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Engineering Technology Division
Performance Assurance Project Office

DOE-NUCLEAR ENERGY STANDARDS PROGRAM
ANNUAL ASSESSMENT, FY 1990

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SUMMARY

To meet the objectives of the programs funded by the Department of Energy (DOE)-Nuclear Energy (NE) Technology Support Programs, the Performance Assurance Project Office (PAPO) administers a nuclear standards program and related activities and fosters the development and application of standards. This standards program is carried out in accordance with the principles in DOE Order 1300.2, *Department of Energy Standards Program*, December 18, 1980.

The purposes of this effort, as set forth in three subtasks, are to (1) manage the NE Standards Program, (2) manage the development and maintenance of NE standards, and (3) operate an NE Standards Information Program.

The first goal of subtask 1 is to promote and support development and utilization of national consensus standards (NCSs) in areas of benefit to DOE's NE programs and projects. This goal meets the requirements established in OMB Circular No. A-119, *Federal Participation in the Development and Use of Voluntary Standards*, October 26, 1982. A major part of this program is to convert existing NE program standards into NCSs where practicable. Twenty-six standards have been converted to NCSs, and twenty-four standards are presently in the conversion process. There were no NE Standards converted to NCSs in FY 1990. A semiannual conversion report that contains information on each conversion action is published. The second goal of this subtask is to inform line managers and standards coordinators about the DOE standards policy and their role in implementing it and the functions and services that PAPO can supply to aid in meeting the goals set forth in the policy. To accomplish this goal, PAPO assists DOE in performing standards assessments, a process used to determine the effectiveness of a contractor's standards program.

The goal for subtask 2 is to provide management for the development and maintenance of NE standards. Approximately 90 NE standards remain active. Activities to review seven standards for possible inactivation and one standard for possible discontinuation were initiated. Development continued on a new Nuclear Nonsafety High-Temperature Design program standard in support of the Power Reactor Inherently Safe Module. The need for a program standard for the New Production Reactor - Modular High Temperature Gas-Cooled Reactor graphite core support structure was identified. The final draft of the *Recommended Practices in Elevated Temperature Design: A Compendium of Breeder Reactor Experiences (1970-1985)* continued in the review process. The purpose of the report is to document liquid metal fast breeder reactor (LMFBR) structural

design and nonlinear elevated-temperature analysis procedures and experiences accumulated over the 15-year period from 1970 to 1985.

Subtask 3 is fulfilled by the Performance Assurance Information Program that collects, compiles, and distributes program-related information, reports, and publications for the benefit of the DOE-NE program participants. Data bases are maintained that are necessary to monitor standards and to provide reports. The *Nuclear Standards Master Index* is published twice each year and distributed to 439 persons or organizations. The annual *Nuclear Energy Standards KWOC Index* was issued to 269 persons or organizations. In January and July, the *Conversion of NE Standards to National Consensus Standards* was published and distributed to 155 persons or organizations. The standards data base contains over 400 records. In addition to the normal distribution, 560 documents were sent to requestors.

1. INTRODUCTION

This report assesses the Performance Assurance Project Office (PAPO) activities in terms of the objectives of the Department of Energy-Nuclear Energy (DOE-NE) funded programs. To meet these objectives, PAPO administers a nuclear standards program and related activities and fosters the development and application of standards.

This task is carried out in accordance with the principles set forth in DOE Order 1300.2, *Department of Energy Standards Program*, December 18, 1980, and DOE memorandum, *Implementation of DOE Orders on Quality Assurance, Standards, and Unusual Occurrence Reporting for Nuclear Energy Programs*, March 3, 1982, and with guidance from the DOE-NE Technology Support Programs. The purposes of this effort, as set forth in three subtasks, are to (1) manage the NE Standards Program, (2) manage the development and maintenance of NE standards, and (3) operate an NE Standards Information Program.

2. STANDARDS PROGRAM

The DOE-NE standards program effort to comply with DOE Order 1300.2 is presented in this section. The accomplishments of this fiscal year are also presented.

2.1 MANAGEMENT OF THE NE STANDARDS PROGRAM

This subtask has two goals. The first is to promote and support development and utilization of national consensus standards (NCSs) in areas to benefit DOE's NE programs and projects. The capability to support development and utilization of NCSs for DOE-NE programs and projects is accomplished through direct participation and interaction with the NCS organizations. Initially, PAPO assists DOE programs and projects in determining those standards needs that can be met through application of existing NCSs. In cases where NCSs do not exist, PAPO offers technical assistance to the NCS organizations to support development of needed standards. In other cases, required NCSs on specific subject areas may exist, but additional requirements may be needed to support DOE programs and projects. PAPO then fosters the development of program NE standards with those additional requirements to be used as supplements to existing NCSs. A major goal of DOE's Nuclear Standards Program is to convert existing NE program standards into NCSs where practicable. This means that an NE standard may form the basis for a standards-writing committee to develop a standard in the same subject area using the voluntary consensus process. Some or all requirements from the NE standard may be incorporated into the NCS. An existing NE standard is deleted or modified as required to supplement the NCS for application to DOE for efficient transfer of DOE's NE program experience to the private sector for commercial use. PAPO fosters this process through planning and monitoring activities. The formal interface between PAPO and the NCSs organization is the Nuclear Standards Board, which manages and coordinates all nuclear-related standards activities for the American National Standards Institute (ANSI).

The second goal of this subtask is to inform line managers and standards coordinators of DOE-funded Light-Water Reactors, Advanced Reactors, Space and Defense Power Systems, Uranium Enrichment, and Remedial Action and Waste Technology Programs about the DOE-Standards Policy for Nuclear Energy and their role in implementing it and the functions and services that PAPO can supply to aid in meeting the goals set forth in the policy. Building on this perception of the standards role, PAPO works cooperatively with managers or standards coordinators to identify standards needs.

and opportunities and to help them initiate appropriate actions to carry out standards development and application plans.

2.1.1 Conversion

Twenty-six (26) NE standards have previously been converted to NCSs. During fiscal year 1990, no additional NE standards were converted. There are twenty-four (24) NE standards in the conversion process that have been accepted by standards development organizations (e.g., ASME, ASTM, IEEE, and INMM) who write NCSs based on the NE standards. Most of the activity in this area focused on NE Standards C 17-5T, *Metal Sheathed, Mineral-Insulated Cable Bulk Material*, and C18-1T, *Ceramic Electric Insulators*, which were presented to ASTM in 1989 for conversion to NCSs. ASTM subsequently referred these standards to their D9 Technical Committee on Electrical and Electronic Insulating Materials for action. The standards were then placed with the D9-14 (Electrical Heating Unit Insulation) and D9-94 (Editorial and Special Assignment) subcommittees for consideration to convert them to ASTM standards. As a result of the meetings of these ASTM subcommittees in March and June 1990, conversion of NE Standards C 17-5T and C18-1T is still under active consideration. Additional meetings of the ASTM subcommittees to continue the consideration process for the NE standards are scheduled for November 1990.

The *Conversion of NE Standards to National Consensus Standards*, report contains information on each conversion action.

2.1.2 Standards Assessment

Standards assessment is a process used to determine the effectiveness of a contractor's standards program. The objectives of the assessments are to:

1. verify, by examination and evaluation of objective evidence, that the standards program is in accordance with DOE Order 1300.2;
2. assess the effectiveness of the standards program;
3. identify deficiencies and areas for improvement; and
4. verify correction of identified standards program deficiencies.

An *Assessment Plan for Development and Application of Standards*, including a tentative schedule, and a *Guide for Assessment of Nuclear Standards Development and Application*, had previously been developed and issued. In response to an action item from the December 12, 1989, program review meetings, the *Guide for Assessment of Nuclear Standards Development and Application*, was reviewed for needed revisions. However, no changes were required to the document.

Two standards assessments were planned for FY 1990. The standards assessment at Westinghouse Hanford scheduled for March 6-7, 1990, was subsequently cancelled due to DOE actions taken to shut down the Fast Flux Test Facility. In addition, PAPO proposed that a standards assessment be conducted at ORNL in July 1990; however, the proposal was not acted upon by DOE. Followup action is anticipated in FY 1991.

2.1.3 Identify Standards Needs and Opportunities

A meeting was conducted at ORNL in February 1990, to explore possible options for enhancing the DOE NE standards work in the ORNL work programs. The discussion of the possible areas of standards development in the work programs will lead to follow-up action in the determination of needs and support requirements for the NE standards program.

The NE standards program was also promoted by PAPO through direct participation in the DOE New Production Reactors Program. Presentations on the need for and development of standards utilizing the methods and procedures provided in the NE standards programs were made to the NPR-Heavy Water Reactor design teams in November 1989, and to the NPR-Modular High Temperature Gas-Cooled Reactor designer in July 1990.

A more concerted and accelerated effort to identify standards needs and opportunities is planned in the future. This effort will focus on working with other DOE program areas (e.g., Remedial Action and Space) to determine their needs. Contact will be established with organizations (e.g., low-radioactive material, American Nuclear Society, and Oak Ridge Operations Office) to determine standards requirements already established, status, and work needed in the future. Another aspect of this program will be to learn more about enrichment requirements by acquiring papers from the International Conference on Enrichment and by maintaining contact with the Atomic Vapor Laser Isotope Separation (AVLIS) Program.

2.1.4 Working Group on Standards

The Working Group on Standards (WGS) provides to DOE and PAPO advice on implementing the nuclear standards program. The WGS facilitates communication and coordinates actions among all participating organizations in support of the standards policy for NE programs. The WGS is composed of members from DOE-NE program laboratory and contractor organizations, each of whom is knowledgeable in the standards-related activities of his organization. The Chairman and Secretary are members of PAPO appointed by the Manager of PAPO.

Four new Standards Coordinators, representing their organizations on the WGS, were appointed in FY 1990. The WGS did not conduct any meetings in FY 1990. A meeting of the WGS is tentatively scheduled for FY 1991.

2.2 MANAGEMENT FOR DEVELOPMENT AND MAINTENANCE OF NE STANDARDS

The goals of this subtask are to provide management for the development and maintenance of NE standards and to provide assistance in the application of NE standards to DOE programs and projects. PAPO initiates and manages the development and maintenance of NE program standards when adequate NCSs are not available or when NCSs cannot be developed on a timely basis. PAPO provides direction and assistance to program and project managers by identifying the appropriate standards writer(s) and a sponsor for each proposed standard, managing each standard development project, and coordinating required maintenance and updating activities for each standard throughout its existence. PAPO coordinates all amendments, revisions, reviews, reproduction, and distribution of NE standards. A concerted effort is under way to discontinue NE standards when they are no longer needed by DOE's NE programs and projects and to ensure proper funding for maintenance of standards that are needed.

2.2.1 Amendments and Revisions

A revision is a complete issue of a standard that incorporates previous amendments and/or technical changes to the standard or when reorganization of the existing information is necessary.

A revision supersedes the previous edition of the standards. The following standard was revised and issued in FY 1990:

F 3-43 Quality Assurance Testing of HEPA Filters

2.2.2 Discontinued and Inactive Standard

A discontinued standard is a previously published standard that is no longer approved for application on new DOE programs and no longer available for distribution. An inactive standard is a previously published standard that is no longer maintained but is available for information only; the standard shall not be applied to new programs unless it is reactivated. No standards were discontinued or inactivated during FY 1990; however, actions to review seven standards for possible inactivation and one standard for possible discontinuation were initiated.

2.2.3 New Standards

The need has been identified to provide a Nuclear Nonsafety High Temperature Design Program standard in support of the Power Reactor Inherently Safe Module (PRISM). The tentative designation for the standard is NE F 9-10T. However, before work begins on the NE standard, the requirements shall be presented to the ASME to determine if they are willing to develop a NCS (code case). Therefore, work has begun on a draft code case covering the pressure vessel components, and this will be presented to the ASME. A preliminary review has been made of the nonsafety piping requirements with the thought of preparing a draft piping code case for submission to the ASME B31 code for pressure piping. A proposal for preparation of the standard has been received and is currently under review.

The design team for the NPR-Modular High Temperature Gas-Cooled Reactor has accepted a recommendation from PAPO and advised DOE that an NPR program standard providing design requirements for the graphite core support structures should be prepared and issued. These requirements are currently outlined in draft Subsection CE to ASME Section III, Division 2. However, consensus review of the draft document is not expected to be completed on a schedule that

supports the project design schedule. The NPR program standard will be developed under the NE Standards Program and, pending NE approval, has been tentatively identified as Standard NE F9-11/NP.

2.2.4 Recommended Practices

The final draft of the *Recommended Practices in Elevated Temperature Design: A Compendium of Breeder Reactor Experiences (1970-1985)* is still in the review process. The purpose of this report is to document LMFBR structural design and nonlinear elevated-temperature analysis procedures and experiences accumulated over the 15-year period. The report concentrates on how design and analyses were performed to ensure structural integrity of LMFBR components over the 20- to 30-year life of a power plant, some of it during elevated-temperature operation; what was found to be successful; and what recommendations can be made for the future design of large-scale commercial LMFBRs. Shortcomings of the present technology are identified and recommendations for future research noted. Typical computer programs used in design and examples of detailed nonlinear analyses to comply with structural design criteria are also provided in the appendices of the report.

3. PERFORMANCE ASSURANCE INFORMATION PROGRAM

The Performance Assurance Information Program was established to collect, compile, and distribute program-related information, reports, and publications for the benefit of the DOE-NE program participants. The PAPO also maintains the data bases and makes the modifications necessary to monitor quality assurance, standards, and safety-related activities and to provide the reports described in this subtask.

3.1 Publications

The *Nuclear Standards Master Index* provides a complete list of all assigned NE standards and rapid retrieval of NE standards information. This index was published twice in FY 1990 and issued to 439 persons or organizations.

The annual *Nuclear Energy Standards KWOC Index* is an alphabetical listing that provides the ability, by means of the keyword out of context (KWOC) concept, for rapid identification of NE standards based on the specific subject areas. This publication was issued to 269 persons or organizations.

The *Conversion of NE Standards to National Consensus Standards* report lists NE standards that have been identified for conversion and also gives, in the form of data and status remarks, information about the conversion effort. The publication was issued to 155 persons or organizations.

The *KWOC Index of U.S. Nuclear Regulatory Commission Guide Series* is prepared as an aid in searching for specific topics in the U.S. Nuclear Regulatory Commission Regulatory Guide Series. This publication was issued to 112 persons or organizations.

3.2 Data Bases

PAPO maintains data bases that are operated on a daily basis to maintain current information. One data base is maintained for standards and contains over 400 records on NE standards. From these data, standards publications are compiled and published. Other data exist; however, their use is limited to operating PAPO more efficiently or providing DOE-NE with information.

3.3 Requests

In addition to the normal distribution, Table 1 shows the documents that were sent to requestors.

Table 1. Number of documents sent to requestors for FY 1988-FY 1990

Documents Requested	Fiscal Year		
	1988	1989	1990
NE Standards	201	717	463
Nuclear Standards Master Index	124	62	65
Nuclear Standards KWOC Index	40	48	26
NRC Regulatory Guide KWOC Index	26	9	6
Total	392	836	560

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