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 Pielert, James H./Executive summary : Con  
 QC100 .U56 NO.86-3397 1986 V19 C.1 NBS-P

**NBSIR 86-3397**

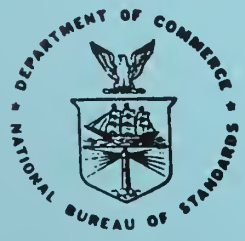
# **Executive Summary - Conference on Accreditation of Construction Materials Testing Laboratories, May 14-15, 1986**

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 National Bureau of Standards  
 Center for Building Technology  
 Construction Materials Reference Laboratories  
 Building Materials Division  
 Gaithersburg, MD 20899

June 1986



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**EXECUTIVE SUMMARY - CONFERENCE  
ON ACCREDITATION OF CONSTRUCTION  
MATERIALS TESTING LABORATORIES,  
MAY 14-15, 1986**

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June 1986

**U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*  
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## Abstract

A two-day Conference hosted by NBS was held in Gaithersburg, Maryland on May 14-15, 1986 to test the hypothesis that "There is a need for a coordinated methodology for accrediting construction materials testing laboratories." Construction materials include primary materials such as: cement, concrete, aggregates, rock and soil, asphalts, metals, wood and masonry. The Conference was structured to consider: (1) the status of existing laboratory evaluation and accreditation programs; (2) current trends in the accreditation process; and (3) the need for and nature of a coordinated accreditation system. The Conference included the presentation of invited papers and four workshop sessions. This Executive Summary presents the findings and proposed actions of the workshops and the Conference recommendations. Conference proceedings will be published later.

**Key Words:** accreditation; building; construction; evaluation; laboratory; materials; standards

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## **1. INTRODUCTION AND BACKGROUND**

A Conference on Accreditation of Construction Materials Testing Laboratories was hosted by the National Bureau of Standards (NBS) in Gaithersburg, Maryland on May 14-15, 1986. The Conference was sponsored by the:

**American Society for Testing and Materials**

**American Association of State Highway and Transportation Officials**

**American Concrete Institute**

**American Council of Independent Laboratories**

**Florida Concrete and Products Association.**

The Cement and Concrete Reference Laboratory (CCRL) is an NBS Research Associate Program sponsored by ASTM Committees C-1 on Cement and C-9 on Concrete and Concrete Aggregates. CCRL is organizationally located in the NBS Center for Building Technology, which manages its day-to-day operations. Policy oversight is provided to CCRL by a Joint ASTM C1/C9 Subcommittee on the CCRL. This Joint Subcommittee is studying the possibility of accrediting laboratories and in September 1985 made a recommendation to the ASTM Board of Directors that:

1. CCRL programs be extended to include laboratory accreditation within the framework of ASTM, and
2. if ASTM allows the Joint Subcommittee and CCRL to proceed with laboratory accreditation, ASTM should work with NBS to revise the policy established at the formation of CCRL in 1929 which specified that CCRL would not certify laboratories.

While this recommendation was being considered by ASTM, the Joint Subcommittee initiated plans for this National Conference to address the overall question of accreditation of construction materials testing laboratories.

The Conference Organizing Committee listed in Appendix A established the purpose and organization of the Conference, selected speakers and workshop chairmen, and prepared guidelines for workshop chairmen. NBS hosted the Conference as a service to the construction community and does not necessarily endorse the conclusions of the workshops or the Conference as a whole.

## 2. PURPOSE AND ORGANIZATION OF CONFERENCE

The Conference was organized to test the hypothesis that:

**"There is a need for a coordinated methodology for accrediting construction materials testing laboratories."**

Construction materials were defined for the purposes of this conference to include primary materials such as: cement, concrete, aggregates, rock and soil, asphalts, metals, wood and masonry.

The Conference was structured to consider:

1. the status of existing laboratory evaluation and accreditation programs for the primary construction materials;
2. current trends in the accreditation process; and
3. the need for and nature of a coordinated national accreditation system.

Appendix B shows the program for the Conference. The first day included the presentation of invited papers and the convening of four workshop sessions. Each workshop was asked to address the Conference hypothesis. The workshops continued meeting on the morning of the second day to prepare reports with findings and proposed actions for presentation to all Conference participants in the afternoon. The workshop reports are given in Section 3 below. Appendix C lists the names and addresses of Conference registrants and



workshop assignments. Appendix D lists the issues provided to the workshop chairmen as possible topics for discussion with the understanding that the workshops could change the list.

The following organizations are referenced in this Executive Summary:

AALA	American Association for Laboratory Accreditation
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
AIA	American Institute of Architects
AMRL	AASHTO Materials Reference Laboratory
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CABO	Council of American Building Officials
CCRL	Cement and Concrete Reference Laboratory
DoD	U.S. Department of Defense
ELF/FCPA	Engineering Laboratories Forum/Florida Concrete and Products Assoc.
FHWA	Federal Highway Administration
GSA	U.S. General Services Administration
HUD	U.S. Department of Housing and Urban Development
ILAC	International Laboratory Accreditation Conference
NBS	National Bureau of Standards
NCSBCS	National Conference of States on Building Codes and Standards
NIBS	National Institute of Building Sciences
NVLAP	National Voluntary Laboratory Accreditation Program
WACEL	Washington Area Council of Engineering Laboratories

### 3. WORKSHOP FINDINGS AND PROPOSED ACTIONS

The workshop assignments shown in Appendix C were made on a random basis except that, where possible, individuals representing the same organization were not assigned to the same workshop. Attendance records at each workshop session were not kept, but attendance was generally less than the assigned number. Therefore, it should not be assumed that each registrant participated in the discussions resulting in the findings and proposed actions of the assigned workshop.

#### 3.1 WORKSHOP I. CHAIRMAN - PAUL KLIEGER<sup>1/</sup>

##### Findings

1. There is a need for a coordinated approach to the accreditation of construction materials testing laboratories. Coordination would have a significant impact in improving the quality of construction in this country.
2. CCRL and AMRL are providing the type of inspection and proficiency testing programs that ought to be included in the requirements of a laboratory accreditation system.
3. The NVLAP program is not as broad in scope as CCRL and AMRL and does not have their credibility even after about eight years of existence.
4. The AALA accreditation program for construction materials is not near the stage of development of CCRL and AMRL and would require a significant amount of time to attain their level.
5. There will be an increasing demand for laboratory accreditation since more and more specifying bodies are requiring it in contract documents.

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<sup>1/</sup> See Appendix C for affiliation of workshop chairmen

6. The accreditation system should offer different levels of accreditation depending on the scope of activities of the particular laboratory rather than just one broad accreditation effort.
7. The initial coordinated accreditation effort should be with the primary construction materials; concrete, steel, asphalt, etc. CCRL and AMRL have well-established programs for many of these materials.
8. There is a need for some type of accreditation for project and branch laboratories.
9. Available standards for laboratory accreditation are improving rapidly (e.g. ASTM E329 Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction), but work remains to be done to insure coverage for all primary construction materials.
10. Certificates of accreditation should be sufficiently detailed so that the client using the laboratory is made aware of the limitations and constraints put on the accreditation. Wording on the certificate can be selected to reduce the potential liability of the accrediting organization.
11. Promotion of a coordinated accreditation program could be accomplished through technical societies such as ACI, ASME, and ASCE, and through technical publications. Workshops and seminars could also be used to bring the program to the attention of specifying agencies.

#### Action Proposed

The first step in the consolidation and coordination of accreditation activities should be taken by CCRL and AMRL by requesting their organizational sponsors (ASTM and AASHTO) to take on the role of accreditors, possibly under

the supervision of their oversight committees. Accreditation can best be accomplished by a voluntary consensus organization rather than either a governmental organization or a private sector organization.

### 3.2 WORKSHOP II. CHAIRMAN - THOMAS FLINT

#### Findings

1. There is a need for a coordinated laboratory accreditation system for the primary construction materials defined for the Conference. The individuality of organizations currently involved with accreditation such as CCRL, NVLAP, AALA and AMRL should be retained where possible.
2. Implementation of the accreditation system should be through an umbrella organization such as ASTM, AASHTO, NIBS, a U.S. conference structured similarly to ILAC, or some combination thereof.
3. Implementation of a coordinated system should attempt to minimize duplication of individual programs such as through the use of shared assessors (e.g. AALA acceptance of CCRL assessments for concrete laboratories).
4. AALA and NVLAP appear to be coming together in that both use specific test methods in evaluating the construction materials discipline.
5. Laboratory accreditation needs to cover equipment, test and operational procedures, and personnel.
6. Educational programs, seminars and publications should be used to promote accreditation along with the use of specification references and regulatory requirements.

#### Action Proposed

Convene a working group of organizations clearly identified as concerned with laboratory accreditation of primary construction materials to quickly follow



up the work of this Conference. The charge to **this group** should be to define the goals, scope, format and procedures of a **coordinated national accreditation system for construction materials testing laboratories**. Selected individuals and organizations should be invited to insure a continuity of consideration based on the **conclusions and recommendations** of this Conference. Participation in the **working group** should be from organizations such as AALA, NVLAP, CCRL, AMRL, ASCE, AASHTO, WACEL, ELF/FCPA, NCSBCS, CABO, ASTM, ACIL, ACI, NBS, DoD, HUD, GSA and FHWA. It is suggested that this meeting be hosted by ASTM and that **Wayne Ellis** be approached to serve as temporary chairman based on his **previous involvement** with ASTM and laboratory accreditation. Planning for this **working group meeting** would be carried out by the chairman and representatives of the **primary organizations** involved (ASTM, AASHTO, AALA and NBS). The **organizing committee** of this Conference should see that this meeting is held as soon as possible.

### 3.3 WORKSHOP III. CHAIRMAN - EDWARD GALLOWAY

#### Findings

1. There is a need for a **coordinated accreditation system** for the primary construction materials. This system should involve the present CCRL and AMRL programs.
2. There should only be one level of accreditation. A laboratory should not be permitted to pick and choose from **among several levels** of accreditation.
3. A laboratory should be inspected every **two years** with an annual review of records.
4. An accreditation program should have an **unbiased credibility**; have knowledgeable, experienced, and **professional personnel**; have proper



- equipment; and possess the ability to adapt to changes in test methods. The program should be operated on a not-for-profit basis.
5. There already are, or soon will be, sufficient standards available (e.g. ASTM E 329) to govern an accreditation system for the primary construction materials.
  6. The time from when a laboratory requests an accreditation to the time the evaluation is made is critical and should be minimized.

#### Actions Proposed

1. The Federal Highway Administration and other appropriate Federal Agencies should encourage/request that state highway administrations require that all testing of primary construction materials be accomplished by accredited laboratories.
2. Building code bodies should be approached and encouraged to require the use of accredited laboratories.
3. Professional organizations such as ACI, ASCE, ASTM, AASHTO, ASME, AIA and others should be encouraged through their membership and publications to make people aware of such an accreditation system and to promote its use to the utmost.
4. Future development of accreditation systems should provide for local or state involvement in order to make these systems work.
5. NVLAP should not move forward to establish an independent laboratory accreditation program but, instead, NVLAP officials should enter the dialogue with other sponsors of this Conference and help develop a harmonized, coordinated system.
6. ASTM and sponsors of this Conference should be encouraged to continue their efforts to reach other organizations to establish policies and to

promote the coordination of accreditation of construction materials testing laboratories. These efforts should include the accrediting of the accrediting bodies.

### 3.4 WORKSHOP IV. CHAIRMAN - WILLIAM GUNDERMAN

#### Findings

1. There is definitely a need for a coordinated laboratory accreditation system for the primary construction materials.
2. Problems are created by multiple standards for the same construction materials such as may occur for standards of ASTM, AASHTO, or State DoT's.
3. Periodic follow-up evaluation of laboratory performances must be part of the accreditation system.
4. The current system where a laboratory may be require to hold several evaluations and accreditations is causing problems relative to costs and impact on operations.
5. Standards for accreditation are currently well developed but procedures and acceptance levels for accrediting or disaccrediting are non-existent except for NVLAP. International standards for accreditation should be used where possible.
6. There is a need for a major educational and/or sales approach to promote acceptance of the system.
7. There should be a minimum scope of accreditation for any given material area such as concrete.
8. If CCRL and AMRL were to expand into accreditation, these services should be marketed as a joint program where applicable. It would be desirable to schedule a common visit by these two inspecting agencies.
9. The format of the accreditation certificate should be appropriate for public display, be relatively simple and, where necessary, be backed up

with other documents such as a scope statement. The laboratory commitment should be indicated by a signature on the part of the laboratory, but not necessarily on the certificate.

10. The ideal way to gain acceptance of a coordinated accreditation system is by reference in specifications. There is a need for better dissemination of current information on laboratory inspection and accreditation systems.

#### Action Proposed

An executive summary of the Conference and workshops should be published and widely distributed to gain the kind of publicity needed to implement a coordinated accreditation system.

#### 4. RECOMMENDATIONS OF THE CONFERENCE

After presentation of the workshop reports and extensive discussion by Conference participants, there was a strong consensus on the following two issues:

1. There is a need for a coordinated national system for the accreditation of construction materials testing laboratories and its development should be initiated.
2. An Executive Summary including findings and proposed actions of the workshops and recommendations of the Conference should be prepared as quickly as possible.

The following recommendations were moved, discussed and passed by the Conference participants.

1. ASTM should, without delay, host a working group of organizations clearly identified as concerned with laboratory accreditation and with principal emphasis on construction materials testing. The charge to the working group should be to define the goals, scope, format and procedures of such a coordinated laboratory accreditation system. Participation in the working group should be by special invitation to individuals from organizations such as: AALA, AASHTO, AMRL, ASCE, CABO, CCRL, DoD, EFL/FCPA, FHWA, GSA, HUD, NBS, NCSBCS, NVLAP and WACEL. Efforts should be made to keep this group small and thus assure that everyone is heard and progress is furthered. Wayne Ellis was recommended as the chairman of the working group if he would agree to serve. A small planning group to organize the meeting should be established consisting of the chairman and representatives of groups such as AALA, AASHTO, ASTM and NBS. The organizers of this Conference should take a lead role in assuring that the working group meeting on the development of a coordinated laboratory accreditation system is expedited to maintain the momentum from this Conference.

2. NVLAP should not move forward to establish an independent laboratory accreditation program for construction materials but, instead, NVLAP officials should enter the dialogue with sponsors of this Conference and help develop a coordinated laboratory accreditation system.

3. CCRL and AMRL should not move forward to establish an independent laboratory accreditation program but, instead, CCRL and AMRL officials should enter the dialogue with sponsors and help develop a coordinated laboratory accreditation system for construction materials.







APPENDIX A

Conference Organizing Committee

Walter E. Capper  
E. L. Conwell & Company

Emery Farkas  
W. R. Grace Company

Richard D. Gaynor  
National Sand and Gravel Association/  
National Ready Mixed Concrete Association

Richard E. Hay  
Federal Highway Administration

Walter E. Kunze  
Portland Cement Association

Joseph F. Lamond  
U.S. Army Corp of Engineers

James H. Pielert  
National Bureau of Standards

Louis U. Spellman  
Blue Circle/Atlantic Cement

Garland W. Steele  
West Virginia Department of Highways



Appendix B

Conference on Accreditation of Construction Materials Testing Laboratories

PROGRAM

May 14, 1986

- 8:00 a.m. Registration (Coffee and Danish in Employees Lounge)
- 9:00 a.m. Welcome .....Dr. Ernest Ambler  
Director, National Bureau of Standards
- 9:10 a.m. Conference Chairman Remarks .....Mr. Walter Kunze  
Chairman, ASTM Joint C1/C9 Subcommittee on the CCRL
- 9:25 a.m. ASTM and Laboratory Accreditation .....Mr. Peter Brown  
Vice President, Finance and Administration, ASTM
- 9:55 a.m. AASHTO Staff Views.....Mr. Francis Francois  
Executive Director, American Association of State Highway and Transportation Officials
- 10:20 a.m. Coffee (Employees Lounge)
- 10:40 a.m. National and International Standards Activities Related to Laboratory Accreditation ..... Mr. John Locke  
Chairman, ASTM Committee E-36
- 11:10 a.m. Status of ASTM Standard E329 and Other Related Standards.....Mr. Spencer Thew  
Chairman, ASTM Subcommittee E36.93
- 11:40 a.m. Status of NVLAP Activities Related to Construction Materials.....Mr. Robert Gladhill  
Project Leader, National Voluntary Laboratory Accreditation Program
- 12:05 p.m. Status of AALA Activities Related to Construction Materials.....Mr. John Locke  
Executive Director, American Association for Laboratory Accreditation
- 12:30 p.m. Accreditation of Testing Laboratories in Florida.....Mr. John Roebuck  
Member, Engineering Laboratories Forum/Florida Concrete and Products Association
- 1:00 p.m. Lunch (NBS Cafeteria)
- 1:55 p.m. Construction Materials Reference Laboratories at NBS.....Mr. James Pielert  
Group Leader, Construction Materials Reference Laboratories

- 2:20 p.m. Laboratory Accreditation from the  
Perspective of a Construction  
Materials Engineer.....Mr. Grover Williams  
American Council of Independent  
Laboratories
- 2:45 p.m. Laboratory Accreditation from the  
Perspective of a Model Building  
Code.....Mr. Thomas Frost  
Manager, Evaluation Services,  
Building Officials and Code  
Administrators International, Inc.
- 3:10 p.m. Coffee (Employees Lounge)
- 3:30 p.m. Laboratory Accreditation from the  
Perspective of State Building  
Code Officials.....Mr. William Connolly  
National Conference of States  
on Building Codes and Standards
- 3:55 p.m. Legal and Liability Concerns  
Associated with Certification and  
Accreditation Programs.....Mr. James Anderson  
Partner, Loomis Owen Fellman  
and Howe
- 4:20 p.m. Certification Program Experiences  
Relative to Liability Issues.....Mr. Richard Gaynor  
Executive Vice President  
National Sand and Gravel  
Association/National Ready-Mixed  
Concrete Association  
and  
Mr. George Krepel, Jr.  
Manager of Production Programs,  
Prestressed Concrete Institute
- 5:00 p.m. Conference Chairman Remarks
- 5:30 p.m. Reception and Dinner at NBS Senior Lunch Club
- 7:00 p.m. Workshop Sessions at NBS
- 9:00 p.m. Adjournment for Evening

May 15, 1986

- 9:00 a.m. Reconvening of Workshop Sessions (Coffee and Danish available)
- 10:30 a.m. Coffee
- 10:50 a.m. Continuation of Workshop Sessions
- 1:00 p.m. Lunch (NBS Cafeteria)
- 2:00 p.m. Reports of Workshop Chairmen
- 5:00 p.m. Concluding Remarks by Conference Chairman
- 5:15 p.m. Conference Adjournment

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## Appendix D

### Guidelines for Workshop Chairmen

Each workshop will have approximately six hours to work together following the presentation of prepared talks. The workshops will begin work on the evening of May 14th at 7:00 p.m. and continue until 9:00 p.m. It is anticipated that this time will be taken to introduce the subject matter, prepare an outline of the potential topics to be discussed, plan on how best to carry out activity, and to initiate indepth discussion. The workshop session on the morning of May 15 from 9:00 a.m. until 1:00 p.m. will be for indepth discussion of the issues and the development of conclusions and recommendations for presentation to the full conference.

Each workshop room will be provided with a viewgraph, flip charts, blackboard space, and a staff support person to assist the chairman. The chairman should select a workshop participant to keep the record of the discussions and conclusions. There will be no recording of the workshop proceedings. The conclusions and recommendations of the workshop will be summarized in a report which will be delivered by the chairman to the full conference on the afternoon of May 15th. The prepared talks and the workshop reports will be recorded. Typing support will be available to assist in preparing the reports.

Each Workshop is to address the Conference hypothesis that "There is a need for a coordinated methodology for accrediting construction materials testing laboratories." The following issues are suggested for workshops consideration:

#### I. Current methodology that may effect performance in construction material testing laboratories

- o indicators pointing out where changes in methodology may improve laboratory performance
- o relationship of laboratory testing to overall quality of construction
- o use of more than one standard for identical type testing (e.g. ASTM and AASHTO)

#### II. Analysis of currently operating evaluation/accreditation systems for construction materials

- o review of the current evaluation/accreditation systems (CCRL, AMRL, NVLAP, AALA, ELF/FCAA, WACL, etc.)
- o impact of current laboratory evaluation/accreditation systems on laboratory performance
- o factors affecting the acceptance of current evaluation/accreditation systems (e.g. cost, scope of coverage, lack of regulatory reference, lack of economic benefit)
- o the adequacy of current standards (both national and international) on the implementation and acceptance of laboratory evaluation/accreditation programs

III. Is there a need for a coordinated laboratory-accreditation system or is the current approach adequate?

- o review of approach recommended by ASTM Panel on Accreditation, NVLAP Construction Materials Testing LAP, etc.

IV. If needed, what are the components and approach for implementation of such a coordinated system?

- o level of accreditation depending upon the scope of services offered by the laboratory
- o review by broad technical (e.g. construction materials) discipline vs. review by standards for specific materials
- o scope of in-laboratory evaluation
  - review of apparatus and/or procedures
  - reliance on professional engineer in charge of laboratory
- o adequacy of available standards on laboratory accreditation
- o implementation of ASTM laboratory evaluation type standards being developed
- o format of certificate of accreditation

V. Approach for gaining acceptance of a coordinated accreditation system

- o promotion of regulatory references requiring use of evaluation/accreditation systems
- o emphasis on the benefits of laboratory accreditation programs to the construction community to justify the costs

U.S. DEPT. OF COMM. <b>BIBLIOGRAPHIC DATA SHEET</b> <i>(See instructions)</i>	<b>1. PUBLICATION OR REPORT NO.</b> NBSIR-86/3397	<b>2. Performing Organ. Report No.</b>	<b>3. Publication Date</b> JUNE 1986
<b>4. TITLE AND SUBTITLE</b> Executive Summary - Conference on Accreditation of Construction Materials Testing Laboratories, May 14-15, 1986			
<b>5. AUTHOR(S)</b> James H. Pielert			
<b>6. PERFORMING ORGANIZATION</b> <i>(If joint or other than NBS, see instructions)</i> NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234		<b>7. Contract/Grant No.</b>	<b>8. Type of Report &amp; Period Covered</b>
<b>9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS</b> <i>(Street, City, State, ZIP)</i> American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103			
<b>10. SUPPLEMENTARY NOTES</b>  <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
<b>11. ABSTRACT</b> <i>(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)</i>  A two-day conference hosted by NBS was held in Gaithersburg, Maryland on May 14-15, 1986 to test the hypothesis that "there is a need for a coordinated methodology for accrediting construction materials testing laboratories." Construction materials include the primary materials such as: cement, concrete aggregates, rock and soil, asphalts, metals, wood and masonry. The conference was structured to consider: (1) the status of existing laboratory evaluation and accreditation programs; (2) current trends in the accreditation process; and (3) the need for and nature of a coordinated accreditation system. Conference format included the presentation of invited papers and four workshop sessions. This Executive Summary presents the findings and proposed actions of the workshop and the conference recommendations. Conference proceedings will be published later.			
<b>12. KEY WORDS</b> <i>(Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)</i>  accreditation; construction; laboratory; materials; standards			
<b>13. AVAILABILITY</b> <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. <input checked="" type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161		<b>14. NO. OF PRINTED PAGES</b>  27	<b>15. Price</b>  \$9.95







