A Survey of the Standards Activities at the U.S. Department of Energy

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Office of Product Standards Policy
Washington, DC 20234

May 1982

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Prepared for
Office of Quality Assurance and Standards
Assistant Secretary for Environmental Protection,
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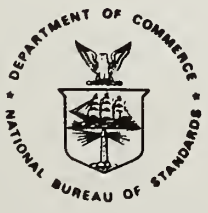


U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

Preface

This report contains information on the standards activities at the highly decentralized Department of Energy (DOE) and recommendations, made by a Survey Team from the National Bureau of Standards (NBS), to enhance the DOE Standards Program. It is intended for use by DOE standards professionals.

The NBS Survey Team thanks the standards professionals and managers who were interviewed during the survey for their cooperation and patience and acknowledges the contributions made by Mr. Robert Poe and others at DOE. The survey was conducted under Interagency Agreement EA-77-01-6010, Task Order A-046 OES.

Abstract

The Department of Energy Standards Program, under the Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness, is responsible for promoting standardization, increasing DOE's participation in voluntary standards bodies and extending the benefits of standardization to the organizational units in DOE. To assist in designing and implementing needed programs, a survey was conducted to obtain information regarding ongoing DOE standards activities. The NBS Survey Team collected data on 17 information categories from a total of 63 DOE employees and DOE contractors in 36 separate interviews at 13 field locations and 15 headquarters offices. The Survey Team found that the flow of standards information within the infrastructure needs to be accelerated and that efforts must be directed toward providing DOE upper management with better understanding of standards programs. The data indicated considerable difficulty in maintaining necessary internal and external interface relationships and a need for guidelines for standards committee participation. The Survey Team suggested an "information focus" as a way for the Departmental Standards Program to help standards professionals at DOE, whose activities are closely involved in the development of energy technology, to improve their overall performance.

Table of Contents

1.1 Background

Federal agencies generally recognize the positive contributions of standardization and related activities. When properly conducted, standardization increases productivity and efficiency, expands opportunities for international trade, conserves resources, and improves safety and health.

Federal participation in the activities of voluntary standards bodies (VSBs) provides incentives and opportunities to establish standards that better serve national needs. The participation of Federal agencies in the development of voluntary standards and the use of those standards in Federal programs are consistent with Federal policy, as established in OMB Circular No. A-119, "Federal Participation in the Development and Use of Voluntary Standards."

Adoption by Federal agencies of voluntary standards (whenever practicable and appropriate) reduces the Federal costs of developing and using standards and, thereby, serves the public interest. Federal adoption of voluntary standards is consistent with the furtherance of the Federal policy of relying upon the private sector to supply Government needs for goods and services, as enunciated in OMB Circular No. A-76, "Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government."

The DOE Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness is responsible for the Department of Energy Standards Program, which includes considerations for promoting standardization, increasing DOE's participation in VSBs, and increasing the use and adoption of voluntary standards in Departmental activities. The purpose of the DOE Standards Program is to extend the benefits of standardization to the various organizational units in DOE.

DOE Order 1300.2 (see Appendix A) defines the objective for the DOE Standards Program: to bring uniformity to the Department's standards activities through coordinated involvement in standards development and to ensure that appropriate attention is given to standards use and development in fulfilling DOE's mission. In order to design and implement programs directed toward achieving this objective, information regarding current Departmental standards activities was needed. It was therefore decided that a survey should be conducted to develop the desired information and to obtain views and perspectives regarding approaches to addressible objectives. This report identifies areas where more attention is needed and makes specific recommendations for program enhancement.

1.2 Information Categories: The Survey Approach

The first objective of this task was to collect data on the standards activities in DOE in a systematic fashion. Toward this end, general areas were suggested by the DOE Standards Coordinator who has the responsibility for the DOE Standards Program. The areas initially emphasized were: Administration, Communications, Coordination, Formal Agreements, Level of Effort, Ongoing Activities, Purpose of Standards, Resource Commitment, and Need for Change.

It was felt that specific information items would be necessary to fully develop the above-mentioned areas. The information items would help the Survey Team to pose specific questions for the interviewees and to develop concrete recommendations in the report. Some examples--under "Administration" the information items included: records, guidelines, policies, and standards lists; under "Resource Commitment" information included: funds, support for outside development, and on-line computer services; under "Ongoing Activities": technology assessments and monitoring of standards development.

Using the information items that related to the general areas, specific questions were prepared and regrouped into information categories for the interviews and this report. The DOE Standards Coordinator and the NBS Survey Team agreed on 17 specific information categories:

1. Interviewees in the Survey
2. Interviewees' Technology, Program, or Support Function
3. Technology Assessments to Determine Standards Needs
4. Attributes of Standards Activities
5. Monitoring of Ongoing Standards Development Activities
6. Organizational Structure Employed for Standards Activities
7. The Energy Standards Infrastructure
8. External Interface Requirements
9. Documents and Records
10. Standards Activities Commitments: Funding and Manpower
11. Standards Information: Sources and Mechanisms
12. Internal Standards Policy: Department Order DOE 1300.2
13. External Standards Policy: OMB Circular A-119
14. Classifications of Standards Program
15. Respondents' Most Important Standards Activities
16. Persistent Problems that Diminish Effectiveness of Standards Activities
17. Respondents' Recommendations to Improve Standards Program

The specific data sought in each information category can be ascertained from the Interview Worksheet. The final version of the DOE Standards Activities Interview Worksheet is in Appendix B.

It was anticipated that the survey would provide data on standards activities which relate to the above categories and, equally important, provide for discussions with a wide variety of standards professionals at all levels of the organization. It was expected that the Survey Team would determine current practices and look for problems, issues, and ideas which were of interest to the interviewees. The NBS Survey Team chose not to restrict itself to a narrow definition of "standards", but to include any reasonable meaning attributed to the term by the individual interviewees. This approach kept the survey flexible and open, and encouraged useful contributions. The data recorded in this report summarize what was discussed with individuals generally responsible for standards and standardization activities in their offices and units. The lists of headquarters offices and field units selected for the survey are in Appendix C.

The findings and recommendations contained in this report are distilled only in part from the data in the exhibits. Additional ideas for recommendations were solicited during the discussions and noted on the interview worksheets, but were not tabulated. Some of these ideas are reflected in the NBS recommendations. Other recommondations are based solely on NBS' long-standing experience with standards development activities, standards information and management support systems, or other standards expertise related to the information category under discussion.

1.3 Key Findings and Recommendations

A total of 63 DOE and DOE contractor employees participated in 36 interviews at 28 headquarters offices and field locations. For detailed information, readers are encouraged to review the results, findings, and recommendations of the survey for all 17 information categories as set forth in Part 2. In this section, key recommendations have been summarized from four of those categories.

The Energy Standards Infrastructure (See Section 2.7.)

According to responses to questions about internal DOE interactions, most contacts relating to standards are apparently maintained with or within three areas: 1) the Offices of the Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness; 2) the Assistant Secretary for Nuclear Energy; and 3) taken as a group, the DOE national laboratories. Several respondents identified informal interactions which are maintained between areas with common interests.

Fifty percent of the respondents specifically included the DOE Standards Program as an "agency" contacted on a regular basis. The interviewees often demonstrated either directly or indirectly the need for information. They need to learn about the standards activities at the department level. Some standards information services are not reaching those units which could benefit most from the information. The data suggest that the flow of standards information within the standards infrastructure needs to be accelerated.

The interviewees frequently spoke of the lack of adequate understanding and appreciation of standards programs on the part of higher level management. In addition to current efforts by the DOE Standards Program to coordinate standards activities and enhance the effective use of standards, the Departmental standards coordinators must specifically communicate the importance of standards to top management. They must convince key DOE officials of the importance of standards programs to the attainment of DOE goals and objectives. The Survey Team also sees a need to report standards successes at the division level.

It is recommended that the Departmental Standards Program take the lead role in promoting standards activities. This should be discussed at the next Standards Policy Committee meeting. The importance of standards must get more visibility within DOE headquarters. This can be achieved by describing DOE's involvement in standards and by highlighting the successes and benefits of standards and standardization activities. The Departmental Standards Program needs to demonstrate, in writing, how specific standards activities support the attainment of DOE goals and objectives--preferably by preparing an annual report for the Assistant Secretaries.

The cadre of highly knowledgeable energy standards professionals must be linked together in a network to facilitate communications and to mutually enhance their ability to deliver technical support to their program areas. The Departmental Standards Program should develop and distribute a list of all standards professionals, cross-referenced by their areas of interest and activities. This list should evolve into a directory that includes committee assignments, information resource contacts and official DOE representatives, by standards areas. The Departmental Coordinators must serve as the catalysts for the development of this information which is necessary for the emergence of a viable internal communications network. They could, in conjunction with the Standards Policy Committee, host an annual meeting or conference for the cadre of energy standards professionals.

External Interface Requirements (See Section 2.8.)

The NBS Survey Team, based on outside contacts maintained by the interviewees, listed 23 industry associations and professional organizations, 32 domestic and international standards writing organizations, and 17 Federal Agencies.

Several standards professionals experienced considerable difficulty in maintaining necessary external interface relationships. Individuals are often unable to prove a need for government sponsorship of their participation on outside standards writing committees, and almost all standards professionals find that travel restrictions often interfere with planned standards activities. The DOE Standards Program is in a position to define criteria for comparing the relative importance of committee assignments and to seek support from the appropriate Assistant Secretaries to make priority participation possible. Even though the authority for participation clearly rests with the line divisions, someone must ensure that DOE maintains the necessary representation on committees that vitally affect energy technologies.

It is recommended that the Standards Program, after consulting with and obtaining the concurrence of key DOE standards officials, issue detailed guidelines for standards committee participation through the DOE Standards Policy Committee, which meets on an ad hoc basis for this kind of purpose. These guidelines should implement requirements of DOE 1300.2 as well as set forth detailed guidance for DOE participation on outside standards writing committees. The guidelines should establish procedures for reporting information and explain the significance of comments or votes in the standards development process. Guidelines for standards committee participation need to be spelled-out by the Office of Quality Assurance and Standards (OQAS), even if they are only tentative, prior to review by the Standards Policy Committee.

A Standards Personnel and Participation System (SPPS), which is being planned, should be constructed and implemented expeditiously in order to: 1) promote effective participation by DOE staff members in standardization activities; 2) assist DOE managers in making decisions about the allocation of DOE resources for these activities; and 3) encourage communication among standards committee participants. Such a system will also maximize the benefits to be

derived from a well-managed standards program by providing accurate and timely information, not only for DOE management officials, but also for industry associations, standards committees, DOE contractors and individual energy company officials.

The DOE Standards Program will have to shoulder more of the interface responsibilities with the private sector. Where high level contacts need to be established and maintained, the DOE Standards Coordinator should represent the interest of DOE, persuade other members of the Policy Committee to accept assignments, or use the influence of his office to make the importance of the assignments known to the supervisors of key standards professionals. Seeking and accepting an assignment on the board of directors of a relevant voluntary standards body is a critical standards activity which mutually enhances both organizations. This should be high on the list of Standards Program priorities.

Standards Information: Sources and Mechanisms (See Section 2.11.)

When questioned about the source of standards information and the availability and adequacy of information tools, fifteen respondents identified other government agencies as their primary standards information source, seventeen identified voluntary standards bodies, four named industry, and one named a university. Standards catalogues were used by 93 percent of the respondents, 87 percent had full-text standards collections, and an on-line computer-based service was available to 17 percent of the respondents. The interviewees reported that most of the available information tools were adequate, but in 37.5 percent of the instances, the tools were not available or not adequate.

It is highly desirable for design engineers, standards engineers, and technicians to have: 1) on-line access to, at a minimum, listings of all mandatory and significant voluntary standards applicable to ongoing projects, and 2) access to a microform collection of important standards. The DOE Standards Program should determine the feasibility of providing a means for on-line title searching and for microform full-text referencing.

As indicated by the respondents, an energy standards data base should also include comprehensive listings of all standards development activities relevant to the environmental, safety, health and other regulatory requirements that could result in new or revised mandatory standards. Listings of all voluntary standards development activities related to energy would also be beneficial to the DOE standards professionals.

Many observations confirm the widespread need for improving the basic information flow among DOE standards professionals. The Survey Team found that there is insufficient awareness of the existence of the Departmental Standards Program and the Standards Policy Committee and not enough interest in DOE standards policy. Standards professionals often lack the information to "sell" standards to management, knowledge of what their counterparts (DOE contractors or DOE employers) are doing, and sophisticated informational tools and systems. A forceful mechanism is urgently needed to coordinate the standards information that currently exists and to provide a system for delivering that information to others in the Department.

The orientation of the Departmental Standards Program is somewhat top-down, but open to opportunities to improve its responsiveness. The effectiveness of the Program can be significantly improved by concentrating resources on the information needs of the standards professionals whose activities are closely involved in the development of new energy technologies. This will provide the Standards Program with sufficient information for maintaining an overview and for improving its responsiveness and effectiveness. The Departmental Standards Program should reassign current resources to focus on information and improve the contribution of standards to productivity in the long term.

Defining details for information management is beyond the scope of this report, but the NBS Survey Team found two areas that should be given immediate attention:

- First, all mandatory and DOE recommended standards in all DOE program areas should be collected. (Two good collections are already known to exist: nuclear and ES&H.) Then the standards should be indexed by those who know their contents and a consolidated, indexed list distributed to each standards professional in the Department.

- Second, all relevant standards development activities within DOE, other agencies, and voluntary standards bodies should be identified at the working level, monitored at OQAS, and subjected to periodic reporting of standards progress. An index of standards development activities in which DOE is involved should be published and updated annually. This index should also be distributed to all DOE standards professionals.

Internal Standards Policy: Departmental Order DOE 1300.2 (See Section 2.12.)

The Standards Order apparently did not have the anticipated impact nor did it reach the level of implementation expected by the Survey Team. One proffered explanation is that DOE orders are perceived as too transient and may therefore engender apathy. Another possibility is the dearth of resources available to implement the Standards Order. The fact that 54 percent of those who reviewed the Order had "no comments" might be as significant as the identification of problems or negative comments. The Survey Team did not perceive that a sufficient level of "management guidance" was provided by the Departmental Standards Program, after the Order was issued, to effectively promote its implementation.

The comments made on the draft Standards Order by many standards managers and professionals should now be reviewed in light of the data obtained in this survey.

The Survey Team believes its most significant recommendation is as follows: The Departmental Standards Program must fully implement Departmental Order DOE 1300.2. This should be accomplished by:

1) preparing a policy implementation plan as soon as possible, then
2) convening the Standards Policy Committee to review and to approve implementation priorities, schedules, etc.

Mere announcement of the Order was found to be insufficient. The Standards Program should assist individual standards coordinators who wish to phase in new functions and activities and should furnish consultation and guidance for other situations. This should be the "first agenda item" for the next Standards Policy Committee meeting.

Part 2. Results of the Survey: Interpretations and Findings

Table of Contents

2. Results of the Survey: Interpretations and Findings

Part 2 contains the Results of the Survey. There are 17 sections, 2.1 through 2.17, each having four subsections. The first subsection is "The Questions Asked". For example, Subsection 2.1.1 contains the questions that were asked relating to information about the interviewees. The reader may also wish to look at the questions as they appeared in the Interview Worksheet. If so, the questions on interviewees are in Appendix B, Category one. Correspondingly, the questions on documents and records, for example, the ninth Category in Appendix B, are in Subsection 2.9.1 of this Part.

The second subsection is "The Responses Received" (from the DOE interviewees). Both specific responses and related comments are included. The third subsection is the "Interpretations and Analysis of the Responses". The fourth subsection contains the "Findings and Recommendations" (made by the NBS Survey Team). The third subsection which often includes discussions and ideas, serves as a bridge between the views of the DOE respondents and the opinions of the NBS Survey Team. For example, the interpretations and analysis of internal standards policy would be found in Subsection 2.12.3, followed by the NBS findings and/or recommendations in Subsection 2.12.4.

The findings and recommendations contained in this report are distilled only in part from the data in the exhibits. Additional ideas for recommendations were solicited during the discussions and noted on the interview worksheets, but not tabulated. Some of these ideas are reflected in the NBS recommendations. Other recommendations are based solely on NBS' long-standing experience with standards development activities, standards information and management support systems, or other standards expertise related to the information category under discussion.

2.1 Interviewees in the Survey

2.1.1 The Questions Asked

In this first set of questions, the interviewees were asked to give their job titles and to provide information as to whether they were DOE employees or DOE contractor employees. Each was also asked to provide in his or her own words a short description of his or her primary duty. They were also asked to estimate the number of years they had been involved with standards. Each question was not always answered by each employee in a group interview; often, one respondent assumed the role of "primary interviewee", providing one answer for the group. For example, only 56 of 63 provided information about their organizational affiliation. In other situations, each question was answered independently by each respondent.

2.1.2 The Responses Received

The interviewees' titles included: Director, Program Manager, Branch Chief--often affixed with Deputy, Assistant, or Acting plus Specialists, Coordinators, etc. The number of managerial titles and professional designations were about equally divided.

Thirty-two respondents identified themselves as DOE employees and 24, all from the field, were employees of DOE contractors. (See Exhibit 2.1.1.) The organizational affiliation of seven persons was not recorded.

Many respondents, in describing their primary activities in their own words, used terms that relate to their position or authority, such as "direct", "manage", etc; interestingly, only six used the word "standards".

The average length of involvement with standards was 12.7 years (see Exhibit 2.1.2) for the 45 who responded to this question: nine claimed 25 or more years of experience with standards, twenty claimed between eight and twenty years of experience and sixteen said that they had five years or less experience.

2.1.3 Interpretations and Analysis of the Responses

The data indicate that standards professionals at all levels of the organization were involved in the survey; they represent three identifiable levels of experience. It is surprising that only six used the word "standards" to describe their primary duties, probably attributable to the fact that their standards tasks are subordinate to, or an integral part of, their perceived program activities.

2.1.4 Findings and Recommendations

The NBS Team found the interviewees in the survey to be highly knowledgeable in technical matters relating to their program areas. However, this cadre of standards professionals gave no evidence of any linkages (except in a few

subsystems such as nuclear and health) which would facilitate the communication of standards-related information or would mutually enhance their ability to deliver technical support to their program areas.

Standards work appears to be an essential functional element, but not especially visible to DOE decision makers. Standards professionals must assume responsibility for developing management awareness of the importance and benefits of standards; this "selling" activity should be pursued even where standards work is the only technical activity. Easy exchange of procedural and policy information related to standards between subsystems and programs within DOE is also needed.

The NBS Survey Team believes that the DOE Standards Program should develop a closely linked network of standards officials. The first step should be the development of a comprehensive list of all standards professionals, cross-referenced by their areas of interests and activities. The next step should be the publication of a directory of standards professionals indexed by appropriate classifications, as identified later in this report.

Exhibit 2.1.1

Interviewees in Standards Survey

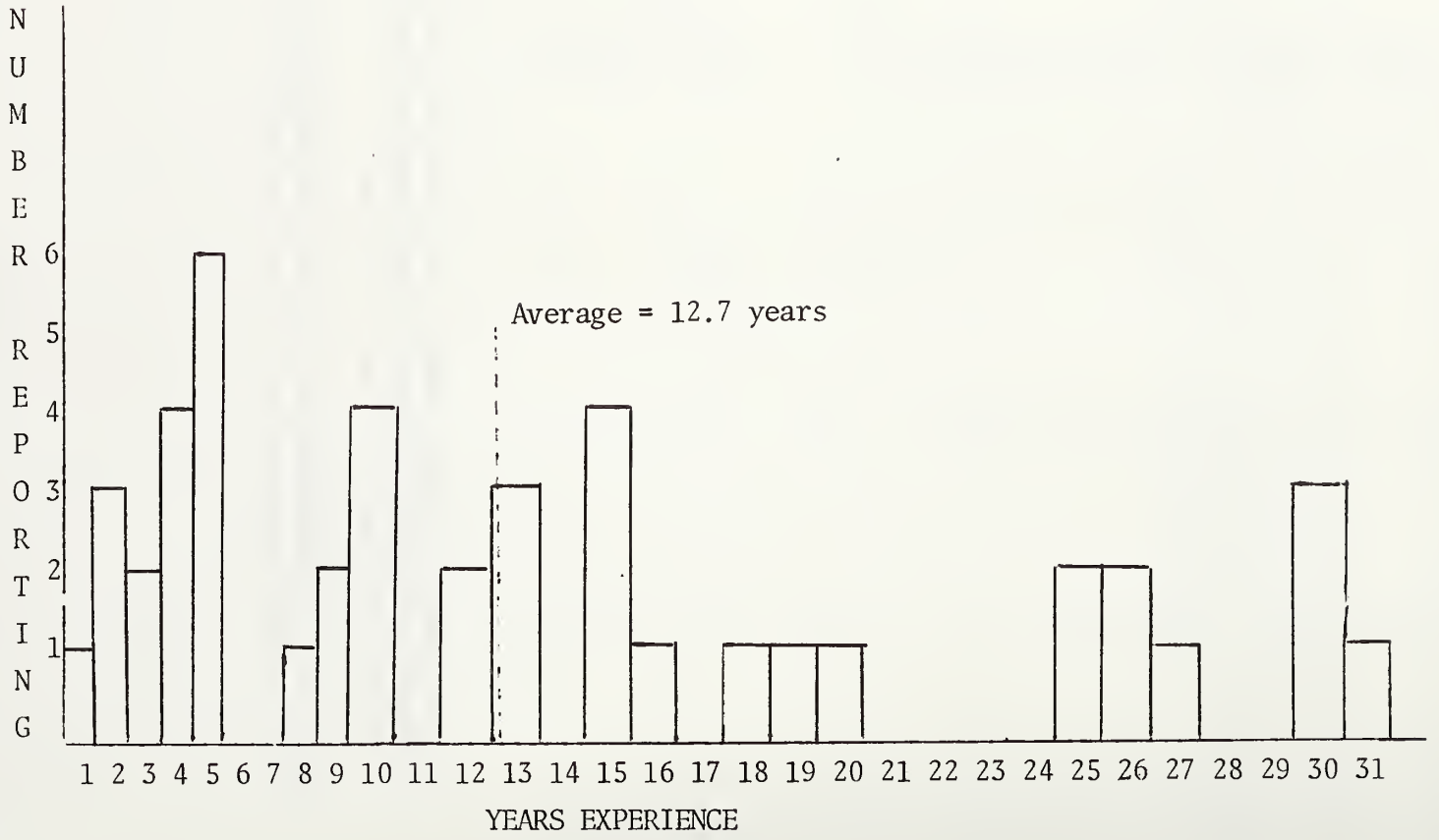
	No. of Interviews	Total No. Interviewees	DOE Employees	Contractor Employees	Standards is Primary Duty	No. Years in Standards
1	1	1	1		No	4
2	1	2	1		No	19
3	1	1	1		Yes	3
4	1	2	1		-	25
5	1	1	1		No	5
6	1	2	1		No	30
7	1	2	1		Yes	13
8	1	1	1		No	5
9	1	1	1		-	30
10	1	1	1		-	10
11	1	1	1		No	5
12	1	2	1		No	3
13	1	1	1		No	10
14	1	1	1		No	18
15	1	1	1		No	10
16	1	3	3		3 No	26, 15, 9
17	1	2	1	1	1 Yes, 1 No	31, 30
18	1	1		1	No	4
19	2	3		3	1 Yes, 2 No	25, 2, 1
20	1	1		1	Yes	12
21	1	5	4	1	-	26, 13, 12, 5, 2
22	1	3		2	2 No	5, 5
23	3	14	2	12	1 No	27, 13, 8, 23
24	2	3	2	1	1 Yes, 1 No	15, 10
25	3	3	3		3 No	9, 4, 4
26	1	1			No	15
27	3	3	1	2	3 No	20, 16, 2
28	1	1	1		-	15

NOTE: The total number of interviewees in column three is often larger than the number of entries in other columns because some interviewees did not provide information for all questions.

NOTE: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.1.2

Number of years of standards experience for a sample of 45 DoE standards professionals



2.2 Interviewees' Technology, Program, or Support Function

2.2.1 The Questions Asked

Interviewees were asked to describe briefly (in their own words) the energy technology developed or supported by their programs, what they do to support it, and to indicate what current stage of technological development best describes their program: research, early development, pilot development, commercialization, ongoing commercial technology, or other.

2.2.2 The Responses Received

Twenty-seven programs were reported to be energy specific or directly related to one or more energy technologies. Those programs involved fossil, solar, nuclear, and other related or exotic (biomass, geothermal, etc.) energy technologies. Most programs were simultaneously at several different stages of technological development. In describing their individual programs, interviewees chose almost three categories each. Sixteen were reported as research and an equal number were reported as early development. For pilot development there were 18, for commercialization there were 12, and nine were identified as ongoing commercial technology.

Three of the 27 energy specific programs identified "other" as a description. These included production, fabrication, and remedial technological development. The nine who did not characterize their programs as energy specific or who felt they were broad in scope, crossing organizational lines, were involved in standards programs which related to automatic data processing data communication, purchasing, construction, or to quality assurance areas. Exhibit 2.2.1, Descriptions of Technology, Program, or Support Function sets forth this information. The stages of technical development are shown in Exhibit 2.2.2.

2.2.3 Interpretations and Analysis of Responses

The responses show a wide variety of energy technologies, run the gamut of developmental stages, and demonstrate that the Department of Energy is a major conglomerate with diverse interests. The breadth and diversity of technologies, programs, and support functions indicate that the Departmental Standards Program is probably limiting its attention to a few areas, at least for the present. However, several patterns of activities are candidates for effective assistance. Technical projects in many different areas are related to each other, and programs in almost all areas have functions in common, hence similar needs. More likely than not, similar standards will be applicable to more than one technical area in the same stage of development. For example, procedural standards are needed in many functional areas and therefore warrant consideration.

2.2.4 Findings and Recommendations

The Departmental Standards Coordinators should review the breadth and diversity of standards activities on a continuing basis, identifying common elements which can benefit from department-wide assistance. Those who must

meet the same environmental safety and health requirements, for example, should have available the same standards information, as well as shared standards development responsibilities.

Early in the analysis stage, the Survey Team recognized a need for a stable mechanism to counter-balance the state of flux attending the Nation's energy programs. Energy technology elements were found to have been functionally and organizationally regrouped and shifted too frequently to achieve the benefits that accrue when it is probable that relationships will stay constant in the near term. One key benefit is shared information. Clearly, though, the information needed by each identifiable segment ought to be maintained no matter how elements are grouped or dispersed. It would be beneficial, at a minimum, for information to be available on a Departmental basis whenever the data are used by two or more segments. A unified energy standards data base, designed to reflect the information needs of the identifiable segments and maintained on a departmental basis, would be stabilizing for the energy technology elements (and their supporting standards activities) even if they were to be transferred to another department.

Exhibit 2.2.1

Descriptions of Technology, Program, or Support Function

1 Develop non-engineering/non-scientific management information system (MIS) for headquarters. Develop long range MIS plan. Provide all policy relating to MIS.

2 Coordinate DOE data communication standards activities, including all comments on proposed standards. Encourage use of standards and grant exceptions.

3 Review major DOE ADP equipment acquisitions over 400K. Develop 5-year DOE plan for computers. Coordinate use of FIPS standards.

4 Support DOE design and construction activities. Establish general design criteria and standards (i.e., fire protection, security, structure, etc.).

5 Provide general purpose procurement for Headquarters-DOE. (Special procurements are initiated by Program Office.)

6 Coordinate and manage activities of 10 regional offices. Influence states with DOE policy.

7 Nuclear Reactor Program--coordinate headquarters management for National Standards Management Center (primarily nuclear).

8 Fossil fuel-oil, gas shale technology--oversee research programs for enhanced oil and tar sands.

9 Solar applications for buildings--support development of voluntary standards.

10 Active solar heating and cooling devices, swimming pool heaters, solar heat pumps--support standards development.

11 Geothermal energy--support high risk, high pay off R&D and commercialization. Reduce life cycle costs. Develop supply technology.

12 Develop and use solar photovoltaic devices.

13 Research, design, fabricate and test of nuclear weapons (at laboratories).

14 Radioactive material residue (remedial action program, safety of DOE Nuclear and Test Reactors)--coordinate activities between DOE and NRC.

15 Provide coordination focal point for Energy Information Administration for information and information processing standards and procedures.

16 Support Nuclear Weapons Program and solar energy development.

17 Nuclear (50%), non-nuclear (50%)--support all energy technologies.

18 Photovoltaics, solar thermal, active heating and cooling, reliability and maintainability of energy process systems.

19 Nuclear (technical integration), waste management; hydro power, conservation, M.H.D., geothermal, alcohol fuels.

20 Sodium reactor components (pumps, steam generators, heat exchangers).

21 Gasification, combustion, component test development, enhanced oil recovery, underground coal gasification.

22 Geothermal, conservation, hydrogen technology, chemical energy systems.

23 Weapons testing (50%), waste isolation project and other defense programs.

24 Nuclear energy facilities--field management of Nuclear Standards Management Center.

25 Synfuels.

26 Transmission lines, high voltage transmission technology.

27a Nuclear (70%), defense programs.

27b Liquid metal fast breeder reactor (Fast Flux Test Facility, Fuels Materials Examination Facility, Fuels Materials Irradiation Test).

27c Nuclear waste, geothermal.

28 Nuclear technology.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.2.2

Stage of Technological Development

	Research	Early Development	Pilot Development	Commercialization	Ongoing Commercial Technology	Other
1						X
2						X
3	X				X	
4					X	
5					X	
6					X	
7	X	X	X	X	X	
8		X				
9	X	X	X	X	X	
10	X	X	X	X	X	
11	X	X	X	X		
12	X	X	X			
13	X	X	X	X		
14			X		X	X
15						
16			X	X		
17	X	X	X			
18		X	X	X		
19a	X	X	X	X	X	X
19b	X	X	X	X	X	
20			X	X		
21			X			
22a				X	X	
22b	X		X			
22c	X					
23	X	X				
24						
25	X	X	X			
26					X	
27a	X	X	X			X
27b	X	X	X			
27c	X					
28	X	X	X		X	

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.3 Technology Assessments to Determine Standards Needs

2.3.1 The Questions Asked

The interviewees were asked to what extent their standards activities significantly entail technology assessments (TA) in determining standards needs with respect to subsystems, components and materials of each technology. For example, a coal TA matrix might show mining, transportation, processing, and consumption arrayed against environmental, safety and health (ES&H) and other limiting regulatory factors. (See Exhibit 2.3.1.) An important objective of the Department is to ensure that all necessary standards are in place to avoid delays in commercialization of new energy technologies.

2.3.2 The Responses Received

Nineteen respondents indicated that they conduct technology assessments to determine standards needs, and six of those indicated that they consider TA to be an important activity. (See Exhibit 2.3.2.) For some, this is only one aspect of their overall responsibility to provide standards assistance in the development or commercialization of new energy technologies. For others, TA is their primary function and the focal point of their standards activities. Some interviewees expressed interest in learning more about TA and any other procedures which might help them to determine where new standards might be needed.

2.3.3 Interpretations and Analysis of Responses

Technology assessment skills, one vehicle for identifying standards needs in programs, are not acquired quickly; yet these vital skills appear to be in short supply in some areas within the group of DOE employees interviewed. It takes a protracted length of time for standards programs to develop the capability necessary to construct a comprehensive matrix containing a complete set of subsystems, components and materials for an emerging energy technology or, concomitantly, a detailed set of regulatory-type requirements. It may take an equal amount of time for the standards professionals to acquire the competencies necessary to examine the matrix (see Exhibit 2.3.1) to discover gaps which may reflect a need for new standards.

2.3.4 Findings and Recommendations

The Survey Team found that many knowledgeable DOE standards professionals are making good use of existing standards to fill standards needs. Some of the standards have to be modified or adapted to fill the gaps. Some DOE standards programs are working effectively in conjunction with voluntary standards writing organizations to assess standards needs and to determine how to allocate their own resources when in-house development becomes necessary. Solar energy is a good example. Voluntary industry standards committees have

helped DOE solar programs to anticipate the need for new standards and to coordinate much early development activity. The Departmental Standards Program needs a coordinating mechanism for this type of function. Technology assessments provide an example of an area where the collection of information from those who have the skills and the dissemination of that information to those who need it, could improve the rate at which new energy technologies are commercialized.

Exhibit 2.3.1

A Simplified Technology

Assessment Matrix

	Environmental	Safety	Health
Mining			
Transportation			
Processing			
Consumption			

Note: In a detailed matrix each subsystem is broken down into components, materials, etc.; examination of transportation components, for example, might reveal that certain safety standards are needed.

Exhibit 2.3.2

Technology Assessments to Determine Standards Needs

Units Conducting Technology Assessments	Comments if Any
7	To a lesser degree than standards development activities.
16	Done at headquarters program level--Environmental Readiness Documents.
17	Technical managers are consulted to look for needed standards and to stimulate their development or adopt voluntary standards.
18	A major effort with their monitoring activities; they provide direct funding to VSBs.
21a	Example: In gasification process evaluation they check if standards work well. Identify need for standards that don't exist. There are no formal procedures.
22	Associate program manager controls program, works with NBS. Problem: no way to make cost/benefit analysis of various procedures.
23a	Very little by operations office.
23b	Very little by test site contractors.
25a	Much anticipation of need for new ES&H standards and (TA for) compliance of new technology with existing standards.
25b	Recommend modifications to several technologies to assure compliance with environmental standards, Pollution Control Guidance Document (precursors to standards).

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.4 Attributes of Standards Activities

2.4.1 The Questions Asked

Interviewees were asked if they use, develop or adopt standards in their programs, and if their standards activities primarily involve development of DOE standards, use of DOE standards, development of voluntary standards or the use of voluntary standards. The term "adopt" was sometimes interpreted in the sense of "modify for use in a program," but not always associated with mandating standards which were originally voluntary (whether the voluntary standards were modified or not).

2.4.2 The Responses Received

Twenty one of those interviewed said their programs were concerned with standards development activities. (See Exhibit 2.4.1.) This group of interviewees included those who draft standards for or support development of standards by others. A primary emphasis for six of these interviewees was in the development of DOE standards, ten were primarily involved with the development of voluntary standards. (See Exhibit 2.4.2.) These data are inconclusive because interviewers allowed more than one primary emphasis; some respondents said their programs had four. (See questions in Category 4 of the Interview Worksheet in Appendix B.)

Thirteen said they adopt private sector standards for their programs, and still others support, encourage, or serve as the transfer agent or depository for standards developed by others. Seventeen said the primary emphasis was on use of DOE standards and 24 chose use of voluntary standards, but 10 of these interviewees chose both groups.

2.4.3 Interpretations and Analysis of Responses

For some programs the responsible individuals are unable to develop or update standards at an acceptable rate. Some fear that much good "front-end" standards work completed in the past may now be in jeopardy without continued high level support; others feel that the importance of standards has not been adequately demonstrated to top management. The Survey Team continually heard direct remarks that "standards don't sell" and insinuations that standards activities absorb time and effort conspicuously, but enhance productivity and results unobtrusively. Developing a voluntary standard often takes industry five years at a cost around $1,000,000; government costs of developing standards in-house may be comparable.

The responses seem to suggest that additional opportunities should be opened to cooperative efforts with the private sector for the development of voluntary standards of interest to DOE (see DOE 1300.2 Section 6a1). Policies and procedures should encourage the use of non-governmental standards for new technologies, especially when existing in-house standards may not be adequate.

2.4.4 Findings and Recommendations

The Departmental Standards Program should do more to emphasize the advantages of adopting and using voluntary standards. Management should be regularly encouraged to involve key professionals in the development of voluntary standards. In this way, DOE program objectives can be better achieved by using the resources of the private sector. Additionally, because of the "multiplier effect", many standards can be developed at relatively low cost by having DOE and DOE Contractor employees on a few committees each.

The Survey Team found the respondents to be aware of and concerned about the very high in-house development costs for new standards; many economize by modifying and using available voluntary standards. Nevertheless, more effective management control of development costs is warranted. In particular, the Departmental Standards Program should seek to minimize waste by reducing duplication or increasing multiple-application. Departmental Standards Coordinators should search for ways to reduce costs.

Exhibit 2.4.1

Attributes of Standards Activities

	Use	Develop*	Adopt**
1	X	X	
2	X	X	
3	X	X	X
4	X		
5			
6	X		
7	X	X	X
8	X		X
9	X	X	
10	X	X	X
11	X	X	
12	X	X	
13	X	X	
14	X	X	X
15	X	X	
16	X	X	
17a	X		
17b	X	X	X
18	X	X	
19	X		
20	X	X	
21	X		
22	X	X	X
23a	X	X	X
23b	X		
24a	X		
24b	X	X	X
25a	X	X	X
25b	X		
25c	X		
26	X	X	
27a	X		X
27b	X		X
27c	X	X	X
28	X		

* Includes those who draft or support development of standards.
** Can mean "made mandatory" and/or "modified for use".

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.4.2

Primary Emphasis of Standards Activities

	Develop DOE Standards	Use DOE Standards	Develop Voluntary Standards	Use Voluntary Standards
1	X	X		
2	X	X	X	X
3			X	X
4				X
5				
6				
7		X		
8				X
9			X	X
10			X	X
11			X	
12			X	
13	X	X	X	X
14	X	X		X
15		X		
16			X	X
17a				X
17b				X
18				X
19		X		X
20				X
21				X
22		X		X
23a		X		
23b		X		X
23c		X		
24a		X		X
24b	X	X	X	X
25a	X			
25b		X		
25c		X		
26			X	X
27a		X		X
27b				X
27c				X
28		X		X

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.5 Monitoring of Ongoing Standards Development Activities

2.5.1 The Question Asked

The interviewees were asked to describe the degree to which they monitor the activities of the organizations outside and inside DOE that develop or revise voluntary standards, mandatory standards, or technical regulations that are of interest to their programs.

Many private sector standards writing organizations regularly report their current standards activities, thus making it possible for standards professionals to be aware of standards development and revision activities related to their own interests. Some energy standards professionals serve on outside committees that are concerned with the needs of their energy technologies. For others, monitoring means continuous review of the Federal Register to identify and influence proposed mandatory standards and technical regulations that could affect their technologies.

2.5.2 The Responses Received

For 23 of the interviewees who responded to this question, monitoring of ongoing standards development was a principal activity. (See Exhibit 2.5.1.) The extent of involvement included checking periodically on the status of the development of new standards and technical regulations and, at each stage of the process, reviewing and commenting. At least four of the respondents, perceived monitoring to be more than just observing, and discussed the necessity of taking an "active role" as part of the monitoring process (i.e., getting their engineers on key standards committees, voting their interests, and providing funds to assist the development process). Several others were less enthusiastic about the importance of monitoring.

2.5.3 Interpretations and Analysis of Responses

The Survey Team found that many comments reflected a view of the importance of monitoring contrary to that anticipated. Based on extensive NBS experience, participation should be more than merely informative and interesting--it is an important job-related responsibility. Most of the despairing comments were directly related to declining resources, which make it increasingly difficult to "keep up with the state of the art". Respondents often felt "let down" when permission to travel to attend and participate was suddenly withdrawn.

If voluntary standards bodies are to be active in developing standards for development, commercialization and production of energy technologies, it appears to be highly advantageous and necessary for key technical people to represent DOE positions on the appropriate industry committees, taking an active role in guiding and expediting new standards through the many steps of the development process.

2.5.4 Findings and Recommendations

The Survey Team found several respondents who took the reasonable position that monitoring the development of standards and technical regulations that might impact given programs must remain under the control of those programs. Nevertheless, a centralized (passive only) monitoring system must continuously cover all areas of interest, continually absorb the monitored information of the individual standards programs, and periodically provide status reports to all DOE standards professionals to permit needed access to information. The relevancy and status of the voluntary and mandatory standards development projects that are monitored should be determined primarily by the individual programs, but status determinations must be supplemented where necessary by the Departmental Standards Program.

Exhibit 2.5.1

Monitoring of Ongoing Standards Development Activities

Units Monitoring Standards Development	Comments
7	To a lesser degree than standards development activities.
9	Track ongoing development, including the funding of ANSI steering committee.
16	Safety would be nice to do but no staff. Health people monitor (for example) "Explosive Safety Manual".
17	Periodically monitor "single writer" but not committee activities unless they have members or direct involvement.
18	A major effort, they provide direct funding to voluntary standards bodies.
19	This activity is tied to their use of voluntary standards.
20	Yes and participate.
21	Probably covered by contractors no formal procedure.
22a	Its part of our program, ASTM helped (new geothermal committee). Cross-adoption more prevalent than monitoring.
22c	They try to get engineers on key committees.
23a	Review and comment on standards development.
23b	Yes, including (technical regulations) in Federal Register.
25a	Try to but number of standards monitored small.
25b	In terms of commenting.
25c	Yes.
26	Thru employees.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.6 Organizational Structure Employed for Standards Activities

2.6.1 The Question Asked

The NBS Survey Team asked interviewees to describe the organizational structure now employed to manage or direct their standards activities, including authority and responsibilities of the various units, and to discuss the relationships of their organizations to the standards activities in which they were engaged. The interviewees were encouraged to discuss how their organization responded to areas of standards responsibility that crossed organizational lines.

2.6.2 The Responses Received

Thirteen respondents indicated the lack of formal structure, focus, breakdown, etc. Twelve suggested that, at best, there is a loosely defined standards coordination or standards reporting function. (See Exhibit 2.6.1.) The sampled responses suggest that DOE, as a large, highly decentralized Federal governmental agency, is characterized by non-unformity in its approach to standards programs. In some program areas the standards function is particularly weak. As to those standards areas that have no organizational focus, the respondents cited examples of relying on their colleagues in other elements.

2.6.3 Interpretations and Analysis of Responses

In the course of interviews where standards operations were not explicitly or clearly defined, the respondents often expressed concern about gaps between performance and the level-of-commitment expected by the technical program manager. Standards professionals often did not know how their effectiveness would be measured. A common response was that real responsibility resided elsewhere, either in the field or at headquarters--whichever location was not their own.

At several interview sites standards activities are integral to the mission, especially in operations where "everyone does standards." In these cases, it is understood that the lack of a clearly defined standards program is not deemed to be relevant; the unity of standards and mission assures availability of resources for standardization activities. However, the absence of a clear or explicit standards function or its integration with a non-standards mission sometimes creates the perception that standards programs are "short-changed."

2.6.4 Findings and Recommendations

The Nuclear Standards Program was found to be one area in DOE with a strong coordination function. Well managed development activities are conducted in the appropriate elements. This exemplary technical standards program, operated jointly by a DOE Contractor and DOE employees, reflected its concern

for standards in the organizational structure even though its operations cross many organizational lines. Other standards areas (such as fossil, solar, data processing, and construction) may benefit from the same kind of focused leadership.

The Survey Team believes that other headquarters/laboratory combinations can assume the responsibility for taking the lead role for a specific standards area where, because of their own vital interests, they are already committed (resources, personnel, expertise, information, etc.). These combinations can pattern a coordination function similar to the one that exists for Nuclear Standards. An expanded Departmental Standards Program could provide the assistance necessary to effect this recommendation.

Exhibit 2.6.1

Description of Organizational Structure Employed for Standards Activities

1	None.
2	Responsible to Assistant Secretary for Administration through Computer Services and Telecommunications Management.
3	See DOE Order 1360.3.
4	Very small office located under Controllers Office--had 13 people now has only 4.
5	None.
6	NA.
7	Integral element of nuclear energy development. Working group advisory to Director on NSMC activities. Consists of Standards Coordinators with nuclear concerns in DOE.
8	No formal structure.
9	None.
10	Headquarters interacts within federal community, NBS is center for technical expertise, VSBs develop standards, and four regional centers interface with marketplace.
11	This is Headquarters Office--Labs manage direct standards work.
12	Headquarters monitors, JPL leads centers and SERI does work on task forces.
13	Standards documents, records, indexes are maintained by field offices.
14	Small organization, no breakdown--has 9 professionals.
15	Division of Energy Data Standardization directs and coordinate most standards activities; others have some control.
16	DOE is functionally responsible for knowing and applying standards for technical divisions contractors, at lowest level, implement requirements on project basis.
17	Standards Coordinator, a staff function, assists engineers directly.
18	Quality Assurance and Standards is splitting into three highly decentralized groups.
19	They have a matrix organization that includes Quality, Safety, Engineering and Technical Publications.
20	Standards Coordinator works through System Engineering Department, reviews standards and technical specifications and prepared bids.
21	No person whose focus is standards--it is being considered.
22	Coordinator for Safety--decentralized, no coordination in various other groups.
23a	Safety, Radiological, Quality Assurance, Purchasing are the four organizations, in decending order, that are structured for standards activities.
23b	F&S has no Standard Coordinator but several people specialize. Safety standards are coordinated through one person. REECO has Coordinator for standards information at library.

23c	Administrator--reviews and updates standards.
24a	Small staff.
24b	See "Guide to the Nuclear Standards Program"--a highly structured organization.
25a	Division Manager is the Coordinator, provides standards input.
25b	Everyone "does" standards and technical regulations.
26	Highly decentralized--standards and specifications are written/used all across all levels of organization; suggestions can come from anywhere. This process leads to free-flowing consensus decisions.
27a	No Standards Coordinator, no organization focal points.
27b	Coordination across organizational lines accomplished by HEDL Standards Coordinator.
27c	Not organized to reflect standards, each function is responsible.
28	Coordination effort, review projects to see if standards are required and are being used.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.7 The Energy Standards Infrastructure

2.7.1 The Questions Asked

The interviewees were asked to name other DOE organizations with which they normally maintain contact relating to standards and to describe the relationship. If a respondent did not name the office responsible for the Departmental Standards Program, he was specifically asked if he had any interactions with the DOE Standards Program or Standards Coordinators and the nature of any such contact.

2.7.2 The Responses Received

Although a precise count was not possible because some answers covered more than one unit, one-to-one relationships were tabulated where possible. (See Exhibit 2.7.1.) It was estimated that twelve contacts relating to standards are maintained with or within three areas: 1) the Offices of the Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness; 2) the Assistant Secretary for Nuclear Energy; and 3) taken as a group, the DOE national laboratories.

Several respondents identified informal interactions which are maintained between functional, technical, and administrative areas with common interest or similar responsibilities. For example, many standards engineers who are actively involved with solar energy technologies maintain relationships with each other.

Fifty percent of the respondents (9 of 15 headquarters offices and 9 of 21 field units) specifically included the DOE Standards Program as an "agency" contacted both formally and informally on a regular basis. The interviewees often demonstrated the need for information, either directly or indirectly, by all concerned. (See Exhibit 2.7.2.) Policy or policy committee activities and standards review-and-comment work were mentioned most. However, there seemed to be little or no exchange of information on standards or standardization activities between many field units and the headquarters Standards Program. One respondent said he did not believe that either the headquarters or the field can help the other. Several participants expressed interest in learning more about the DOE Standards Program.

2.7.3 Interpretations and Analysis of Responses

In essence, many interviewees were obviously unfamiliar with the activities of the DOE Standards Program; some did not even know of its existence. The data suggest that the flow of standards information within the standards infrastructure needs to be accelerated.

Most of the respondents were pleased to know that headquarters was interested in learning more about their standards activities. Conversely, the respondents need to learn about the standards activities at the department level. Some standards information services do not reach those individual

units which could benefit most from information currently available as a standards-activity service from headquarters; for example, the capability of quickly securing a list of applicable standards for a project or for obtaining an extensive index on an energy subject.

2.7.4 Findings and Recommendations

A mechanism for the collection and dissemination of standards information in all areas (administrative, functional, regulatory and technical) should be established. The Standards Program might first develop a brochure of its functions and services, later adding centers of expertise in other elements and disseminating this information throughout the Department.

The frequent reference to the need for "selling standards" to managers not oriented to the importance of standards suggests that the DOE Standards Program should augment its current efforts in coordinating standards activities and enhancing the effective use of standards. The Departmental Standards Coordinators must specifically communicate to top management the importance of standards for attaining DOE goals and objectives. The Survey Team also sees a need to report standards successes at the division level.

It is recommended that the Departmental Standards Program take the lead role in promoting standards activities. This should be discussed at the next Standards Policy Committee meeting. The importance of standards can get needed visibility within DOE headquarters by describing DOE's involvement in standards and by highlighting successes and benefits of standards and standardization activities. The Departmental Standards Program needs to demonstrate, in writing, to top management and to standards professionals how specific standards activities support the attainment of DOE goals and objectives. It is recommended that this be accomplished by preparing an annual report for the Assistant Secretaries and a brochure for general distribution.

Standards professionals cannot depend on others to expound on their standards achievements and justify their existence; standards professionals at all levels must assume responsibility and communicate their own standards-program accomplishments to management.

There is some sentiment for revising the Departmental standards program to enhance horizontal communications where incompatible data affect DOE responsibilities. The need for change was frequently discussed or hinted at, but usually without directly addressing specific techniques for strengthening bonds among standards professionals. Establishment of a standards information network may be especially important at this time when some form of agency disestablishment is being contemplated. Although a few interviewees see little possibility of exchanging help between headquarters and the field, most standards professionals believe that their programs would benefit from an expanded, working program of information exchange.

The cadre of highly knowledgeable energy standards professionals must be linked together in a network to facilitate communications and to mutually enhance their ability to deliver technical support to their program areas. The Departmental Standards Program should develop and distribute a list of all standards professionals, cross-referenced by their area of interest and activities. This list should evolve into a directory that includes committee assignments, information resource contacts and official DOE representatives by standards areas. The Departmental Coordinators must serve as the catalysts for the development of this information which is necessary for the emergence of a viable, internal communications network. They could, in conjunction with the Standards Policy Committee, host an annual meeting or conference, which might include seminars and technical papers, for the cadre of energy standards professionals.

Exhibit 2.7.1

Contacts with Other DOE Organizations Relating to Standards

1	Controller, Procurement, Defense Program, EV, Administration.
2	With ADP Management Group and ADP Systems. With any DOE Groups who wants to transmit data.
3	Controller; Procurement and Contract Management; Defense Programs through DOE Order 1360.3--specific responsiblities are assigned to them.
4	EV, OES implement higher level policy in facility design such as in safeguards and security and personal radiation exposure.
5	None regularly maintained--contact offices which could be affected by GSA or Military Specifications.
6	Only as required to transfer programs.
7	EV Coordination.
8	EV--Environmental Impact Statement--Health, Safety help develop policy and review other agency standards.
9	SERI: EV--DOE standards policy; Regional Solar Energy Centers; Lawrence Berkley and Los Alamos National Laboratories.
10	Standard working group from domestic policy review group of Federal Agencies. Conservation--BEPS, RCS.
11	Brookhaven National Laboratory Management and research on geothermal. Batelle Pacific Northwest and other divisions through the Engineering Materials Coordination Committee.
12	SERI, Sandia, Brookhaven for health and safety, and JPL.
13	EV, Office of Health and Environmental Research.
14	A/S Nuclear Energy, Program Manager Office of Nuclear Energy--clean up work.
15	Metric Committee, Office of Administration (ADP Standards).
16	Fusion Energy, Los Alamos and Sandia many technical lines of communications with programmatic offices.
17	NSMC, A/S NE, RTT.
19	Office of Safety, Quality Assurance and Safeguards.
20	Office of Nuclear Energy, Safety QA and Safeguards.
21	Headquarters--many areas.
22	Sandia, LBL, and Oak Ridge--conservation and renewable resources.
23a	Headquarters, OES.
23b	NRC.
24a	Union Carbide.
24b	NE and EV, Headquarters.
25a	Other Energy Technology Centes, Fossil Energy at Headquarters, Office of Basic Energy Science.
25b	Fossil Energy--Environmental Protection & Emergency Preparedness.
26	None, work with Boeing and Electric Power Research Institute.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.7.2

Nature of Contacts with the Departmental Standards Program

3	Work with DOE Policy Committee--review materials as requested and provide comments.
4	Informal relating to development and interpretation of criteria, and more formal relating to wavers of criteria.
6	Keep contact on routine basis--obtain reports.
7	Coordination.
8	Extensive interaction--help develop policy and review standards.
9	Policy Committee.
10	Informal and interactive--participated on 1300.2.
13	Committee Membership.
14	Policy Implementation.
16	Audit of field use of prescribed standards.
17	Coordination with QA standards and metric provide feedback on DOE Order.
21	Some contact.
22	Some interaction.
23a	Request to comment on standards.
23b	Contracts thru Field Offices, QA and others have many interface activities.
24b	Some coordination.
25b	Contacts safety people and health and environment.
25c	Reviews work for OES.
27a	Review, comment, identify standards needs.
27b	Worked on Recommended Practices.
28	Coordination.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.8 External Interface Requirements

2.8.1 The Questions Asked

The NBS Survey Team asked the interviewees to identify the contacts they maintained with industry associations, professional organizations, or companies developing standards, to identify the type of contact (i.e., attends meetings, participates, contracts, etc.), and to list the names of the associations.

Interviewees were then asked what contacts they maintained with voluntary domestic standards bodies or international standards bodies, the type of contact and the identifications of the standards bodies.

They were also asked about contacts they maintained with Federal, state or local government agencies, the type of contact maintained, and the names of the agencies.

2.8.2 The Responses Given

Some organizations appeared in more than one list, for example, ASME (see Appendix D, "List of Acronyms and Abbreviations Used in This Report") was considered to be both a standards-writing body and a professional organization. Counts in this subsection were by predominance according to the respondents, but only stray data were regrouped into the table listing where they most frequently occur. (See Exhibit 2.8.1.)

Twenty-three industry associations and professional organizations were identified, including ANS, API and SEIA. Only a couple of individual companies were mentioned.

Thirty-two domestic and international standards writing organizations were named: fourteen listed ASTM, twelve listed ANSI, seven ASME, five IEEE, and four ASHRAE. In the international area, six listed ISO and three listed IAEA. Seventeen Federal agencies were listed: NBS was mentioned 19 times, EPA six, DoI four and DoD, GSA, and OSHA three times each.

The standards programs involved a variety of support agreements, domestic committee assignments, and arrangements with voluntary standards bodies. Internationally, contacts included written agreements with foreign nations, as well as informal talks with technical peers from other countries. (See Exhibit 2.8.2.)

2.8.3 Interpretations and Analysis of Responses

Several standards professionals experienced considerable difficulty in maintaining necessary external interface relationships. Individuals are often unable to prove a need for government sponsorship of their participation on outside standards writing committees, and almost all standards professionals find that travel restrictions often interfere with planned standards activities. The DOE Standards Program is in a position to develop DOE

criteria for assessing the relative importance of committee assignments and to seek support from the appropriate Assistant Secretaries to make priority participation possible. Even though the authority for participation clearly rests with the line divisions, someone must ensure that DOE maintains the necessary representation and the committee chairmanships that vitally affect energy technologies.

The respondents raised several important issues with regard to committee participation. For example, one interviewee asked about the current significance of his comments as standards are developed: are the comments to be considered to be official in some degree? A second added the suggestion that information concerning committee assignments should be rapidly available so he will have a readily accessible DOE contact if he needs to call for information. Another said that information on international standards should be available to all. Others stated that the DOE Standards Program will have to shoulder more of the interface responsibilities with industry through voluntary standards bodies, which seems to be appropriate.

2.8.4 Finding and Recommendations

It is recommended that the Standards Program, after consulting with and obtaining the concurrence of key DOE standards officials, issue detailed guidelines for standards committee participation through the DOE Standards Policy Committee, which meets on an ad hoc basis for this kind of purpose. These standards guidelines should implement requirements of DOE 1300.2, as well as set forth detailed guidance for DOE participation on outside standards writing committees. The guidelines should establish procedures for reporting information and explain the significance of comments or votes in the standards development process. Guidelines for standards committee participation need to be spelled out by the Office of Quality Assurance and Standards (OQAS), even if they are only tentative, prior to review by the Standards Policy Committee.

All committee assignments of DOE and DOE-contractor employees who participate in writing standards should be listed in the directory recommended in Subsection 2.1.4 and contained in the proposed information system: A Standards Personnel and Participation System (SPPS), which is being planned. This system should be constructed and implemented in order to: 1) promote effective participation by DOE staff members in standardization activities, 2) assist DOE managers in making decisions about the allocation of DOE resources for these activities, and 3) encourage communication among standards committee participants. Such a system can also maximize the benefits to be derived from a well-managed standards program in that it will provide accurate and timely information for DOE management officials, as well as for industry associations, standards committees, DOE contractors and individual energy company officials.

The DOE Standards Program will have to shoulder more of the liaison responsibilities with the private sector. Where high level contacts need to be established and maintained, the DOE Standards Coordinator should represent the interests of DOE, persuade other members of the Policy Committee to accept

assignments, or use the influence of his office to make the importance of the assignments known to the supervisors of key standards professionals. Seeking and accepting an assignment on the board of directors of a relevant voluntary standards body is a critical standards activity which mutually enhances both organizations. It should be high on the list of DOE Standards Program priorities.

Exhibit 2.8.1

External Contacts

	Industry	Voluntary	International	Federal Government	State/Local Government
1	GOCO	None	None	None	None
2	None	None	None	NBS	None
3	ACMA, EIA ANS	ANSI	ISO	NBS, ADP Users Group	None
4			None	GSA/PBS	None
5				GSA, DOD	
6				FRC, DoI	
7	NSMC, Oak Ridge, AIF	IEEE, ASME ANS, ASTM, AISI, ANSI, ASNME	IAEA	NRC, EPA	
8	None			None	No formal relationship
9	ASHRAE	ASTM, ANSI	ISO	NBS, HUD	NCSBSC, NLC BOCA, SBCC, ICBO
10	SMACNA, SEIA, NASC ARI	ANSI, ASHRAE, ASTM	ANSI, IAE GATT	HUD, FTC NBS, IRS, TVA, EPA	ISCC
11	ACI, API	ASME, ASTM NACE	Mexico, Italy, New Zealand and Japan	NBS, USGS	None
12	SEMA, SEIA	ASTM, ANSI IEEE		NASA, NBS DoD, Interior USCG	Not much
13					
14	ANS	ANSI Committee		EPA, NRC	NY, NJ
15	API, EIA	ASTM, ANSI		DOC, ADP Users Group	
16	BMA	ANSI, NFPA ASTM, UBS	IAEA	NBS, EPA DoT, OSHA	Colorado
17	SES	ASHRAE, ASQC		DCASR	FEB
18	SEIA	ASTM, IEEE ASME, ASHRAE ANSI, NEC	ISO, IEC	NBS, HUD	ICC
19		IEEE, ANSI, ASTM, ASME		NSMC, OSHA	50 States, Universities
20	None	Some VSB committees	None	None	Ventura and LA counties
21	Several companies	ASTM, WPCF ASCE	None	EPA, OSHA	SBC, City of Morgantown

Note: See Appendix D, "List of Acronyms and Abbreviations Used in This Report."

22	GRI API, ASTM AGA, EPRI	ACI, NACE, ASHRAE	IEA	None	NY-ERDA
23a		NFPA, UL		NIOSH, EPA, Comment on Federal	
23b	AMA, API	ANSI, NFPA, ASTM, AWS, AWWA, ASQC, NSC, NCSL	IADC	Register	
23c	AOMA, AAFP, EMG			NIOSH, OSHA	Medical and Hospital Boards
24a	Very little	Very little	None	None	None
24b	ASME	ASTM, IEEE, ANSI, ANS ASME	None	NRC, NBS, DOD, EPA	None
25		ASTM	None	NBS, USGS	Alleghany County, PA Environmental Resources
26	EPRI	IEEE, ANSI	IEC		State, noise & Building Codes
27a	None	None	None	Comment on safety standards	S/L environ- mental offices
27b	Very little	ANS, ANSI ASME, AICHE	TC 85	None	None
27c	GRC	some VSB	ISO	EPA	
28	NACC, DuPont	ANS, ANSI, ASTM	IAEA	None	None

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.8.2

Comments on Types of External Interface Requirements

1	Expect to contact other Federal agencies.
2	Should participate in NTIA and NCS but don't.
3	Industry and International contacts are nominal.
4	Very little contact with VSBs.
5	Comment on GSA and DOD standards.
6	Regional offices may work with State and local government.
7	Review and comment on standards.
8	Limited participation, result of individual initiative--not encouraged by DOE policy.
9	Participate in committee--provide support.
10	Training, certification, participation and data exchange.
11	Committee activity, development.
12	Informal talks in international area.
13	Working memberships from labs, contacts maintained by others.
14	Participate on VSB committees--obtain State and local review of criteria.
15	Standardize energy terms and definitions.
16	Attend meetings, help develop standards, review proposed regulations.
17	Twenty to forty people are on VSB committees.
18	Attend meetings, serve on committees, State and local may not continue.
19	Attend ASTM meetings.
20	Attend meetings twice a year--provide safety inspectors for California.
21	Component testing with industry--VSB memberships.
22	Attend meetings, participate--research work in international area.
23a	Some members are chairman--comment on Federal regulations.
23b	Some industry associations are not really standards related--VSB memberships.
23c	Review and comment--serve on boards.
24a	Very little--contract people to do it.
24b	Except for NRC other Federal contacts are minor.
25	Attend on informal basis technical meetings with industry, work with states on waste disposal.
26	Serve on several IEEE committees, tied to IEC.
27a	Comment on proposed safety standards in Federal Register--work with State and local environmental standards.
27b	No contracts with VSBs, some memberships.
27c	Write and review standards for VSBs--correspond with ISO.
28	Considered participation with industry.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.9 Documents and Records

2.9.1 The Questions Asked

The following questions were asked: Do you have any internal standards procedures or guidelines in place or in process? Do you have a list of standards that your program uses or that your program has under development? Do you have a list of your publications that use or relate directly to standards? What record-keeping activities, if any, do you use to record money or time expended in standards work, and who is the individual, if any, doing the record-keeping?

2.9.2 The Responses Received

Fifty percent of the respondents said that written standards procedures are in place for their programs, and most said that a variety of guidelines are used. Lists of applicable standards were maintained by 16 DOE offices or agencies, and 14 have standards publications. One laboratory was developing a preferred list of standards recommended for use by their engineers, plus an internal standards manual. Lists of standards maintained by officials at other Federal agencies were also used by some offices. (See Exhibit 2.9.1.)

Sixty percent of the respondents indicated that they do not record expenditures for standards work; only 20 percent of those responding said they keep adequate records. Some data were maintained in specialized cases, such as when standards are the only products of a project. Some costs of travel to standards meetings were also recorded. (See Exhibit 2.9.2.)

2.9.3 Interpretations and Analysis of Responses

The responses show that important information in standards lists plus other data in documents and records of specific DOE programs might be readily available. Optimistic comments suggest that this information could be updated, edited, and incorporated into an energy standards data base. Other comments are interpreted as "new lists need to be developed from scratch." Nevertheless, the lists could serve as the basis for indexing standards titles by keywords, and the resultant list could then be made available to all energy standards professionals to assist them in searching for relevant standards.

2.9.4 Findings and Recommendations

The existence of many standards documents was noted during the survey; where they were readily available, they were collected. The balance of those documents should probably be collected by the DOE Standards Program, and the Standards Order could be used as the justification to conduct a documents analysis. This could provide more base line data and additional insights concerning DOE standards activities. Standards procedures and guidelines of the various elements should be examined with reference to current DOE policies, and illustrative models should be provided for the benefit of those divisions now lacking standards procedures.

Two key issues surfaced during these discussions: What is the value of tracking detailed standards costs for each project? Should engineers record standards time or should managers estimate standards costs? The data show that only seven programs devote the time of a designated individual to collect and/or maintain records of standards expenditures. None of the seven volunteered any information that might suggest any benefit to this routine. There is no evidence to support the suggestion that, perhaps, a departmental policy should require this type of practice. It is by no means obvious that benefits gained would exceed the costs of instituting record-keeping where it does not now exist. The Departmental Standards Program will have to convince DOE management that aggregating standards expenditures Department-wide is justifiable.

Exhibit 2.9.1

Internal Standards Procedures or Guidelines, List of Standards, and List of Publications

	Procedures or Guidelines		Lists of Standards		List of Publications	
	Yes	No	Yes	No	Yes	No
1	X			X		X
2	X			X		X
3	X		X		X	
4		X				
5		X		X		X
6		X		X		X
7	X		X			X
8		X		X		X
9		X		X		X
10		X	X		X	
11		X		X		X
12	X		X		X	
13		X		X		X
14		X		X	X	
15	X			X	X	
16	X		X		X	
17	X		X			X
18	X		X		X	
19	X		X		X	
20	X					X
21	X		X			X
22		X		X		X
23a		X	X			X
23b	X		X		X	
23c	X		X		X	
24a		X	X			X
24b	X		X		X	
25a	X			X	X	
25b		X	X		X	
26	X		X			X
27a		X	X			X
27b	X		X		X	
27c	X			X	X	
28		X	X			X

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.9.2

Records of Money or Time Expended in Standards Work

	What Kind of Records do you Maintain for Resources Expended?	Is a Specific Person or Office Responsible?
1	None.	
2	None.	
3	N/A.	
4	None.	
5	None.	
6	None.	
7	None, except where standards is the only. product of a project.	
8	None.	
9	None.	
10	Monthly Account Report on Standards.	SERI (eventually).
11	None.	
12		
13	None.	Have to go to field. offices.
14	None	
15	Time and Accountability reporting system #6081 account code for standards.	Assistant Administrator.
16	Very little.	No.
17a	None.	
17b	Some records are maintained for ANL people.	Standards Coordinator.
18	None, but standards dollars charged to tasks. could be estimated.	
19	None, all charged to overhead.	
20	Timecards have designation for RDT Standards.	Accounting.
21	None.	
22	None.	
23	None--except for travel costs to some standards meetings.	
23b	None.	
23c	Ongoing, review of standards is part of the job.	Administrator.
24a	None.	
24b	None.	
25a	They track spending by category and could pick out standard costs.	
25b	None.	
26	None.	
27a	None.	
27b	Records for HEDL people are maintained.	The Standards Coordinator.
27c	They use computerized work breakdown accounting system.	Each Project Leader.
28	Can't separate for standards.	No.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.10 Standards Activities Commitments: Funding and Manpower

2.10.1 The Questions Asked

With respect to organizational resources committed to standards activities (i.e., developing, reviewing, commenting, etc), interviewees were asked to discuss fiscal year (FY) trends, how FY 81 was expected to compare with FY 80. They were asked to estimate funding for personnel, travel, contracts/grants, and information systems. They were also asked about the total funding for the program or organization for which the information is pertinent.

Similar questions were also asked about programmatic allocation of manpower including total man years for full-time and part-time personnel, the number of people devoted solely to standards activities, and the number of people working part-time on standards. (See item 10 of the Interview Worksheet in Appendix B.)

2.10.2 The Responses Received

Twelve departmental elements estimated funding for standards activities in FY 80; many of these were based on approximated manpower allocations. Five respondents knew that their accounting systems were set up to track standards costs. (See Exhibit 2.10.1.) Several interviewees said that they are not authorized to answer funding questions and most others did not have cost data available. Significant comparisions between FY 81 and FY 80 were not made by the respondents; there were some comments ("about the same" or "about the same except for some cuts").

A total of 19 manpower estimates were made for FY 80. The data show that the man-year totals for standards work generally comprise many fractions of man-years contributed by a large number of individuals (at one site there were 200 individuals involved) who devote a small part of their time to standards activities. A few respondents indicated that funding for contracts/grants could be misleading since there could be a very large expenditure in one year and nothing the next.

2.10.3 Interpretations and Analysis of Responses

During the discussions in the funding area, a few standards professionals expressed concern about the resources which might be expended in developing information systems where consideration has not been given to establishing mechanisms to utilize the output. Continuous support, said one interviewee, is the particular need for any standards information system which is to be funded within the Department. More significant insights came from the analysis of the manpower data--a very large number of people are devoted to standards activities on a part-time basis. The Survey Team infers from the funding and manpower discussions that hundreds of individuals potentially have contributions to make to, and would be significant users of, a viable information system.

With existing resources, the Departmental Standards Program can help to establish output delivery mechanisms for interested standards units and secure guarantees from those standards units for continuous support in providing input. The availability of many potential participants should influence OQAS decision makers, and should weigh heavily in considerations by each unit managers to provide continuing support for an information system. Resource commitments should feature cost effective mechanisms which allow energy standards professionals to utilize the output.

2.10.4 Findings and Recommendations

As noted in Subsection 2.9.4, detailed tracking of expenditures for all standards activities is not recommended. However, funding commitments in the form of line items should be established in two areas for each standards program. It is recommended that line items be established to support the travel required to sustain active participation in voluntary standards development activities and to support standards information and data programs. This is important to help keep management aware of the costs and significance of energy standards information. Additionally, a line item should be established for funds to support a Departmental standards information program.

Exhibit 2.10.1

Standards Activities Commitments

	Cost Data Available	Manpower Data Available
1	No	No
2	Yes	Yes
3	No	Yes
4	Yes	Yes
5	No	Yes
6	No	No
7	No	Yes
8	No	Yes
9	No	No
10	No	No
11	No	Yes
12	No	No
13	No	No
14	Yes	Yes
15	No	No
16	Yes	Yes
17	No	No
18	Yes	Yes
19	Yes	Yes
20	Yes	Yes
21	No	No
22	Yes	Yes
23	Yes	Yes
24	Yes	Yes
25	Yes	Yes
26	No	Yes
27	Yes	Yes
28	No	Yes
	12/28	19/28

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.11 Standards Information: Sources and Mechanisms

2.11.1 The Questions Asked

The Survey Team asked where interviewees got most of their standards information. Interviewees were also asked about the availability and adequacy of four standards information tools: standards catalogues, in-house standards collections, technical libraries with a standards collection, and on-line computer-based standards services. They were first asked to indicate the availability of such tools and, if they gave a "yes" answer, to indicate the adequacy of each tool used. If the tool was unavailable or inadequate, interviewees were asked if they would like to have an adequate information tool of that type. (See Appendix B, Interview Worksheet, Item 11.)

2.11.2 The Responses Received

Seventeen respondents said DOE Departmental elements were an important source for standards information. Seven of those got most of their standards information from headquarters offices, with the balance divided between field offices and DOE contractors. Fifteen respondents identified other government agencies as their primary information source. (See Exhibit 2.11.1.)

Seventeen respondents said they got most of their standards information from voluntary standards bodies and from technical, trade, and professional societies; most frequently mentioned were ANSI and ASTM. For four respondents a primary information source was industry, and one named a university.

Out of 30 respondents, 28 used standards catalogues and other lists and indexes provided by standards-writing organizations; 26 had full-text in-house standards collections; and 25 used the full-text collections at their technical libraries. An on-line computer-based service was available to 5 of the 30 respondents. The interviewees reported that most of the available information systems were adequate. (See Exhibit 2.11.2.) But, in 45 of 120 instances (30 interview situations times 4 information tools), the information tools were either not available or deemed to be not adequate by the users.

2.11.3 Interpretations and Analysis of Responses

These questions uncovered two significant points. During one interview, a respondent suggested to the NBS interviewer that many of the interviewees themselves were responsible for standards information in their programs, hence alleging inadequacy might reflect unfavorably on their own performance. Another respondent, who judged his information system to be adequate for his facility, stressed the need for compatibility of data for interchange among other research facilities.

The adequacy of the classifications and subject categories in standards catalogues published by standards writing organizations was questioned. One interviewee criticized the lack of care in characterization, thereby degrading

his ability to identify applicable standards. Another said that the in-house standards collection at his laboratory is adequate, but he alone is sufficiently conversant to identify relevant sections within the collection and he alone knows where to locate elements of the collection which are distributed about the laboratory among the key users at various locations.

It is highly desirable for design engineers, standards engineers, and technicians to have access to: 1) on-line listings of all mandatory and significant voluntary standards applicable to ongoing projects, and 2) access to a microform collection of important standards. The DOE Standards Program should determine the feasibility of providing a means for on-line title searching and for microform full-text referencing.

As indicated by the respondents, an energy standards data base should include comprehensive listings of all standards development activities relevant to the environmental, safety, health and other regulatory requirements that could result in new or revised mandatory standards. Listings of all voluntary standards development activities related to energy would also be beneficial to the DOE standards professionals.

It is noteworthy that many standards professionals are concerned not only with the vertical flow of information but, to a much greater extent, with the horizontal exchange of compatible standards information among related standards programs. Some less experienced standards professionals are concerned about their ability to get basic standards information; they can improve matters by making better use of standards information facilities and services now available. Respondents at five locations expressed a desire for an on-line standards system, but at one interview site, where four DOE contractor employees agreed that an on-line system would be useful, only a single "yes" in the table represents that composite view. (The Standards-Information-Tools Matrix, Exhibit 2.11.2, contains one vote for each of 30 interview sites.) One laboratory has started developing an in-house system. The Survey Team also noted with interest the concerns of those not desiring an on-line system.

Several who did not desire an on-line system, or who were not sure, offered meaningful comments. One respondent did not want an automated information system unless it is financially supported from year to year, implying his worry that it might not be kept up-to-date. Another said he has become disenchanted because of his previous unsatisfying experience with centralized on-line computer systems in general. Another questioned whether such a system could be cost effective within a large decentralized Federal agency. One did not give a "yes" answer because of his concern for keeping an on-line system up-to-date; that unit cannot now keep up with the revisions of the nuclear standards. Another withheld a "yes" answer because he felt that he could not justify to his management the cost of a terminal. Nevertheless, the NBS Survey Team, based on its understanding of the DOE standards situations, believes that the effectiveness of the standards program can be significantly improved if the Departmental Standards Program concentrates its resources on an "information focus".

2.11.4 Findings and Recommendations

The NBS Survey Team has discussed the many aspects of DOE standards information and has translated its understanding of this composite picture into a primary thrust for the Departmental Standards Program: the delivery of standards information through the decentralized organization to the standards engineers and technicans at the project level.

Many observations confirm the widespread need for improving the basic information flow among DOE standards professionals. The Survey Team found insufficient awareness of the existence of the Departmental Standards Program and the Standards Policy Committee and not enough interest in DOE standards policy. Standards professionals often lack the information to "sell" standards to management; they lack knowledge of what their counterparts (DOE contractors or DOE employers) are doing; and they lack sophisticated informational tools and systems. A forceful mechanism is urgently needed to coordinate the collecting and cataloging of the standards information that currently exists and to provide a system for delivering that information to others in the Department.

The orientation of the Departmental Standards Program is somewhat top-down, but open to opportunities to improve its responsiveness to the needs of standards programs in the field. The effectiveness of the Program can be significantly improved by concentrating resources on the information needs of the standards professionals whose activities are closely involved in the development of new energy technologies. This will provide enough information to maintain an overview of standards activities and to improve the Program's responsiveness and effectiveness. As a result, the Departmental Standards Program's interactions and policy implementation responsibilities should become more readily accepted by DOE standards professionals. The Departmental Standards Program should reassign current resources to focus on information and improve the contribution of standards to productivity in the long term.

Defining details for information management is beyond the scope of this report, but the NBS Survey Team found two areas that should be given immediate attention:

- First, mandatory and DOE-recommended standards in all DOE program areas should be collected. (Two good collections are already known to exist: 1) nuclear and 2) environmental, safety and health.) Then the standards should be indexed by those who know their contents and a consolidated, indexed list distributed to each standards professional in the Department.

- Second, all relevant standards development activities (voluntary as well as regulatory) within DOE, other agencies, and voluntary standards bodies should be identified and noted at the working level, monitored at OQAS, and subjected to periodic reporting of standards progress. An index of standards development activities in which DOE is involved should be published and updated annually. This index should also be distributed to all DOE standards professionals.

These two elements (standards and standards activities) should be the foundation for the type of energy standards data base needed to coordinate a DOE Standards Information Program. The NBS Survey Team receognized early in the survey, that a cost-effective coordinative mechanism would be essential to sustain a focus for the Departmental Standards Program. As it became apparent that the survey data emphasized information, the Team hypothesized that an Energy Standards Data Base (ESDB) would be the appropriate mechanism. Although no effort was made to suppress other alternatives, the team attempted to examine its belief that an ESDB would be an acceptable approach.

An ESDB, based on the existing information systems would not incur heavy development or maintenance costs and could be flexible enough to permit each standards program to develop and control its own aspect of the general system. The mechanism would remain stable under future reorganization and could evolve into an on-line system available to knowledgeable users (including information specialists at each technical library) within two years. A low-risk start, using some of the 63 respondents who have already expressed interest, could be initiated in two or three pilot areas immediately.

Exhibit 2.11.1

Important Standards Information Sources?

	Information Source
1	DOE, NBS
2	FIPS
3	Government agencies, newsletters
4	Standards generating groups, associations, newsletters and catalogues
5	GSA and Military
6	Program Offices
7	Contractors, National Labs
8	ASTM, Industry, Microfilm service, DOE Library
9	Standards Committees
10	NBS, SERI, ANSI, ISCC
11	NBS, Industry
12	SERI, ANSI, ASTM, IEEE, NEC, Industry
13	Industry
14	Federal Agencies, ANS, ANSI
15	NTIS, ANSI, ADP Users Group
16	Industry, VSMF Service
17	Standards Coordinators, Technical Information Service
18	NBS, VSB, Contractors
19	VSBs
20	Technical Societies, Standards Coordinator, Oak Ridge
21	VSBs, Societies, EPA, NBS, CFR
22	In-house Collections
23a	Standards Organizations
23b	Standards Organizations, GIDEP
23c	ALMA, NIOSH, NV Medical School
24a	Oak Ridge Technical Library, Carbide Engineering Library
24b	DOE Technical Programs
25a	ASTM, Bureau of Mines
25b	CFR, Federal Register
26	Committee Members, Power Industry
27a	Headquarters
27c	Technical Library
28	DuPont

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.11.2

Standards Information Tools--Are They Available and Adequate?

	Is it Available?			If Available, is it Adequate?			If Not Available or Adequate, Should it be?		
	Yes	No	Not Sure	Yes	No	Not Sure	Yes	No	Not Sure
A. Standards Catalogues	28	2	0	24	4	0	0	1	5
B. In-house Standards Collection	26	4	0	23	2	1	1	3	2
C. Technical Library with Standards Collection	25	5	0	18	5	2	2	4	4
D. On-line Computer-based Standards Service	5	22	3	4	1	0	5	12	6

NOTE: Recorded data from 30 locations were used in this matrix.

NOTE: See Appendix B, Interview Worksheet, Category 11.

2.12 Internal Standards Policy: Departmental Order DoE 1300.2

2.12.1 The Questions Asked

The interviewees were asked if they had seen the new DOE Order 1300.2: Department of Energy Standards Program. Those who had seen it were asked if they had formed any opinions or had any comments.

2.12.2 The Responses Received

All 15 respondents from the headquarters offices and 9 of 19 field respondents had seen the Order. Seven of the ten who had not seen the document were at national laboratories or technical facilities. Four respondents (all DOE employees) praised the document, ten had no comment and seven perceived some problems. (See Exhibit 2.12.1.)

2.12.3 Interpretations and Analysis of Responses

The Standards Order apparently did not have the anticipated impact. It did not reach the level of implementation which had been expected by the NBS Survey Team. One proffered explanation is that DOE orders are perceived as too transient and may therefore engender apathy. Another possibility is the dearth of resources available to implement the Standards Order. The fact that 54 percent of those who reviewed the Order had "no comments" might be as significant as the identification of problems or negative comment. The Survey Team was not pursuaded that a sufficient level of "management guidance" was provided by the Departmental Standards Program, after the Order was issued, to effectively promote its implementation.

The Survey Team did not analyze the Order with the intent of offering criticisms in this report. However, on subsequent review, after analyzing the responses, it was noted that Subsection 7.b(1) of the Standards Order may not be adequate to cover the information needs of those standards areas that need a stronger focal point. In certain functional or technical areas that cross organizational lines, OQAS should be able to assign the responsibility to managers to take a lead role for defining standards information needs. If direct action by the Standards Program is lacking, it is likely that each element will hope that another element will expend its resources and share its information.

2.12.4 Findings and Recommendations

The comments made on the draft Standards Order by many standards managers and professionals should now be reviewed in light of the data obtained in this survey.

The Survey Team believes its most significant recommendation is as follows: The Departmental Standards Program must fully implement Departmental Order DOE 1300.2. This should be accomplished by:

1) preparing a policy implementation plan as soon as possible, then
2) convening the Standards Policy Committee to review and approve implementation priorities, schedules, etc.

Mere announcement of the Order was found to be insufficient. The Standards Program should assist individual standards coordinators who wish to phase in new functions and activities and should consult and provide guidance for other situations. This should be the "first agenda item" for the next Standards Policy Committee meeting.

Exhibit 2.12.1

DOE 1300.2, Department of Energy Standards Program

	Have You Seen It?	Any Comments So Far?
1	Yes	Didn't think EV was interested in area of Management Information Systems.
2	Yes	Unusual place to have responsibility.
3	Yes	Order meets our needs.
4	Yes	Definition of standards is too broad.
5	Yes	None.
6	Yes	No comments.
7	Yes	No comments.
8	Yes	Beautiful document.
9	Yes	No comments.
10	Yes	Manageable, difficult to observe.
11	Yes	No comments.
12	Yes	No comments.
13	Yes	None.
14	Yes	Good document.
15	Yes	Needs better definition of standards.
16	Yes	Don't have resources or time to implement the order.
17	Yes	Will be able to comment after one year; implementation will depend on funds.
18	Yes	None.
19	Yes	Not specific as to what DOE is trying to do.
20	No	
21	Yes	No.
22	No	Not seen by three interviewees.
23a	Yes	None.
23b	No	Sometimes see orders and directives, this one doesn't register.
23c	No	
24a	Yes	Needs more specifics to implement.
25a	Yes	No.
25b	Yes	No.
26	Yes	Totally unwaranteed.
27b	Yes	No comments so far.
27c	No	
28	Yes	Helped write it, looks good.

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.13 External Standards Policy: OMB Circular A-119

2.13.1 The Questions Asked

The interviewees were asked about OMB Circular No. A-119, "Federal Participation in the Development and Use of Voluntary Standards," and the reporting requirements of the draft implementation guidelines for the Circular. (See Appendix B, Interview Worksheet, Category 13.) Seven specific questions (the seventh in four parts) were related to the reporting requirements. Each question could be answered in terms of degree of anticipated compliance: yes, no trouble (NT); yes, with little trouble (LT); yes, with moderate trouble (MT); yes, with a great deal of trouble (GT); no (N); or the question is not applicable to this division or office (NA). The interviewees were only asked to estimate the level of effort required to gather the data together for an annual report.

For example, for the first reporting requirement, the interviewer posed the following question: "Could you provide an annual listing of standards developed by your office/division or adopted by your unit?" The second item in the first row of the matrix (See Exhibit 2.13.1) shows that 10 anticipated little trouble (LT) in responding to this requirement of the Circular. Five respondees found the question to be not applicable (NA).

2.13.2 The Responses Received

Exhibit 2.13.1 contains the responses for 33 DOE elements by question and level of effort required. The exhibit shows that, for every question, some respondents would encounter some trouble if their units had to meet the minimal reporting requirements of OMB Circular A-119. For question "a", a listing of developed or adopted standards, 7 of the 33 respondees said there would be "great trouble", 9 saw "great trouble" for question "b", on procurement, and 3 expected "great trouble" with "c", on acquisitions. Of 11 applicable instances, 3 interviewees felt that they could not answer questions "d" and "e" on the replacement of technical regulations and voluntary standards.

2.13.3 Interpretations and Analysis of Responses

Responses are somewhat similar to those expected from the private sector--there are too many reporting and paper work requirements. It appeared that the strongest responses came from experienced, standards professionals whether in support or in opposition to the reporting requirements. Nevertheless, NBS has had in operation for the last five years a reporting system based on data that are similar to the data needed for reporting requirements "f" and "g". This system continues to yield valuable information both to the Bureau managers and to the individual NBS participants.

2.13.4 Findings and Recommendations

The NBS Survey Team recommends that DOE collect information on employee committee assignments to benefit the standards professionals as well as the Departmental Standards Program. DOE should develop lists of appropriate

voluntary standards, standards developed or adopted by DOE, and mandatory standards and technical regulations. It is also recommended that DOE develop requirements, for use by all DOE units including contractors, for reporting of standards activities. These efforts will provide immediate enhancement of the coordination and management of the standards programs within the Department.

Under OMB Circular A-119, a Federal policy has been established for Executive Branch agencies which encourages participation in voluntary standards activities where such participation "is in the public interest and is compatible with the agencies' missions, authorities, priorities and budget limitations". The OMB Circular as issued in January 1980 established the policy that directed Federal agencies to "rely on voluntary standards both domestic and international with respect to Federal procurement, whenever feasible...."

On April 20, 1982, (after this survey was completed) OMB published a proposed revision of A-119 (47 F.R. 16920) which broadens the policy to promote reliance on voluntary standards in the "procurement and regulating activities" of the Federal Government. It appears that there will be little opposition to the expansion of the policy to include the use of voluntary standards in regulatory activities inasmuch as this conforms to the Administration's general philosophy and meets the objectives of regulatory reform.

In view of this new emphasis in Federal agency participation in voluntary standards activities and use of voluntary standards, the NBS Survey Team further recommends that DOE immediately begin to implement the recommendations discussed above relating to information on standards and standards activities, and that DOE also implement a standards program which will support and fulfill the policy directives contained in the OMB Circular. Implementing the new Federal voluntary standards policy should result in 1) greater and more effective agency involvement in voluntary standards activities, 2) a coordinated and well-managed DOE program relating to participation in voluntary standards activities, 3) the establishment of standardization needs and priorities, and 4) increased use of voluntary standards in DOE programs.

Exhibit 2.13.1

External Standards Policy

Draft implementation guidelines for the OMB Circular A-119 contain the following types of reporting requirements.

a. An annual listing of standards developed or adopted by your unit.
b. The total number of voluntary standards adopted for procurement acquisition purposes by your unit during the previous 12 months.
c. The total number of procurement acquisition standards withdrawn due to the adoption of voluntary standards by your unit during the previous 12 months.
d. The total number of voluntary standards adopted for regulatory purposes by your unit during the previous 12 months.
e. The total number of regulatory standards withdrawn due to the adoption of voluntary standards during the previous 12 months.
f. The number of representatives from your unit participating in the activities of each of the standards bodies, including the number of meetings attended and number of days spent on voluntary standards activities.
g. An annual report on support which your unit provided to each voluntary standards body in the following categories:
    1. Direct financial support (separate estimates for each standards body) including organizational membership fees paid, contracts given to standards bodies, and grants to standards bodies.
    2. An estimate of administrative support given to standards bodies such as hosting meetings or providing secretarial support.
    3. An estimate of technical support given to standards bodies including travel costs associated with meetings, costs of reviewing documents, preparing for meetings, and participating in cooperative testing programs.
    4. An estimate of costs associated with joint planning activities.

Thirty three respondents were asked if they could answer these types of questions for their unit. Their answers are in the table under the following headings:

Yes: No trouble (NT)	With little trouble (LT)	Moderate trouble (MT)	Great deal of trouble (GT)	No (N)	Not Applicable (NA)
a. 7	10	4	7	0	5
b. 3	5	2	9	0	14
c. 3	5	3	3	1	18
d. 0	0	4	0	2	27
e. 1	0	2	1	1	28
f. 4	10	12	2	1	4
g. 1 6	13	4	0	0	10
g. 2 6	8	7	4	0	8
g. 3 4	5	10	7	1	6
g. 4 4	6	6	6	0	11

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.14 Classifications of Standards Programs

2.14.1 The Questions Asked

The interviewees were asked to categorize the standards used in their program according to eight areas and to indicate if these were in-house DOE standards or other types of standards. The categories and the number of offices/divisions using each type is reported in Exhibit 2.14.1.

2.14.2 The Responses Received

Thirty four offices/divisions responded, choosing an average of five and a half categories each. Thirteen said they used primarily DOE standards and five said they used primarily non-DOE standards. Sixteen said they used both. Exhibit 2.14.2 shows the number of offices/divisions using each selected type of standard.

2.14.3 Interpretations and Analysis of Responses

There are many orientations to the Department's standards activities: administrative, functional, regulatory and technical. Additionally, the standards programs generally operate as part of the infrastructure, often independently of the formal DOE organization, and usually independently of each other. DOE is a complex, heterogeneous organization. The Departmental Program may not be able to maintain an overview of all the many types of standards activities within its structure no matter how it is organized.

2.14.4 Findings and Recommendations

DOE standards activities are many and varied. However, information needs are not so divergent among standards programs as to be not susceptible to a Departmental solution. There are three basic, information needs:

1) Identification of relevant standards by searching titles, indexes, etc.;
2) Identification of ongoing standards activities, voluntary as well as regulatory, that are relevant to a specific subject, including determination of the status of each activity, the organization responsible for it, and the name of the contact for further information; and
3) Acquisition of full text copies of standards (proposed as well as final) for review and application.

Quite often standards engineers from diverse Departmental elements are independently and simultaneously searching for similar, or even identical, standards. This is not only inefficient, but it encourages each decentralized Departmental element to attempt to develop and maintain an independent data base, which is usually uneconomical.

Considering the broad mixture (administrative, functional, regulatory and technical) of standards categories, a mechanism of focusing information for mutual support and enhancement would be highly desirable, capitalizing on the

fact that the component standards programs are staffed by highly-competent professionals. A unified and well-coordinated energy standards data base could increase efficiency and effectiveness, at least in pre-selected areas. Departmental coordination of standards and standardization information could be provided with very few additional resources.

Exhibit 2.14.1

Categories of DOE and Non-DOE standards

		P	R	O	C	S	H	E	A	Other
1	N									
	D	X		X						Business, Financial
2	N									
	D	X	X	X					X	
3	N									
	D	X		X					X	
4	N									
	D					X	X	X	X	
5	N									
	D	X								
6	N	X	X	X	X	X	X	X	X	
	D									
7	N									
	D	X	X	X	X	X	X	X	X	Minor Systems
8	N									
	D					X	X	X		Field
9	N				X	X	X			
	D									
10	N		X	X		X	X	X	X	
	D	X				X	X	X		
11	N			X	X	X	X	X		Technical
	D									
12	N				X	X	X	X		
	D									
13	N									
	D	X		X		X	X		X	

KEY: P - Procurement, R - Regulation, O - Operation, C - Commercialization, S - Safety, H - Health, E - Environment, A - Acquisition of Major Systems or Facilities, D - In-House DOE, N - Non-DOE

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

		P	R	O	C	S	H	E	A	Other
14	N									
	D			X		X	X	X		
15	N									
	D				X					
16	N	X	X	X	X	X	X	X	X	Calibration
	D	X	X	X	X	X	X	X	X	Packaging
17	N	X	X	X	X	X	X	X	X	
	D	X	X	X	X	X	X	X	X	Design Engineering
18	N			X	X	X	X	X	X	Engineering
	D									
19	N	X	X	X	X	X	X	X	X	
	D	X	X	X	X	X	X	X	X	
20	N	X		X	X	X	X	X		
	D	X		X	X					
21	N			X		X	X	X	X	Federal/State
	D	X	X	X		X	X	X	X	
22	N				X	X	X	X		
	D	X	X		X	X	X	X		
23a	N									
	D	X				X	X	X		
23b	N		X	X	X	X	X	X	X	
	D	X	X	X	X	X	X	X	X	Calibration
23c	N									
	D	X								
24a	N	X		X					X	
	D	X		X					X	
24b	N	X		X	X	X	X	X	X	
	D	X		X	X	X	X	X	X	
25a	N					X	X	X		
	D			X						Control

KEY: P - Procurement, R - Regulation, O - Operation, C - Commercialization, S - Safety, H - Health, E - Environment, A - Acquisition of Major Systems or Facilities, D - In-House DOE, N - Non-DOE

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

		P	R	O	C	S	H	E	A	Other
25b	N									
	D					X	X	X		
25c	N					X	X	X		
	D	X	X	X		X	X	X	X	SARS, QA
27a	N	X	X	X	X	X	X	X	X	
	D	X	X	X	X	X	X	X	X	
27b	N	X			X	X	X			
	D	X	X					X	X	Program
27c	N									
	D	X	X				X	X	X	
28	N									
	D	X		X	X	X	X		X	

KEY: P - Procurement, R - Regulation, O - Operation, C - Commercialization, S - Safety, H - Health, E - Environment, A - Acquisition of Major Systems or Facilities, D - In-House DOE, N - Non-DOE

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

Exhibit 2.14.2

Offices/Divisions Using Selected Types of Standards

Type of Standards	Number of DOE Units
Health (H)	28
Safety (S)	26
Purchasing (P)	25
Environmental (E)	24
Operational (O)	22
Systems/Facilities (S/F)	20
Commercialization (C)	17
Regulatory (R)	14
Other (O)	13

2.15 Respondents' Most Important Standards Activities

2.15.1 The Question Asked

The interviewees were asked to describe the standards-related activities of major importance to their programs.

2.15.2 The Responses Received

There were 48 responses. (See Exhibit 2.15.1.) In twelve cases, either the respondents named two activities or the Survey Team fit their responses into two categories. Standards development was clearly identified as the most important standards activity by 10 respondents. Developing, writing and publishing both in-house DOE and, in coordination with others, non DOE standards, led the list.

Chosen second, with eight responses, was the adaptation, application, and implementation of standards. Conducting technology assessments to determine standards needs and reviewing or commenting on standards development by others each received three responses.

Seven respondents reported interaction and coordination with agencies external to DOE as their most important standards activity. These included interactions with voluntary standards bodies and other organizations in the private sector and governmental agencies at all levels. Another seven identified management and coordination of standards activities internal to DOE as the most important. Four respondents cited their involvement with requirements such as standards related DOE policy and Federal laws or regulations (such as ES&H).

Six respondents selected activities that relate directly to standards information or data. Descriptions noted in the interviews included the preparation of procedures for collecting and reporting data and establishing compatibility with research at other facilities, development of model documents and manuals, and the general interchange of information.

2.15.3 Interpretations and Analysis of the Responses

The discussions clearly revealed that standards activities are perceived by DOE employees and DOE contractor employees as subordinate to the overall mission of almost all of the departmental elements contacted, but generally as being well-integrated into most energy programs on an ongoing basis.

These key standards activities are also diverse, hence the Departmental Standards Program will have difficulty in maintaining an overview of the "most important" activities. The Standards Policy Committee may even have problems in defining "most important".

2.15.4 Findings and Recommendations

The Survey Team found several patterns of standards activities (e.g., conducting technology assessments, revising or adapting voluntary standards for DOE use, etc.) which are important to the individual programs and, consequently, important to the overall mission of DOE. The data are inconclusive, however, as to whether these similar activities are mutually enhancing or "going it alone". The Departmental Standards Program should, at a minimum, assist these elements in getting to know each other. DOE should convene a forum to develop or document productive methods and techniques for enhancing uniformity in the Department's standards development activities. The Standards Program should expand its coordinated involvement in standards activities even though perceived opportunities to bring uniformity to the Department's standards activities may not be based on clear relationships with the field.

Exhibit 2.15.1

Describe Standards Activities of Major Importance to Programs

1 Review all major MIS Proposals--plan to standardize data elements on usage, definition and terms.

2 Facilitate interchange of information through networks connected to AUTODIN. Ensure that messages comply with standards.

3 Fortran extension development effort which may result in recommended standard change through established procedures with ANSI Fortran Committee and NBS.

4 Monitor national codes and standards relating to construction.

5 Review and comment on GSA and Military Specifications and Standards (distribute to affected DOE offices if necessary).

6 Transfer agent between programs and regional offices, implement activities.

7 Management and coordination of standards development and application. Encourage consideration by program managers of standards development and updating.

8 Identify standards needs (industry contractors go to voluntary standards bodies for development of standards).

9 Development of a model solar document, respond to needs of state and local governments and public.

10 Development of standards, fund ANSI Steering Committee. Major activities carried out by using voluntary standards bodies, NBS codes and SERI.

11 Work with the private sector.

12 Work with industry and associations toward standards development; task force groups formed.

13 Radiological program is of major importance. Toxic Substances Act has major impact.

14 Identify standards needs by site survey, match with existing standards or develop new standards when necessary; comment on NRC regulations relating to reactor safety.

15 Standards procedures, forms, and generic terms; statistical guidelines for collecting and reporting on data.

16 Implementation of appropriate design and construction standards by contractors thru appraisals and audits.

17 Implementation of DOE Standards Policy. Make sure applicable standards are specified and all use same terms.

18 Identification of needs (functional and marketplace)--the development of test methods.

19 Develop "Prefered List of Standards to be used at INEL." Help to determine need for new standards. Design standards.

20 Assure compliance with ASME Codes--use RDT standards where higher level of quality is necessary.

21 Verify and certify standards--make data compatible with research at other facilities (as in gasification methods development)--application of Calibration Standards.

22	Go to bodies and ask them to be advisors to review programs and recommendation tests--avoid environmental problems associated with new systems.
23a	Adopt national standards--develop or modify standards for unique requirements.
23b	Compliance with established standards. Design to consensus standards.
23c	Matching available health standards with employees. Input for Headquarter's and pre-employment exams, physical fitness standards test for guards.
24a	RDT Standards.
24b	Management and coordination of standards, development for nuclear energy facilities; publish RDT standards.
25a	Development of analytical methods for intercomparisions of processes.
25b	Support and comment on standards developed by DOE.
25c	Knowing what standards are available, keeping up to date.
26	Generate unique specifications based on climate and geography and quality control requirement imposed on vendors.
27a	Monitor contractors activities to ensure compliance with required standards.
27b	Write RDT and industrial standards, assist engineers to use standards.
27c	Develop standards to chemically measure liquids in geothermal area. Environment area is key, health and safety is second in order of importance.
28	Work with RDT Standards (assist in development and use them).

Note: Numbers 1-15 are headquarters offices (see Exhibit C.1) and numbers 16-28 are field organizational units (see Exhibit C.2).

2.16 Persistent Problems that Diminish Effectiveness of Standards Activities

2.16.1 The Question Asked

The interviewees were asked to identify any persistent problems which have diminished their ability to carry out their standards activities. The interviewers suggested several possibilities (e.g., money, organization, literature, staff, policy, travel restrictions, etc.) and asked the interviewers to describe their most persistent problem. The interviewers generally encouraged the interviewees to be specific rather than express the general need for more money, more staff or both. The gist of their statements are summarized in Exhibit 2.16.1.

2.16.2 The Responses Received

Eight respondents saw no persistent, major, serious or unusual problem. However, 21 respondents specifically identified inadequate resources, 12 naming funding and nine naming short staff. Information, its availability and flow, was identified as a persistent problem ten times, organizational structure was identified seven times, and management problems and problems relating to policy were each identified four times.

Twelve respondents encountered persistent problems in meeting their external interface requirements. Seven of those had significant difficulties with external agencies involving policy, coordination or timeliness. Five were concerned about being able to participate in standards activities of outside organizations, with two specifically citing limited travel funds.

Five respondents addressed the need to "sell" standards continually, to improve their image and to rejustify their existence. In twelve statements, the persistent problem reflected directly on the ability of the respondent to do his or her job; six were general in nature and an equal number were more explicit.

2.16.3 Interpretations and Analysis of the Responses

The tone of the respondents varied considerably as they described their problems, some showing extreme concern. However, many statements can be interpreted as "nothing unusual". Most of the problems surfaced and were discussed in earlier sections, but some received added emphasis, such as the need for information and additional staff. Many respondents, in the aggregate, merely identified opportunities for the Departmental Standards Program to improve its effectiveness.

The seven statements relating to external interface activities reflect the most significant problems distilled by the survey team. Questions of department-wide significance, such as the suggestion that DOE provide specific written instructions for participants in standards committee activities, should be addressed by the DOE Standards Program.

2.16.4 Findings and Recommendations

These statements are quite similar to responses discussed in earlier sections, but require further examination by the Standards Coordinators to assess their supplemental value. Quick-fix "solutions" for locally-viewed problems may have beneficial short-term effects. However, it is instead recommended that the set of problems be addressed as a whole within the context of an overall approach.

Exhibit 2.16.1

The Respondents Statements of Persistent Problems

Staff size is inadequate.

Have only one staff person and need 4 to 6.

Getting by, short on staff but no serious problem.

Staff shortage, we have 3 need 6, minimum of 5.

Standards coordination previously done five days per week was not sufficient; it is being cut to one day per week.

There is a Headquarters personnel shortage.

Funding--travel money.

Money for programs to develop and update standards (particularly to update).

Funding constraints.

If industry speeds up program, may need money to speed work to develop codes and standards.

Budget cuts.

Too much reporting and documentation.

Reference sources are inadequate.

No one knows what is going on in DOE standards.

Senior management is not aware of standards requirements.

Review and update of lists of required standards should be made twice a year.

Distribution of DOE Orders, never got copy of 1300.2.

More substantial empirical data base.

Information is needed for complex technical interactions.

No DOE quality assurance program.

Inappropriate location in organization for this function (inappropriate emphasis).

Organization mitigates against implementing standards. Problems of organization, reorganization and changing management.

More strength is needed by Headquarters in standards position for areas other than nuclear energy.

No central activity in DOE for design review in relation to construction standards.

New decentralization will diffuse contacts; effective coordination of standards will be lost.

Constant change--need to develop new relationships.

Management perspective is too diverse; middle management favors strong decentralization.

Must educate each new upper management person.

More direction and funding to determine options and examine alternate solutions.

Can't anticipate need for development of new standards because of institutional barriers.

Industry often wants lowest common denominator standards--lowest level agreeable.

A serious gap exists relating to standards of interior, environmental quality. As energy requirements tighten, health hazards increase--work must be done to determine acceptable levels.

Chapter 1 to Order DOE 5480.1 needs revision.

Policy on existing standards support is not consistant.

Standards participation receives low priority in times of funding constraints.

Getting standards in place with State and local governments.

Lack of real support to participate when money is tight.

Specific written instructions should be given for participation in standards committee activities.

In past standards participation was encouraged now they anticipate budget problems.

Problems with National Security Agency on data encryption standards.

The Respondents Statements of Persistent Problems (Continued)

Not completely satisifed with the process of producing FIPS standards.

By the time comments are requested on a proposed government standard they are so far along that comments aren't fully considered or can't be.

Availability of travel funds.

Problem of paying for travel to standards meetings.

Senior management does not endorse or support standards programs with people and money.

The Standards Coordinator is a "step child."

Image of standards is inadequate.

Must constantly "sell" standards.

Can't keep up with development; we have 2 standards people, need 4.

Falling behind in maintaining reviewing and updating about 25 RDT standards--not enough money.

Some things (the need for new standards) will fall thru the cracks.

Standards need to be revised.

Testing is limited and Delphi technique doesn't always work--standards developers need more resources.

Ability to meet new standards needs is slipping.

Scope of work packages should include guidance for standards development.

New standards cannot be put into place quickly.

It's hard to fit new technologies into existing technical regulations, standards defintions, and worst-case scenarios.

Difficulty implementing standards for certain applications.

Lack of availability of standards--many must be custom made for a project.

Not enough resources in safety area to respond to each specific safety requirement.

2.17 Respondents' Recommendations to Improve DOE Standards Program

2.17.1 The Questions Asked.

The survey team asked the interviewees for recommendations to improve the present standards programs and any additional recommendations or suggestions concerning organizational policies, authority/responsibility, or support from DOE, such as standards information services, monitoring of standards development, or additional resources.

2.17.2 The Responses Received.

Forty-six suggestions and recommendations from the participants have been roughly characterized into seven areas; other possible sets might be useful for the interests of other analysts. There are four statements on resources, eight on information systems, and ten in the information/communications area. There are seven organizational type suggestions and three concerning the standards professionals as a group. Seven statements relate to management and six are characterized as suggestions that relate to Department policy. (See Exhibit 2.17.1.)

2.17.3 Interpretations and Analysis of the Responses.

Many of the suggestions or recommendations are broad in their outlook, others deal with a specific problem of a particular respondent. Taken as a whole, however, they provide a framework for improving the productivity of the individual DOE standards professional, as well as the effectiveness of the Departmental standards programs.

Statements generally characterizable as "policy or management" reflect a desire for more awareness and support by higher management, as well as more management involvement in priority setting at the project level. The responding DOE standards professionals seem to want clearer directions for their projects and sharper guidelines for their interactions with the standards community. Stronger and more explicit policy statements need to be developed and implemented. More responsive standards management at headquarters must pervade the decentralized and widely scattered Departmental elements.

Eight respondents suggested that an effective standards information system is needed. Such a system should include an energy standards data base with listings of existing standards and current standards development activities. It should be available in each technical library, on-line and searchable by Department standards professionals, and backed up with full text of all relevant and appropriate standards. The Survey Team believes that many of the elements of such a system are already in operation in diverse locations and at moderate levels. The Departmental Standards Program must decide when to act in this area and how to effectively coordinate these elements.

Communications on standards matters currently appear to be inadequate at all levels within the Department. Ten respondents stated emphatically that they want to know, or need to know, much more about each other's activities and

programs (i.e., who among their peers are knowledgable in key areas, on committees of mutual interest or just doing things that they should know about). The requested information suggests a program that could be implemented in a cost effect manner.

2.17.4 Findings and Recommendations.

A method for incorporating some of these suggestions into a base for future action was suggested in the previous section. Moreover, the NBS survey team finds these suggestions to be representative of a high interest in standards at DOE and recommends to the Departmental Standards Coordinators that they carefully consider the merits of each suggestion.

Exhibit 2.17.1

Suggestions and Recommendations to
Improve Present Standard Program

Improve environment by supporting activities of individuals on voluntary standards bodies.

Better Headquarters staff and funding.

DOE support could help on travel to ASTM geothermal committee.

Ten percent of the RDT standards are too rigorous; more money is needed.

Would like a data bank available to check on existence and sources of standards.

Full-text of required standards should be disseminated throughout DOE to all relevant areas.

Need more information on relevant standards in process; monitor ANSI N-Series, EPA and NRC.

Better centralized information service that can be tapped into, to look for existance of standards.

Would like a more adequate standards reference library.

Reports on status of standards development are needed in field.

A central monitoring system could cover current standards activities, new and revisions, but it would not be specific enough for individual programs.

A monitoring system for standards development information and a "needs identification" program are needed.

Only problem is getting hands on latest revision (we'll have a member on committee if its that critical).

Would like to see a list of who's on which committee doing what in DOE.

Offical channel of communications for non-nuclear is needed.

Need information referencing various standards responsibilities of different secretaries.

Improved communications (was not aware of DOE Standards Policy Committee).

More field awareness of Departmental Standards program is needed.

Suggestions and Recommendations to Improve
Present Standard Program (Continued)

Need good information program to promote standards.

More information on department wide standards activities would be useful.

Needs to be a way for ADP Management to be more aware of the activities that EIA and MIS Group in Controllers Office are doing in ADP standards area.

Support annual get-together of working people.

Departmental Standards Program needs to locate expertise for guidance and comments in drafting of new standards.

Problem of cooperation from other elements: i.e., no comments or criteria, they are either unwilling or unable to comment.

Use guides at highest level of organization for entire activity.

Packaging of safety requirements needed and programs to do it. They should be cited precisely.

Outreach for standards opportunities should be at Headquarters rather than Oak Ridge.

Need crosscutting of other government agencies to support but not dominate voluntary standards activities.

Each Operations Office should have a focus for standards coordination.

Well organized monitoring programs, similar to nuclear, are needed for other technologies.

Need primary office in DOE that coordinates policy and works with industry to bring standards about.

Continue to use existing systems avoid redevelopment.

More awareness and backing by DOE in standards area, other than Nuclear Management.

DOE management should decide who sets priorities and monitors projects.

Improve upper management support and recognition of standards programs; currently there's no clout.

If proposed government standard has serious ramification and DOE commentor feels strongly enough to have a meeting on objections or comments, a hearing should be schedules before finalization.

Suggestions and Recommeendation to Improve
Present Standard Program (Continued)

There needs to be a firm positive DOE policy to continue support of programs that successfully accelerate voluntary standards programs.

Stronger policy by higher management for standards programs within DOE.

Revise DOE 5480.1, Chapter 1.

Specific line items for certain standards could be considered.

Desirability of having voluntary standards developed for energy technology needs better direction, and priorities set by management.

Fund NSMC directly; fund standards separately not in bits and pieces from overhead.

Policy is needed to provide program line item on standards development in program work package.

Appendixes

Table of Contents

APPENDIX A

U.S. Department of Energy

Washington, D.C.

ORDER

DOE 1300.2

12-18-80

SUBJECT: DEPARTMENT OF ENERGY STANDARDS PROGRAM

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1. PURPOSE. This Order establishes general policy guidelines, authorities and responsibilities for Department of Energy (DOE) standards programs and guidelines for participation in private sector standards organizations.

2. SCOPE. The provisions of this Order apply to all Departmental elements, including the Federal Energy Regulatory Commission, and to all DOE contracts which require adherence to Departmental Directives.

3. EXCLUSIONS. This Order does not apply to Federal interagency standards development, such as automatic data processing and data communication standards, or to the internal Directives system of the Department.

4. REFERENCES

   a. Federal Energy Administration Act of 1974 (15 U.S.C. 761) as amended by Public Law 95-70 of 7-21-77 which added Section 32, "Use of Commercial Standards." Section 32 sets forth requirements for the Secretary as a condition in using non-Federal commercial standards in carrying out DOE's regulatory responsibilities formerly assigned the Federal Energy Administration. This Act applies only to those DOE functions that originated in the Federal Energy Administration.

   b. Federal Participation in the Development and Use of Voluntary Standards, Office of Management and Budget Circular A-119 of 1-17-80 which establishes policies to be followed by executive branch agencies in working with organizations which plan, develop, produce, and coordinate voluntary standards. It also establishes policies to be followed by executive branch agencies in adopting and using standards for procurement purposes.

5. DEFINITIONS.

   a. Standard. A prescribed set of rules, conditions, or requirements concerned with classification of components; delineation of procedures; specifications of materials, performance, design, or operations; the definition of terms or measurements of quality and quantity in describing materials, products, systems, services or practices.

DISTRIBUTION:
All Departmental Elements
Federal Energy Regulatory Commission

INITIATED BY:
Office of Environment

b. Voluntary Standards (commercial standards). Those standards that are established generally by private sector bodies and are available for use by any person or organization, private or governmental. Voluntary standards are also referred to as "industry standards" as well as "consensus standards" (standards developed under due process procedures) but do not include professional standards of personal conduct, private standards of individual firms, standards mandated by law, or standards of individual organizations for their internal use.

c. Government Standards. Federal agency standards and specifications including proposed or recommmended standards developed by Federal agency personnel, outside groups under agency regulations, or by organizations or committees made up solely of Government agency representatives.

d. Voluntary Standards Bodies. Nongovernmental bodies which are broadly based, multimembered, domestic and multinational organizations, industry associations, and professional or technical societies which develop, establish, or coordinate voluntary standards activities.

e. Standards-developing Groups. Committees, subcommittees, boards or other principal subdivisions of voluntary standards bodies, established by such bodies for the purpose of developing, revising, or reviewing standards, and which are bound by the procedures of those bodies.

f. DOE Representative. An employee approved by the DOE Designating Official: (1) to work on standards committee assignments by reason of individual professional or technical expertise to further technical programmatic objectives of the Department or (2) to serve as an official spokesperson for the Department on boards of directors governing as policy-developing bodies, including, for example, management boards of standards developing organizations.

g. Interagency Committee on Standards Policy. A committee established under the auspices of the Department of Commerce to coordinate and provide policy guidance to the heads of Federal agencies on standards. It is comprised of representatives from the major Federal departments and agencies which have an interest in standards. The Committee is chaired by the Deputy Assistant Secretary for Product Standards, Office of the Assistant Secretary for Productivity, Technology and Innovation, U. S. Department of Commerce.

b. Objective. It is the objective of this Order to bring uniformity to the Department's standards activities through coordinated involvement in standards development and to ensure that appropriate attention is given to standards use and development in fulfilling DOE's mission.

7. RESPONSIBILITIES AND AUTHORITIES.

a. The Assistant Secretary for Environment shall:

(1) Develop policies, implementating procedures and guidelines with respect to the Department's standards program activities, interpret this Order, and make recommendations for changes as appropriate.

(2) Provide a focal point for the coordination of internal and external matters relating to the Department's standards policy and generic program. Such coordination shall include liaison with other Federal agencies; participation as a member of the Interagency Committee on Standards Policy; and coordination with voluntary standards bodies, recognizing that standards development and their coordination is the responsibility of the Department's organizational elements.

(3) Maintain an overview of DOE standards activities to identify generic issues, problems, and proposals for consideration of DOE management and develop the supporting information necessary for such consideration.

(4) Be responsible for ensuring the implementation of Office of Management and Budget Circular No. A-119 by the Department of Energy. Interface with the Secretary of Commerce in the development of the procedures required by the Circular.

(5) Serve as the DOE Designating Official for the purpose of designating DOE Representatives to voluntary standards committees and international voluntary standards development activities. Such designations shall be based on the coordinated recommendations of the appropriate DOE organizational elements. (See 7b(5).)

(6) Coordinate contracts and grants to voluntary standards bodies to preclude duplication.

6. POLICY AND OBJECTIVE.

a. Policy

(1) General. The policy of DOE in its procurement, regulatory, and other program activities is to:

(a) Recognize that standards and their use are integral to its mission.

(b) Ensure the development of appropriate standards for regulatory, operational, and commercialization activities; give preference to developing standards through the consensus process (standards developed under due process procedures).

(c) Rely on domestic or international voluntary standards when such voluntary standards are adequate and appropriate for the intended application, except when a mandatory government standard applies.

(d) Conduct standards activities consistent with Federal statutes and policies taking into account, for example, laws and regulations relating to antitrust, national security, small business, product safety, the environment, and conflict of interest.

(2) Participation. The Department encourages participation in the activities of voluntary standards developing bodies consistent with Office of Management and Budget Circular No. A-119, guidance provided by the Department of Commerce and Chapter 1 of this Order. Participation may extend to chairing committees; serving as a DOE Representative on standards committees, writing groups or task forces. Participation may also extend to voting in committee activities consistent with Federal guidance. Participants may not vote when specifically instructed by the DOE Designating Official, or if working on DOE program functions formerly assigned to the Federal Energy Administration. This latter prohibition is in conformance with the Federal Energy Administration Act, Section 32. In order to maintain the private nature of non-Government organizations, DOE representatives will refrain from decision-making involvement in the day-to-day management of such organizations (e.g., selection of salaried officers and employees, and establishment of staff salaries).

(7) Maintain central data base of information on:

(a) Standards program and activities.

(b) Personnel participating in private sector standards development activities.

(c) Listing of externally developed voluntary standards adopted or endorsed for use by the Department.

(d) Listing of existing Departmental standards and those under development to satisfy Department needs.

(e) Resources applied to standards utilizing input from the Offices of the Controller and Administration.

(8) Assist Departmental elements in establishing appropriate standards activities, as requested.

(9) Develop an annual report on standards activities to advise management on the extent and type of involvement with private sector standards activities, and other reports as necessary in carrying out these responsibilities.

b. Heads of Departmental Elements and the Chairman of the Federal Energy Regulatory Commission shall:

(1) Establish and implement appropriate standards programs and provide necessary resources in their areas of responsibility in accordance with this Order to assure that standards are used and developed as necessary in their assigned areas. When appropriate, these activities should extend to the development of a "Standards Program Plan" which describes strategies for the identification and development, needed resources and allocations and other selected activities to assure that adequate standards will be available and used when needed to accomplish mission objectives. The organizational standards program plans and revisions should be provided to the Assistant Secretary for Environment for evaluation and comment to reduce overlap, redundancy, and conflict in program approaches and activities.

(2) Observe the following principles in planning, developing and implementing standards activities:

(a) Work with voluntary standards bodies and qualified technical experts, including those from small business and the general public in developing plans for satisfying program standards needs.

(b) Assure utilization of voluntary standards promulgated by private sector standards bodies, when such standards are applicable and adequate for the intended use except when a mandatory Government standard applies, and further assure that standards adopted for regulatory application in carrying out responsibilities formerly assigned to the Federal Energy Administration conform to the requirements established in the Federal Energy Administration Act, Section 32.

(c) Provide general support where appropriate to voluntary standards bodies, including direct financial support, indirect or administrative aide, and technical support.

(d) Develop interim Departmental or program specific standards only when mandatory Government or voluntary standards or adequate commonly accepted commercial standard practices are not available or cannot be prepared in a useable form on a timely basis.

(e) Utilize the talents and benefits available from national and international standards organizations.

(f) Encourage the development of appropriate performance standards recognizing the need for prescriptive or design standards in some applications.

(3) Develop external relationships to work with other Federal agencies, voluntary standards bodies, or standards setting bodies of other nations in the development of standards that meet specific program objectives.

(4) Encourage and support participation of DOE staff members as representatives in voluntary standards or international standards bodies when it serves the best interest of DOE and the Federal Government.

(5) Nominate to the Assistant Secretary for Environment representatives to voluntary standards bodies. (See 7a(5).)

(6) Report to the Assistant Secretary for Environment, upon request, data necessary to fulfill the reporting requirements of Office of Management and Budget Circular A-119 and Department of Commerce implementing guidance, concerning program resources applied to standards activities.

(7) Coordinate with the Assistant Secretary for Environment contracts and grants to voluntary standards bodies to preclude duplication.

(8) Designate a person to serve as organizational representative with the Assistant Secretary for Environment in carrying out liaison and coordination activities.

William S. Heffelfinger
Director of Administration

Appendix B

DOE STANDARDS ACTIVITIES INTERVIEW WORKSHEET

1. Interviewees in the Survey

Name_____
Title _____
Office _____
Primary Duty _____
DOE _____
Contractor _____
Number of Years involved with standards _____

2. Interviewees' Technology, Program, or Support Function

Please describe briefly the energy technology that is being developed by your program or the technology you support.

_____
_____
_____
_____
_____

What current stage of technological development best describes this program?

a. Research

b. Early development

c. Pilot development

d. Commercialization

e. On-going commercial technology

f. Other _____

Remarks _____
_____
_____
_____

3. Technology Assessments to Determine Standards Needs

Do these activities primarily involve Technology Assessment to determine standards needs?

Remarks _____

4. Attributes of Standards Activities

Do you use, develop or adopt standards?
Do these standards activities primarily involve:
Development/Use of DOE Standards;
Development/Use of Voluntary Standards?

Remarks _____

5. Monitoring of On-going Standards Development Activities

Do these standards activities primarily involve Monitoring on-going standards development?

Remarks _____

6. Organizational Structure Employed for Standards Activities

Please describe your organizational structure now employed for standards activities. Include authority and responsibility fo the various units.

_____

7. The Energy Standards Infrastructure

What other DOE organization do you normally maintain contact with relating to Standards? Identify organization, describe relationship and how it is accomplished.

If Office of Quality Assurance and Standards is not included, ask specifically if they have any contact. Yes/No.

If Yes, what was the nature of the contact?

8. External Interface Requirements

What contacts do you maintain with the following? What type of contact? (i.e., attend meetings, participate, contracts, etc.) (List names of associations, agencies, bodies etc.)

(a) Industry associations or companies developing standards

(b) Voluntary domestic standards bodies

(c) International standards bodies

(d) Federal government agencies

(e) State or local government

_____
_____
_____
_____

9. Documents and Records

Do you have any internal standards procedures or guidelines in place or in process? Yes/No. (If yes, request copies)

Do you have a list of standards that your program uses? ... that your program has under development? Yes/No. (If yes, could we have a copy?)

Do you have a list of your publications that use or relate directly to standards? Yes/No.

What record keeping activities are now being used, if any, to record money spent or time expanded in standards work?

_____
_____
_____

Is there one person involved in this record keeping? Yes/No.
Identify _____

10. Standards Activities Commitments: Funding and Manpower

What resources would you <u>estimate</u> your organization committed to direct standards activities (i.e., developing, reviewing, commenting, etc.) in FY80? Would FY81 be materially different? If so, describe.

<u>Estimated $ FY80</u>

Total funding _____
Project personnel _____
Travel _____
Contracts with DOE laboratories _____
Contracts with companies _____
Contracts with other government agencies _____
Grants/contracts with universities _____
Information System _____

Total funding for program or organization for which this information is pertinent _____

13. External Standards Policy: OMB Circular A-119

Draft implementation guidelines for the OMB Circular A-119 contain the following types of reporting requirements.

Could you answer these types of questions? (Substitute your organization for DOE or agency.)

Yes, no trouble	With little/Moderate/Great deal of trouble			or	No
(Y)	(LT)	(MT)	(GT)		(N)

NA - Not applicable

a. An annual listing of standards developed or adopted by DOE.
b. The total number of voluntary standards adopted for procurement acquisition purposes by the agency during the previous 12 month.
c. The total number of agency procurement standards withdrawn due to the adoption of voluntary standards by the agency during the previous 12 months.
d. The total number of voluntary standards during the previous 12 months.
e. The total number of agency regulatory standards withdrawn due to adoption by the agency of voluntary standards during the previous 12 months.
f. The number of agency representatives participating in the activities of each of the standards bodies, including the number of meetings attended and number of days spent on voluntary standards activities.
g. An annual report on agency support to each voluntary standards body in the following categories:
    1. Direct financial support (separate estimates for each standards body) including organizational membership fees paid, contracts given to standards bodies, and grants to standards bodies.
    2. An estimate of administrative support given to standards bodies such as hosting meetings or providing secretarial support.
    3. An estimate of technical support given to standards bodies including travel costs associated with meetings; costs of reviewing documents, preparing for meetings, participating in cooperative testing programs.
    4. An estimate of costs associated with joint planning activities.

Estimated Manpower for FY80

Total man-years devoted to standards _____
Number of people devoted solely to standards _____
  Total man-years for full-time to standards _____
Number of people devoted part-time to standards _____
  Total man-years for part-time people _____

Total man-years for program or organization for which the above information is pertinent _____

11. Standards Information: Sources and Mechanisms

Where do you get most standards information?

_____
_____
_____
_____

Do you use/have available the following and if you use them or have them available, are they adequate:

	Yes/No	If yes, is it adequate? Yes/No	If no, would you desire? Yes/No
(a) Standards catalogues	_____	_____	_____
(b) In-house standards collection	_____	_____	_____
(c) On-line computer-based standards service	_____	_____	_____
(d) Technical library with standards collection	_____	_____	_____

Remarks

_____
_____
_____

12. Internal Standards Policy: Departmental Order DOE 1300.2

Have you seen the new DOE Order 1300.2 Department of Energy Standards Program (12-18-80)? Yes/No.

If yes, any comments so far?

_____
_____
_____

14. Classifications of Standards Programs

Standards in this program are primarily related to:

	In house DOE	Public
(a) procurement	( )	( )
(b) regulation	( )	( )
(c) operation	( )	( )
(d) commercialization	( )	( )
(e) safety	( )	( )
(f) health	( )	( )
(g) environment	( )	( )
(h) acquisition of major systems or facilities	( )	( )
(i) other _____	( )	( )

15. Respondents' Most Important Standards Activities

Describe standards activities of major importance to your program.

_____
_____
_____
_____

16. Persistent Problems that Diminish Effectiveness of Standards Activities

Can you identify any persistent problems which have diminished your ability to carry out your standards activities? Yes/No i.e., money, organization, literature, staff, policy? Please describe.

_____
_____
_____
_____

17. Respondents' Recommendations to Improve Standards Program

Do you have any recommendation to improve the present standards programs. Yes/No Please describe.

_____
_____
_____

If the discussion does not touch the following--ask if there are any suggestions or recommendation on items below:

(a) Organization policies authority/responsibilities
(b) Support from DOE
    (1) Standards information service
    (2) Monitoring of standards development
    (3) Other
(c) Additional resources

_____
_____
_____
_____
_____

Name of Person Interviewed _____
Job Title _____
Work Address _____
_____

Work Phone _____

Would you suggest several others we should talk to in the field.

_____
_____
_____
_____

Interviewers _____
_____

Date of Interview _____

Appendix C

Headquarters Offices and Field Units Included in the Survey

The Survey Team selected 15 headquarters offices (see Exhibit C.1). Five of these offices were under the Assistant Secretary for Management and Administration and four were under the Assistant Secretary for Conservation and Renewable Energy.

The Survey Team selected 23 organizational units at 13 field locations and met with both DOE and DOE contractor employees at these locations. (See Exhibit C.2.) Two of the field locations visited were energy technology centers, seven were national laboratories, and four were other facilities or institutes. Concurrent interviews were completed for seven DOE field offices at seven of those locations.

A total of 63 DOE or DOE contractor employees were interviewed. Four members of the NBS Survey Team conducted 36 separate interviews, lasting from two to four hours each. Twenty-one of the interviews were held at 13 field locations; 15 interviews were conducted at headquarters offices in the Washington, D.C. area. In many interviews there were two or more employees present with more than one responding to the questions. Part 2 presents the data, summarizes the results and sets forth the interpretations and findings.

EXHIBIT C.1
List of Headquarters Offices

1 A/S for Management and Administration
(Information Systems)

2 A/S for Management and Administration
(Telecommunications)

3 A/S for Management and Administration
(ADP Management)

4 A/S for Management and Administration
(Construction)

5 A/S for Management and Administration
(Procurement)

6 A/S Congressional, Intergovernmental
and Public Affairs

7 A/S Nuclear Energy
(Quality Assurance and Standards)

8 A/S Fossil Energy
(Enhanced Oil Recovery)

9 A/S Conservation & Renewable Energy
(Buildings Division Passive Solar)

10 A/S Conservation & Renewable Energy
(Buildings Division Active Solar)

11 A/S Conservation & Renewable Energy
(Geothermal Energy)

12 A/S Conservation & Renewable Energy
(Photovoltaic Energy)

13 A/S Defense Programs
(Military Applications)

14 A/S Environmental Protection, Safety &
Emergency Preparedness

15 Energy Information Administration
(Energy Data Standards)

A/S = Assistant Secretary

These numbers key to Exhibits in Part 2.

EXHIBIT C.2
List of Field Organizational Units

16 Albuquerque Operations Office and Laboratories

17a Chicago Operations Office

17b Chicago, Argonne National Laboratory

18 Denver, Solar Energy Research Institute

19 Idaho National Engineering Laboratory & Operations Office

20 Los Angeles, Energy Technology Engineering Center

21 Morgantown Energy Technology Center

22a New York, Brookhaven National Laboratory (Conservation)

22b New York, Brookhaven National Laboratory (Hydrogen Technology)

22c New York, Brookhaven National Laboratory (Geothermal)

23a Nevada Operations Office

23b Nevada Test Site (Weapons Facilities)

23c Nevada Test Site (Medical Group)

24a Oak Ridge Operations Office

24b Oak Ridge National Laboratory

25a Pittsburgh Energy Technology Center (Analytical Chemistry)

25b Pittsburgh Energy Technology Center (Environment Safety and Health)

25c Pittsburgh Energy Technology Center (Liquefaction Project Management)

26 Portland, Bonneville Power Administration

27a Richland Operations Office

27b Richland, Hanford Engineering Development Laboratory

27c Richland, Pacific Northwest Laboratory

28 Savannah River Operations Office and Laboratory

These numbers key to Exhibits in Part 2.

Appendix D

List of Acronyms and Abbreviations Used in This Report

ACI	American Concrete Institute
ADP	Automated Data Processing
AGA	American Gas Association
AICHE	American Institute of Chemical Engineers
AIF	Atomic Industrial Forum
AISI	American Iron and Steel Institute
ANL	Argonne National Laboratory
ANS	American Nuclear Society
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating & Air-Conditioning Engineers, Inc.
ASME	The American Society of Mechanical Engineers, Inc.
ASQC	American Society for Quality Control, Inc.
ASTM	American Society for Testing and Materials
AUTODIN	Automatic Digital Network
AWS	American Welding Society, Inc.
AWWA	American Water Works Association, Inc.
BNL	Brookhaven National Laboratory
DCASR	Defense Contract Administration Service Region
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DOT	Department of Transportation
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESDB	Energy Standards Data Base
ES&H	Environmental, Safety and Health
ETEC	Energy Technology Engineering Center
EV	Environment
FE	Fossil Energy
FIPS	Federal Information Processing Standards
FRC	Federal Regional Council
FTC	Federal Trade Commission
GOCO	Government Owned Contracter Operated
GSA	General Services Administration
HEDL	Hanford Engineering Development Laboratory
HUD	Department of Housing & Urban Development
IAEA	International Atomic Energy Agency
IEEE	The Institute of Electrical and Electronics Engineers, Inc.
INEL	Idaho National Engineering Laboratory
IRS	Internal Revenue Service
MIS	Management Information Systems

NACE	National Association of Corrosion Engineers
NASA	National Aeronautics and Space Administration
NASC	National Association of Solar Contracters
NBS	National Bureau of Standards
NCS	National Communications System
NE	Nuclear Eneregy
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NRC	Nuclear Regulatory Commission
NSC	National Safety Council
NSMC	Nuclear Standards Management Center
NTIA	Natinal Telcommunications and Information Administration
OES	Office of Environmental Safety
OMB	Office of Management and Budget
OPSP	Office of Product Standards Policy
OQAS	Office of Quality Assurance and Standards
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PNL	Pacific Northwest Laboratory
QA	Quality Assurance
RDT	Reactor Development Technology
SEIA	Solar Energy Industries Association
SEMA	Speciality Equipment Manufacturers Association
SERI	Solar Energy Research Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc.
SPPS	Standards Personnel Participation System
TVA	Tennessee Valley Authority
UL	Underwriters Laboratories
USCG	United States Coast Guard
USGS	United States Geological Survey
VSBs	Voluntary Standards Bodies
WPCF	Water Pollution Control Federation

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Terrance Troy

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WASHINGTON, D.C. 20234

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U.S. Department of Energy
Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness
Office of Quality Assurance and Standards
Washington, D.C. 20545

10. SUPPLEMENTARY NOTES

[ ] Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

The Department of Energy Standards Program, under the Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness, is responsible for promoting standardization, increasing DOE's participation in voluntary standards bodies and extending the benefits of standardization to the organizational units in DOE. To assist in designing and implementing needed programs, a survey was conducted to obtain information regarding ongoing DOE standards activities. The NBS Survey Team collected data on 17 information categories from a total of 63 DOE employees and DOE contractors in 36 separate interviews at 13 field locations and 15 headquarters offices. The Survey Team found that the flow of standards information within the infrastructure needs to be accelerated and that efforts must be directed toward providing DOE upper management with better understanding of standards programs. The data indicated considerable difficulty in maintaining necessary internal and external interface relationships and a need for guidelines for standards committee participation. The Survey Team suggested an "information focus" as a way for the Departmental Standards Program to help standards professionals at DOE, whose activities are closely involved in the development of energy technology, to improve their overall performance.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

energy, standards, information, data base, technology, policy, survey

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