambler, Dr. McCoubrey, and Al Tholen, I have been assured that the Bureau is still supportive of the National Conference on Weights and Measures and its objectives. In fact, the reorganization of the Bureau will strengthen the relationship between the Conference and weights and measures officials.

Methods and technology continue to change and it is as important now as it was in 1904 for the states to have NBS assistance in

providing essential standards, support and services that lead to uniform measurements, model laws and regulations. With our involvement in the International Organization of Legal Metrology (OIML) it is imperative that NBS not only continue assisting the states, but that, through joint efforts, those services to the states be increasingly effective in terms of uniformity of measurement throughout the Nation and in those areas that have worldwide implications.

Since I have been serving on the U.S. Advisory Committee for OIML Activities, I have seen NBS personnel from different divisions and sections within the Bureau assume leadership responsibility or provide technical assistance for many of the OIML operations. With the Bureau's reorganization, I envision this type of cooperation increasing between NBS, the Conference, and State weights and measures needs. Yes, rather than diminishing their responsibility, I can see the Bureau's involvement increasing the understanding and growth of the total concept of legal metrology whether this be at home or abroad.

The Conference must communicate its viewpoints to the Bureau Director in a more formal fashion than in the past. For the past several years, during the interim committee meeting of the Conference, key weights and measures officials have had lunch with the Bureau Director and Division Chiefs responsible for OWM activities. This has been an excellent gathering and one that should continue. However, I feel that the Conference must take a more positive and organized position through annual meetings with responsible Bureau managers, including the Associate Director for Measurement Service, the Chief of the Office of Weights and Measures and the executive secretary of the National Conference on Weights and Measures. Through such meetings, well developed goals, objectives, and plans of the Conference on Weights and Measures can be integrated with NBS planning of its support of weights and measures officials in the Nation. It is only through such meetings that our needs can be described with depth and understanding. It is only through a well designed program that NBS can project budget and decide on its abilities to fulfill our perceived needs. It is my recommendation that the Committee on National Measurement, Policy and Coordination (P&C) assume this responsibility and schedule such meetings with NBS for the next year on Friday, July 14 just following the Conference Executive Committee Breakfast.

You will note by the Conference Announcement that this year's theme is "Changing Dimensions and Directions in Measurement Assurance." Bud and his Staff have arranged for speakers on current topics that are of interest to all.

Weights and Measures activities *are* changing dimensions and directions. You will note that discussions will be held on national type approvals, laboratory accreditation, and other important topics. This year should see increased metric activities with the establishment of the U.S. Metric Board. I am sure that Dr. Louis Polk, Chairman of the U.S. Metric Board, will charge this Conference with certain responsibilities. The Conference must not delay any longer in providing guidance to industry and weights and measures officials in the total metric world. We must take the initiative and provide industry with uniform metric laws, regulations, and technical requirements. To do this, we are counting on the Department of Commerce providing the consultation and assistance specified in section 6 of the 1975 Metric Conversion Act.

Weight and measures officials will find that OIML—Legal Metrology will become increasingly important in Conference activities as we face up to adopting some of the OIML philosophy and live up to our moral obligations as adopted by the Conference. You will note that I said adopt some of the OIML philosophy. Should we feel that some OIML concepts are inappropriate, then we have the responsibility to communicate this to the respective pilot secretariats through the U.S. Committee for OIML activities.

Weights and measures officials have been most concerned this past year with the proposed changes to Handbook 67 and proposed Net Weight Regulations of FDA and USDA. On your behalf, I testified at the FDA hearing in Atlanta, Georgia and the USDA hearing in Washington, D. C. Dr. Charles Green of New Mexico assisted in the USDA testimony in behalf of the conference. Also a meeting was held with several state weights and measures officials and representatives of the Grocery Manufacturers Association (GMA) during the Fourth Annual American National Metric Conference meeting in Atlanta, Georgia. Weights and measures officials have expressed their views very clearly, simply stating they want net weight at retail. Weights and measures officials feel that industry has control of the packaging, marketing and distribution of commodities and therefore has the ability to provide net weight at retail. Some weights and measures officials feel that certain parts of the proposed regulations should be changed and have recommended that the Federal agencies consult the Interagency Net Weight Committee to work out a solution and develop a regulation that will provide for net weight for all packaged commodities and one that will be equitable to the consumer as well as to industry.

On a number of occasions, I have seen industry and regulatory officials at opposite ends of the spectrum, neither indicating they are interested or willing to give any ground. Some of this is good

because it brings out all the views; however, when the standoff is arbitrary or capricious, it prohibits the meeting of the minds and projection of meaningful regulations. I would urge that weights and measures and industry officials sincerely seek consensus through joint arbitration and project the best possible solution that will be equitable to all.

I want to thank Dr. Ambler, Al Tholen, Bud Wollen and his staff for their continued cooperation and untiring efforts as they labor so hard to pull together another Conference that's better than the last.

We all have a responsibility here this week, some will be speakers, some serving on committees and some just listening. Whatever position you fill, do your best.

The Conference will be all for naught unless we are attentive, listen with open minds, and work to improve our programs when we get back home.

Again, I want to express by appreciation to all of you for making this Conference possible and for making a real contribution toward positive changing of Dimensions and Directions in Measurement Assurance.

ADDRESS BY CONFERENCE PRESIDENT

Presented by DR. ERNEST AMBLER, Director,
National Bureau of Standards



I am very pleased to be making my first appearance before you as President of this Conference. That does not mean that I am a stranger to your activities. I had the privilege of addressing you 2 years ago, when I was Acting Director. I am quite familiar with the operations of our Office of Weights and Measures and know many of you personally.

Becoming ex officio President of the Conference is a welcome addition to my duties and a responsibility that I take most seriously. I believe that a just and effective system of weights and measures is a vital part of a free marketplace. Helping you provide such a system is a function of which NBS is proud. We are proud not only of the end products, which are the intangible of equity and confidence, but we are proud of the process as well. For this Conference represents, probably more than any other group I know, long term and effective cooperation between Federal, state, and local government.

This cooperation has had but one goal over the 73 years since the Conference first met, and that goal is service to the American people. Looking back over the record of this Conference gives some measure of its success. But a more concrete measure is the accuracy that characterizes millions of commercial sales every day. This accuracy is a tribute to your efforts.

Obviously, as times change and new requirements arise, this Conference has shifted to meet the challenge. I'm sure the weights and measures officials who came to the first Conference in 1905 would be amazed at the variety of measurements and devices you are responsible for today. Liquefied petroleum gas, a commodity now measured in many of your jurisdictions, was not an item of commerce in 1905, and digital electronics which now is becoming so prevalent, had not even been invented. To handle such new challenges requires the full skills of well trained, well equipped professional metrologists and inspectors.

Speaking of equipment, I am pleased to note that the state-standards program will be completed this year. Under this project, which was authorized by Congress in 1965, each State plus the District of Columbia, Puerto Rico, and the Virgin Islands received

new measurement standards, including metric. In turn, each recipient had to meet uniform requirements in its facilities, its equipment, and the training level of its measurement personnel. So today the separate bodies represented at this conference share a common base of measurement expertise. I believe this condition is unique in the history of the Conference, and is an accomplishment of which we should be proud. With this achievement behind us, we must now ask "Where do we go from here?"

I will not really try to answer that question, for the answers must arise from the discussion and consensus of this organization. However, I will present some of my perceptions and observations that may stimulate your thinking on the matter.

To begin with, I think it is clear that the traditional weights and measures role won't disappear. Buyers, sellers, and the need for equitable exchange are constants of almost any economy. Thus the concern with measurement of pounds, gallons, feet, or hopefully in the future their metric equivalents, will not diminish. However, there will be pressures to do the job more efficiently, and I believe a great deal of progress can be made in this direction.

Coupled with the need to conduct classical weights and measures functions more efficiently is the opportunity to expand your measurement services. For example, many Federal laws and regulations place measurement requirements on the states. In many cases state weights and measures offices can make significant contributions towards meeting these needs or insuring their correctness.

I'll come back to these topics of efficiency and expanded responsibility in a moment, after I touch upon a real paradox. The paradox is that the increasing scope and complexity of the marketplace calls for more sophisticated measurements on the one hand, while taxpayers are calling for budget restraint on the other. This is a problem we must all face head on. I say we, for budget restraint is a problem as NBS as well.

At the Federal level, President Carter aims for a balanced budget. This, of course, creates stiff competition for support. It is clear that only the best and most necessary programs have any hopes of significant funding. Thus a great deal of thought, planning, discussion and persuasion must go into our respective budget requests.

I'm sure that the same type of fiscal pressures are at work in every state. Whether or not other states will go the route of California's Proposition 13 is unclear. It is clear that voters across the land are concerned about the size and efficiency of government. Again, the response of weights and measures officials must be one of actively seeking new and better ways of doing their jobs.

Let me suggest some areas that you might explore in your discussions and deliberations.

- It may well be possible to extend your resources by adopting a regional approach. For example, the State of Illinois is establishing a facility for the calibration of x-ray dosimeters. These dosimeters are used to check the radiation dose received by patients during diagnostic x-ray procedures in hospitals, medical or dental offices. We are helping them plan their facility, and we will provide a standard radiation source and some laboratory equipment on long-term loan. The exciting thing about the establishment of this calibration facility is the State's willingness to provide measurement service to the surrounding area, thus preventing the needless duplication of effort.

In a similar vein, the Southern States Energy Board is considering the creation of one laboratory to meet the radiation measurement needs of the 17 members states. The Board has asked our radiation experts to discuss the project with them, and we will offer whatever guidance and assistance we can.

We view these regional efforts as test cases. If successful, they may lead the way to wider use of cooperative arrangements. Potentially, everyone comes out ahead. The participating states will have a quality measurement service close at hand, and will avoid the need to establish duplicate facilities. Here at NBS, our routine calibration load will be decreased, freeing our people to concentrate on research leading to measurement improvement.

- As you know, NBS conducts a yearly laboratory audit program in which each state makes measurements and returns the data to us for analysis. We believe a better system might be to circulate artifacts among states on a regional basis, with NBS entering the loop to evaluate the data and report to the participants. Such a system would speed the process, would give states experience in assessing the status of their own measurement system, and would provide each state with an indication of how its measurements compare with those made in other states. This concept will be discussed with you in more detail by people from the Office of Weights and Measures.
- Another potential for extending resources is being explored in Rhode Island. The Engineering Department of the State University of Rhode Island is considering the expansion of an

engineering metrology program. This program has the potential of extending the services usually offered by weights and measures labs to such areas as dimensional measurements and pressure.

- These services would be offered to regional industries, not just those within the state. The University is also interested in providing special training for measurement personnel, including weights and measures technicians and engineers, again on a regional basis. Both of these programs are being explored in cooperation with the State Weights and Measures office, and may provide a model for university involvement in other states.
- The computer also offers untapped potential in the weights and measures field. Uniform inspection data, computerized record keeping, and active data sharing among States would lead to increased efficiency in your operations. For example, ready access to data from many states might permit early identification of nationwide trouble with particular types of measurement devices. Or, computerized records might pave the way to variable-time-interval inspection, which would free weights and measures officials for other tasks. NBS could help in this area by providing uniform computer software that would place all users on a common basis. This is all speculative, of course, but I believe an exploration of the benefits you might derive from computer use would be time well spent.
- I mentioned before the broad measurement needs that now confront every state. Noise, radiation, air and water pollution—these and other areas increasingly call for expertise at the State level. In many states the responsibility for field monitoring of such quantities is assigned to specific agencies. However, there is a possible role for your operations, and that is by serving as the central calibration point for field instruments. I know this is a bold departure from your weights and measures role, and that new interagency working relationships are required, but there is need for such service, and the time may be ripe for bold actions. Again, this is a point for you to consider and explore.
- Finally, I think it is appropriate, and important, for you to emphasize the importance of good measurement to the people you serve. The new movie, which you will see in a few moments, was produced by this Conference and by NBS to do just that. You might consider circulating copies of it to

schools, civic organizations, and other groups within your jurisdictions.

So far I've been suggesting ways by which you might increase the scope of your own operations. Let me now tell you about some of the steps we are taking to improve NBS.

During the past year the Bureau was reorganized for the first time in 13 years. We are now structured along major functional lines, with a National Measurement Laboratory, a National Engineering Laboratory, and an Institute for Computer Sciences and Technology.

Of immediate interest to this Conference is the location and status of our Office of Weights and Measures. OWM is now part of the National Measurement Laboratory, and reports to the Associate Director for Measurement Services. Also reporting to the same Associate Director are the Office of Measurement Services, and the Office of Domestic and International Measurement Standards. Thus we have brought together related groups whose programs will interact more strongly, as they should.

For example, one function of the Office of Measurement Services is that of providing leadership for calibration services and measurement assurance programs for industry. Obviously, the knowledge and experience developed in these programs may be applicable to our weights and measures program, and the people involved will be in close contact with one another.

I think it is particularly important that the office responsible for our involvement in the International Organization of Legal Metrology is now allied with the Office of Weights and Measures. As you know, OIML is to the world what, in many ways, the National Conference on Weights and Measures is to the United States. In this time of expanding foreign trade and increasing complexity, it is important that nations seek a common basis for their commercial transactions. OIML helps provide that basis.

The United States joined OIML in 1972, and NBS has been given responsibility for coordinating U.S. involvement. To do this well, strong support and participation is needed from all sectors. I'm pleased that this Conference is involved in OIML activities in many ways. For example, the Conference is represented on the Advisory Board that assists us in conducting our program; each state is asked to comment on proposed standards relevant to weights and measures; and your Specifications and Tolerances Committee is reviewing OIML proposals as a resource in updating Handbook 44. I won't dwell any longer on OIML other than to note with pleasure that A. J. van Male, President of the International Committee of Legal Metrology, which is part of OIML, is

on the Conference program, and Mr. Barnard Athané, Director of the International Bureau of Legal Metrology, is attending the Conference.

One of the objectives of the NBS reorganization was to promote interaction and cooperation across organizational lines. An example of such cooperation is represented by the talk at this Conference by one of our experts in electromagnetic interference. For some time we have had an active research program on EMI at our Boulder, Colorado laboratory, a program whose findings may help avert or solve problems of interference with commercial measuring devices. The Office of Weights and Measures will keep abreast of that program and apply its findings wherever possible. This kind of cooperation is what we hoped would result in the new organization.

Turning to the Weights and Measures Office itself, we have taken a number of actions to increase its effectiveness. For example, Mr. Al Tholen, an engineer with extensive management experience, is now Chief of OWM. This has permitted Bud Wollin to concentrate his efforts on the National Conference. We have always considered this liaison function extremely important, and Bud brings to it a great deal of experience and dedication. We are taking steps to assure that he has adequate staff assistance for his work in this area.

We also plan to broaden our capabilities by adding a professional who is expert in electronics and in microprocessors. This addition will give us capabilities in the growing areas of dynamic measurement and modern point-of-sale devices and systems. Of course this person will keep in close touch with developments in our Center for Electronics and Electrical Engineering, especially the work on EMI and methods of grain moisture measurement. Our laboratory automation program presents new opportunities which will be of interest to OWM. Finally, we are taking steps to provide staff competence for looking ahead at where measurement technology might be going. In this way our programs can be shaped to anticipate your needs, rather than react to them.

I believe the steps we are taking will help prepare us for the measurement world of tomorrow. NBS is eager to assist you, as we have for 73 years, in providing for accurate measurement in commerce and trade. Let us work together to improve the efficiency of the services that are now provided, and to respond to the diverse measurement demands that are being made upon us. In this way we can fulfill the motto and goal of this Conference—*That Equity May Prevail*.

COMMITTEE APPOINTMENTS BY DR. AMBLER

It is now my privilege to announce the appointment of individuals to serve on the Conference standing committees. I am sure you are well aware how important the work and accomplishments of these committees are to the success of the Conference and to weights and measures administration throughout the Nation.

In behalf of the Conference, I would like to express my sincere appreciation to all committee members for their valuable contributions over the year. To outgoing committee members, I offer my special thanks for their loyal service to the Conference.

Committee on Specifications and Tolerances

Mr. Lacy H. DeGrange, Supervisor of Weights and Measures, Maryland Department of Agriculture, is appointed for a 5-year term to replace Mr. Marion L. Kinlaw, whose term is expiring.

Committee on Laws and Regulations

Mr. John J. Bartfai, Director of Weights and Measures, New York Department of Agriculture and Markets, is appointed for a 5-year term to replace Mr. Charles H. Vincent, whose term is expiring.

Committee on Education, Administration, and Consumer Affairs

Mr. Walter F. Junkins, Director of Weights and Measures, Pennsylvania Department of Agriculture, is appointed for a 5-year term to replace Mr. William B. Harper, whose term is expiring.

Mr. Raymond H. Helmick, Chief of Weights and Measures for the State of Arizona, is appointed for a 1-year term to replace Mr. William H. Korth who has found it necessary to resign from the Committee.

Committee on Liaison With the Federal Government

Mr. Terry A. Hocin, Deputy Commissioner, Department of Consumer Sales, Weights and Measures for the city of Chicago, is appointed for a 5-year term to replace Mr. Edward H. Stadolnik, whose term is expiring.

Committee on National Measurement Policy and Coordination

As you know, the membership of this Committee is comprised of the chairman of each of the four standing committees and the Conference chairman who serves as its fifth member and as chairman of this Committee.

PRESENTATION OF HONOR AWARDS

Dr. Ambler presented Honor Awards to members of the Conference who, by attending the 62nd Conference in 1977, reached one of the attendance categories for which recognition is made—attendance at 10, 15, 20, 25, 30, or 35 meetings.

Award Recipients

25 Years

WILLIAM I. THOMPSON
EMMETT F. WEHMANN

Monmouth County, New Jersey
Neptune Measurement Company

20 Years

J. R. BIRD

New Jersey

15 Years

H. K. SHARP

Oklahoma

10 Years

DEAN BRAHOS
FRANK BRUGH
J. M. CHOAMIN
STAN J. DARSEY
J. A. ETZKORN
ARVID W. FENGER
ROBERT B. JONES
ANTHONY J. LADD
D. L. LYNCH
J. C. MAYS
WEBSTER McMURRY
RALPH W. MILLER, JR.
FRED D. MORGAN
WILLIAM F. NICOL
H. E. SANDEL
CHARLES H. VINCENT

Hammond, Indiana
Indianapolis, Indiana
Middlesex County, New Jersey
Florida
South Dakota
Minnesota
Salem County, New Jersey
Akron, Ohio
Kansas City, Kansas
Miami, Florida
Tippecanoe County, Indiana
Jewel Companies, Inc.
Utah
Nicol Scales Company
San Bernardino County, California
Dallas, Texas

FILM—"THE MARKETPLACE"

Presented by The National Bureau of Standards, U.S. Department of Commerce, and The National Conference on Weights and Measures, this film illustrates how accuracy in the marketplace is protected by local weights and measures officials. The film spends a day with an inspector as he tests scales in a produce market, checks the accuracy of gasoline pumps, and verifies the weights of prepackaged foods.

"THE MARKETPLACE" is available for free loan from Association Films, Inc., 866 Third Avenue, New York, New York 10022. When ordering refer to the title of the film and Loan Number OP 427.

Sixteen millimeter color prints or ¾-inch video cassettes (both with sound) are available from the producer. Purchase price is \$69.00, which includes shipping charges. Order from:

Screen Presentations, Inc.
309 Massachusetts Avenue, N.E.
Washington, DC 20002

ADDRESS

Presented by ESTHER PETERSON, Special Assistant to the President for Consumer Affairs, The White House



I have addressed this Conference before, several times, and always I have felt a tremendous friendship and mutuality of our goals. I am very appreciative of all the work that you have always done and the support and assistance that you have given.

I was very impressed with your new film, "The Marketplace," and I appreciate having the opportunity to view it with you this morning. I think it is splendid if we can get information about your work out to the public.

I am concerned when people say, "Oh, there is too much government, too much government." I often wonder if people really realize how much good government we have and the kind of protections that they have. And I welcome support for the film and for the kind of information that it is providing, which I think is extremely helpful and good.

I always say we want efficient government. We want good government to really carry out the kind of programs and objectives that you people do so well. I congratulate you for that.

When I have talked with you before, I have talked about truth-in-packaging legislation. We have talked about all kinds of different labels and projects on which we have worked together. Today I do want to talk to you about some of the developments. It is a very dynamic marketplace, and all of the areas of your concern are dynamic. I also want to talk to you a little bit about some of those questions. But I understand that you have wanted to know a little bit about what is happening to the consumer movement and where we are. I want to discuss that with you very briefly.

As you know, the Agency for Consumer Representation was defeated on the Hill, and I think partly because of a lack of understanding on the part of our people about what we were trying to do, to just be sure that whenever a decision was made, a regulation was made, that somebody was there representing the consumer. It was a matter of trying to balance the forces of the marketplace; you bring accuracy into the marketplace through your work, which is so splendid. We are trying to see if we can't bring an equity, a balancing of the forces, so that when decisions were made that they could be made in the interest of all components. It didn't mean that the consumer interest would win every time, but it meant that when a decision would be made the consumer interest would be represented.

I think that my experience with Giant was that type of thing. It is the thing that made me say, "Look, let's be sure that we factor the user into our decision making." So with the defeat of the Consumer Office bill many people said, "Oh, that is the end of the consumer movement." Well, my friends, they are wrong.

I think that that is just a little part of it. I am sorry for the defeat because I think it would have been an efficient way of our moving our Government. I was distressed about the lack of accuracy and the misinformation that was circulated around the country that aided in the defeat, and the powerful business forces that worked toward the defeat. In some cases it was a bit frightening for me.

But as I go around the country I find that the consumer movement is not defeated. It is growing stronger. I see it in the States. I see it in the cities. I see it in the media. I see it in the press.

Long ago when I first started there were very few consumer reporters, maybe one or two. There is hardly a paper now that does not have a consumer reporter; a consumer beat is a usual beat for the press now. I don't think there are many radio or television stations that don't have consumer reporting. The polls, the Louis

Harris polls, and others, all say that they are moving this way. It is not always organized, you know, consumers don't all belong to the Consumer's League and the Consumer Federation. But there is an undercurrent of identification with the consumer movement, and with the kinds of objectives that they have. So I definitely say that the consumer movement is here and it is strong.

Actually, in my philosophy, I think the consumer movement is a strong bulwark for the free enterprise system, which I believe in very deeply. And when you go way back to Adam Smith, he said that you have got to take the consumer into consideration. Otherwise the production capacity just doesn't function.

I was reminded of this recently when reading a quotation from Adam Smith to a group of graduate students in marketing, and I will read it to you. It is from Adam Smith's "Wealth of Nations." He says, "Consumption is the sole end and purpose of all production, and the interest of the producer ought to be attended to only so far as it may be necessary for promoting that of the consumer." The maxim is so perfectly self-evident that it would be absurd to attempt to prove it. This was the father of the free enterprise system saying that you do have to take the consumer into account.

I asked these students, "Who said the quote?" Who did they think said it? Do you know what they answered? They thought it was Ralph Nader, which just goes to show that sometimes, in looking at the basic philosophy of our country, in trying to get this balancing of forces, we sometimes don't quite see it.

So actually we are moving, and I think that it will be good for the country because I think it keeps a wholesome balancing of forces. And that is what we have to move into. We have labor forces. We have the industrial forces. Now we have got to bring in the user, the kind of thing that you do so well by your efforts at protecting them in the marketplace.

Therefore, I was glad when I was asked to please explain a little bit about what is happening in the Federal Government. With the defeat of the bill, President Carter called me and said, "Esther, what do we do? I want to keep a consumer presence high in the Government, because it is extremely important. I have a commitment to it." And he said, "Decisions made by the Government have a direct and substantial impact on the American consumer. And what do we do?" So he gave some new responsibilities to the Office that I have.

And frankly, yes, I will say it. I sometimes wonder if we would have had this authority if the bill hadn't been defeated. So maybe it is a victory in a way, because the thing that we are trying to do is factor the consumer interest into the decision-making process. This is what we had hoped we could do if the bill had passed. As

it is now, President Carter has enlarged the responsibilities of my Office so that we participate in the decision-making process of the Domestic Policy Council, which means that when decisions affecting the consumer are made—and I have to be terribly careful to be sure that I know from the office standpoint that these are decisions that have an impact on the consumer—that I must submit an opinion on how any action will affect the consumer.

It means again that in the Presidential decisions, the decisions that we make at the top level, that we don't just say how does this affect labor or how does it change things in general? We have got to also say how this affects the end-user. And again I say that doesn't mean that you win all the time. But it does mean that you are working for a balancing of the decision-making, which makes for a fairer marketplace and a fairer approach to questions. I think that is a very important development, and already I have participated in these areas and I think with some success. We have not had 100 percent victory, and perhaps we shouldn't. It should be a balance.

The other things that we are doing is surveying the consumer programs in all of the agencies to be sure that they are meeting the consumer needs. The President definitely wants to see that there's a consumer presence in every agency. I certainly think that the Bureau of Standards' film is a good example of really trying to explain, implement and talk about the consumer presence.

We have to review all the Federal agency consumer programs, looking at their budgets, to see that they are carrying out the mandate that they have. We must also help coordinate their efforts. Of course, it doesn't mean that we don't work to promote consumer legislation, that we don't meet with people, that we don't get their advice. So it is actually an on-going program to see that the consumer presence is there, heightened more because it is now a little higher up in the decision-making process.

It is a tremendous responsibility, that I may say is a little frightening at times. And I am concerned that we do it well, that we do not speak unless we are positive of the evidence that we have in making any recommendations. And it is a responsibility that I carry heavily and with an awareness of that responsibility, because historically we are moving into a whole new territory.

As I go around and as I have lived through the development of the labor movement, through the development of the civil rights movement, and the women's movement, and I have participated in all of those, I have learned that there are great forces in our society that are part of our history. If you look at our history from its beginning, you will see many efforts of people to enlarge democ-

racy, to enlarge participation, from our agrarian movement. And if you look at history you see this.

I visualize, my friends, the consumer movement is the next big movement in our country. I think we will have a common denominator of participants that is far greater even than any of the others. I still don't know what form it will take. But I do think we have to organize our efforts to be sure that we are sensitive to it, that it is balanced, and that it knows what it is talking about, because always in new developments one has to be very cautious about these things.

Well, anyway, that is where we are today in the development of our consumer program. I am encouraged by it. I am a little frightened by it because how do we move? I am very definitely for wanting voluntary compliance in as many ways as we can. I don't believe in running to Congress with everything. And I am pleased that part of our mandate is to work with groups to see that we can do as much as we possibly can.

Now with all of these things that we are talking about and about the dynamic marketplace, I certainly want to talk about some of the other kinds of things that you are interested in.

We know that the marketplace is dynamic, is moving. And one of the biggest problems is to keep pace with it. I am really amazed at the kind of new things that are always coming that we have to work on, the Electronic Funds Transfer System for example, extremely important; and how we are moving toward a cashless society. What do we do to protect the consumer in these areas?

There are all kinds of new technologies that are developing that we have to anticipate and see that there is fairness and equity as they develop.

When I talked with you before I talked about truth-in-packaging. I think that that has achieved its essential objectives in giving the consumer basic information on packages about a product, its weight, and its manufacturer. There is still a lot more information that has to be given on the label, if consumers say they want it. But we have made progress in labeling clear and readable. And of course it is marvelous what you people do to see that the inside contents live up to what is said on the outside.

Your Corn Flakes experience reminds me so much of when we were working during the Truth-in-Packaging hearings when we emptied out a box of Corn Flakes, because the manufacturers said, "Oh, the contents have to settle, and we have to have this much air space up above." And we emptied out 12 packages of Corn Flakes and they were all one-third empty. I shan't forget. So actually this was not a weight problem, but the point is that we

are beginning to bring reasonableness. And I am pleased that the work on the packaging labeling bill did have some effect.

I think unit pricing of course was an answer to the failure of getting all the things we needed in our packaging bill, and certainly price comparisons could be and should be much simpler. I am pleased that the unit pricing concept has been adopted in 11 States, and in 6 cities and several counties. And I think we have all helped to pioneer this concept. And I am pleased that I had something to do with that when we were experimenting with many of the supermarkets that would move ahead before legislation and really help develop a reasonable approach to these questions. And I am pleased. Its widespread adoption is important, and it is a priority goal for me. I certainly hope it is for you, too.

It will be one of the seven labeling concepts which will come up at joint hearings this fall which may lead to the most extensive revision in food and safety and quality legislation since the Wholesome Meat Act was passed in 1906.

Now I want to tell you about those hearings, which can be so far reaching. As you probably know, the Food and Drug Administration, the Department of Agriculture, and the Federal Trade Commission have announced a series of joint hearings, which will review current food labeling regulations, the labels that result, and the problems that arise.

Now these hearings, which are a response to President Carter's injunction to make our Government really work better and be closer to the people, acknowledge several facts.

First, they have acknowledged that each agency has separate and concurrent regulations which overlap and sometimes conflict. And I have had experiences with those when I was in the private sector. I shan't forget testifying when one rule was being proposed. Had that rule gone into effect, at Giant Food we would have been in compliance with the new rule and out of compliance with another. We have got to be careful about these things. That is one reason I am sorry that agency bill was defeated, because one of the provisions in the bill was to make the agency review and abolish regulations that are detrimental to the consumer and to industry as well. I am hoping that in some of the hearings some of these questions will come up, because it is true that there is a great overlapping of regulations.

And then the second thing is that the laws on which these regulations are based are often vague and usually reflect conditions which existed 40 or more years ago. And there are many examples of those, when certain kinds of labelings were required for some products and not others and confusion of standards of identity.

I have gone into that many times, and I am sure that we have talked about it.

I am hoping that we can get at a common basis through these hearings to clarify many of those questions. And then I think the third point that comes is that technology has revolutionized the food industry in those 40 years or so, since many of our basic rules and regulations were made. And these we have to look at very carefully.

Hopefully these hearings that I have talked about will result in a program of national labeling laws, which President Carter can propose to the Congress next year, and which will lead to uniform and comprehensive food labels on which all parties can agree, covering such issues as open dating, nutritional labeling, ingredient labeling, food fortification, imitation and substitute food, and the introduction of administrative concepts such as safe and suitable. All of these are designed to regulate the introduction of foods and food additives into the food system.

I know there are a lot of other questions, but this is the list that came out that the Food and Drug Administration will consider at the present time. Probably other things could be brought up, and if so I hope that you will watch for the hearings in your area, participate in them and use them as an opportunity to bring some of your ideas before these agencies.

By the time that the Congress works its will on the new food labeling proposal I hope also that weights and measures will be expressed on those labels in meters and liters. But I must admit that I won't hold my breath on that one. I don't think I would be quite safe. But nevertheless it is you people who will be pressing and will be moving for that. And if there is a feeling of movement I think that will help.

For we as a nation are committed by law to the conversion from pounds and gallons and inches to kilograms and liters and meters, to the metric system. The U. S. Metric Board was created to coordinate the action, and the Department of Commerce was assigned to assist the States with the metric conversion, and the States will be responsible for the conversion. No one can force the metric system on commerce, industry, or the public. And that is as it should be. We do need, however, very broad understanding. I am so convinced, and we have been working hard to see that consumers understand. And I think we are making progress there. At first consumers were afraid the metric system would be another rip-off. But I think now that consumers are beginning to see the advantages that could come from metric. But we have to have their involvement.

One of the crucial reasons for adopting the metric system is the growing reliance of our economy on exports. One of the major contributors to our present current inflation problem is a negative balance of trade, as you all know, which simply means that if the President and the American people are going to control inflation in the years ahead, we must sell more American products abroad. We are one of the few countries, as you well know, which does not follow the metric system. To the extent that the lack of readily usable information on American products impedes the flow of exports, the sluggish pace of metric conversion is another contributor to inflation.

But now let me get it straight. I do not want to give the impression that moving to the metric system will solve inflation. It certainly will not. It is a very, very complicated question, as you all know. No single action of any one person or institution or activity could really solve that problem. But it will be controlled. It must be controlled, however, by a thousand different actions, each geared for the purpose of controlling inflation, either directly or indirectly.

And I may say at this time, sitting there when we are struggling to try to have a good policy and to try to do as much of it as we can without the force of restrictions, I would welcome and we would welcome at the White House, any ideas that you have. There are many small steps that could be taken in this inflation battle. We would be grateful for a letter. I would be grateful, and I promise you that it would get to the proper areas.

As I told you before, we now have a consumer input into these decisions. We have had some marvelous letters from consumers, suggesting very positive kinds of things. But you are the experts. And may I say that we would welcome a word from you on steps that you feel we could take.

Now the conversion to metric is essential for more than its domestic benefit. Careful planning must be done, done right, and done soon. In many ways the best example of how not to convert to metric is the haphazard process currently being followed. Some States are currently moving toward metric while other States are not. Some States have appointed metric coordinators, but not all.

I cannot stress strongly enough how vital it is for your group to come to grips with the difficult decisions that have to be made. I am sure you are doing this, and I want to let you know that I know it, that we welcome it. Model State conversion plans must be created, and I know you are working on that, in order to guide our Nation to metrication. And we need your guidance on these things.

I appreciate that there are hard choice to be made. Some of you favor soft conversion or simply expressing the old sizes in terms of

metric units. Others within your Conference favor hard conversion or changing the size of the package to round metric. I don't know the total answer to this. It is not easy. But it is here where I think we must look to you experts for a tremendous amount of help.

States draft proposals. I think we need to consult on all of these areas and be sure that we are moving in the right direction.

The Consumer Liaison Committee of the Metric Council said in their report this year, and I quote, "The key advantage to soft conversion is that packaging production is not affected since the physical size of the package does not change. The disadvantage of soft conversion is that the numbers are apt to be more complex and awkward for consumers." For hard conversion the opposite is true. The major advantage is an easy to handle even number, and the principal disadvantage is that changes in packaging and production must be made. It is not an easy decision, but it is going to be made and we must move in that direction.

No one is saying that the decision to go hard or soft is simple. I am saying that it is crucial. Unless model State conversion plans are drawn up as carefully and expeditiously as possible, we are likely to see an uncoordinated hodgepodge of State laws that serve neither industry or the consumer.

The decisions that you are about to make are, of course, not limited in their importance to the point of sale. They have broad ramifications in home use as well, and one aspect of metric conversion which must be considered is the consumer's ability to make adaptations with as little confusion as possible.

And I must say in this case that I lived under the metric system for 10 years abroad, and I like it. I like it. I found it simple, maybe because I could add to 10 and divide by 10. And I found no confusion in adapting. I think once we get experience we can adapt rather easily. Some of the questions about cup sizes that are causing trouble, I know are absolutely solvable. Your guidance is essential now, before manufacturers begin to move in a lot of these directions. So we have to move fast.

But before any of the metric advances can take place it is necessary to remove existing legal barriers to conversion by amending weights and measure laws so that conversion will not be impeded for any person or industry that wants to go metric voluntarily and in a reasonable way.

I am pleased to see that progress is being made in this one area. And I applaud you for including a discussion of your inch-pound model State packaging and labeling regulation on your agenda for this Conference. I urge that it be adopted by your Conference and by each of the States.

Progress. The metric conversion will not come from good intentions, however, or even the dedicated support of professionals. It will take public support and it will take public funds. On both I urge you to begin now to bring the citizens, the consumer, into the discussion and consideration on conversion. The Conference has a well deserved reputation for cooperation, and the spirit of cooperation which is now practiced between government and industry simply reflects the adage that practice makes perfect. Practice in the procedures of public participation will be equally as rewarding. And my Office stands ready to assist you in developing a procedure for gaining consumer input. We have some experience in this field, and we would like to help with that.

Bringing the public into your deliberation process will have benefits in addition to more timely metric conversions and more equitable resources. It may lead to a better understanding by the citizens and consumer of how we can achieve a new marketplace where the checks and balances are internal and automatic to the maximum extent possible. True weights and measures are such internal mechanisms, and to the extent that they can exert a silent, regulatory hand, the need for more direct intervention to sustain the economic vitality of the marketplace is limited.

I think you people have paved the way in showing how important this is. I applaud it. I just hope that we can work these things out as much as possible so we don't find ourselves running to Congress for everything; that we really try to do it ourselves through this internal mechanism that you have developed so well.

A case in point is the net weight labeling rule that is currently proposed by the USDA. Again I was pleased to see statements by Mr. Lyles and Mr. Green on behalf of your organization in support of the USDA proposed legislation on net weight labeling of meat and poultry products. I was pleased to see that, very definitely.

There was a strong, active industry opposition, as you know, to this proposal. And once again we are having difficulty in getting consumers to understand the importance of the regulation. Consumers may think that when they go to the store and buy a chicken and it says 1 pound that they are getting 1 pound of chicken. But that is not necessarily the case. They may be getting 15 ounces of chicken and 1 ounce of water. Water is valuable, especially in our Western States. But I don't know anyone who wants to buy chicken flavored water at 60 cents a pound.

That is what it costs if it sits in the bottom of the chicken tray. And I tell you in my supermarket experience that water bothers consumers a great deal. And they would keep saying "Am I paying for that or am I not paying for it?" And it was a very difficult

thing to answer, and we had to do a lot of repackaging on that question.

It seems on the surface a simple thing to ask that the weight declared on the label reflect the true weight of meat or poultry bought at the time of purchase. The issue that is not simple is what I really want to discuss, because at its heart it is an issue of technology.

When poultry became another mechanized part of agriculture, which brought great benefits to the consumer, we won't forget that a major problem was to keep the broiler carcass from spoiling while it was shipped to the market. I didn't really understand that until I went through processing plants. This required, as you know, a rapid cooling process. And the technology that resulted is the cold Bryan bath. A consequence of the technology is that about 9 percent of the finished carcass by weight is added weight. If this was purposefully added it would be an adulterant. But since it is not a health hazard the USDA designated the added water as an unavoidable adulterant, which is legal, and saved the broiler from being condemned. Each year the added water costs the consumer hundreds of millions of dollars. Last year the cost of water in poultry to consumers is estimated to be \$500 million.

It is generally acknowledged that even the best broiler processing plant ships more finished product by weight than what enters the plant as potential. More goes out by weight than comes in.

And I thought your film in showing the rippling effect of a little bit was extremely helpful. I think here is another case in point of your guardianship of these questions.

We can insist that a package of chicken show the net weight of the meat it contains, but the solution to the problem should also include improved processing technology as well as improved weight measuring technology. If we rely on the latter alone, we are ignoring the real cause of the problem. The poultry industry, USDA, Department of Weights and Measures, these officials need to explore together the potential for waterless cooling, a new technology, and its phase development, if it is at all possible.

An investment of public funds which can produce a half billion dollars annual savings is a significant step against future inflation pressures.

We are quite obviously starting to require a greater level of professionalism from within the weights and measures field as we are within the consumer movement. We are requiring it to develop professionalism in the metrication field and its practitioners. I have been told—and I find it hard to believe—that I could count on one hand the number of universities which offer metrication as a de-

gree discipline. And I would have three fingers left over. Yet in Europe it is a career program at many universities and colleges.

I see this not as a problem but as an opportunity. Metrication is uniquely a consumer activity, one that could provide the core of degree programs in consumer careers for consumer departments and institutions. Perhaps this is another area where we can work together for mutual benefit.

I think a lot of our employment question is how do we develop new careers and new professionalism in fields that are developing and that we see coming. We can do so I am sure in the metric conversion, in citizen participation, in new technologies, and the evaluation of technological problems, such as net weight, and in career development for consumer activities as well. We need a new professionalism in all these areas.

We have come a long way, and the distance may not always look as great as it is. But all you need to do is look back in history and you can see from whence we have come. You have all read the old funny things that used to happen to people on their weights and measures. There was one man who put stones in all kinds of things. But I love this one quote from Caveat Emptor Magazine, which I quote from. It is from King Louis XI, and according to this he said, and I quote: "Anyone who sells butter containing stones and others things to add to the weight will be put in our pillary. The said butter will be placed on his head until entirely melted by the sun. Dogs may lick him and people offend him with whatever defamatory expressions they please without offense to God or King. And if the sun is not warm enough, the accused will be exposed to the haul of the goal in front of a roaring fire where everyone will see him."

Well, I think we have come a long way in both of these areas. But many challenges remain ahead for us. It is good to look back and know how far we have come. I want to thank you for your co-operation and invite continued work together.

INTRODUCTION OF DR. LOUIS F. POLK

Presented by SYDNEY D. ANDREWS, Director, Division of Standards,
Department of Agriculture and Consumer Services,
State of Florida



MR. ANDREWS: Thank you very much, Mr. Chairman. I am a member of the U.S. Metric Board, thanks to my colleagues in the National Conference on Weights and Measures, and I want to begin by expressing my appreciation for the honor you have paid me by recommending me to the President. I am pleased to say after a long and arduous wait we have now been confirmed by the Senate, sworn in at the White House, and are now constituted as a Board of the Federal Government. For this I am very

grateful. Also for the privilege of introducing our guest speaker this morning I would like to express my appreciation.

He is truly an outstanding individual. This became readily apparent during his academic days with the achievement of several degrees which would prepare him for what has developed into one of the illustrious careers of our country, and one that is even now reaching new heights when most of us would be contemplating retiring, if not actually enjoying retirement.

He is a man of many interests and many talents. He has been active in the fields of finance, industry, civic, and military affairs; and has excelled in the field of metrology. He has served many organizations on their boards of directors. He has also held office in many business, civic, and scientific organizations, which is a testimonial to his leadership.

He has written numerous papers and given countless speeches, many of them in the field of metrology. He holds patents on a host of gauges, precision instruments, and machine tools.

His accomplishments as well as his honors are entirely too numerous for me even to recite on this occasion, for that alone would take more time than we have allocated for his presentation. He has served the National Academy of Sciences on the Advisory Panel to the Metrology Division of the National Bureau of Standards, and so he is certainly no stranger to the work of the Office of Weights and Measures and the National Conference on Weights and Measures.

He is a recognized authority in International Metrology, and in the interest of related research has visited the National Standards

Bureaus of all of the leading nations in the world. In World War II he served his country as a technical consultant to the Chief of Ordnance. He has represented the U.S. on many delegations for international meetings. One which is especially interesting to us is that in 1960 he was the U.S. Government's public delegate to the 11th International Conference on Weights and Measures at Paris, the treaty conference at which 32 nations adopted an isotropic wavelength to replace the meter bar as the international standard of length when the modernized metric system was officially adopted.

He served recently as chairman of the National Metric Advisory Panel for the Department of Commerce during the U.S. Metric Study, which was conducted between 1968 and 1971, and which led to the recommendation for the legislation now known as the Metric Conversion Act of 1975.

His interest in, and contributions to, the cause of metrication are already legion. It is no wonder that President Ford initially appointed him to chair the newly created U.S. Metric Board and that President Carter reinforced that confidence by also appointing him to this position.

And so it is my pleasure at this time to present to you the man with whom I have the privilege of working on this Board that we hope will help this country achieve metrication; a true scholar and gentleman, and chairman of the U.S. Metric Board, Mr. Louis F. Polk.

ROLE OF U.S. METRIC BOARD AND ITS OBJECTIVES

Presented by DR. LOUIS POLK, *Chairman*, U.S. Metric Board



Mr. Chairman, distinguished Guests, Ladies and Gentlemen: It is a genuine pleasure to be speaking to this distinguished and experienced measurement group, as your association now nears its three-fourth century mark—just 2 more years away—1980. Next, let me confirm that I am speaking as an individual and my comments today are my own and not necessarily shared by every member of the United States Metric Board. Secondly a quote, "Fools who will not learn from history will be forced to relive it."

Later, midway in my remarks, I shall return and repeat this early sentence. Meantime, a report on where the brand new Metric Board

is now. The first 13 members were approved a few months ago. As of approximately 2 weeks ago we are finally whole as to membership, the last 4 members of a total specified 17 having been approved and confirmed by the Senate. Anyone familiar with presidential appointments knows that thorough appropriate investigation and Senate hearings are involved.

Starting about 2½ months ago many applicants for the position of executive director were reviewed. About 16 were interviewed. The final selection was Dr. Malcolm O'Hagan, known to many of you I am sure. He is an outstanding and competent gentleman with both an excellent formal education as well as extensive practical industrial experience in measurement. During the last 3 years he has been President of the non-advocate American National Metric Council. He joined us July 1. This was accomplished amicably with the American National Metric Council and with the full assurance that it would in nowise delete their effort as an active and aggressive private sector non-advocate organization.

During these initial approximately 3½ months this spanking brand new baby Board has had little staff except in recent weeks for the loan of one Budget and one Legal aide for which the Board is very, very grateful to the National Bureau of Standards. This part-time Board is naturally disappointed in that we still do not have offices which would permit more efficient working, although we appreciate the difficulties involved in a space-hungry Washington, D.C. at modest government rates. Rental efforts have been pursued diligently by proper governmental departments and ourselves since the day one. Latest indications are the Board may have a temporary office soon and regular quarters within months. It is much appreciated that the White House Executive Office extended appropriate limited funds from the President's Unanticipated Needs fund about 6 weeks ago to tide the Board over until regular financing is made available by the Congress, which is expected soon after present appropriation hearings. If all goes well we should be in position fully to staff the Board and truly get underway within the next 3 to 4 months. Meantime, there is a continual stream of correspondence from widely dispersed citizens, public and governmental sources at home and abroad all requiring daily attention. And we apologize if staff limitations prevent responding to all of it as promptly as we personally prefer. You will understand the part-time Board has had its hands full preparing supplementary budgets to complete this governmental fiscal year 1978 as well as for 1979 and projecting and applying for 1980 funds plus preparing a requested 5-year projection.

Simultaneously much of this same part-time Board has energetically been studying and analyzing both as individuals and by

ad hoc committees such matters as policies, procedures, and programs. It's a hard-working down-to-earth Board committed to doing its best. In good-natured vein, starting a governmental Board from scratch was not expected to be easy and has not disappointed our expectations in that regard. While progress is being made care is being taken to avoid trip wires at the starting gate. The Board is diligent and possesses good intent in this familiarization and shakedown period. It is jealous of its financial integrity and from the first stages included planning for internal auditing. It is a small-scale operation and will do its best to avoid being part of what is termed the great national rip-off as outlined in the "U.S. News and World Report" of July 3, this year.

This distinguished audience today, more than many groups, has had an unusual insight and opportunity for knowledge about measurement in the marketplace—its pluses, its minuses, its temptations, its opportunities and successes, as it maintains equity in the marketplace. Your experience is of immeasurable value, and we shall rely on your enlightened assistance in the Board's operation to avoid mistakes or pitfalls as well as enhance the Board's and your success in protecting consumers, labor, business, industry and education. Those interests and others are all inextricably entwined. I would be remiss, if I failed this opportunity formally and publicly to welcome in no ordinary sense your counsel, and invite your participation in every appropriate manner in meeting our Board's responsibilities. We are counting on your support.

Under the U.S. Constitution, Congress has the responsibility for the establishment and maintenance of weights and measures. Under Public Law 94-168 they have delegated certain duties to the U.S. Metric Board. The Law reads on policies in part as follows:

Early on under section 2—"this Nation today is the only industrially developed nation which has not established a national policy of committing itself and taking steps to facilitate conversion to the metric system." (End of first quote.)

Then under the next section—section 3—"It is therefore declared that the policy of the United States shall be to coordinate and plan the increasing use of the metric system in the United States and to establish a United States Metric Board to coordinate the voluntary conversion to the metric system." (End of second quote.)

Further into the Law under section 6—"It shall be the function of the Board to devise and carry out a broad program of *planning, coordination, and public education, consistent with other national policy and interests, with the aim of implementing the policy set forth in this Act.*" (End of third quote.)

Let me repeat section 3—"It is therefore declared that the policy of the United States shall be to coordinate and plan the increasing use of the metric system in the United States and to establish a United States Metric Board to coordinate the voluntary conversion to the metric system." (End of quote.)

This may or may not be one of the most enviable opportunities to help our country in the light of some of the current pro and con discussion. The policy of the Law is clearly stated and the Board certainly should not and cannot do more nor less than act under that Law.

Measurement systems, like most all other systems, or anything else in life, are subject to the ingenuity of human nature which may not always be as pure as the poet's driven snow. It is understandable that some may not wish to be disturbed or do not welcome logic or more information and facts, since possibly they've already made up their minds. Yet there is no denying that every leading industrial nation as well as the overwhelming majority of all others have set their course on a metric system, voluntary or otherwise, and we must do business with them. Prudence, then, more than justifies a careful, calm, patient but sure study of our present measurement situation in the world today. Measurement is too important for hasty snap decisions. It is part of the Board's role to make sense out of all this and determine under law what changes may be recommended and how rapidly they should be considered. While this can be difficult it also can be successful. It is well to recall my early remark "Fools who will not learn from history will be forced to relive it." And, of course, we've all heard "there's nothing new under the sun." That latter obviously, is false as jet planes, radios, TV, automatic refrigeration and countless other inventions, or new Olympic records easily demonstrate. However, there's a tremendous amount of repetition too. Now bear with me as I try to sort out some things we take for granted, whether it's because "there's nothing new under the sun" or whether, "if we don't learn from history we shall have to relive it."

Let's turn back in time to the ancient pages of measurement history. We find that one of the first measuring systems was a calendar, a system for measuring the passage of time. The ancient world had a multitude of such measuring systems covering calendars of all kinds to measure the days, the nights, the weeks, the months, the seasons and the years. Research among them discloses that the Romans got their first calendar from the Greeks, but the Romans, about 738 B.C. developed their own calendar. It only had 10 months and 304 days so got out of seasonal phase rather quickly.

And then politics quickly got into the act with one king adding

2 more months so that he could add 2 more months of tax collecting. And others used the extra months to stay in office longer. In other parts of the world other calendars proliferated, with varying numbers of days and seasons. About 700 years later Julius Caesar asked his astronomer Susiogenes to review and suggest means for improving calendar accuracy and correcting the 3 months out of phase season condition of that years calendar. Based on his staff's findings, Caesar ruled that the particular year we know as 46 B.C., should have 445 days to bring the following years into phase. That, of course, was quite a 1-year increase and the people were much upset and the Romans called it "the year of confusion." That new wise calendar was known as the Julian calendar with a normal $365\frac{1}{4}$ days, and was widely used for more than 1500 years. For the modern world late in the 16th century even that calendar was not quite good enough and was replaced by the improved Gregorian calendar worked out in the year 1580 A.D. It is the most widely used today and draws into one system the phase determinations of the moon and the seasonal activities determined by the sun. This is complex since the moon's phases and sun's motions are incompatible; but by adopting regular cycles of days and relatively straightforward rules of application, infrequently adding extra days by formula, you end up with a year having an error of less than half a minute more or less. Remember that calendar was initiated in the year 1580 A.D. However, our western world dragged its feet with Great Britain finally adopting it 172 years later in 1752 which meant subtracting 11 days from that particular year. This caused a tremendous amount of consternation among the citizens and mobs rioted in the streets crying "Give us back our eleven days."

Now if you've endured staying with me you've a right to ask why I have researched these matters for a talk on the metric system. Why, of course, you understand that even in this more educated and enlightened day many persons almost instinctively still react negatively unless, they are given in advance, the information necessary to comprehend personally any need for change. In that sense history does repeat itself for human nature is slow to change. And the novice or the uninformed often understandably reject "the new" even before knowing what the facts are. And yet our country's original pioneering *spirit* prided itself on its willingness to adopt *constructive* ideas and changes, Washington, Benjamin Franklin, Jefferson, Lincoln and others were outspoken in this regard. Our country became great and remains so as it thoughtfully dares to adopt or create constructive change within an enlightened climate. Whatever the personal opinion of any of us, let us resolve to reach our decision on this historic measurement systems matter

on the basis of facts—not ignorance, not prejudice or not even just plain aversion to temporary inconvenience—rather whatever the decision be—pro or con metric—it should be decided with an attitude that will enable our country best to arrive at conclusions based on facts not fancy, so that our country's needs are well served. Nothing is perfect even as “thee and me.” Such being the case we must be alert not to hinder possible improvement as well as not changing for change's sake alone. In the last several years the rest of the industrial and scientific world has been changing to metric and we may truly risk becoming a measurement backward isolated island if we do not give full consideration to this matter. False pride should not lead us into deceiving ourselves as one elderly couple did soon after World War I as they proudly watched their returning son marching down a crowded ticker tape street in New York City with his buddies and army mates from a just arrived troop ship. It was then Mother turned to Dad saying excitedly “Oh, look they're all out of step but our son, Jim.”

Today, about 60 years later we can understand that remark sympathetically but hopefully do better ourselves. However, we must be sure and careful to present all the facts regarding our daily work and lives so that the truth can prevail. Our people should know that this isn't a plot by foreigners or communists or giant multinational corporations (a buzz phrase I might add), and not the product of misled educators or scoundrels or scalawags, but is an honest effort to help the voluntary sector under law make more use of an improved measuring system. No measuring system is perfect. It needs constant attention to keep up to date with changing needs and like all other measuring systems must be adapted to our own particular needs in the United States, yet it should be remembered that the metric system has undergone over 100 years of testing, proving and improving and all the rest of the world has turned to it. We should be willing to risk studying and being sure we are properly informed in reaching a decision. That is better than mobs in the street crying “Give us back our eleven days.”

In another measurement area would any of us wish to return to Roman numerals instead of our present Arabic system of numbers? Just imagine doing your computation, division and multiplication, and other calculations in Roman numerals. We can thank early thinkers for making that change for us. In your imagination you can guess what it was like before the symbol zero was invented and yet it took mankind about 5000 years after Arabic numbers were introduced to think of a symbol for zero. That only occurred after an unknown Hindu introduced it late in the ninth century.

We have considered our rich world heritage because it points to

our responsibilities to leave this world richer in its wisdom, in its ability to understand and comprehend and truly progress—yes, to truly consider honestly and frankly new or old promising interesting ideas—even if they temporarily inconvenience us.

How will posterity judge today's generations—as timid—or cowardly—of course not—as begrudging a modest expenditure for better measurement—of course not. The majority of today's generations want wisdom to win—not ignorance, but wisdom, and we must not block any proper flow of knowledge, to our present generations, so they can act with wisdom. An enlightened America is not a dull plodding nation. It is not primarily a reactionary group, it is primarily a conservative forward moving generation. Selfishness is not an obsession nor is inconvenience a major concern. Enlightenment must be one of our country's goals. In human nature there are many great folks, but also always there are some who like to dispute everything and want everyone to join them in supporting their dispute. Sometimes they are extremely aggressive and disputatious people and their efforts to teach and persuade while protected under law must be in turn wisely understood lest there develop a mass block against further knowledge and harmony and progress.

Much remains to be done. Opposition is to be expected and taken in stride without rancor but with recognition of any merit it may possess. The Board, like all humans, will doubtless make some mistakes, but it will do its best, which after all is the most we can expect from any of us. Mankind's progress has been paced by its ability to divide its measuring units finer and finer and multiply them larger and larger whether we are breaking down protons and neutrons or reaching into unlimited space.

Recall Galileo, one of history's greatest astronomers and early scientists whose studies proved to him that the earth was not flat and that the sun, moon and earth were free objects in space revolving in different relations to each other, and how he was forced to recant his beliefs by the Inquisition and banished to a solitary existence for much of his life; yet eventually was enshrined and recognized as one of the greatest thinkers in scientific history. And Columbus whose crew feared they would sail over the edge of the ocean into a bottomless pit when they failed to sight land at the originally expected time. And as for the farce that the metric system should be shunned as the tool of foreigners, Alexander G. Bell, Einstein, Marconi, Steinmetz, von Braun and many other famous scientists and inventors whom we revere were born abroad. In fact, only a small percentage of U.S. citizens can claim family lineage in this country beyond two hundred twenty-five years unless, God bless them, they have native Indians in their family tree.

More than many, the audience I address today has the opportunity to influence and bring about wise solutions to our measurement needs. First hand you have observed both the successes, the follies and human failures requiring a just measurement system. You are engaged realistically in bringing fairness and justice to the marketplace in every walk of daily life. It is your daily responsibility not only to monitor our weights and measures but also to recommend improvements and the best means of bringing them about economically, and with justice for all. Yours is a tremendous opportunity to observe and to point out needed changes and the means to adjust regulation to changing needs or improvement. Your honorable profession walks in the footsteps of history's heroes. You cannot—you will not fail them. You move forward with measurement progress. Thank you very much.

ADDRESS

Presented by A. J. VAN MALE,
Chief Director of the Dutch Service of Metrology,
President of the International Committee of Legal Metrology
of the International Organization of Legal Metrology
(OIML)



Mr. President, Ladies and Gentlemen, this is the second time that I have been invited, as the President of the International Committee of Legal Metrology, to attend and address the annual Conference on Weights and Measures in the United States of America. The first time was in 1970, at the 48th annual Conference held in Salt Lake City. Again, it is a great privilege and pleasure to me to be here in your country amongst you all, colleagues, and other representatives interested in metrology.

To me, there is a great difference between my presence now and 8 years ago. In 1970, the USA was not yet a member of OIML. Today, you have been a member for about 6 years. In 1970, the theme I talked about was "The Challenge of the 70's; A Common Future in Legal Metrology." In 1970, I stressed that the aim of OIML, primarily, was to continue the work of harmonization of technical specifications for measuring instruments, specifications to be laid down in International Recommendations, acceptable to all of us. In other words, to find a world-wide compromise concerning technical specifications in order to facilitate international trade

in measuring instruments in the long term. I think this is one of the main purposes today.

What has happened since 1970 which is of particular interest to the USA in this field?

- Primarily the USA became a party to the OIML-treaty in 1972.
- At the fourth international conference of OIML in London in 1972 new working structures involving Pilot and Reporting Secretariats were accepted in principle.
- The list of subjects to be studied by our Organization had been expanded substantially and had to be divided among candidate countries.
- The Pilot Secretariats assigned to candidate countries by the International Committee of Legal Metrology have had to set up working programs.
- The reorganization of the working plans is a time consuming effort, that is still in an early stage.

Nevertheless, the decision to restructure the working methods at the moment when the USA became a member of OIML offered the USA, and also other member States, the opportunity to apply in principle for the responsibility for a number of very important subjects. The USA accepted this challenge and became a candidate for seven Pilot Secretariats and many Reporting Secretariats.

In order to ensure the progress of the current work of OIML it was decided that countries responsible for Secretariats for existing subjects should retain this responsibility. Most of the OIML Pilot Secretariats have now presented their working plans which were generally initially studied during meetings with other interested member countries and often with a participation of international institutions concerned with the subject. These working plans and the candidate Reporting Secretariats were formally accepted by the International Committee during its meetings of 1975, 1976, and, lately, June 1978.

Some of the Pilot Secretariats have not yet presented their working plan. I am looking forward to the internationally very important working plan of SP. 17 concerning "Pollution Measurements" on which American know-how is of prime importance to the World, and of which the legal metrology aspects will be of increasing interest in the near future.

Another suggestion accepted in principle concerns the introduction of procedures for the periodic revision of International Recommendations. This decision made possible the review of the first 19

Recommendations already existing at the moment when the USA became a member of OIML.

I am well aware of the difficulties of the task for OIML to produce an increasing number of International Recommendations in close collaboration with other International Organizations, and, at the same time, to set up a periodic revision program in order to keep up with technological evolution adequately. Nevertheless, this first attempt of systematic revision of our Recommendations seems to be successful, and this made it possible for your country to influence the revised documents.

The new working structure and plans have caused some apparent delays. Thus the number of drafts likely to be presented to the next Conference will be rather limited as the initial effect of the introduction of the new Pilot and Reporting Secretariat structure has been to lengthen the time required for documents to pass from the stage of first draft to adoption by the International Committee or action by the Conference. This apparent delay should only be temporary. However, in the future, it will be necessary to conform to working methods and time schedules as far as possible and to study questions of priorities very thoroughly.

The input of large industrial countries such as USA is an essential aspect of the increased activity of the Organization. Moreover, as the orientation of an International Organization depends on the overall wishes of its member States, the effect of the USA joining OIML will become also in this respect more evident.

One of the very important initiatives of the USA in OIML was the creation, together with other countries interested, of an English translation service associated with the OIML Bureau in Paris. This service is important not only for countries with English as their mother tongue, but also for those countries that use English as a vehicular language and, in particular for a great number of developing countries. In my mind the addition of English as an operational language will accelerate the extension and dissemination of the OIML activities over the world.

Another proposition studied seriously during the last Committee meeting concerns the introduction of an OIML mark, a suggestion put forward by the delegation of the Federal Republic of Germany during the meeting of Presidential Advisory Council in September 1977. It could lead to the fulfillment of the ideal which the initiators of OIML must have dreamed of 40 years ago, the acceptance at the international level of OIML type approval. Already during the last meeting of the Presidential Council it was striking how much interest was shown in this aim. In this respect, of course, many problems have yet to be solved, problems of harmonization of test procedures and in particular the creation of a climate of con-

fidence and reliability among the authorities responsible for the approval of measuring instruments. In the end, OIML Recommendations will cover the measuring process from start to finish. The proposition regarding the use of an OIML mark will become most important, as soon as manufacturers are incited to produce measuring instruments complying with the specifications of OIML Recommendations and will become more and more important when users will place their trust in the procedures concerned and start demanding measuring instruments bearing the OIML mark of conformity.

I am well aware of the complicated procedures that may need to be studied in order to put the whole OIML type approval system under a legal (statutory) umbrella. The decision of the Committee last June to form an "ad hoc" group to study in detail the various questions which arise from this subject is a promise for the future development of this proposed system.

Apart from judicial implications, I think it is possible to introduce an OIML mark in many countries to show that measuring instruments meet the requirements of OIML Recommendations. Where the USA is concerned I think the idea of creating an OIML mark will be only one of the stimuli towards early implementation of the OIML Recommendations to your country.

The documents of the 63rd National Conference on Weights and Measures show me the views of experts in your country who have not only studied the Recommendations thoroughly but are often also in agreement with the philosophy and principles expressed in OIML documents. The theme of this Conference is: "Changing Dimensions and Directions in Measurement Assurance." Would the OIML approval mark on measuring instruments mean such a change?

In general, a mark guarantees certain properties of a product. In particular the OIML mark on a measuring instrument would guarantee that the instrument's metrological characteristics were in conformity with the appropriate OIML Recommendation. It would not guarantee the measuring results in general. To be able to give measurement assurance, in addition to reliable "measuring instruments," control of circumstances, freedom from interference, a reliable operator and so on, are necessary.

More and more metrological institutions are getting involved in the evaluation of capabilities regarding metrology of industrial and other laboratories. At the moment, we are in the stage of evaluating the results of the last Committee meeting held in Paris last month. I like to mention some of the results, namely:

Resolutions and decisions concerning the following subjects:

"The Problem of Quorum and Voting Procedures during meetings of the Committee and of the Conference," a problem that exists not only in OIML as I learned in recent days. An ad hoc group is charged with preparing the report on this subject, which will be presented to the sixth international conference of the OIML, here in Washington in 1980.

Another subject to be presented to the next Conference will be a definitive report about the eventual creation of a "Development Council." In particular, it was decided that the terms of reference of such a council for giving assistance to developing countries in the field of metrology should be defined clearly.

Furthermore, the Committee decided to set up an ad hoc group to study the problem of the creation of the OIML mark of conformity, which I mentioned already.

According to the interpretation of the document "OIML Work Policy" it was decided by the Committee that the participation of a country in the work of an OIML Secretariat is carried out by a representative who must be an expert of the National Service of Metrology or who may act as an expert of this service without it being necessary for him to be employed by this Service. I am very pleased with this clarification of the situation and I hope you will be too.

I would like to mention here that the Committee finally adopted the International Documents, LEGAL UNITS OF MEASUREMENT concerning the SI and other units accepted permanently or temporarily, and a second International Document, LEGAL QUALIFICATION OF MEASURING INSTRUMENTS which had been worked out by the OIML Bureau.

I would like to conclude this enumeration of decisions by the Committee with the information that the Committee renewed the contract of the Director of the Bureau in Paris for a period of 5 years. It is a great pleasure for me to inform you that Mr. Athane, who is present, accompanied by his wife, has accepted the prolongation of his term of office.

Further, I would like to summarize briefly the role of the USA during the first 6 years of membership in OIML. First of all, I would like to mention the initiative of the USA to set up an English translation service associated with the Bureau in Paris, which is of fundamental value to OIML in communication and in public relations in the world. Second is the fact that your country will take so much responsibility in the work program of OIML. I appreciate this very much, but moreover, I admire the seriousness with which you are organizing and building up the interest in the work of OIML in your country and, as the President of the Committee I am very thankful to you for this effort.

I would like to add a few words about the future role of the USA in OIML work. In my opinion it will increase considerably in the near future, now that most of the working plans and subjects have been recently distributed.

During the next Conference in 1980 we will certainly be better able to arrange our priorities. We are also looking forward to the report of the ad hoc group on the mark of conformity in which your country will participate. After listening to the discussion during these days of the sessions I believe it is very important for the USA to study the problems concerning this OIML mark in connection with your development of a national type-approval system. The harmonization of technical requirements is very closely connected with the mutual acceptance of test procedures, and experience on a national level is of major importance.

In view of the legal and judicial implications, the process of technical harmonization will take many years. However, it is worthwhile to start with this study as soon as possible in order to attain harmonization and to remove trade barriers in the world, this harmonization being still as I have said earlier one of the main purposes of OIML since its creation. I hope that the National Conference on Weights and Measures will find the means and methods to deal with these problems.

Standardization started on a voluntary basis, but competition makes it often impossible for industries not to apply such voluntary standards. However, as soon as the authorities are involved in the application of, or have to enforce, certain product regulations, every institution has to accept in fact the implementation of so-called "Voluntary Standards." In this respect the delegation of authority by National Metrological Institutes to recognized laboratories of institutes and industries may well increase in the future, but under certain final rules. The metrological procedures to be followed will have to be studied if mutual acceptance is the final aim.

Although there is a general definition of legal metrology as cited yesterday by Dr. McCoubrey, one can only define the subject enforced by law in relation to any particular country or state. This means that no subjects in metrology are excluded in principle from being dealt with in the OIML working program, be it in the field of trade, or health and security, or pollution. However, in order to prevent break-downs in the development of activities, it is necessary for the OIML to collaborate as closely as possible with other international and national organizations of industries and consumers.

Before I finish my address, I like to say a few words about our plans for the 1980 Conference to be held in Washington June 16-20, 1980. First of all, I am very grateful to the USA Government

for their invitation and I am sure that all the members of the Committee greatly appreciate your hospitality. The 1980 Conference, even if it receives only a limited number of Recommendations to sanction, may well prove to be important in the development of OIML. It will be for the first time that the supreme organ of OIML will meet outside of Europe, thus emphasizing its international character; it will be the first opportunity for the Organization to take stock of the changes which have arisen as a result of the creation of the new work structure; it will be an occasion to examine the certain progress in the relations between OIML and other international organizations, particularly in the fields of standardization and development—improvements which should reduce the risk of overlapping or duplication of effort, leading to more efficient distribution of international work between organizations, and adding to the possibilities for help in the metrology field for developing countries.

Furthermore, it will be for the first time that a great number of delegates of the International Conference of Legal Metrology will have the opportunity to meet you. We are looking forward to your Conference in 1980 and to meeting you again.

NET WEIGHT ASSURANCE—A RESPONSIBILITY FOR BOTH GOVERNMENT AND INDUSTRY

Presented by SYDNEY J. BUTLER
Deputy Assistant Secretary for Consumer Services,
U. S. Department of Agriculture



It is a pleasure to be here. I guess it might be proper for me to ask those in the back if you can hear me. It might even be more proper in as nice a room as this is to ask if you in the back of the room can even see me, or if on this beautiful July day you even want to see me.

Harold, I appreciate being asked to speak here today. It is a fine audience. I know, when I had talked to you about coming, that I hoped for and asked for a nice responsive audience, but this is really quite a nice surprise. It is sort of like the drunk who wandered on the deck of the Titanic on that fateful night and said, "I know I ordered ice, but this is too much."

Anyway, it is a pleasure for me to be here this afternoon to speak on behalf of Carol Foreman, who is the Assistant Secretary for Food and Consumer Services. I am the Deputy Assistant Secretary for Food and Consumer Services. She wanted me to say that she is sorry she could not be with you today. As many of you know, we have been involved in hearings over the past few days, and Ms. Foreman's schedule has been extremely crowded.

Harold asked me to speak about the status of our proposed net weight relations and the rationale behind these regulations. I am sure many of you are already familiar with our proposal. Indeed, much of the impetus for new net weight regulations has come from State and local weights and measures officials like yourselves. Our proposal has generated intense interest, as indicated by the great number of comments that we have received from Government officials, consumers, and the food industry.

The Department published its proposed net weight regulations for meat and poultry products early last December. The proposed regulations generally require that, first, the net weight, on the average, be accurate at all points in the distribution chain from the processing plant to the retail store, and second, that unusable free liquid be excluded in determining the net weight.

Consumer groups and State weights and measures officials generally support it. The meat and poultry industries have generally

been opposed to it. Regardless of either position, it is clear that we must resolve these issues quickly since, under the present regulations, consumers very often cannot know how much useful product they are getting. This occurs because the weight declared on the label does not accurately reflect the actual amount of usable product in the package. In these times of high prices, this situation is particularly painful.

Let me briefly and quickly describe how we arrived at the present situation. Prior to the enactment of the Wholesome Meat Act of 1967 and the Wholesome Poultry Products Act of 1968, the Department of Agriculture had very limited authority to take actions against adulterated or misbranded meat and poultry products once those products were removed from the Federal establishments or the packing plants where they were produced.

The 1967 and 1968 Acts extended the Federal coverage with respect to adulteration and misbranding all the way from the packing plant through the retail chain and to the retail store. The purpose of this extension of authority, according to the 1967 report of the House Committee on Agriculture, was "to eliminate numerous opportunities now present to defraud consumers and endanger the public health."

In testifying in support of the House bill, amending the Federal Meat Inspection Act, the administration described the situation that the extension of Federal authority was designed to correct: "There exists considerable disparity between statutory provisions of Federal, State, and local laws which creates a form of economic separation that carries with it significant competitive advantages for the unregulated. Excessive waters and extenders, chemicals that mask the true condition of a product, and misleading or deceptive labeling are typical examples."

In order to clarify the relationship between Federal and State authority, the 1967 and 1968 Acts excluded the States from imposing any requirements in addition to or different from those under the Federal Meat Inspection Acts.

In 1972 or 1973, as most of you know, the California weights and measures officials began to order bacon produced by the Rath Packing Company off the retail market on the grounds that the bacon was short weight. The California officials stated that they had found approximately 70 percent of the lots of Rath bacon to be short weight and contended that the product should have weighed, on the average, the net weight stated on the packages.

Rath's lawyers disagreed and pointed out in court that the Federal meat inspection regulations permitted reasonable variations caused by loss or gain of moisture during the course of good distribution practices. The U.S. District Court ruled that Califor-

nia was precluded from imposing net weight requirements in addition to or different from the Federal requirements. However, the court also ruled that the Federal net weight regulation was void because the Department of Agriculture had failed to specify reasonable variation and thus existing Federal regulation was too vague for enforcement.

In response to this ruling by the District Court, the Department of Agriculture sought to rectify the vagueness problem and published a proposal in December of 1973. Reasonable variation was spelled out in the proposal. To meet the standard, processors would have to pack above the stated weight to allow for shrinkage between packaging and retail sale. In addition, the proposal would have permitted the inclusion in the net weight of free liquids that had drained from the product.

Over 1,600 comments were received on this 1973 net weight proposal. Industry contended the allowances or reasonable variations were too restrictive. Consumers were opposed to permitting net weight determinations on the basis of the lot average. They wanted every single package to equal or exceed the stated weight. Consumers also objected to the provision permitting the inclusion in the net weight of free liquids that had drained from the product. The Department never issued final regulations on this 1973 proposal.

In 1975 a U.S. Court of Appeals reviewed the holding of the District Court and held that the USDA regulation was not void for vagueness and affirmed the District Court's holding that the Federal law prevented the State from issuing laws or regulations in addition to or different from the Federal standards.

This pre-emption ruling was appealed by California and in March of 1977, last year, the Supreme Court affirmed that the Federal statute was not void for vagueness and that States could not enforce net weight laws or regulations in addition to or different from those required under the Federal law.

Though I wasn't here last year, I am sure that issue was probably widely discussed at this Conference.

That Supreme Court decision, just 2 months into this present administration, meant that if States wishes to enforce net weight standards on Federally inspected products sold at retail, they had to rely totally on Federal regulations, and since our Federal regulations did not spell out what reasonable variations were, the States were on their own to make distinctions between reasonable loss and short weighting. As a result, many States now feel that they are unable to carry out their weights and measures functions effectively.

After the Supreme Court decision in March, 1977, California formally petitioned the Department to clarify its net weight regulations. The petition, the California petition, as it is known, was supported by State government officials from 48 States who served as Commissioners, supervisors, and directors of the State agencies, such as agriculture, consumer affairs, business regulation, weights and measures, public service, dairy commission, and attorney general.

In addition, the California petition was supported by the American Farm Bureau, the National Grange, the National Farmers' Organization, and the National Farmers' Union. The petition's concepts were also favored by the National Association of Attorneys General, the Board of Directors of the Consumer Federation of America, and the National Conference on Weights and Measures.

On December 2, 1977, the Department of Agriculture issued its proposed new net weight regulations designed to provide State officials with the means to enforce net weight at retail. The principal features of the proposal are as follows:

First, the proposal would eliminate the present unquantified allowance for moisture loss from products during the course of distribution. Processors would have to take such loss into account in declaring the weight on the package.

Second, the proposal would exclude from the net weight of products any juices or liquids that normally drain off meat and poultry. For example, water which drains from chicken and is absorbed by the packing material or the curing solution in the bag of corned beef brisket would no longer be considered chicken or corned beef when weight checks are made under our proposal.

Third, the proposal defines specific limits by which individual items within a lot will be allowed to vary from the weight stated on the label. There would be no allowance, however, to permit the average weight of the entire lot to go beneath the stated weight.

Finally, to enforce the average weight requirement as well as the allowance for individual items, the proposal would require mandatory quality control programs in meat and poultry plants. All lots of consumer size containers from a particular plant would be sampled under such a program.

Let me briefly address the rationale for the proposal. We believe the approach we are now taking is both straightforward and in the best interest of consumers. With respect to the reasonable variations problem, the USDA could have elected to attempt to establish standards for expected weight loss between packing and retail sale. State weights and measures officials would then have based their enforcement actions on those standards.

For example, if the reasonable weight loss for a 3-pound chicken was 3 ounces, then a package of chicken weighing 2 pounds, 13 ounces at retail would still be in compliance. We saw two problems with this approach.

First, we would have had enormous problems in establishing such standards. It would have to be done on a product by product basis, taking into account the many types of packaging employed, distribution pattern, and other factors. However, even though we cannot easily make such industry-wide determinations, individual meat and poultry processors are in a position to make such determinations for their own brands of products.

Secondly, if the actual product weight is below the stated weight, consumer comparison shopping is frustrated. Consumers would have to know a great deal about expected shrink values for all of the various kinds of products to make a correct or an accurate price/weight comparison. For these two reasons we decided that the most reasonable approach would be to require processors to evaluate their own reasonable weight losses for their products and pack accordingly so the weights at retail would be accurate for the consumer.

With respect to the liquids which drain from the product, between packaging and sale to consumer, quite frankly, we responded to many consumer complaints. Consumers just cannot understand why they must pay meat prices for water. Much of the water which drains from chicken and other poultry is there because most of the poultry processors use a water and ice chilling method and the birds do absorb water. We have had to establish limits on water pick-up during this chilling process and our inspectors must make daily checks in every plant to see that these limits are not exceeded.

With regard to the public response to our proposal. I was talking to Bill Dubbert just a few minutes ago, and he told me that we have now received and are in the process of evaluating—over 3,000 comments on our net weight proposal.

We have not had time to totally evaluate these comments but several themes are becoming obvious. The industry asserts that it has had insufficient time to make studies of normal weight losses during distribution. In response to this complaint, we extended the original comment period so that the industry has had a total of 6 months to do whatever studies it needs. Industry was also obviously able to utilize the information it gathered in response to the 1973 net weight proposal. Industry also states it will need to increase meat and poultry prices to allow for the over-pack that would be needed for some products.

States and consumer groups continue to support the proposal. A few States which have recently supported the need for the proposal are now expressing some reservations, notably with respect to the difficulties poultry processors may have, and we are evaluating those concerns.

Industry has also objected to the weight variations we proposed for bulk pack products, claiming they are unrealistic. At the present time we tend to agree with that judgment and that criticism, and adjustments will be made in the final regulations.

Industry has also expressed concern that they will be legally responsible for short weights caused by mishandling at some point in the distribution chain. We believe that this also appears to be a legitimate concern. In our view, assignment of responsibility in a short weight case should depend upon the circumstances of that case, and if a distributor or retailer fails to follow proper handling instructions and as a result causes the product to be short weighted, the processor should not be held responsible.

We are now evaluating all of the comments that we received and hope to be ready with the final regulations this fall. Before going ahead with final regulations, we will have in hand an analysis of the economic impact of the new regulations. The Consumer Federation of America is now conducting such a consumer economic impact study under contract with the Department.

The industry has opposed this contract, asserting that the Department may be prejudicing industry's ability to file responsive comments. The contract was entered into by the Food Safety and Quality Service of the Department of Agriculture in an effort to determine from the consumer standpoint the economic impact of the proposal. Once the study is completed, and we expect it to be completed by August, if significant differences arise between data submitted by industry and that submitted and analyzed by the Consumer Federation of America, the Department, will reopen the comment period briefly on this specific economic issue.

You should also be aware, and I feel sure that you are, that the Grocery Manufacturers of America has determined to mount a substantial political campaign against the implementation of our proposal. GMA's position is to create a national net weight assurance program by calling together various industry, Government, and consumer organizations to study and evaluate the net weight issue. You should know that this position, if successful, will result in no change in the present regulations for at least 3 years. GMA is politically powerful and can be counted on to actively pursue their position.

Finally, we are well aware of the need to move as expeditiously as possible in getting new regulations into place. We are anxious to

resolve this important issue. State and local officials, I am sure, are anxious to have enforcement authority, and consumers are anxious to have accurate net weights on the meat and poultry that they buy.

DISCUSSION

MR. OFFNER. Dan Offner, City of St. Louis. I am sure if I don't ask these couple of questions, someone else will. So let's get them out. In regard to the present hearings that are going on, what is the purpose of the hearings and, well, what is your personal, not official, your personal reaction or evaluation of what is transpiring in these hearings?

MR. BUTLER: The hearings, for those of you who don't live in Washington or who might not be familiar with the political system here, is known as an oversight hearing. A subcommittee of the House Agriculture Committee asked the Food Safety and Quality Service to appear before it to address four or five issues that the Food Safety and Quality Service has dealt with over the past year. The hearings were held yesterday and lasted from 10:00 o'clock in the morning until 3:00 o'clock yesterday afternoon. They are basically designed to do what the name implies, to oversee and to review the performance of the Food Safety and Quality Service. There were questions on many issues, most of which might not concern all of you here, issues such as nitrites in cured meat products. Net weight labeling, however, was one of the issues under discussion at the hearing. Among the other issues were meat grading, the problem of sulfa residues in swine, and the reorganization of the Agency.

I formed this impression concerning the net weight labeling issue: the questions were not particularly aggressive, but they were precise. Perhaps the grocery manufacturers, the poultry industry, and the meat industry, had numerous contacts with Congressmen prior to the hearing and had provided accurate information to the Congressmen. Therefore, the questions were precise and accurate and didn't belabor points which were easy to refute.

Generally I feel like we answered the questions well and we made our position clear. But I do foresee that we will get further written questions that will focus more specifically on the net weight labeling issue. With that in mind, I do want to emphasize that the Grocery Manufacturers' Association of America may mount a strong political campaign to delay the implementation of our proposal. In fact, I am sure that the Association has already been lobbying heavily and providing information to appropriate Congressmen.

So I pass that on to you for what it is worth. I do think it is accurate to say that if GMA wins this political issue the regulations which you are now enforcing will not change for some 2 or 3 years. They want a 2-year period to study it. Then, even if we do have a recommendation at the end of the 2 years, it would take us another year to get the proposal out and get comments back in.

Generally, I would like to sum up by saying that we feel good about the hearings but we expect a tough political fight on the issue of net weights.

MR. STADOLNIK: Ed Stadolnik, Massachusetts. In the upcoming joint hearings that are going to be held by USDA, FDA, and FTC, will the subject of net weight labeling be an appropriate subject at these hearings?

MR. BUTLER: I have been involved in setting up those hearings and I don't believe that net weight labeling will be an issue. The issues to be discussed will be matters such as open date labeling, ingredient labeling, fortification, safe and suitable ingredients, that sort of thing.

We have felt that net weight labeling was a rather large issue in itself. We have already held public hearings on this single issue. FDA had two public hearings and the Department of Agriculture had one public hearing on net weights. So, the answer is, I don't think net weights will be one of the issues for the particular hearings you have mentioned.

MR. OFFNER: Mr. Stadolnik's question brings to mind a point that is of concern to all of us and that is, especially since the Rath decision, it becomes very obvious that there has to be a uniformity or at least a reasonable uniformity of approach to such things as net weight labeling and so forth and the standards for such judgment, on the part of all of the Federal agencies that have an interest in this.

The weights and measures official has to look at the problem in the field and it is of some importance that USDA, FDA, and FTC at least stay in the same ballpark with us and I am not so much asking a question here as simply indicating a problem area to you as a representative of USDA, as one of the agencies involved.

In other words, weights and measures people, USDA people, Food and Drug Administration, and the Federal Trade Commission people all have to remain on good speaking terms and have to come up with pretty much the same answers to the same problem on different products if we are going to get the job done in the field.

MR. BUTLER: I understand that. Of course, I cannot speak for the Food and Drug Administration. They have held their hearings

on net weights and I cannot give you a prediction on when they might come forward with their regulations. You would probably know more about that than I would. However, when they get ready to formulate their final proposal, we will be very much a part of coordinating it with them.

MR. PROBST: Bob Probst, Wisconsin. I think the Conference and everyone agrees with this net weight at time of sale concept. We have been in contact with the Consumer Federation people on doing some testing and some reporting and I guess we want to support this thing as much as possible. The question I have is if we are to report or to create or to find out statistics to support the impact of the new regulations, it is not clear in our mind what the new USDA regulations are going to be, so how would we test and report to those figures? Do I make myself clear?

MR. BUTLER: No, I don't quite understand. If you are talking about providing information at the time the comment period is reopened, if it is reopened, then I understand the question. If you are not, then I don't.

MR. PROBST: I guess my question goes back to our type of testing. In other words, if we are to do some reporting to CFA, we know what current standards of testing are applicable. But we are not clear what the standards will be for testing and, in the case of the drained weight procedure, under the proposed Federal standards if we are to test for the impact of the new regulation, we don't have the new regulation in place to test for it. That is my point.

MR. BUTLER: Yes. I certainly hope if there is some confusion there, that you will work with the Consumer Federation and if Bill Dubbert is not in here, I will certainly offer his services to coordinate this task. We definitely need to know the correct figures because I am sure one of the big issues will be, Is our proposal inflationary? Will it cause packing companies to overpack and therefore charge more for the product? We absolutely have to have correct information to know whether it is going to cost more, and if so, how much more. If it isn't going to cost more, we want to be able to defend it. So it is very important to us that we work it out.

MR. THOMPSON: Dick Thompson, Maryland. I would like to thank you for appearing here today. It is good to see you again. I would like to leave a thought with you relative to GMA's proposal about this national forum for discussing net weight issues.

In my conversations with weights and measures officials here at this Conference this year, many of us are concerned that here again is another place for the industry to attempt to spread the Government's resources even thinner. We tend to feel that we already have such an organization embodied in this Conference

and that very recently a member representing industry interests in a light and casual way, I might add, did indicate that there are so many meetings and so many organizations to attend, that his time is quite limited.

So for these reasons we do view that with some concern, and I would like to pass that along to you.

MR. BUTLER: Thank you. Yes, that is why I brought it up in my speech. This is going to turn into a serious political issue and if you are concerned about it, then you should make it known.

MR. KOSITS: Frank Kosits, Ohio. I would like to ask a question. With these hearings going on, has the Senate Bill 727 come out of the Agricultural and Forest Committee or is it still collecting dust?

MR. BUTLER: The hearings that we were concerned with just lasted the 1 day and had no direct effect on any proposed legislation. I don't know the answer to your question except that the hearings that we had, had nothing to do with the bills you mention but only with oversight function.

MR. DELFINO: Ezio Delfino, California. I have a question but I would like to back up to what Bob Prost from Wisconsin commented on. I think the point he was making is that if you contemplate changing the MAVs, that could have a significant result on the studies that we may be doing. So we may be using a procedure that you are contemplating changing, and if this is so, that information perhaps should be made available to us. It could have a significant difference.

My question is do you have a target date for implementation of your regulations?

MR. BUTLER: We have been assured that the Consumer Federation contract will be completed in August. We would then open the comment period probably for another 30 days just to attempt to finally resolve any discrepancies between the industry data and the Consumer Federation data. Tentatively, we hope to implement our proposal sometime in October.

MR. DELFINO: One other comment. The political pressures, as I understand it, being applied by industry to some States' weights and measures officials is tremendous. What do you see that we can do to counteract this?

MR. BUTLER: I am really limited, as a political official, to advise you how to do it, other than to make it known through your appropriate representatives. I think the best way to do it is to just keep the issue in mind. The major complaint by the poultry industry, for example, is that moisture loss is unavoidable. If you continue to work with people that you know in the poultry industry, I think you will find out that that issue is not as exact as they say it is and that in some sense it is slightly phony. So that my

advice to you would be to talk to your poultry people that you know and can trust and get an accurate determination of how real that issue is and then make the results of that conversation known appropriately to your Congressman.

Ms. PERLMUTTER: Cathy Perlmutter, with the Consumer Federation of America. I wanted to make clear to Mr. Probst and anyone else who has kindly helped us with volunteering to do some sampling, that if they have any questions about the sampling procedures, they can—they should speak with us, and Dr. Brickenkamp has also volunteered to help us with that.

Mr. BUTLER: Thanks very much.

Mr. STADOLNIK: I understand that the proposed USDA regulations will also apply to random weight packages that are packaged in the neighborhood supermarket, sold only in that supermarket and not otherwise involved in interstate commerce. I have some questions. Could you explain first of all the rationale in that approach and secondly, do you think it would have been appropriate in the proposal to express that particular intent a little more clearly?

Mr. BUTLER: If we didn't express it clearly, then I think we should have. It didn't get across. If I understand your question correctly, you are concerned about products in interstate commerce. State inspection programs must be at least equal to the Federal inspection programs. So, if we are requiring products that move in interstate commerce to have accurate net weights then the "equal to" provisions would make similar standards applicable on State inspected product.

Mr. BIRD: Jim Bird, New Jersey. I would like to point out an argument that we use in our responses is that it is a matter of principle rather than cost. The Supreme Court of the United States said that to correct inequities in schools they had to bus; that increased the cost to the taxpayer. It had to be done. I think a great principle is involved here that needs to be corrected. One is that before packages, a consumer, that is, a buyer, had the responsibility to determine for himself that he got the amount and quality that he paid for at the time of sale. It was a one to one consummation. Now that these packages are put together in the back room of a store, another State, another country, the consumer no longer has that responsibility, and the responsibility then has turned to caveat venditor, to the manufacturer and we believe that it is his responsibility, regardless of what our adversaries say about additional cost, to give the consumer an accurate package at time of sale and also so that we can check it to see that it is accurate.

MR. BUTLER: Thank you, sir. That is obviously the rationale behind our proposal also. I remember attending one of the hearings and the thing that was pointed out to me was that the consumer is the only one in the whole retail chain that has no recourse unless he or she carried a scale to the meat counter. All of the way from the retail through the distributor level or from the processor to the distributor to the retail level, there is a means of checking and a means of redress. If a distributor receives and weighs short packages from his processor, he has a corrective system, either economically or by other leverage or just by an agreement.

The same applied between the distributor and the retailer. But unless the consumer carries a scale and weighs the product at the time of purchase, he or she has no recourse. That is also one of the arguments that most impressed me.

VOTING SYSTEMS FOR ASSEMBLIES

Presented by DR. AELRED KURTENBACH, President
Daktroniks, Incorporated



Good afternoon Ladies and Gentlemen. I have visited with the Conference Executive Secretary, Mr. Wollin, in the past regarding the possible use of an electronic voting system for this Conference. To give you just a bit of background about our company, we are located in Brookings, South Dakota, sort of out in the prairie. We manufacture displays of various kinds. One of our products is electronic voting systems for legislative assemblies. We have supplied the voting systems for many State legislative bodies. We also manufacture sports scoreboards of all kinds for high school, college, and professional teams and supply information displays like you see at banks and stores which give time and temperature. In summary, we specialize in electronic display systems of many designs and we are interested in working with this Conference to meet your needs for a modern and efficient voting system.

To increase your awareness on this subject, I would like to show you some slides of voting systems we have installed in various States. This will give you an idea of the variety of systems that are available.

[Editor's Note: At this point in Dr. Kurtenbach's presentation he showed a large number of slides and discussed them for the audience. Among the systems shown were those in Utah, Montana, New Hampshire, Iowa, Illinois, Connecticut, Oregon, Georgia, South Dakota, Mississippi, West Virginia and North Carolina. Discussion centered on the many component parts of a system such as (1) control console, (2) voting keyboards, (3) message and wall display, (4) recorders and printers and (5) computer.]

In conclusion, as I anticipate the needs for this Conference, you would like to have the capability for members of the House of State Representatives to vote individually and to have their votes displayed after all votes have been cast and voting is closed. And then the totals would be computed for the House of State Representatives automatically and those displayed when voting is completed.

And while that is being done, the vote for the House of Delegates will be tallied manually, and then that would be entered into

the system and displayed. This information would be printed out along with some identifying information like the date and item number.

This would be a good application of our system, for as I said we use the new electronic item called the microprocessor and so instead of having to do a lot of redesign and rewiring, we would be able to just put in a different program to suit this Conference which would hold costs down quite a bit. It would also allow you to make some minor changes, as time passes, which may be deemed necessary.

REPORTS OF STANDING COMMITTEES

REPORT OF THE COMMITTEE ON NATIONAL MEASUREMENT POLICY AND COORDINATION

Presented by RICHARD L. THOMPSON, Chief, Weights and Measures
Section, Division of Inspection and Regulation, Department of
Agriculture, State of Maryland

(Wednesday, July 12, 1978)

VOTING KEY

100

INTRODUCTION



The Committee on National Measurement Policy and Coordination (P & C Committee) submits its final report to the 63rd National Conference on Weights and Measures (NCWM). The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

101

EXECUTIVE COMMITTEE MATTERS

The P & C Committee included in its agenda for the interim meetings several items that were referred to the Executive Committee for action during the 63rd NCWM. Consideration of these items at this time by the P & C Committee, and in joint session with members of other standing committees who attend the interim meetings, allows for the development and reporting on such items in the committee's tentative report and for publication in the Announcement Booklet. The items referred to the Executive Committee were (1) the duties of the NCWM chairman, (2) the new voting system, (3) the notice on the 1978 and 1980 Conferences, and (4) the Associate Membership Committee Charter. The recommendations and actions on these items are included in the report of the Executive Committee.

(Item 101 was adopted)

102

METRIC UPDATE

The P & C Committee was pleased to have the NCWM representative to the U.S. Metric Board, Mr. Sydney D. Andrews, State

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of Florida, sit in on its sessions during the interim meetings. At the time of these meetings the Metric Board had not been formally established although the President had submitted his list of appointees to Congress for confirmation. Subsequently, we are pleased to report Congressional confirmation has been achieved and Mr. Andrews is now a member of the U.S. Metric Board representing the NCWM and other standards making organizations. Mr. Andrews reported on activities of the Weights and Measures Sector Committee of the American National Metric Council (ANMC) and provided information on developments that are taking place throughout the country in general. Further details on such developments are reported in the Tentative Reports by other standing committees of NCWM.

The Executive Committee of the ANMC Weights and Measures Sector Committee held an evening meeting to review a draft metric conversion plan. This plan covers all areas of concern to weights and measures officials including (a) Measurement Units and Physical Standards, (b) Laws and Regulations, (c) Equipment, (d) Enforcement, and (e) Training and Public Awareness. Further consideration of the plan and action on its implementation will be taken at a meeting of the Sector Committee during the National Conference.

The P & C Committee discussed and approved the following letter by the NCWM chairman to the Secretary of Commerce. A similar letter was also sent to the Speaker of the House of Representatives and President of the Senate.

Honorable Juanita M. Kreps
Secretary of Commerce
Washington, D.C. 20230

Dear Madame Secretary:

As you know, the Metric Conversion Act of 1975, (PL 94-168), calls for the "voluntary conversion of the United States to the metric system of measurement."

It is important as we proceed to move voluntarily towards increased use of the metric system that all barriers to such usage be removed. I am writing on behalf of the National Conference on Weights and Measures concerning one such barrier: the Fair Packaging and Labeling Act (PL 89-755). Specifically, the Fair Packaging and Labeling Act now makes it mandatory to label consumer commodities in customary units. It needs to be amended to allow either sole customary unit labeling or sole metric unit labeling.

The National Conference on Weights and Measures is an organization of state and local weights and measures officials, working to achieve uniformity in weights and measures laws and regulations, with an overall goal of insuring equity in the marketplace. Among the Con-

ference's many specific areas of concern is the packaging and labeling of consumer products, from the standpoint of both clarity and accuracy of contents.

I am writing to urge your support in securing prompt amendment of the Fair Packaging and Labeling Act. If there is any way that the Conference can be of assistance in this effort, please do not hesitate to contact me.

Sincerely,

(signed)

James F. Lyles, Chairman
National Conference on Weights and Measures

The following letter was received from the Department of Commerce in response to Chairman Lyles' letter:

February 28, 1978

Mr. James F. Lyles
Chairman
National Conference on Weights and Measures
Weights and Measures Section
Department of Agriculture and Commerce
One North 14th Street, Room 032
Richmond, Virginia 23219

Dear Mr. Lyles:

I have been asked to respond to your letter of February 13 to Secretary Kreps concerning an amendmnt to the Fair Packaging and Labeling Act to permit metric labeling of packaged consumer commodities.

We share your concern that the requirements of the Fair Packaging and Labeling Act impede the introduction of the metric system into the marketplace. We have also noticed the errors in metric labeling of packaged goods where producers have added metric quantity statements to the required quantity declarations. This situation has the potential for confusing consumers.

As you know, the Federal Trade Commission and the Food and Drug Administration have regulatory authority under the Act. The role of the Secretary of Commerce is to promote standardization and to assist the States. In this regard, we plan to work with those two agencies in developing appropriate amendments to the Act.

We look forward to the advice and assistance of the National Conference on Weights and Measures in this matter.

Sincerely,

(Signed)

Howard I. Forman
Deputy Assistant Secretary for Product Standards

(Item 102 was adopted)

Mr. James F. Lyles, Conference chairman and NCWM representative to the U.S. Public Advisory Committee for OIML, presented the following report to the committee on the highlights of OIML activities since the last National Conference in Dallas:

There have been a number of activities in OIML of interest to weights and measures officials during the past several months. I will highlight the most important of these activities for you, and you will probably hear more about them from the OWM staff during the committee sessions.

August 77—The U.S. received the first draft OIML International Recommendations dealing with grain moisture meters and it was submitted to several States and NCWM committees for review. This draft was written by the French and was the subject of an international meeting held in Paris in October. The U.S. delegation to that meeting was headed by Dr. Brickenkamp (OWM) and included Sam Hindsman from the State of Arkansas. This is an important effort because of long standing problems in measuring grain moisture within the U.S. and internationally.

September 77—The U.S. Advisory Committee for International Legal Metrology met in Boulder, Colorado at the NBS labs as a prelude to U.S. participation in the OIML Presidential Council meetings held several weeks later in Paris. I attended the Boulder meetings representing the NCWM. Of paramount interest to us was a discussion of a new initiative within OIML to establish a system whereby nations, on the basis of a thorough test, could certify measuring instruments as meeting the requirements of OIML International Recommendations. This "OIML Mark" concept is being pushed in OIML and is likely to succeed. It has major implications to U.S. manufacturers and to us as well since weights and measures labs might be asked to participate in the U.S. certification system. This concept was discussed at length at the meeting of the OIML Presidential Council in September and the result of the discussion was that the International Bureau of Legal Metrology (BIML) would further research the question and present the issue to the International Committee for Legal Metrology meeting in Paris in June, 1978.

Also of interest in September, again in Boulder, was the meeting of OIML Pilot Secretariat 22 on Principles of Metrological Control which is administered by the U.S. and more specifically by Bascom Birmingham (Deputy Director of the IBS Boulder Labs) and Dr. Brian Belanger (NBS Office of Measurement Services).

Two U.S. National Working Groups were established to coordinate this work and weights and measures officials are members of both groups.

One final item of interest in September, the U.S. participated in a joint OIML/ISO working group meeting on air separators which was held in London. Bill Andrus, Wally Seward and Howard Siebold participated in the meeting which was to finalize requirements for air separators installed in fluid measuring systems. These requirements will become part of an overall OIML International Recommendation on Liquid Measuring Systems which will probably be published in its second draft form in early 1978 and which will be the basis for an international meeting in October of 1978. NCWM should keep a close eye on this document because it could offer a valuable resource for a metric H-44 liquid measuring device code.

October 77—U.S. attended the OIML grain moisture meeting in Paris which I have already mentioned and which we will be hearing more about. U.S. also attended an OIML meeting in Budapest, Hungary on length measurement and was asked there by the French to participate in their working group on fabric measuring devices. Accordingly, the draft OIML International Recommendation on these devices has been submitted to the NCWM for review and we will be asked to participate in a meeting probably in the fall of 1978, on this document.

The US also attended a UN/Food and Agricultural Organization meeting on Methods of Analysis and Sampling, which was held in Budapest. There was a large delegation from the US representing USDA, FDA, NBS and industry and some of the discussion concerning prepackage control might have an influence on our new H-67. Mary Natrella represented NBS at this meeting, and as you know, Mary has been working closely with OWM on H-67.

November/December 77—Meetings were held at NBS to organize US National Working Groups for OIML PS 7 on weighing systems, and their working groups will begin drafting proposed recommendations on Examination Procedure Outlines to be submitted to OIML. Also under PS 7, John Elengo's secretariat on load cells has made excellent progress and now has a first draft recommendation on load cells which we will probably see shortly.

Meetings of Interest Between January-June, 1978

Five OIML meetings are scheduled which impact on NCWM programs:

(1) **March or April**—Under the sponsorship of the Packaging Institute, USA, a packaging symposium of one day's length is being

planned to explore what approaches the US should take in administering OIML PS20 on prepackaged goods. It is likely that a US National Working Group will be assembled to prepare three packaging initiatives on OIML dealing with: (a) labeling requirements; (b) statistical control of prepackaged goods (H-67), and (c) recommended metric quantity patterns for prepackaged products.

(2) **April**—A meeting on water meters is scheduled in Paris. The American Water Works Association will participate along with NBS. NCWM interest in this area is uncertain at this time.

(3) **June**—A meeting on PS7/RS5 Automatic Weighing Machines was held in London on June 26-30, 1978, hosted by Mr. Fred Samuels of the United Kingdom and his staff, to discuss a draft document applicable to gravimetric filling machines. Discussion developed concerning the scope of the document. Several member countries considered bulk weighing systems, that is, automatic hopper scales which weigh commodities such as grain in many drafts of a specified amount, to be within the scope of the document. Other member countries disagreed and it was finally decided that the draft would apply only to filling machines used to weigh products which are packaged. Because of the problems in international grain weighing, a separate document is to be developed for bulk weighing systems.

A meeting was also held in June in Paris. The meeting of the International Committee for Legal Metrology was called to review a wide range of topics, including such issues as the "OIML Mark" program, amending the OIML convention as regards voting requirements, and responding to a Soviet initiative on programs for teaching of legal metrology. Many items were discussed at the meeting and, as a result, an Ad Hoc Committee was formed to continue study of the "OIML Mark" program and the implications it will have in the realm of legal metrology.

In summary, as you have heard, OIML activity of interest to the NCWM has been very heavy since last July, and it is likely to continue at this pace. The 180 Reporting Secretariats in OIML are now very active and we should expect at least one draft OIML recommendation a month which impacts upon the Conference. We should also expect during 1978 that weights and measures officials will be looked to as participants in US delegations to OIML international meetings covering NCWM topics. We should, therefore, do our best to ensure that the NCWM responds adequately to these issues.

(Item 103 was adopted)

Prior to the interim meeting, the Food Safety and Quality Service of the U.S. Department of Agriculture announced its new proposal relative to net weight for meat, meat products, poultry and poultry products. In essence, USDA proposed that the weight of the indicated commodities equal or exceed the declared quantity at any point in the distribution chain. The P & C Committee reviewed the proposal in light of the October 1977 petition to the various Federal agencies by the State of California, 48 States and other interested parties.

It was the view of the committee that the matter should be assigned to the Committee on Liaison for the development of a NCWM position and for subsequent presentation to the Executive Committee of the Conference.

While a considerable number of weights and measures officials were present at the interim meetings, the P & C Committee seized this opportunity to coordinate participation in the USDA hearing by conference members and to arrange for Jim Lyles (Virginia) and Dr. Charles Green (New Mexico) to present the consensus of NCWM. Further, the executive secretary arranged for meetings between members of NCWM and representatives of the Food and Drug Administration and the Federal Trade Commission, while the Conference participants in the USDA net weight hearings were in the Washington, D.C. area.

Immediately following the adjournment of the 63rd NCWM, the executive secretary arranged for Conference representatives to meet with the FDA and USDA, to further amplify NCWM support and interest on this issue and offer any possible assistance in its resolution.

(Item 104 was adopted)

105

TASK FORCE ON NATIONAL TYPE APPROVAL PROGRAM

In 1976, the Conference demonstrated its support for the NBS Prototype Examination Program and manufacturers joined with weights and measures representatives in calling for increased NBS support of the program. Considerable interest was expressed regarding an effort to eliminate the backlog and the extended time required for examinations. The P & C Committee endorsed the formation of a "Task Force on National Type Approval Program" to assess the situation, with Mr. Ezio Delfino, State of California, serving as chairman of the Task Force.

The Task Force, comprised of weights and measures officials and representatives of the Associate Membership, met during the 62nd NCWM in Dallas, Texas. After considerable discussion and the presentation of varying points of view, the Task Force was divided into an eastern and western subgroup to study the matter further. As a result of the information presented by the two subgroups, a general plan was subsequently developed during the interim meetings held in January.

The Task Force feels that the concept of a National Type Approval Program is a valid one. Such a program, in theory, could assist greatly in making better use of nationwide resources and at the same time satisfy some of the concerns facing the Nation by developments in the International Organization of Legal Metrology (OIML). Such a program should also accomplish some of the following points.

1. Upgrade the quality of existing type approval programs.
2. Provide for greater uniformity in approval requirements and the application of those requirements.
3. Assist in reducing the workload for weights and measures jurisdictions.
4. Provide the manufacturers a single examination for their equipment.

It is the general consensus of the Task Force members that any national type approval system should be developed in an incremental fashion. The effort of the Task Force, therefore, has been to focus on and develop thoughts relative to how an organization can be structured and a broad outline of how such an organization would operate. The following plan, then, can be considered a first attempt to develop an organization to oversee a national type approval program. It should be understood that the plan is presented for discussion purposes only, and is not a recommendation. The committee recognizes that there are other alternatives available. Such possible alternatives are (a) Federal only, with NBS as a sole participant; (b) full utilization of private industry, or (c) some type of variation of the present system.

It is important that all concerned communicate their ideas, alternatives and philosophies to the Task Force prior to the 63rd Conference in July. Alternative concepts should be submitted in sufficient written detail in order to enable the Task Force to make a proper evaluation.

A NATIONAL TYPE APPROVAL PROGRAM (NTAP)
FOR WEIGHING AND MEASURING DEVICES
(DRAFT PLAN)

Program Scope

The National Type Approval Program for Weighing and Measuring Devices is a program for identifying, on a uniform national basis, those specific types (by manufacturer and model) of weighing and measuring equipment that meet national consensus legal metrology standards. National consensus legal metrology standards include applicable Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices as published in NBS Handbook 44, and in addition, those device examination methods and test procedures established under the program as necessary to determine conformance with national and international performance requirements. Under this program all States will be classified within one of three categories: *Participant*, *Subscriber*, or *Observer*. States classified within the first two named categories will be further identified by the qualifier "WITH EXCEPTIONS," under specified conditions.

Definitions

Participant—A State or other primary jurisdiction that has agreed to, and can legally accept within that jurisdiction, the results of National Type Approval and that also elects to perform within that jurisdiction National Type Approval examination for which the jurisdiction has been qualified (in terms of facilities, standards, personnel and software) by the program.

Subscriber—A State or other primary jurisdiction that has agreed to and can legally accept within that jurisdiction the results of National Type Approval.

Observer—A State or other primary jurisdiction that has not agreed to or cannot legally accept within that jurisdiction the results of National Type Approval.

With Exceptions—A qualifier to be used in conjunction with any *Participant* or *Subscriber* State whose legally adopted specifications, tolerance or other technical requirements for commercial devices differ from national consensus legal metrology standards in a substantive manner. These exceptions to national consensus legal metrology standards, documented with specificity for individual States, determine the extent to which National Type Approval applies within the State.

Program Structure

The National Type Approval Program for Weighing and Measuring Devices would function in close association with the National Bureau of Standards, Office of Weights and Measures. It would, however, be a separate and distinct program of the National Conference on Weights and Measures (NCWM). It would cooperate with existing organizations such as SMA, GPMA, ASTM, ANSI, U.S. OIML secretariats, State and regional weights and measures groups and others, as appropriate. NBS-OWM would provide staff assistance in coordinating NTAP activities through technical oversight, including the development of certification criteria. In addition, and initially, NBS-OWM staff assistance in the training and/or auditing of *Participant* State personnel in the performance of device type approvals (examinations and documents) would be necessary.

Board of Governors

The activities, policies and procedures of the National Type Approval Program are governed and directed by the NTAP Board of Governors and its chairman. The Board of Governors shall consist of one representative from each State or primary jurisdiction classified as a *Participant* in NTAP plus one representative for every five States (or fraction thereof) classified as *Subscriber*. In addition, the chairman of the Advisory Committee to the National Type Approval Program shall be an ex officio board member. Board members representing *Subscriber* States shall serve 4-year terms (initial appointments to be staggered) and are eligible for reappointment.

NTAP Advisory Committee

An Advisory Committee (AC) to the National Type Approval Program shall represent the interests of device manufacturers, marketers, and users. Through its chairman, the AC will be represented on the NTAP Board of Governors. The Advisory Committee shall consist of one member representing device manufacturers or marketers and one member representing device users in each sector of the weighing and measuring device fields as classified by the individual device codes in NBS Handbook 44 plus one member at large (i.e., "General Code" member). The Board of Governors is empowered however to designate up to a total of six of the individual device codes to be represented by a "combined-code" member seat.

Operation

Type approval examination of devices under the National Type Approval Program is a responsibility of the *Participants*. Qualified city and/or county jurisdictions within a *Participant* could also be a part of the NTAP device examination process. The *Participant* would provide the necessary facilities, test equipment, standards and personnel for type approvals. Documentation would be in a standard format for all *Participants* in the program. Where warranted, special facilities or equipment and standards of device manufacturers, assemblers or distributors could be utilized in the program. Similar resources of the National Bureau of Standards, at least initially, would be eligible for use as well.

Device manufacturers, assemblers or distributors requesting a National Type Approval certificate for any model or design of weighing or measuring equipment would be expected to contact the nearest *Participant* jurisdiction qualified to conduct a type approval examination for their category of device. The actual examination (inspection and testing) would be performed in a standard manner using methods and procedures as adopted by the National Type Approval Program.

All *Participant*, *Subscriber*, and *Observer* States would receive copies of NTAP certificates issued, as well as periodic lists of devices for which approval is still pending and for which approval is not achieved or no longer sought.

Certification of Participants

All States and primary jurisdictions (and their local subdivisions where applicable) that seek *Participant* status in the National Type Approval Program are to be evaluated according to qualifications adopted by the NTAP Board of Governors. Members of the Board of Governor's Audit and Certification Committee, who are not connected with the candidate State's application would serve as the review and evaluation committee. Applicants to become *Participant* members in the NTAP would specify by type, capacity, and H-44 code the devices for which their jurisdiction sought certification to perform type approvals. A periodic review of all *Participant* jurisdictions would be conducted by the Audit and Certification Committee.

Financing

The Board of Governors of the NTAP would establish minimum fees based on type, capacity, and other relevant factors for each type approval examination conducted (regardless of outcome).

This fee would be paid to the NTAP office by the device manufacturer, assembler, or distributor and would not be dependent upon or conditioned upon which *Participant* State performed the type approval exam. Fees collected would be used to defray overall program expenses.

Two written statements and several comments were received prior to and during the open hearing in support of the basic concepts of a National Type Approval Program. The Task Force also heard specific recommendations for the structure of this program.

The Task Force will meet during the 63rd NCWM and plans to meet during the interim meetings in January, 1979. This week the committee will review the comments it has received and plans to issue a proposed timetable for the continued development of a plan for a National Type Approval Program. The Task Force will send the results and recommendations of this meeting to weights and measures officials and to the Regional Weights and Measures Associations. The Task Force requests that the Regional Associations schedule time at their meetings to develop positions and suggestions on the Task Force recommendations for consideration at the interim meetings and at the 64th NCWM.

(Item 105 was adopted)

R. THOMPSON, *Chairman*
M. KINLAW, *Chairman*, S & T Committee
J. BENNETT, *Chairman*, L & R Committee
S. MALONE, *Chairman*, Education Committee
E. STADOLNIK, *Chairman*, Liaison Committee
H. WOLLIN, *Executive Secretary*, NCWM
J. LYLES, *Representative*, OIML
S. ANDREWS, *Representative*, U.S. Metric Board
E. DELFINO, *Chairman*, NTAP Task Force

Committee on National Measurement Policy and Coordination

(On motion of the committee chairman, the report of the Committee on National Measurement Policy and Coordination voting key items 100 through 105 was adopted in its entirety by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totalized in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on National Measurement Policy
and Coordination*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
100	47	1	78	0
101	48	0	65	0
102	47	0	77	0
103	48	0	80	1
104	47	0	81	0
105	47	1	74	4

REPORT OF THE COMMITTEE ON LAWS AND REGULATIONS

Presented by JOHN T. BENNETT, *Chairman*; Chief, Weights and Measures Division, Department of Consumer Protection, State of Connecticut

(Thursday, July 13, 1978)

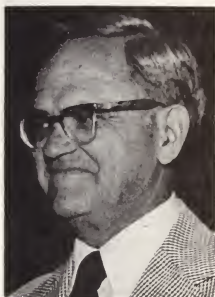
VOTING KEY

200

INTRODUCTION

The Committee on Laws and Regulations submits its report to the 63rd National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by this final report.

The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.



201

HANDBOOK 67

The final draft of the Second Edition of National Bureau of Standards Handbook 67, Checking Prepackaged Commodities, was distributed in December 1977, and comments were received during the interim meetings at a joint session of the Liaison and the Education Committees with the Laws and Regulations Committee.

The issue raised by most industry representatives at this meeting was the need for adequate opportunity to provide input concerning the details of the Handbook such as the maximum allowable variations (MAV's). The Conference has traditionally allowed for specific exceptions to MAV's through sections in both the Model State Method of Sale of Commodities and Packaging and Labeling Regulations. This practice will be continued. In addition, comments on and suggestions regarding Handbook 67 are appropriate at any time and should be made directly to Dr. Carroll Brickenkamp, National Bureau of Standards, Office of Weights and Measures. In addition, requests for exemptions to the MAV's for specific commodities should be made to the Staff Assistant, Laws and Regulations Committee, OWM.

It should also be noted that NBS Handbook 67 reflects current regulations at the Federal level. For example, the Handbook is

written to conform with moisture-loss allowances now a part of such regulations. There are currently proposals under consideration by USDA, FDA and FTC to change these regulations to require accurate statements of net weight at time of sale. If and when these changes are approved, Handbook 67 will be appropriately revised by NBS to reflect these changes.

The Laws and Regulations Committee supports the efforts of the Liaison Committee to achieve uniformity of sampling procedures, allowable variations and other technical issues between NBS and the U.S. Department of Agriculture, Food and Drug Administration and the Federal Trade Commission. It urges these agencies to join in this effort that will allow weights and measures officials to follow the same package checking procedures for all commodities. The committee also supports the intent of the OWM to conduct an extensive training program to train weights and measures officials to properly use the procedures described in Handbook 67.

The committee notes that NBS is continuing to develop Handbook 67 and expects to have it printed in early 1979. The committee expects to recommend the endorsement of Handbook 67 after it is in final form and has received adequate testing by weights and measures officials.

In a statement made at the open hearing of the Laws and Regulations Committee on July 10, 1978, Mr. Albert Tholen, Chief of the Office of Weights and Measures, made the following points concerning Office of Weights and Measures' plans for Handbook 67:

The Office of Weights and Measures received many valuable comments both orally and in writing on the December 1977 draft of H-67. We will send you a letter detailing the planned modifications to the document before publication. We plan for the letter to reach you very soon. You will have the opportunity for further input relative to the draft H-67. Following this last comment period, we will send the manuscript to the typists (estimated to be about August 30, 1978) and then on for editorial review (October 15, 1978), and publication (about December 1, 1978). Our best estimate at this time for distribution would be by February of next year. Meanwhile, the Office of Weights and Measures staff is assembling and conducting a program for training in package inspection following the H-67 principles and procedures.

The handbook is being written within the following guidelines or principles so that the general procedures:

- (1) are in compliance with existing net weight labeling regulations;
- (2) are equally useable by local, State, or Federal agencies for producing uniform results;
- (3) are technically correct and legally supportable;
- (4) use sampling as the basis of testing for compliance rather than testing every package; and
- (5) are practical for use by trained inspectors.

We at Office of Weights and Measures appreciate the interest, support, and constructive recommendations made by so many people in this effort.

(Item 201 was adopted)

202 METRIC CONVERSION OF MODEL REGULATIONS

As a part of the commitment of NCWM to support metric conversion and in further support of the voluntary nature of the Metric Conversion Act of 1975 (Public Law 94-168), the committee is giving major attention to the removal of legal barriers to those that wish to go metric. The committee discussed plans of OWM staff to prepare first drafts of joint metric/inch-pound versions of the Model State Method of Sale of Commodities and Model State Unit Pricing Regulations. These drafts will be available for distribution at the 63rd National Conference. The committee intends to receive comments at the interim meeting in January 1979 and, if appropriate, recommend adoption by the 64th National Conference later that year.

(Item 202 was adopted)

203 MODEL STATE METHOD OF SALE OF COMMODITIES REGULATION

203-1 Baler and Binder Twine

The committee recommends that section 203-1, Baler and Binder Twine, be amended to read as follows:

The Western Weights and Measures Association recommended the elimination of the minus five percent tolerance on the declared length of binder twine. (See sec. 2.1). The Association feels that inexpensive products such as binder twine can be economically packaged with either a wide range or with a higher fill target to maintain full labeled quantity.

The Cordage Institute indicated at the interim meetings that it had no opposition to the proposed change. However, at this Conference, the Institute and two manufacturers spoke against the proposal, but some members of the Institute favored it. The Institute also presented the committee with a "Standard for Agricultural Twines," including a method of determining knot strength. The Institute recommends a tolerance of 10 percent be established for

knot strength. However, some members of the Institute do not concur in this proposal for the 10 percent tolerance.

The committee is not in a position to evaluate this issue at this time and therefore recommends that this proposal be tabled for further consideration at the next interim meeting.

(Item 203-1 was adopted. A motion to amend the item was defeated.)

203-2 Insulation

The committee reviewed the guidelines adopted at the 62nd National Conference and received status reports from insulation experts at NBS and received testimony from one manufacturer. The Voluntary Consumer Products Information Labeling Program (CPILP), under development as a pilot program at NBS, has selected insulation as its first product. Since this effort is just beginning, the committee is not recommending any action for the 1978 Conference.

The committee notes that the issue of proper labeling of home insulation is reaching a critical level and feels strongly that affirmative action by NCWM must be taken soon if it is to be of value to consumers. The committee's intention is to consider this issue at the interim meeting in 1979 and have a proposed method of sale regulation for consideration at the 64th National Conference.

(Item 203-2 was adopted)

203-3 Prepackaged Produce

The State of California has raised the issue of a needed method of sale for prepackaged produce. USDA is proposing a marketing order to cover retail packages of carrots. California feels this is a problem in the offing and is looking for guidance. The committee agrees that this is a potential problem and requests all weights and measures jurisdictions to supply any information or opinions, such as current State or local regulations, current enforcement problems, and/or recommended action for consideration at next year's interim meetings.

(Item 203-3 was adopted)

203-4 Mail Order Shipping Charges

At the 62nd National Conference, William Korth of Ventura County, California, raised the question of the accuracy of catalog

package weights for shipping purposes, when the shipping charge is based on the weight of the package. Mr. Korth met with the committee during the interim meeting and presented additional material which indicates that the overcharging due to the quoted weight exceeding the actual weight is still occurring. The committee wishes to commend Mr. Korth for his interest in calling this problem to the attention of the Conference and diligence in following it up with additional data.

At this time the committee is unable to recommend action on this matter. An apparent solution would be to require accurate weights as a basis for shipping charges. The committee, therefore, requests all weights and measures jurisdictions to assist in determining the extent of this problem. The committee also requests the Mail Order Shipping Association and any other groups or private firms engaged in mail order shipping to provide information on the impact of a requirement for accurate weighing of packages being shipped. The committee will consider further action when sufficient information becomes available.

(Item 203-4 was adopted)

204

MODEL STATE PACKAGING AND LABELING REGULATION

The committee received comments on the metric/inch-pound version of the Model State Packaging and Labeling Regulation. This draft has been widely circulated both at and since the last National Conference. Many helpful comments have been received. The final draft, reflecting these comments, is enclosed in this report as appendix A. The Committee wishes to stress that this regulation does not require any changes in any packages or labels. Rather, it allows those persons wishing to go metric and not restrained by other laws or regulations to do so in any orderly way. Further, it provides guidance to those wishing to include metric on labels even though other requirements preclude metric-only labels at this time.

Therefore, the committee recommends for consideration and adoption the final draft of the "Model State Packaging and Labeling Regulation," as printed in appendix A of this report and as amended below, as well as further amended by the consideration of items 204-1 and 204-5, below.

Changes to final draft, Model State Packaging and Labeling Regulation:

- (1) All reference of "customary" system change to "inch-pound" system

Reference: Federal Agency and ANMC Metric Practice Committee recommendations

- (2) Change all metre/litre spellings to meter/liter

Section 6.6.1(b) will be changed to read: "In accord with NBS policy, the meter/liter spellings are used in this document. However, the metre/litre spellings are also acceptable and are preferred by NCWM."

- (3) Delete definition 2.9, Round Metric Size

- (4) Section 6.5(b) and 7.4(b), change 15°C to 60°F to reflect current practice

- (5) Section 6.8.1(d) and 6.8.2(d) change "fluid measure" to read "liquid or dry measure."

- (6) Section 6.10(a) revise to read: A metric statement in a declaration of net quantity of contents of any consumer commodity may contain only decimal fractions.

6.10(d) revise to read: A decimal fraction shall not be carried out to more than two places. Revise 6.8.2(a) to (d) to read "not more than two places."

- (7) Section 6.11.2 change "combination" to "combined." Delete, after provided, the phrase "that it is so positioned with the required statement that it constitutes a dual statement of net quantity and."

- (8) Section 8.2.1, add Provided, that in the case of the symbol for milliliter (mL), the "m" shall meet one-half the minimum height standard.

- (9) Table 1, delete metric (millimeter) equivalents to inch values.

- (10) Section 6.1, add: Except where additional exemption is otherwise provided herein, all metric labeling requirements affected by this 1978 revision shall apply only to labels:
(a) revised after the effective date of this Regulation or
(b) as of July 1, 1980, whichever occurs first.

A motion was made and seconded to amend items (2) and (8) above as follows:

- (2) Section 6.6.1(b) will be changed to read: The metre/litre spellings are preferred by NCWM. However, the meter/liter spellings are acceptable.

- (8) Section 8.2.1, add Provided, that in the case of the symbol for milliliter, the "m" shall meet one-half the minimum height standard.

(This motion to amend passed. Item 204 as amended was adopted.) *

*EDITOR'S NOTE: Since the adjournment of the Conference, the U.S. Metric Board has adopted as its editorial policy the spellings "meter" and "liter" and has called upon other public and private sector groups to adhere to this policy. Accordingly, and with the concurrence of the Executive Committee of the Conference, the "meter" and "liter" spellings will be used in this Model Regulation.

204-1 Sand

The State of Hawaii raised the issue of the sale of sand in permanent wooden bins and sold by price per cubic measure. The committee agrees with Hawaii that the sale of sand in this manner is subject to the Model State Packaging and Labeling Regulation, under the definition of "Consumer Package" (sec. 2.2), and that no further action is needed.

(Item 204-1 was adopted)

204-2 Incense

The State of Oregon raised the issue of proper quantity declarations for the sale of incense. The question is what, if any, information other than count such as weight or volume or length, is necessary for an adequate description on packages of incense. The committee is of the opinion that a statement of count as defined in section 6.3.1(c) of the Model is fully informative and is sufficient in this case.

(Item 204-2 was adopted)

204-3 Aerosols

The committee received a communication from a private consultant in the aerosol field recommending an amendment to the Model State Packaging and Labeling Regulation, section 10.3, to include the option of labeling aerosols by net weight and net volume. The committee feels there is still no viable procedure to measure the volume of aerosols and thus recommends no change to the model.

(Item 204-3 was adopted)

204-4 Packaged Seed

The committee received a request from the Association of Seed Control Officials of the Northeastern States to revise section 10.10 to require the sale of all seed intended for home use by count. The committee noted that both the 59th and 60th National Conferences considered this issue and felt no change was advisable. The committee does not feel that any such change should be considered unless new information is made available to offset this determination.

(Item 204-4 was adopted)

204-5 Corn Meal

The committee received a request from the American Corn Millers Federation to amend the Model State Packaging and Labeling Regulation, section 11.20, to clarify the intent to include corn meal as well as corn flour, as it now reads, in the exemption from the requirement for location of the net weight labeling statement. The committee agrees that this is the intent of section 11.20, and recommends that this be revised as follows:

11.20. Corn Flour and Corn Meal—Corn Flour and corn meal packaged in conventional 5-, 10-, 25-, 50-, and 100-pound bags shall be exempt from the requirement in this regulation for location (see subsec. 8.1.1.) of the net quality declaration. [Amended 1978]

(Item 204-5 was adopted)

205

OTHER ITEMS

205-1 Ice Glazed Seafood

The committee joined with the Liaison Committee to hear a presentation by the National Maritime Fisheries Service (NMFS) of the U.S. Department of Commerce concerning the improper determination of the amount of glaze (i.e. ice coating) applied to some seafood products when determining their net weight. This results in actual net weight which is less than the declared net weight. The committee agrees that this is a serious problem and encourages the Liaison Committee to work with the NMFS to develop a recommendation for consideration by the Laws and Regulations Committee.

(Item 205-1 was adopted)

205-2 Temperature Compensation—Vehicle Tank Meters

At the joint session during the interim meeting, the Specifications and Tolerances Committee indicated that they were considering amending Handbook 44 to allow for temperature compensation for vehicle tank meters. The Laws and Regulations Committee will need to consider appropriate additions to the Model State Method of Sale of Commodities Regulation to provide for the sale of petroleum products at retail in this manner.

At this Conference, the American Petroleum Institute requested that the Specifications and Tolerances Committee delay consideration of this matter to allow time to hold a joint NBS-NCWM-API symposium on this subject in the spring of 1979. The Laws and Regulations Committee supports the need for such a symposium and will delay the development of additions to the Model State Method of Sale of Commodities Regulation until such time as the Specifications and Tolerances Committee is ready to proceed on this issue.

(Item 205-2 was adopted)

205-3 Typing Paper

The State of Virginia raised the issue of short measure typing paper. This seems to be an enforcement problem, with no information available to suggest that an exemption should be provided to regular enforcement practice.

(Item 205-3 was adopted)

205-4 Guidelines

The committee heard plans by the Office of Weights and Measures to issue guidelines, such as the guideline for insulation approved by the 62nd National Conference. It is anticipated that these would be issued in loose leaf form, one guideline per page, and could become part of an enforcement notebook that would also include interpretations, policy statements, and copies of the model law and model regulations. The committee endorses this proposal and encourages the OWM staff to proceed to implement this as rapidly as possible.

(Item 205-4 was adopted)

205-5 Model Weights and Measures Ordinance

The committee notes and approves of Office of Weights and Measures plans not to reprint the Model Weights and Measures Ordinance.

nance every year. Instead, copies of the individual model regulations will be supplied as they are revised. The Ordinance will be revised only when a significant change occurs in a model regulation or to the text of the Ordinance itself.

(Item 205-5 was adopted)

J. T. BENNETT, *Chairman*, Connecticut
S. F. HINDSMAN, Arkansas
D. I. OFFNER, St. Louis, Missouri
R. W. PROBST, Wisconsin
C. H. VINCENT, Dallas, Texas
J. V. ODOM, *Staff Assistant*, NBS
H. F. WOLLIN, *Exec. Secy.*, NBS

Committee on Laws and Regulations

(On motion of the committee chairman, the report of the Committee on Laws and Regulations voting key items 200 through 205-5 was adopted in its entirety and as amended by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totalized in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on Laws and Regulations*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
200	37	0	68	0
201	38	0	67	0
202	35	0	71	0
203-1	35	1	59	16
203-1A	23	16	16	61
203-2	41	0	74	1
203-3				
203-4	43	0	72	0
204	40	1	62	2
204-A	35	4	60	6
204-1	42	0	66	0
204-2				
204-3				
204-4	41	0	63	0
204-5	40	0	67	0
205				
205-1				
205-2	40	0	68	0
205-3	38	0	70	0
205-4				
205-5	38	1	70	0



FINAL DRAFT

APPENDIX A



MODEL STATE

Packaging & Labeling

REGULATION

1978

U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards

**as adopted by
the National Conference
on
Weights and Measures**



FOREWORD

The Model State Packaging and Labeling Regulation was first adopted during the 37th National Conference on Weights and Measures in 1952. Reporting to the Conference, the Committee on Legislation stated:

The National Conference should adopt a model package regulation for the guidance of those States authorized to adopt such a regulation under provisions of their weights and measures laws. Since so much of the work of weights and measures officials in the package field concerns food products, the importance of uniformity between the Federal Food and Drug Administration's regulations and any model regulations to be adopted by this Conference cannot be over-emphasized.

Since its inception, the Model Packaging Regulation has been continually revised to meet the complexities of an enormous expansion in the packaging industry--an expansion which, in late 1966, brought about the passage of the Fair Packaging and Labeling Act. Recognizing the need for compatibility with the Federal Act, the Committee on Laws and Regulations of the 53rd National Conference in 1968 amended the Model Packaging and Labeling Regulation to parallel regulations adopted by Federal agencies under FPLA. The process of amending and revising this Regulation is a continuing one, in order to keep it current with practices in the packaging field and make it compatible with appropriate Federal Regulations.

This current revision is intended to provide guidance for the use of metric units on labels as well as allow metric only labels for those commodities not covered by Federal laws or regulations. Nothing contained in this regulation should be construed to supersede any labeling requirement specified in Federal law or requiring the use of metric except as specifically indicated.

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

**MODEL STATE PACKAGING AND LABELING REGULATION
1978
(METRIC AND INCH-POUND UNITS)**

as adopted* by

The National Conference on Weights and Measures

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

*In accord with NBS policy, the meter/liter spellings are used in this document. However, the metre/litre spellings are acceptable, and are preferred by the NCWM.



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MODEL STATE PACKAGING AND LABELING REGULATION

1978

SECTION 1. APPLICATION. -- This regulation shall apply to packages and to commodities in package form, but shall not apply to:

- (a) inner wrappings not intended to be individually sold to the customer,
- (b) shipping containers or wrapping used solely for the transportation of any commodities in bulk or in quantity to manufacturers, packers, or processors, or to wholesale or retail distributors, but in no event shall this exclusion apply to packages of consumer or nonconsumer commodities, as defined herein,
- (c) auxiliary containers or outer wrappings used to deliver packages of such commodities to retail customers if such containers or wrappings bear no printed matter pertaining to any particular commodity,
- (d) containers used for retail tray pack displays when the container itself is not intended to be sold (e.g., the tray that is used to display individual envelopes of seasonings, gravies, etc., and the tray itself is not intended to be sold), or
- (e) open carriers and transparent wrappers or carriers for containers when the wrappers or carriers do not bear any written, printed, or graphic matter obscuring the label information required by this regulation.

SECTION 2. DEFINITIONS. --

2.1. Commodity in Package Form. -- The term "commodity in package form" shall be construed to mean a commodity put up or packaged in any manner in advance of sale in units suitable for either wholesale or retail sale. An individual item or lot of any commodity not in package form as defined in this section, but on which there is marked a selling price based on an established price per unit of weight or of measure, shall be construed to be a commodity in package form. Where the term "package" is used in this regulation, it shall be construed to mean "commodity in package form" as herein defined.

2.2. Consumer Package: Package of Consumer Commodity. -- A "consumer package" or "package of consumer commodity" shall be construed to mean a commodity in package form that is customarily produced or distributed for sale through retail sales agencies or instrumentalities for consumption by individuals or use by individuals for the purposes of personal care or in the performance of services ordinarily rendered in or about the household or in connection with personal possessions.

2.3. Nonconsumer Package: Package of Nonconsumer Commodity. -- A "nonconsumer package" or "package of nonconsumer commodity" shall be construed to mean any commodity in package form other than a consumer package, and particularly a package intended solely for industrial or institutional use or for wholesale distribution.

2.4. Random Package. -- The term "random package" shall be construed to mean a package that is one of a lot, shipment, or delivery of packages of the same consumer commodity with varying weights; that is, packages of the same consumer commodity with no fixed pattern of weight.

2.5. Label. -- The term "label" shall be construed to mean any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon or adjacent to a consumer commodity or a package containing any consumer commodity, for purposes of branding, identifying, or giving any information with respect to the commodity or to the contents of the package, except that an inspector's tag or other nonpromotional matter affixed to or appearing upon a consumer commodity shall not be deemed to be a label requiring the repetition of label information required by this regulation.

2.6. Person. -- The term "person" shall be construed to mean both singular and plural, and shall include any individual, partnership, company, corporation, association, and society.

2.7. Principal Display Panel or Panels. -- The term "principal display panel or panels" shall be construed to mean that part, or those parts, of a label that is, or are, so designed as to most likely be displayed, presented, shown, or examined under normal and customary conditions of display and purchase. Wherever a principal display panel appears more than once on a package, all requirements pertaining to the "principal display panel" shall pertain to all such "principal display panels."

2.8. Multi-Unit Package. -- The term "multi-unit package" shall be construed to mean a package containing two or more individual packages of the same commodity, in the same quantity, with the

individual packages intended to be sold as part of the multi-unit package but capable of being individually sold in full compliance with all requirements of this regulation.

SECTION 3. DECLARATION OF IDENTITY: CONSUMER PACKAGE. --

3.1. Declaration of Identity: Consumer Package. -- A declaration of identity on a consumer package shall appear on the principal display panel, and shall positively identify the commodity in the package by its common or usual name, description, generic term, or the like.

3.1.1. Parallel Identity Declaration: Consumer Package. -- A declaration of identity on a consumer package shall appear generally parallel to the base on which the package rests as it is designed to be displayed.

SECTION 4. DECLARATION OF IDENTITY: NONCONSUMER PACKAGE. -- A declaration of identity on a nonconsumer package shall appear on the outside of a package and shall positively identify the commodity in the package by its common or usual name, description, generic term, or the like.

SECTION 5. DECLARATION OF RESPONSIBILITY: CONSUMER AND NONCONSUMER PACKAGES. -- Any package kept, offered, or exposed for sale, or sold, at any place other than on the premises where packed shall specify conspicuously on the label of the package the name and address of the manufacturer, packer, or distributor. The name shall be the actual corporate name, or, when not incorporated, the name under which the business is conducted. The address shall include street address, city, state, and ZIP Code; however, the street address may be omitted if this is shown in a current city directory or telephone directory.

If a person manufactures, packs, or distributes a commodity at a place other than his principal place of business, the label may state the principal place of business in lieu of the actual place where the commodity was manufactured or packed or is to be distributed, unless such statement would be misleading. Where the commodity is not manufactured by the person whose name appears on the label, the name shall be qualified by a phrase that reveals the connection such person has with such commodity, such as "Manufactured for and packed by _____," "Distributed by _____," or any other wording of similar import that expresses the facts.

SECTION 6. DECLARATION OF QUANTITY: CONSUMER PACKAGES. --

6.1. General. -- The metric and inch-pound systems of weights and measures are recognized as proper systems to be used in the declaration of quantity. Units of both systems may be presented in a dual declaration of quantity. Except where additional exemption is

otherwise provided herein, all metric labeling requirements affected by this 1978 revision shall apply only to labels: (a) revised after the effective date of this regulation or (b) as of July 1, 1980, whichever occurs first.

6.2. Largest Whole Unit. -- Where this regulation requires that the quantity declaration be in terms of the largest whole unit, the declaration shall, with respect to a particular package, be in terms of the largest whole unit of weight or measure, with any remainder expressed (following the requirements of Section 6.10. Fractions):

(a) Inch-Pound Units

- (1) in common or decimal fractions of such largest whole unit, or in
- (2) the next smaller whole unit, or units, with any further remainder in terms of common or decimal fractions of the smallest unit present in the quantity declaration

(b) Metric Units, in decimal fractions of such largest whole unit.

6.3. Net Quantity. -- A declaration of net quantity of the commodity in the package, exclusive of wrappers and any other material packed with such commodity, shall appear on the principal display panel of a consumer package and, unless otherwise specified in this regulation (see subsections 6.7. through 6.8.3.), shall be in terms of the largest whole unit.

6.3.1. Use of "Net Weight." -- The term "net weight" shall be used in conjunction with the declaration of quantity in units of weight. The term may either precede or follow the declaration of weight.

6.3.2. Lines of Print or Type. -- A declaration of quantity may appear on one or more lines of print or type.

6.4. Terms: Weight, Liquid Measure, Dry Measure, or Count. -- The declaration of the quantity of a particular commodity shall be expressed in terms of liquid measure if the commodity is liquid, or dry measure if the commodity is dry, or in terms of weight if the commodity is solid, semisolid, viscous, or a mixture of solid and liquid, or in terms of numerical count. However, if there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such declaration of quantity may be expressed in its traditional terms, if such traditional declaration gives accurate and adequate information as to the quantity of the commodity.

6.4.1. Combination Declaration. --

- (a) A declaration of quantity in terms of weight shall be combined with appropriate declarations of the measure, count, and size of the individual units unless a declaration of weight alone is fully informative.
- (b) A declaration of quantity in terms of measure shall be combined with appropriate declarations of the weight, count, and size of the individual units unless a declaration of measure alone is fully informative.
- (c) A declaration of quantity in terms of count shall be combined with appropriate declarations of the weight, measure, and size of the individual units unless a declaration of count alone is fully informative.

6.5. Inch-Pound System: Weight, Measure. -- A declaration of quantity:

- (a) in units of weight, shall be in terms of the avoirdupois pound or ounce;
- (b) in units of liquid measure, shall be in terms of the United States gallon of 231 cubic inches or liquid-quart, liquid-pint, or fluid-ounce subdivisions of the gallon, and shall express the volume at 68 °F except in the case of petroleum products for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 40 °F;
- (c) in units of linear measure, shall be in terms of the yard, foot, or inch;
- (d) in units of area measure, shall be in terms of the square yard, square foot, or square inch;
- (e) in units of volume measure, shall be in terms of the cubic yard, cubic foot, or cubic inch;
- (f) in units of dry measure, shall be in terms of the United States bushel of 2150.42 cubic inches, or peck, dry-quart, and dry-pint subdivisions of the bushel.

6.5.1. Symbols and Abbreviations. -- Any of the following symbols and abbreviations, and none other, shall be employed in the quantity statement on a package of commodity:

avoirdupois	avdp	ounce	oz
cubic	cu	pint	pt
feet or foot	ft	pound	lb
fluid	fl	quart	qt
gallon	gal	square	sq
inch	in	weight	wt
liquid	liq	yard	yd

(There normally are no periods following, nor plural forms of, symbols. For example, "oz" is the symbol for both "ounce" and "ounces." Both upper and lower case letters are acceptable.)

6.5.2. Units with Two or More Meanings. -- When the term "ounce" is employed in a declaration of liquid quantity, the declaration shall identify the particular meaning of the term by the use of the term "fluid"; however, such distinction may be omitted when, by association of terms (for example, as in "1 pint 4 ounces"), the proper meaning is obvious. Whenever the declaration of quantity is in terms of the dry pint or dry quart, the declaration shall include the word "dry."

6.6. Metric Units: Weight, Measure. -- A declaration of quantity:

- (a) in units of weight shall be in terms of the kilogram, gram, or milligram.
- (b) in units of liquid measure shall be in terms of the liter¹ or milliliter, and shall express the volume at 20 °C, except in the case of petroleum products, for which the declaration shall express the volume at 15 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 4 °C;
- (c) in units of linear measure shall be in terms of the meter¹, centimeter, or millimeter.

¹In accord with NBS policy, the meter/liter spellings are used in this document. However, the metre/litre spellings are also acceptable and are preferred by the NCWM.

- (d) in units of area measure, shall be in terms of the square meter or square centimeter.
- (e) in units of volume other than liquid measure, shall be in terms of the liter and milliliter, except that the terms cubic meter and cubic centimeter will be used only when specifically designated as a method of sale.

6.6.1. Symbols. -- Any of the following symbols for metric units, and none other, may be employed in the quantity statement on a package of commodity:

kilogram	kg	meter	m	cubic meter	m ³
gram	g	centimeter	cm	cubic centimeter	cm ³
milligram	mg	millimeter	mm		
liter	L	square meter	m ²		
milliliter	mL	square centimeter	cm ²		

- (a) Symbols, except for liter, are not capitalized unless the unit is derived from a proper name. Periods should not be used after the symbol. Symbols are always written in the singular form--do not add "s" to express the plural when the symbol is used.
- (b) The "l" symbol for liter and "ml" symbol for milliliter are allowed for exports and for label stock in existence at the time of the adoption of this requirement.

6.7. Prescribed Units, Inch-Pound System. --

6.7.1. Less than 1 Foot, 1 Square Foot, 1 Pound, or 1 Pint. -- The declaration of quantity shall be expressed in terms of

- (a) in the case of length measure of less than 1 foot, inches and fractions of inches;
- (b) in the case of area measure of less than 1 square foot, square inches and fractions of square inches;
- (c) in the case of weight of less than 1 pound, ounces and fractions of ounces;
- (d) in the case of liquid measure of less than 1 pint, fluid ounces and fractions of fluid ounces;

Provided, that the quantity declaration appearing on a random package may be expressed in terms of decimal fractions of the largest appropriate unit, the fraction being carried out to not more than two decimal places.

6.7.2. Weight: Dual Quantity Declaration. -- On packages containing 1 pound or more but less than 4 pounds, the declaration shall be expressed in ounces and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit: Provided, that the quantity declaration appearing on a random package may be expressed in terms of pounds and decimal fractions of the pound carried out to not more than two decimal places.

6.7.3. Liquid Measure: Dual Quantity Declaration. -- On packages containing 1 pint or more, but less than 1 gallon, the declaration shall be expressed in fluid ounces and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.7.4. Length Measure: Dual Quantity Declaration. -- On packages containing 1 foot or more, but less than 4 feet, the declaration shall be expressed in inches and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.7.5. Area Measure: Dual Quantity Declaration. -- On packages containing 1 square foot or more but less than 4 square feet, the declaration shall be expressed in square inches and, in addition, shall be followed by a declaration in parentheses, expressed in terms of the largest whole unit.

6.7.6. Four Feet, 4 Square Feet, 4 Pounds, 1 Gallon, or More. -- In the case of

(a) length measure of 4 feet or more

the declaration of quantity shall be expressed in terms of feet, followed in parentheses by a declaration of yards and common or decimal fractions of the yard, or in terms of feet followed in parentheses by a declaration of yards with any remainder in terms of feet and inches. In the case of

(b) area measure of 4 square feet or more;

(c) weight of 4 pounds or more;

(d) liquid measure of 1 gallon or more

the declaration of quantity shall be expressed in terms of the largest whole unit.

6.7.7. Bidimensional Commodities. -- For bidimensional commodities (including roll-type commodities) the quantity declaration shall be expressed,

- (a) if less than 1 square foot, in terms of linear inches and fractions of linear inches;
- (b) if at least 1 square foot but less than 4 square feet, in terms of square inches followed in parentheses by a declaration of both the length and width, each being in terms of the largest whole unit: Provided, that
 - (1) no square inch declaration is required for a bi-dimensional commodity of 4 inches width or less,
 - (2) a dimension of less than 2 feet may be stated in inches within the parenthetical declaration, and
 - (3) commodities consisting of usable individual units (except roll-type commodities with individual usable units created by perforations, for which see subsection 6.9. Count: Ply.) require a declaration of unit area but not a declaration of total area of all such units;
- (c) if 4 square feet or more, in terms of square feet followed in parentheses by a declaration of the length and width in terms of the largest whole unit: Provided, that
 - (1) no declaration in square feet is required for a bi-dimensional commodity with a width of 4 inches or less,
 - (2) bidimensional commodities, with a width of 4 inches or less, shall have the length expressed in inches followed by a statement in parentheses of the length in the largest whole unit. [Example: 2 inches by 360 inches (10 yards).]
 - (3) a dimension of less than 2 feet may be stated in inches within the parenthetical declaration, and
- (d) no declaration in square units is required for commodities for which the length and width measurements are critical in terms of end use (such as tablecloths or bedsheets) if such commodities clearly present the length and width measurements on the label.

6.8. Prescribed Units, Metric System. --

6.8.1. Less than 1 Meter, 1 Square Meter, 1 Kilogram, or 1 Liter. -- The declaration of quantity shall be expressed in terms of:

- (a) in the case of length measure of less than 1 meter in millimeters;

- (b) in the case of area measure of less than 1 square meter, square centimeters and decimal fractions of square centimeters;
- (c) in the case of weight of less than 1 kilogram, grams and decimal fractions of a gram, but if less than 1 gram, then in milligrams;
- (d) in the case of liquid or dry measure of less than one liter, milliliters.

Provided, that the quantity declaration appearing on a random package may be expressed in terms of decimal fractions of the largest appropriate unit, the fraction being carried out to not more than two decimal places.

6.8.2. One Meter, 1 Square Meter, 1 Liter or More. -- In the case of:

- (a) length measure of 1 meter or more; in meters and decimal fractions to not more than two places.
- (b) area measure of 1 square meter or more; in square meters and decimal fractions to not more than two places.
- (c) weight of 1 kilogram or more; in kilograms and decimal fractions to not more than two places.
- (d) liquid or dry measure of 1 liter or more; in liters and decimal fractions to not more than two places.

6.8.3. Bidimensional Commodities. -- For bidimensional commodities (including roll-type commodities) the quantity declaration shall be expressed:

- (a) if less than 1 square meter in terms of length and width.
- (b) if 1 square meter or more, in terms of square measure followed in parentheses by a declaration of length and width: Provided, that
 - (1) quantity declarations on bidimensional commodities with a width of 100 millimeters or less may be expressed in terms of width and length, only.
 - (2) commodities consisting of usable individual units (except roll-type commodities with individual usable units created by perforations, for which see subsection 6.9. Count: Ply.) require a declaration of unit area but not a declaration of total area of all such units.

- (3) no declaration in square units is required for commodities for which the length and width measurements are critical in terms of end use (such as tablecloths or bedsheets) if such commodities clearly present the length and width measurements on the label.

6.9. Count: Ply. -- If the commodity is in individually usable units of one or more components or ply, the quantity declaration shall, in addition to complying with other applicable quantity declaration requirements of this regulation, include the number of ply and total number of usable units.

Roll-type commodities, when perforated so as to identify individual usable units, shall not be deemed to be made up of usable units; however, such roll-type commodities shall be labeled in terms of

- (a) total area measurement,
- (b) number of ply,
- (c) count of usable units, and
- (d) dimensions of a single usable unit.

6.10. Fractions. --

- (a) Metric: A metric statement in a declaration of net quantity of contents of any consumer commodity may contain only decimal fractions.
- (b) Inch-Pound: An inch-pound statement of net quantity of contents of any consumer commodity may contain common or decimal fractions. A common fraction shall be in terms of halves, quarters, eighths, sixteenths, or thirty-seconds, except that
 - (1) if there exists a firmly established general consumer usage and trade custom of employing different common fractions in the net quantity declaration of a particular commodity, they may be employed, and
 - (2) if linear measurements are required in terms of yards or feet, common fractions may be in terms of thirds.
- (c) Common fractions: A common fraction shall be reduced to its lowest term (Example: $2/4$ becomes $1/2$).

- (d) Decimal fractions: A decimal fraction shall not be carried out to more than two places.

6.11. Supplementary Declarations. --

6.11.1. Supplementary Quantity Declarations. -- The required quantity declaration may be supplemented by one or more declarations of weight, measure, or count, such declaration appearing other than on a principal display panel. Such supplemental statement of quantity of contents shall not include any term qualifying a unit of weight, measure, or count that tends to exaggerate the amount of commodity contained in the package (e.g., "giant" quart, "larger" liter, "full" gallon, "when packed," "minimum," or words of similar import).

6.11.2. Combined Metric and Inch-Pound Declarations. -- An equivalent statement of the net quantity of contents in terms of either the inch-pound or metric system is not regarded as a supplemental statement and such statement may also appear on the principal display panel; Provided, that it conforms to both Section 6.5. and Section 6.6.

6.11.3. Rounding. -- In all conversions for the purpose of showing an equivalent metric or inch-pound quantity to a rounded customary or metric quantity, the number of significant digits retained should be such that accuracy is neither sacrificed nor exaggerated. As a general rule, converted values should be rounded down by dropping any digit beyond the first three. (Example: 196.4 g becomes 196 g or 1.759 ft become 1.75 ft.)

6.12. Qualification of Declaration Prohibited. -- In no case shall any declaration of quantity be qualified by the addition of the words "when packed," "minimum," or "not less than," or any words of similar import, nor shall any unit of weight, measure, or count be qualified by any term (such as "jumbo," "giant," "full," or the like) that tends to exaggerate the amount of commodity.

SECTION 7. DECLARATION OF QUANTITY: NONCONSUMER PACKAGES. --

7.1. General. -- The metric and inch-pound systems of weights and measures are recognized as proper systems to be used in the declaration of quantity. Units of both systems might be combined in a dual declaration of quantity.²

²Reminder: Although nonconsumer packages under this regulation might bear only metric declarations, this should not be construed to supersede any labeling requirement specified in Federal law.

7.2. Location. -- A nonconsumer package shall bear on the outside a declaration of the net quantity of contents. Such declaration shall be in terms of the largest whole unit (see subsection 6.2. Largest Whole Unit).

7.3. Terms: Weight, Liquid Measure, Dry Measure, or Count. -- The declaration of the quantity of a particular commodity shall be expressed in terms of liquid measure if the commodity is liquid, or in terms of dry measure if the commodity is dry, or in terms of weight if the commodity is solid, semisolid, viscous, or a mixture of solid and liquid, or in terms of numerical count. However, if there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such declaration of quantity may be expressed in its traditional terms, if such traditional declaration gives accurate and adequate information as to the quantity of the commodity.

7.4. Inch-Pound Units: Weight, Measure. -- A declaration of quantity:

- (a) in units of weight, shall be in terms of the avoirdupois pound or ounce;
- (b) in units of liquid measure, shall be in terms of the United States gallon of 231 cubic inches or liquid-quart, liquid-pint, or fluid-ounce subdivisions of the gallon, and shall express the volume at 68 °F except in the case of petroleum products, for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 40 °F;
- (c) in units of linear measure, shall be in terms of the yard, foot, or inch;
- (d) in units of area measure, shall be in terms of the square yard, square foot, or square inch;
- (e) in units of volume measure, shall be in terms of the cubic yard, cubic foot, or cubic inch;
- (f) in units of dry measure, shall be in terms of the United States bushel of 2150.42 cubic inches, or peck, dry-quart and dry-pint subdivisions of the bushel.

7.4.1. Symbols and Abbreviations. -- Any generally accepted symbol and abbreviation of a unit name may be employed in the quantity statement on a package of commodity. (For commonly accepted symbols and abbreviations, see subsection 6.5.1. Symbols and Abbreviations.)

7.5. Metric Units: Weight, Measure. -- A declaration of quantity:

- (a) in units of weight, shall be in terms of the kilogram, gram, or milligram;
- (b) in units of liquid measure, shall be in terms of the liter or milliliter, and shall express the volume at 20 °C, except in the case of petroleum products, for which the declaration shall express the volume at 15 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 4 °C;
- (c) in units of linear measure, shall be in terms of the meter, centimeter, or millimeter;
- (d) in units of area measure, shall be in terms of the square meter or square centimeter;
- (e) in units of volume other than liquid measure, shall be in terms of the liter and milliliter, except that the terms cubic meter and cubic centimeter will be used only when specifically designated as a method of sale.

7.5.1. Symbols. -- Only those symbols as detailed in subsection 6.6.1. Symbols., and none other, may be employed in the quantity statement on a package of commodity.

7.6. Character of Declaration: Average. -- The average quantity of contents in the package of a particular lot, shipment, or delivery shall at least equal the declared quantity, and no unreasonable shortage in any package shall be permitted, even though overages in other packages in the same shipment, delivery, or lot compensate for such shortage.

SECTION 8. PROMINENCE AND PLACEMENT: CONSUMER PACKAGES. --

8.1. General. -- All information required to appear on a consumer package shall appear thereon in the English language and shall be prominent, definite, and plain, and shall be conspicuous as to size and style of letters and numbers and as to color of letters and

numbers in contrast to color of background. Any required information that is either in hand lettering or hand script shall be entirely clear and equal to printing in legibility.

8.1.1. Location. -- The declaration or declarations of quantity of the contents of a package shall appear in the bottom 30 percent of the principal display panel or panels. For cylindrical containers, see also subsection 10.7. for additional requirements.

8.1.2. Style of Type or Lettering. -- The declaration or declarations of quantity shall be in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphic material on the package, except that a declaration of net quantity blown, formed, or molded on a glass or plastic surface is permissible when all label information is blown, formed, or molded on the surface.

8.1.3. Color Contrast. -- The declaration or declarations of quantity shall be in a color that contrasts conspicuously with its background, except that a declaration of net quantity blown, formed, or molded on a glass or plastic surface shall not be required to be presented in a contrasting color if no required label information is on the surface in a contrasting color.

8.1.4. Free Area. -- The area surrounding the quantity declaration shall be free of printed information

- (a) above and below, by a space equal to at least the height of the lettering in the declaration, and
- (b) to the left and right, by a space equal to twice the width of the letter "N" of the style and size of type used in the declaration.

8.1.5. Parallel Quantity Declaration. -- The quantity declaration shall be presented in such a manner as to be generally parallel to the declaration of identity and to the base on which the package rests as it is designed to be displayed.

8.2. Calculation of Area of Principal Display Panel for Purposes of Type Size. -- The area of the principal display panel shall be

- (a) in the case of a rectangular container, one entire side which properly can be considered to be the principal display panel, the product of the height times the width of that side;
- (b) in the case of a cylindrical or nearly cylindrical container, 40 percent of the product of the height of the container times the circumference; or

- (c) in the case of any other shaped container, 40 percent of the total surface of the container, unless such container presents an obvious principal display panel (e.g., the top of a triangular or circular package of cheese, or the top of a can of shoe polish), in which event the area shall consist of the entire such surface.

Determination of the principal display panel shall exclude tops, bottoms, flanges at tops and bottoms of cans, and shoulders and necks of bottles or jars.

8.2.1. Minimum Height of Numbers and Letters. -- The height of any letter or number in the required quantity declaration shall be not less than that shown in Table 1 with respect to the area of the panel, and the height of each number of a common fraction shall meet one-half the minimum height standards; Provided, that in the case of the symbol for milliliter, the "m" shall meet one-half the minimum height standard.

8.2.2. Numbers and Letters: Proportion. -- No number or letter shall be more than three times as high as it is wide.

TABLE 1. Minimum Height of Numbers and Letters

Area of principal display panel	Minimum height of numbers and letters	Minimum height: label information blown, formed, or molded on surface of container
5 square inches (in ²) and less	1/16 inch	1/8 inch
Greater than 5 in ² and not greater than 25 in ²	1/8 inch	3/16 inch
Greater than 25 in ² and not greater than 100 in ²	3/16 inch	1/4 inch
Greater than 100 in ² and not greater than 400 in ²	1/4 inch	5/16 inch
Greater than 400 in ²	1/2	9/16 inch

SECTION 9. PROMINENCE AND PLACEMENT: NONCONSUMER PACKAGES. --

9.1. General -- All information required to appear on a nonconsumer package shall be definitely and clearly stated thereon in the English language. Any required information that is either in hand lettering or hand script shall be entirely clear and equal to printing in legibility.

SECTION 10. REQUIREMENTS: SPECIFIC CONSUMER COMMODITIES, PACKAGES, CONTAINERS. --

10.1. Display Card Package. -- For an individual package affixed to a display card, or for a commodity and display card together comprising a package, the type size of the quantity declaration is governed by the dimensions of the display card.

10.2. Eggs. -- When cartons containing 12 eggs have been designed so as to permit division in half by the retail purchaser, the required quantity declaration shall be so positioned as to have its context destroyed when the carton is divided.

10.3. Aerosols and Similar Pressurized Containers. -- The declaration of quantity on an aerosol package, and on a similar pressurized package, shall disclose the net quantity of the commodity (including propellant), in terms of weight, that will be expelled when the instructions for use as shown on the container are followed.

10.4. Multi-Unit Packages. -- Any package containing more than one individual "commodity in package form" (see subsection 2.1.) of the same commodity shall bear on the outside of the package a declaration of

- (a) the number of individual units,
- (b) the quantity of each individual unit, and
- (c) the total quantity of the contents of the multi-unit package: Provided, that any such declaration of total quantity shall not be required to include the parenthetical quantity statement of a dual quantity representation. (Example: soap bars, "6 Bars, Net Weight 75 g each; Total Net Weight 450 g")

10.5. Combination Packages. -- Any package containing individual units of dissimilar commodities (such as an antiquing or a housecleaning kit, for example) shall bear on the label of the package a quantity declaration for each unit. (Example: sponges and cleaner: "2 sponges, each 10 cm x 15 cm x 2 cm; 1 box cleaner, net weight 150 g.")

10.6. Variety Packages. -- Any package containing individual units of reasonably similar commodities (such as, for example, seasonal gift packages, variety packages of cereal) shall bear on the label of the package a declaration of the total quantity of commodity in the package. (Example: plastic tableware: 4 spoons, 4 forks, 4 knives, 12 pieces total.)

10.7. Cylindrical Containers. -- In the case of cylindrical or nearly cylindrical containers, information required to appear on the principal display panel shall appear within that 40 percent of the circumference which is most likely to be displayed, presented, shown, or examined under customary conditions of display for retail sale.

10.8. Measurement of Container-Type Commodities, How Expressed. --

10.8.1. General. -- Commodities designated and sold at retail to be used as containers for other materials or objects, such as bags, cups, boxes, and pans, shall be labeled with the declaration of net quantity as follows:

- (a) For bag-type commodities, in terms of count followed by linear dimensions of the bag (whether packaged in a perforated roll or otherwise).

When the unit bag is characterized by two dimensions because of the absence of a gusset, the width and length will be expressed:

- (1) Inch-Pound units - in inches, except that a dimension of 2 feet or more will be expressed in feet with any remainder in terms of inches or common or decimal fractions of the foot. (Example: "25 BAGS, 17 IN X 20 IN" or "100 BAGS, 20 IN X 2 FT 6 IN" or "50 BAGS, 20 IN X 2-1/2 FT")
- (2) Metric units - in millimeters except a dimension of one meter or more will be expressed in meters with the remainder in terms of decimal fractions of the meter (Examples: "25 BAGS, 500 mm X 600 mm" or "50 BAGS, 750 mm X 1.2 m")

When the unit bag is gusseted, the dimensions will be expressed as width, depth, and length.

- (1) Inch-pound units - expressed in feet with any remainder in terms of inches or the common or decimal fractions of the foot. (Examples: "25 BAGS, 17 IN X 4 IN X 20 IN" or "100 BAGS, 20 IN X 12 IN X 2-1/2 FT")

- (2) Metric units - in millimeters except a dimension of one meter or more will be expressed in meters with the remainder in terms of decimal fractions of the meter. (Examples: "25 BAGS, 430 mm X 100 mm X 500 mm" or "50 BAGS, 500 mm X 300 mm X 1.2 m")
- (b) For other square, oblong, rectangular, or similarly shaped containers, in terms of count followed by length, width, and depth, except depth need not be listed when less than 50 millimeters or 2 inches. (Examples: "2 PANS, 8 IN X 8 IN" or "2 PANS, 203 mm X 203 mm")
- (c) For circular or other generally round-shaped containers, except cups, and the like, in terms of count followed by diameter and depth, except depth need not be listed when less than 50 millimeters or two inches. (Examples: "4 PANS, 8-IN DIAMETER X 4 IN" or "4 PANS, 200-mm DIAMETER X 100 mm")
- (d) Notwithstanding the above requirements, the net quantity statement for containers such as cups will be listed in terms of count and liquid capacity per unit. (Examples: "24 CUPS, 6-FL OZ CAPACITY" or "24 CUPS 250-mL CAPACITY")

10.8.2. Capacity. -- When the functional use of the container is related by label references in standard terms of measure to the capability of holding a specific quantity of substance or class of substances such references shall be a part of the net quantity statement and shall specify capacity as follows:

(a) Inch-Pound Units:

- (1) Liquid measure for containers which are intended to be used for liquids, semisolids, viscous materials, or mixtures of solids and liquids. The expressed capacity will be stated in terms of the largest whole unit (gallon, quart, pint, ounce, with any remainder in terms of the common decimal fraction of that unit.) (Examples: Freezer Boxes - "4 BOXES, 1-QT CAPACITY, 5 IN X 4 IN X 3 IN")
- (2) Dry measure for containers which are intended to be used for solids. The expressed capacity will be stated in terms of the largest whole unit (bushel, peck), with any remainder in terms of the common or decimal fraction of that unit. (Example: Leaf Bags - "8 BAGS, 6-BUSHEL CAPACITY, 3 FT X 5 FT")
- (3) Where containers are used as liners for other more permanent containers, in the same terms as are

normally used to express the capacity of the more permanent containers. (Example: Garbage Can Liners - "10 LINERS, 2 FT 6 IN X 3 FT 9 IN. FITS UP TO 30-GALLON CANS")

- (b) Metric units: Volume measure for all containers and liners. (Examples: "4 BOXES, 1-L CAPACITY. 150 mm X 120 mm X 90 mm;" "8 BAGS, 200-L CAPACITY, 850 mm X 1.5 m" or "10 LINERS, 750 mm X 1 m, FITS UP TO 120-L CANS")

10.8.3. Terms. -- For purposes of this section, the use of the terms "CAPACITY," "DIAMETER," and "FLUID" is optional.

10.9. Textile Products, Threads, and Yarns. --

10.9.1. Wearing Apparel. -- Wearing apparel (including non-textile apparel and accessories such as leather goods and footwear) sold as single-unit items, or if normally sold in pairs (such as hosiery, gloves, and shoes) sold as single-unit pairs, shall be exempt from the requirements for a net quantity statement by count, as required by subsection 6.4. of this regulation.

10.9.2. Textiles. -- Bedsheets, blankets, pillowcases, comforters, quilts, bedspreads, mattress covers and pads, afghans, throws, dresser and other furniture scarfs, tablecloths and napkins, flags, curtains, drapes, dishtowels, dish cloths, towels, face cloths, utility cloths, bath mats, carpets and rugs, pot holders, fixture and appliance covers, non-rectangular diapers, slip covers, etc., shall be exempt from the requirements of subsections 6.7.7. and 6.8.3. of this regulation: Provided, that

- (a) The quantity statement for fitted sheets and mattress covers shall state, in centimeters or inches, the length and width of the mattress for which the item is designed, such as "twin," "double," "king," etc. (Example: "Double Sheet for 135-cm X 190-cm mattress.")
- (b) The quantity statement for flat sheets shall state the size designation of the mattress for which the sheet is designed, such as "twin," "double," "king," etc. The quantity statement also shall state, in centimeters or inches, the length and width of the mattress for which the sheet is designed, followed in parentheses by a statement, in inches, of the length and width of the finished sheet. (Example: "Twin Flat Sheet for 100-cm X 190-cm mattress [170-cm X 240-cm finished size]")
- (c) The quantity statement for pillowcases shall state the size designation of the pillow for which the pillowcase

is designed, such as "youth," "standard," and "queen," etc. The quantity statement also shall state, in centimeters or inches, the length and width of the pillow for which the pillowcase is designed, followed in parentheses by a statement, in centimeters or inches, of the length and width of the finished pillowcase, (Example: "Standard Pillowcase for 50-cm X 65-cm pillow [53-cm X 75 cm-finished size]")

- (d) The quantity statement for blankets, comforters, quilts, bedspreads, mattress pads, afghans, and throws shall state, in inches, the length and width of the finished item. The quantity statement also may state the length of any ornamentation and the size designation of the mattress for which the item is designed, such as "twin," "double," "king," etc.
- (e) The quantity statement for tablecloths and napkins shall state, in centimeters or inches, the length and width of the finished item. The quantity statement also may state parenthetically, in centimeters or inches, the length and width of the item before hemming and properly identified as such.
- (f) The quantity statement for curtains, drapes, flags, furniture scarfs, etc., shall state, in centimeters or inches, the length and width of the finished item. The quantity statement also may state parenthetically, in centimeters or inches, the length of any ornamentation.
- (g) The quantity statement for carpets and rugs shall state, in meters or feet, with any remainder in decimal fractions of the meter for metric sizes or common or decimal fractions of the foot or in inches for customary sizes, the length and width of the item. The quantity statement also may state parenthetically, in centimeters or inches, the length of any ornamentation.
- (h) The quantity statement for woven dish towels, dish cloths, towels, face cloths, utility cloths, bath mats, etc., shall state, in centimeters or inches, the length and width of the item. The quantity statement for such items, when knitted, need not state the dimensions.
- (i) The quantity statement for textile products such as pot holders, fixture and appliance covers, non-rectangular diapers, slip covers, etc., shall be stated in terms of count and may include size designations and dimensions.
- (j) The quantity statement for other than rectangular textile products identified in subsections (a) through (h) shall

state the geometric shape of the product and the dimensions which are customarily used in describing such geometric shape. (Example: "Oval Tablecloth 140 cm X 110 cm" representing the maximum length and width in this case.)

- (k) The quantity statement for packages of remnants of textile products of assorted sizes, when sold by count, shall be accompanied by the term "irregular dimensions" and the minimum size of such remnants.

10.9.3. Textiles: Variations from Declared Dimensions. --

- (a) For an item with no declared dimension less than 60 centimeters or 24 inches, a minus variation greater than 3% of a declared dimension and a plus variation greater than 6% of a declared dimension should be considered unreasonable.
- (b) For an item with a declared dimension less than 60 centimeters or 24 inches, a minus variation greater than 6% of that declared dimension and a plus variation greater than 12% of that declared dimension should be considered unreasonable.

10.9.4. Exemption: Variety Textile Packages. -- Variety packages of textiles which are required by reason of subsection 6.4.1. to provide a combination declaration stating the quantity of each individual unit, shall be exempt from the requirements in this regulation for:

- (a) Location (See subsection 8.1.1.),
- (b) Free area (See subsection 8.1.4), and
- (c) Minimum height of numbers and letters (See subsection 8.2.1.).

10.9.5. Sewing Threads, Handicraft Threads, and Yarns. -- Sewing and handicraft threads shall be exempt from the requirements of subsection 6.7.2. and 6.8.2. of this regulation: Provided, that

- (a) The net quantity statement for customary sizes of sewing and handicraft threads shall be expressed in terms of yards.
- (b) The net quantity statement for yarns shall be expressed in terms of weight.
- (c) Thread products may, in lieu of name and address, bear a trademark, symbol, brand, or other mark that positively identifies the manufacturer, packer, or distributor,

provided that such marks, employed to identify the vendor, shall be filed with the director.

- (d) Each unit of industrial thread shall be marked to show its net measure in terms of meters or yards or its net weight in terms of kilograms or grams or avoirdupois pounds or ounces, except that ready-wound bobbins which are not sold separately, shall not be required to be individually marked but the package containing such bobbins shall be marked to show the number of bobbins contained therein and the net meters or yards of thread on each bobbin.

10.10. Packaged Seed. -- Packages of seeds intended for planting shall be labeled in full accord with this regulation except as follows:

- (a) The quantity statement shall appear in the upper thirty percent of the principal display panel.
- (b) The quantity statements shall be in terms of the largest whole unit of the metric system for all weights up to seven grams, and in grams or in ounces for all other weights less than 225 grams or eight ounces; packaged seeds weighing 225 grams or eight ounces or more shall not be subject to Section 10.10.
- (c) The quantity statement for coated seed, encapsulated seed, pelletized seed, pre-planters, seed tapes, etc., shall be in terms of count.

SECTION 11. EXEMPTIONS. --

11.1. General. -- Whenever any consumer commodity or package of consumer commodity is exempted from the requirements for dual quantity declaration, the net quantity required to appear on the package shall be in terms of the largest whole unit (except see subsection 10.4.(c)).

11.2. Random Packages. -- A random package bearing a label conspicuously declaring

- (a) the net weight,
- (b) the price per kilogram or pound, and
- (c) the total price

shall be exempt from the type size, dual declaration, placement, and free area requirements of this regulation. In the case of a random package packed at one place for subsequent sale at another, neither the

price per unit of weight nor the total selling price need appear on the package, provided the package label includes both such prices at the time it is offered or exposed for sale at retail.

This exemption shall also apply to uniform weight packages of cheese and cheese products labeled in the same manner and by the same type of equipment as random packages exempted by this section.

11.3. Small Confections. -- Individually wrapped pieces of "penny candy" and other confectionery of less than 15 grams or one-half ounce net weight per individual piece shall be exempt from the labeling requirements of this regulation when the container in which such confectionery is shipped is in conformance with the labeling requirements of this regulation. Similarly, when such confectionery items are sold in bags or boxes, such items shall be exempt from the labeling requirements of this regulation, including the required declaration of net quantity of contents, when the declaration of the bag or box meets the requirements of this regulation.

11.4. Individual Servings. -- Individual-serving-size packages of foods containing less than 15 grams or 1/2 ounce or less than 15 milliliters or 1/2 fluid ounce for use in restaurants, institutions, and passenger carriers, and not intended for sale at retail, shall be exempt from the required declaration of net quantity of contents specified in this regulation.

11.5. Cuts, Plugs, and Twists of Tobacco and Cigars. -- When individual cuts, plugs, and twists of tobacco and individual cigars are shipped or delivered in containers that conform to the labeling requirements of this regulation, such individual cuts, plugs, and twists of tobacco and cigars shall be exempt from such labeling requirements.

11.6. Reusable (Returnable) Glass Containers. -- Nothing in this Regulation shall be deemed to preclude the continued use of reusable (returnable) glass containers: Provided, that such glass containers ordered after the effective date of this regulation shall conform to all requirements of this regulation.

11.7. Cigarettes and Small Cigars. -- Cartons of cigarettes and small cigars, containing ten individual packages of twenty, labeled in accordance with the requirements of this regulation, shall be exempt from the requirements set forth in subsection 8.1.1. Location, subsection 8.2.1. Minimum Height of Numbers and Letters, and subsection 10.4. Multi-Unit Packages; Provided, that such cartons bear a declaration of the net quantity of commodity in the package.

11.8. Packaged Commodities with Labeling Requirements Specified in Federal Law. -- Packages of meat and meat products, poultry products, tobacco and tobacco products, insecticides,

fungicides, rodenticides, and alcoholic beverages shall be exempt from those portions of these regulations requiring dual declarations in customary units and specifying location and minimum type size of the net quantity declaration: Provided, that quantity labeling requirements for such products are specified in Federal Law, so as to follow reasonably sound principles of providing consumer information.

11.9. Fluid Dairy Products, Ice Cream, and Similar Frozen Desserts. --

- (a) When packaged in 1/2-liquid-pint and 1/2-gallon containers, are exempt from the requirements for stating net contents of 8 fluid ounces and 64 fluid ounces, which may be expressed as 1/2 pint and 1/2 gallon, respectively.
- (b) When packaged in 1-liquid-pint, 1-liquid-quart, and 1/2-gallon containers, are exempt from the dual net contents declaration requirements of subsection 6.7.3.
- (c) When measured by and packaged in measure containers as defined in "Measure Container Code of National Bureau of Standards Handbook 44," in sizes allowable by Model Method of Sale of Commodities Regulations, are exempt from the requirements of subsection 8.1.1. that the declaration of net contents be located within the bottom 30 percent of the principal display panel.
- (d) Milk and milk products when measured by and packaged in glass or plastic containers of sizes allowable by the Model Method of Sale of Commodities Regulation are exempt from the placement requirement of subsection 8.1.1. that the declaration of net contents be located within the bottom 30 percent of the principal display panel; Provided that other required label information is conspicuously displayed on the cap or outside closure, and the required net quantity of contents declaration is conspicuously blown, formed, or molded on, or permanently applied to that part of the glass or plastic container that is at or above the shoulder of the container.

11.10. Single Strength and Less Than Single Strength Fruit Juice Beverages, Imitations Thereof, and Drinking Water. --

- (a) When packaged in glass, plastic, or fluid milk type paper containers of 8- and 64-fluid-ounce capacity, are exempt from the requirements of subsection 6.5.(b), to the extent that net contents of 8 fluid ounces and 64 fluid ounces (or 2 quarts) may be expressed as 1/2 pint (or half pint) and 1/2 gallon (or half gallon), respectively.

- (b) When packaged in glass, plastic, or fluid milk type paper containers of 1-pint, 1-quart, and 1/2-gallon capacities, are exempt from the dual net contents declaration requirements of subsection 6.7.4.
- (c) When packaged in glass or plastic containers of round metric sizes or 1/2-pint, 1-pint, 1-quart, 1/2-gallon, and 1-gallon capacities, are exempt from the placement requirement of subsection 8.1.1. that the declaration of net contents be located within the bottom 30 percent of the principal display panel; Provided, that other label information is conspicuously displayed on the cap or outside closure and the required net quantity of contents declaration is conspicuously blown, formed, or molded into or permanently applied to that part of the glass or plastic container that is at or above the shoulder of the container.

11.11. Soft-Drink Bottles. -- Bottles of soft drinks shall be exempt from the placement requirements for the declaration of

- (a) identity, when such declaration appears on the bottle closure, and
- (b) quantity, when such declaration is blown, formed, or molded on or above the shoulder of the container and when all other information required by this regulation appears only on the bottle closure.

11.12. Multi-Unit Soft-Drink Packages. -- Multi-unit packages of soft drinks are exempt from the requirement for a declaration of

- (a) responsibility, when such declaration appears on the individual units and is not obscured by the multi-unit packaging, or when the outside container bears a statement to the effect that such declaration will be found on the individual units inside, and
- (b) identity, when such declaration appears on the individual units and is not obscured by the multi-unit packaging.

11.13. Butter. -- When packaged in sizes allowable by the Model Method of Sale of Commodities Regulation with continuous label copy wrapping, butter is exempt from the requirements that the statement of identity (subsection 3.1.1.) and the net quantity declaration (subsection 8.1.5.) be generally parallel to the base of the package. When packaged in 8-ounce and 1-pound units, butter is exempt from the requirement for location (subsection 8.1.1.) of net quantity declaration and, when packaged in 1-pound units, is exempt from the requirement for dual quantity declaration (subsection 6.7.2).

11.14. Eggs. -- Cartons containing 12 eggs shall be exempt from the requirement for location (subsection 8.1.1.) of net quantity declaration. When such cartons are designed to permit division in half, each half shall be exempt from the labeling requirements of this regulation if the undivided carton conforms to all such requirements.

11.15. Flour. -- Packages of wheat flour packaged in sizes allowable by the Model Method of Sale of Commodities Regulation shall be exempt from the requirement in this regulation for location (subsection 8.1.1.) of the net quantity declaration and, when packaged in units of 2 pounds, shall be exempt also from the requirement for a dual quantity declaration (subsection 6.7.2.).

11.16. Small Packages. -- On a principal display panel of 32 square centimeters or five square inches or less, the declaration of quantity need not appear in the bottom 30% of the principal display panel if that declaration satisfies the other requirements of this regulation.

11.17. Decorative Containers. -- The principal display panel of a cosmetic marketed in a "boudoir-type" container including decorative cosmetic containers of the "cartridge," "pill box," "compact," or "pencil" variety, and those with a capacity of 7 grams or 1/4 ounce or less, may be a tear-away tag or tape affixed to the decorative container and bearing the mandatory label information as required by this regulation.

11.18. Combination Packages. -- Combination packages are exempt from the requirements in this regulation for

- (a) Location (see subsection 8.1.1.),
- (b) Free area (see subsection 8.1.4.), and
- (c) Minimum Height of Numbers and Letters (see subsection 8.2.1.)

11.19. Margarine. -- Margarine in a round metric size or 1 pound rectangular packages, except for packages containing whipped or soft margarine or packages containing more than four sticks, shall be exempt from the requirement in this regulation for location (see subsection 8.1.1.) of the net quantity declaration, and shall be exempt from the requirement for a dual quantity declaration (see subsection 6.7.2.).

11.20. Corn Flour and Corn Meal. -- Corn flour and corn meal packaged in a round metric size or conventional 5-, 10-, 25-, 50-, and 100-pound bags shall be exempt from the requirement in this regulation for location (see subsection 8.1.1.) of the net quantity declaration.

11.21. Prescription and Insulin-Containing Drugs. -- Prescription and insulin-containing drugs subject to the provisions of Section 503(b) (1) or 506 of the Federal Food, Drug, and Cosmetic Act shall be exempt from the provisions of this regulation.

11.22. Camera Film. -- Camera film packaged and labeled for retail sale is exempt from the net quantity statement requirements of this regulation which specify how measurement of commodities should be expressed; Provided, that

- (a) The net quantity of contents on packages of movie film and bulk still film is expressed in terms of the number of linear meters or feet of usable film contained therein.
- (b) The net quantity of contents on packages of exposed movie film is expressed in terms of the running time of the exposed film for that portion of film which is of entertainment value.
- (c) The net quantity of contents on packages of still film is expressed in terms of the number of exposures the contents will provide. The length and width measurements of the individual exposures, expressed in millimeters or inches, are authorized as an optional statement. (Example: "36 exposures, 36 mm X 24 mm" or "12 exposures, 2-1/4 in X 2-1/4 in")

11.23. Paints and Kindred Products. --

- (a) Paints, varnishes, lacquers, thinners, removers, oils, resins, and solvents, when packed in 1-liquid-pint and 1-liquid-quart units shall be exempt from the dual quantity declaration requirements of subsection 6.7.3.
- (b) Tint base paint may be labeled on the principal display panel, as required by this regulation, in terms of round metric size or a quart or a gallon including the addition of colorant selected by the purchaser, provided that the system employed ensures that the purchaser always obtains a round metric size or quart or a gallon; and further provided that in conjunction with the required quantity statement on the principal display panel, a statement indicating that the tint base paint is not to be sold without the addition of colorant is presented; and further provided that the contents of the container, before the addition of colorant, is stated in milliliters or fluid ounces elsewhere on the label.

Wherever the above conditions cannot be met, containers of tint base paint must be labeled with a statement of the actual net contents prior to the addition of colorant in full accord with all the requirements of this regulation.

11.24. Automotive Cooling System Antifreeze. -- Antifreeze, when packed in 1-liquid-quart units, in metal or plastic containers, shall be exempt from the dual quantity declaration requirements of subsection 6.7.3.

11.25. Motor Oils. -- Motor oils, when packed in 1-liquid-quart units, shall be exempt from the dual quantity declaration requirements of subsection 6.7.3. Additionally, motor oil in round metric sizes or 1-liquid-quart, 1-gallon, 1-1/4-gallon, 2-gallon, and 2-1/2-gallon units, bearing the principal display panel on the body of the container, is exempt from the requirements, of SECTION 3. DECLARATION OF IDENTITY: CONSUMER PACKAGE, to the extent that the Society of Automotive Engineers (SAE) viscosity number is required to appear on the principal display panel, provided the SAE viscosity number appears on the can lid and is expressed in letters and numerals in type size of at least 6 millimeter or 1/4 inch.

11.26. Pillows, Cushions, Comforters, Mattress Pads, Sleeping Bags, and Similar Products. -- Those products, including pillows, cushions, comforters, mattress pads, and sleeping bags, that bear a permanent label as designated by the Association of Bedding and Furniture Law Officials or by the California Bureau of Home Furnishings shall be exempt from the requirements for location (Section 8.1.1.), size of letters or numbers (Section 8.2.1. and 8.2.2.), free area (Section 8.1.4.) and the declarations of identity and responsibility (Sections 3.1. and 5.); Provided, that declarations of identity, quantity, and responsibility are presented on a permanently attached label and satisfy the other requirements of this Regulation, and further provided that the information on such permanently attached label be fully observable to the purchaser.

11.27. Commodities' Variable Weights and Sizes. -- Individual packaged commodities put up in variable weights and sizes for sale intact, and intended to be weighed and marked with the correct quantity statement prior to or at the point of retail sale, are exempt from the requirements of SECTION 6. DECLARATION OF QUANTITY: CONSUMER PACKAGES, while moving in commerce and while held for sale prior to weighing and marking; Provided, that the outside container bears a label declaration of the total net weight.

11.28. Packaged Commodities Sold by Count. -- When a packaged consumer commodity is properly measured in terms of count only, or in terms of count and some other appropriate unit, and the individual units are fully visible to the purchaser, such packages shall be labeled in full accord with this regulation except that those containing 6 or less items need not include a statement of count.

11.29. Fishing Lines and Reels. -- Packaged fishing lines and reels are exempt from the dual quantity declaration requirements of Section 6.7.6. (a); Provided, that quantity or capacity, as appropriate is presented in terms of meters or yards in full accord with all other requirements of this regulation.

SECTION 12. VARIATIONS TO BE ALLOWED. --

12.1. Packaging Variations. --

12.1.1. Variations from Declared Net Quantity. -- Variations from the declared net weight, measure, or count shall be permitted when caused by unavoidable deviations in weighing, measuring, or counting the contents of individual packages that occur in good packaging practice, but such variations shall not be permitted to such extent that the average of the quantities in the packages of a particular commodity, or a lot of the commodity that is kept, offered, or exposed for sale, or sold, is below the quantity stated, and no unreasonable shortage in any package shall be permitted, even though overages in other packages in the same shipment, delivery, or lot compensate for such shortage. Variations above the declared quantity shall not be unreasonably large.

12.1.2. Variations Resulting from Exposure. -- Variations from the declared weight or measure shall be permitted when caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure, but only after the commodity is introduced into intrastate commerce: Provided, that the phrase "introduced into intrastate commerce" as used in this paragraph shall be construed to define the time and the place at which the first sale and delivery of a package is made within the state, the delivery being either

- (a) directly to the purchaser or to his agent, or
- (b) to a common carrier for shipment to the purchaser, and this paragraph shall be construed as requiring that, so long as a shipment, delivery, or lot of packages of a particular commodity remains in the possession or under the control of the packager or the person who introduces the package into intrastate commerce, exposure variations shall not be permitted.

12.2. Magnitude of Permitted Variations. -- The magnitude of variations permitted under Sections 12., 12.1, 12.1.1., and 12.1.2. of this regulation shall be those contained in the procedures and tables of National Bureau of Standards Handbook 67, "Checking Pre-packaged Commodities" and the "Model State Method of Sale of Commodities Regulation."

SECTION 13. RETAIL SALE PRICE REPRESENTATIONS. --

13.1. "Cents-off" Representations. --

- (a) The term "cents-off representation" means any printed matter consisting of the words "cents-off" or words of similar import, placed upon any consumer package or placed upon any label affixed or adjacent to such package, stating or representing by implication that it is being offered for sale at a price lower than the ordinary and customary retail sale price.
- (b) Except as set forth in Section 13.2., the packager or labeler of a consumer commodity shall not have imprinted thereon a "cents-off" representation unless:
 - (1) The commodity has been sold at an ordinary and customary price in the most recent and regular course of business where the "cents-off" promotion is made.
 - (2) The commodity so labeled is sold at a reduction from the ordinary and customary price, which reduction is at least equal to the amount of the "cents-off" representation imprinted on the commodity package or label.
 - (3) Each "cents-off" representation imprinted on the package or label is limited to a phrase which reflects that the price marked by the retailer represents the savings in the amount of the "cents-off" the retailer's regular price; e.g., "Price Marked is ____ ¢ Off the Regular Price," "Price Marked is ____ Cents off the Regular Price of This Package"; provided, the package or label may in addition bear in the usual pricing spot a form reflecting a space for the regular price, the represented "cents-off" and a space for the price to be paid by the consumer.
 - (4) The commodity at retail presents the regular price, designated as the "regular price," clearly and conspicuously on the package or label of the commodity or on a sign, placard, or shelf-marker placed in a position contiguous to the retail display of the "cents-off" marked commodity.
 - (5) a. Not more than three "cents-off" promotions of any single size commodity may be initiated in the same trade area within a twelve-month period;

- b. At least 30 days must lapse between "cents-off" promotions of any particular size packaged or labeled commodity in a specific trade area; and
 - c. Any single size commodity so labeled may not be sold in a trade area for a duration in excess of 6 months within any twelve-month period.
- (6) Sales of any single size commodity so labeled in a trade area do not exceed in volume fifty percent (50%) of the total volume of sales of such size commodity in the same trade area during any twelve-month period. The twelve-month period may be the calendar, fiscal, or market year provided the identical period is applied in this subparagraph and subparagraph (5) of this paragraph. Volume limits may be calculated on the basis of projections for the current year but shall not exceed 50 percent of the sales for the preceding year in the event actual sales are less than the projection for the current year.
- (c) No "cents-off" promotion shall be made available in any circumstances where it is known or there is reason to know that it will be used as an instrumentality for deception or for frustration of value comparison, e.g., where the retailer charges a price which does not fully pass on to the consumers the represented price reduction or where the retailer fails to display the regular price in the display area of the "cents-off" marked product.
 - (d) The sponsor of a "cents-off" promotion shall prepare and maintain invoices or other records showing compliance with this section. The invoices or other records required by this section shall be open to inspection and shall be retained for a period of one year subsequent to the end of the year (calendar, fiscal, or market) in which the "cents-off" promotion occurs.

13.2. Introductory Offers. --

- (a) The term "introductory offer" means any printed matter consisting of the words "introductory offer" or words of similar import, placed upon a package containing any new commodity or upon any label affixed or adjacent to such new commodity, stating or representing by implication that such new commodity is offered for retail sale at a price lower than the anticipated ordinary and customary retail sale price.

- (b) The packager or labeler of a consumer commodity may not have imprinted thereon an introductory offer unless:
 - (1) The product contained in the package is new, has been changed in a functionally significant and substantial respect, or is being introduced into a trade area for the first time.
 - (2) Each offer on a package or label is clearly and conspicuously qualified.
 - (3) No commodity so labeled is sold in a trade area for duration in excess of 6 months.
 - (4) At the time of making the introductory offer promotion, the offerer intends in good faith to offer the commodity, alone, at the anticipated ordinary and customary price for a reasonably substantial period of time following the duration of the introductory offer promotion.
- (c) The packager or labeler of a consumer commodity shall not have imprinted thereon an introductory offer in the form of a "cents-off" representation unless, in addition to the requirements in paragraph (b) of this section:
 - (1) The package or label clearly and conspicuously and in immediate conjunction with the phrase "Introductory Offer" bears the phrase " cents-off the after-introductory offer price."
 - (2) The commodity so labeled is sold at a reduction from the anticipated ordinary customary price, which reduction is at least equal to the amount of the reduction from the after-introductory offer price representation on the commodity package or label.
- (d) No introductory offer with a "cents-off" representation shall be made available in any circumstance where it is known or there is reason to know that it will be used as an instrumentality for deception or for frustration of value comparison, e.g., where the retailer charges a price which does not fully pass on to consumers the represented price reduction.
- (e) The sponsor of an introductory offer shall prepare and maintain invoices or other records showing compliance with this section. The invoices or other records required by this section shall be open to inspection

and shall be retained for a period of one year subsequent to the period of the introductory offer.

13.3. Economy Size. --

- (a) The term "economy size" means any printed matter consisting of the words "economy size," "economy pack," "budget pack," "bargain size," "value size," or words of similar import placed upon any package containing any consumer commodity or placed upon any label affixed or adjacent to such commodity, stating or representing directly or by implication that a retail sale price advantage is accorded the purchaser thereof by reason of the size of that package or the quantity of its contents.
- (b) The packager or labeler of a consumer commodity may not have imprinted thereon an "economy" size representation unless:
 - (1) At the same time the same brand of the commodity is offered in at least one other packaged size or labeled form.
 - (2) Only one packaged or labeled form of that brand of commodity labeled with an "economy size" representation is offered.
 - (3) The commodity labeled with an "economy size" representation is sold at a price per unit of weight, volume, measure, or count which is substantially reduced (i.e., at least 5 percent) from the actual price of all other packaged or labeled units of the same brand of that commodity offered simultaneously.
- (c) No "economy size" package shall be made available in any circumstances where it is known that it will be used as an instrumentality for deception, e.g., where the retailer charges a price which does not pass on to the consumer the substantial reduction in cost per unit initially granted.
- (d) The sponsor of an "economy size" package shall prepare and maintain invoices or other records showing compliance with paragraph (b) of this section. The invoices or other records required by this section shall be open to inspection and shall be retained for one year.

SECTION 14. REVOCATION OF CONFLICTING REGULATIONS. -- All provisions of all orders and regulations heretofore issued on this same subject that are contrary to or inconsistent with the provisions of this regulation, and specifically _____

are hereby revoked.

SECTION 15. EFFECTIVE DATE. -- This regulation shall become effective on _____.

Given under my hand and the seal of my office in the City of _____, on this _____ day of _____, A.D. 19____.

SIGNED _____

APPENDIX: Metric/Inch-Pound Conversion Factors

LENGTH

1 inch = 2.54 cm*	1 millimeter = 0.039 370 1 in
1 foot = 30.48 cm*	1 centimeter = 0.393 701 in
1 yard = 0.9144 m*	1 meter = 3.280 84 ft

Area

1 square inch = 6.4516 cm ² *	1 square centimeter = 0.155 000 in ²
1 square foot = 929.030 cm ²	1 square meter = 10.763 9 ft ²
1 square yard = 0.836 127 m ²	

Volume or Capacity

1 cubic inch = 16.3871 cm ³	1 cubic centimeter = 0.061 023 7 in ³
1 cubic foot = 0.028 316 8 m ³	1 cubic meter = 35.314 7 ft ³
1 cubic yard = 0.764 555 m ³	1 cubic meter = 1.307 95 yd ³
1 ounce (fluid) = 29.573 5 mL	1 milliliter = 0.033 814 0 oz (fluid)
1 pint (liquid) = 473.177 mL or 0.473 177 L	
1 quart (liquid) = 946.353 mL or 0.946 353 L	
1 gallon = 3.785 41 L	1 liter = 1.056 69 qt (liquid)
1 bushel = 35.2391 L	1 liter = 0.264 172 gal

Weight (mass)

1 ounce = 28.349 5 g	1 milligram = 0.000 035 274 0 oz
1 pound = 453.592 g or	0.015 432 4 grain
0.453 592 kg	1 gram = 0.035 274 0 oz
	1 kilogram = 2.204 62 lb

Temperature

$$t_{oC} = \frac{5}{9} (t_{oF} - 32)^*$$

$$t_{oF} = 1.8 t_{oC} + 32^*$$

NOTE: These conversion factors are given to six significant digits in the event such accuracy is necessary. See Section 6.11.3. Rounding for information about the use of conversion factors in labeling.

* Exactly

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Questions concerning adoption, interpretation, and
the like, should be sent to the above address.

REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES

Presented by MARION L. KINLAW, Director, Consumer Standards
Division, North Carolina Department of Agriculture

(Thursday, July 13, 1978)

VOTING KEY

300

INTRODUCTION



The Committee on Specifications and Tolerances submits its report to the 63rd National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by this final report. The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made

during the open meeting of the committee. All recommended amendments are to appropriate provisions of the codes of the National Bureau of Standards Handbook 44, Fourth Edition, "Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices."

NOTE: All paragraphs to be amended are printed in their present form; that which is to be deleted is shown lined out, and that which is to be added is underlined.

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O.I.M.L. IMPACT AND OTHER CONSIDERATIONS

During the past year, the Specifications and Tolerances Committee has participated in various O.I.M.L. activities. Recognizing that O.I.M.L. will impact on weights and measures in the United States in the near future and that this impact can be extremely beneficial, the committee has initiated efforts to provide all information available to Conference members. Each State office has been provided a list of O.I.M.L. documents impacting on legal metrology, and a recommended filing system. It is the committee's view that these documents are a valuable resource for amendments to Handbook 44 and in the development of Handbook 44 SI. This fact will be illustrated further in this report.

The committee reviewed three international documents making recommendations for possible amendment. The documents were International Recommendation #1, Materialized Measures of Length for General Uses; International Recommendation #4, Volumetric Flasks (one mark) in Glass; and Second Pre-Draft, Instruments for Measuring the Length of Fabrics, Cables, and Wires. International Recommendation #4 was circulated to the 50 State offices and responses were received from 14 States.

It will be the policy of the committee to circulate for comment to all 50 State offices each international document for which there is a need to develop a U.S. position. The committee urges that these documents be given careful review.

The committee participated in a meeting of the U.S. National Working Group for PS 7, "Scales and Weighing Systems," at which a new work plan for U.S. participation was developed.

The committee also participated in an organizational meeting of PS 7/RS 7, "Inservice Examination Procedures." The committee will play an active role in all PS 7 work and will be looking to other Conference members for aid and support.

International Recommendation #3, "Metrological Regulations for Non-Automatic Weighing Machines"

The committee has made an in-depth study and review of this document and is convinced that the philosophy and principles expressed therein are appropriate for application in the U.S. These principles and philosophies are the basis for the resolution of four specific issues which the committee was requested to resolve. These issues are dealt with at length as Items 1, 2, 13, 14 and 15 of the Scale Code, and Item 5 of the General Code.

So that the information is readily available as these issues are discussed, the principles of International Recommendation #3 as expressed in section 3 of that document are presented here in part:

- (1) The accuracy of weighing a given load is independent of the principle of operating (design technology) of the device.
- (2) The value of the scale division indicates the accuracy of the device.
- (3) The maximum permissible errors (tolerances) are fixed in absolute values as a number of scale divisions as a function of load (expressed in number of scale divisions).
- (4) A minimum capacity is specified to indicate that weighing light loads can cause extremely large relative errors. (This does not refer to scale accuracy, but rather weighing errors.)

It is also necessary to establish a classification of devices based on accuracy capabilities. Thus, in International Recommendation #3 accuracy classes are established. So that a proper perspective can be readily obtained, the accuracy classes, with an example of those devices generally included in each class, are listed below:

CLASS I, "SPECIAL ACCURACY."—Balances in Weights and Measures Metrology Laboratories and at the National Bureau of Standards used for precision calibration of mass standards.

CLASS II, "HIGH ACCURACY."—Balances used in Laboratories, generally direct reading, used for scientific analysis and field work for commercial weight testing.

CLASS III, "MEDIUM ACCURACY."—Those scales found in the commercial measurement system including vehicle, livestock, industrial, bench, prepack, computing and checkweighing scales. Most commercial equipment used in the United States would fall in this class.

CLASS IV, "ORDINARY ACCURACY."—Scales used for weighing products such as laundry, dry cleaning, and baggage, and other devices such as person weighers and baby scales.

The discussion that follows is to aid in understanding the application of the principles of International Recommendation #3 when determining the appropriateness of the design of a device for a given weighing application. It is anticipated that for most commercial applications (Class III scales) the ratio of the normal weighing range is between 25:1 and 100:1 with 50:1 about average.

For example if a vehicle scale is needed to weigh loads from 2 000 to 100 000 pounds, this is a ratio of 50:1. Since the minimum capacity is established in terms of scale divisions (d), (for small capacity scales, it is generally $20d$, for large capacity scales $50d$), the value of the scale division would be 40 pounds. ($2\,000\text{ pounds} \div 50d = 40\text{ pounds}$.) The number of scale divisions (n) is established as 2 500. ($100\,000\text{ pounds} \div 40\text{ pounds} = 2\,500$.)

This then describes the practical design of a vehicle scale, or any other large capacity scale. The tolerances applicable to this device are:

From	To and Including	Initial Verification	In Service
2 000 lb (min)	20 000 lb (500d)	20 lb (0.5d)	40 lb (1d)
20 000 lb+ (500d+)	80 000 lb (2 000d)	40 lb (1.0d)	80 lb (2d)
80 000 lb+ (2 000d+)	100 000 lb (max)	60 lb (1.5d)	120 lb (3d)

Extending similar principles for the design of a computing scale would result in the following:

Capacity = 25.0 pounds, scale division = 0.01 pound, number of scale divisions = 2 500, minimum capacity = 0.20 pound.

A brief explanation of the reason for establishing a minimum capacity (min) is as follows: If the value of the scale division (d) on a particular scale is equal to 1 pound, the uncertainty of the correct weight of any load weighed to the closest pound is equal to $\pm \frac{1}{2}$ pound. Consequently, if the weight of an unknown mass to be weighed is $19\frac{1}{2}$ pounds, the selected value would be 19 pounds or 20 pounds. The relationship of this $\frac{1}{2}$ pound error to the 20 pounds indicated weight is a relative error of $2\frac{1}{2}$ percent. Thus, the minimum capacity of 20d or 20 pounds establishes a maximum relative error of $2\frac{1}{2}$ percent since this percentage decreases as the load increases.

A final consideration is the uncertainty of the reference point or zero balance indications. The O.I.M.L. requirements establish a maximum zero reference uncertainty or error of $\pm \frac{1}{4}d$.

It is hoped that this brief explanation will be of some aid to the conference in its deliberations. It is intended for educational purposes only and does not reflect any changes in Handbook 44.

(Item 301 was adopted)

302

GENERAL CODE

302-1 G-S.1. Identification

The committee received several comments about this paragraph. These comments ranged from suggestions that "The quality of the identification plate should be stipulated with design criteria" to "part of this paragraph should be directed to the user."

Considerable discussion ensued during the interim meeting and many manufacturers offered comments. It is the view of the committee that this paragraph is necessary to properly identify equipment in service.

In order to accomplish this, the identification methodology used must be reasonably permanent and reasonably observable. The committee is hesitant to amend this paragraph setting forth specific design criteria for a plate, but rather offers the following views with respect to the permanence of the methodology used.

The plate may be "pressure sensitized" for application providing that when an attempt is made to "peel off" the plate, it is so damaged that it cannot be reused, thus preventing exchanging plates on different equipment. The information must be applied in such a manner that it cannot be removed or obliterated easily and pref-

erably raised or indented. It should also be susceptible of being scraped clean of paint in the event that the equipment on which it is applied is subject to repainting, such as on vehicle tank meters.

It is also the view of the committee that some reference in this paragraph is necessary to remind the manufacturer that he must consider the visibility of this information after installation when applying the plate, e.g., to remind the manufacturer that applying the identification plate on the bottom of a "black box" is certainly not appropriate. However, the committee recognizes that the manufacturer cannot control installation in all circumstances.

Therefore, the committee recommends that this paragraph be amended by adding the word "conventional" so that the paragraph will read in part:

G.S.1. Identification.—All equipment except weights shall be clearly and permanently marked on a *surface visible after in a conventional installation* * . . ." And add the following parenthetical at the end of this paragraph: (See also G-UR.2.1.1.)

Further, the committee recommends adding the following User Requirement:

G-UR.2.1.1. Visibility of Identification.—Equipment shall be installed in such a manner that all required markings are readily observable.

(Item 302-1 was adopted)

302-2 G-S.53.1. Dual Indications

The committee received two suggestions to amend this paragraph for clarification purposes. The committee agrees that such an amendment will help clarify the application of this paragraph and recommends amendment to the first sentence as follows:

G-S.5.3.1. Dual Indications.—On equipment designed to indicate or record in either ~~or~~ both U.S. Customary ~~or~~ and metric units, . . .

The committee wishes to remind the Conference for further clarification purposes that this requirement does not apply to equipment designed to facilitate a change to metric units with an internal adjustment not available to the user.

(Item 302-2 was adopted)

302-3 G-S.5.5. Money Values, Mathematical Agreement

The committee received comments from two regional associations and one trade association regarding this requirement. In each of the last 2 years in its Conference report, the committee has made

lengthy reference to the philosophy expressed in this section concerning retail fuel computing devices. The committee cannot, in good faith, compromise its position as expressed in those previous reports and wishes to reconfirm its views as follow:

A digital indication or recorded representation of a quantity, a unit price, and a total price must be mathematically correct. That is, it must meet the criteria expressed in the formula:

Quantity (Q) times (\times) Unit Price (U.P.) equals (=) Total Price (T.P.) to the nearest cent ($\pm \$0.005$) $\therefore (Q \times \text{U.P.} = \text{T.P.} \pm \$0.005)$

Further, any similar information presented as analog values or a combination of analog and digital values must meet the philosophy expressed here. (See LMD Code Item 2.)

The committee's view was even further reinforced in reviewing a recent newspaper article which stated in part, "a service station attendant was shot and killed in an argument with a customer over a penny's worth of gasoline. The argument apparently began when the customer said he had one penny less than the amount on the gasoline pump at the self-service station . . ."

The committee also discussed the possibility of requiring this mathematical agreement to meet the criteria set forth in Handbook 44—Fundamentals paragraph 10.2 (d). This paragraph establishes the methodology used in rounding off when the next figure beyond the last figure to be retained is 5 and there are only zeros beyond this 5. This is commonly referred to as the "odd-even method."

Several comments were offered at the interim meeting regarding this principle as it applies to computing devices on weighing and measuring equipment. There was not sufficient time for the committee to reach a conclusion on this issue and will include it for consideration on next year's agenda.

(Item 302-3 was adopted)

302-4 G-S.6 Marking, Operational Controls, Indications, and Features

The committee received several suggestions concerning this paragraph. In response to the comment that it was difficult to enforce this requirement on equipment already in service, the committee recommends that this requirement be made "non-retroactive" as of January 1, 1977. Another suggestion was to "develop standard symbols or abbreviations" for operational keys or control switches.

The committee recognizes the difficulty in the development of uniform interpretations of this paragraph. The problem discussed in

1976 which resulted in the addition of this paragraph, was that on large, sophisticated, complex control boards on large capacity weighing equipment, such as batching systems and grain weighing systems, the markings were not readily understandable.

The committee, in all its wisdom, cannot offer at this time any recommendation for code amendment or standard symbols, that will resolve all interpretive problems for this paragraph. The committee feels there are many considerations in determining compliance with this paragraph, such as:

- (1) Is the equipment used in direct sales, indirect sales, or both?
- (2) Are the operational controls and features intended to be observed by both parties in a transaction as on a livestock or vehicle scale, or are they intended for the operator only as on an electronic cash register?
- (3) Are the controls and features many, varied, and complex, or are they few and simple, such as only two keys intended for the operator's use on a digital computing scale?

The committee will continue to study the problem and requests that comments continue to be sent to the committee.

(Item 302-4 was adopted)

302-5 G.T. Tolerances

The committee received a comment that if acceptance tolerances were applicable only to type approval tests and initial verification tests (first test of a new device not previously tested) confusion in interpretations would be eliminated. It is the view of the committee that this recommendation is worthy of serious consideration, but that the Conference is probably not ready to deal with this issue this year.

The committee will continue the study of this idea and urges the Conference to do so as well. The issues to be considered are:

- (1) The committee has often been asked to define "major reconditioning or overhaul" and has been unable to respond.
- (2) The references to 30 days in paragraphs (b), (c), and (d) have varied from time to time (60 days, 90 days, etc.) and are always a subject of discussion.
- (3) O.I.M.L. requirements are consistent with the suggestion, i.e., one set of tolerances applies to the initial verification of a device and another set applies to all other in-service tests.

(Item 302-5 was adopted)

303-1 Postal Computing Scales

Several comments were received on the committee's recommendations for Postal Scale Requirements presented in its final report at the last National Conference. There were also several presentations and a number of comments at the interim meeting.

The previous recommendations were made on the basis of the technology presently in existence for postal weighing (and a new technology should certainly not provide a lesser performance capability) and the O.I.M.L. principles expressed in International Recommendation #3 and International Recommendation #28. There also had been discussions with Post Office representatives.

As a result of comments which have been received, the committee offers modifications to the guideline specifications. The committee recommends the requirements remain tentative for another year. The proposed changes are listed below:

- (1) The width of zero for weight classifiers used to determine U.S. Postal Service (USPS) rates be less than plus or minus 1/16 oz. Weight classifiers not used to determine USPS rates may define zero within plus or minus one-half a displayed division.
- (2) The zone of uncertainty be included in the tolerance structure.
- (3) The zone of uncertainty is required to be less than 1/16 oz for all test loads.
- (4) The tolerances for weight classifiers be established consistent with those of the USPS. The tolerances for weight classifiers would be one-sided, that is, for under registration only. An example of the tolerance application follows the summary of the proposed guidelines. The committee requests comments on the practicality of establishing a separate tolerance for the USPS weight classifiers and another tolerance for weight classifiers used in other applications.
- (5) The device could also be marked with the statement "For Weight Classification Only" to limit its use and indicate its special design.

Essentially, a weight classifier is required to indicate the value of the test load or less when the test load equals an integral number of scales divisions. When the tolerance value is applied, the device is required to indicate a value above the original test load.

Included below are the specifications which are unchanged from 1977. The committee recommends the adoption of the following guidelines for weight classifiers.

GENERAL CODE

G-S.1. If the identification badge is located on the back of the device and the scale is built in, the badge may not be visible after installation. If the device is heavy or difficult to move, the badge located on the back of the device is not suitable.

G-S.5.1. (a) After discussion with U.S. Postal Service representatives, it was decided that for a scale to be appropriate in design for its intended purpose (determining postal rates) it should classify the weight values, that is, the weight classifier should indicate that the load is equal to or less than the displayed value. This design shall be consistent with the rate structure established by the U.S. Postal Service and as presented in their tables. The design of the weight indication requires it to be identified as a special application. Scale Code S.6.2. intends that a scale designed for limited application be identified as such. It is appropriate to combine these identifications to comply with these sections. This can be accomplished by placing immediately above or below the weight indication the statement "For Rate Determinations Only" or "For Weight Classification Only." The U.S. Postal Service will not permit UPS rates on the scales they purchase.

(b) The scales should be designed so that no price is indicated when there is no load on the load receiving element.

(c) The zone is required to be displayed on devices used to determine U.S. Postal Service rates. (This section is new: Comments are requested whether this should be required on all computing weight classifiers.)

G-S.5.5. Price indications must agree with the weight indications based on the design given in G-S.5.1.

SCALE CODE

S.1.1. Zero Indication.—Weight classifiers used by the U.S. Postal Service shall define zero within plus or minus 1/16 oz. When 1/16 oz is placed on the weighing element the device shall give a stable weight indication which is different from zero. Weight classifiers not used by the U.S. Postal Service may define zero within plus or minus one-half of a displayed division.

S.1.4. Digital Indications.—The zone of uncertainty shall be less than 1/16 oz.

S.1.6.3. This section is applicable when both parties are present at the time the rate is being determined. This establishes the rate determination as a direct sale and applies to the USPS (UPS and other rate determinations when both parties are present). This should be considered nonretroactive and applicable only to digital electronic computing scales. The USPS wants customer indications with these scales.

S.6.1.(c) Because the capacity by minimum division is not immediately apparent on a digital device, it must be conspicuously marked either above or below the display or in close proximity (also required by G-S.5.1.).

S.6.2. The philosophy of this section is to require specialized equipment to be identified as such. Since the weight indications are not permitted to "round off," the scale should not be used for normal weighing. Consequently, the device should be marked with the statement "For Rate Determination Only," "For Weight Classification Only," or a similar and suitable statement.

T.1. Tolerance Application.—The tolerance for weight classifiers shall be for under registration only (one-sided) according to the table below:

From 0 through 4 lb	3/64 oz
From 4 through 10 lb	3/32 oz
From 10 through 20 lb	3/16 oz
From 20 through 30 lb	5/16 oz
From 30 through 50 lb	1/2 oz
From 50 through 70 lb	3/4 oz
Over 70 lb	0.07% of the test load

Application of a weight equal to the tolerance value shall result in a weight indication greater than the original test load.

EXAMPLE:

Test load	Indication (All indications must be stable.)
0	0 lb 0.0 oz
1/16 oz	0 lb 0.5 oz
1 oz	0 lb 1.0 oz
1 3/64 oz	0 lb 1.5 oz
4 lb	4 lb 0.0 oz
4 lb 3/64 oz	4 lb 0.5 oz
50 lb	50 lb 0.0 oz
50 lb 1/2 oz	50 lb 0.5 oz
70 lb	69 lb 15.5 oz or 70 lb 0.0 oz
70 lb 3/4 oz	70 lb 0.5 oz or 70 lb 1.0 oz

(Item 303-1 was adopted)

303-2 Grain Test Scales

The committee received a comment concerning the design of grain moisture test scales. At the interim meeting, the committee heard a very informative presentation concerning the devices used to weigh samples of grain for not only moisture test, but dockage purposes as well. It was pointed out that:

Confusion does exist in the code requirements with references to both grain-moisture-test scales and moisture-test scales used in the dairy industry, and there is a significant economic impact in the use of grain dockage scales. Especially so when one considers that tolerances applicable to the vehicle or hopper scale on which the grain is weighed is 0.05 percent, 0.1 percent, or 0.2 percent, and the error in readability alone, on those devices used to determine "dockage" is as much as 0.5 percent (from $2\frac{1}{2}$ times to 10 times as great). This means that when bulk grain sold by the farmer is weighed on a device with a maximum error of ± 40 pounds on a 20,000 pound load, an error of 100 pounds can result in simply reading the device used to determine "dockage."

The committee feels strongly that these issues must be addressed, but recognizes that hardships could develop if the Conference were to take immediate action and the design, performance, and use criteria applicable to this equipment were to be enforceable as of January 1, 1979. Therefore, the recommendations that follow are for discussion purposes during the ensuing year, and the committee will develop final code amendments during its 1979 interim meeting for action by the 64th Conference in 1979.

Handbook 44 changes recommended:

(1) The term "moisture-test scale" should be changed to "dairy product moisture test scale" thus eliminating any possibility of confusing grain moisture test scale requirements with dairy product moisture test scale requirements.

(2) The term "grain-moisture test scale" should be changed to "grain test scale" and redefined to include not only those devices used to weigh grain samples for moisture test but those used to weigh grain samples for dockage testing as well.

(3) Require grain test scales to have at least 500 scale divisions and that the value of the scale division be not greater than 0.5 gram.

The following chart depicts typical designs and tolerance applications that would result:

Cap. (Max)	(d)	n	Min. Tol.	Main. Tol. at Cap.
250 g	0.5 g	500	0.25 g	0.5 g (1d)
500 g	0.5 g	1 000	0.25 g	1.0 g (2d)
1 000 g	0.5 g	2 000	0.25 g	1.0 g (2d)

These criteria are consistent with O.I.M.L. requirements and the tolerances are based on International Recommendation #3 for class III scales.

(Item 303-2 was adopted)

303-3 Electronic Cash Registers/Tare Capability

A suggestion was received that, to facilitate enforcement, Handbook 44 should be amended to specifically require that electronic cash registers, when interfaced with weighing elements for use at supermarket check out stands, be equipped with a tare capability. The committee did address this subject in last year's report and will do so once again in hopes of settling this issue for all concerned. It is the view of the committee that a tare capability must be included in the design of these electronic cash registers in order to meet existing laws and regulations.

The specific law and regulation which should prove to be all the enforcement tool necessary to gain compliance is as follows:

- (1) Model State Weights and Measures Law, section 1.2. Weight, which defines "weight" as "net weight."
- (2) Handbook 44, Scale Code, paragraph S.1.6.4. Recorded Representations, Point of Sale Systems, which requires the recording of "Net Weight" for all items weighed by such a system.

Finally, it is the view of the committee that any of these systems which do not include a tare capability would not meet the requirement of these two paragraphs and the jurisdictions should enforce these provisions accordingly.

(Item 303-3 was adopted)

303-4 "Warm Up" Time

The committee discussed and heard comments during the interim meeting on the weighing problems caused when devices were used

prior to "being warmed up" for the time period recommended by the manufacturer. The committee carefully reviewed all those many comments and considered several approaches as a solution to the problem.

In the tentative report, the committee had recommended code amendment as follows:

Add the following non-retroactive paragraph:

S.1.4.2. Values Displayed, Temperature Conditions.—A digital indicating element shall not display any usable values until the operating temperature (warm up time) necessary for accurate weighing and a stable zero balance condition has been attained.

Since the publishing of the tentative report, the committee received several comments from members of SMA indicating concurrence with the philosophy expressed in this recommended specification paragraph. However, it was also their view that this design criterion may not be a proper solution to the problem. They have requested that action be deferred and have stated that they will present to the committee at its interim meeting in January their recommended solution.

Therefore, the committee recommends no code amendment at this time.

(Item 303-4 was adopted)

303-5 Sealing Digital Indicating Elements

The ease with which the span and zero potentiometers can be adjusted on digital electronic scales has raised the concern of weights and measures officials that these adjustments may be fraudulently changed without an indication to this effect. A suggestion was received to restrict access to these adjustable components by requiring a security seal to be applied which must be broken when an adjustment is made.

The committee believes this is an appropriate requirement for electronic indicating elements which are not permanently attached to weighing elements and to electronic computing scales since access to the adjustment potentiometers is relatively easy. It is not believed necessary to extend this requirement to adjustment potentiometers located in weighing elements since in many cases access to the adjustable components is more difficult. The committee feels that paragraph S.4.2. Adjustable Components for Weighing Elements is adequate.

The General Code Section G-UR.4.5. Security Seal states, "A security seal shall be appropriately affixed to any adjustment mecha-

nism designed to be sealed." Coupled with this requirement, it is only necessary to additionally require a provision for sealing these adjustable components to achieve the effect of requiring these components to be sealed. Therefore, it is recommended that a new non-retroactive paragraph be added under S.1. Design of Indicating and Recording Elements and of Recorded Representations to read:

S.1.8. Provision for Sealing Adjustable Components on Electronic Devices.—Provision shall be made for applying a security seal in a manner which requires the security seal to be broken before an adjustment can be made to any component affecting the performance of the device.

(Item 303-5 was adopted)

303-6 S.6.1.(c). Marking Requirements—Nominal Capacity

It has been interpreted that it is necessary to conspicuously mark all digital indicators with a capacity statement because the device capacity is not immediately evident.

The necessity of this requirement was questioned since digital scales are not permitted to display weight values above 105 percent of nominal capacity (S.1.4.1.). Also, since indicating elements are frequently designed to interface with weighing elements of different capacities, and because the capacity is not known until actual installation, this marking must be done by the installer.

The committee reviewed the comments it received and believes the capacity statement is beneficial and justified as an aid to prevent overloading the scale and conveys information to the customer which assists in the interpretation and understanding of the weight display. It is the committee's view that this statement should be of contrasting color with its background, so the device will be "conspicuously marked," and recommends this section be amended to clarify this requirement as follows:

S.6.1. Nominal Capacity.—The nominal capacity shall be conspicuously marked as follows:

(a) On any scale equipped with unit weights or weight ranges.

(b) On any scale with which counterpoise or equal-arm weights are intended to be used.

(c) On any automatic-indicating or recording scale so constructed that the ~~capacities~~ capacity of the ~~several individual~~ indicating and recording element or elements is not immediately apparent.

(d) On any scale with a nominal capacity less than the sum of the reading elements.

(Item 303-6 was adopted)

303-7 N.1. Testing Procedures

A suggestion was received that a note paragraph be developed to guide those in the field when determining the "width" of a digital zero indication for compliance with paragraph S.1.1.

It is the committee's view that this would more appropriately be a part of an examination procedure as published in the National Bureau of Standards Handbook 112, "Examination Procedure Outlines for Commercial Weighting and Measuring Devices," and requested the Office of Weights and Measures to develop such a procedure for circulation.

(Item 303-7 was adopted)

303-8 N.1.2.1. Zero Balance Shift

The committee received a recommendation that this note paragraph be made a "tolerance" paragraph and that the word "change" be used instead of "shift."

This paragraph was added by Conference action last year, and these recommendations were considered by the committee in developing its last year's report. In that report, the committee did encourage further comments from the Conference. On the basis of information it has received, the committee does not recommend any change from last year's recommendation; however, the subject will continue to be studied.

(Item 303-8 was adopted)

303-9 Electromagnetic Interference

The committee has made reference to E.M.I. and R.F.I. (Radio Frequency Interference), in its reports over the last few years. In its report to the 61st National Conference on Weights and Measures (NCWM), the committee referenced the work of the Scale Manufacturers Association (SMA) subcommittee formed to deal with this problem and the Conference adopted the Handbook 44 Code amendments recommended by that subcommittee. This group has continued to meet and at the interim meeting presented to the Specifications and Tolerances Committee a recommended RFI/EMI Field Test Procedure.

The committee wishes to express its appreciation to SMA for this fine work and recommends the endorsement of this procedure

by the Conference. Copies of the procedures have been sent to the States and will be available at the Conference for review.

(Item 303-9 was adopted)

303-10 T.1.2. To Scales With Multiple Elements

The committee received a comment that paragraph (b) could be misinterpreted to allow an out of tolerance condition on a device. To make certain that, although the difference between an analog and a digital indication may be as much as the value of the minimum graduated interval, for any test load, both values must be within tolerance limits. The committee recommends amendment by adding the following sentence to the end of this paragraph:

The values indicated and recorded shall be within applicable tolerances.

The committee was also advised that this requirement can be interpreted other ways than intended. A particular problem are those weighing systems equipped with digital indicators and "back up" analog indicators such as a weighbeam.

It is the view of the committee that the first sentence of paragraph T.1.2 applies to this equipment; i.e., tolerances are applied independently to each indicating element. To resolve this issue, the committee intends to develop clarifying language for this entire section at its next interim meeting in January, 1979, for action by the 64th NCWM.

(Item 303-10 was adopted)

303-11 T.1.8. To Sectional Tests on Vehicle, Livestock, and Railroad Track Scales

A comment was received that officials were having a difficult time understanding the reference to "absolute value" of a tolerance, and that this paragraph should be amended for clarification purposes. The committee recognizes the problem, but feels that this reference will have increased use in the future and since this paragraph was only added last year, this judgment may be too hasty.

It is the view of the committee that "absolute value" as used in this paragraph is appropriate since that is the very basis of the performance criteria expressed and urges all officials to communicate in order to develop a complete and mutual understanding of this term.

(Item 303-11 was adopted)

303-12 T.3. Basic Tolerance Values for Grain Hopper Scales.

A comment was received that in this section it is difficult to determine the tolerance applicable to grain hopper scales. The committee agrees and recommends the following:

Amend T.3.1. General as follows:

T.3.1. General.—Except for prescription, jewelers, cream-test, moisture test, animal, livestock, crane, axle load, hopper (other than grain hopper), vehicle, and railway-track scales, wheel load-weighers, and monorail scales, equipment specified in paragraphs T.3.2 through T.3.8. the basic maintenance and acceptance tolerances shall be as shown in Table 4 (for scales indicating or recording in avoirdupois units) and table 5 (for scales indicating or recording in apothecaries or metric units). Basic tolerance values include the minimum tolerance values as set forth in section T.2).

Add a new paragraph to read:

T.3.5.1. For Grain Hopper Scales.—The basic maintenance tolerance shall be 1 pound per 1,000 pounds of test load (0.1 percent). The acceptance tolerance shall be one half of the basic maintenance tolerance.

Amend the heading of table 4 as follows:

TABLE 4.—BASIC TOLERANCES FOR SCALES INDICATING OR RECORDING IN AVOIRDUPOIS UNITS, EXCEPT FOR PRESCRIPTION, JEWELERS, CREAM-TEST, MOISTURE TEST, ANIMAL, LIVESTOCK, CRANE, AXLE LOAD, HOPPER (OTHER THAN GRAIN HOPPER), VEHICLE AND RAILWAY TRACK SCALES, WHEEL LOAD-WEIGHERS, AND MONORAIL SCALES. EQUIPMENT SPECIFIED IN PARAGRAPH T.3.2. THROUGH T.3.8.

(Item 303-12 was adopted)

303-13 Value of the Scale Division for Unusually Large Vehicle Scales.

The committee received a recommendation once again to amend Handbook 44 to require the value of the scale division to be not greater than 20 pounds on vehicle scales with capacities less than 400,000 pounds. This resulted in a continuation of the discussion of last year precipitated by a similar recommendation.

It is the view of the committee that specifying the value of the scale division without considering the scale capacity and the magnitude of loads to be weighed is inappropriate, and the philosophy expressed in the OIML International Recommendation is more sound. Therefore, the committee repeats its recommendation made in last year's report in part as follows:

It was determined that if it is deemed appropriate to use a 25-pound capacity scale to weigh 2 pounds of shrimp at \$10.00 per pound, to the closest 0.01 pound [in this instance the number of scale divisions is 2500 and the ratio of the load (2 lb) to the value of the scale division (0.01 lb) is 200:1]; that it is equally appropriate to weigh a 200,000-lb load on a 500,000-lb capacity scale to the nearest 100 lb. In this instance the number of scale divisions is 5000 and the ratio of the load (200,000 lb) to the value of the scale division (100 lb) is 2000:1. Thus, the precision provided is 10 times better when weighing sand and gravel, etc., on the large scale, than when weighing shrimp at retail. Another example considered was the weighing of 7500 lb of hogs (30 hogs averaging 250 lb) to the closest 5 lb, which provides a ratio between the load and the value of the scale division of 1500:1.

Therefore, the committee wishes to recommend that the scale industry and weights and measures officials encourage the sale and use of scales equipped with from 1000 to 6000 divisions for most commercial operations.

In response to the recommendations and comments received the committee recommends amendment of the code as follows:

Change the definition of the vehicle scale to read:

vehicle scale. One adapted to weighing highway vehicles and larger industrial vehicles.

In paragraph UR.4.4., strike the word "highway" in the first and second lines.

Amend UR.1.1.6 to read:

U.R. 1.1.6. For Vehicle Scales and Axle-Load Scales Used in Combination.—The value of the smallest division on a scale or scales used to determine the weight of a vehicle shall be as follows:

- (a) For scales with capacity up to and including 120,000 lb, not greater than 20 lb.
- (b) For scales with a capacity of more than 120,000 lb up to and including 300,000 lb, not greater than 50 lb.

- (c) For scales with a capacity of more than 300,000 lb not greater than 100 lb.

A motion was made and seconded to amend this item as follows:
In the fourth paragraph, delete "6000" and insert "10,000."

Change the recommended UR.1.1.6 to read:

UR.1.1.6. For Vehicle Scales and Axle-Load Scales Used in Combination.—The value of the smallest division on a scale or scales used to determine the weight of a vehicle shall be as follows:

- (a) For scales with capacity up to and including 200,000 lb, not greater than 20 lb.
- (b) For scales with a capacity of more than 200,000 lb, not greater than 50 lb.

A lengthy discussion ensued and many delegates offered comment. The motion to amend was defeated.

(A motion to table the entire item 303-13 was made, seconded and passed.)

303-14 U.R.1.1 Value of the Scale Division for Small Capacity Scales

The committee received two communications with recommendations for establishing a minimum for the value of scale divisions on scales of less than 500 pound capacity.

The committee, many times over the last few years, has received similar requests but it has been unable to respond because there are too many scales with too many different applications to develop a minimum graduated interval for every application.

For example, what minimum graduate interval values should be specified for scales used for weighing grass seed in 1-lb or 2-lb boxes, or 5-lb or 10-lb bags, or 50-lb or 100-lb bags? Scales with similar capacities could be used for weighing nails in similar quantities; i.e., 1 lb or 2 lb, or 5 lb or 10 lb, or 50 lb or 100 lb. And then again, the scale may be used for random weighings, or to weigh other products like precious metals, grains, seed corn, fertilizers, sand, cement, etc.

It is the committee's view that when the philosophy and principles expressed in the O.I.M.L. documents previously discussed in this report are incorporated into U.S. requirements, this appar-

ent problem will be solved. In the meantime, as an aid to Conference members, the committee offers the following advice:

When a field official encounters a piece of equipment in use, he must always apply the considerations specified in G-UR.1.1. Suitability of Equipment. With respect to the scale capacity and the value of the scale divisions, most times, the code will provide definitive answers. However, in the absence of definitive requirements, the following criteria should help him in making this decision:

- (1) Is the device being used consistent with available technology?
- (2) The device should have at least 400 scale divisions, and as the magnitude of the quantity being weighed increases and the relative value of the product increases, this can be increased to 1,000 or 2,000. For example, a 500-pound bench dial scale for wholesale weighing of fresh meat in quantities from 20 pound to 500 pounds (25:1 ratio) should have at least 1,000 divisions which will provide a minimum division of 0.5 pound and should not be used for weighing less than 10 pounds (20d).

If a 20-pound capacity scale is being used for weighing specified amounts of nails from 1 pound to 20 pounds, the value of the scale division could be as much as $\frac{1}{2}$ oz; the minimum weighing then would be 10 oz (20d) and the number of scale divisions would be 640.

A 5-pound scale can be used to weigh various commodities in random or specified amounts. If the product is granular or in small particles, relatively expensive, and to be weighed in random amounts, a beam scale with $\frac{1}{32}$ -oz divisions ($n = 2,560$) could well be appropriate. By the same token, 5-pound scales are available with $\frac{1}{16}$ -oz ($n = 1,280$) or $\frac{1}{8}$ -oz ($n = 640$) divisions. For less expensive products, and/or specified quantities, either of these would be appropriate. To summarize the principal considerations:

- (1) The smallest amount to be weighed should be equal to at least 20d. However, if the weighing range ratio (heaviest load divided by the lightest load) is quite small, such as 2:1, the lightest load to be weighed should be equal to at least $\frac{1}{4}$ of the scale capacity.

- (2) The number of scale divisions should be at least 400 and in many cases will be 1,000 or 2,000.

- (3) The device should be consistent with the best technology generally used by others for the same or similar weighing application.

At the present time, this is the best the committee can offer. Code amendments are not recommended since they would neces-

sarily have to be minimum and in certain applications it would make appropriate technology more difficult to require.

(Item 303-14 was adopted)

303-15 UR.3.2. Minimum Load on Vehicle Scale

A suggestion was received that in order to avoid any possible misinterpretation of the application of this paragraph, it should be amended by adding the word "net" before the word "load". The committee recommends amendment as follows:

UR.3.2. Minimum Net Load on Vehicle Scale.—A vehicle scale shall not be used for weighing a net load less than an amount equal to 50 scale divisions.

(Item 303-15 was defeated following considerable debate on this recommended amendment.)

304 CODE FOR BELT CONVEYOR SCALES

T.2. Tolerance Values

The committee addressed this subject in its report of last year and on the basis of the information and data available at that time recommended no tolerance change. The information data made available to the committee since that time does not, in the view of the committee, justify a different recommendation at this time.

A motion was made and seconded to amend this item by recommending code amendment of tolerance paragraph T.2 to reduce tolerance value from 0.5 percent of test load to 0.25 percent.

(A motion to table item 304 was made and passed following considerable discussion on the proposed amendment.)

305 CODE FOR LIQUID MEASURING DEVICES

305-1 Vapor Recovery: Stage II

Tentative specifications and tolerances were presented at the 1977 National Conference on Weights and Measures (NCWM) to limit delivery errors which may result from the recycling of fuel through Stage II vapor recovery systems. A proposed test procedure was distributed for comment in September 1977.

Several comments have been received which have resulted in changes to the test procedure, but only minor changes to the specifications and tolerances presented at the 1977 NCWM. The com-

ments raised several questions concerning the effect of evaporation caused by vacuum assist systems on the delivered quantity, and the recycled fuel measured during a test of a system. The value of 0.02 percent was questioned in terms of practicality. A relatively simple field test procedure is needed to periodically test a vapor recovery system to determine if it is operating properly. Recommendations have been received to initiate a study to control and limit the spillage resulting from refueling motor vehicles. Many of these should be addressed before final requirements are adopted.

It is therefore recommended that the tentative requirements presented at the last NCWM be updated along with the test procedure and that they remain tentative for another year. Adoption of final criteria would be scheduled for a future NCWM. A field test procedure should be developed to verify that systems are performing properly.

The proposed test procedures and criteria are primarily intended for the type certification of a stage II vapor recovery system. A system would be subject to certification in each State where it is to be used. Each State has the option to test a system or to accept the results of tests conducted in other States. If the same model system is used by several oil companies, only one certification test is necessary in each State for the system.

The new proposed test procedure calls for the exclusion of test results when the system is not used in the proper manner, that is, not according to the manufacturer's directions. This will include those instances where the operator "tops off" the fuel tank or misuses the equipment in any other manner. Under these conditions, these test results are not expected to be strongly dependent upon the operator. Therefore, a system may be tested in either a self-service or full-service station and the system may be certified for both uses if it passes the test. The selection of a station will be decided by the State and the company involved.

The tentative specifications which will apply to vapor recovery systems are:

S.3.1.1. Vapor recovery. A motor-fuel device with a vapor recovery system shall be equipped with

- (a) effective means automatic in operation to stop the liquid flow when the receiving vessel is full, and
- (b) effective means automatic in operation to prevent the passage of liquid through the vapor return line.

T.2.5. Vapor Recovery Systems Test. In a vapor recovery system test, the quantity of measured product recycled during a delivery shall not exceed

- (a) 0.2 percent of an individual delivery, and
- (b) 0.02 percent of the total fuel delivered to the 200 or more vehicles fueled during the test period.

Part (b) of S.3.1.1. may be complied with by either a special device incorporated in the system to prevent recirculation of fuel or may be achieved through the basic design of the system. Conformance with S.3.1.1. shall be determined by applying the tentative tolerances set forth in T.2.5. and using the prescribed test procedures.

The recycled fuel is determined by measuring the fuel in the liquid trap, not the vapors which were generated. The philosophy behind the tolerance in T.2.5. (a) is to maintain a level of accuracy consistent with the current metering tolerance of $0.5 \text{ in}^3 / \text{gal}$. The 0.2 percent of an individual delivery is approximately $0.5 \text{ in}^3 / \text{gal}$. The tolerance in T.2.5. (b) is based on the belief that vapor recovery systems should not routinely recycle quantities up to 0.2 percent and was obtained empirically by evaluating the test results available in 1977. Although the practicality of this value has been questioned, sufficient test results have not been presented to result in a change in this value at this time.

As a result of a meeting with petroleum industry representatives, the test procedure has been modified. The value of formal test procedures complete with drawings of equipment, definitions, and detailed explanations as requested during the meeting is recognized. Formalizing the test procedure is planned as the tentative requirements advance to final adoption. At this time, the test procedures are presented in an informal manner to transmit the latest ideas for testing vapor recovery systems. More detailed information on the test equipment and procedures will be provided at a later date.

Equipment Needed

A liquid trap, a graduated measure, a pressure gage sensitive to 0.1 inch water column with a reading capacity up to 10 inches of water column, adapters with pressure traps (for vacuum assist systems) to be installed in the vapor return lines immediately behind the nozzle to measure the operating pressure (the adapters are to be provided by the company submitting the system for a test), a hose to connect the pressure gage to the adapter tap, and a 5-gallon test measure with a fill pipe adapter equipped with a pressure tap.

Test Procedure

(1) Install a liquid trap in the vapor return line at the base of each dispenser. All the gasoline pumps should be equipped with fuel traps to catch any recycled fuel.

(2) A minimum of 200 vehicles shall be included in the test. The test sample should consist of 200 consecutive vehicles serviced by the station. At least 40 percent (80 vehicles) of the 200 sample vehicles shall be fueled using the unleaded gasoline dispensers.

(Note: This ratio closely represents the current ratio of cars requiring unleaded fuel to the total U.S. automobile population. This will allow the sample ratio to vary to a limited extent to reflect the vehicle populations of each State. This will also permit flexibility to deal with the changing proportions which will exist from year to year.)

Exclude from the sample any deliveries less than 5 gallons or more than 30 gallons, since these deliveries may influence the test results in an unrepresentative manner. Also exclude any deliveries involving "topping off" or other misuse of the equipment.

Vehicles with owner modified fuel pipes or which have trailer hitches which interfere with nozzle insertion should also be excluded from the test.

A suggestion was received that vehicle models may be identified through experience as being "problem vehicles" and should be excluded from the test. This suggestion will be considered if State certification programs demonstrate a need for such a classification. At the present time, there are no vehicles recognized as problem vehicles.

(3) After each fuel delivery, raise the vapor return line to transfer any fuel in the line to the liquid trap. Measure the recycled fuel by emptying the liquid trap into the graduated measure. Record the vehicle information which will be used to determine if any fueling problems are caused by particular vehicles or fill pipe configurations.

(4) Vacuum assist systems only. Measure the pressure at which the system is operating by using the adapter installed behind the nozzle. Also, make a delivery to the 5-gallon measure and obtain the pressure reading at the pressure tap on the test measure fill pipe adapter. This pressure reading will be used as a reference point to monitor the system's operating pressure at later dates since the effectiveness of a system may vary with the operating pressure.

If the test results are not within the tentative performance levels specified in T.2.5., the system fails. A vapor recovery system which

fails a certification test must undergo another 200 vehicle test to demonstrate compliance with the applicable specifications and tolerances before certification is granted.

The committee wishes to express its appreciation to Dr. Olaf Leifson and the California Division of Measurement Standards for their continued work in the area of vapor recovery and their valuable contributions to the development of the tolerances, design and performance criteria, and test procedures.

(Item 305-1 was adopted)

305-2 S.1.4.4. Money Value Computations

The discussions concerning mathematical agreement on retail fuel devices when the price per gallon exceeds \$1.00 have revealed some misunderstanding of the applicability of this section to digital computing devices, and specifically whether or not 1 cent money value divisions are required. It is the committee's view that the sentences, "Value graduations shall be supplied and shall be accurately positioned." and "The value of each graduated interval shall be one cent," in paragraph S.1.4.4. apply only to analog computing devices. These references do not apply to digital devices since digital devices do not have graduations or graduated intervals, rather they have digital divisions and display values in discrete steps.

The misunderstanding that digital retail fuel devices must indicate total prices in 1 cent money intervals gave rise to the subsequent erroneous argument that digital devices must indicate measured quantities to 0.001 gallon. This is not necessary since digital devices are not required to have 1 cent intervals. It is acceptable for retail devices to indicate the measured quantity to 0.01 gallon and multiply the quantity indication by the unit price as a calculator function to obtain the total price to the nearest cent.

The decreasing value of the penny due to inflation is reflected to an extent in the rising price of retail gasoline. Section S.1.4.4. currently requires 1 cent intervals on analog computing devices but this requirement was written more than 30 years ago when gasoline prices were substantially lower than today's prices. It is certainly not appropriate to require 1 cent intervals as the unit price continues to increase. A maximum money value division for both analog and digital devices should be specified to place the two technologies on an equal basis and relate the money value divisions to the unit price to reflect the actual monetary value of 1 cent. The committee believes that the appropriate maximum money values for various unit prices should be 1 cent for unit prices through \$1.00 per gallon, 2 cents for unit prices above \$1.00 through \$2.00,

3 cents for unit prices above \$2.00 through \$3.00 per gallon, and so on. This would not preclude the use of smaller money value divisions but the smaller values would not be mandated by this approach.

Device manufacturers and retail fuel marketers may express a concern that these money value divisions will not provide for sales of whole dollar amount of gasoline for all unit prices. For example, at \$3.00 per gallon and using 3 cent money values, it is not possible to sell \$10.00 worth of gasoline. It will be either \$9.99 or \$10.02. The committee wishes to emphasize that if industry believes it is essential to sell in whole dollar amounts, the option exists for the manufacturers and marketers to use smaller money value divisions than the maximum divisions specified. However, this decision should not be mandated through a requirement in Handbook 44.

The committee wishes to repeat the position it has taken in the final reports of 1976 and 1977 as adopted by the National Conference on Weights and Measures and as expressed elsewhere in this report. Mathematical agreement to the nearest money value division between the quantity and total price is an essential component in computing devices. Although the committee does not believe 1 cent money value divisions are necessary, it does believe the mathematical agreement should be required to the nearest money value division on the device.

The committee recommends S.1.4.4. Money Value Computations be amended to reflect these considerations in the following manner:

S.1.4.4. Money Value Computations.—Money-value computations on a retail device shall be of the full-computing type in which the money value at a single unit price, or at each of a series of unit prices, shall be computed for every delivery within either the range of measurement of the device or the range of the computing elements, whichever is less. Value graduations shall be supplied and shall be accurately positioned. The value of each graduated interval shall be 1 cent. Money value divisions shall not be greater than 1 percent of the unit price rounded up to the next higher cent. Any analog money value indication shall be in mathematical agreement with its associated quantity indication to the nearest money value graduation.

Examples of this requirement are as follows:

Unit Price	x 1%	Maximum Money Value Division
\$1.599	\$0.01599	\$.02
1.999	0.01999	.02
3.009	0.03009	.04
4.000	0.04000	.04

305-3 "Meter"—"Metering"—"Measuring"

The committee received a comment that these terms were used inappropriately in the Code for Cryogenic Liquid-Measuring Devices. The comment included a recommendation that the word "measured" would be more correct than "metered" and the word "device" or the term "measuring system" would be more correct than "meter." The committee agreed with that comment and that it applied to the Liquid-Measuring Devices Code and the Liquefied Petroleum Gas Code as well. However, the committee feels that re-printing all of these codes to accommodate this change is too extensive and recommends that these changes be made when others are necessary or when the next edition of Handbook 44 is published.

(Item 305-3 was adopted)

306 CODE FOR VEHICLE TANK METERS

306-1 Temperature Compensator Technology

The committee was asked, "Since the Code for Vehicle Tank Meters does not contain any reference to automatic temperature compensators (a.t.c.), does this preclude the use of automatic temperature compensators on vehicle tank meters? The committee believes this to be the intent of the Conference. The committee was then requested to include requirements in the code, both technical and user requirements, in recognition of this technology and method of sales. It is the view of the committee that this can be done quite simply; however, it would be remiss in so doing without other steps being taken first.

The committee feels that its first responsibility is to inform the Conference on certain implications arising from the recognition of temperature compensation and some other questions in need of answers. If this code were so amended, which of the products being measured by these devices can be sold on a temperature compensated basis? Any product measured by a vehicle tank meter such as gasoline, fuel oil #1, #2, naptha, liquid feed, liquid fertilizer, or milk? If it pertains to all of them, what then is the correct cubic coefficient of thermal expansion for all of these products?

Let us assume that temperature compensation is to apply only to petroleum products; then this is answered since there are ample density tables available for most petroleum products. This brings us to the next question.

Can anyone use temperature compensation for a given product at his own pleasure? The committee response is an emphatic "no"

and believes this to be the key to the entire issue. It is the view of the committee that if temperature compensation is recognized by code amendment, then for a given product all companies within a State must use temperature compensation at all times or temperature compensation shall not be used by any company for that product. This is simply saying that a uniform standard must be provided for the conduct of commerce, and that if one company were to use temperature compensation and another company did not, two different standards would be in use and unfair competition and consumer misunderstanding will result.

It is the view of the committee that in any transaction in which volume is expressed at a temperature other than product temperature at time of sale, it is necessary to stipulate by regulation the standards or conditions which prevail. Therefore, before the code is amended to recognize temperature compensation, the following must precede this action:

Each State will need to determine which products can appropriately be sold on a temperature compensated basis. It will then be necessary to establish by regulation which products are to be temperature compensated, indicating that it is applicable at all times by the entire industry within each State. This regulation would be similar to paragraph 6.4 (b) in the Model State Packaging and Labeling Regulation which establishes standard temperatures for certain products. This paragraph reads in part as follows:

“(b) Units: Weight, Measure.—A declaration of quantity in units of liquid measure shall be in terms of the United States gallon of 231 cubic inches or liquid-quart, liquid-pint, or fluid-ounce subdivisions of the gallon, and shall express the volume at 68°F (20°C), except in the case of petroleum products, for which the declaration shall express the volume at 60°F (15.6°C),” . . .

This regulation simply sets a uniform standard that all canned motor oil sold by all companies, at all times must be on the basis of a 60°F volume. It does not allow any particular oil company to make a choice. This assures that all purchasers receive the same quantity regardless of the supplier. The committee recommends that individual States hold public hearings with industry and consumer involvement in order to determine whether or not temperature compensation for certain products should be used.

After this has been accomplished, it will be necessary to reference by regulation specific tables so that a uniform standard is established and those choosing not to obtain automatic temperature compensators can temperature compensate by determining the product's temperature during the measurement process and make the correction with the legal table.

So that each State may explore all of the impact of temperature compensation, the committee does not recommend code amendment at this time.

At the open meeting, the API suggested that a joint NBS/NCWM/API symposium be held to aid the members of NCWM in exploring all of the issues and to develop appropriate model regulations.

The committee concurs with this suggestion and will proceed on that basis.

(Item 306-1 was adopted)

306-2 N.4.2. Special Tests (Except milk-metering systems)

The committee received comment that this paragraph was being misinterpreted and in need of clarification. In response to this request and to make certain the weights and measures officials understand that special tests are necessary, the committee recommends this paragraph be amended as follows:

N.4.2. Special Tests (Except milk-metering measuring systems).
—“Special” tests shall be made to develop the operating characteristics of a metering measuring system and any special elements and accessories attached to or associated with the meter, shall be made as circumstances require device. Any test except as set forth in N.4.1. shall be considered a special test. Special tests of a meter-measuring system shall be made as follows: . . .

To be consistent, this same change should be made to paragraph N.4.2. as it appears in the Liquid-Measuring Devices, LPG-Liquid-Measuring Devices, and LPG-Vapor-Measuring Device Codes. However, the committee feels that a reprint of all of those pages is unnecessary to accommodate this change and recommends that the Office of Weights and Measures make those Code changes when other amendments require replacement sheets.

(Item 306-2 was adopted)

307 CODE FOR CRYOGENIC LIQUID-MEASURING DEVICES

307-1 S.2.1. Vapor Elimination

Accuracy in a liquid measurement process requires the removal of vapor from the liquid before the liquid is measured. A comment was received which revealed this section of the code applied only

to pumpless measuring systems. It is the intent of the committee that vapor elimination be required in all cryogenic liquid-measuring systems. The committee recommends this section be amended to read:

3.2.1. Vapor Elimination. A ~~pressure activated- (pumpless)-~~ metering measuring system shall be equipped with an effective vapor eliminator or other effective means to prevent the passage of vapor through the meter device where such vapor will cause overregistration of or tend to damage or degrade the meter device. Vent lines from the vapor eliminator shall be made of metal tubing or some other suitably rigid material.

307-2 S.2.2. Directional Flow Valves

Directional flow valves which automatically prevent the reversal of liquid flow are considered an essential component of metering systems where this situation could occur. Reversal of flow can and does occur in cryogenic liquid-measuring systems when valves are operated in an incorrect sequence. The committee believes automatic directional flow valves should be required on cryogenic systems but their installation is not required under section S.2.2. The committee recommends S.2.2. be amended to include this requirement as follows:

S.2.2. Directional Flow Valves.—A valve or valves or other effective means, automatic in operation, to prevent the reversal of flow shall be installed in or adjacent to the measuring device.

(Item 307-2 was adopted)

307.3 N.7. Automatic Temperature Compensation

Cryogenic liquid-measuring devices are permitted to have automatic temperature or density compensating mechanisms but the note section does not require a test of the compensators when they are present. To correct this oversight and to clarify that the temperature or density compensators should be tested whenever they are present in the measuring system, the committee recommends adding a new note section as follows:

N.7. Automatic Temperature Compensation.—If a device is equipped with an automatic temperature or density compensator the compensator shall be tested by comparing the quantity indicated or recorded by the device with the compensator connected and operating, with the actual delivered quantity cor-

rected to the normal boiling point of the cryogenic product being measured.

(Item 307-3 was adopted)

308 CODE FOR WIRE- AND CORDAGE-MEASURING DEVICES

N.1. Testing Medium

A particular State commented that they have been testing these devices with readily available $\frac{3}{8}$ -inch wide steel tapes and experiencing no problems. In the absence of any data supporting the $\frac{1}{2}$ -inch width presently required, the committee assumes the $\frac{3}{8}$ -inch width tape will accomplish the purposes intended and recommends this paragraph be amended accordingly.

(Item 308 was adopted)

309 CODE FOR TIMING DEVICES

N.1. Test Method

To correct an oversight by the committee in amending this paragraph last year in recognition of digital timepieces, the committee recommends this section be amended as follows:

N.1. Test Method.—A timing device shall be tested with a timepiece with an error of not greater than plus or minus 15 seconds per 24-hour period. In the test of timing devices with a nominal capacity of 1 hour or less, stopwatches with a minimum division of not greater than one-fifth second shall be used. In the test of timing devices with a nominal capacity of more than 1 hour, the value of the minimum division on the timepiece shall be not greater than 1 second. Timepieces and stopwatches shall be calibrated with standard time signals as described in National Bureau of Standards Special Publication 432, NBS Time and Frequency Dissemination Services, or any superseding publication.

(Item 309 was adopted)

310 OTHER ITEMS

310-1 Marking—"Not Sealed"

The committee received several communications and heard many comments at the interim meeting on this subject. Since this subject has been discussed at the regional association meetings, the committee does not wish to present lengthy comments in this

report. It is the view of the committee that there is some merit to the idea on a voluntary basis. However, the committee does not believe that the Conference is prepared to take action on a law or regulation at the present time and recommends that discussions continue at the regional and local level.

(Item 310-1 was adopted)

310-2 Marking—Equipment Not Designed to Handbook 44 Requirements

The committee addressed itself to this issue in its report to the 61st National Conference on Weights and Measures. It was expressed in that report that Handbook 44 would not be the appropriate document to require such marking. It further recommended that some enforcement action should be taken when equipment obviously not intended for commercial use is advertised with a reference to meeting the requirements of the National Bureau of Standards Handbook 44.

At the interim meeting, the committee received many and varied comments on this subject from those attending. The committee decided that this is a many faceted problem and it is extremely difficult to set forth by regulation the particular equipment to be marked. For example, is it necessary to mark rulers intended for use by high school students and or non-commercial measures such as measuring cups or oil cans intended for use by individuals?

It is the committee's view that there is a need for some action to be taken but the committee cannot make a positive recommendation at this time. However, this subject should continue to be studied and discussed in the hope that an appropriate resolution of this issue will eventually develop.

(Item 310-2 was adopted)

310-3 Sphygmomanometers

A communication was received indicating that with the extensive availability of these devices, both for purchase or as coin-operated machines, a standard specifying design and performance criteria was needed to protect consumers. The committee most heartily agrees; however, since this is a medical device, the responsibility for the development of such a standard is that of the Food and Drug Administration. Therefore, the committee turned this item over to the Liaison Committee for their action.

(Item 310-3 was adopted)

310-4 Kilowatt Hour Meters

The committee received a request that a code be developed for these devices usually used to measure the consumption of electricity in households.

The committee did not have sufficient time to deal with this request and will include it on its "future items" agenda.

(Item 310-4 was adopted)

310-5 Federal Grain Inspection Service (FGIS)

At its meeting on Sunday prior to the open meeting, the committee heard comments from the representatives of USDA-Federal Grain Inspection Service (FGIS) concerning their program. The committee was also presented with "Chapter III—Weighing Division Handbook." This publication contained a number of requirements applicable to railroad track, vehicle, hopper and portable scales used for weighing grain that are different from the requirements of NBS Handbook 44. It was the view of the committee that the implementation of these conflicting requirements is premature and that these issues must first be fully explored by all members of the National Conference on Weights and Measures. The committee communicated this information to the Resolutions Committee so that a resolution indicating this view could be presented for Conference action. The committee will develop a response to the USDA on these proposed regulations and recommends that all jurisdictions respond to USDA and would appreciate receiving a copy of this correspondence.

(Item 310-5 was adopted)

(Motion was made and passed to remove items 303-13 and 304 from the table and have the committee continue its study on these matters for consideration by the Conference next year.)

M. L. KINLAW, North Carolina, *Chairman*

J. R. BIRD, New Jersey

G. L. DELANO, Montana

D. GUENSLER, California

F. NAGELE, Michigan

O. K. WARNLOF, *Staff Assistant*, NBS

H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Specifications and Tolerances

(On motion of the committee chairman, the report of the Committee on Specifications and Tolerances voting key items 300 through 310-5 was adopted)

in its entirety and as amended by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totalized in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on Specifications and Tolerances*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
300	44	0	70	0
301	47	1	74	0
302-1	44	0	74	0
302-2	44	1	74	1
302-3				
302-4				
302-5				
303-1	46	0	78	1
303-2	45	0	78	0
303-3				
303-4	43	1	79	0
303-5	27	9	30	29
303-6	40	0	76	0
303-7				
303-8				
303-9				
303-10	45	0	79	0
303-11				
303-12				
303-13A	34	11	42	34
303-13T	39	4	80	3
303-14	45	0	72	0
303-15	23	17	35	46
304T	39	4	73	5
305-1	45	0	73	0
305-2	37	1	72	0
305-3	40	2	76	0
306-1	45	0	80	0
306-2	45	0	76	0
307-1				
307-2				
307-3				
308				
309				
310-1				
310-2	45	0	76	0
310-3				
310-4				
310-5	45	0	76	0
310-5				

REPORT OF THE COMMITTEE ON EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS

Presented by STEVEN A. MALONE, Administrator, Division of Weights and Measures, Department of Agriculture, State of Nebraska.

(Thursday, July 13, 1978)

VOTING KEY

400

INTRODUCTION



The Committee on Education, Administration, and Consumer Affairs submits its final report to the 63rd National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement, and as amended by the final report. The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

401

NATIONAL WEIGHTS AND MEASURES WEEK

Mr. Steve Malone of the State of Nebraska who serves as the national chairman of the week is sincerely commended by the committee for his national leadership in securing promotional materials and particularly for his efforts in bringing to the attention of the U.S. Congress the importance of weights and measures week.

Mr. Malone communicated with 168 weights and measures jurisdictions asking them to name a weights and measures week coordinator. He received replies from 123 jurisdictions. He also contacted 134 businesses that had attended the 1977 National Conference on Weights and Measures asking for their support of the week. The committee wishes to recognize and thank the following regional coordinators who helped in the promotion of the week in their regions: Walter Junkins of Pennsylvania representing the Northeast Conference, Dr. Charles Greene of New Mexico representing the Western Conference, Ronald Harrell of Baton Rouge, Louisiana representing the Southern Conference, and Mr. Malone representing the Northwest.

Once again the committee is grateful to Ray Lloyd and the Scale Manufacturers Association for supplying each jurisdiction

with promotional kits and bumper stickers. Sincere thanks are also extended to Tom Stabler and Toledo Scale Division of Reliance Electric Company for providing gummed weights and measures week seals for affixing to envelopes and correspondence. Sincere appreciation is also extended to Ellis Fitzgerald and Fairbanks Weighing Division of Colt Industries for printing and distributing the third man posters.

To continue the established process of naming a National Weights and Measures chairman during the interim meeting, Mr. Tony Ladd, Superintendent, Weights and Measures, Consumer Protection, 1420 Triplett Boulevard, Akron, Ohio 44306, was named by the committee to serve for the 1979 week. The committee also recommends, if possible, that all weights and measures week coordinators for 1978 be used in 1979. In this way, experience gained in 1978 should make 1979 even more efficient and productive.

In order to meet news media deadlines, the committee intends to yearly announce the theme for National Weights and Measures Week at the National Conference in July and to arrange for publicity packets to be distributed no later than October each year.

Accordingly the theme for the 1979 week will be "WEIGHTS AND MEASURES IS CONSUMER PROTECTION."

Effort will continue to be made to obtain a Presidential proclamation proclaiming March 1-7 as National Weights and Measures Week.

PROMOTIONAL ACTIVITIES

1. The committee has made contact with a supplier of quality neckties, in assorted colors, imprinted with equal arm balances. These ties will be available for sale at the National Conference for \$6.50 each.

2. The weights and measures medallions have been completely sold out and the proceeds turned over to the Accounting Department of NBS to be used for the production of the new weights and measures film.

3. The committee has designed and obtained a supplier for an attractive National Conference membership plaque. Plans are being made to have them available for sale at the National Conference for \$5 each. These wall plaques are appropriate for all classes of membership of the conference.

The new 16-mm color film titled "The Marketplace" has been completed and will replace the film "Assignment Weights and Measures" in the NBS Film Library. This excellent film will be shown at the National Conference in July and the committee is making arrangements to offer the film for sale to weights and measures jurisdictions and associate members of the National Conference at very modest cost.

404 WEIGHTS AND MEASURES PROGRAM EVALUATION

As endorsed by the 62nd National Conference at Dallas a task force was established to work with the committee to develop guidelines for weights and measures program evaluation. The committee would like to extend its sincere thanks to the task force members: Marion Kinlaw of North Carolina, Darrell Guensler of California, Tom Stabler of Toledo Scale Company, Ellis Fitzgerald of Fairbanks Weighing Division, Colt Industries, and Henry Oppermann of the Office of Weights and Measures for their input and help in the preliminary development of the program evaluation. From the combined efforts of the committee and task force, a timetable for the development of the evaluation program and an outline of program areas to be evaluated has been developed. The committee submits the following outline of program areas to be evaluated and a recommended timetable for conference consideration:

- (1) Laws and Regulations
 - 1.1 National Conference on Weights & Measures models
- (2) Standards
 - 2.1 Laboratory
 - 2.2 Field
- (3) Personnel
 - 3.1 Administrative
 - 3.2 Clerical
 - 3.3 Field
 - 3.3.1 Number
 - 3.3.2 Qualification
 - 3.3.3 Training
- (4) Budget
 - 4.1 Salary
 - 4.2 Physical Plant
 - 4.3 Supplies
 - 4.4 Equipment

- (5) Administration
 - 5.1 Policy
 - 5.2 Records
 - 5.3 Planning
 - 5.4 Training
 - 5.5 Enforcement
 - 5.6 Test Procedures
 - 5.7 Supervision
 - 5.8 Cost Benefit
 - 5.9 Public Education

Timetable

- 1979—Develop criteria for implementing program
- 1980—Implementation—funding—Who? When? How?
- 1981—First evaluations—review
- 1982—Evaluate and review entire program

The committee recognizes that a continuing program of both internal and external evaluation is a necessary ingredient for a truly effective weights and measures program. It is the intent of the committee to provide the basis for such a program. The program will be completely voluntary and available for those who feel that benefit can be derived from its use.

The overall objective of this program is to identify both strengths and weaknesses of existing enforcement programs and to provide a mechanism to be used for upgrading where appropriate.

The committee expects and solicits continued support and input from the task force members and urges all other conference members to provide ideas, concerns, and suggestions as the program progresses.

The committee wishes to express its sincere appreciation to Mr. Darrell Guensler of California for his excellent presentation on the California program evaluation system.

405

RECORDING OF CONFERENCE SESSIONS

Members of the conference have expressed their desire to obtain cassette tapes of certain conference proceedings. In order to determine if there is sufficient interest in this project, the committee plans to develop a brief questionnaire to be filled out and collected during the National Conference in July.

406

OIML BROCHURE

In an effort to better inform and educate conference members in the organization, functions, and U.S. participation in the Inter-

is aware of the fact that budget cuts and personnel and travel ceilings at OWM during recent years are primarily responsible for this problem. It is hoped that with the reorganization that is taking place at NBS proper attention will be given to increased funding and staffing for OWM so that these valuable services to the State and local weights and measures officials may be continued and expanded where appropriate.

410

COST BENEFIT PERFORMANCE AUDIT

In line with the committee's interest and attention to weights and measures program evaluation, Mr. Charles Vincent, Dallas, Texas, met with the committee during its interim meeting to discuss an effective cost-benefit analysis of a weights and measures program. The auditors staff in Dallas has just completed an extensive computer cost benefit study of the city weights and measures program and Mr. Vincent has agreed to make this program available as a model for other jurisdictions interested in this type of information and for committee use in the Program Evaluation project being undertaken.

The committee wishes to express its sincere appreciation to Mr. Charles Vincent and Mr. Robert Lockridge of Dallas, Texas, for their excellent presentations and comments on the recent performance audit of the Dallas weights and measures program. On behalf of the Conference delegates, the committee also extends its gratitude to Mr. Vincent and Mr. Lockridge for making copies of the audit available to the delegates.

411

MODEL REGULATION FOR VARIABLE FREQUENCY OF INSPECTION

Mr. Ellis Fitzgerald of Fairbanks Weighing Division, Colt Industries, has developed and made available to the committee a suggested Model Regulation for Variable Frequency of Inspection. The committee is in general agreement with the concept expressed in this material and feels it would be appropriate for inclusion in the existing Model Regulation for the Voluntary Registration of Servicemen when revision of this regulation is anticipated. Accordingly, the committee recommends that this material be submitted

to the L & R Committee for additional study and possible action during the interim meeting.

S. MALONE, *Chairman*, Nebraska
W. B. HARPER, Birmingham, Alabama
A. J. LADD, Akron, Ohio
R. WALKER, Clark County, Indiana
R. N. SMITH, *Staff Assistant*, NBS
H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Education, Administration,
and Consumer Affairs

(On motion of the committee chairman, the report of the Committee on Education, Administration, and Consumer Affairs, voting key items 400 through 411, was adopted in its entirety by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totaled in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on Education, Administration,
and Consumer Affairs*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
400 (entire report)	42	0	67	0

REPORT OF THE COMMITTEE ON LIAISON

Presented by EDWARD H. STADOLNIK, Head Administrative Assistant, Executive Office of Consumer Affairs, Boston, Massachusetts

(Tuesday, July 11, 1978)

VOTING KEY

500

INTRODUCTION



The Committee on Liaison submits its report to the 63rd National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by this final report. The report represents recommendations of the committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the committee.

501

METRIC ACTIVITIES

501-1 State Boards

During the 1977 Conference information was requested concerning established State metric boards and others still in the formative stages. Interest was expressed regarding the consolidation of information pertaining to such activity.

This information should provide a useful resource for those jurisdictions with established metric boards as well as those contemplating the formation of such a board. The committee supports the development of such State boards and recommends that State weights and measures offices be integral participants in such an organization. Mr. Jeffrey Odom, Metric Coordinator of the Office of Weights and Measures, NBS, as announced in a memorandum to State weights and measures officials, is serving as a focal point for the reception and distribution of information pertaining to such activity. Information sought in communications from State officials are the names and addresses of the chairman and board members, the scope of the board activities, and accomplishments. A current listing of such information is to be presented in the next OWM Tech Memo. In order for Mr. Odom to continue as a focal point for such activities it is requested that the State directors continue

to send information to him concerning metric board activity in their jurisdictions. A summary of such information will be published at periodic intervals in the Tech Memo. We recommend that all States share their experience in this undertaking. The Conference can become a valuable center of information concerning metric board activity.

The American National Metric Council has been working with a number of representatives of State metric boards in an attempt to establish some common guidelines that would be useful during a metric transition period.

501-2. Survey of State Laws and Regulations

One of the most significant problems relating to metric conversion is in the area of State laws and regulations which impact in measurement sensitive areas. Municipal and county laws and regulations likewise will have to be addressed.

The Conference last year suggested that the committee take positive action to promote review and revision of State weights and measures laws and regulations to permit an orderly and uniform transition to metric. This should be a primary objective of the State metric boards. In 1977, the Office of Weights and Measures conducted a survey of the States in an attempt to provide some preliminary data relating to weights and measures laws and regulations and the metric transition. A copy of the summary of this survey to date is included in this report. It is anticipated that additional responses will be received and the survey then will be updated.

SUMMARY OF SURVEY OF STATE LAWS AND REGULATIONS

The goal of the survey was in part to stimulate awareness of the need to plan for necessary changes in laws and regulations to accommodate metric conversion. Forty States and the District of Columbia and Puerto Rico responded to the survey. In response to a question concerning obstacles in weights and measures (W/M) laws to metric conversion 15 States could see no problem (usually noting that metric was legal under their State W/M law). Eight said there was a problem, and 17 indicated that there was a problem with W/M regulation, rather than with the W/M law. There were 34 States that identified problems in non-weights and measures laws and other obstacles, and 6 saw no problem. Some of the obstacles listed by the 34 States were tax laws, gasoline and transportation taxes, alcohol tax, feed and fertilizer laws, gasoline price posting, city ordinances, trade practice laws, etc. All States listed

standard procedures (legislative for W/M laws and publication and hearings for regulations) to be followed in amending these laws and regulations. When queried as to what the Office of Weights and Measures, or the National Conference on Weights and Measures could do to expedite the revision of laws and regulations, 16 States suggested prompt revision of model laws and regulations. Thirteen States requested letters of encouragement to governors and/or legislators, five State wanted information to keep in step, and seven required no assistance.

501-3. Model State Metric Conversion Plan

The committee received a request to consider developing a Model State Metric Conversion Plan and agreed that there was a definite need for such a plan. However, it was uncertain as to the best approach to follow in the development of such a plan in the absence of a national metric board. For example, it was noted that the State of New York indicated that they had taken steps to modify its weights and measures law and had incorporated features that would remove obstacles to metric conversion. Some of the committee considered this as a first step in the development of such a plan. Some members felt that emphasis should be placed on the development of a Model State Metric Conversion Plan which would provide the U.S. Metric Board with a weights and measures oriented start in the development of a national plan. It is anticipated that the development of a draft plan even in broad outline will entail considerable time and effort. The committee welcomes suggestions regarding available sources of assistance.

The Suggested State Metric Conversion Implementation Act prepared by William Zeiter, the American Bar Association Liaison to the Special Committee to Draft a Uniform Metric System Act of the National Conference of Commissioners on Uniform State Laws, is another possible approach. Copies of the suggested Act are available from the Office of Weights and Measures.

501-4. U.S. Metric Board Information

The committee is pleased to present a listing of the names, addresses, and areas of representation of the 17 members of the U.S. Metric Board nominated by President Carter and recently confirmed by the U.S. Senate:

Dr. LOUIS F. POLK, Louis Polk, Inc., Box 967, Dayton, OH 45401,
Chairman

SYDNEY D. ANDREWS, Florida Department of Agriculture & Consumer Services, Division of Standards, Mayo Building, Tallahassee, FL 32304, Standards

- CARL A. BECK, Charles Beck Machine Corporation, King of Prussia, PA 19406, Small Business
- Dr. PAUL BLOCK, Jr., Toledo Blade, 541 Superior Street, Toledo, OH 43660, News Media
- FRANCIS R. DUGAN, Dugan & Meyers Construction Co., Inc., 11110 Kenwood Road, Cincinnati, OH 45242, Construction
- THOMAS A. HANNIGAN, International Brotherhood of Electrical Workers, 1125 15th Street, N.W., Washington, D.C. 20005, Labor
- Dr. FRANK HARTMAN, 1114 Kimberly Drive, Lansing, MI 48912, State and Local Government
- SANDRA R. KENNEY, 5314 Plainfield Avenue, Baltimore, MD 21206, Television Educational Media
- ANDREW KENOPENSKY, International Association of Machinist and Aero-Space Workers, 1300 Connecticut Avenue, Washington, D.C. 20036, Labor
- Dr. HENRY KROEZE, 21720 W. North Avenue, Brookfield, WI 53005, Engineering
- JOYCE MILLER, Amalgamated Clothing and Textile Workers Union, 15 Union Square, New York, NY 10003, Labor/Women
- GLENN NISHIMURA, 1852 Cross Street, Little Rock, AR 72206, Consumers
- SATENIG S. ST. MARIE, J. C. Penney Company, 1301 Avenue of the Americas, New York, NY 10019, Retailing
- DENNIS R. SMITH, Box 521, Middleboro, MA 02346, Education
- Dr. ROGER E. TRAVIS, MEDI, Inc., 27 Maple Avenue, Holbrook, MA 02343, Small Business
- ADRIAN G. WEAVER, IBM Corporation, Armonk, NY 10504, Manufacturing/Business
- Dr. BRUCE JOHNSON, Department of Electric Engineering, University of Nevada, Reno, Nevada 89507, Science
- Communications to the U.S. Metric Board should be directed to:
Executive Director: Malcolm O'Hagan
- U.S. Metric Board
P. O. Box 19268
Washington, D.C. 20036

502-1. Multi-unit, Variety, and Combination Packages

The Committee on Laws and Regulations in their final report to the 62nd National Conference on Weights and Measures (NCWM) requested the Liaison Committee to consider the need to reconcile Federal laws and regulations as well as the Conference's model laws and regulations insofar as their provisions relate to quantity declarations used on multi-unit, variety, and combination packages. The Laws and Regulations Committee had previously concluded that packages and enforcement officials alike were experiencing an unfortunate degree of confusion attributable to the lack of uniformity of such regulatory provisions.

The Liaison Committee has studied the regulatory provisions mentioned and discussed them with representatives of the Food and Drug Administration (FDA), the Federal Trade Commission (FTC), and the U.S. Department of Agriculture (USDA). Those representatives and members of the committee unanimously agreed that the lack of uniformity is undesirable and may be unnecessary. The Chairman of the Liaison Committee has appointed a subcommittee consisting of two committee members, Messrs. Charles Greene and Merrill Thompson, to prepare a discussion draft of revised regulations. It is the Committee's belief that such a draft should be submitted simultaneously for informal comment by the NCWM Laws and Regulations Committee, and the FDA, FTC, and USDA. It is anticipated that thereafter the Liaison Committee will finalize the draft at the 63rd NCWM and ask that the Laws and Regulations Committee process the draft during the 1979 interim meetings as a proposal to amend the Model State Packaging and Labeling Regulation. Once adopted by the NCWM, the Liaison Committee will prepare petitions addressed to the FDA, FTC and USDA requesting those agencies to adopt suitably modified regulations applicable to multi-unit, variety and combination packages. The goal should be uniformity.

502-2. Ice Glazed Seafood

A request was made by the National Marine Fisheries Service (NMFS) that the measurement of glaze on seafoods and the determination of compliance with the labeled quantity of contents be considered as an agenda item.

Mr. James Brooker and Dr. Sackett of NMFS met with a joint session of the Laws and Regulations and Liaison Committees to present their case. The problem they are concerned with is primarily that encountered in the apparent practice by some of the

seafood industry of improperly determining the amount of glaze (i.e., ice coating) on certain seafood products, when declaring their net weight on items packed for institutional use. The glaze is an effective method of protecting frozen seafood from dehydration (freeze burn) and contamination and prolongs storage life. The glaze, however, is not part of the net weight. Processors packing seafood products under NMFS voluntary seafood inspection program must determine net weights using Association of Official Analytical Chemists (AOAC) procedures. Other packers do not use these procedures; instead they apply a 2 or 3 percent "glaze deduction." The different methods create an environment for unfair trade practices.

The NMFS will submit to the committee recommended procedures for uniform standard methods of test for glazed seafood products. It was also recommended to NMFS that based upon their experience and findings they petition the Food and Drug Administration (FDA) to consider changes in their regulations to address standards of fill, quality, and identity for products of this type. Weights and measures officials present at the interim meetings have encountered similar problems and expressed an interest in the NMFS proposed uniform method of test. The committee encourages NMFS to keep the committee informed of their activities and to work with the Conference in developing remedies to problems of mutual concern.

502-3. Handbook 67

The committee met in joint session with the Committees on Laws and Regulations and Education, Administration, and Consumer Affairs to discuss the final draft of the Second Edition of NBS Handbook 67, Checking Prepackaged Commodities, completed in December 1977. A report of this session is presented in the tentative report of the Committee on Laws and Regulations.

503

FEDERAL AGENCY ACTIVITIES

503-1. Food and Drug Administration Hearing on Net Weight Labeling

The Food and Drug Administration (FDA) held hearings on net weight labeling in San Francisco, California, on December 8, 1977, and in Atlanta, Georgia, on December 15, 1977. These hearings were presided over by Dr. Donald Kennedy, Commissioner of the Food and Drug Administration. The U.S. Department of Agriculture (USDA) was represented by Dr. Robert Angelotti, Administrator of Food Safety and Quality Service, in San Francisco and by Mr. Sydney Butler, Department Assistant Secretary for Food

and Consumer Service, in Atlanta. Reports on these hearings were presented before the Laws and Regulations Committee and the Liaison Committee by Henry Oppermann who attended the San Francisco hearing and Carroll Brickenkamp who testified for the National Bureau of Standards at the Atlanta hearings. Additional remarks were made by weights and measures officials who testified at one of the hearings and were present at the committee meeting.

At the hearings, the supporters of the California petition for net weight at time of sale were weights and measures officials, consumer advocates, retail grocers and institutional buyers. The principal opponents were the rice, meat, dried fruit and nut interests; bakers; flour millers; macaroni producers; cheese importers; and frozen foods packagers. The main request of proponents of net weight at time of sale was for FDA to promulgate regulations which specifically require maintenance of the present practice of full net weight of packaged goods at retail by eliminating allowable package variations due to loss or gain of moisture. The principal arguments given by the opponents were that moisture loss did not necessarily mean short measure, and overpacking or different packing materials (with increased costs) would be necessary for net weight at time of sale.

FDA repeatedly requested data to support the positions presented. To that end, the weights and measures position that they have traditionally required full net weight at retail and thus are requesting FDA to maintain the status quo rather than change it could be supported by individual State records of package compliance levels in the recent past. (A request for such information has been sent out to the States by the NCWM executive secretary.)

The committee is of the opinion that we should continue to strive toward the development of uniform net weight labeling requirements in all Federal agencies consistent with the principal of net weight at time of sale.

503-2. U.S. Department of Agriculture (USDA) Proposal on Net Weight Labeling

In December 2, 1977, Federal Register (42FR 61279-61284), the U.S. Department of Agriculture, Food Safety and Quality Service proposed a new net weight labeling regulation covering packaged meat or poultry products. At the interim meetings, the National Measurement Policy and Coordination Committee requested the Liaison Committee to ascertain the views of the NCWM members present at the interim meetings, January 22-27, in order to prepare an NCWM position to be presented to USDA before the deadline for comment on the proposal (March 2, 1978). Ed. Note: USDA proposal deadline extended to June 2, 1978. During the

week of the interim meetings USDA further announced a public hearing to be held February 9, 1978, in Washington, D.C. and invited presentations on the USDA proposal. It was decided at the joint session of the standing committees that a presentation be prepared which could be given at the public hearing as the NCWM position on the USDA proposal.

The following is the text of this presentation:

**STATEMENT OF JAMES F. LYLES (VIRGINIA)
AND CHARLES H. GREENE (NEW MEXICO)**

Representing the
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES
Before a Hearing by the
UNITED STATES DEPARTMENT OF AGRICULTURE
on the
USDA PROPOSED REGULATION ON NET WEIGHT LABELING
OF MEAT OR POULTRY PRODUCTS

Ref: 42FR 61279-61284
43FR 2881

INTRODUCTION

Mr. Chairman:

I am James F. Lyles, Supervisor, Weights and Measures Section, Division of Product and Industry Regulation, Department of Agriculture and Commerce, State of Virginia. Today, I appear before you as the chairman of the National Conference on Weights and Measures (NCWM) and to represent the views of that body on the subject of this public hearing on net weight labeling of meat or poultry products. Invited to testify with me is my colleague, Dr. Charles H. Greene, Chief of the Division of Consumer & Marketing Services, Department of Agriculture for the State of New Mexico. Dr. Greene is the immediate past chairman of the Western States Weights and Measures Association, and he is currently a member of the Liaison Committee of the National Conference.

The National Conference on Weights and Measures was established in 1905 by the National Bureau of Standards (NBS) for the purpose of securing and maintaining uniformity among State weights and measures laws, regulations, and methods of inspection. The Bureau, which is an agency of the U.S. Department of Commerce, has continued its sponsorship of the Conference over these many years.

The Conference is an organization of State, county, and city weights and measures officials from throughout the United States. Meetings of the Conference bring together the weights and measures regulatory officials and representatives from business, industry, trade associations, and consumer organizations to hear, discuss, and take action on matters that relate to weights and measures technology and administration. The actions of NCWM provide the legal and technical basis for our system of weights and measures in the United States, and the Conference has been cited on numerous occasions as a most effective example of Federal/State cooperative effort.

The principal reason we have asked to appear before you today is to offer the consensus that was reached on the net weight issue by weights and measures officials who attended the interim committee meetings of the National Conference on Weights and Measures the week of January 23-27, 1978, at the National Bureau of Standards. Those officials attending the interim committee meetings were members of the National Measurement Policy and Coordination Committee, Liaison Committee, Laws and Regulations Committee, Specifications and Tolerances Committee, and the Education, Administration, and Consumer Affairs Committee. The Conference position, as presented here today, has also received approval of the Conference Executive Committee.

This past July in Dallas, Texas, in its report to the National Conference, the Conference Committee on National Measurement Policy and Coordination recommended the adoption of a resolution calling upon the Federal agencies (namely Food and Drug Administration, U.S. Department of Agriculture, and Federal Trade Commission) to make appropriate amendments to their regulations that would require full net weight at retail. The following policy statement was adopted by the Conference:

"It is the policy of the National Conference on Weights and Measures that measurement equity in the United States demands the continuation of an applied system of weights and measures regulation which assures accurate net weight at the time of retail sale."

It is now my pleasure to call upon Dr. Greene to continue our presentation.

STATEMENT

My name is Charles H. Greene and I reside at 2420 Desert Drive, Las Cruces, New Mexico. I am employed by the New Mexico Department of Agriculture as Chief of the Division of Consumer and Marketing Services. It is the responsibility of my division to enforce the New Mexico weights and measures law. I am also a member of the Liaison Committee of the National Conference on Weights and Measures, and an immediate past president of the Western Association of Weights and Measures.

I am speaking on behalf of the New Mexico Secretary of Agriculture, the Western Weights and Measures Association, and the National Conference on Weights and Measures.

We commend the U.S. Department of Agriculture—Food Safety and Quality Service in its efforts to improve the regulatory climate regarding net contents in packaged goods. The proposed regulation is an important step in this improvement.

We concur with the USDA proposed regulation specifically (1) with the elimination of reasonable variations due to gain or loss of moisture, (2) with the requirement for net weight at retail, and (3) with the definition of tare as wet tare or drained weight. We also propose some modifications to the proposed regulations.

It has been a major goal of the National Conference on Weights and Measures and its member jurisdictions to secure uniformity of regulation and enforcement of weights and measures requirements. Just as the adoption in the last century of uniform standards of weight and measure made possible a coherent system of measurement nationwide, so, we feel, uniform requirements on package contents at all points of distribution will aid

interstate commerce by removing trade barriers resulting from varying packaging standards and test procedures. Requiring net weight at the retail level assures the consumer of a legal right to obtain the quantity stated on the label regardless of when, where, or how the commodity was packaged, while equalizing competition within a marketing area by requiring all packagers to deliver accurate net weight to the consumer.

As you know, the weights and measures official generally carries out his package inspection at the retail outlet. Thus, he is the sometimes not so invisible third party of the final transaction—the exchange that occurs between the consumer and his supplier of goods and services. It is most often to the State or local weights and measures official that the consumer turns if he perceives any symptoms of incorrect weight or measure and hence any incorrect value in exchange. And, it is the State or local weights and measures official who provides the final assurance that correct weight or measure can be obtained—is in fact taken for granted—at any and all retail outlets.

It is therefore most gratifying to see the proposed regulation include the specification that net content statements be accurate at any point of distribution. The courts have firmly established the principle that Federal regulations preempt State regulations that are inconsistent with the Federal regulations. The USDA proposal would provide for coincidence of Federal and State requirements and therefore will definitely improve the ability of the weights and measures official to carry out his responsibilities.

The change USDA proposes from “net weight when packed” to net weight throughout distribution will undoubtedly have an impact on processors and packagers although the impact should not be major since States have found that most packages packed at retail already comply with this requirement. We know you will receive testimony from industry regarding this impact.

In the view of those I represent, the impact need not necessarily be detrimental. Some packagers may revise their package target weights to put more product in the package in order to minimize the probability of being accused of short-fill. Other packagers may adopt different packaging methods and materials. For example, vacuum packaging may be applied to a wider variety of products. Packagers who take this route may find—as in bacon packaging—that they have improved weight retention and can therefore reduce their overpack, and we are informed by USDA that the packager can extend the shelf life of the product in this manner. Regardless of how packagers adjust to the proposed regulations, we feel that the consumer will benefit by receiving full net weight at retail. Whenever we have had occasion to ask the question, consumer preference is for a full pound not a package labeled one pound which contains less than 16 ounces. Therefore, we endorse the USDA proposed requirements for net weight at retail.

Members of the NCWM generally support the concept that in-plant quantity control programs, properly designed and properly administered will contribute significantly to the achievement of the goal of full net content to the purchaser. The Conference takes the position that the efficacy of such programs probably does not depend on whether they are mandatory or voluntary, but rather that the programs’ success depends more on their design and implementation. Thus, we do not take a position on the question of mandatory versus voluntary programs.

The NCWM wishes to commend the Department for its treatment of tare weight. We feel this clarifies some areas of concern which some of our members have expressed about the existing definition of tare weight in the current regulations. We do feel there may need to be further minor clari-

fications. For example, there may be valid reasons for distinguishing between blood and other fluids which may be found in packages of certain meats, depending on whether moisture has or has not been added.

It is indeed appropriate that the USDA proposal directly addresses the problem of "reasonable variations." The explanation accompanying the proposal indicates the variations suggested as reasonable in table II of the USDA proposal are supported by data relating to packaging operations. The Conference does not mean to imply criticism of the validity of the data, nor of the inferences drawn from the data which led to the numbers in table II. However, we do recognize some minor differences between the approach outlined in table II and the approach taken in the currently proposed draft revision to National Bureau of Standards Handbook 67, "Checking Pre-packaged Commodities." The basic difference lies in the expression of these variations in the USDA proposal in terms of units of weight and ease of packaging for various package sizes versus the expression of these variations as percentages of the labeled weight proposed in Handbook 67. We support the concept established in NBS Handbook 67 of a fixed percentage and encourage USDA to consider this method of classifying reasonable variations.

Some of the "limits for immediate containers" (table II) in the USDA proposal appear to be too large. For example, we cite the allowance of 0.73 ounce in a package which may be as small as 7 ounces declared net weight (group 4). In this instance, the allowable shortage for an individual package could be as much as ten percent short weight and still be acceptable. It may be difficult to convince consumers that such an individual shortage in a single purchase is tolerable although it would be made up in purchases of other packages of that product.

The Conference's full support is offered to the concept expressed in the USDA proposal that a manufacturing lot can be evaluated by means of a random sample of packages from that lot. Properly applied, sampling plans can provide the maximum information with the minimum expenditure of effort and time.

The Conference naturally prefers uniformity in regulations and testing procedures. At the NCWM Interim Work Sessions held January 23-27, 1978, it was the consensus of the standing committees to recommend endorsement of the principles and methods in NBS Handbook 67 to the voting membership this coming July. Since we expect weights and measures officials to begin using the revised Handbook 67 to check packages of other kinds of items, including all items packaged at retail, we would like to seem them be able to use Handbook 67 to check meat and poultry packaged under USDA supervision, also.

As it has been presented by Mr. Lyles, it is NCWM policy that USDA promulgate requirements for full net weight at all points in distribution eliminating reasonable variations due to gain or loss of moisture. However, we recognize that NBS was correct to draft Handbook 67 proposal in the manner in which it now appears. Present law provides for moisture allowances; Handbook 67 provides procedures to determine compliance with present law. When the situation changes, and Federal regulations are revised as a result of hearings such as this one, the references to moisture allowance will be removed from Handbook 67.

To summarize the NCWM position, we wish to be counted as a supporter of the USDA proposal. We commend the USDA for being responsive to the petition of the States on this matter. We feel that USDA should promulgate its proposed regulations but with the modifications we have indicated so that uniform standards can be achieved for all consumer packaged commodities.

503-3. Sphygmomanometers

Concern has been expressed by some weights and measures officials with respect to the accuracy of sphygmomanometers (blood pressure measuring devices) available for purchase at drugstores, department stores, and other general retail establishments. The accuracy as well as the legality of coin-operated blood pressure measuring devices was also questioned. For example, the committee learned that some State laws view the coin-operated devices as the illegal practice of medicine.

Mr. David Segerson of the Food and Drug Administration (FDA), Biomedical Laboratory met with the committee to discuss the devices. He indicated that these instruments were considered medical devices that were included in the scope of FDA regulations. Mr. Segerson stated that although the FDA had received few complaints concerning these devices, the National Institutes of Health had received a large number of inquiries. The development of standards for sphygmomanometers was given a low priority by FDA because of the large number of medical devices regulated and the need to establish priorities in research and testing, standardization, device evaluation, and compliance. The matter, however, has not been shelved since FDA has determined that it would be appropriate to pursue a voluntary standards approach through the American National Standards Institute (ANSI) for sphygmomanometers. The Association for the Advancement of Medical Instrumentation, an associate member of ANSI has agreed to undertake this project.

There are currently two specifications to draw on. The first is Federal Specification GG-S-618C, Sphygmomanometer, Aneroid, and Mercurial and the second is the International Organization of Legal Metrology International Recommendation No. 16, Manometers for Instruments for Measuring Blood Pressure (Sphygmomanometers).

503-4. Consumer Product Labeling Information Program

Dr. Jordon J. Baruch, Assistant Secretary of Commerce for Science and Technology, in July 1977, announced plans to begin an experimental voluntary consumer product labeling program to aid consumers in their purchase decisions. Mr. Roscoe Bloss of NBS met with a joint session of Laws and Regulations and Liaison Committees to explain the program.

The goal of the program is to make product performance information available to consumers at the point of sale. A further goal is to educate consumers in the use of product performance infor-

mation. The program will also help participants more accurately describe to consumers the performance of their products.

Program participants such as manufacturers and retailers will test their products using standardized test methods and will label their products with the results of the tests. Products covered will be those that consumers have difficulty evaluating and comparing. Performance characteristics covered will be chiefly those that are important to consumers and can be measured objectively, and that consumers cannot determine through mere inspection of the product.

The program will also cover some advertising requirements for labeled products.

A voluntary consumer product information labeling program is underway for thermal insulation for homes and appears to fulfill a need for such information. A tentative sample information label for one type of insulation is given in figure 1.

The committee feels that a program of this type would be very useful in providing information to the Conference concerning labeling problems with products such as insulation, carpet and carpet pad materials, and other such products and recommends Conference cooperation and support of this program.

503-5. Grain Moisture Measurement Assurance

The NBS Office of Weights and Measures (OWM) has been providing technical assistance to States on grain moisture measurement device test programs designed around each State's individual resources and experience in this device inspection and test area. OWM has also consulted with the device manufacturers and USDA on reference methodology alternatives to the USDA official oven drying techniques. OWM has asked States to enter into a cooperative program with the Office in order to systematically collect and analyze data from as many geographical regions and on as many grain species as possible. However, there is little flow of information between States which have valuable experience to share, and a State's individual effect on meter companies and USDA is not as great as it might be collectively. A mechanism is needed to facilitate this information exchange.

It has also been brought to the Office of Weights and Measures' attention that there exists within certain States a jurisdictional problem yet to be resolved with USDA concerning which agency is the final authority on a grain moisture content value. The State agency is usually the only authority checking the accuracy of the devices used at the first buyer/seller exchange between the farmer and the elevator operator, whereas USDA has clear jurisdiction



U.S. Department of Commerce
VOLUNTARY CONSUMER PRODUCT
INFORMATION LABELING PROGRAM
INFOTAG

**Thermal Insulation for Homes
Mineral Wool
Blanket Type**

• For use in:

☒ Attic floors

☒ Basement ceilings

☒ Floors over crawl spaces

☒ Open walls

☒ Enclosed walls

• **CAUTION: Follow instructions.** Proper installation is necessary for safety and effectiveness.

• The contents of this package will provide:

An R value* of	And will cover (square feet)	To give a thickness of (inches)
19	53	6

*NOTE: A higher R value means less energy loss. Find the best R value for your location and home. For the best dollar value, compare fuel savings to insulation cost.

• Price Comparison

The Price Comparison Numbers should be used to find your best value. To find the Price Comparison Number for *this* package, multiply .99 by the price per package.

$$.99 \times \text{Price of this Package} = \text{PRICE COMPARISON NUMBER}$$

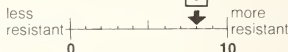
The smaller the Price Comparison Number, the less your cost for insulation.

• Fire Resistance Ratings

Resistance to
Surface Flame
Spread



Resistance to
Smoldering



The higher the number, the more resistant to burning. Remember, any material *might* burn under extreme conditions.

Building Code Compliance

Some building codes and other regulations require that the FSC number not exceed a certain value. Check with your local authorities. The FSC number for this package is

25

• Corrosion

This material may corrode.

☐ Aluminum

☐ Copper

☐ Steel

☐ Galvanized steel

☒ None of these

Data on this label certified by:

Figure 1

when grain must be graded for export. But there exists an area of jurisdiction overlap which needs to be studied, defined, and explored directly with USDA.

Although 6 State weights and measures agencies have been testing grain moisture measurement devices for some number of years and 16 more States are starting such programs, there presently

exists no specifications or tolerances in NBS Handbook 44 to guide them in their enforcement duties. A mechanism is needed to allow for the examination by individual States of the suitability of divergent proposals for appropriate grain moisture meter codes.

Moreover, specifications and tolerances for completely automatic devices have been proposed by the International Organization of Legal Metrology's Pilot Secretariat 18, Reporting Secretariat 1, "Humidimeters for Cereal Grains and Oleaginous Seeds." These specifications should be evaluated for their suitability by individual States in the United States.

It appears that these divergent needs of the States can be met by a State task force, titled "Task Force on Grain Moisture Measurement Assurance," with USDA representation in at least an ex officio capacity. It is felt that during the task force's initial phase it should report to the Liaison Committee since the task force will be establishing interactive mechanisms between States with USDA and with meter manufacturers during this phase. Later, the task force should report to the Specifications and Tolerances Committee when suitable specifications and tolerances are being evaluated for incorporation into Handbook 44.

(If the National Conference on Weights and Measures (NCWM) concurs with this recommendation by the Liaison Committee, a task force will subsequently be appointed by the NCWM chairman.)

504

PROTOTYPE EXAMINATIONS

A suggestion was received from a jurisdiction that a list be prepared of devices that have met the requirements of National Bureau of Standards (NBS) Handbook 44. A list developed along the lines of device category or manufacturer (for example) and updated on an annual basis would expedite the search for a particular device. Such a list would also be of value to State weights and measures offices which no longer have a complete file of reports of test.

The committee agrees with this suggestion and requests the Office of Weights and Measures to consider developing and maintaining such a list.

E. H. STADOLNIK, *Chairman*, Massachusetts

C. H. GREENE, New Mexico

O. D. MULLINAX, Georgia

J. WILSON, Federal-State Reports, Inc.

M. S. THOMPSON, Chadwell, Kayser,

Ruggles, McGee & Hastings, Ltd.

S. HASKO, *Staff Assistant*, NBS

H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Liaison

(On motion of the committee chairman, the report of the Committee on Liaison voting key items 500 through 504 was adopted in its entirety by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totaled in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on Liaison*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
500 (Entire Report)	41	0	61	0

REPORTS OF THE ANNUAL COMMITTEES

REPORT OF THE EXECUTIVE COMMITTEE

Presented by JAMES F. LYLES, *Conference Chairman*; Supervisor, Weights and Measures Section, Division of Product and Industry Regulation, Department of Agriculture and Consumer Services, State of Virginia



(Wednesday, July 12, 1978)

VOTING KEY

600

INTRODUCTION

The Executive Committee submits its final report for consideration by the 63rd National Conference on Weights and Measures.

601

NATIONAL MEASUREMENT POLICY AND COORDINATION COMMITTEE ITEMS

The following items were referred from the Committee on National Measurement Policy and Coordination and were detailed in the tentative report of that committee as follows:

601-1

DUTIES OF NCWM CHAIRMAN

In accordance with the proposals made by the NMPC Committee last year and approved by the 62nd Conference, the duties of the chairman of the National Conference on Weights and Measures shall be expanded to include: (a) serving as the NCWM representative to the U.S. Public Advisory Committee for International Legal Metrology in connection with matters of the International Organization of Legal Metrology (OILM), and (b) serving as the fifth member and chairman of the Committee on National Measurement Policy and Coordination. It should be noted that the term of appointment as NCWM representative to the U.S. Public Advisory Committee for OIIML runs for 2 years as authorized by the U.S. Department of Commerce. Mr. Jim Lyles was appointed this year and his term will expire in March of 1980. Thus, only the Conference chairmen who are elected during the odd calendar years will have this added responsibility.

The committee recommends the final adoption of the following changes to the Conference Organization and Procedure concerning the duties of the Conference chairmen:

*Amend section 5. COMMITTEES, Standing Committees, (second and third sentences) to read respectively—*The membership of the Committee on National Measurement Policy and Coordination shall be comprised of the committee chairmen of the other four standing committees and the Conference chairman. The Conference chairman shall serve as the chairman of the National Measurement Policy and Coordination Committee.

*Amend section 6. DUTIES OF OFFICERS, Chairman, by adding—*The Conference chairman serves as the fifth member and chairman of the Committee on National Measurement Policy and Coordination.

Those Conference chairmen who are elected to office during the old calendar years will be appointed and serve as the Conference representative to the U.S. Public Advisory Committee for OIML for a 2-year term.

601-2

NEW VOTING SYSTEM

The NMPC Committee reviewed the voting structure and procedures that were proposed by the committee and approved by the Conference after extensive consideration and discussion last year. The main concerns and principles that were presented by the committee and discussed during the 1977 Conference are summarized as follows to provide further clarity and understanding of the new voting system.

1. Participation of all State and local weights and measures officials is encouraged and perpetuated.
2. Procedures will prohibit "packing the Conference" by any one jurisdiction.
3. Procedures will reflect the basic structure of weights and measures authority and organization in the United States.
4. Conference actions will represent national consensus and the majority opinion of the States since model laws, model regulations, Handbook 44 and other outputs of the Conference are recommended as national standards in the interest of nationwide uniformity.
5. The new system involves a bicameral or "two house" voting structure. The Houses will be called the "House of State Representatives" and the "House of Delegates."

6. The votes of each State and total votes of each House will be recorded.
7. State and local officials are encouraged to meet and study the issues reported by the NCWM standing committees prior to and during the annual Conference meeting. It is important that both State and local officials attend the voting sessions and take whatever opportunities are available to gain a clear and complete understanding of the issues before they vote on them.

The NMPC Committee is firm in its belief that the new voting system is needed and will contribute considerably to an increase in the quality and professionalism of the NCWM. In the hope that the new voting system can be implemented this year to some degree at least, following its formal adoption early in the Conference program, the committee has requested the Conference chairman, NMPC Committee chairman, and executive secretary to investigate the ways and means for such implementation. The committee was pleased to hear a presentation by two representatives of the International Roll-Call Corporation concerning the electronic voting systems that their firm has supplied to and maintains in many State legislatures. They indicated that the NCWM voting system would present no design problems for them. However, contact is to be made with other companies who supply such equipment to obtain complete design and cost information for consideration at the coming Conference.

The committee recommends the final adoption of the following new voting system as an amendment to section 8 (and other sections as appropriate) of the Conference Organization and Procedure:

Section 8. VOTING SYSTEM

All questions before a meeting of the Conference that are to be decided by a formal recorded vote of the active members shall be voted on in accordance with the following voting structure and procedures.

Credentials Committee

- (a) The committee administers the Conference voting system, serves as an advisory body on procedures, and makes decisions concerning disputed rights of designated representatives.
- (b) The committee shall consist of three (3) members (one State—one county—one city), and each member shall serve for 3 years on a rotation basis (one on—one off each year).

- (c) Members shall be appointed from the active membership by the Conference chairman.

House of State Representatives

- (a) Each State will be authorized one official to serve as its representative at the NCWM. The District of Columbia and the U.S. Commonwealths and Territories that have weights and measures programs similar to the States (for example, have followed the model laws and regulations and have adopted Handbook 44) will also be allowed a representative. This body of officials will be known as the "House of State Representatives."
- (b) The State weights and measures director or his designee (State or local government official) shall be the State representative.
- (c) Each representative will be specified annually to the Credentials Committee 30 days before the NCWM annual meeting. Provision for exceptions to this deadline will be allowed.
- (d) An alternate shall be named prior to the NCWM annual meeting in case the designated representative cannot attend.

House of Delegates

- (a) All other State and local weights and measures regulatory officials (those not sitting in the House of State Representatives) will be grouped as a body and known as the "House of Delegates."
- (b) No other special requirements apply.

Minimum Votes

- (a) In the House of State Representatives, a minimum of 27 votes must be cast in favor of an issue or 27 votes cast in opposition to an issue for the vote to be considered official.
- (b) In the House of Delegates, a minimum of 27 votes in support of or 27 votes in opposition to an issue must be cast for the vote to be considered official. If more than 54 total votes are cast, a simple majority will rule. Should a tie vote occur or if the minimum 27 votes in support or opposition are not cast, the issue shall be decided by the vote of the House of State Representatives.

Voting Rules

- (a) A proxy vote will not be permitted. Since issues and recommendations in the committees' tentative reports are often modified and amended at the Conference, the attendance of officials at the NCWM annual meeting and voting sessions is vital.
- (b) All voting will be by a show of hands, standing vote, or machine (electronic). No voice voting. No abstentions.
- (c) Voting by both Houses will be simultaneous.
- (d) Roberts Rules of Parliamentary Procedure shall be used unless different rules are otherwise specified.
- (e) These procedures (rules) apply only to the plenary (general) sessions of NCWM.

Committee Reports

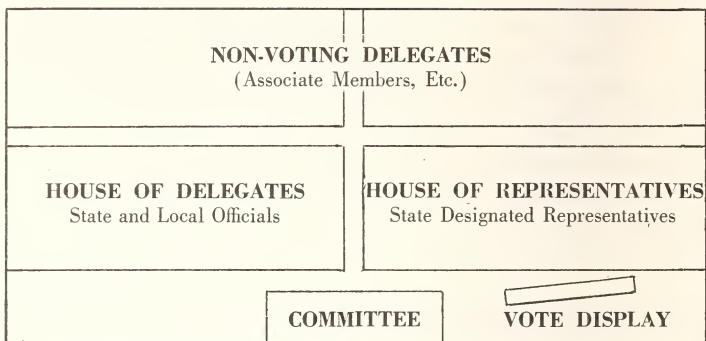
Alternatives that may be used in voting on the reports:

- (a) Vote on the entire report
- (b) Vote on grouped items or sections
- (c) Vote on individual items:
 - (1) At committee discretion;
 - (2) On request by voting delegate with support of 10 others.

Floor Amendments

- (a) Committee chairmen will be allowed to offer amendments during the day of voting to make editorial changes in their final reports.
- (b) Substantive changes can be made at the request of weights measures officials only, and:
 - (1) two-thirds of the voting delegates of each House must agree to debate a proposed amendment, and
 - (2) a two-thirds favorable vote of each House on the amendment is required for passage.

Seating



- (a) Seating arrangement for voting session only.
- (b) Monitors to count votes and control placement and movement of delegates.
- (c) The voting system will be designed to record the votes of the State representatives whether an electronic system, show of hands, or standing vote is used.

Voting Results

After a motion and a second, call for a vote (yea/nay)—show of hands, standing, or electronic vote:

(a) Motion accepted IF:

- (1) a minimum of 27 members of the House of State Representatives vote Yea.

And If

- (2) a majority of the members of the House of Delegates votes Yea (a minimum of 27 Yea votes required);*

(b) Motion rejected IF:

- (1) a minimum of 27 members of the House of State Representatives votes Nay.

And If

- (2) a majority of the members of the House of Delegates votes Nay (a minimum of 27 Nay votes required);*

*If the minimum number of votes required to pass or fail an issue is not cast in the House of Delegates, the issue will be determined by the votes of the House of State Representatives.

(c) Split Vote:

When the two Houses split on an issue or the minimum number of votes supporting or opposing an issue is not obtained in the House of State Representatives, the issue is returned to the standing committee for further consideration. The committee may drop the issue or reconsider it for submission the following year. The issue cannot be recalled for another vote at the same Conference.

The Executive Committee recommends that the NCWM Organization and Procedures brochure be modified to reflect the above changes.

Also, it should be added that the committee recommends further investigation on electronic voting systems be conducted.

601-3 NOTICE ON 1979, 1980 AND 1981 CONFERENCES

The committee takes this opportunity to remind the Conference membership of the plans and arrangements for the NCWM annual meetings in 1979, 1980 and 1981 as follows:

(a) Plans for the 64th NCWM are:

Location:	Portland, Oregon
Hotel:	Red Lion Motor Inn at Jantzen Beach
Dates:	July 22-27, 1979
Rates:	\$38 (Single)
	\$47 (Double)

(b) Plans for the interim meetings are:

Location:	NBS, Gaithersburg, MD
Dates:	January 22-26, 1979

(c) Plans for the 65th NCWM are:

Location:	Washington, D.C.
Hotel:	Shoreham Americana
Dates:	June 21-27, 1980

This conference will be conducted the week following the International Organization of Legal Metrology Plenary meet-

ing in Washington, D.C. (June 16-20, 1980) in order to provide the conference membership and international visitors an opportunity to exchange views and ideas.

(d) Plans for the 66th NCWM are:

Special invitations were received from the States of Georgia and Hawaii as possible locations for the 66th NCWM, July, 1981. The Executive Committee asks the Conference to support the incoming Executive Committee in gathering further information on the location and costs of the 66th NCWM.

601-4 ASSOCIATE MEMBERSHIP COMMITTEE CHARTER

During 1977 the Associate Membership Committee (AMC) determined that a charter, specifically defining its membership group's function, was appropriate and necessary. The AMC appointed a task force to study the development of the charter with Mr. Thomas Stabler serving as task force chairman. The task force met with the chairman of NCWM, the executive secretary, and the chairman of the NMPC Committee in an effort to discuss those items which were germane to the NCWM.

Subsequently, a draft of the proposed Associate Membership Charter was developed and submitted to the executive secretary for discussion during the interim meeting. The NMPC Committee reviewed the proposed charter and referred it to the Executive Committee for further review and appropriate action.

The Associate Membership Committee and its task force are to be commended for the interest and the effort displayed in this endeavor. The draft of the proposed charter of the National Conference on Weights and Measures Associate Membership Committee is included for informational purposes.

**CHARTER OF THE
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES
ASSOCIATE MEMBERSHIP COMMITTEE**

1. *Membership*

The Associate Membership Committee shall consist of 10 members to be appointed by the Conference chairman. Individual members may be eligible for reappointment for no more than 4 additional consecutive 1 years terms.

2. *Officers*

The Associate Membership Committee shall annually elect a committee chairman, vice chairman and treasurer from within its membership.

3. *Duties of Officers*

Chairman:

- 3.1 Shall coordinate participation by associate membership in National Conference program activities.
- 3.2 Shall plan activities and events sponsored by associate membership cooperatively with the NCWM executive secretary and Conference chairman.
- 3.3 Shall request and obtain concurrence by Associate Membership Committee relative to NCWM plans for involvement of associate membership.
- 3.4 Shall call for and conduct an annual meeting of associate members during the National Conference. The time and place shall be coordinated with the executive secretary to avoid program and logistical conflicts.
- 3.5 Shall report informally to the associate members on the plans and activities of the Associate Membership Committee.
- 3.6 Shall submit annually a report to the National Conference Executive Committee concerning the program of the Associate Membership Committee. The report is intended to be included in the final report of the Executive Committee to the National Conference.
- 3.7 Shall co-sign all checks written in behalf of the committee.
- 3.8 Shall appoint, as necessary, associate members to assist in the planning and coordination functions to assure the highest level of support to the National Conference.

Vice Chairman:

- 3.9 Shall assist the committee chairman in the planning and implementation of Associate Membership Committee programs.
- 3.10 Shall act and serve in behalf of the committee chairman during his absence.
- 3.11 Shall audit annually the committee treasurer's report, together with a selected committee member other than the treasurer.

Treasurer:

- 3.12 Shall maintain an accounting of all monies collected and distributed in behalf of the associate membership.

- 3.13 Shall submit an annual report at the time of the annual meeting.
- 3.14 Shall co-sign, with the committee chairman, all checks written in behalf of the associate membership and shall maintain bank statements for appropriate accounts in which associate membership funds are deposited.

4. Committee Responsibilities

The Associate Membership Committee:

- 4.1 Shall convene annually at the time of the National Conference on Weights and Measures. A meeting of the committee may be called at any other time deemed necessary by the committee chairman, i.e., at the interim meeting.
- 4.2 Shall approve and present to the Executive Committee, the Associate Membership Committee's annual report for inclusion in the Report of the National Conference; and, may present to the Executive Committee its views and concerns of national interest.
- 4.3 Shall recommend one or more technical advisors to the standing committees and other committees of the National Conference when deemed appropriate.
- 4.4 May plan and conduct Associate Membership reception at the National Conference.
- 4.5 Should assist in planning and coordination of Associate Membership display at the National Conference.
- 4.6 Should encourage Associate Membership to participate in and otherwise assist in Weights and Measures conferences, meetings, seminars, training programs and to assist chairman of the National Weights and Measures Week.
- 4.7 Should serve as a mechanism for dissemination of information of interest to associate members.

602 REPORT OF THE ASSOCIATE MEMBERSHIP COMMITTEE

(by Tom Stabler, Chairman; Toledo Scale Company)

The Associate Membership Committee held its annual meeting July 10, 1978, at which time the past year's program was reviewed and principal tasks highlighted:

- (a) Associate Membership Committee Charter;
- (b) Three-ring binders for NCWM materials;
- (c) Equipment exhibit;
- (d) Associate Membership reception.

The Associate Membership Committee also discussed an expanded program which would increase industry representation in the committee's activities. Members expressed interest in participating in weights and measures training schools in the areas of package control and device technology.

Next year's committee was encouraged to focus on the formation of a "clearing house" to assist in training and improved communication between associate members.

An expression of thanks was extended to all industries that gave generously in support of the Associate Membership reception, an "Evening South of the Border." We trust that all attendees will have an enjoyable "fiesta."

J. F. LYLES, *Chairman*

S. J. DARSEY

A. W. FENDER

L. D. HOLLOWAY

D. L. LYNCH

J. H. AKEY

J. H. LEWIS

L. H. DEGRANGE

J. A. ETZKORN

C. E. FORESTER

D. L. GRIFFITH

J. W. JONES

T. E. KIRBY

E. R. LEEMAN

W. McMURRY

C. MITALSKI

H. F. WOLLIN, *Exec. Secy.*, NCWM

Executive Committee

(On motion of the committee chairman, the report of the Executive Committee voting key items 600 through 602 was adopted in its entirety by the Conference. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference.)

REPORT OF THE COMMITTEE ON RESOLUTIONS

Presented by EZIO F. DELFINO, Chief, Division of Measurement Standards, State of California

(Thursday, July 13, 1978)

VOTING KEY

700

INTRODUCTION



The Committee on Resolutions wishes to express the appreciation of the 63rd National Conference on Weights and Measures to each and every one who contributed their time and talents towards the arrangements for, the conduct of, and participation in this National Conference. A special vote of thanks goes to the following persons and organizations:

701

SPECIAL THANKS

1. Dr. Ernest Ambler, Director of the National Bureau of Standards, for his fine address.
2. Ms. Esther Peterson, Special Assistant to the President for Consumer Affairs, for her outstanding address and long interest and cooperation with weights and measures in the U.S.
3. Dr. Louis F. Polk, Chairman of the U.S. Metric Board, for his timely remarks.
4. Mr. A. J. van Male, Director of the Dutch Service of Metrology and President of the International Committee of Legal Metrology of the OIML, for his fine presentation.
5. Mr. F. L. N. Samuels, Controller of Weights and Measures, Metrology Quality Assurance and Standards Division of the Department of Prices and Consumer Protection of the United Kingdom, for his informative address.
6. Mr. Sydney Butler, Deputy Assistant Secretary for Food and Consumer Services of the U.S. Department of Agriculture and Ms. Ellen Williams, Associate Commissioner, Office of Policy and Coordination of the Food and Drug Administration for their interesting remarks.
7. All speakers of the Conference for their expertise and contributions to the program.

8. All officers and appointed officials of the 63rd National Conference on Weights and Measures for their assistance and service towards a very successful Conference.
9. All committee members for their time and efforts throughout the past year to prepare and present their reports.
10. The governing officials of the State and local jurisdictions for their interest and support in weights and measures administration in the U.S.
11. Representatives of business and industry for their cooperation and hospitality.
12. The management and staff of the Shoreham Americana Hotel for their fine facilities and many courtesies which contributed to the enjoyment and comfort of the delegates.
13. The National Bureau of Standards, and in particular the staff of the Office of Weights and Measures, for planning and administering the many details involved in the work and program of the National Conference.

The following resolutions are presented in their entirety for consideration of the members of the Conference:

702

A RESOLUTION ON THE FEDERAL GRAIN INSPECTION SERVICE

Be it resolved that the National Conference on Weights and Measures, in Conference in Washington, D.C., July 9-14, 1978, request the Federal Grain Inspection Service, United States Department of Agriculture, to accept and honor specifications and tolerances as established by the National Bureau of Standards Handbook 44, "Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices," as the official requirements for the inspection and testing of such scales that the Federal Grain Inspection Service shall use in the official weighing and supervision of weighing of grain located at all grain elevators, warehouses, or other storage or handling facilities at which official weighing services are provided under the United States Grain Standards Act as Amended.

Be it further resolved that the Federal Grain Inspection Service not establish specifications and tolerances, that are in conflict with those specifications and tolerances as established by National Bureau of Standards Handbook 44 without first publishing such regulations (with a comment period of at least 120 days and hearings conducted) as prescribed by law under section 4(b) of the United

States Grain Standards Act as Amended. It is resolved that the Federal Grain Inspection Service work through the National Conference on Weights and Measures to amend National Bureau of Standards Handbook 44 instead of implementing conflicting regulations.

Be it further resolved that the National Conference on Weights and Measures request the Federal Grain Inspection Service, United States Department of Agriculture, to enter into agreement with such States weights and measures officials as may desire, to acknowledge and recognize such States legal inspection and sealing of such scales that the Federal Grain Inspection Service shall use in the official weighing or supervision of weighing of grain located at all grain elevators, warehouses, or other storage or handling facilities at which official weighing services are provided under the United States Grain Standards Act as Amended.

Be it further resolved that the National Conference on Weights and Measures, approving this resolution provide copies to the Honorable Robert Bergland, Secretary, United States Department of Agriculture and Dr. L. E. Bartelt, Administrator, Federal Grain Inspection Service.

703

A RESOLUTION OF COMMENDATION

Whereas for the past 13 years Mr. Earl Prideaux of Colorado has bestowed outstanding leadership and fellowship on the National Conference on Weights and Measures. He has gained the admiration and respect from almost every member. His energy and dedication have created an enthusiasm that will long be remembered by the Conference, and his influence will be evident for many years to come.

Therefore, be it resolved that the 63rd National Conference on Weights and Measures in session July 9-14, 1978, in Washington, D.C., do commend Mr. Earl Prideaux for his achievements.

E. F. DELFINO, *Chairman*, California
J. J. BARTFAI, New York
F. L. BRUGH, Indiana
J. B. RABB, Alabama
E. C. HEFFRON, Michigan
T. A. HOCIN, Illinois
G. M. KENNEDY, Maine
H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Resolutions

(On motion of the committee chairman, the report of the Committee on Resolutions voting key items 700 through 703 was adopted in its entirety by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totaled in the table that follows. The Conference also authorized the executive secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

VOTING RESULTS—*Committee on Resolutions*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
700	43	0	72	0

REPORT OF THE COMMITTEE ON NOMINATIONS

Presented by EARL PRIDEAUX, Chief of Weights and Measures Section, State of Colorado

(Thursday, July 13, 1978)

VOTING KEY

800

INTRODUCTION



The Committee on Nominations met on Tuesday, July 11, for the purpose of selecting a slate of nominees for all elective offices for the 10 elective memberships of the Executive Committee. In the selection of nominees from the active membership, consideration was given to attendance records, geographical distribution, Conference participation, and other factors deemed by the committee to be important.

The Committee on Nominations submits the following names in nomination for office to serve during the ensuing year at the 64th National Conference on Weights and Measures:

Chairman: Kendrik Simila, State of Oregon

Vice Chairmen:

1. E. R. Leeman, State of Wyoming
2. J. V. Pugh, State of South Carolina
3. N. M. Ross, Omaha, Nebraska
4. E. H. Stadolnik, State of Massachusetts

Treasurer: James H. Akey, Wausau, Wisconsin

Chaplain: John H. Lewis, State of Washington

Executive Committee:

1. J. T. Bennett, Connecticut
2. F. Daniels, Wayne County, Indiana
3. A. Helgeson, State of North Dakota
4. G. M. Kennedy, State of Maine
5. J. C. Mays, Dade County, Florida
6. A. B. Moody, Jr., Richmond, Virginia

7. W. R. Mossberg, Los Angeles County, California
8. J. L. O'Neill, State of Kansas
9. B. W. Sullivant, State of Arkansas
10. S. Valtri, Philadelphia, Pennsylvania

(There being no further nominations from the floor, the chairman declared nominations closed.)

E. PRIDEAUX, *Chairman*
 S. D. ANDREWS, Florida
 G. L. JOHNSON, Kentucky
 H. K. SHARP, Oklahoma
 R. J. SILCOCK, Indiana
 J. H. LEWIS, Washington
 R. L. THOMPSON, Maryland

Committee on Nominations

(On motion of the committee chairman, the report of the Committee on Nominations voting key item 800 was adopted in its entirety by the Conference. The results of the voting in the House of Representatives and the House of Delegates under the new Conference voting system are totaled in the table that follows.)

VOTING RESULTS—*Committee on Nominations*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
800	46	0	64	0

REPORT OF THE COMMITTEE ON AUDITING

Presented by D. J. WEICK, Sealer, Weights and Measures and
Consumer Protection Division, Topeka, Kansas

(Thursday, July 13, 1978)



VOTING KEY

900

INTRODUCTION

The Auditing Committee met on Thursday, July 13, for the purpose of reviewing the financial records of the Conference treasurer, Mr. James H. Akey. The committee finds these records to be in accordance with Conference procedure and correct.

D. J. WEICKS, *Chairman*, Topeka, Kansas
G. S. FRANKS, Cumberland County, New
Jersey
J. SHELTON, Tennessee

Committee on Auditing

(On motion of the committee chairman, the report of the Committee on Auditing voting key item 900 was adopted by the Conference. The results of the voting in the House of Representatives and the House of Delegates under the new Conference voting system are totalized in the table that follows.)

VOTING RESULTS—*Committee on Auditing*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
900	41	0	65	0

REPORT OF THE CONFERENCE TREASURER

Presented by JAMES H. AKEY, *Treasurer*, Sealer of Weights and Measures, City of Wausau, Wisconsin

(Thursday, July 13, 1978)



VOTING KEY

1000

Balance on hand, July 1, 1977 -----	\$ 6,961.91
General Account Balance -----	\$ 6,981.01
Medallion Account Balance -----	(19.10)
	<u>\$ 6,961.91</u>
General Account balance on hand, July 1, 1977 -----	\$ 6,981.01

RECEIPTS

Registration, 392 @ \$50.00 -----	\$19,600.00
Dude Ranch tickets sold -----	216.00
Ladies Events tickets sold -----	515.00
Certificates of Deposit redeemed, February 13, 1978 -----	5,000.00
Interest of Certificate of Deposit redeemed -----	92.56
	<u>\$25,423.56</u>

\$32,404.57

DISBURSEMENTS:

Sandy Sandifer, Conference orchestra -----	\$ 595.00
Caldwell Printing Company, Committee reports -----	1,672.19

Bauer Audio Video, Inc.,	
Projection equipment rental ----	91.79
IBM Corp., Typewriters rental ----	93.00
AVW Audio Visual Inc., Projector	
rental -----	44.75
Daniel McCurry, Speakers expenses	250.25
Dallas County Heritage Society,	
Inc., Ladies luncheon and tour --	249.25
Neiman-Marcus, Ladies tea and	
models expenses -----	511.00
Dallas Transit System,	
Transportation -----	902.00
Sheraton-Dallas, Conference	
expenses -----	2,416.74
Registration desk & operating	
expenses (cash) -----	206.33
2-90 day Certificates of Deposit	
purchased -----	10,000.00
Franklin Press, Printing of	
letterheads, etc. -----	269.50
Bank charge, check printing -----	4.27
James F. Lyles, Chairman, Travel	
expense, four meetings -----	1,043.00
OWM, Interim meeting expenses --	521.27
National Measurement Policy &	
Coordination Committee -----	875.54
Specifications & Tolerances	
Committee -----	2,105.35
Laws & Regulations Committee ---	1,912.76
Education, Administration &	
Consumer Affairs Committee ---	2,098.36
Liaison Committee -----	1,157.77
Charles H. Greene, USDA Net	
Weight Hearing -----	90.00
Hillwood Mansion, Deposit for 1978	
ladies tour -----	75.00
Postmaster, stamps -----	26.00
	<u>\$27,211.12</u>

General Account balance on hand,	
July 1, 1978 -----	\$ 5,193.45

Ninety day renewable Certificate of	
Deposit No. 7468 -----	\$ 5,000.00

Medallion Account balance on hand,		
July 1, 1977 -----	\$	(19.10)

RECEIPTS

Sale of decals -----	\$	63.50
Sale of 35 medallions -----		262.50
	\$	<u>326.00</u>

Medallion Account balance on hand,		
July 1, 1978 -----	\$	<u>306.90</u>

Necktie Account

RECEIPTS

Sale of 118 neckties @ \$6.50 ----	\$	767.00
------------------------------------	----	--------

DISBURSEMENTS

Renleigh Co., 250 neckties -----	\$	996.25
Necktie Account balance on hand,		
July 1, 1978 -----	\$	<u>(229.25)</u>
(Inventory of 132 neckties @ \$6.50		
= \$858.00)		

Membership Plaque Account

DISBURSEMENTS

As-Well Trophy & Engraving,		
200 plaques -----	\$	803.65
Plaque Account balance on hand,		
July 1, 1978 -----	\$	<u>(803.65)</u>
(Inventory of 200 plaques @ \$5.00		
= \$1,000.00)		

RECAP

Balances on hand, July 1, 1978		
General Account -----	\$	5,193.45
Medallion Account -----		306.90
Necktie Account -----		(229.25)
Membership Plaque Account -----		<u>(803.65)</u>
Net balance on hand, July 1, 1978 -----	\$	4,467.45
Certificate of Deposit -----		5,000.00
Total -----	\$	<u><u>9,467.45</u></u>

Depository, First Wisconsin National Bank of Wausau

(Signed) JAMES H. AKEY, *Treasurer*

(On motion of the Treasurer, the report of the Conference Treasurer voting key item 1000 was adopted in its entirety by the Conference. The results of the voting in the House of State Representatives and the House of Delegates under the new Conference voting system are totalized in the table that follows.)

VOTING RESULTS—*Conference Treasurer*

Voting Key	House of State Representatives		House of Delegates	
	Yes	No	Yes	No
1000	42	0	66	0

REGISTRATION LIST

63rd NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

July 9-14, 1978

Shoreham Americana Hotel, Washington, D.C.

WEIGHTS AND MEASURES OFFICIALS

ALABAMA

STATE ----- JOHN B. RABB, Weights and Measures Laboratory Supervisor, Alabama Department of Agriculture, P.O. Box 3336 (1445 Federal Drive), Montgomery, Alabama 36109 (Tel. (205) 832-6766)

CITY
Birmingham ----- DON E. STAGG, Chief Inspector—Weights and Measures Division, City of Birmingham—Inspection Services Department, Room 207, City Hall, Birmingham, Alabama 35203 (Tel. (205) 254-2211)

ALASKA

STATE ----- JOSEPH L. SWANSON, Chief, Weights and Measures, State of Alaska, 2263 Spenard Road, Anchorage, Alaska 99503 (Tel. (907) 279-0508)

ARIZONA

STATE ----- PATRICIA FULLINWIDER, Asst. Director, Weights and Measures, State of Arizona, 3039 W. Indian School Road, Phoenix, Arizona 85017 (Tel. (602) 271-5211)

RAYMOND H. HELMICK, Chief, Weights and Measures Division, State of Arizona Department of Administration, 3039 West Indian School Road, Phoenix, Arizona 85017 (Tel. (602) 943-3837)

ARKANSAS

STATE ----- SAM F. HINDSMAN, Director, Weights and Measures, State of Arkansas, 4608 West 61st Street, Little Rock, Arkansas 72209 (Tel. (501) 371-1759)

BILLY W. SULLIVANT, Laboratory Supervisor,
Arkansas Weights and Measures Division,
4608 West 61st Street, Little Rock, Arkansas
72209 (Tel. (501) 371-1759)

CALIFORNIA

STATE ----- EZIO F. DELFINO, Chief, Division of Measurement Standards, California State Department of Food and Agriculture, 8500 Fruitridge Road, Sacramento, California 95826 (Tel. (916) 445-7001)

DARRELL A. GUENSLER, Assistant Chief, Division of Measurement Standards, State of California, 8500 Fruitridge Road, Sacramento, California 95826 (Tel. (916) 445-7001)

COUNTY

Alameda ----- PATRICK E. NICHOLS, Director of Weights and Measures, Alameda County, Department of Weights and Measures, 333—5th Street, Street, Oakland, California 94607 (Tel. (415) 874-6736)

Los Angeles ----- WESLEY R. MOSSBERG, Director, Weights and Measures, Los Angeles County, 11012 Garfield Avenue, South Gate, California 90280 (Tel. (213) 922-8921)

Riverside ----- JOSEPH W. JONES, Director, Riverside County, California Association of Weights and Measures Officials, 2950 Washington, Riverside, California 92504 (Tel. (714) 787-2620)

COLORADO

STATE ----- EARL PRIDEAUX, Chief, Weights and Measures, State of Colorado, 3125 Wyandot, Denver, Colorado 80211 (Tel. (303) 839-2845)

CONNECTICUT

STATE ----- JOHN T. BENNETT, Chief, Weights and Measures Division, Department of Consumer Protection, State Office Building, Room G-17, Hartford, Connecticut 06115 (Tel. (203) 566-4778)

CITY

Hartford ----- JOHN MOKRYCKI, Sealer of Weights and Measures, City of Hartford, 550 Main Street, Hartford, Connecticut 06103 (Tel. (203) 566-6457)

Middletown ----- GUY J. TOMMASI, Sealer of Weights and Measures, City of Middletown, City Hall, Middletown, Connecticut 06457 (Tel. (203) 347-4671)

DELAWARE

STATE ----- EUGENE KEELEY, Supervisor of Weights and Measures, State of Delaware, Drawer D, Dover, Delaware 19901 (Tel. (302) 678-4824)

DISTRICT OF COLUMBIA

MARGARET B. BOND, Inspector, Weights and Measures Market Division, 1110 U Street, S.E., Washington, DC 20020 (Tel. (202) 767-7923)

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STAN DARSEY, Chief, Bureau of Weights and Measures, Florida Department of Agriculture and Consumer Services, Mayo Building, Tallahassee, Florida 32304 (Tel. (904) 488-9140)

COUNTY

Dade ----- JOHN C. MAYS, Director, Consumer Protection, Dade County, 140 W. Flagler Street, Miami, Florida 33130 (Tel. (305) 579-4222)

GEORGIA

STATE ----- THOMAS E. KIRBY, Director, Weights and Measures Laboratory, Georgia Department of Agriculture, Atlanta Farmers Market, Forest Park, Georgia 30050 (Tel. (404) 363-7611)

HAWAII

STATE ----- CHARLES G. BOCKUS, Supervising Metrologist, State of Hawaii, P.O. Box 226, Captain Cook, Hawaii 96704 (Tel. (808) 323-2608)

IDAHO

STATE ----- LYMAN D. HOLLOWAY, Chief, Idaho Bureau of Weights and Measures, Department of Agriculture, 2216 Kellogg Lane, Boise, Idaho 83702 (Tel. (208) 384-2345)

ILLINOIS

STATE ----- WAYNE BEHRNS, Bureau Chief, Product Inspection Standards, Illinois Department of Agriculture, Emmerson Building, State Fairgrounds, Springfield, Illinois 62706 (Tel. (217) 782-3817)

SIDNEY A. COLBROOK, Weights and Measures Program Supervisor, Illinois Department of Agriculture, Bureau of Products Inspections and Standards, Emmerson Building, State Fairgrounds, Springfield, Illinois 62706 (Tel. (217) 782-3817)

CASEY L. MITALSKI, Quantity Standard Technician, State of Illinois Department of Agriculture, 531 East Sangamon Avenue, Springfield, Illinois 62706 (Tel. (217) 782-7655)

CITY

Chicago ----- TERRY A. HOCIN, Deputy Commissioner, Department of Consumer Sales, Weights and Measures, Room 808, City Hall, 121 North

LaSalle Street, Chicago, Illinois 60602 (Tel.
(312) 744-4092)

Chicago ----- JESSE BLACKMON, Supervisor, 121 North La-
Salle Street, Chicago, Illinois 60602 (Tel.
(312) 744-4008)

INDIANA

STATE ----- ROBERT W. WALKER, Director, State Board of
Health, Division of Weights and Measures,
Indianapolis, Indiana 46206 (Tel. (317)
633-0350)

COUNTY

Gibson ----- W. R. SEVIER, County Inspector, Gibson Coun-
ty, Courthouse Annex, Princeton, Indiana
47683 (Tel. (812) 795-2532)

Clark ----- HAROLD BRADSHAW, Inspector, Weights and
Measures, Clark County, City-County Build-
ing, Room #314, Jeffersonville, Indiana
47130 (Tel. (812) 283-4451 Station 53)

Johnson ----- WAYNE E. HANDY, Inspector of Weights and
Measures, Johnson County, Johnson County
Courthouse, Franklin, Indiana 46131 (Tel.
(317) 736-5774)

Porter ----- RICHARD H. CLAUSSEN, Inspector, Porter Coun-
ty, 1401 N. Calumet, Room 501, Valparaiso,
Indiana 46347 (Tel. (219) 464-4722)

St. Joseph ----- CHESTER S. ZMUDZINSKI, Inspector, Weights
and Measures, St. Joseph County, 227 W.
Jefferson Boulevard, South Bend, Indiana
46601 (Tel. (219) 284-9751)

Tippecanoe ----- WEBSTER McMURRY, Inspector, Weights and
Measures, Tippecanoe County, P.O. Box 444,
LaFayette, Indiana 47902 (Tel. (317) 423-
9229)

Vigo ----- ROBERT J. SILCOCK, Inspector, Vigo County,
Weights and Measures, Room 5, Courthouse,
Terre Haute, Indiana 47802 (Tel. (812)
238-8349)

Wayne ----- FRANCIS W. DANIELS (REV.), Administrator,
Wayne County Weights and Measures, 50
N. Fifth, Richmond, Indiana 47374 (Tel.
(317) 966-5561)

CITY

Anderson ----- EARL GADBERRY, Anderson City Inspector, De-
partment of Weights and Measures, P.O.
Box 2100—Anderson City Building, Ander-
son, Indiana 46011 (Tel. (317) 646-5814)

- Gary ----- JOHN NASTAV, City Sealer, 1100 Massachusetts Street, Gary, Indiana 46407 (Tel. (219) 944-6732)
- Hammond ----- DEAN BRAHOS, City Sealer, City of Hammond, 7220 Hohman Avenue, Hammond, Indiana 46324 (Tel. 219) 932-3569)
- Indianapolis ----- WILLIAM BOWMAN, Deputy Inspector, Division of Weights and Measures, City of Indianapolis, Room G6, City-County Building, Indianapolis, Indiana 46204 (Tel. (317) 633-3733)
- Indianapolis ----- FRANK L. BRUGH, Administrator, Division of Weights and Measures, City of Indianapolis, Room G6, City-County Building, Indianapolis, Indiana 46204 (Tel. (317) 633-3733)
- Indianapolis ----- RALPH HANNAH, Deputy Inspector, Division of Weights and Measures, Room G6, City-County Building, Indianapolis, Indiana 46204 (Tel. (317) 633-3733)
- Misawaka ----- GEORGE STAFFELDT, Inspector, Weights and Measures, City Hall, Mishawaka, Indiana 46544 (Tel. (219) 259-5265)
- New Albany ----- JAMES M. MOREILLON, Inspector, Weights and Measures, City of New Albany, 627 E. 4th Street, New Albany, Indiana 47150 (Tel. (812) 944-4260)
- South Bend ----- BERT S. CHICHOWICZ, City Sealer, City of South Bend, 701 W. Sample Street, Room 113, South Bend, Indiana 46621 (Tel. (219) 284-9273)

IOWA

- STATE ----- JAMES O'CONNOR, Supervisor, Weights and Measures, Iowa Department of Agriculture, Henry A. Wallace Building, Des Moines, Iowa 50319 (Tel. (515) 281-5716)
- KERMIT L. TOLAND, Supervisor, Metrology Laboratory, Iowa Department of Agriculture, Henry A. Wallace Building, Des Moines, Iowa 50319 (Tel. (515) 281-5716)

KANSAS

- STATE ----- JOHN L. O'NEILL, Director and State Sealer, P.O. Box 678, Topeka, Kansas 66601 (Tel. (913) 296-3846)

CITY

Kansas City ----- DONALD L. LYNCH, City Sealer, Weights and Measures Control, Department of Finance and Revenue, 701 North Seventh Street, Kansas City, Kansas 66101 (Tel. (913) 371-2000, Ext. 440)

Topeka ----- DONALD J. WEICK, Chief Inspector of Weights and Measures, Weights and Measures and Consumer Protection Division, City Building, Room 353, Seventh and Quincy, Topeka, Kansas 66603 (Tel. (913) 295-3883)

KENTUCKY

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RON EGNEW, Laboratory Supervisor, 106 W. 2nd Street, Frankfort, Kentucky 40601 (Tel. (502) 564-4870)

LOUISIANA

STATE ----- WILLIAM H. DANIELS, Director, Weights and Measures, Louisiana Department of Agriculture, Capitol Station, Baton Rouge, Louisiana 70804 (Tel. (504) 925-4651)

MAINE

STATE ----- GAYLON M. KENNEDY, Deputy State Sealer of Weights and Measures, Maine Department of Agriculture, State House, Augusta, Maine 04333 (Tel. (207) 289-3841)

MARSHALL M. WHITE, Metrologist, State of Maine Department of Agriculture, State Office Building, Augusta, Maine 04330 (Tel. (207) 289-2751)

MARYLAND

TATE ----- RICHARD L. THOMPSON, Chief of Weights and Measures, Maryland Department of Agriculture, Room 3204 Symons Hall, College Park, Maryland 20742 (Tel. (301) 454-3551)

LACY H. DEGRANGE, Assistant Chief, Weights and Measures Section, Maryland Department of Agriculture, College Park, Maryland 20742 (Tel. (301) 454-3551)

CHARLES R. STOCKMAN, Metrologist, 3205 Symons Hall, College Park, Maryland 20742 (Tel. (301) 454-3551)

COUNTY

Prince Georges ----- ROBERT J. CORD, Chief, Weights and Measures Inspector, Prince Georges County, 9133 Central Avenue, Capitol Heights, Maryland 20027 (Tel. (301) 350-5802)

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DONALD P. SAVAGE, Sealer II, Prince Georges County, 9133 Central Avenue, Capitol Heights, Maryland 20027 (Tel. (301) 350-5802)

MASSACHUSETTS

STATE ----- EDWARD H. STADOLNIK, Head Administrative Assistant, Executive Office of Consumer Affairs, Division of Standards, Room 1115, One Ashburton Place, Boston, Massachusetts 02108 (Tel. (617) 727-3480)

CITY

Agawam ----- LOUIS D. DRAGHETTI, Inspector of Weights and Measures, Town of Agawam, 36 Main Street, Agawam, Massachusetts 01001 (Tel. (413) 786-0400)

Barnstable ----- THOMAS F. GEILER, Sealer of Weights and Measures, Town of Barnstable, 397 Main Street, Hyannis, Massachusetts 02601 (Tel. (617) 775-1120)

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Plymouth ----- DAVID A. MONTANARI, Sealer of Weights and Measures, Town of Plymouth, 11 Lincoln Street, Plymouth, Massachusetts 02360 (Tel. (617) 747-1620)

West Springfield ----- PAUL T. GAMELLI, Inspector of Weights and Measures, Town of West Springfield, 2 Central Street, West Springfield, Massachusetts 01089 (Tel. (413) 781-7550)

MICHIGAN

- STATE ----- HAROLD BIRGY, Metrologist, Michigan Department of Agriculture, Lewis Cass Building, P.O. Box 30017, Lansing, Michigan 48909 (Tel. (517) 373-1060)
- LAWRENCE MARTIN GOLDIN, Weights and Measures Inspector, 350 Ottawa NW, Grand Rapids, Michigan 49503 (Tel. (616) 456-6988)
- EDWARD C. HEFFRON (D.V.M.), Chief, Food Inspection Division, Michigan Department of Agriculture, Box 30017, Lansing, Michigan 48909 (Tel. (517) 373-1060)
- FRANK NAGELE, Weights and Measures Specialist, Michigan Department of Agriculture, Box 30017, Lansing, Michigan 48909 (Tel. (511) 373-1060)
- ROGER L. ROBINSON, Food Inspector, Michigan Department of Agriculture, 1120 W. State Fair, Detroit, Michigan 48203 (Tel. (313) 368-0280)

MINNESOTA

- STATE ----- ARVID W. FENGER, Senior Weights and Measures Inspector, 1015 Currie Avenue, Minneapolis, Minnesota 55403 (Tel. (612) 333-3249)
- GEORGE MACDONALD, Regional Supervisor, State of Minnesota Division of Weights and Measures, 1015 Currie Avenue, Minneapolis, Minnesota 55403 (Tel. (612) 333-3249)
- CITY
Minneapolis ----- RICHARD R. SCULLY, Inspector, City of Minneapolis, Room 101A City Hall, Minneapolis, Minnesota 55415 (Tel. (612) 348-2080)

MISSISSIPPI

- STATE ----- GENE WILLIAMS, Director, Consumer Protection Division, Mississippi Department of Agriculture and Commerce, P.O. Box 1609, Jackson, Mississippi 39205 (Tel. (601) 354-6258)
- DAVID MORGAN, Assistant Director, Consumer Protection Division, State of Mississippi, P.O. Box 1609, Jackson, Mississippi 39205 (Tel. (601) 354-6258)

MISSOURI

STATE ----- BOB MERRICK, Acting Director, State of Missouri Department of Agriculture, Weights and Measures, P.O. Box 630, Jefferson City, Missouri 65102 (Tel. (314) 751-3841)

JACK PIERCE, Program Supervisor, Department of Agriculture, Weights and Measures Division, P.O. Box 630, Jefferson City, Missouri 65102 (Tel. (314) 751-3440)

LOUIS A. STEPHENS, Program Supervisor, Department of Agriculture, Weights and Measures Division, P.O. Box 630, Jefferson City, Missouri 65102 (Tel. (314) 751-4992)

CITY

St. Louis ----- DANIEL I. OFFNER, Commissioner of Weights and Measures, City of St. Louis, 1220 Carr Lane Avenue—Room 145, St. Louis, Missouri 63104 (Tel. (314) 453-3251)

MONTANA

STATE ----- GARY DELANO, Administrator, Montana Division of Weights and Measures, 805 N. Main, Helena, Montana 59601 (Tel. (406) 449-3163)

NEBRASKA

STATE ----- STEVEN A. MALONE, Administrator, Nebraska Department of Agriculture, Division of Weights and Measures, Box 94757, 301 Centennial Mall South, 4th Floor, Lincoln, Nebraska 68509 (Tel. (402) 471-2875)

CITY

Omaha ----- NORMAN M. ROSS, Chief, Weights and Measures Division, Public Safety Department, 1819 Farnam, Omaha, Nebraska 68102 (Tel. (402) 444-5368)

NEW HAMPSHIRE

STATE ----- WALTER J. TUSEN, Chief Inspector, New Hampshire Bureau of Weights and Measures, 85 Manchester Street, Concord, New Hampshire 03301 (Tel. (603) 271-3700)

NEW JERSEY

STATE ----- BERNIE ARCKIVY, Metrologist, 187 W. Hanover Street, Trenton, New Jersey, 08625 (Tel. (609) 292-4615)

JAMES R. BIRD, Deputy State Superintendent,
187 West Hanover Street, Trenton, New
Jersey 08625 (Tel. (609) 292-4615)

SAMUEL H. CHRISTIE, JR., State Director,
Weights and Measures (Retired), Spec.
Asst. State Supt. by Commission and Sta-
tute, 187 W. Hanover Street, Trenton, New
Jersey 08625 (Tel. (201) 647-3267)

COUNTY

- Camden ----- A. J. FRANCESCONI, Superintendent, Camden
County, New Jersey, Room 306, Court
House, Camden, New Jersey 08101 (Tel.
(609) 757-8196)
- Cape May ----- A. DAVID GIDDING, County Superintendent,
6807 Seaview Avenue, Wildwood Crest, New
Jersey 08260 (Tel. (609) 522-4861)
- Cumberland ----- GEORGE S. FRANKS, County Superintendent,
Weights and Measures and Consumer Pro-
tection, 788 E. Commerce Street, Bridgeton,
New Jersey 08302 (Tel. (609) 451-8000 Ext.
296)
- Gloucester ----- ROBERT J. MORRIS, Superintendent, County of
Gloucester Weights and Measures, County
Building, 49 Wood Street, Woodbury, New
Jersey 08096 (Tel. (609) 845-1600)
- Gloucester ----- JOSEPH SILVESTRO, Assistant Superintendent,
49 Wood Street, Woodbury, New Jersey
08096 (Tel. (609) 845-1600 Ext. 252)
- Mercer ----- RALPH M. BODENWEISER, Superintendent, Mer-
cer County Weights and Measures Depart-
ment, County Administration Building, 640
South Broad Street, Trenton, New Jersey
08605 (Tel. (609) 989-6579)
- Middlesex ----- JOHN M. CHOAMIN, Superintendent, Middle-
sex County Weights and Measures, 841
Georges Road, North Brunswick, New Jer-
sey 08902 (Tel. (201) 246-6298)
- Monmouth ----- WILLIAM I. THOMPSON, Superintendent, Mon-
mouth County Department of Weights and
Measures, Hall of Records, Freehold, New
Jersey 07728 (Tel. (201) 431-7363)
- Salem ----- ROBERT B. JONES, Superintendent, Salem
County Weights and Measures, P.O. Box 24,
Salem, New Jersey 08079 (Tel. (609) 935-
3152)

CITY

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