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accommodating user needs in computer program development

an American National Standard

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American National Standard for Accommodating User Needs in Computer Program Development

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American Nuclear Society

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Working Group ANS-10.5

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard for Accommodating User Needs in Computer Program Development, ANSI/ANS-10.5-1994.)

This standard is a revision of American National Standard Guidelines for Considering User Needs in Computer Program Development, ANSI/ANS-10.5-1986. It was prepared under the supervision of the ANS-10 Subcommittee of the American Nuclear Society's Standards Committee. This subcommittee is sponsored by the Mathematics and Computation Division of the Society. The Mathematics and Computation Division has encouraged the development and interchange of computer software. These recommendations are based on experience in the development and use of computer software for scientific and engineering calculations in the nuclear industry.

A high degree of reliance is placed on results produced by computer calculations. Often the users of computer programs have limited program expertise and can be unaware of the consequences of misapplication. Similarly, program developers may have limited appreciation of user needs, particularly in the area of adequate documentation, input preparation, and output interpretation. Cooperative interaction between developers and prospective users throughout the development and trial use periods is important to generate a product that can be used with a high degree of reliability. In many projects, the prospective user is not available or not accessible and the developer must anticipate the needs of users.

This standard recommends programming and documentation practices that are important for accommodating user needs. Proper application of this standard will improve the design and utility of computer software by encouraging the developer to consider aspects related to user requirements, which are often overlooked or assigned a low priority. This standard is intended to support the process of software development, but is not intended to support a specific order of software life cycle phases. It is recognized that a substantial effort may be required to fully implement these recommendations. The cost of this effort must be weighed against the potential benefits resulting from ease of use and increased reliability.

This standard is one of four documents directed towards individuals who develop computer programs. The other three are American National Standard Recommended Programming Practices to Facilitate the Portability of Scientific and Engineering Computer Programs, ANSI/ANS-10.2-1988; American National Standard for Documentation of Computer Software, ANSI/ANS-10.3-1986; and American National Standard Criteria for the Verification and Validation of Scientific and Engineering Computer Programs for the Nuclear Industry, ANSI/ANS-10.4-1987. These standards are under continual maintenance by Subcommittee ANS-10. The user is advised to review the current version of these standards for possible changes.

As used here, the definition of criteria is "The bases for judging a particular process or product". The term "should" denotes a guideline; the term "shall" denotes a mandatory requirement.

This standard was drafted by Working Group ANS-10.5. The members at the time this standard was prepared were:

Andrew Smetana, Chairman, *Westinghouse Savannah River Company*
Sally Hartzell, *Power Computing Company*
Steve Nathan, *Westinghouse Savannah River Company*

The members of Subcommittee ANS-10, Mathematics and Computations, at the time this standard was approved, were:

S. Hartzell, Chair, *Power Computing Company*
R. J. Breen, *Electric Power Research Institute*
M. K. Butler, *Argonne National Laboratory*
J. S. Dukelow, *Battelle Pacific Northwest Laboratory*
S. Harris, *Science Applications International Corporation*

B. L. Kirk, *Oak Ridge National Laboratory*
L. I. Kopp, *U. S. Nuclear Regulatory Commission*
G. C. Main, *BCS Richland, Inc.*
G. W. Main, *JMJ Associates*
N. H. Marshall, *EG&G Idaho, Inc.*
S. J. Nathan, *Westinghouse Savannah River Company*
A. O. Smetana, *Westinghouse Savannah River Company*

Consensus Committee N17, Research Reactors, Reactor Physics, Radiation Shielding, and Computational Methods, had the following membership at the time it reviewed and approved this standard:

T. M. Raby, Chairman
A. Weitzberg, Secretary

J. D. Buchanan ..... Individual
A. D. Callihan ..... Individual
R. E. Carter ..... Individual
D. Cokinos ..... Brookhaven National Laboratory
A. De La Paz ..... Vista Technologies
D. Duffey ..... American Institute of Chemical Engineers
H. Goldstein ..... American Physical Society
S. Hartzell ..... Power Computing Company
P. B. Hemmig ..... U. S. Department of Energy
J. W. Lewellen (Alt.)
W. A. Holt ..... American Public Health Association
W. C. Hopkins ..... Bechtel Corporation
J. E. Hyder ..... Health Physics Society
A. G. Johnson (Alt.)
L. I. Kopp ..... Individual
J. Miller ..... Institute of Electrical and Electronics Engineers, Inc.
J. E. Olhoeft ..... Individual
T. M. Raby ..... American Nuclear Society
W. J. Richards ..... U. S. Department of Defense
M. M. Ter Pogossian ..... American College of Radiology
J. F. Torrence ..... National Institute of Standards and Technology
D. K. Trubey ..... Individual
S. H. Weiss ..... U. S. Nuclear Regulatory Commission
A. Adams Jr. (Alt.)
A. Weitzberg ..... Halliburton NUS Corporation
W. L. Whittemore ..... GA Technologies, Inc.

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Accommodating User Needs in Computer Program Development

1. Scope and Objectives

1.1 Scope. This standard presents criteria for accommodating user needs in the preparation of computer software for scientific and engineering applications.

1.2 Objectives. Adherence to these criteria will help ensure proper application and simplify the use of computer programs. The intent is to encourage the development of a product that will be easy to apply correctly.

2. Definitions

The definitions given below are applicable specifically to this standard.

default value. The value assigned to a variable by the program when its value is not specified by the user.

external data files. The data files which exist prior to or after execution of a computer program. They include:

library files—Used to retain commonly accepted data in a standardized form.

interface files—Used to share data between programs or subprograms.

restart files—Used to retain data between successive executions of the same program.

implementation. Installation of a program for execution on a particular computer system or in the user's computer environment.

input. Data received by a program.

interactive program. A program whose execution may be controlled by the user via an input and response dialogue.

output. Data delivered by a program.

program development. The processes which are involved in producing computer software and its documentation. They are:

- initiation
- requirements definition
- design
- coding
- integration and testing
- installation and checkout
- operations and maintenance.

user. A person who applies a program to perform a specific task.

3. Introduction

Computer software should be developed so that the needs of the user are anticipated, specifically in the areas of proper application, ease of use, and implementation. In this document the users are considered to be persons who work with a program developed by someone else. They may use the program to obtain results directly, or their task may be to implement the program on a different computer system. This guidance is directed to those individuals who develop computer programs, including both those who do initial development and those who interface with and modify existing programs.

When selecting, implementing, and applying an unfamiliar computer program, the new user must have sufficient information. Specifically the user is concerned with:

- proper application
- ease of use
- reliability
- computing costs
- input requirements
- hardware requirements
- interpretation of results
- time required to obtain results
- ease of modification.