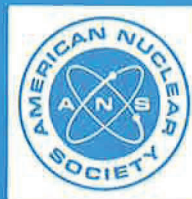


American Nuclear Society

**recommended programming practices to facilitate the
portability of scientific computer programs**

WITHDRAWN

an American National Standard



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**American National Standard
Recommended Programming Practices to Facilitate
the Portability of Scientific Computer Programs**

**Secretariat
American Nuclear Society**

**Prepared by the
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Standards Committee
Working Group ANS-10.2**

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Foreword

(This Foreword is not a part of American National Standard Recommended Programming Practices to Facilitate the Portability of Scientific Computer Programs, ANSI/ANS-10.2-1982.)

This standard is a major revision of ANS Std. 3-1971, Recommended Programming Practices to Facilitate the Interchange of Digital Computer Programs. Both documents were prepared by Subcommittee ANS-10 of the Standards Committee of the American Nuclear Society (ANS). This subcommittee is sponsored by the Mathematics and Computation Division of the Society. Since its inception the Mathematics and Computation Division has encouraged and promoted the interchange of digital computer programs (codes) within the nuclear industry. The practices recommended herein are based on experience in working with programs for neutronics, shielding, and engineering calculations in this industry.

To obtain feedback from users and developers of computer programs on the importance and the desired content of a programming practices standard, a questionnaire was published in 1978 in an ANS Mathematics and Computation Division Newsletter. In addition it was also distributed by the National Energy Software Center (previously called the Argonne Code Center) and by the Radiation Shielding Information Center (RSIC). Over 300 responses were received from engineers, scientists, programmers, systems analysts and managers. A cross-section was obtained from government, industry, and academia — both foreign and domestic. The majority of respondees expressed support for such a standard.

As a guideline, this standard recommends programming practices that are important for interchanging computer programs from one installation to another. It is one of three documents directed toward individuals who develop computer programs. The other two are American National Standard Guidelines for the Documentation of Computer Programs, N413-1974 (ANS-10.3) and American National Standard Guidelines for Considering User Needs in Computer Program Development, ANSI/ANS-10.5-1979. The definition of "guidelines", as used here, is taken from American National Standard Quality Assurance Terms and Definitions, ANSI/ASME N45.2.10-1973:

"Particular provisions which are considered good practice but which are not mandatory in programs intended to comply with this standard. The term "should" denotes a guideline; the term "shall" denotes a mandatory requirement."

This standard is directed at the computer-independent aspects of digital computer programs. That is, the program developer is asked to accept the fact that many of the difficulties associated with interchange and conversion from one computer model to another can be avoided. Unnecessary expense, waste of effort, and loss of computing capability have occurred because the practices recommended have not been assigned sufficient importance. This is true not only in program interchange between installations but also in program modification and conversion within the originating installation. Some of the recommendations herein cover elementary practices normally followed, yet often overlooked. They can be put into practice with only a reasonable amount of additional effort over that normally expended in developing major computer programs.

These recommendations may have to be supplemented to cover local requirements for program development to accommodate the computing environment and application considerations.

Great diversity has come with the rapid advance in computing technology. Several quite different models of computers are in wide use. Several "higher level" program-

ming languages are in use, such as FORTRAN, ALGOL, PASCAL, and PL/1. These programming languages are implemented by a variety of compilers. To meet the needs for greater flexibility, improved efficiency, and easier use, the programming languages continue to be extended, and such extension leads to incompatibilities and difficulties in conversion.

American National Standard Programming Language FORTRAN, ANSI X3.9-1978, is currently recognized as the de facto standard for much scientific and engineering computation. Thus, many of the practices recommended herein are directed at FORTRAN programming. Nevertheless, the development of and experimentation with more advanced higher level languages is encouraged. This document will be modified to acknowledge new de facto standards as they evolve. The need for compatibility within the advancing technology is recognized, and effort toward satisfying this need is encouraged.

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