27
11/21/79
201.707

ornl

ORNL-5586

**OAK
RIDGE
NATIONAL
LABORATORY**

**UNION
CARBIDE**

Management Plan for the Nuclear Standards Program

MASTER

**OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

BLANK PAGE

ORNL-5586
SPECIAL

Contract No. W-7405-eng-26

Engineering Technology Division

MANAGEMENT PLAN FOR THE NUCLEAR STANDARDS PROGRAM

Date Published: November 1979

Prepared by the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY

DISCLAIMER

This document contains information which is the property of the United States Government and is loaned to you by the Department of Energy. It is to be used for the purposes for which it was loaned and is not to be distributed outside your organization without the prior written consent of the Department of Energy. This document is not to be used for advertising or promotional purposes, for copying or reproduction, or for any other purpose without the prior written consent of the Department of Energy. The Department of Energy assumes no responsibility for the accuracy or completeness of the information contained herein.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

224

CONTENTS

	<u>Page</u>
PREFACE	v
APPROVAL PAGE	vii
EXECUTIVE SUMMARY	ix
1. INTRODUCTION	1.1
1.1 General Standards Policy of the Office of Nuclear Energy Programs	1.1
1.2 Function of Nuclear Standards Management Center	1.3
1.3 Outline of Management Plan	1.5
2. OVERVIEW OF DOE NUCLEAR ENERGY PROGRAMS	2.1
2.1 Background and Posture	2.1
2.2 Current Organization and Activities	2.3
2.2.1 Advanced Nuclear Systems and Projects Division	2.3
2.2.2 Nuclear Power Development Division	2.4
2.2.3 Reactor Research and Technology Division	2.6
3. HISTORY OF U.S. NUCLEAR STANDARDS ACTIVITIES	3.1
3.1 Overview	3.1
3.2 Nuclear Standards Management Board	3.2
3.3 RDT Standards	3.6
3.4 National Consensus Standards Activities	3.10
4. BASIC APPROACH AND OBJECTIVES	4.1
4.1 Philosophy of Standards Program Management	4.1
4.2 Objectives	4.4
4.2.1 Key objective	4.5
4.2.2 Critical objectives	4.6
4.2.3 Specific objectives	4.6
5. PLAN OF ACTION	5.1
5.1 Collection and Organization of Standards Status Information and Outreach to Program Managers (CO-1) ...	5.1
5.2 Liaison with National Consensus Standards Organi- zations (CO-2)	5.2
5.3 Fostering the Development and Application of Program Standards (CO-3)	5.9

	<u>Page</u>
5.4 Operation of Nuclear Standards Program Information Center (CO-4)	5.11
5.5 Development of Interfaces with Related Organizations Associated with Nuclear Standards (CO-5)	5.18
5.6 Assistance to DOE in Evaluation and Supervision of Nuclear Standards Activities, with Emphasis on Application (CO-6)	5.19
5.7 Coordination, Maintenance, Distribution, and Cataloging of Existing Program Standards (CO-7)	5.21
5.8 Interaction with the Working Group on Standards (CO-8)	5.23
5.9 Objective and Milestone Charts	5.24
6. ORGANIZATION AND ADMINISTRATION	6.1
6.1 Organizational Framework	6.1
6.1.1 Description of ORNL organization	6.1
6.1.2 Nuclear Standards Management Center organization	6.1
6.2 Resource Requirements	6.8
6.3 Organizational Interfaces	6.10
6.4 Control Thresholds	6.12
6.5 Reporting and Accountability	6.14
6.5.1 Internal ORNL accountability and reporting	6.14
6.5.2 Reports to be issued	6.15
6.5.3 Distribution of reports	6.16
APPENDIX A. STANDARDS POLICY FOR NUCLEAR ENERGY PROGRAMS	A.1
APPENDIX B. MANAGEMENT AGREEMENT, NUCLEAR STANDARDS OFFICE	B.1
APPENDIX C. DEFINITIONS AND ACRONYMS	C.1

PREFACE

This Management Plan was prepared to describe the manner in which Oak Ridge National Laboratory will provide technical management of the Nuclear Standards Program. The organizational structure that has been established within ORNL for this function is the Nuclear Standards Management Center, which includes the Nuclear Standards Office (NSO) already in existence at ORNL.

This plan is intended to support the policies and practices for the development and application of technical standards in ETN projects, programs, and technology developments as set forth in a standards policy memorandum from the DOE Program Director for Nuclear Energy.* A copy of this ETN policy memorandum is attached as Appendix A.

The role to be played by ORNL in helping to implement the nuclear standards policies and practices is outlined in a Management Agreement signed by D. B. Trauger, ORNL; J. A. Lenhard, DOE Oak Ridge Operations Office; and R. D. Thorne, then DOE Assistant Secretary for Energy Technology.[†] This agreement is included as Appendix B. This Management Plan is intended to fulfill one of the provisions of the Management Agreement, which states that it is to be a responsibility of ORNL to

"Prepare, with input and concurrence from OR, a Nuclear Standards Program Management Plan, which includes program tasks and control thresholds consistent with ETN policy and programmatic guidance and with the NSO functional assignment."

*Letter, G. W. Cunningham, DOE/ETN, to H. E. Roser et al., "Standards Policy for Nuclear Energy Programs," July 31, 1978.

[†]Letter, R. D. Thorne, DOE, to R. J. Hart, Manager, Oak Ridge Operations Office, "Management Agreement, Nuclear Standards Office, ORNL," October 23, 1978.

APPROVAL PAGE

This Nuclear Standards Program Management Plan is approved for implementation.

J. M. Corum, Manager
Nuclear Standards Management Center
Oak Ridge National Laboratory

J. A. Lenhard, Assistant Manager
Energy Research and Development
Oak Ridge Operations Office
Department of Energy

A. J. Pressesky, Director
Nuclear Power Development Division
Department of Energy

EXECUTIVE SUMMARY

The Office of Nuclear Energy Programs (ETN) has issued a "Standards Policy for Nuclear Energy Programs"* which declares standards development and application to be integral and important elements of nuclear energy development. While placing responsibility for standard activities within each area on the managers of these areas, it also invests the Director of the Nuclear Power Development Division (NPD) with the chief responsibility for promoting and managing the ETN standards effort.

The objectives of the ETN standards program are (1) to foster the development of standards that can be used by industry in the construction and operation of safe, reliable, and economic civilian nuclear energy facilities, recognizing that standards are one of the primary ways by which engineering experience and expertise can be transferred to follow-on projects and the private sector, (2) to reduce technical risk to ETN programs, and (3) to ensure a consistent approach to similar needs in diverse ETN civilian nuclear energy programs.

In order to achieve these objectives it is desirable to make the maximum use of standards developed and adopted by national consensus standards-writing organizations so as to assure broad agreement in the civilian nuclear energy industry; program standards developed within ETN programs will be used only where national consensus standards are not, or not yet, developed to an adequate extent.

The Oak Ridge National Laboratory (ORNL) has been given the responsibility, spelled out in a Management Agreement,[†] for supporting NPD in its standards role and managing important aspects of the standards program. To this effort, ORNL brings the expertise and staff developed since 1967 in the ORNL Nuclear Standards Office (NSO) for writing, maintaining, distributing, and managing RDT standards for the AEC (later ERDA and now DOE) Fast Breeder Reactor Program. Under the new policy, ORNL's role and

*Letter, G. W. Cunningham, DOE/ETN, to H. E. Roser et al., "Standards Policy for Nuclear Energy Programs," July 31, 1978.

[†]Letter, R. D. Thorne, DOE, to R. J. Hart, Manager, Oak Ridge Operations Office, "Management Agreement, Nuclear Standards Office, ORNL," October 23, 1978.

responsibilities are strengthened and broadened to include all ETN standards areas, to assume additional tasks in monitoring and assessing standards activities in ETN programs, and to support NPD in performing its standards responsibilities. This Nuclear Standards Program Management Plan explains how this ORNL responsibility will be met.

To emphasize ORNL's expanded and modified responsibilities in the nuclear standards area, a new organizational entity, the Nuclear Standards Management Center (NSMC), has been set up as the organizational structure to handle all aspects of the expanded standards program. The NSMC will consist of an Office of Advanced Planning and Implementation (OAPI), the existing Nuclear Standards Office (NSO), and a new Nuclear Standards Program Information Center (NSPIC) located within the NSO. The OAPI will be primarily responsible for outreach and long range planning activities relative to implementing the expanded responsibilities of the program. Figure ES-1 indicates NSMC's place in the ORNL organization and its structure.

The NSO will continue to be the executive arm of the NSMC. In addition to its long-standing responsibilities for maintaining the RDT standards program, the NSO will also be responsible for developing and maintaining other ETN program standards, for interacting with and participating in national consensus standards activities, for developing and operating the NSPIC, and for providing assistance to the OAPI outreach and program expansion activities.

Office for Advanced Planning and Implementation

Under the guidance of the Nuclear Power Development Division, the Office for Advanced Planning and Implementation has broad responsibilities for fostering and promoting standards activities to cover standards concerns of all the divisions of ETN (with the exception of the Naval Reactors Division). This office will undertake a staged series of actions to gather information about the present status of standards needs, accomplishments, and applications and to then deal with the information in a constructive way. These activities are intended to support DOE's firm intent to promote the use and application, in all possible ways, of national

Fig. ES-1. The Nuclear Standards Management Center in the CRNL organization structure.

consensus standards and to develop program standards only where the former do not yet exist in adequate extent, or with sufficient specificity or rigor, or are not yet in place.

A vital early goal will be the formulation of an objective set of criteria defining what constitutes standards "ripeness" in ETN activities, that is, the suitability for standards development at the present stage of a given project, program, or development activity. With these criteria in hand, a survey of all ETN activities will be carried out to determine the standards status of each program component and to identify the key persons and organizational elements who are, or should become, involved in standards activities as appropriate.

Based on the results of this survey, an active outreach program will then be undertaken to contact the key individuals in each of the areas in which standards action is appropriate to (1) assist them in determining their responsibilities in connection with standards production and application, (2) offer and supply the offices of the NSMC in meeting these responsibilities by technical advice, assistance, and other means found suitable, and (3) keep these individuals and organizations informed about changes, updates, and status in the nuclear standards area under ETN responsibility.

In order to improve interactions with national consensus standards activities, it is proposed that a representative of the NSMC attend the meetings of the Nuclear Standards Management Board, a constituent committee of the American National Standards Institute, and that contact with the various consensus standards-writing organizations (ANS, ASMF, etc.) be pursued, offering technical and other assistance to encourage these groups to develop standards of interest to ETN. The exact modes for these interactions remain to be worked out.

As a longer-range goal, plans and contacts will be made to promote mutually beneficial cooperation with standards activities in nuclear-related areas outside ETN, such as with the Nuclear Regulatory Commission and National Bureau of Standards, and in nonnuclear energy technology areas in DOE.

Nuclear Standards Office

The NSO has demonstrated expertise in the planning, development, management, and execution of a viable RDT standards program; it is also proficient in the mechanics of preparing, issuing, updating, distributing, and cataloging of program standards. In the past, these program standards have been written largely by individuals (cognizant engineers) in "standards-writer" organizations at various DOE laboratory and contractor sites; these activities have been and continue to be managed by the NSO. Many of these standards were written by NSO staff functioning as members of the ORNL standards-writer organization.

A greater effort will be made in the future to induce the writing of needed standards by national consensus standards-writing organizations where this is possible for items having common interest to both DOE programs and the nuclear industry in general. Where such commonality of interest cannot be demonstrated, program standards will continue to be developed using either the conventional individual standards-writer procedure described above or, where appropriate, the limited-consensus procedure, in which committees, representing all pertinent viewpoints, will do the actual writing and reviewing of the standard. The standards-writing expertise of the NSO will continue to be utilized in staff and technical support to both the program standard and national consensus standards-writing activities, to the degree and in the form most appropriate for each. Furthermore, the NSO will continue to maintain and distribute the existing RDT standards and will provide staff, technical, and administrative support to other ETN standards-writing activities as these develop.

The present operation of collecting and disseminating unusual occurrence reports (UORs) dealing with operating incidents and failures will also be continued, and analyses of these reports will continue to be issued. The maintenance of standards information in the form of a data base as well as other information activities, such as periodic bulletins, UOR reports and analyses, and standards personnel listings, will be centralized in a Nuclear Standards Program Information Center in order to enhance the visibility and usefulness of this aspect of the program. The

Information Center will also serve as a data resource to answer queries and requests for help in the nuclear standards area.

The NSO presently provides staff support for the Nuclear Standards Working Group, a multiorganization advisory group dealing with breeder reactor standards matters. It is proposed that careful consideration be given to possible changes in both the membership and internal organization of this Working Group to enable it to deal effectively with the wide range of technical areas to be covered by the standards activities of the NSMC. Perhaps a steering committee and subgroup structure will be desirable, or some other system for bringing the needed expertise to bear on the problems that arise.

MANAGEMENT PLAN FOR THE NUCLEAR STANDARDS PROGRAM*

1. INTRODUCTION

1.1 General Standards Policy of the
Office of Nuclear Energy Programs

On July 31, 1978, the DOE[†] Program Director for Nuclear Energy, G. W. Cunningham, issued a "Standards Policy for Nuclear Energy Programs" (see Appendix A). This document assigns responsibilities to various organization elements, including ETN division directors, field office managers, and project directors for development and application of standards. The policy statement recognizes that standards are important channels by which the results of the research and development activities performed under the auspices of the DOE Office of Nuclear Energy Programs (ETN) are preserved for transfer to later projects and activities and transmitted to the civilian sector. Since commercialization is a key objective of ETN's civilian nuclear energy programs, the importance of standards in this context is readily understood.

In the policy statement, the director of the Nuclear Power Development Division (NPD) is assigned the major responsibilities for the detailed formulation and execution of the general policy and objectives described therein. The policy also requires the director of NPD to fund and provide policy and guidance to the Oak Ridge National Laboratory (ORNL) Nuclear Standards Office (NSO) — more precisely, the Nuclear Standards Management Center (NSMC) — through the Oak Ridge Operations Office (OR). The ORNL NSMC is called upon by the director of NPD to provide support in fulfilling a major part of his responsibilities with regard to the development and application of standards and the implementation of the ETN standards policy.

It is the purpose of this Management Plan to detail the actions to be taken by the ORNL NSMC to support NPD and ETN line organizations in

*Work performed under DOE/NPD AG 20 60 04 2 (OH022), Nuclear Standards.

[†]Appendix C contains a set of definitions and a complete listing of acronyms.

carrying out their responsibilities for implementing the ETN standards policy. Although final responsibility for making policy rests with NPD and decisions as to the scope and magnitude of activities and judgment of the adequacy and appropriateness of standards efforts belong to the appropriate line organizations, the ORNL NSMC, as set forth in this Management Plan, will manage much of the detailed implementation of standards policy and support the ETN standards program by a variety of information-managing and dissemination activities. To achieve these goals, the NSMC will actively interact with field offices, contractor managers, and Headquarters staff. The policy statement is the key document defining the goal of all NSMC efforts.

The policy statement thrust has several aspects. First, there is the desire to have as complete a coverage of standards as possible and to utilize the national consensus standards organizations to the maximum feasible extent for developing needed standards. When feasible, program standards are to be used only until national consensus standards can replace them. Second, as much as possible there should be ETN-wide coordination between projects and activities to make standards as comprehensive in applicability and as uniform as possible. Third, access to standards information for program participants should be made as easy as possible. Not only will information be available upon request and in appropriate periodic indexes and listings, but active outreach efforts toward field and contractor managers at all levels will be made to acquaint them of available information and services relating to their standards responsibilities. This involves both extended data base development and programs to increase the visibility of standards activities. Finally, the application of standards in all aspects of ETN activities is to be monitored and improved.

The ORNL NSMC will have a significant role to play in moving ahead with these key thrusts, and as program management organization it will have an opportunity to be of service in all its aspects.

1.2 Function of Nuclear Standards Management Center

Given the basic philosophy of standards development and application in all appropriate ETN activities as outlined in Sect. 1.1 and with the unique position that the NSMC holds as adjunct to the director of NPD in assisting him to carry out the responsibilities entrusted to him in connection with nuclear standards by the policy statement, it is apparent that the NSMC has a central and crucial role to play in implementing the ETN standards system. The outline of the specific role to be undertaken by the NSMC is detailed in the "Management Agreement" (see Appendix B).

With respect to nomenclature, it should be emphasized that the name NSMC will be used for the overall ORNL standards organization, reflecting its primary mission of providing management support and expertise for the entire ETN standards effort. The NSMC will consist of the NSO, concerned primarily with technical activities aimed at the development, adoption, modification, updating, and dissemination of nuclear standards, and the Office for Advanced Planning and Implementation (OAPI), primarily responsible for outreach activities and the promotion of standards development and application.

The functional assignments given to ORNL comprise a list of 14 items, which will be briefly analyzed here and whose implementation plan forms the central body of this document.

Item A is a general assignment to manage the ETN Nuclear Standards Program, beginning with the development of a Nuclear Standards Program Management Plan, which is embodied in this document.

Item B, which directs the NSMC to provide assistance to ETN headquarters managers, field offices, project offices, and contractors in both the development and application of standards, is a key element in this management plan. This will be implemented with a fact-finding effort to ascertain the present status of standards development and application and an outreach program to inform the appropriate managers about the support available from the NSMC to fulfill their standards responsibilities. The application of standards to the widest possible range of ETN activities will be stressed.

Item C directs the NSMC to maintain cognizance of ETN activities and standards needs for the purpose of advising ETN, field office, and contractor managers of issues and proposals. It will be met by the information-gathering process already mentioned, augmented by continuing contacts with ongoing DOE programs to stay abreast of changing developments (by site visits, literature perusal, meeting attendance, etc.) and by the issuance of ad hoc communications to the appropriate ETN and contractor managers as issues arise and are identified. The information products to be described below will also assist in keeping these managers informed regarding standards developments.

Item D, coordination of development and application of standards across ETN division lines, will be a natural consequence of the ETN-wide survey of standards status, augmented by careful scrutiny of needs so as to facilitate the broadest possible application of standards and writing of standards with the broadest possible applicability.

Item E, coordination of preparation and distribution of program standards, is a continuation of ongoing activities of this type, broadened as needed to cover areas in addition to the fast breeder reactor (FBR) programs heretofore included.

Items F and G deal with the interactions of the NSMC with the national consensus standards organizations. As will be subsequently described, a number of channels will be pursued for such interactions, including membership on suitable administrative and coordinating groups and standards-writing committees.

Item H directs the NSMC to communicate and coordinate with the Nuclear Regulatory Commission (NRC) regarding its standards activities. In this area, closer communications will be established, and consideration will be given to including relevant information from the NRC standards program in the NSMC information products and data base. The question of closer relationship or common application of ETN and NRC standards in areas of overlap will need to be studied jointly with cognizant NRC personnel.

Items I, K, M, and N deal with the maintenance of information bases and files, which are to some extent already in existence and will be broadened to encompass additional appropriate areas. A study will be

made to determine suitability of a computer-based, remote-terminal-retrievable information system (RECON).

Item J relates to assistance to ETN in assessing standards development and application by ETN field office and contractor organizations. This activity will flow out of the needs and applications assessments and their updates mentioned above.

Item L requires an enhanced visibility of standards activities vis-a-vis both the public and private sectors. This will be the chief thrust of the Nuclear Standards Program Information Center (NSPIC) proposed as part of this management plan.

With the implementation of this management plan and a working cooperation between the NSMC and ETN, the entire standards effort should benefit from close coordination, increased visibility, and enhanced management control.

1.3 Outline of Management Plan

This Management Plan begins in Chap. 2 with an overview of the DOE nuclear energy program and its history, so as to lay a foundation upon which to describe the origin and scope of the standards program and to lead to an understanding of how it has come to its present posture. The organizational structure of ETN is then briefly reviewed to facilitate an understanding of the coverage of the standards activities to be managed and the relationship between NPD and other ETN organizations.

Based on this background material, a brief outline of the history of the standards program is presented in Chap. 3. The outline is necessary for a clear understanding of this Management Plan, since the activities it proposes are in many instances extensions and continuations of prior activities.

Chapter 4 presents a brief description of the basic philosophy of this plan to acquaint the reader with the ideas that underlie the specific program goals. These are then presented in the remainder of Chap. 4 and in Chap. 5 as a triple hierarchy of objectives, starting with the key objective of the entire program, eight critical objectives (COs) proposed for achieving the desired results, and then a number of specific objectives

(SOs) representing measurable proposed achievements for each of the critical objectives. The specific objectives are given in the form of milestone charts showing the proposed dates by which the objectives are to be met. However, it is important to realize that many of the specific objectives are ongoing or continuous in nature, and specific completion dates thus cannot be meaningfully assigned.

The actions and methods proposed for fulfilling each of the specific objectives, with dates, where possible, by which to judge their achievement, are presented in maximum detail in Chap. 5. This chapter thus embodies the proposed action plan.

Chapter 6 deals with organizational matters -- a brief description of the ORNL organization and the NSMC's place in it, the structure of the NSMC itself, the resource management proposed for operating the NSMC, the organization interfaces, and the reporting and accountability procedures proposed.

2. OVERVIEW OF DOE NUCLEAR ENERGY PROGRAMS

2.1 Background and Posture

The Atomic Energy Act of 1946 in part provided a national policy for the development, use, and control of atomic energy. Under the direction of the General Manager, the Atomic Energy Commission (AEC) established and administered programs in research, development, manufacturing, and promotional functions. Regulatory functions were under the Director of Regulation.

During the later 1940s the AEC began an experimental power reactor program, in which a number of experimental power reactors were built and operated in the 1950s. The earliest demonstration plants were built largely at AEC laboratories. The enactment of the Atomic Energy Act of 1954, which permitted private ownership of reactors and private use of nuclear fuel under leasing arrangements, ushered in the development of nuclear power for utility application. In 1955, industry was invited to join the AEC in developing power reactors through the Cooperative Power Demonstration Reactor Program. Commercial nuclear power stations completely owned and operated by electric utilities followed soon thereafter; some of these were built under the joint demonstration program, others were privately financed. In the Cooperative Power Demonstration Reactor Program, the government contributed technical and financial assistance, particularly with regard to the fuel and the research and development (R&D) programs. The nuclear industry also began contributing heavily to the development and commercialization of thermal reactors in the 1960s to the point where, in the United States by the end of 1978, 70 nuclear reactors were licensed to operate and were producing nearly 13% of the nation's electrical energy.

The U.S. interest in breeder reactors dates back to the days of the Manhattan Project, when the possibility of nuclear breeding was first recognized. From this early recognition emerged a national program for developing the liquid-metal-cooled fast breeder reactor (LMFBR). The LMFBR program received major emphasis in the late 1960s with plans to build the Fast Flux Test Facility (FFTF) and later with the design of the Clinch

River Breeder Reactor Plant (CRBRP). Simultaneously, a major effort was mounted to develop the necessary base technology. As discussed in Chap. 3, the RDT Standards Program, which was the forerunner of the current Nuclear Standards Program, was initiated in 1967, and one of its objectives was to develop standards applicable to liquid-metal-cooled reactor systems.

In 1975 the NRC became an independent agency, and the Energy Research and Development Administration (ERDA) established a task force to consider the need for government participation with industry in a cooperative technology-development program to improve power reactor productivity and reduce the capital costs and construction schedules of new nuclear plants. As a result of the task force findings, ERDA initiated in FY 1976 the light-water reactor (LWR) technology-development program. This program's goals are to conserve oil and natural gas by improving productivity and to reduce new-plant costs and schedules.

In 1977 an additional objective was added to the program — the improvement of uranium utilization — because of the administration's decision to forgo fuel reprocessing. Work to improve the utilization of uranium fuel without fuel reprocessing was initiated in the summer of 1977 and is being continued.

The National Energy Plan of April 1977 established the present fission energy policy, which is to:

- enhance the potential for increased near-term commercial deployment of light-water reactors by improving LWR technology, reducing institutional impediments, demonstrating capability for safely managing radioactive wastes, and establishing a publicly acceptable plan for managing such waste on a commercial scale;
- examine all advanced fission options for their nonproliferation, economic, technical, and institutional merits, while deferring commitment to technologies based on plutonium;
- maintain advanced fission systems in a research and development stage but in a state of readiness should a decision be made in the future to demonstrate one or more of them.

2.3

ERDA was dissolved and the Department of Energy was established in October 1977. The National Energy Plan is still in effect and expresses a resolve to eliminate technical and institutional impediments to the maturity of the LWR system. At the same time, demonstration and commercialization of advanced fission systems and the reprocessing of spent fuel have been deferred indefinitely pending a reassessment of all fission options.

2.2 Current Organization and Activities

ETN, under the Assistant Secretary for Energy Technology, is divided into seven divisions, as follows:

Resource Management, Acquisition, and Administration Division
Plans and Analysis Division
Nuclear Alternative Systems Assessment Division
Advanced Nuclear Systems and Projects Division (ANSP)
Nuclear Power Development Division (NPD)
Reactor Research and Technology Division (RRT)
Naval Reactors Division (NRD)

The last four of these divisions are the organizations with direct R&D responsibilities, and the standards activities to be managed under the program plan involve primarily the ANSP, NPD, and RRT divisions. NRD is specifically excluded by the terms of the policy statement.

In Sects. 2.2.1-2.2.3, the areas of coverage of each of the divisions with whose work the NSMC is to be involved will be briefly presented to indicate the scope of the standards area to be included.

2.2.1 Advanced Nuclear Systems and Projects Division

The ANSP Division's responsibilities include space applications and advanced isotope separation, as well as other activities such as studies on cogeneration/district heating and nuclear energy centers.

Space applications include both space applications proper and terrestrial compact power systems. For both of these application areas, the emphasis is on isotope power supplies, mostly based on plutonium 238 for

use either in space or at remote earth locations. Mission-system development is usually performed by industrial contractors, whose activities include quality assurance and reliability monitoring, isotope materials and capsule development, environment impact and safety evaluation, and advanced studies on thermoelectric materials. This may well constitute an area ripe for standards development and implementation. The program emphasis in this area is on reliability, environmental safety, and specific mission needs such as longevity and survivability of the space systems.

In support of these space applications, the Technology Base and Special Projects subprogram develops advanced isotope fuels and improves alloys, graphites, and thermoelectric materials. National laboratories and selected contractors will be utilized to meet such objectives as advanced development of a modular plutonium 238 heat source, improved thermoelectric materials with efficiencies in the 11-14% range, cesium 137 isotope utilization for sewage sludge treatment, and other studies on the beneficial utilization of isotopes derivable from reactor waste streams. Standards development may still be premature for such advanced projects, but the areas will be surveyed to establish appropriate time stages for standards development.

Advanced isotope separation is another ANSP responsibility area. This includes work in the nuclear power studies part of the advanced fission systems on laser and plasma techniques for recovery of uranium 235 from enrichment plant tails. These advanced concepts studies will probably not be standards-ripe in the near future; however, they will be monitored from a standards viewpoint.

2.2.2 Nuclear Power Development Division

Together with RRT, NPD forms the heart of the civilian nuclear energy program and thus of nuclear standards activities.

One of the main responsibility areas is LWR development, whose principal objectives include the improvement of plant productivity of LWRs (measured by capacity and availability factors) now in operation or committed, through the development, demonstration, and widespread use of improved technologies; the improvement of the utilization of uranium fuel in existing LWRs without recycle, resulting in less consumption of uranium

2.5

to produce an equivalent amount of electricity, and therefore to extend uranium resources; and the improvement of the safety of LWRs.

These objectives will be met by work in a number of subprogram areas as follows:

Uranium utilization. This subprogram involves the development and demonstration of methods for improving uranium utilization in light-water reactors. These include the development and demonstration of fuel designs capable of high discharge burnup; the investigation, development, and demonstration of other practical backfittable and nonbackfittable methods for improving LWR uranium utilization; and the conduct of a supporting research and demonstration effort directed at providing basic technical data and developing solutions to key fuel problems, such as pellet-cladding interaction.

Occupational radiation dose reduction. This subprogram involves the development and demonstration of technologies to help reduce radiation exposures to LWR plant personnel. This includes work directed at reducing radiation sources by thorough and dilute system decontamination, decontamination of subsystems, fuel decontamination, and development of advanced purification equipment. It also includes work directed at reducing workers' time in radiation fields through development of advanced diagnostic and surveillance systems such as acoustic emission monitoring and dynamic monitoring.

Productivity enhancement. This subprogram involves the development and demonstration of technologies for improving the productivity of LWRs through resolution of key critical problems such as denting of PWR steam generators. The scope of this subprogram ranges from treating known problems in present LWR components and systems to technology development for diagnosing and minimizing the impact of future problems which may develop.

High-temperature gas-cooled reactor (HTGR) development falls within the NPD responsibility. Two of its program components are the steam-cycle HTGR and the advanced high-temperature reactors. In the former area, the DOE program involves close cooperation with utilities and potential manufacturers, and at present the absence of firm financial commitments from these sectors has slowed DOE work plans. Standards development and

application in this area may be of significance in the future if commercialization and industry-government cooperative development take place on an expanded scale.

In the advanced gas-cooled reactor area, concepts under investigation include a gas-turbine HTGR and a very high-temperature reactor for process heat applications. In this area an "umbrella" agreement between the German Federal Republic and the United States, also joined by France and Switzerland, provides for cooperative development. U.S. specific work focuses on development of fuels, graphite, and high-temperature alloys for use in the helium environment and on analysis and conceptual design efforts. Standards development and application in this area will be monitored but will probably not mature until after FY 1980.

Fuel processing is another NPD responsibility area. Since the decision on indefinite delay of reprocessing was made, emphasis in this area has been on alternative fuel cycle development to meet proliferation-resistance objectives.

The program includes FBR fuel studies (using coprocessing and partial decontamination to achieve proliferation resistance), HTGR fuels based on uranium 233 (emphasizing medium enrichment and denatured fuel), and thorium fuel recycle. Engineering-scale test facilities for components are being planned in all of these reprocessing areas, so that standards development and application may well become significant over the next several years. The progress will be monitored.

2.2.3 Reactor Research and Technology Division

This division has the responsibility for research and development on fast reactors, both gas- and liquid-metal-cooled, and includes a number of separate responsibility areas.

The Fuels, Materials, and Chemistry Branch has the responsibility for materials work on fuel, cladding, blanket, and duct materials, as well as overall program direction of R&D technology associated with LMFBR systems.

The fuels and absorber work includes development on reference fuels, absorber, and materials; advanced and alternative fuels and materials; and fuel fabrication processes. Fuels and materials will be tested both

out of core and in core and subjected to postirradiation hot-cell examinations.

Since the goal is to develop fabrication methods and designs of fuels and other core materials and components, this is clearly a high-interest area from a standards perspective which will be carefully examined to assure appropriate standards activities.

The Safety and Physics Branch has responsibility for R&D activities in the two important areas of safety and physics. The safety work is organized around the level-of-assurance (LOA) concept - to develop and implement programs for preventing reactor accidents (LOA-1), limiting core damage by inherent reactor response characteristics (LOA-2), controlling accident progression (LOA-3), and attenuating accident consequences (LOA-4). The development, acquisition, and operation of facilities (TREAT, SLSF, THORS, etc.) are also included.

As solutions to the technical problems in the safety area are developed, standards development and application will clearly be a significant part of this work, and this area will be carefully monitored for this purpose.

The physics section deals with physics R&D programs for the acquisition, evaluation, and promulgation of nuclear data, critical experiments, dosimetry, shielding, and associated computer codes. Standards should form a significant and useful adjunct to this work in propagating the best methods and results from such investigations.

The Conceptual Design Study (CDS) Branch has the responsibility for the conceptual design study, which will be the next large-scale step in fast breeder reactor design. Although this effort is still in its early stages, it should, at a future stage, be a utilizer of earlier experience in the form of standards. This work will be monitored for standards application.

The Engineered Components Branch provides overall program management for reactor plant systems and component development as well as structural analysis and development support for the breeder program. This branch has responsibility for materials engineering and structural design, as well as systems requirements for component development, and has explicitly stated interests in guides, standards, and specifications for breeder

components, materials application, and structural engineering. Thus the work of this branch will be one of the major areas for standards activities by the NSMC.

The Project Operations Branch has responsibility for the FFTF and CRBRP projects, as well as development of fuel transfer shipping casks. Here also, standards should be extensively used and developed, and these activities will be thoroughly monitored by the NSMC for early involvement.

The Gas-Cooled Fast Breeder Reactor (GCFR) Branch provides program direction for gas-cooled fast breeder reactor development. This work is in an early stage of activity, and its future development is uncertain. Thus standards involvement is probably premature at present, but the NSMC will monitor this work to make sure that standards concerns are implemented at the appropriate time.

3. HISTORY OF U.S. NUCLEAR STANDARDS ACTIVITIES

3.1 Overview

A large number of nuclear power plants were ordered or were under construction in 1966, and this created for the first time an awareness of a potential deficiency within the industrial capability of this country to support a safe and economically sound nuclear power industry. This rapid new growth of industrial power plant projects resulted in over 200 new major participating companies and contractors being brought into the nuclear power business in 1967. The effect of this expansion was to spread industrial capabilities very thin in many areas. Closely coupled with this potential industrial capability deficiency was the realization that important reactor research and development programs were often not realizing their objectives as a result of unforeseen problems, failures, and delays brought about by insufficient engineering attention to essentially standard or nondevelopmental materials, equipment, and processes. The need for documenting sound and proven engineering practices that would be systematically utilized to provide a disciplined engineering approach to the design and execution of reactor projects was evident.

Recognizing that standards would be needed for many subject areas, thousands of people from numerous organizations (ranging from nuclear scientists to automotive engineers and insurance experts) soon became involved, working on a variety of standards projects sometimes unknown to the larger nuclear community. Standards were developed by many groups within the United States. They were prepared, promulgated, and accepted in many ways. Almost all evolved under the auspices of one or another of the technical societies having membership with professional interest in and knowledge of the pertinent nuclear system technologies.

Standards prepared by such societies represent the consensus of a representative group of knowledgeable individual members of the society. While frequently sponsored by their companies and institutions, these individuals perform their services as independent professionals. Organizations significantly associated with the development of nuclear standards

3.2

include the following:

- American Concrete Institute (ACI)
- American Insurance Association (AIA)
- American Institute of Chemical Engineers (AIChE)
- American Nuclear Society (ANS)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- American Society for Nondestructive Testing (ASNT)
- American Society for Quality Control (ASQC)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- Health Physics Society (HPS)
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute of Nuclear Materials Management (INMM)
- Instrument Society of America (ISA)
- National Bureau of Standards (NBS)
- National Fire Protection Association (NFPA)

The key organization involved in U.S. standards work is the American National Standards Institute (ANSI). This institute has taken the lead in assuring the development of standards, principally through professional societies and trade associations. ANSI also serves as a national clearinghouse for standards and provides the mechanism for developing and approving standards supported by a national consensus. It can be thought of as an umbrella standards organization to which essentially all of the technical societies and other standards organizations belong. The ANSI had its origin in 1918 as the American Engineering Standards Committee, which was organized by five engineering societies to provide a means for eliminating confusion and duplication among standards they issued. In 1928, it was reorganized as the American Standards Association after being enlarged by the addition of trade associations and more of the technical and professional societies. In 1966, it was reorganized again as the United States of America Standards Institute, and in 1969 the name was changed again to the present American National Standards Institute.

3.2 Nuclear Standards Management Board

Standards work under the auspices of ANSI is supervised by a number of technical advisory boards. The one responsible for the nuclear field is the Nuclear Standards Management Board (NSMB).

3.3

This technical advisory board presently has 11 active American national standards committees under its jurisdiction, each of which is sponsored by one of the member organizations of ANSI. These committees are called "N committees" from the number designations by which they are known. Four former N committees are no longer under NSMB jurisdiction but are operated as "accredited" committees by secretariats within the responsible technical society.

The eleven active committees are listed below, with their number designations and the technical societies or organization managing the respective secretariats:

- N13 (Health Physics Society), Radiation Protection. Standards for the protection of individuals and groups from occupational or environmental exposure to radiation or radioactive materials either of general applicability or related to specific classes of activities.
- N14 (American Insurance Association), Transportation of Fissile and Radioactive Materials. Standards for the packaging and transportation of fissile and radioactive materials but not including movement or handling during processing and manufacturing operations.
- N15 (Institute of Nuclear Materials Management), Methods of Nuclear Material Control. Standards for protection, control, and accounting of special nuclear materials in all phases of the nuclear fuel cycle, including analytical procedures where necessary and special to this purpose, except that physical protection of special nuclear material within a nuclear power plant is not included.
- N16 (American Nuclear Society), Nuclear Criticality Safety. Standards for determining the potential for nuclear criticality of fissile material outside reactors for the prevention of accidental criticality and for coping with accidents, should they occur.
- N17 (American Nuclear Society), Research Reactors, Reactor Physics, and Radiation Shielding. Standards for the location, design, construction, operation, and maintenance of all nuclear reactors for training and research, excluding reactors designed for electrical energy production. Standards for the location, design, construction, operation, and maintenance of critical facilities. Standards for calculational methods

and computer codes for use in nuclear-reactor and reactor-physics calculations, including shielding. Inputs to such calculations, such as nuclear cross sections, are included.

- N19 (American Nuclear Society), Nonradiological Environmental Effects. Standards for the protection of individuals and the environment from the nonradiological impact of nuclear facilities.
- N41 (Institute of Electrical and Electronics Engineers), Controls, Instrumentation, and Electrical Systems for Nuclear Power Generating Stations. Standards, specifications, and methods of testing related to controls, instrumentation, and electrical systems for nuclear power generating stations, including safety of operation and personnel.
- N42 (Institute of Electrical and Electronics Engineers), Nuclear Instruments. Standards related to instrumentation for control, protection, and information and to instrumentation systems and components thereof, for use in the radiation and nuclear fields, including personnel protection, industrial processes, analysis and laboratory work, radiation calibration, and nuclear and radiation applications.
- N43 (National Bureau of Standards), Equipment for Non-Medical Radiation Applications. Standards pertaining to products and equipment for non-medical scientific, industrial, and educational uses involving ionizing radiation sources, including radioactive materials, accelerators, and x-ray equipment, but excluding nuclear reactors.
- N46 (American Institute of Chemical Engineers), Nuclear Reactor Fuel Cycle. Standards for the location, design, construction, and maintenance of all nuclear fuel cycle facilities (except nuclear reactors) and processes concerned with the production, reclamation, and disposal of nuclear fuels. This includes the nuclear aspects of uranium and thorium mining, management of waste from mining and milling, and on-site processes involved in management of wastes from nuclear fuel preparation and reprocessing.
- N48 (American Nuclear Society), Radioactive Waste Management. Standards dealing with the definition of waste categories, general criteria for waste management, and for the location, design, construction, and operation, maintenance, and surveillance of radioactive waste management facilities that provide for final storage.

3.5

The four committees no longer under NSMC auspices but now directly operated by technical society secretariats as accredited committees are as follows:

- Former N11 (American Society for Testing and Materials), Basic Materials and Materials Testing for Nuclear Applications.
- Former N18 (American Nuclear Society), Nuclear Design Criteria. Standards dealing with the nuclear aspects of design criteria for nuclear power generating stations.
- Former N44 (Institute of Electrical and Electronics Engineers), Equipment and Materials for Medical Radiation Applications. Standards for the preparation and use of radioactive materials and radiation sources in medical applications.
- Former N45 (American Society of Mechanical Engineers), Reactor Plants and Their Maintenance. Standards for the location, design, construction, and maintenance of nuclear reactors, including equipment, methods, and components special for this purpose.

With few exceptions, nuclear standards issued to date and those to be developed are generated under the auspices of these committees. The work done by each committee is normally performed by subcommittees or ad hoc committees, for which appropriate professional society sponsorship is frequently sought. Thus there might be an IEEE-sponsored ad hoc committee writing quality assurance standards for instrumentation and electrical equipment under committee N17, which is sponsored by ANS.

Membership on a given national standards committee is quite diverse within the technology. Former N45, for example, includes individuals from DOE, NRC, nuclear equipment manufacturers, nuclear plant engineers and constructors, utility companies, independent consultants, and other professionals. However, the by-laws of ANSI require even additional participation in the process of review and acceptance of its standards before publication. One of the terms frequently used in standards work is "consensus." This term means approval by substantially more than a majority but not necessarily unanimous agreement. Numbers like 80% acceptance have been suggested as a definition of consensus; however, the determination is

3.6

generally based not only on the number of acceptances but also on the significance and importance of the dissenting votes and comments.

Consensus standards represent national acceptance by those engaged in virtually all facets of a given technology. It is intended that such nuclear standards shall represent extremely broad-based and extensively reviewed practices and requirements and thus form a solid base for nuclear programs in the United States.

DOE has actively supported the activities of ANSI and the societies discussed above. During the formative stages of this industry effort, DOE contributed significant financial support to ANSI in managing the development of nuclear standards via a subcontract from ORNL. In mid-1978, ETN issued the standards policy, which made clear its intent to support national consensus standards activities. It emphasizes maximum utilization of national consensus standards as well as strong participation in their environment.

In addition to the standards developed by these national standards committees under ANSI sponsorship and NSMB guidance, a number of program standards specific to DOE's nuclear energy programs have been written within the program itself, either by the standards offices [formerly at ORNL and the Liquid-Metal Engineering Center (LMEC), now at ORNL only] or by contractor organizations, in those areas where standards were needed but not available from the national organizations or not completely suitable for the special needs of the nuclear program. Not all these program standards were developed from scratch; in many cases, existing national standards were augmented by modifications and additions to make them specifically applicable to nuclear program needs. This latter aspect of standards development will be more fully discussed in Sect. 3.3.

3.3 RDT Standards

In early 1967 the RDT Standards Program was established to meet the need for documenting sound and proven engineering practices that could be utilized in providing a systematic and disciplined engineering approach to reactor projects. The objective of the program was to define and document the engineering and quality assurance practices necessary to support

3.7

the safe and economic development and growth of nuclear power. The goals of the program were to

- ensure that the materials and equipment obtained would be of a quality consistent with the application needs,
- establish the important features of equipment, systems, and structures to be properly evaluated during design, procurement, fabrication, installation, and operation,
- establish practices that would be understood and used by industry.

To carry out the program, two standards offices were established by the AEC Division of Reactor Development and Technology, one at ORNL and the other at LMEC. ORNL was assigned the responsibility for developing standards applicable to water-cooled reactor systems, while LMEC was assigned the responsibility of developing standards applicable to liquid-metal-cooled reactor systems. ORNL was also assigned lead responsibility for the development of standards that could have application to either type of system. The philosophy was to begin by documenting water reactor systems technology, since it was in a more advanced state of development, and then to extend the applicable practices and techniques into the area of liquid metals. It was soon recognized, however, that new practices and techniques would have to be added to develop and define liquid-metal technology more fully. To bring this material together for the Commission's high-priority LMFBR program, LMEC was assigned the responsibility of drawing together and consolidating the different or modified basic standards applicable to the LMFBR program and to projects such as the Experimental Breeder Reactor II (EBR-II), Sodium Pump Test Facility, and the FFTF.

Separate from RDT standards activities, there were nuclear industry standards development efforts through ANSI, technical societies and trade associations, and the AEC regulatory program; however, the RDT efforts aimed at developing standards to meet program needs in a timely manner proceeded for the most part independently of these activities.

In early 1969, the AEC provided direction to the standards program that emphasized the need for a concentrated effort on the part of both

ORNL and LMEC to develop standards needed to implement RDT projects, particularly FFTF and the Loss-of-Fluid Test Facility (LOFT). Along with this shift in emphasis, the AEC desired the standards program to work more closely with national codes and standards bodies such as ASME, ANS, and IEEE and to support actively the development activities of the reorganized ANSI.

An immediate need of the redirected RDT standards program was to locate an existing body of documented engineering standards and quality assurance practices that could be used as a base to build on. This was obtained from the Naval Reactor Program, where practices had been documented in a body of materials, equipment, and process specifications prepared by the Bettis Atomic Power Laboratory. Early efforts in the RDT standards program were, therefore, directed primarily toward the conversion of these Bettis MEP specifications into RDT standards. This task was completed near the end of 1968 after approximately 60 documents had been issued as approved tentative standards.

Basic guidelines were established by RDT for the development of standards. These were as follows:

- Material and process standards were to be prepared that were suitable as building blocks or support standards for specifying the technical and quality assurance requirements for designing, constructing, and operating equipment, structures, and systems.
- New standards were to be prepared only in areas where nationally accepted codes and standards were not available or were insufficient to provide for the application needs.
- When nationally accepted and applicable codes and standards existed but were determined to be insufficient, a supplementing standard was to be prepared. This new standard was to invoke the nationally accepted code or standard and then provide supplementary requirements in such a way as not to violate or compromise the nationally accepted code or standard.
- The standards were to cross-reference support standards without repeating, excerpting, or paraphrasing similar requirements.
- Requirement-type standards were to be in a form that would make them enforceable and auditable.

In order to assure the usefulness of a given set of standards, it was necessary to involve people from many phases of a project. The RDT standards effort encompassed engineering methodology, quality assurance, public safety, performance reliability, operation, and maintenance. The design, construction, operation, and research experience of various AEC contractors was utilized. A concerted effort was made in preparing the standards to try to keep in mind the various needs of reactor designers, reactor owners, and national laboratories involved in the AEC research and development programs and to provide requirements that were in compliance with AEC regulatory criteria.

Insofar as practical the program guidelines relating to the use of existing professional societies' codes and standards were followed, and in those cases where these codes and standards were adequate, no attempt to prepare new standards was made. Where most of an existing standard was usable, the portion of the standard considered valid as the base for an RDT standard was supplemented as necessary. In cases where there were no existing standards to cover the points that were necessary for reliable and continuous operation of a given device, a new standard was prepared.

During the early period of the RDT standards program, all the preparation work on standards was carried on by the standards offices either directly or through subcontract arrangements. However, during 1969, because of a need for more rapid development of standards, RDT directed its contractors involved in various development projects to prepare the new standards needed for their work themselves. In these cases, the standards offices had responsibility only for coordination of editorial and administrative matters. In some particular cases, there were joint efforts among contractors, the standards offices, and other AEC laboratories for standards development.

A vital need in any standards program is the maintenance of the standards that have been prepared and issued; they must be periodically revised and updated. For example, it was recognized that the naval nuclear program standards that formed the basis of the early RDT standards contained some practices developed for specialized or singular applications and might not be the most useful for the wide variety of RDT project needs. For this reason, the standards program felt obliged to reevaluate these

standards in the light of the experience of industry and other RDT contractors who had been using the standards for several years. A considerable effort has been expended in monitoring standards application, talking with manufacturers and suppliers, analyzing unusual occurrence reports, and listening to the problems encountered by standards users.

As they were developed, RDT standards were distributed to RDT program activities for review, comment, and direct application and validation on RDT programs. Periodic revisions of RDT standards have been issued as new and improved technology became available.

In 1973, when the design and construction of the FFTF began, the decision was made to close the standards office at LMEC. The office at ORNL was identified as the RDT standards office serving as the focal point for management of the program for RDT. In 1978, the RDT Standards Office was renamed the Nuclear Standards Office (NSO) to facilitate the expanding range of responsibilities across ETN programs.

3.4 National Consensus Standards Activities

National consensus standards-writing organizations have continued to develop nuclear standards in their areas of expertise. Most of the needed standards identified in the late 1960s have now been published; many have been updated to reflect application experience and current technology. The organizations and technical societies listed in Sect. 3.1 as principal contributors continue to be the leaders in the development of nuclear standards.

The ASME Advanced Reactors Subcommittee has established a subcommittee on LMFBR standards to identify standards needed for breeder reactor applications. The approach is to develop a matrix to identify all the standards needed for an LMFBR power plant. Existing standards potentially applicable to these needs are identified. The standards are then evaluated to determine whether they can be used as is, need to be supplemented or modified, or are, in fact, unsuitable. The NSO participated in these activities and, in fact, originated the concept of such a matrix. NSO personnel have developed information concerning the identification of standards and their suitability in meeting identified needs within the

3.11

matrix. Currently, the NSO is responsible for computerizing the information developed by the subcommittee as a management tool for summarizing the information, initiating needed standards development, and tracking the progress of these activities.

As will be emphasized in the following chapters, the present posture of DOE/ETN is to encourage and promote, by all feasible measures, the development and application of national consensus standards. Program standards are reserved only for situations where national consensus standards are not available, not technically adequate, or not yet adopted. Even in such cases, replacement of program standards by national consensus standards at the earliest feasible time is a goal of the Nuclear Standards Program.

4. BASIC APPROACH AND OBJECTIVES

4.1 Philosophy of Standards Program Management

The basic posture of the NSMC at ORNL is to be a service resource to ETN in managing its standards responsibilities and objectives. Organizationally the NSMC is responsive to, and supported by, ETN's Nuclear Power Development Division.

The NSMC has two basic functions — the management and coordination of the nuclear standards program and the gathering and dissemination of information relating to nuclear standards. The latter function forms a necessary basis and support for the former, since proper management and coordination must be solidly founded on an adequate base of information.

The needed information includes the current status of standards efforts [including development and application of program standards and national consensus standards (NCS)] and the needs in various program areas for developing new standards, for updating existing ones, and for applying standards to appropriate program activities. Since the situation is continually in flux, this will be an ongoing activity. Based on a detailed understanding of standards status, needs, and opportunities, the NSMC will thus be in a position to manage and coordinate the nuclear standards program under the guidance and with the cognizance and approval of NPD.

The supplying of information to the nuclear program will primarily be handled by a new organizational structure in the NSMC, to be called the Nuclear Standards Program Information Center (NSPIC). NSPIC will act (1) as an information resource, advising or informing upon request, (2) as an active disseminator of information in the form of a newsletter, which will include listings of standards and standards-project status information and information products, and (3) possibly a computer data base accessible from remote terminals.

The basic management philosophy calls for an active outreach to persons charged with the responsibility for standards development and application in their operation of ETN-funded programs and activities, to aid them in knowing what their responsibilities in this area are, how to go

BLANK PAGE

about satisfying them, and what assistance in doing so is available to them from the NSMC. This outreach will involve site visits and ongoing communications by mail and telephone, following an initial information-gathering campaign to identify all the programs and managers who need to be included in this effort.

Since it is the basic intent of ETN that, wherever possible in its operations, national consensus standards be used and that program standards specifically written for and tailored to nuclear program needs will be used only where national consensus standards are not available or where program standard supplements are needed to national consensus standards, it will be important to strengthen the ties of the NSMC to the organizations involved in producing and maintaining national consensus standards. This will involve membership or staff assistance to some of the national standards-writing committees and closer interaction with the Nuclear Standards Management Board (NSMB), which, while it does not write standards itself, serves as an umbrella organization to coordinate, promote, and foster the writing of consensus standards by the appropriate groups.

Because of the strong emphasis on implementation of ETN standards policy and goals via the NCS process, NSMC will strive by all means to promote NCS organization adoption of standards of interest to ETN. In part, this will be done by identifying all NCS organizations and committees that may be in a position to develop and adopt standards of concern to ETN and developing a channel of input to each of them. This will include, but will not be limited to, identifying present ORNL or other national laboratory members of these committees or some other member with whom suitably close contact will be maintained, so as to use these persons as advocates or champions of standards development actions desired by NSMC for ETN. Appropriate NSMC staff persons will attend some of the NCS committee meetings on a regular basis so as to establish the necessary understanding and liaison for positively motivating these NCS committees to standards actions of interest to ETN. When appropriate, NSMC assistance, be it staff or technical in nature, will be offered to the NCS committees to assist them in their desired standards actions.

A second step in moving toward consensus standards where national consensus standards are not available is to promote the use of the limited-

consensus standards (LCS) method in place of the single-writer method presently used for most RDT program standards. A procedure for such standards production is already in development and will be implemented on a trial basis. The NSMC will undertake the necessary organizational activities to provide for the appointment and functioning of the writing and review committees required for implementing the LCS method.

Finally, the NSMC will, through its internal arm, the NSO, continue to provide for the maintenance, updating, publication, and distribution of the existing program standards plus additional ones that are developed in the future.

In 1977 a Working Group on Standards (WGS) was established to facilitate communications and coordinate actions among breeder reactor program participants in support of the standards policy. The charter of the WGS defines its roles and responsibilities to be as follows:

- provide a forum for discussion of problem areas and methods for resolution,
- provide recommendations for improvement of standards activities,
- recommend criteria, procedures, and actions for accomplishing the goals and objectives of the nuclear standards program,
- develop guidelines to assist participating organizations in the proper application of standards to nuclear energy activities.

The WGS is chaired by the manager of the NSO at the NSMC and is composed of representatives from individual participating organizations, each of whom is knowledgeable of the standards-related activities of his organization. Task groups are established as necessary to perform assigned activities on an ad hoc basis, and staff support is supplied by the NSMC.

In order to enable the WGS to continue to operate successfully in support of the standards activities of ETN it may become desirable to add additional members, as needs are identified, who have expertise in technical areas not presently covered by the membership. This aspect of the WGS function will be monitored by the NSMC, and appropriate recommendations will be made to NPD.

With such a broadening of the technical coverage of the WGS, modification of its internal structure, perhaps along the lines of a steering

committee buttressed by technical subgroups, may become advantageous, and the NSMC will also make suitable recommendations to NPD in this regard should the need be identified.

The NSMC is required to aid the line organizations (Headquarters, field offices, contractors) in the performance of their standards program management responsibilities, which include the supervision of standards application. To this end, it is proposed that additional emphasis be given in the future to monitoring the application of standards in all appropriate phases of ETN's activities and that information on standards application be made available to the line organization managers for their use in improving the application of standards. The NSMC will also contribute to the development of suitable methods for more formal audits and surveys of standards application so as to provide the required depth and detail of information.

In the longer run, thought and study will be dedicated to the possibilities and approaches for increasing the interaction of ETN standards activities with other related efforts both within DOE (through the DOE-wide standards committee) and with other organizations, such as NBS and NRC, who are active in establishing and promoting standards, guides, norms, and codes bearing on the nuclear technology area.

4.2 Objectives

Effective planning must be based on a clear understanding of the results to be accomplished. Once these results are established and stated, a course of action can be determined. The purpose of this section is to present, in the form of a system of objectives, the results to be accomplished by the NSMC.

The system used here consists of three levels of objectives, which may be readily visualized by the diagram on page 4.5. The key objective is defined as the primary result that the enterprise as a whole - in this case the NSMC - is organized to accomplish. It establishes the purpose and nature of the NSMC.

The key objective can best be met by concentrating most of the efforts and resources on a critical few performance areas that are deemed

to be vital to the attainment of that objective. These "critical objectives" (COs) are statements of the continuing results that are vital and critical to the attainment of the key objective.

Once the COs are established, attention can be focused on specific actions that must be completed in order to achieve them. "Specific objectives" (SOs) are thus statements of the measurable results that must be accomplished to attain the critical objectives.

An effective plan must be dynamic, it must be regularly reviewed and revised, and it must always reflect current conditions and circumstances. Thus, although the key objective is a statement of the long-range invariant goal, the COs and, to a much greater extent, the SOs are relatively short-range. The SOs presented in this section are generally quantifiable in terms of near-term milestones and will be updated regularly. The COs are assessed for necessary modifications, deletions, or additions.

The NSMC key and critical objectives are stated in the following subsections. In Chap. 5, the specific objectives are described, and action plans and methods for achieving the objectives are presented.

4.2.1 Key objective

The key objective of the NSMC was established through an analysis of the "DOE Standards Policy for Nuclear Energy Programs" and the "Management Agreement Between DOE/Division for Nuclear Power Development, Oak Ridge Operations Office, and ORNL." Briefly stated, the key objective is to provide technical management of the DOE nuclear standards program so as

- (1) to promote the application of standards in ETN-funded programs and
- (2) to ensure that information and experience gained are documented in the form of standards suitable for utilization in future programs and activities in both the public and private sectors.

4.2.2 Critical objectives

The critical objectives for the NSMC were established by identifying critical performance areas — those areas that warrant a focusing of primary effort. There are eight critical objectives:

- CO-1. Maintain cognizance of standards needs, status, and applications in all phases of ETN activities except NRD, and, based on this information, assist ETN projects and programs in determining appropriate standards actions.
- CO-2. Maintain appropriate contacts and liaison with national consensus standards organizations, and promote development and use of NCSs to cover ETN standards needs to the maximum possible extent.
- CO-3. Foster the development and utilization of program standards where NCSs are not suitable or adequate.
- CO-4. Establish and operate the Nuclear Standards Program Information Center (NSPIC) to enhance the visibility and utility of the ETN standards program.
- CO-5. Establish and maintain appropriate interfaces with related organizations associated with nuclear standards.
- CO-6. Assist ETN in the evaluation and supervision of ETN standards affairs, with emphasis on application.
- CO-7. Maintain, distribute, coordinate, and catalog ETN program standards (such as RDT standards) for use and access by the nuclear community.
- CO-8. Expand and maintain the WGS to cover the entire ETN standards area.

4.2.3 Specific objectives

Based on the key and critical objectives for the NSMC, the specific objectives aim to achieve the results necessary for the attainment of the COs. The specific objectives, together with a plan of action for meeting each, are presented in the following chapter.

5. PLAN OF ACTION

In this chapter we shall first (Sects. 5.1-5.8) exhibit each of the eight COs together with the SOs associated with each, accompanied by a listing of their performance standards, milestones, and completion dates. The standards are intended to be measurable or observable achievements by which success in achieving the SOs can be judged. The milestones and completion dates give an indication of the time frame within which these achievements are to be accomplished. Generally, an attempt has been made to associate a specific milestone with each SO. However, several of the SOs reflect continuing efforts, although still having measurable results associated with them. In Sect. 5.9 a set of objective and milestone charts is presented giving more detail on the starting and completion times for the specific program steps. Together the sections of this chapter present a complete plan of action for the NSMC and a set of measures against which to judge the achievement of its goals.

5.1 Collection and Organization of Standards Status
Information and Outreach to Program Managers (CO-1)

SO-1.1 Establish objective criteria for use by participants in determining standards needs and development feasibility (new)*

An important part of the NSMC program will be the broadening and expansion of contacts with program managers who are responsible for implementing standards work in their program areas to assure that all program areas are suitably covered. It will therefore be important to help these persons in deciding when a given area is ready for standards implementation, preparatory to assisting them with carrying out these responsibilities.

Accordingly, the NSMC will develop and write a set of objective criteria for establishing the suitability of a program area for standards implementation. This document will list the criteria and conditions that make a subject ripe for standards.

*Each SO is identified as being a new activity, an expanded activity, or an ongoing activity.

Standards.

1. The criteria for standards feasibility are in accordance with relevant DOE guidance for standards applicability.
2. The criteria are clear, unambiguous, and complete.

Milestone and completion date. Criteria written, September 30, 1979.

S0-1.2 Identify all ETN activities currently involving standards or with potential for development and/or use of standards (expanded)

In order for the NSMC to fulfill its responsibilities toward managing the nuclear standards activities, it must first obtain a clear picture of their present status, not only in the program areas with which it is already familiar from the past activities of the NSO but including all the activities of ETN. This will be accomplished by a series of contacts -- first with DOE headquarters personnel to survey the range of activities encompassed, augmented by suitable literature searches, and then by contacts with DOE field office and contractor organizations to flesh out the NSMC's detailed understanding of all present and planned activities in the ETN area and in particular their status with respect to the generation, adoption, and utilization of standards. The focus of this information-gathering effort will be on those activities for which adequate information is lacking.

This survey will be based on the criteria established under S0-1.1 and will certainly include a study of the 189a or WPAS* documents, or similar documentation describing activities in sufficient detail for evaluating their suitability for standards use. This will be augmented by detailed discussion, including site visits as required to clear up difficulties and add such additional understanding as may be required. Discussions will also include field office managers, technical management center personnel, program managers, and contractor personnel involved in administering subcontracts and work by others.

The critical fact, then, to be established for each program and activity area, at a level of detail judged suitable in view of the results of this fact-finding effort, is the standards status. This status will

*Work Package Proposal and Authorization System.

be based on a finding that adequate standards coverage already exists for the particular area in question, that standards applicable to the area need revising, updating, or expanding, that standards are in some stage of preparation or study, or that a given area is not yet ripe for standards activity. In the latter case, an attempt will be made, in cooperation with the responsible people involved, to estimate a future date by which standards "ripeness" will occur.

The NSO has been working closely with the ASME Subcommittee on LMFBR Codes and Standards, which is presently engaged in assembling a data matrix on FBR standards needs and status; this information will be utilized to avoid duplication of effort.

Standards.

1. All ETN program information is obtained in sufficient detail from ETN headquarters.
2. Contacts with field office and contractor personnel cognizant of standards status are thorough enough to make standards-ripeness judgments possible.
3. Copies of relevant up-to-date program documents are identified and available.

Milestone and completion date. Initial review completed, December 31, 1979.

SO-1.3 Conduct an outreach program to educate, aid, and support managers in identifying standards-ripe areas and initiating suitable standards activities (new)

It is likely that not all headquarters, field office, program, and project management personnel will have an equally vivid impression of what standards activities are or ought to be in their areas, especially in areas where standards have not heretofore played an important, highly visible role. It will therefore be an important part of NSMC's activities to establish and implement an outreach program to contact the responsible persons, make them aware of the criteria for standards feasibility described above, and assist them in making the determinations of standards applicability in accordance with SO-1.1. This will, of course, be an ongoing process as personnel and program changes occur, but the plan is to

begin with an initial round of contacts that will include all identified managers. Other NSMC activities, especially those of the Nuclear Standards Information Center, to be described below, will also aid in keeping all persons involved informed as to standards activities and status. The *Guide to the Nuclear Standards Program* now being developed by the WGS will also be an important communications tool in this effort.

DOE headquarters cooperation in the outreach activity will be indispensable both for identifying people and research areas that can benefit from such activities and in lending their support and influence in cases where field or contractor organizations require encouragement and persuasion to undertake standards implementation at a level deemed appropriate by the NSMC in coordination with cognizant ETN staff.

An important aspect of this outreach activity will be the establishment of informal personal communication channels, identifying the key persons involved, and establishing communication links that will make ongoing contacts and cooperation easy and fruitful in the future. Successful standards implementation will be possible only by establishing and maintaining this kind of close contact and cooperation between the NSMC and the responsible personnel actually involved with ETN's research and development activities.

Standards.

1. The proper contact persons for all ETN activities are identified.
2. All contact persons are interviewed and made aware of their proper standards responsibilities and the NSMC aid and support available to them.
3. Headquarters support is solicited where appropriate.

Milestones and completion dates. First-round contacts completed, December 31, 1979; ongoing outreach activities, continuous.

SO-1.4 Identify standards that can apply to more than one ETN area and coordinate their suitable development and application (new)

Separate standards efforts in each separate ETN program area may result in unnecessary fragmenting of standards development activities, with overlapping or duplicative standards in different program areas. Thus it will be an NSMC obligation to monitor standards activities for such

5.5

overlaps in order to promote suitable joint standards development where this is the case. In such cases the NSMC will recommend to ETN headquarters a cognizant program organization to act as technical lead to provide for common standards development.

Standards.

1. All standards activities have been checked for possible overlay or duplication.
2. Maximum possible unification is achieved.

Milestones and completion dates. Initial survey of overlap and duplication areas, January 31, 1980; monitoring for possible coordinating actions, continuous.

SO-1.5 Establish and maintain a matrix of status of ETN standards activities (expanded)

Based on the results of the survey (SO-1.2) a matrix chart listing the standards status for each ETN program component will be prepared. This chart will be a key tool for managing the standards effort, and it will be kept updated as the status of standards activity in the various R&D areas changes. It is important to note that this compilation will cover all ETN activities (with the exception of NRD), including those for which standards preparation, use, or implementation are not or not yet judged to be feasible.

Standard.

1. The matrix is comprehensive and comprehensible.

Milestone and completion date. Matrix chart complete, March 31, 1980.

5.2 Liaison with National Consensus Standards Organizations (CO-2)

In order for the NSMC to fulfill its mission of promoting the use of NCSs wherever possible and its function as the management arm of the DOE nuclear standards program, it must maintain direct and continuing contact with the NSMB of ANSI. ANSI, although not itself a standards-writing organization, coordinates the standards-writing activities of the NCS organizations (e.g., ANS, ASME, ASTM, IEEE) and, after conducting appropriate

peer and public reviews, approves and coordinates the publication of such standards as American National Standards. NSMB is one of several technical management boards of ANSI that coordinate standards proposals, standards-writing activities, and resolution of problems of the NCS organizations participating on that board. As such, it is the focal point of nuclear standards activities in the NCS community. NPD is an organizational member of NSMB, and an NSMC staff member presently participates as an observer.

SO-2.1 Strengthen relations with NSMB and improve interfaces with, and support to, NCS organizations (new)

The preferred option in the development of new standards in support of DOE nuclear programs is to have these standards developed by an NCS organization. Efforts to this end are best made through the NSMB. In order to improve and strengthen NSMC interactions with NSMB, a representative of the OAPI will attend the NSMB meetings to obtain first-hand information on NCS standards issues, plans, and activities. When the need for a particular standard or type of standard has been identified within an ETN program, an NSMB Project Charter will be submitted and processed in accordance with established ANSI procedures. When the project has been assigned to an NCS organization, the NSMC will support the effort by providing technical, research, administrative, or other direct assistance, as requested by the assigned NCS organization, and will coordinate the review of documents developed in the course of the effort with the ETN community.

Standards.

1. An OAPI member attends NSMB meetings.
2. Appropriate technical, research, and staff assistance is provided to NCS organizations in the preparation of national consensus standards.

Milestone and completion date. OAPI representative to NSMB makes presentation to NSMC, September 13, 1979.

SO-2.2 Propose and foster the conversion of appropriate program standards to NCSs (ongoing)

Once an NCS organization has agreed to develop a national consensus standard in response to an ETN program need and if there are existing ETN

program standards that bear on the subject, the NSMC makes such standards available to the NCS organization for conversion to a national consensus standard, either as source material or to provide a point of departure for the development of the NCS. In support of this activity, the NSO is presently surveying the existing inventory of RDT standards to identify additional standards that are potentially convertible to NCSs or that may provide useful source material for the development of an NCS. Candidate RDT standards identified in this effort will be made available to NSMB and its member organizations. If terms from this list are selected for conversion by an NSMB member organization, the NSMC will provide assistance as outlined in SO-2.1 and monitor development of the selected standard(s), either indirectly through the NSMB or directly by participation on the assigned standards-writing working group.

Standards.

1. All RDT standards are surveyed to establish potential candidates for conversion to NCS standards.
2. Plans are developed for the conversion of each potential candidate standard.
3. Liaison with the NSMB or identified NCS organizations is established for standards development in areas of ETN interest.
4. Progress in development of standards by the NSMB is fostered by appropriate technical assistance and monitored.

Milestones and completion dates. Survey RDT standards for suitability for NCS conversion and develop conversion plans for each, September 30, 1979; present candidate standards to NCS organization for conversion and monitor progress, ongoing.

SO-2.3 Assist ETN projects and programs to determine standards needs that can be met by modifying or supplementing existing NCSs (ongoing)

A major policy of government standards-writing and utilization agencies in general and of the ETN program in particular is to avoid unnecessary redundancy in standards development. Insofar as practicable, existing NCSs will be employed to satisfy program standards requirements. However, national consensus standards usually reflect the broad needs of

industry and may not meet, as written, the more focused needs of ETN programs. In such instances, the NSMC may help to prepare supplements to existing national consensus standards to provide the additional or supplementary requirements necessary to meet specific program needs, using LCS procedures where applicable. In this regard, the NSMC will maintain cognizance of the various programs of ETN contractors, review them with the contractors with respect to possible standards needs, and promote the use of existing NCSs to meet those needs where possible. The NSMC will also offer its services to such contractors in the development of supplements to potentially useful NCSs to tailor the requirements of those standards to the particular needs of the contractor and the ETN program.

Standards.

1. Based on comprehensive information on program standards needs and existing NCSs, suitable recommendations are made to ETN program participants on needs that can be met using NCS standards.
2. Suitable support and assistance are given to ETN projects, contractors, and program participants in using or supplementing NCSs for ETN program applications.

Milestone and completion date. Support and assist ETN contractors and participants in modifying and supplementing NCSs where possible, ongoing.

SO-2.4 Develop appropriate liaison with NCS organizations and establish registers of technical persons who can provide support to NCS standards development activities (new)

One of the most important goals of the NSMC and, indeed, of the entire nuclear standards program is to promote the development and adoption of standards of interest and value to the nuclear standards program by NCS organizations. One of the ways the NSMC can promote such actions is to assist NCS organizations in finding resource persons who can work on the development or review of specific standards. Therefore, as needs are identified, the NSMC will develop registers of names of such resource persons who are experts in various technical areas and whose assistance can be made available for technical assistance to NCS organizations.

The NSMC will also strive by all means to develop and maintain closer relationships with the standards management bodies of the various NCS

organizations, both through the NSMB and directly by identifying and developing suitable personal contacts with members of these organizations in order to improve and facilitate liaison and to motivate such organizations to develop and adopt standards of interest to the nuclear standards program.

Standards.

1. Registers of technical support persons for assistance to NCS organizations are developed as needed in a timely manner.
2. Liaison channels with NCS organizations, including identification of specific advocate persons in these organizations, are established.

Milestones and completion dates. Establish registers of technical support persons, as needed; liaison with NCS organizations, ongoing.

5.3 Fostering the Development and Application of Program Standards (CO-3)

SO-3.1 Provide direction and assistance to program and project participants in the development and application of appropriate program standards (expanded)

Program standards are developed when existing NCS standards are not applicable or sufficient because their requirements are not adequate for the intended ETN application, the development of a new NCS is deemed to be impracticable or unsuitable, or such NCS development is judged to be still premature.

In the past the program standards development process was based on the assignment of a cognizant engineer in a standards-writer organization who was responsible for the preparation and maintenance of the standard. The cognizant engineer had the obligation to solicit input from program participants as well as manufacturers and suppliers on whom these standards were invoked.

The LCS procedure (see SOs 3.2-3.4) is now to be established to obtain a more formal consensus of all parties with an interest in the proposed standard and will henceforth be the method of choice for the development of program standards. However, cognizant-engineer development of program standards will remain an option where its use is judged more appropriate.

The NSMC will provide direction and assistance to program and project participants in determining when and how the development of program standards processes will be implemented, in assignment of cognizant engineers (when appropriate), in the selection and operation of writing and review committees, and in application of such standards.

Standard.

1. Program standards, of the LCS or cognizant-engineer-writer type, are prepared as appropriate for ETN applications.

Milestone and completion date. Direction and guidance in development and application of program standards, ongoing.

SO-3.2 Development of LCS procedure (ongoing)

In 1977 the LCS concept was established as an alternative method of developing program standards, and a procedure was developed by an ad hoc group under the WGS. This procedure is not greatly different from the procedures described in RDT F 1-1 for the preparation of RDT standards, but it emphasizes and formalizes consensus features that were not stressed as much previously. The procedure was completed, submitted for NPD approval, and is now being revised to appropriately reflect their comments. It will be distributed to DOE contractor organizations with a recommendation that it be appropriately implemented.

Standards.

1. LCS procedure is satisfactorily completed and submitted to ETN with the recommendation for implementation.
2. ETN approval is received. The LCS procedure is distributed to DOE contractor organizations.

Milestone and completion date. LCS procedure approved by ETN and distributed to DOE contractor organizations, December 31, 1979.

SO-3.3 Conduct trial implementation of LCS procedure (ongoing)

In order to test the LCS procedure, a trial implementation on a single standard will be attempted. Following completion of trial implementation, the LCS procedure will be modified as needed to reflect the experience gained in the trial application. Comments and recommendations

will be solicited by the NSO, and the procedure will be revised to reflect these comments appropriately. The revised procedure will then be submitted to ETN with the recommendation that it be fully implemented in the future development of selected ETN standards.

Standards.

1. Representative standard chosen for LCS procedure trial.
2. Experience gained in trial implementation of the LCS method is fully evaluated and utilized.

Milestones and completion dates. Trial implementation is completed, April 30, 1980; procedure is revised and submitted for ETN approval, May 31, 1980.

SO-3.4 Implement LCS procedure (ongoing)

Upon receipt of ETN approval, the LCS procedure will be distributed by the NSO to ETN contractor organizations with instructions that it be used in appropriate cases in the development of ETN standards where national consensus standards are nonexistent or inadequate. The instructions will also advise the recipients that the NSO is available to provide guidance in the interpretation and implementation of the LCS procedure.

Standards.

1. LCS procedure is distributed to ETN contractor organizations.
2. ETN standards-writing activities are monitored to determine that the LCS procedure is being properly implemented where appropriate.
3. Where the LCS procedure is not being fully implemented, the organizations involved are contacted and assisted in implementing the LCS procedure.

Milestones and completion dates. Distribute LCS procedure, June 30, 1980; monitor implementation of LCS procedure, continuous; provide guidance to contractor organization concerning implementation, continuous.

5.4 Operation of Nuclear Standards Program
Information Center (CO-4)

A Nuclear Standards Program Information Center (NSPIC) will be established to perform the following functions (SO-4.1-SO-4.6) of the NSMC.

SO-4.1 Implement periodic newsletter covering ongoing nuclear standards program activities (new)

A newsletter will be designed and issued to ETN nuclear standards program participants (DOE headquarters and field offices, national laboratory and contractor personnel) and to appropriate technical societies and other organizations. This newsletter will contain up-to-date information on significant developments concerning standards activities in ETN programs, areas of NCS interest, new standards or revisions, changes in committee memberships, review of drafts, news of organizational and other changes in the nuclear standards area, conversions of program standards to NCSs, and the development of program standards.

Standards.

1. All information suitable for newsletter dissemination is collected.
2. The newsletter is interestingly formatted and written.
3. Newsletter recipient list is established.
4. The newsletter is published on a regular timely basis.

Milestones and completion dates. Design newsletter, August 31, 1979; identify feature articles to be included in first issue and source for information (individuals responsible for each), August 31, 1979; publish first issue of newsletter, September 30, 1979; publish initial issues on quarterly schedule, continuing.

SO-4.2 Provide assistance and information as called upon by ETN headquarters, field offices, and contractors concerning activities, availability, and applications of standards (ongoing)

As called upon by any ETN organization, field office, technical management center, contractor, or laboratory, the NSPIC will provide appropriate information and assistance concerning nuclear standards activities, standards availability, and applications as appropriate.

Standards.

1. All information requests for standards-related information from appropriate organizations are filled in a timely and complete manner.

Milestone and completion date. Response to information requests, ongoing.

SO-4.3 Expand and maintain the present data base of nuclear standards information; investigate the feasibility of improving access via RECON (expanded)

The existing standards data base, which heretofore included only information concerning RDT program standards, will continue to be maintained. It will be expanded as appropriate to accommodate other program standards developed for ETN programs.

Following completion of the survey of each ETN project and program (SO-1.2), information concerning existing non-RDT program standards and any new program standards identified for development and application will be added to the data set, together with identification of areas where there is a potential for the development and/or application of standards.

The capability for retrieving information from the computer data sets is quite extensive. For example, the following types of hard-copy output can be produced within a 24-hr period:

- Information applicable to any given ETN program or project, standards-writer organization, ETN branch or division, or cognizant engineer; status of all or selected groups of standards; standards with a specific status (e.g., those that require scheduling or rescheduling, approval, drafting, or publication).
- A key-word-in-context (KWIC) index (of titles or other appropriate information) of all or selected groups of standards.

The data sets will be expanded to include information concerning NCS activities of interest to ongoing nuclear standards program, as well as information on program standards in the process of conversion to NCSs. These computer data sets can be made accessible through RECON, which is a DOE-wide computerized information retrieval system that is designed to provide users with remote-terminal access to computer data sets.

Standard.

1. Comprehensive data sets to provide appropriate information concerning nuclear standards activities to ETN programs and participants are maintained.

Milestones and completion dates. Complete expansion of data sets to include all appropriate information on ETN program standards status,

March 31, 1980; prepare and make available for users information on retrievability using RECON (if this is decided on), May 31, 1980.

SO-4.4 Maintain and annually issue directory of *Personnel Involved in the Development of Nuclear Standards in the United States* (ongoing)

Information concerning persons involved in the development of nuclear standards, guides, and codes in the United States will continue to be collected and maintained in computer data sets that will be used to produce annual issues of a directory of *Personnel Involved in the Development of Nuclear Standards in the United States*. The information in the directory will include identification of organizations and their personnel, as well as the committees on which these are serving; a listing of the makeup of the various committees, which identifies all persons serving on them; a listing of all persons serving on committees, which identifies their company and all committees on which they are participating; and a KWIC index of the committees identified in the directory. The computer data base will be updated on a continuing basis.

Selected searches for any type of data contained in the data sets can be performed and printouts made available upon request. Such searches will also be utilized to solicit update information from technical societies and companies in the preparation of revised issues of the directory.

Standards.

1. Complete and accurate information concerning personnel, companies, and committees involved in the development of nuclear standards is collected and maintained in the computer data sets.
2. Requests for special printouts of directory data are promptly and fully met.

Milestones and completion dates. Publish 1979 issue of directory, December 31, 1979; maintain updated directory data and publish annual issues, ongoing.

SO-4.5 Maintain Unusual Occurrence Report program, including technical review and analysis of UORs, maintaining computer data base, and issuing semimonthly listings and semiannual reports (ongoing)

Unusual Occurrence Reports (UORs) are mandatory reports in a specified format which are completed by RRT and NPD contractors and program participants "for each unusual or unplanned occurrence that has programmatic significance which occurs during design, development, fabrication, storage, shipment, installation, construction, testing, operation, maintenance, modification, or decommissioning of . . . program reactors, test reactors, test facilities, experiments and experimental facilities, components, systems, processes, and structures."* By pointing to possible design or practice problems, they are valuable input to the standards process and have therefore been collected, analyzed, and distributed by the NSMC as a part of its standards activities.

UORs received by the NSMC will continue to be reviewed and evaluated, and appropriate information concerning each incident, its causes, symptoms, etc., will be entered in complete data sets. Where received UORs are inaccurate or incomplete or have not been properly prepared, the NSMC will advise the preparing organization that the UOR is to be revised to correct the identified deficiencies and resubmitted to the NSMC. Progress by the originating organization in completing and reporting follow-up to ensure corrective actions will be monitored by the NSMC, and appropriate action will be taken to advise the proper organization when corrective action is not taken on a timely basis or when further corrective action is required to prevent recurrence of the event.

Statistical and tabular output will be produced and used as the basis for preparing semiannual review and analysis reports. These analyses will provide a mechanism for identifying problem areas and bringing undesirable circumstances to the attention of responsible parties in the initiating organization and the affected community. When analysis of one or a series of UORs indicates a situation concerning a particular trend or problem of interest, a special report, bulletin, or memo will be issued to bring the identified condition to the attention of program and project participants

*RDT Standard F 1-3T, *Preparation of Unusual Occurrence Reports*.

and, where appropriate, to recommend possible precautionary action within their organizations. In addition, the routine report will serve as the basis for further investigation, assessment, and implementation of corrective action. In addition to the semi-annual analysis report, semi-monthly summaries of UORs will continue to be issued.

The technical review and analysis of the UORs will seek to identify the apparent causes of the occurrences and, insofar as practicable, the underlying cause of failure. It is also expected that the identified or potential impact upon codes and standards, including program standards, can be evaluated. The information in the computer data sets will be analyzed and used as the basis for occasional lessons-learned reports concerning specific trends and problems. These reports will provide detailed narrative descriptions of the selected UORs and will include recommended ways to minimize the possibility of similar occurrences among the various ETN programs.

Standards.

1. The UORs received are properly and promptly entered into computer data sets.
2. UORs are evaluated, and appropriate corrective action is taken to assure that UORs are complete, accurate, and timely.
3. Information on problems and corrective actions is correctly identified and promptly disseminated.
4. Semiannual analyses of UORs are prepared and issued in a timely manner.
5. Semimonthly summaries are issued on a regular basis.
6. The lessons-learned reports issued upon analysis of UORs are appropriate and informative.

Milestones and completion dates. Receive UORs and enter information in computer data sets, continuing; issue summaries of UORs received, semi-monthly; analyze UOR information for preparation of semiannual reports, prepare and issue semiannual review and analysis reports, semiannually; issue periodic lessons-learned reports, as required.

SO-4.6 Maintain the Catalog of Specifications program, issue annual editions of the Catalog, and maintain computer data base (ongoing)

A Catalog of Specifications will be maintained to provide ETN, contractors, and laboratories with a central source for information concerning specifications that have been used by program participants in the procurement of components, systems, and materials for breeder reactor programs. The catalog will be prepared in accordance with an approved plan and will identify appropriate specifications and significant data that could be of benefit to the writers of breeder reactor specifications. The information collected concerning the specifications will be maintained in computer data sets that will be used to produce all indexes and other listings to be included in the catalog, and copies of appropriate specifications will be maintained in a library and made available to users.

Standards.

1. Information pertaining to past procurements that can be beneficial in the development of future specifications for LMFBR procurements has been fully identified and made available to program participants.
2. A workable plan for preparation of a catalog of specifications has been prepared.
3. Additional information as required to maintain a catalog of specifications is collected.
4. A library of specifications is successfully established from which documents can be made available upon request.

Milestones and completion dates. Revised plan is completed and submitted to NPD for approval, March 31, 1979; review specifications data and identify information to be included in computer data sets, May 31, 1979; produce catalog from computer data sets, March 31, 1980; issue completed catalog, June 30, 1980; maintain and publish annual issues of catalog, continuing.

5.5 Development of Interfaces with Related Organizations Associated with Nuclear Standards (CO-5)

SO-5.1 Establish closer information and liaison ties to NRC Standards and Regulatory Guides activities to foster cooperative or complementary standards activities (new)

It is Federal policy to promote consistency among branches of the government with respect to standards. The NRC is another major Federal organization with responsibilities in the nuclear area. The NSO has maintained informal contacts with NRC for a number of years, reflecting requirements of regulatory guides published by that organization where they may impact on RDT standards activities and providing comment review on those guides when requested. The NSMC plans to establish closer information and cooperation ties to NRC to foster cooperative or complementary standards activities in the future, including a direct tie with the NRC Office of Standards Development (OSD) for the formal exchange of information, comment review of documents under development by the two offices (OSD and NSMC), and other activities of mutual interest, including perhaps reciprocal reviews of some draft standards and guides. An early meeting will be sought with responsible OSD persons to explore fruitful avenues for closer interactions.

Standards.

1. Standards-responsible persons and organization elements at OSD are identified and contacted to explore cooperative efforts.
2. Cooperative standards activities with OSD are pursued to mutual advantage and for prevention of duplication or inconsistent stances.

Milestones and completion dates. Meeting with OSD staff to discuss coordination and cooperation, August 31, 1979; interactions and communication with NRC in standards area, ongoing.

SO-5.2 Establish appropriate contacts with NBS and DOD in activities of interest to the nuclear standards program (expanded)

Military standards and specifications are occasionally referenced or employed in nuclear standards work, and it would be inconsistent to duplicate the work reflected in those documents where they can suffice directly or with minor modifications in activities related to ETN programs.

The NSO has for several years maintained cognizance of military standards and specifications through subscription to the Department of Defense (DOD) Index of Standards and Specifications, although it has not participated in the development of those documents and has not requested DOD to participate in the development of RDT standards. The NSO has also maintained an informal relationship with the Office of Engineering and Information Processing Standards (OEIP) of the National Bureau of Standards (NBS), primarily because it collects and indexes engineering standards published by technical, trade, and commercial organizations throughout the world. The NSMC will maintain cognizance of the standards activities of the DOE Defense Material Specifications and Standards Office and the OEIP in order to maintain information ties with these organizations' activities related to the ETN standards program. In some cases the NSMC may provide draft review services to DOD and, conversely, may request similar service from that organization with respect to NSMC projects. Contacts with the staffs of these organizations will be established and maintained to explore possible mutually beneficial interactions.

Standards.

1. Standards staff and organization elements at DOD and NBS are successfully identified for contacts to maintain and improve information interactions.
2. Mutually beneficial interactions are undertaken and maintained.

Milestones and completion dates. Meeting with DOD staff to explore mutual interests, November 30, 1979; meeting with NBS staff to explore mutual interests, December 31, 1979; cognizance maintained of DOD and NBS standards activities in areas of interest overlap, ongoing.

5.6 Assistance to DOE in Evaluation and Supervision of Nuclear Standards Activities, with Emphasis on Application (CO-6)

SO-6.1 Survey application of standards in ETN project and program procurement, design, and specification activities (new)

The NSMC will survey ETN contractor procurement, design, and specification activities to monitor utilization of standards as appropriate. This survey will determine what kinds of standards are being applied to

a given activity, what existing standards might advantageously be applied, and what new standards need development for application. NSMC will then assist ETN to assess the degree of compliance with the requirements for the application of standards. This activity will be based on literature reviews, site visits, discussions with ETN headquarters and field offices, and other sources of information to be identified.

Standards.

1. Contractor activities surveys are complete and current.
2. Efforts to assess compliance with requirements for standards applications are useful to ETN personnel.

Milestone and completion date. First round of ETN project and program participant surveys completed, March 31, 1980.

SO-6.2 Advise cognizant line organization managers of corrective actions required in standards application, support corrective programs and actions, and offer NSMC support (new)

The NSMC will advise cognizant line organization managers of any corrective action required in standards utilization and application as identified in the course of activity under SO-6.1 and maintain cognizance of corrective actions to monitor the improvements based on the recommendations. The NSMC will also offer technical help, support, and information services (through NSPIC) to aid contractors in applying standards.

Standards.

1. Areas where standards application needs strengthening are identified and brought to the attention of appropriate managers.
2. Appropriate technical and information aid is tendered to ETN organizations to strengthen standards application.

Milestones and completion dates. Make improvement recommendations, when identified; offer NSMC assistance, ongoing.

SO-6.3 Assist ETN line organizations (headquarters, field offices, and contractors) in the application, use, and evaluation of standards application audits (ongoing)

The WGS is presently in the process of completing a standards application audit (SAA) procedure, which will spell out the methods, aims, and formalisms of such audits to monitor application of standards in all the ETN contractor organizations and laboratories.

The NSMC will carefully study the SAA process to determine the most effective ways by which it may give appropriate assistance with SAAs. It is expected that a major role that the NSMC can play will lie in the area of coordination and planning of SAAs, worked out through contacts with the cognizant line organizations conducting the audits. Based on the information developed in the course of SO-6.1 and SO-6.2, the NSMC will make contact with the appropriate line organizations and offer planning and coordination for the performance of SAAs.

In suitable instances the NSMC may offer technical or planning assistance for the auditing organization in the planning and performance of the audit.

The NSMC will establish and maintain a file of audit reports resulting from the SAAs and make recommendations to the line organizations regarding follow-up audits if they seem desirable.

Standards.

1. Detailed plans for supporting SAAs by planning, assistance, and coordination activities are completed.
2. With NPD approval the NSMC supplies proper assistance to the auditing organization to support the performance of audits.
3. The file of completed SAA reports is established and up to date.

Milestones and completion dates. Submit first SAA recommendations to NPD, March 31, 1980; aid auditing organization to perform SAA if requested, at request.

5.7 Coordination, Maintenance, Distribution, and Cataloging of Existing Program Standards (CO-7)

SO-7.1 List, distribute, and coordinate the reproduction of ETN program standards (ongoing)

The NSO will continue the present activities of maintaining approved program standards for use by nuclear standards program participants and will coordinate with the Technical Information Center (TIC) the reproduction and distribution of these approved standards to the established mailing lists. In addition, copies will be maintained by the NSO and will be distributed in response to requests received from participating

organizations. As program standards are identified among ETN organizations, these standards will be obtained for maintenance and distribution by the NSO. Up-to-date listings of the available standards will be produced from the central data sets and will be distributed by TIC to established distribution lists.

Standard.

1. The library of all approved program standards is complete, and these standards are promptly available on request to the nuclear community.

Milestones and completion dates. Evaluate existing distribution lists and modify as required to accommodate the expanded activities, February 28, 1980; coordinate distribution of all new, approved, revised, and amended standards with TIC, continuing; issue indexes to identify available standards, quarterly.

SO-7.2 Review program standards for needed revisions, updating, conversion to NCS, or discontinuance and assist standards writers in performing such actions (ongoing)

The NSO will continue to monitor program standards to determine needs for modifications, updating, or discontinuance if no longer applicable. The NSMC will offer assistance as required with the revision process, manage the necessary review and adoption procedures (or channel the standard to an NCS committee, if this seems desirable, for adoption or modification as an NCS), and coordinate the approval process.

Standards.

1. All approved program standards are reviewed frequently enough to establish need for revisions, updating, or discontinuance in a timely manner.
2. The assistance offered to standards writers to maintain program standards is adequate and useful.

Milestone and completion date. Complete first-round review of all existing program standards to establish revision or updating needs, March 31, 1980.

5.8 Interaction with the Working Group on Standards (CO-8)

SO-8.1 Provide administrative and managerial support for WGS (ongoing)

In 1977, the WGS was established to facilitate communications and coordinate actions among BRP participants on standards matters. The WGS is composed of representatives from individual participating organizations, each of whom is knowledgeable of the standards-related activities of his organization. Meetings are held periodically to consider matters of concern to the participating organizations. The WGS is chaired by the NSO manager, and the NSO administrative coordinator serves as secretary to the WGS, providing staff support to the group.

Standard.

1. Managerial and administrative support for the Working Group on Standards provided by the NSO manager and administrative coordinator is effective and adequate.

Milestone and completion date. Provide managerial and administrative support to WGS, ongoing.

SO-8.2 Consider modifications to WGS structure and membership and make recommendations to NPD on each (new)

Given the broadened area of coverage of standards activities mandated by the new standards policy, it is appropriate that the structure and function of the WGS should be reviewed to determine whether a change should be made to enable it to cope effectively with changed conditions. One possibility is the addition of new members to the WGS to broaden its technical competence in accordance with the broadened coverage of standards activities. Such additional members will be suggested to NPD as needs are identified and candidates for membership are located.

With an enlarged WGS, modification of its structure may become desirable, perhaps in the form of a steering committee and several permanent subject-specialized subgroups. This matter, too, will be carefully considered by the NSMC, and recommendations will be made to NPD as developments warrant.

Standards.

1. The makeup of the WGS has been properly matched to the coverage and requirements of the nuclear standards program.
2. A suitable structure modification for the WGS has been defined and proposed to NPD for implementation.

Milestones and completion dates. Complete first-round study of WGS membership needs, May 31, 1980; submit WGS structure modification recommendations to NPD, September 30, 1980.

5.9 Objective and Milestone Charts

The objective and milestone charts in this section show graphically the schedules for the SOs and indicate which of the objectives are of a continuing nature. In cases where it is appropriate, milestones have been shown for completion of first-round efforts in continuing program objectives.

CRITICAL OBJECTIVE/SPECIFIC OBJECTIVE	MILESTONES							
	FY 1979				FY 1980			
	1	2	3	4	1	2	3	4
CO-1. Maintain Cognizance of ETN Standards Activities and Assist in Determining Appropriate Standards Actions								
SO-1.1 Establish objective criteria for use by participants in determining standards needs and development feasibility				▽				
SO-1.2 Identify all ETN activities currently involving standards or with potential for development and/or use of standards					▽			
SO-1.3 Conduct an outreach program to educate, aid, and support managers in identifying standards-ripe areas and initiating suitable standards activities								
SO-1.4 Identify standards that can apply to more than one ETN area and coordinate their suitable development and application					▽			
SO-1.5 Establish and maintain a matrix of status of ETN standards activities						▽		
CO-2. Maintain Appropriate Contacts and Liaison with NCS Organizations and Promote Development and Use of Such Standards								
SO-2.1 Strengthen relations with NSMB and improve interfaces with, and support to, NCS organizations								
SO-2.2 Propose and foster the conversion of appropriate program standards to NCSs:								
• Surveying RDT standards (and, later, other program standards) for suitability for NCS conversion and developing conversion plan for each				▽				

CRITICAL OBJECTIVE/SPECIFIC OBJECTIVE	MILESTONES							
	FY 1979				FY 1980			
	1	2	3	4	1	2	3	4
CO-2. Maintain Appropriate Contacts and Liaison with NCS Organizations and Promote Development and Use of Such Standards (cont'd):								
• Presenting selected standards to appropriate national consensus standards-writing organizations								
• Monitoring status of conversion activities								
SO-2.3 Assist ETN projects and programs to determine program standards needs that can be met by modifying or supplementing existing NCSs								
SO-2.4 Develop appropriate liaison with NCS organizations and establish registers of technical persons who can provide support to NCS standards development activities								
CO-3. Foster Development and Application of Program Standards								
SO-3.1 Provide direction and assistance to program and project participants in the development and application of appropriate program standards								
SO-3.2 Development of LCS procedure								
SO-3.3 Conduct trial implementation of LCS procedure								
SO-3.4 Implement LCS procedure								
CO-4. Establish and Operate the Nuclear Standards Program Information Center								
SO-4.1 Implement periodic newsletter covering ongoing nuclear standards program activities:								

CRITICAL OBJECTIVE/SPECIFIC OBJECTIVE	MILESTONES								
	FY 1979				FY 1980				BEYOND FY 1980
	1	2	3	4	1	2	3	4	
CO-4. Establish and Operate the Nuclear Standards Program Information Center (cont'd):									
<ul style="list-style-type: none"> • News of organizational and other changes in the nuclear standards area • National consensus standards • Conversion efforts • Program standards 									
SO-4.2 Provide assistance and information as called upon by ETN headquarters, field offices, and contractors concerning activities, availability, and applications of standards									→
SO-4.3 Expand and maintain the present data base of nuclear standards information; investigate the feasibility of improving access via RECON							▽		→
SO-4.4 Maintain and annually issue directory of <i>Personnel Involved in the Development of Nuclear Standards in the United States</i>						▽			12/31 ▽ (annually)
SO-4.5 Maintain Unusual Occurrence Report program, including technical review and analysis of UORs, maintaining computer data base, and issuing semi-monthly listings and semiannual reports			▽		▽		▽		▽ (semiannually)
SO-4.6 Maintain the Catalog of Specifications program, issue annual editions of the Catalog, and maintain computer data base							▽		6/30 ▽ (annually)

CRITICAL OBJECTIVE/SPECIFIC OBJECTIVE	MILESTONES								
	FY 1979				FY 1980				BEYOND FY 1980
	1	2	3	4	1	2	3	4	
CO-5. Establish and Maintain Interfaces with Related Organizations Associated with Nuclear Standards									→
SO-5.1 Establish closer information and liaison ties to NRC Standards and Regulatory Guides activities to foster cooperative or complementary standards activities				▽					→
SO-5.2 Establish appropriate contacts with NBS and DOD in activities of interest to the nuclear standards program									→
CO-6. Assist DOE in Evaluation and Supervision of the Nuclear Standards Program, with Emphasis on Application									→
SO-6.1 Survey application of standards in ETN project and program procurement, design, and specification activities									→
SO-6.2 Advise cognizant line organization managers of corrective actions required in standards application, support corrective programs and actions, and offer NSMC support									→
SO-6.3 Assist ETN line organizations (headquarters, field offices, and contractors) in the application, use, and evaluation of standards application audits							▽		→
CO-7. Coordinate, Maintain, Distribute, and Catalog ETN Program Standards									→
SO-7.1 List, distribute, and coordinate the reproduction of ETN program standards									→

CRITICAL OBJECTIVE/SPECIFIC OBJECTIVE	MILESTONES								
	FY 1979				FY 1980				BEYOND FY 1980
	1	2	3	4	1	2	3	4	
CO-7. Coordinate, Maintain, Distribute, and Catalog ETN Program Standards (cont'd):									
SO-7.2 Review program standards for needed revisions, updating, conversion to NCS, or discontinuance and assist standards writers in performing such actions							▽		→
CO-8. Interaction with the WGS									→
SO-8.1 Provide administrative and managerial support for WGS									→
SO-8.2 Consider modifications to WGS structure and membership and make recommendations to NPD on each							▽	▽	→

6. ORGANIZATION AND ADMINISTRATION

6.1 Organizational Framework

6.1.1 Description of ORNL organization

The Oak Ridge National Laboratory utilizes a matrix organization for the management of activities such as the NSMC. Programmatically the NSMC is one of the Laboratory's nuclear reactor technology programs; in the functional line organization, it is a part of the Engineering Technology Division. Figures 6.1-6.4 show this organizational framework.

Figure 6.1 depicts the upper management organization of ORNL. The NSMC is located under D. B. Trauger, Associate Director for Nuclear and Engineering Technologies, and Fig. 6.2 depicts the management structure for the activities under his direction. Both line and program organizations appear in Fig. 6.2. The divisions shown participate not only in the programs shown but in programs reporting to other associate directors as well. Likewise, the programs shown in Fig. 6.2 may draw upon divisions other than those shown. The location of the NSMC is indicated in Fig. 6.2.

Figures 6.3 and 6.4 show the organizational structure of the Nuclear Reactor Technology Programs (W. O. Harms, Director) and the Engineering Technology Division (H. E. Trammell, Director) respectively. The NSMC is indicated in both. For support and services, the center makes use of groups within the Engineering Technology Division (Fig. 6.4) as well as the Laboratory support and services shown in Fig. 6.1.

6.1.2 Nuclear Standards Management Center organization

The organization of the NSMC within ORNL and the main lines of interface with ETN program participants are shown in Fig. 6.5. The primary functional unit of the NSMC is the NSO, managed by F. L. Hannon. That office is responsible for providing assistance in the actual development, distribution, and application of nuclear standards and for the maintenance of an information center and data base on nuclear standards.

In addition to the NSO, the center consists of an office of the Assistant Manager for Advanced Planning and Implementation. This office, which is headed by E. G. Silver, is responsible for fostering the development

BLANK PAGE

Fig. 6.1. ORNL management organization.

Fig. 6.2. Organization under ORNL Associate Director for Nuclear and Engineering Technologies, showing matrix location of Nuclear Standards Management Center.

Fig. 6.3. Organization of Nuclear Reactor Technology Programs, showing programmatic location of Nuclear Standards Management Center.

Fig. 6.4. Organization of ORNL Engineering Technology Division, showing the line organization location of the Nuclear Standards Management Center.

Fig. 6.5. Organization of the Nuclear Standards Management Center.

and application of standards throughout the ETN activities. As such, the office is responsible for many of the center's planning, promotional, outreach, and interfacing functions.

The key responsibilities and duties of (1) the Manager of the Nuclear Standards Management Center, (2) the Assistant Manager for Advanced Planning and Implementation, and (3) the Manager of the Nuclear Standards Office are briefly summarized below.

Manager, Nuclear Standards Management Center.

- Responsible for the overall management of the NSMC in accordance with established and approved plans, DOE direction, and budgets.
- Retains accountability for success of the NSMC's functional assignment.
- Responsible for the overall management of the center's staff in accordance with the established policies and procedures of ORNL and Union Carbide Corporation, Nuclear Division.
- Communicates with the cognizant NPD branch and section chiefs* and with cognizant individuals at OR on matters regarding budgets, overall plans and progress, directions and policies, and performance.

Assistant Manager for Advanced Planning and Implementation.

- Maintains cognizance of all ETN activities and assists in determining and coordinating standards actions.
- Responsible for the NSMC's outreach activities to foster the development and application of standards in ETN's various programs and activities.
- Responsible for the center's planning activities, including updating of the management plan and preparation of annual work plans.
- Establishes and maintains communications with ETN and contractor program managers and field office personnel in areas relating to standards actions.
- Offers (with prior NPD approval in principle) and coordinates assistance of the Nuclear Standards Management Center to ETN and contractor program managers and field office personnel.

*Chief, Quality Assurance and Standards and Operational Safety Branch, and Chief, Quality Assurance and Standards Section.

- Maintains liaison and general coordination with national consensus activities of benefit to ETN.
- Provides liaison with nongovernment nuclear standards organizations, DOE standards organizations other than ETN, and Nuclear Regulatory Commission standards activities and pursues cooperation and coordination possibilities as identified.

Manager, Nuclear Standards Office.

- Supervises the staff and activities of the Nuclear Standards Office.
- Provides for coordination and assistance in the development, distribution, and application of program standards for various ETN programs.
- Provides for the maintenance of an information center and data base on ETN-related nuclear standards activities.
- Serves as chairman of the WGS.
- Provides for technical assistance to and coordination with national consensus standards activities of benefit to ETN programs.
- Assists in assessments of standards development and application by ETN contractor organizations.
- Communicates with ETN headquarters and OR personnel on matters related to the above duties.

The chief functional responsibilities of the structures within the NSMC are diagrammed in Fig. 6.6.

6.2 Resource Requirements

Table 6.1 shows the financial and personnel resources available to the NSMC in FY 1979 and two projections of these resource requirements for fiscal years 1980, 1981, and 1982. The "Minimum" projection represents the best present estimate of resources required for the NSMC to continue at essentially the present level of effort, without significant broadening of the technical area beyond that covered by the NSC in the past. The "Growth" projection projects the needs based on a successful outreach program with attendant modest broadening in the coverage of technical areas and expanded services to the nuclear standards community. Projections

Fig. 6.6. Functional organization of the Nuclear Standards Management Center.

Table 6.1. NSMC resources and requirement projections

Fiscal year	Projection	Funding (thousands of dollars)	Personnel (person- years)
1979	Actual	730	10.1
1980	Minimum	920	11.6
	Growth	920	11.6
1981	Minimum	970	11.6
	Growth	1110	14.0
1982 ^a	Minimum	970	11.6
	Growth	1180	15.0

^aProjection in 1981 dollars.

beyond FY 1982 are not shown because at the present early stage of planning it is not possible to make such projections meaningful for longer periods.

Table 6.2 indicates current best estimates of the percentage distribution of these resources among the eight COs making up the NSMC program. This distribution should be considered to be a planning guide only, and it is expected that intra-NSMC shifts will be made as the program unfolds and its needs become better established.

6.3 Organizational Interfaces

The NSMC has the lead management role in the ETN nuclear standards program. In this capacity it takes policy direction and programmatic guidance from NPD; conducts activities and projects to support and implement the policy; assists ETN headquarters, field office, and contractor staff in the planning and execution of their activities and responsibilities in support of the policy; maintains cognizance of contractor activities under the program; and provides a channel for interaction with the NCS effort.

Financial resources to enable ETN's contractors to meet their responsibilities to the ETN standards program are provided by ETN through the

Table 6.2. Estimated percentage distribution of NSMC resources

Critical objective	Percentage of resources		
	FY 1979	FY 1980	FY 1981
CO-1. Maintain cognizance of ETN standards activities and assist in determining appropriate standards actions	15	15	15
CO-2. Maintain appropriate contacts and liaison with NCS organizations and promote development and use of such standards	14	15	17
CO-3. Foster the development and application of program standards where national consensus standards are not feasible	11	10	9
CO-4. Establish and operate the Nuclear Standards Program Information Center	20	20	20
CO-5. Establish and maintain interfaces with related organizations associated with nuclear standards	1	2	2
CO-6. Assist DOE in evaluation and supervision of nuclear standards affairs, with emphasis on application	17	17	17
CO-7. Maintain, distribute, coordinate, and catalog ETN program standards	14	13	12
CO-8. Expand and maintain Working Group on Standards	8	8	8
Total	100	100	100

DOE field offices (OR in the case of the NSMC). The field offices are responsible for maintaining business-management interfaces with the contractor organizations, auditing the expenditure of funds and resources by the contractor organizations in support of the standards program, and monitoring the performance and progress of contractor organizations in meeting program objectives. NSMC contacts with contractor organizations concerning activities relative to those responsibilities are made with the cognizance of the concerned field office.

Contacts between the NSMC and ETN headquarters staff and between the NSMC and contractor organizations relating to activities and projects that implement the standards program are made directly with the concerned parties, usually with the contractor-assigned standards coordinator in the case of contractor organizations.

The NSMC also supports ETN standards activities by its interaction with the WGS, one of a number of technical working groups established by ETN to give special attention to technical areas of particular importance. The function of the WGS is to facilitate communications and coordinate actions among the various direct participants in the ETN standards program, and it provides a forum for the discussion of issues and problems related to the program. It also does a certain amount of project planning to implement the program, including the development of operational procedures and criteria for meeting the objectives of the program.

Interfaces with NCS organizations take place through attendance at NSMB meetings, through membership on the committees and working groups of the various technical societies, and by performance of specific tasks in support of NCS activities (see Sect. 5.2).

6.4 Control Thresholds

The "Management Agreement" states that the performance of certain functions must be consistent with established control thresholds. These thresholds will define the limitations on actions that can be performed by the NSMC without explicit review and approval by OR or NPD. Control thresholds that have been established for the RDT standards program need to be reaffirmed as a part of this plan. With expansion of NSMC's responsibilities into ETN programs other than the BRP, new control thresholds must be established.

One of the most significant areas of control is in the approval of standards and standards-related documents. Presently, cognizant DOE/ETN organizations have approval authority for ETN program standards developed within their areas of technical purview. It is proposed that for those standards requiring such approval a procedure be established whereby the NSMC will evaluate the standard (making use of such ad hoc expert advice

as appears appropriate in each instance) and submit to the approving management authority a recommendation proposing approval, disapproval, or desirable modifications. The NSMC will consider the question of how best to implement this change in procedures and make a proposal to NPD in this regard. It is not intended that the final authority and responsibility of the cognizant ETN management office be weakened or reduced by this change, but rather it is intended as a form of assistance by the NSMC to ETN management in the standards area.

Other responsibilities and authorities for standards approval actions will remain as stated in RDT F 1-1.

A second area of control thresholds concerns interactions with ETN programs to provide technical assistance in areas other than the BRP with which NSO has interacted extensively in the past. After NSMC is established the standards needs of these programs, the amount of assistance required from NSMC will be estimated. If the effort in any one fiscal year is not more than two person-months, NSMC will undertake the action on its own, but if the needed effort exceeds this amount, the assistance plan will be documented and submitted for approval by NPD, who will consult with the cognizant ETN office. Additional financial support from the program in question may be required if the effort involved is large.

A third area of control thresholds concerns interactions with NCS writing organizations. Participation in NCS activities will continue in accordance with current practices; however, in instances where the NSMC can provide assistance to an NCS project of benefit to ETN programs, the NSMC is empowered to complete the necessary arrangements and then request approval by NPD to activate the planned assistance if the total effort exceeds the equivalent of two person-months. If the required effort is less than this threshold, NSMC may provide the assistance without prior NPD approval, provided it can be done without adverse impact on the NSMC's other responsibilities. If the assistance involves financial support, the NSMC will take appropriate measures to ensure that NPD funding is not compromised and will adhere to any dollar-specific thresholds that NPD may impose.

As stated in the "Management Agreement," resources will be secured and provided by NPD, and the NSMC will identify specific work tasks to

which these resources will be allocated. Overall program funding will be provided by NPD and administered by OR; needed changes will be identified and proposed by the NSMC to OR and NPD. However, adjustments within the overall funding necessary to accommodate changes in program emphasis or direction will be made by the NSMC without OR or NPD approval. Where such changes have a significant impact on work task milestones, the periodic reports to OR and NPD will be revised to reflect these adjustments in the WPAS.

6.5 Reporting and Accountability

6.5.1 Internal ORNL accountability and reporting

The management system used at ORNL places heavy emphasis on preestablished goals as measures against which to judge performance. The internal accountability and reporting systems utilize these goals.

For the NSMC, this management plan and its system of objectives described in Sect. 4.2 serve to establish the overall goals. On the basis of this document, a work breakdown structure (WBS) is prepared annually; it establishes specific goals and milestones. In addition to the WBS, plans of action are prepared for specific tasks. From the WBS and the action plans, measures of performance (MOPs) for the year are established for each individual associated with the NSMC. These MOPs concentrate on the critical aspects of the individual job and on the most important accomplishments to be achieved.

This system of goals — the objectives of this document, the milestones of the WBS, and the individual MOPs — is used as a basis for appraising the performance of the center as a whole, of the managers, and of the individual staff members. The reporting and accountability system for doing this is briefly outlined below.

As described in the following section, the NSMC prepares a monthly technical status report, which includes sections on major problems and on changes in scope and/or schedule. Quarterly management reports are prepared, which assess the status of the milestones for the quarter and the actual spending rate relative to the planned spending rate. This same budget assessment is made internally on a monthly basis. These reports

provide a mechanism for formal appraisal of the NSMC's progress by ORNL management on a regular basis.

In addition, regular meetings are held between the manager of the center and the appropriate program and line management. The Director of Nuclear Reactor Technology Programs meets weekly with his program managers to discuss progress, problem areas, etc. In addition, he conducts an informal technical and management review with each program manager at least once each quarter. On the line organization side, weekly meetings of the management staff and the NSMC staff are held. None of these meetings is intended to replace, however, the daily contacts that take place.

Each individual in the NSMC undergoes a performance review annually in order to relate the NSMC's goals with his individual goals and to review actual performance in the light of established MOPs. Again, this formal performance review does not take the place of good daily communications between the center's management and staff.

6.5.2 Reports to be issued

Since the gathering and dissemination of information is a vital part of the NSMC's activities, it follows quite naturally that the preparation and issuance of various reports to the ETN community, and specifically the standards-involved part of that community, are among the most central of its functions.

Much of the information issued is of a tabular or repetitive type consisting of status reports, lists of standards or personnel, and similar information, which readily lends itself to the use of computer files and which will, in fact, be so assembled, maintained, and issued. The use of such techniques will be increased and utilized to its maximum extent in the future so as to make the information available as valuable management and operational tools to the standards community as quickly and completely as possible.

The reports to be issued divide quite naturally into periodic reports, issued at defined intervals, and topical reports, issued when needed without a periodic basis. As the program develops and needs become more clearly identifiable, the number and frequency of these reports will

undoubtedly change to keep abreast of changing needs. The following reports comprise the presently planned group:

- A. Periodic reports with programmatic content
 - 1. Semimonthly
 - a. UOR summaries
 - 2. Quarterly
 - a. NSPIC Newsletter
 - b. Index of Program Standards
 - c. Status Report on Program Standards
 - d. Master Index of Program Standards
 - 3. Semiannual
 - a. UOR analyses
 - 4. Annual
 - a. Catalog of specifications
 - b. *Directory of Personnel Involved in the Development of Nuclear Standards in the United States*
 - 5. Period yet to be determined
 - a. Report on standards conversion activities
- B. Periodic NSMC management reports
 - 1. Monthly technical status report
 - 2. Quarterly management reports (resources and milestones)
 - 3. Annual NSMC Program Report
- C. Topical (nonperiodic) reports
 - 1. UOR lessons-learned reports
 - 2. Other periodic reports as occasion demands

6.5.3 Distribution of reports

The distribution lists for the various information products to be disseminated by the NSMC will only be briefly indicated here, since they will in any event be changed as the area of coverage of the NSMC activities is expanded.

The Index of Program Standards is issued in editions of about 1000 copies to about 600 addressees, including components of the nuclear energy industry and ETN programs, projects, and facilities. The UOR documents (summaries and analyses) are sent to RRT and NPD program participants and

facility managers and also to members of the Information Transfer Working Group at each of the major breeder reactor program contractors, laboratories, and field offices. The Status Report on Program Standards goes to a limited distribution list of about 400 addressees, consisting primarily of program management people who use it as a management planning tool.

The Master Index of Program Standards goes only to about 50 ETN and program management personnel. It is planned to give the NSPIC Newsletter very wide dissemination, similar to that of the Index of Program Standards, with probably some additions to cover the entire R&D community involved in any way with nuclear standards.

Among the periodic management reports, the monthly Technical Status Report on Nuclear Standards goes to a distribution list of about 50 persons, primarily RRT and NPD managers and field office personnel, but also including the standards coordinators in the major contractor organizations. The Quarterly Management Reports (Resources and Milestones) go only to ORNL management and DOE management personnel directly involved with the program. The distribution list for the Annual NSMC Program Report remains to be established.

The topical reports will be issued to the appropriate UC-79 distribution lists, depending on the subject coverage.

A-1

Appendix A

STANDARDS POLICY FOR NUCLEAR ENERGY PROGRAMS

Department of Energy
Washington, D.C. 20545

JUL 11 1973

TO: H. E. Roser, Manager, AL
R. H. Bauer, Manager, CH
C. E. Williams, Manager, ID
R. J. Hart, Manager, OR
A. G. Fremling, Manager, RL
N. Stetson, Manager, SR
J. LaGrone, Acting Manager, SAN
M. E. Gates, Manager, NV
R. L. Ferguson, Director, FFTF/PO, RL
L. W. Caffey, Director, CRBRP/PO, OR
E. S. Beckjord, Acting Director, NPD
B. J. Rock, Acting Deputy Director, ASMP
R. G. Staker, Acting Director, RRT
Adm. H. G. Rickover, Director, NR

FROM: George W. Cunningham
Program Director for Nuclear Energy

SUBJECT: STANDARDS POLICY FOR NUCLEAR ENERGY PROGRAMS

I. PURPOSE

This memorandum provides the policy and practices to be followed for the development and application of technical standards in ETN projects, programs, and technology developments.

II. POLICY AND OBJECTIVES

A. It is ETN policy that:

1. Standards development and application are integral and important elements of nuclear energy development.
2. Managers are responsible for standards activities within their areas.
3. Standards development in cooperation with national consensus standards writing organizations is preferred for projects and programs directed towards civilian nuclear energy activities.

B. The objectives of this policy are to:

1. Foster, commensurate with resources and responsibilities, the development of standards which can be used by industry in the construction and operation of safe, reliable, and economic civilian nuclear energy facilities.
2. Reduce technical risk to ETN programs.
3. Utilize a proven method for transferring ETN civilian program results to private sector practice.
4. Ensure a consistent approach to similar needs in diverse ETN civilian nuclear energy programs.

III. APPLICABILITY

This policy is applicable to ETN Headquarters and to field and project offices, laboratories and contractors insofar as these organizations are responsible for administration, direction and implementation of ETN projects, programs and technology developments.

For standards activities of the Division of Naval Reactors, the Director of Naval Reactors is responsible for the provisions of Section IV below.

IV. RESPONSIBILITIES AND AUTHORITIES

A. Director, Division of Nuclear Power Development

1. Develop policy and practices on standards development and application within ETN programs.
2. Provide staff assistance, when requested, to ETN division directors and program managers, DOE field office managers and project directors on standards development and application within ETN programs and related field areas of responsibility.
3. Coordinate the development and application of standards applicable to more than one ETN program area.
4. Maintain an overview of standards activities within ETN programs to identify issues, problems, or proposals for consideration by ETN division directors and program managers, field office managers and project directors.

Multiple Addressees

- 3 -

5. Manage the RDT Standards Program including coordination of RDT standards actions under the technical cognizance of other divisions within ETN programs.
 6. Obtain resources for and provide policy and programmatic guidance to the ORNL/Nuclear Standards Office through the cognizant field office.
 7. Provide for review and comment on standards aspects of top-level project and program documents.
 8. Maintain management liaison with national consensus standards activities as related to ETN programs.
 9. Provide public/private sector standards policy liaison for ETN.
 10. Maintain a central data base of information on standards activities within ETN programs and on out-of-house standards activities of interest to ETN programs.
 11. Provide ETN coordination with other DOE standards activities.
- B. Division Directors, Nuclear Energy Technology Programs
1. Provide programmatic guidance to field on standards aspects of individual programs within division responsibility.
 2. Assure that standards development and application are consistent, where appropriate, across programs within division responsibility.
 3. In the approval of project management agreements/plans, include consideration of standards selection and development.
 4. Approve initiatives for standards development requiring division resources.
 5. Approve, or ensure with division expertise and resources and in accord with ETN procedures (to be developed), division HQ staff participation in national consensus standards writing organizations.

JUL 21 1976

Multiple Addressees

- 4 -

6. Where beneficial to division programmatic goals, provide technical liaison with voluntary consensus standards writing organizations.

C. Field Office Managers and Project Directors

1. Assure that standards activities are integrated into project plans, schedules, and resource allocations.
2. Provide technical review of standards selections for projects.
3. Provide field and laboratory/contractor recommendations to HQ divisions on standards development initiatives.
4. Assure that appropriate user experience and technical advances are reflected in standards.
5. Perform audits of laboratory and contractor standards application.
6. Advise ETN division directors of progress and problems on standards activities within their programs.
7. Provide technical interfaces with national consensus standards writing organizations.
8. Authorize lab/contractor participation in national consensus standards writing organizations where such participation utilizes ETN resources.

V. GUIDELINES ON IMPLEMENTATION

Laboratories and contractors are responsible for identifying those elements of a component, system, or facility, within the organization's responsibility that are essential to achieving the design function and for specifying the appropriate standards, consistent with the complexity and functional requirements of the component, system, or facility.

Appropriate nationally recognized standards should be employed where they exist. Existing standards which are not fully adequate should be supplemented by an additional requirements document which should be utilized in the conduct of the program and provided to the organization responsible for writing the original standard in the form of a recommended change.

Multiple Addressees

- 5 -

When it is consistent with the Objectives that a new standard be developed, the standard should preferably be prepared by a national consensus standards writing organization. However, if this is not practicable at the time of need, then a standard should be otherwise developed by the cognizant contractor or laboratory. Such a standard should be considered a "program standard" to be used on an interim basis until an adequate national consensus standard is available. (RDT standards, for example, are program standards. This includes those RDT standards which were developed by a consensus of participating organizations or are supplementary to national consensus standards.)

When practicable a program standard should be written in a format compatible with projected transfer to a national consensus standard. When a relevant national consensus standards activity is initiated, the program standard should be recommended to the standards writing organization as input.

Program standards should be continually updated to ensure that they contain the most practical set of technically justified requirements that can be developed consistent with the status of the technology. Similarly, information from experience should be fed back into national consensus standards. Users of a specific standard are responsible for providing user experience to the appropriate standards writing organizations.

Standards should be called out by reference, in entirety or in part, as appropriate to specific needs. Where parts of standards are referenced in contracts, specifications, or other documents, these documents may include the text from the standards provided that the text is quoted without change. When these documents contain modified requirements from standards, then the modification should be clearly identified.

Responsibilities for the development and maintenance of program standards should be clearly defined in project, program, or technology development management plans. Funding for standards responsibilities should be integral with the budgets for these activities.

cc: See Attached List

Multiple Addressees

- 6 -

cc: R. Thorne, ASET
J. Liverman, ASEV
J. Crawford, ETN
H. Hollister, OES
R. Morgan, WM
G. Dix, OES
R. Brodsky, NR
R. Cochran, ETO
D. Trauger, ORNL
H. Trammell, ORNL
J. Corum, ORNL
F. Hannon, ORNL
P. Patriarca, ORNL
AI Standards Coordinator, R. G. Chalker
ANL Standards Coordinator, N. Balai
ARD Standards Coordinator, C. Roderick
EG&G Standards Coordinator, T. A. Warburton
GA Standards Coordinator, B. L. Coleman
GE Standards Coordinator, W. H. Leach
HEDL Standards Coordinator, R. A. Thiede
LASL Standards Coordinator, R. D. O'Dell
LMEC Standards Coordinator, J. K. Balkwill
SR Standards Coordinator, C. G. Halsted

B.1

Appendix B

MANAGEMENT AGREEMENT, NUCLEAR STANDARDS OFFICE

Department of Energy
Washington, D.C. 20545

OCT 23 1978

TO: Robert J. Hart, Manager
Oak Ridge Operations Office, OR
/s/
FROM: Robert D. Thorne
Assistant Secretary
for Energy Technology
SUBJECT: MANAGEMENT AGREEMENT, NUCLEAR STANDARDS OFFICE, ORNL

The attached subject Management Agreement submitted by memorandum, J. A. Lenhard, OR, to E. S. Beckjord, NPD, October 3, 1978, which defines the responsibilities of NPD, OR and ORNL relative to the operation of the Nuclear Standards Office at ORNL is approved.

Attachment:
Management Agreement

cc: R. Egli, OR
J. Pidkowicz, OR
D. Trauger, ORNL
H. Trammell, ORNL
J. Corum, ORNL
P. Patriarca, ORNL
F. Hannon, ORNL

BLANK PAGE

NUCLEAR STANDARDS OFFICE
MANAGEMENT AGREEMENT BETWEEN DOE/DIVISION OF NUCLEAR
POWER DEVELOPMENT, OAK RIDGE OPERATIONS OFFICE, AND
ORNL/NUCLEAR STANDARDS OFFICE

September 27, 1978

I. Purpose

The purpose of this Management Agreement is to define the responsibilities of the Division of Nuclear Power Development (NPD), the Oak Ridge Operations Office (OR), and the Nuclear Standards Office (NSO) at ORNL relative to the management of DOE's Nuclear Energy Program standards activities, herein referred to as the Nuclear Standards Program. The basic function of the NSO is to provide technical management of the Nuclear Standards Program for NPD, which has the lead division role for ETN* standards activities. The responsibilities of each party are given in the following section of this Agreement, and the NSO functional assignment is presented in the final section.

II. Responsibilities

A. Division of Nuclear Power Development (NPD)

1. Provide Nuclear Standards Program policy and programmatic guidance.
2. Provide overall direction of Nuclear Standards Program planning and implementation.
3. Secure and provide resources to NSO through OR.
4. Approve Nuclear Standards Program Management Plan (prepared by ORNL), including work scope, work tasks, priorities, major deliverables and milestones, schedules and costs, and requirements/restrictions on the use of other laboratories and contractors.

*Energy Technology - Nuclear

B.5

2

5. Establish, jointly with OR and NSO, control thresholds for NSO assignment and approve actions that exceed these thresholds.
6. Approve requests for NSO technical assistance to ETN HQ managers, field offices, contractors, and private sector standards-writing organizations exceeding preestablished thresholds.
7. Review program progress, status, and overall costs in collaboration with OR.
8. Provide public/private sector policy liaison.
9. Expedite Headquarters interface activities and follow-up actions.
10. Retain accountability for success of overall Nuclear Standards Program.

B. Oak Ridge Operations Office (OR)

1. Provide input and concurrence to NSO in development of Nuclear Standards Program Management Plan and overall program tasks.
2. Provide contract management/administration of NSO.
3. Monitor and evaluate NSO performance, including its use of other laboratories and contractors, jointly with Headquarters.
4. Make recommendations, as appropriate, on required corrective actions or revisions to Nuclear Standards Program scope and direction.
5. Expedite business management interfaces and follow-up actions.
6. Retain accountability for business management of NSO functional assignment.

C. Nuclear Standards Office (NSO)

1. Actively promote the objectives of the Nuclear Standards Program by:
 - a. providing coordination and a cohesive umbrella for all ETN standards activities;

- b. fostering the development, acceptance, and application of nuclear standards; and
 - c. providing leadership for the development and adoption of national consensus standards.
2. Prepare, with input and concurrence from OR, a Nuclear Standards Program Management Plan, which includes program tasks and control thresholds consistent with ETN policy and programmatic guidance and with the NSO functional assignment itemized in the next section of this Agreement.
 3. Provide input to, and coordinate, key standards-related milestones for ETN participants jointly with Headquarters.
 4. Identify and implement specific work tasks and allocate resources for NSO activities.
 5. Provide technical direction for in-house and subcontractor tasks.
 6. Identify and implement changes to NSO work task milestones and funding allocations consistent with control thresholds and delegated authorities.
 7. Analyze and evaluate status of ongoing and planned NSO functional assignment; advise OR of problems and exception items.
 8. Recommend revisions, when appropriate, to NSO functional assignment; update Management Plan accordingly.
 9. Recommend revisions to ETN standards policy and plans based on laboratory and contractor input.
 10. Retain accountability for NSO functional assignment.
 11. Provide liaison between public and private sector standards activities.

III. Nuclear Standards Office Functional Assignment

- A. Manage ETN's multidivisional Nuclear Standards Program in accordance with approved Management Plan and DOE guidance and funding.
- B. Provide assistance on standards development and application to ETN Headquarters managers, field offices, project offices, and contractors.

B.7

4

- C. Maintain cognizance of ETN activities and standards needs to identify and define issues, problems, or proposals, for consideration by ETN division directors, field office managers, project directors, and program managers.
- D. Coordinate the development and application of standards applicable to more than one ETN area.
- E. Coordinate the preparation and distribution of "program standards" (RDT Standards, for example) as required for each of ETN's major programs.
- F. Encourage development of, and provide liaison with, national consensus standards activities related to ETN programs.
- G. Provide assistance, consistent with control thresholds and approval policies, to national consensus standards development efforts of benefit to ETN programs.
- H. Provide coordination and communication between Nuclear Standards Program activities and related NRC standards-writing activities.
- I. Maintain a central data base of information on standards activities within ETN programs as well as outside standards activities of interest to ETN programs.
- J. Assist in assessments of standards development and application by ETN field and contractor organizations.
- K. Maintain file of assessments of laboratory and contractor standards development and application of the resulting corrective actions.
- L. Provide for dissemination of ETN standards-related information, where appropriate, to public/private sectors.
- M. Maintain file of Unusual Occurrence Reports (UOR) and provide summaries and analyses of UOR information.
- N. Maintain Catalog of Specifications for Breeder Reactor Program.

B.8

Understood and agreed to by:

/s/

Assistant Secretary for Energy Technology

Joseph A. Serhard

Oak Ridge Operations Office

DB Trauger

Oak Ridge National Laboratory

C.1

Appendix C

DEFINITIONS AND ACRONYMS

C-1 Definitions

The following definitions are provided to ensure a uniform understanding of select terms as they are used in this Management Plan; terms that are adequately defined in the dictionary are not included.

Code — a statement of specifications, principles, rules, or regulations that has statutory force when adopted by an appropriate government body.

Cognizant engineer — a technically competent individual responsible for all organizational actions necessary to ensure the timely and appropriate preparation, application, and updating of a specific technically adequate standard.

Consensus — substantial agreement among those concerned with the scope and provisions of the issue under consideration. Consensus implies more than a simple majority but not necessarily unanimity. In the standards area, it also implies that both producers and users of the standard are included in its approval process, as well as all other groups with legitimate interests in the standard in question.

Guide — information in the form of a recommendation derived from established practices for a particular operation.

Limited consensus standard — a type of program standard developed by a consensus among those interested in or affected by the needs of a specific program.

National consensus standard — a standard developed under the consensus process by technical societies and industry associations representing concerned industry and government interests.

Program standard — a standard developed to meet the needs of a specific technical program. A consensus is not necessary, although the standard may be used outside the program for which it was developed.

Specification — a statement of detailed requirements covering characteristics such as materials, dimensions, ratings, tests, design, and installation for a specific item or series of identical items or systems. However, ASTM, for example, has a body of "ASTM Standard Specifications" which, though technically specifications, have been adopted

BLANK PAGE

C.4

through a consensus process and thus partake of the nature of standards as defined below.

Standard - a set of requirements established by custom, general consent, or a specified formal procedure. The standard provides overall guiding principles for categories of similar components, systems, services, or activities.

C-2 Acronyms

Acronyms have been used frequently throughout this Management Plan. To assist the reader, these acronyms and their meanings are listed below for reference.

ACI	American Concrete Institute
AEC	Atomic Energy Commission
AIA	American Insurance Association
AIChE	American Institute of Chemical Engineers
ANS	American Nuclear Society
ANSP	Advanced Nuclear Systems and Projects Division (DOE)
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BRP	Breeder Reactor Program (formerly the LMFBR Program)
CDS	Conceptual design study
CO	Critical objective
CRBRP	Clinch River Breeder Reactor Plant
DOD	Department of Defense
DOE	Department of Energy (successor to ERDA)
EBR-II	Experimental Breeder Reactor II
ERDA	Energy Research and Development Administration (successor to AEC)
ETEC	Energy Technology Engineering Center

C.5

ETN	Office of Nuclear Energy Programs
FBR	Fast breeder reactor
FFTF	Fast Flux Test Facility
GCFR	Gas-cooled fast breeder reactor
HPS	Health Physics Society
HTGR	High-temperature gas-cooled reactor
IEEE	Institute of Electrical and Electronics Engineers
INMM	Institute of Nuclear Materials Management
ISA	Instrument Society of America
KWIC	Key word in context
LCS	Limited consensus standard
LMEC	Liquid-Metal Engineering Center (now Energy Technology Engineering Center)
LMFBR	Liquid-metal fast breeder reactor
LOA	Level of assurance
LOFT	Loss of Fluid Test
LWR	Light water reactor
MOP	Measure of performance
NBS	National Bureau of Standards
NCS	National consensus standard
NFPA	National Fire Protection Association
NPD	Division of Nuclear Power Development (DOE)
NRD	Naval Reactors Division (DOE)
NSMB	Nuclear Standards Management Board (ANSI)
NSMC	Nuclear Standards Management Center
NSO	Nuclear Standards Office
NSPIC	Nuclear Standards Program Information Center
NRC	Nuclear Regulatory Commission
OAPI	Office of Advanced Planning and Implementation (NSMC)
OEIP	Office of Engineering and Information Processing Standards (NBS)
OR	Oak Ridge Operations Office (DOE)
ORNL	Oak Ridge National Laboratory
OSD	Office of Standards Development (NRC)
RECON	REmote CONtrol (information retrieval via computer terminals)
RDT	Reactor Development and Technology

C.6

RRT	Division of Reactor Research and Technology (DOE)
SAA	Standards application audit
SLSF	Sodium Loop Safety Facility
SO	Specific objective
THORS	Thermohydraulic out-of-reactor safety
TIC	Technical Information Center
TREAT	Transient Reactor Test Facility
UOR	Unusual occurrence report
WBS	Work breakdown structure
WGS	Working Group on Standards
WPAS	Work Package Proposal and Authorization System