

APPENDIX A  
PLAN FOR IMPLEMENTATION  
OF A  
NATIONAL TYPE EVALUATION PROGRAM  
INTRODUCTION

GOAL: A national type evaluation program, acceptable to all States, that provides for design and performance evaluations of new weighing and measuring devices subject to weights and measures regulations.

BACKGROUND

The authority for most weights and measures enforcement rests with the individual States. Each State has the authority and is mandated to examine devices to determine compliance with established design and performance criteria. A manufacturer wishing to market devices and systems in interstate commerce must comply with all the requirements of each State. Fourteen States have laws or regulations requiring that a commercial weighing or measuring device be submitted for type evaluation before it can be declared legal for trade in those States. This can result in considerable expense and marketing delays to a device manufacturer wishing to obtain approval for entry of a device in several of these States. The remaining States either (a) turn to another agency, typically NBS, to determine if a device has been examined and complies with requirements, or (b) conduct more extensive field examinations on a new device when it is first encountered in the field. This can result in varying opinions on whether or not a device complies with requirements and can lead to nonuniform enforcement practices regarding the device.

ASSUMPTIONS

1. A State is not normally in a good position to evaluate a device for nationwide application. Many States have neither the resources nor the capability to do type evaluation testing and are fully supportive of a national program that will provide for uniformity of testing and for reciprocal acceptance of test results. The NBS, by virtue of its role as a technical advisor to the States in developing national standards and as participant in the review and development of international standards, has the exposure, knowledge, and experience to provide technical advice on a national basis.
2. Nonuniformity in device evaluations in the U.S. causes inefficiencies for manufacturers and enforcement officials alike.

3. Uniform test procedures and criteria acceptable to all parties are essential to conducting a successful type evaluation program. Handbook 44 is written in general terms to apply to a wide range of devices and, consequently, interpretations are necessary. Uniformity of test procedures, criteria, and interpretations can be achieved when all parties affected participate in the decision making process. This participatory process is the hallmark of the National Conference on Weights and Measures (NCWM).
4. A majority of manufacturers seek a single source of evaluation to satisfy the approval requirements for the entire country. This will minimize cost and facilitate production and marketing. Past experience demonstrates that most States will accept a device Report of Test issued by NBS.
5. The role described in this paper for NBS is consistent with its mission to promote uniformity in weights and measures laws and methods of inspection by serving as a technical advisor to the States and the National Conference on Weights and Measures.
6. OIML is in the process of developing an International Certification System that would permit a device to undergo a type evaluation in one country and then be accepted by all countries. When this is complete, U.S. participation in this system is essential for U.S. manufacturers to compete internationally. This necessitates a fully adequate U.S. program to be in place. Private communications have clearly indicated that a certification scheme closely associated with NBS will be the only one acceptable internationally.

## LEGAL METROLOGY CONTROL SYSTEM

### CONCEPT

A type evaluation program is the first of a three-stage legal metrology control system. Under the process described here, "type" devices, which in fact might be plans, schematics, drawings, or even pre-production models, are submitted for evaluation using agreed-to procedures and uniform criteria in authorized laboratories. (For purposes of the NTEP, production devices imported into the U.S. will be treated as "types" for evaluation purposes.)

Based on the results of evaluation, assuming the type meets the design and performance criteria, designs are fixed, component sources and tooling are established, acceptance test procedures are established, and production lots are manufactured for application to individual customer orders.

## ROLES

Responsibilities under the control system follow current practices for the most part. In simplest terms, the government's role addresses three key stages:

1. Type evaluation carried out under the authority of the States through the NCWM with technical support of NBS;
2. Initial verification carried out by State and local authorities; and
3. Subsequent verification carried out by State and local authorities.

## NATIONAL TYPE EVALUATION PROGRAM

### SCOPE

The National Type Evaluation Program (NTEP) for commercial weighing and measuring devices and field test standards is a program for determining through uniform examination and testing procedures, that type devices and equipment (by manufacturer and model) are in conformance with applicable national legal metrology standards.

National legal metrology standards include applicable specifications, tolerances, and other design, engineering, technical, procedural, and administrative requirements for commercial weighing and measuring devices and field test standards as published in NBS Handbook 44 or in handbooks, guidelines, or other references established by the NTEP and adopted by the National Conference on Weights and Measures.

The type evaluation is a two-phase process: design evaluation and performance testing. Authorized laboratories, either governmental or private, may perform any phase of the NTEP under the collective authority of the States through the National Conference on Weights and Measures.

The NTEP is open to all States and all device manufacturers.

### PURPOSE

Approval of the type submitted for evaluation is the first of a three-stage legal metrology control system demonstrating that devices conform to established metrological, technical, and administrative requirements as adopted by the National Conference on Weights and Measures.

## DEFINITIONS AND PRECEPTS

Design evaluation is the analysis of a device with respect to:

- suitability for the intended application (design and operating characteristics)
- impact of design on the measurement process
- consistency with "equity" and existing equipment
- related criteria and information from State and Federal agencies and other nations.

Performance testing determines those operating characteristics that include accuracy, precision, and repeatability under varying loads, flows, power sources, and environmental parameters.

### Conformance:

A decision by the National Bureau of Standards that the type of a device conforms to the design and performance requirements prescribed by the National Conference on Weights and Measures; evaluation may apply to whole systems, main devices or elements, or auxiliary devices or elements that impact on the commercial measurement process.

## CONCEPT

The National Type Evaluation Program is perceived as consisting of the following components:

- Design and Performance Standards  
The standards for commercial devices are continually amended, revised, and incorporated into NBS Handbook 44 through existing procedures of the NCWM.
- Test Criteria  
These performance test criteria and design checklist have been developed by NBS, revised by the NCWM Technical Subcommittee of the National Type Approval Task Force, and are expected to become a new NBS handbook, revised and amended following NCWM procedures.
- Laboratory Authorization Criteria  
These criteria are to be developed by NBS and reviewed and adopted by the NCWM.
- Type Evaluations  
Evaluations will be performed by authorized labs (which may be State or NBS). Some performance evaluations, because of the size and nature of the device, will be field evaluations conducted by private and State organizations.

- Type Evaluation Certificate

NBS will assess the type evaluation and issue the type evaluation certificate.

Once NTEP becomes operational, a Board of Governors of NTEP will direct the activities, policies, and procedures of the NTEP. An agent of the Board of Governors of the NTEP will supervise operations and an NTEP Advisory Committee will represent the interests of the manufacturers, retail sales organizations, and users of commercial devices.

CRITERIA AND REQUIREMENTS

NBS Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices" (H-44), is a reference code book specifying both design and performance requirements for commercial measurement equipment adopted by all 50 States. In addition to H-44, test equipment for weights and measures enforcement agency use is evaluated against three existing NBS handbooks:

105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 1. Specifications and Tolerances for Field Standard Weights (NBS Class F),"

105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 2. Specifications and Tolerances for Field Standard Measuring Flasks,"

105-3, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 3. Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards."

Handbook 44 is written in general terms so as not to hamper device design and innovation unnecessarily. For type evaluations, therefore, interpretations of H-44 must be made in order to decide whether a new design does or does not comply with design requirements of H-44. Performance requirements are clearly defined in H-44, but type performance test protocols are not specified in this handbook. In order to meet these needs, a new handbook has been drafted to augment H-44 which describes the interpretations made in the conduct of NBS type evaluations and also provides checklists for manufacturers and performance test protocols that are being used by NBS, California, and the Federal Grain Inspection Service (FGIS) in their type evaluations (draft distributed as NBSIR 80-2179, "Type Approval Criteria and Test Procedures"). The first draft was studied, modified, and endorsed by the Technical Subcommittees of the NCWM National Type Approval Task Force and approved by the NCWM at its 67th Annual Meeting.

Significant additions have been made by the Technical Committees and approval will be requested at the 68th Annual Meeting. This handbook will be published as a new NBS handbook to accompany H-44 and used as the design assessment criteria for National Type Evaluation once adopted by the NCWM.

## LABORATORY AUTHORIZATION

1. Authorization Process Agreement is drafted by NBS and sent to NCWM for adoption.
2. NBS announces Laboratory Authorization Process in appropriate media.
3. Laboratory applies to NBS for authorization.
4. NBS reviews application.
5. NBS sends criteria for authorization and questionnaire to the inquiring laboratory.
6. The laboratory returns the completed questionnaire to NBS for evaluation.
7. NBS evaluates questionnaire and schedules on-site inspection of laboratory.
8. The on-site inspection is conducted and the results are reported to NBS.
9. The on-site inspection results are reviewed by NBS.
10. A Certificate of Authorization is sent to the laboratory with a copy to NCWM.
11. List of authorized laboratories maintained by the NCWM.

## CONDUCT OF EVALUATIONS

A type device will normally be processed through a two-phased evaluation:

- design evaluation, and
- performance evaluation.

The design evaluation will be conducted by NBS professional staff or authorized laboratory staff who are specially experienced in the considerations needed.

The performance evaluation will be conducted in authorized laboratories.

## REVOCABILITY OF A CONFORMITY DECISION

Certificate of conformity of a type can be revoked by decision of the NBS authority:

1. When it is found during initial or subsequent verification that production devices present faults that render the devices unsuitable for their intended purpose.
2. When the production devices are not the same as the device that has been issued an NTEP conformance certificate.
3. When legal requirements change and the conforming model is not consistent with the change.

The manufacturer will have to apply for re-evaluation when he makes a change to the device.

#### DEVICE POPULATION PROJECTIONS

Table 1 provides the potential market of equipment for a National Type Evaluation Program. These estimates are based on the present output of NBS and the State of California, anticipated technological innovations, and that portion of the market presently not utilizing this program. It is anticipated that the demand will increase after the first year's operation, peaking in the second or third year, and leveling off in the fourth year to an average annual demand.

The quantities are for actual evaluations conducted, not certificates issued, since in some instances the issuance of a certificate may require tests on two or more devices.

The categories of equipment are based on codes of NBS Handbook 44 and, to some extent, the time involved in the examination of the equipment. There is a final category of "field test equipment" denoting equipment necessary for field enforcement agency use rather than commercial measurement. This equipment is evaluated against the NBS Handbook 105 series (see CRITERIA AND REQUIREMENTS).

Table 1.  
Device Population Projections  
(Potential Market)

<u>Scales and Weighing Systems</u>	Fiscal Year			
	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>
o Bench and counter, 30-lb capacity or less	30	35	35	30
o Bench, counter, and floor, 30-lb to 2000 lb	15	20	20	20
o Self-contained, over 2000 lb	10	15	15	10
o Large capacity	15	20	20	15
o Indicating elements	20	25	25	20
o Printers	5	10	5	5
 <u>Liquid Measuring Device Systems</u>				
o Retail motor fuel dispensers	5	10	5	5
o Computing registers/consales	20	25	20	15
o Slow-flow meters	2	3	2	1
o Vehicle tank meters	3	5	5	3
o Wholesale meters	3	5	5	3
o Indicating elements	5	10	10	5
 <u>Other Devices and Systems</u>				
o Volumetric measures	10	15	10	10
o Fabric measuring devices	2	2	1	1
o Linear measures	2	2	2	2
o Taximeters	3	5	3	2
o Timing devices	2	5	3	2
o Grain moisture meters	5	5	2	2
o Field test equipment	5	5	5	5
Totals	162	222	193	156

Note: If the average cost of a type evaluation is estimated at \$1000, then the figures above represent potential business incomes to authorized labs. The cost of obtaining and maintaining a laboratory authorization must be examined in light of this income, because the cost/revenue ratio may be such that almost no private labs will apply.

#### SCHE DULE FOR IMPLEMENTATION

The following three charts describe the decision and task process necessary to establish a National Type Evaluation Program. The charts track this process from fiscal year '82 to fiscal year '85 according to major participating organizations or sectors: NBS, four subgroups of the NCWM, the voting membership of the NCWM, State and local governments, and industry. Individual decision and task statements are numbered in a time sequence culminating in operation of a National Type Evaluation Program under the auspices of the NCWM by October 1984.

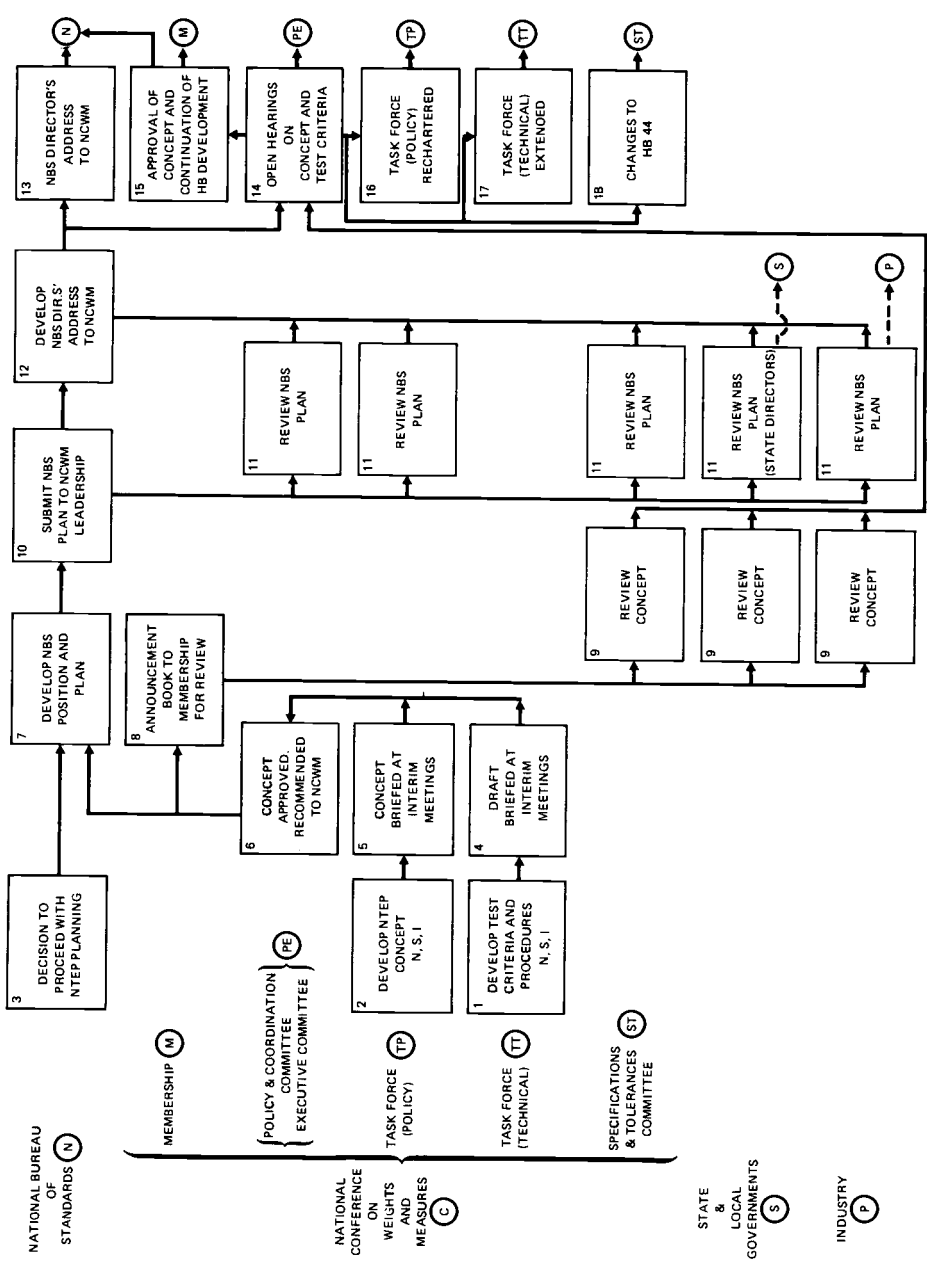


JULY 1982

JUNE 1982

MAY 1982

JAN. 1982



NATIONAL BUREAU OF STANDARDS (N)

MEMBERSHIP (M)

POLICY & COORDINATION COMMITTEE EXECUTIVE COMMITTEE (PE)

NATIONAL CONFERENCE ON WEIGHTS AND MEASURES (C)

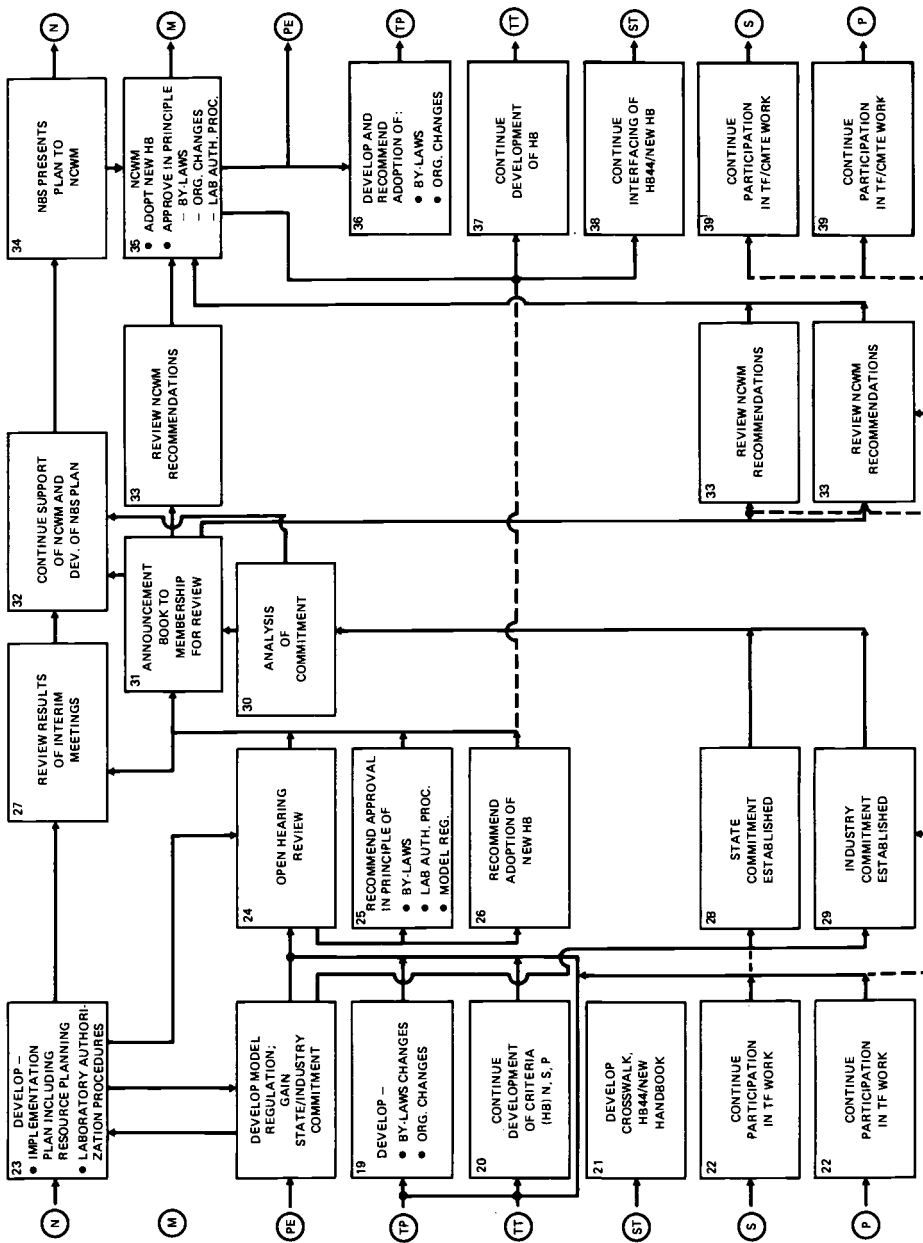
TASK FORCE (POLICY) (TP)

TASK FORCE (TECHNICAL) (TT)

SPECIFICATIONS & TOLERANCES COMMITTEE (ST)

STATE & LOCAL GOVERNMENTS (S)

INDUSTRY (P)



OCT. 1984

JULY 1984

MAY 1984

JAN. 1984

