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**ANL CP-5 DECONTAMINATION AND DECOMMISSIONING
PROJECT
NECESSARY AND SUFFICIENT PILOT**

**REPORT OF THE STANDARDS IDENTIFICATION TEAM
ON THE SELECTION OF THE
NECESSARY AND SUFFICIENT STANDARDS SET**

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**Argonne National Laboratory
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Preface

CP-5 Site Description and History

The CP-5 reactor was a heavy-water moderated and cooled, highly-enriched uranium-fueled thermal reactor designed for supplying neutrons for research. The reactor was operated almost continuously for 25 years until its final shutdown in 1979. It is situated on approximately three acres in the southwestern section of Argonne National Laboratory. In 1980, all nuclear fuel and the heavy water that could be drained from the process systems were shipped off-site, and the CP-5 facility was placed into lay-up pending funding for decommissioning. It was maintained in the lay-up condition with a minimum of maintenance until 1990, when the decontamination and decommissioning (D&D) project began.

This D&D project provides for the disassembly and removal of all radioactive components, equipment, and structures that are associated with the CP-5 facility. The experimental area around the CP-5 reactor has been prepared for D&D, and the area outside the facility has been remediated. The reactor primary coolant and support systems have been removed and packaged as waste. The significant remaining tasks are (1) removal of the reactor internals and the biological shield structure; (2) decontamination of the rod storage area; (3) decontamination of the various radioactive material storage and handling facilities, including the fuel pool; and (4) decontamination and dismantlement of the building.

CP-5 Remedial Concerns

Although the reactor has been out of operation since 1979, the CP-5 facility could be of significant environmental concern in the future because of the potential for inadvertent exposure to personnel and the migration of radionuclides that could occur as a result of groundwater leakage and the continuing deterioration of the buildings. Also, the biological shield continuously releases tritium vapor. However, this release is monitored and is within the allowable release limits as defined by the U.S. Department of Energy (DOE).

The current estimated volume of contaminated media at CP-5 is approximately 40,000 ft³ of contact-handled, low-level waste and 1,000 ft³ of remote-handled, low-level waste. In addition to these materials, the project has the following:

- More than 300 tons of lead contained within the biological shield,
- 10,000 lb of lead encased in stainless steel,
- 80 steel-encased lead pots,
- A 300-lb block of beryllium, and
- Cadmium control rods (all activated or contaminated).

Environment, Safety, and Health Standards in DOE

DOE is committed to protecting its workers, the public, and the environment. To achieve this objective effectively, DOE and associated personnel must understand the work that needs to be done and tailor protection to address the hazards associated with this work.

Until now, DOE has regulated the environment, safety, and health (ES&H) aspects of its work through DOE Orders. However, this approach suffers from several disadvantages. Most notably, it has been difficult to craft DOE Orders that recognize and deal effectively with the wide diversity of DOE work; this diversity can lead to inappropriate requirements. Also, because the Order-based approach does not easily incorporate the benefits of experience, practices can become obsolete or ineffectual.

Recognizing the disadvantages of the current approach, DOE is developing an integrated standards program as the basis for ensuring the protection of workers, the public, and the environment. A key element of this program is the "necessary and sufficient" (N&S) process. This process starts with analysis of the particular activity and its potential hazards and leads to adoption of appropriate standards for that activity to ensure adequate protection.

The N&S process uses total quality management principles to identify and implement standards that will adequately protect workers, the public, and the environment. The starting point is a clear plan for the work to be performed (such as construction, operation, manufacturing, research, transportation, or remediation). For the CP-5 D&D project, a team of CP-5 workers analyzed the D&D work to determine potential hazards and identify ways to remove or control those hazards. This team included individuals with detailed knowledge of the work to be done, subject matter experts, and people affected by the work hazards.

The primary objective of the standards identification process described herein is to identify or develop a set of standards that, when implemented, provides reasonable assurance that the health and safety of the workers, public, and environment will be protected during the performance of CP-5 D&D project work. All applicable requirements of law and regulation are included in the set of standards. The outcome of the process is the agreed-to set of standards listed herein, which addresses the identified hazards and is thus appropriate for the D&D work being performed. The set of standards maintains adequate protection without excessive requirements and is based on expert judgment.

The transition period between CP-5 D&D safety management systems based on DOE Orders and other DOE directives to systems based on the N&S set of standards must be carefully managed to ensure continuity of protection. All the CP-5 ES&H activities will be governed by the current system of ES&H DOE Orders and rules until approved procedures that implement the N&S standards set are in place.

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Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
ALARA	as low as reasonably achievable
ANL-E	Argonne National Laboratory-East (Illinois site)
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASA	Auditable Safety Analysis
BIO	basis for interim operation
CAA	Clean Air Act
CCE	Center for Cost Engineering
CEMP	Comprehensive Emergency Management Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
CP-5	Chicago Pile-5
CWA	Clean Water Act
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
E.O.	Executive Order
EEM	environmental, engineering, and management
EM	Office of the Assistant Secretary for Environmental Management
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know
ES&H	Environment, Safety and Health
FP	fire protection
HASP	Health and Safety Plan
IAC	Illinois Administrative Code
IDNS	Illinois Department of Nuclear Safety
IEPA	Illinois Environmental Protection Agency
ILCS	Illinois Combined Statutes
IT	identification team
LAN	local area network
LBNL	Lawrence Berkeley National Laboratory
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety & Health
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NSPM	Nuclear Safety Procedures Manual
NTLF	National Tritium Labelling Facility
NUREG	<u>NU</u> clear <u>REG</u> ulatory (an NRC-prepared document)
OH	occupational health

Acronyms (Cont.)

OS	occupational safety
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure level
RCRA	Resource Conservation and Recovery Act
RESRAD	<u>RES</u> idual <u>RAD</u> ioactivity (title of a computer code)
RG	Regulatory Guide (an NRC-prepared document)
RP	radiological protection
SAR	safety analysis report
SME	subject matter expert
SWMU	solid waste management unit
TEDE	total effective dose equivalent
TLV	threshold limit value
TSCA	Toxic Substances Control Act

ANL CP-5 Decontamination and Decommissioning Project Necessary and Sufficient Pilot

Report of the Standards Identification Team on the Selection of the Necessary and Sufficient Standards Set

1 Project Scope

1.1 Defining the Work and Hazards

The U.S. Department of Energy (DOE) Standards Committee developed and issued a draft guidance document on closure: a process for identifying necessary and sufficient (N&S) sets of standards for various N&S pilot projects. This process has five major elements, the first of which is to define the scope of work and any related issues (i.e., hazards) that will be subject to the standards. This element is critical; the work and its associated hazards and uncertainties must be clearly defined to ensure that the standards provide the desired level of protection to workers, the public, and the environment yet can be met efficiently and at a reasonable cost. It is equally critical that any assumptions about the work scope or areas within the scope that are not defined clearly at this time be documented.

At the direction of the Convened Group, CP-5 project management personnel were directed to develop a list of ES&H-related hazards/issues for the CP-5 D&D Project. No other N&S standards for research reactor D&D projects were available for comparison. The CP-5 hazards identified as being subject to standards were compared with the hazards discussed in the (1) *Health and Safety Plan for the D&D of the CP-5 Facility* (July 1995, PP-1.1-16, Rev. A-0), (2) the CP-5 Safety Analysis Report (July 1994), (3) the final report on N&S standards for the Lawrence Berkeley National Laboratory (LBNL) National Tritium Labelling Facility (NTLF), (4) the final report on the D&D of Ames Laboratory's research reactor (December 1981), and (5) the Fermilab N&S Pilot final report (July 1995). Management discussed the list of issues with CP-5 project personnel, including health physics technicians and waste management mechanics. The resultant initial list of issues, which also identified the associated work activity or hazard, was presented to the Convened Group, who, in turn, provided it to a Standards Identification Team. This initial list (Appendix A) served as the critical starting point in defining the scope of work for which the Standards Identification Team was to develop a set of N&S standards. The Standards Identification Team was empowered to revise the list to more accurately define the work hazards anticipated during the D&D activity. The team evaluated the completeness of the initial issues and their relevancy to each of four topical areas; consolidated, divided, and reworded some issues; and identified some new issues for the revised list (Appendix B). This effort is further discussed in Section 2.4. A comparison of the initial issues list and the final issues list (Issues Roadmap/Crosswalk) is included as Appendix C.

1.2 Uncertainties and Assumptions

Some uncertainties and scoping assumptions concerning the development of the issues list were identified by the team and documented in the Issue Documentation Forms (Appendix D). The following is a brief discussion of the more important ones.

1.2.1 Hazards Related to New Technologies

The CP-5 D&D project will also serve as a major test bed for new D&D technology demonstrations. About 40 technologies are expected to be tested during D&D operations. The final list of technologies to be demonstrated will depend on the level of funding, schedule of ongoing activities, and significance of the demonstration for determining safety enhancements and cost reductions. Because of the preliminary nature of the technology development proposals, the final list of issues (Appendix B) does not attempt to define hazards that may or may not be associated with future selected technologies. Section 6 of this report discusses the need for a mechanism to control against new hazards posed by selected technologies that are not adequately covered in this original set of standards.

1.2.2 ES&H Standards with Regard to Management Issues

The Standards Identification Team needed to define "ES&H" before identifying N&S standards, since the focus of the CP-5 D&D standards identification pilot project was "ES&H standards." The draft DOE guidance document on N&S closure processes does not define the term "ES&H," nor does DOE Interim Policy 450.2 on the identification and implementation of and compliance with ES&H requirements. The Convened Group determined that the Standards Identification Team should not limit its scope to only ES&H issues and expressly empowered the team to address management system issues such as reporting, conduct of operations, quality assurance, and training (minutes of the Convened Group meeting on September 27, 1995; minutes of the Standards Identification Team meeting on October 18, 1995). (Minutes of the Standards Identification Team are provided in Appendix E.) Early in the standards identification process, the Standards Identification Team had come to a majority rule that the constraints on its time and resources would prevent it from effectively considering such management system issues, despite the fact that they were relevant to virtually every issue on the issues list. The team also believed that sitewide consistency was required for dealing with these issues, so they should not be included in a process that was project-limited. However, to the extent that some of these issues (reporting, training, quality assurance) were considered integral to a standard, they were included in the standard. For example, the Occupational Safety Focus Group identified training as a core element of general worker and construction safety activities and listed 29 CFR 1926.21(b)(2) as an applicable external standard. The Environment, Engineering, and Management Focus Group included standards for safety occurrence reporting. To the extent that these issues were not addressed in a standard, they would continue to be addressed by the performance-based management contract (Section 6.2).

However, as a result of problems that arose in preparing the modification to the contract between DOE and the University of Chicago and the Confirmation Team's concerns, the issue of defining ES&H standards was raised again. The contract modification needed to reflect — in a manner consistent with the set of N&S standards — the subset of the DOE ES&H directives in Appendix F that would not apply to the CP-5 project. To assist in this effort, the Convened Group directed the Standards Identification Team to reconsider management system issues (in particular, “conduct of operations and training and maintenance” issues) and to consider anything in the 5480, 420, 440, or 450 series (except 425.1 and 5480.29) to be “ES&H Orders” (minutes of the Convened Group meeting on December 19, 1995). The Standards Identification Team used this directive as the basis for expanding the scope of the standards identification process to include management systems that contribute to environmental protection or the safety and health of workers or the public. To do so, the team focused on the four series of orders identified above, as well as the 5400 series and the 460 series, which were also considered to be ES&H. (See additional discussion in Section 6.2.)

1.2.3 Expansion of Scope to Greenfield Conditions

It was also assumed by the Standards Identification Team that the CP-5 D&D project would proceed beyond the originally envisioned scope of reusing the facility to a wider scope of completely dismantling the building and achieving “greenfield” (unrestricted use) conditions (minutes of the Convened Group meeting on August 2, 1995). Therefore, the final issues list includes all work activities associated with achieving this goal.

1.2.4 Scope of Project Activity

The Standards Identification Team agreed that the scope of a particular issue should best be defined by the scope of the D&D plan, or as a practical matter, by project funding. For example, the team did not consider existing yard contamination because it believed that the scope of the project does not include the cleanup of the adjacent yard. The existing yard contamination is designated a solid waste management unit (SWMU) in the Resource Conservation Recovery Act (RCRA), and cleanup required by the Part B permit will be a sitewide activity to be funded by corrective action resources from DOE's Office of the Assistant Secretary for Environmental Management (EM) rather than by the CP-5 D&D project. Nevertheless, the team did include RCRA cleanup standards in the set of N&S standards in case the cleanup and removal of the CP-5 facility results in additional yard contamination or in case the soil in a building location that is not part of the SWMU is contaminated.

2 Standards Identification

2.1 Creation of the Standards Identification Team

The Convened Group selected the Standards Identification Team members from applicants who responded to an opportunity announcement. The Group was guided by an internal document on identifying the team composition and selecting the identification team members. The opportunity was identified as a full-time, temporary duty to complete the process of identifying the set of standards. The Standards Identification Team members were divided into four focus groups: Environmental, Engineering, and Management (EEM); Occupational Safety (OS); Occupational Health (OH); and Radiological Protection (RP). Each focus group was assigned a leader and issues. Additional slots were reserved for representatives of stakeholder organizations, including EM at DOE headquarters, the Illinois Department of Nuclear Safety, Commonwealth Edison, DuPage County, and ANL union(s). Two team members were CP-5 project management personnel, and two others had participated in the Fermilab N&S standards pilot project and had first-hand experience with the Fermilab standards identification process.

The Standards Identification Team unanimously concluded it needed additional expertise to complete the process in a timely manner. It requested that additional members join and that subject matter experts (SMEs) be used (Table 2.1). These team members and SMEs were drawn primarily from the ANL-E ES&H Division. Union members were invited to participate in the process because of their expertise. Remaining stakeholder organizations such as the Illinois Environmental Protection Agency and Occupational Safety and Health Administration (OSHA) elected to not

TABLE 2.1 Standards Identification Team Composition

Focus Group	Original Membership	Final Membership	Original Issues	Final Issues
Environmental	5	6 (+2 SME)	19	25
Occupational Safety	4	4 (+4 SME)	60	48
Occupational Health	3	4 (+1 SME)	17	10
Radiological Protection	5	4 (+2 SME)	16	12
Total	14 ^a	18 (+9 SME)	111 ^b	95

^a Some members were on two teams.

^b Issue #82 was assigned to two teams.

participate in the standards identification activity. A list of the final Standards Identification Team members and SMEs is provided in Appendix G. Their credentials are summarized in Appendix H.

2.2 Operation of Team

The first 3-day meeting of the CP-5 Standards Identification Team started with an extensive briefing given by the Process Leader. It included an orientation on DOE's draft guidance document on the closure process for N&S sets of standards, a tour of the CP-5 facility, a briefing on the history of CP-5 and the D&D plan, and an introduction of the issues list. Team members including the Standards Identification Team Leader and the four focus group leaders were introduced.

The Standards Identification Team was not sequestered for a period of days or weeks as N&S standards identification teams for other pilot projects had been. After the initial 3-day meeting, meetings that lasted about 3 hours were scheduled on one afternoon each week. Focus group meetings were scheduled an average of once or twice a week. Individual members were assigned to work on individual issues.

Each Standards Identification Team meeting followed an agenda prepared in advance and was documented in minutes. The minutes summarized briefing information for interested parties who had not attended the meeting and documented assumptions and other matters of consensus for the record. Consensus was reached by a majority vote. A dissenting team member was encouraged to complete a Minority Opinion Documentation Form (see Appendix I), which would have been submitted to the Convened Group for resolution. However, during the 2-month process, no significant dissent developed and no forms were completed.

2.3 Resources Used by Team

The team was provided with direction on the process for developing a set of N&S standards. The primary direction was stated in DOE's draft document on the closure process for N&S sets of standards and in the Standards Identification Team charter (Appendix F). Supplemental guidance from the Convened Group (see Sections 1 and 2.5) was conveyed by the Process Leader. It was also provided with summaries of the processes used in the Fermilab and LBNL Tritium Facility N&S standards identification pilot projects.

The Standards Identification Team needed to be able to access numerous documents quickly. Because a process-specific resource library was not available to the team, personal resources of members and SMEs were heavily relied on. The DOE-CH law library was also a useful resource. Unfortunately, the ANL-E library system was not as useful, because it focuses on providing scientific and technological rather than regulatory resources, although the library does keep up-to-date copies of federal and other regulations. Several team members had personal computer CD-ROM databases that were used. Also, in response to a request from the Standards Identification

Team, the Convened Group made a CD-ROM database (Searchmate) available. It contained several pertinent portions of the *Code of Federal Regulations* (CFR), such as Titles 10, 16, 29, and 40, as well as the *Federal Register* from January through October 1, 1995. This CD-ROM database was accessed through a single desktop computer, and its use was regulated through a sign-up list that enabled the entire team to use it when needed.

2.4 Standards Identification Process

2.4.1 Revising the Issues List

As indicated in Section 1, the initial list of project issues and activities was greatly modified during the standards identification process. Although some of the list was revised before the standards identification process began, most of the changes occurred during the process. The issues in the list were assigned to the four focus groups by topic, and the individual focus groups revised their own issues as necessary. Some issues were reworded or reorganized when the hazards that could be encountered during CP-5 activities were better understood. Some issues were reassigned to other focus groups. Some issues were "cross-cut" to minimize duplication and overlap. As a result of this activity, a revised issues list was produced (see Appendix B).

For example, the RP Focus Group significantly changed the RP issues. These changes were made after the group divided the initial issues into three topical areas and then evaluated the completeness and relevancy of the initial issues with regard to each area. The topical areas covered the (1) sources of radiation hazards, (2) general administration of the radiation protection program, and (3) criteria by which material and the project site could be released from continued radiological control. The RP Group met frequently to discuss these topical areas (primarily the release criteria) and also met with the EEM Focus Group and OH Focus Group to discuss interfacing issues and arrange for the reassignment of specific issues.

The RP Group decided to identify each source of radiation hazard as an individual issue to ensure completeness; it also identified a new issue (airborne radioactive particulates) and reworded other issues. Although these issues could have been combined into a single issue, the RP Group decided there were benefits to leaving them as individual issues.

For Topical Area 2 (general administration of the radiation protection program), the RP Group decided to consolidate several initial issues into one issue, since a single legal requirement (10 CFR Part 835) fully addressed that topic. The RP Group considered whether a waiver from the applicable legal requirement should be requested on the basis of the possible application of alternate standards. Such a waiver was requested as a part of the LBNL NTLF N&S standards identification pilot project. The Process Leader obtained data on the basis for the NTLF waiver request, including detailed matrixes comparing specific provisions, for review by the RP Group. The RP Group concluded that the NTLF and its basis were not directly applicable to the CP-5 D&D project.

2.4.2 Approach Taken

The Standards Identification Team decided to follow the standards identification process used by Fermilab. It reviewed the process logic flow diagram and document form used by the Fermilab team and confirmed that it was consistent with the guidance contained in the March 16, 1995, DOE draft closure process for N&S sets of standards. However, the team revised the Fermilab process flow chart and Issue Documentation Form to make individual questions more clear and make the logic paths of the two products consistent (Appendixes J and K). It also revised the questions on the form and the chart so they would be the same and revised the Issue Documentation Form to provide boxes that would allow for documentation of standards, standard justifications, and assumptions.

The team used a hierarchical approach to identify the standards to be considered for each issue. If a higher-tier standard existed and was judged to be "necessary and sufficient," that standard was identified as the N&S standard for that issue and the process was stopped. If some portion of the standard was judged as being not sufficient, lower-tier standards were reviewed for their applicability and sufficiency.

More specifically, the process used three tiers of standards.

- *Legally applicable standards.* These standards, which are applicable by law to DOE activities, constitute the first, or highest tier. These are addressed in Steps 2 through 7 of the process (Blocks 2 through 7 of the form). The legal requirements include statutory requirements and regulations, including state standards in federally delegated programs and other programs for which Congress has unambiguously waived federal sovereign immunity. (Note: Steps 5 and 6 provide for the identification of non-value-added elements of required standards.)
- *External standards.* The second tier (Blocks 8-10) consists of external standards, which encompass a wide range of nonlegally binding standards, including (1) regulations or statutes (federal, state, or local) for which sovereign immunity has not been waived (e.g., OSHA regulations); (2) guidance documents issued to accompany regulations or statutes; (3) general industry consensus standards (e.g., American National Standards Institute [ANSI], American Society of Mechanical Engineers [ASME]); (4) proposed/draft regulations or statutes; and (5) DOE documents (e.g., DOE Orders, standards, manuals).
- *Internal standards.* Only if the legally applicable and external standards together are not considered fully sufficient are standards in the third tier reviewed for their applicability and sufficiency. The third tier consists of site-specific or project-specific internal standards,

including contractor procedures contained in the ANL-E ES&H Manual and project-specific documents (Blocks 11 and 12).

The Standards Identification Team generally concluded that legal requirements and/or necessary external standards were sufficient to provide the desired level of protection. However, even though the process did not provide for evaluation of third-tier standards if the standards in the first two tiers were sufficient, the team was able to provide the project with the benefit of its knowledge of internal procedures. Members could comment (in Block 14) on the ability of such internal procedures to assure compliance with the higher standards. In other words, the existing internal standards were evaluated as implementing procedures rather than as standards in and of themselves. For the few cases in which sufficient standards could not be identified, Block 12 of the form was also used to specify an existing manual chapter as a standard or to summarize the Standard Identification Team's recommendation of the elements of a new, project-specific standard.

As necessary, the team identified specific portions of a standard so nonapplicable portions were excluded (e.g., 40 CFR 61.150, rather than 40 CFR Part 61, Subpart M). Once a standard was identified, the reason for the selection was summarized in Block 13 of the form. The justification for selecting a legally binding requirement generally consisted of (1) a statement on the basis for its applicability, including a brief description of the requirement's scope (to demonstrate how it addresses the specific issue), and (2) an assessment of its sufficiency. The basis for selecting external and internal standards consisted of (1) a brief description of why that standard is applicable (such as the scope matches the issue and no legal requirement exists, or the scope includes an item not addressed by an identified legal requirement) and (2) an assessment of its sufficiency.

Finally, (1) the issue-specific assumptions about implementing the identified standard(s) and (2) an assessment of the potential overall impact on the project's resources and schedule were documented in Blocks 14 and 15.

Consensus was obtained at several levels in the identification process. First, consensus was reached within each focus group before the Issue Documentation Forms were submitted to the Identification Team Leader. Process issues or other issues relevant to other focus groups also were raised for the entire team to discuss at its weekly meetings. Although team operating protocols allowed issues to be (1) presented to the Convened Group for resolution or (2) decided by majority rule with documentation of the dissent (see Minority Opinion Form, Appendix I), the Standards Identification Team never needed to resort to these measures, and consensus was reached in all disputes. The last step in the process was to obtain the full team's confirmation of the proposed set of N&S standards. This step was accomplished in a 1-day meeting of the entire Standards Identification Team, after the last Issue Documentation Form had been submitted.

2.5 Specific Process Issues

The team was given specific process directives or guidance by the Convened Group. In some cases, the team identified an alternative approach that was proposed to and approved by the Convened Group. This section discusses these specific process issues as well as other process issues that were raised and resolved within the Standards Identification Team.

2.5.1 Performance Measures

The Convened Group directed the Standards Identification Team to consider N&S standards as those standards needed to ensure that performance would be rated "excellent" according to the ES&H-related performance measures in the current ANL contract (e.g., Performance Measures 6, Environmental Management, and 9, Environment, Safety and Health, in Appendix B of the ANL contract). A copy of these performance measures was provided as an attachment to the Standards Identification Team charter. The team reviewed the performance measures provided and could not determine how the contractor's performance of the CP-5 D&D project-specific activities could or would be used to determine overall contractor performance for these measures. Neither the Process Leader nor project management personnel on the team could provide this information to the team. The team decided it was not possible to determine how the use of a particular standard would affect overall contractor performance when such a standard might be used for only one project on the site. It reached consensus that it was not appropriate to apply performance measures that evaluate the effectiveness of the contractor's management of the entire site to the contractor's management of a specific project, without having first defined how the project's performance would affect those site performance measures. The team reported this conclusion to the Convened Group and indicated that an alternative measure would be recommended after members had an opportunity to study the issues and potential standards. Later the team concluded that the level of ES&H protection and environmental management control provided by the project-specific standards should be "better than average but not perfect." This level is consistent with an "excellent" performance rating, which is better than "good" but less than "outstanding." The team agreed to use professional judgment and common sense in interpreting these terms.

2.5.2 New Internal Standards Generation

The Standards Identification Team was empowered to generate project-specific internal standards for issues if it determined that existing external standards were not sufficient. However, team members agreed that this task was not possible, given the time constraints and limited resources. They decided it was more appropriate to identify areas in need of CP-5 D&D project-specific standards and to recommend the main consideration(s) to be incorporated in these standards. The actual development of a new standard could then be undertaken by the project staff or by a special ad hoc team chartered for that limited purpose. The team's experience was that the issues overall were well-addressed and that only very specific aspects of individual issues required further direction or guidance to ensure an adequate level of protection.

2.5.3 Consideration of ES&H Manual

The Convened Group requested that the team make its first effort at identifying a N&S set of standards by (1) treating the CP-5 site as if it were located outside of the ANL-E site and (2) reviewing the provisions in the ANL-E ES&H Manual for applicability. The request was based on a discussion documented in the minutes of Convened Group Meeting 8. The Standards Identification Team found it impossible to carry out this request. The team first determined that the off-site assumption would not be appropriate, because the CP-5 D&D project would need to rely to a great extent on the matrix support of other ANL organizations (e.g., waste management). The team also determined that it did not have enough time or resources to review the ES&H Manual, much less other sitewide ES&H-related procedural manuals. Finally, the team concluded the request itself was inappropriate, since under the DOE draft N&S closure process, the implementation of a selected N&S set of standards is a project activity, not a responsibility of the Standards Identification Team. Nevertheless, specific portions of the ANL-E ES&H Manual were considered as potential (internal) standards when legal requirements and external standards were deemed not sufficient. Also, many members of the team were familiar enough with the various ES&H-related sections of the manual to determine that they would assure compliance with the necessary standards or were familiar enough with the history of ANL operations to know that past adherence to such procedures had resulted in the necessary level of protection. In such cases, this information was noted on the Standards Identification Team Issue Documentation Forms. In summary, when an internal procedure was not specifically identified as a "necessary internal standard," it was considered one of several means by which the selected N&S standards were currently being implemented.

2.5.4 Process Assumptions

The following list of assumptions guided the selection of standards and completion of the documentation forms. Dates refer to minutes of Standards Identification Team meetings (Appendix E).

- Do not justify standards that were not selected (October 11, 1995).
- Limit citations to minimum (part, section, paragraph) (October 18, 1995).
- Include standards for issues that may not happen but for which there is potential, "just in case" (e.g., release reporting and emergency management) (October 18, 1995).
- Include the date, revision number, or some identifying characteristic of the version of external standards selected (November 7, 1995).

2.6 Schedule

The August 25, 1995, version of the program charter for the CP-5 D&D project standards closure process estimated that standards identification activities would take 1 month. Since the initial meeting of the Standards Identification Team was on October 10, 1995, the team's goal was to present the N&S standards set to the Convened Group's Confirmation Team on or about November 17, 1995. This schedule was discussed at the November 7, 1995, Standards Identification Team meeting (see Appendix E), when the team identified the need to let the schedule "slip" by 2 weeks (including the Thanksgiving holiday). Consistent with its determination that the quality of the product was more important than a particular deadline, the Convened Group approved the revised schedule, which provided for submission of the final set of standards and this report on December 8, 1995, and for a meeting between the Standards Identification Team and the Confirmation Team (defense) on December 13-15. The entire standards identification process therefore took less than 2 months.

2.7 Cost Estimate

The ANL Center for Cost Engineering (CCE) made an initial effort to quantify the costs associated with the CP-5 N&S pilot. Because the Identification Team Leader was the only person funded specifically for this N&S activity, it was very difficult to accurately determine costs. To provide an indication of the costs, a questionnaire (Appendix L) was prepared and distributed to the Standards Identification Team members. The set of participants in this questionnaire was limited to the Standards Identification Team so that the process could be tested on a smaller number of people. To obtain an estimate of the total costs, these data will have to be extrapolated to the full N&S team or additional questionnaires will have to be prepared. At this time, neither step has been taken. The findings and conclusions of the questionnaire are presented in Appendix M.

2.8 Confirmation Meeting

The Confirmation Meeting was held on December 13-15, 1995, a total of 2 1/2 days. A briefing was given by the Identification Team Leader on the overall process performed by the team, their assumptions, resources, etc. Each focus group leader along with the members of the group presented their set of standards. The Confirmation Panel asked questions and discussed the final selection of the standard set. Suggestions and comments were submitted on a form (Appendix Q). The comments/questions were either discussed at the meeting or answered outside the meeting. The completed forms are included in this report in Appendix R. All the suggestions and/or comments have been reflected in this final report.

3 Necessary and Sufficient Set of Standards

The Standards Identification Team's proposed set of N&S standards is provided in Appendix L. The matrix shows the standards on an issue-by-issue basis, with standards designated as legally applicable, necessary external, and necessary internal. An Issue Documentation Form, which is designed to present the assumptions and basis for selecting standards, is provided in Appendix K.

3.1 Summary of Impacts on the N&S Process

The N&S Closure Process and the resulting Issue Documentation Form required the Standards Identification Team to rate the impact of implementing the standards on the project. The ratings are *major positive impact*, *minor positive impact*, *no net impact*, *minor negative impact*, and *major negative impact*. The definition of "impact" is based on the requirement in Process Element 4 that the team "[6] identify...(B) the unique resources required to implement the set of standards." "Impact" ultimately was defined as the effect of implementing the standards on project cost, project schedule, and/or the safety of the workers. Positive impacts were defined as decreased costs, shortened schedule, and/or increased safety. Negative impacts were defined as increased costs, lengthened schedule, and/or decreased safety. For example, if the schedule of the project would be delayed by a month, but the cost would not be changed and the safety of the workers would not be jeopardized, the impact would be rated "minor negative." If the cost of the project would be decreased, and, in addition, the schedule would be cut by 6 months and the safety factor would not be jeopardized, the impact would be rated "major positive." If the focus group determined that the application of the set of standards for an issue would not change the current methodology or techniques being used by the project to deal with the issue, it was assumed there would be "no net impact." After completion of the Standards Identification Team issue documents, an assessment of the impact (assumed by each focus group) of applying of the selected standards on the individual issue was conducted and is provided in Appendix O.

The revised issues list for the CP-5 project contained 92 issues that the Standard Identification Team felt covered all ES&H aspects of the current scope of work as presented. However, after the Confirmation Team Meeting on December 13-15, 1995, three new issues were added, increasing the final issues list to 95 issues.

Of the 95 issues addressed by the team, 87 were assumed to have "no net impact." The team believed the application of the N&S standards would have some impact on 8 issues. Figure 3.1 provides a graphical summary of the overall impact of the set of N&S standards on the total list of issues. Because of the relatively small number of issues for which applying the N&S standards set would affect the cost of the project, each one with an assumed impact is listed in Appendix O, with a short description of the basis for this assumed impact. In addition, Appendix O lists each issue and the team's assumed impact.

FIGURE 3.1 Summary of Impacts on N&S Process Issues

Also, after the Confirmation Team Meeting, the Convened Group directed the Standards Identification Team to reevaluate the impacts (see Appendix P). The team discussed the direction given to them in length at its meeting on January 23, 1996 (see Appendix E). It concluded that the impacts were evaluated against these criteria and that its impact analysis therefore satisfied the requirements of the Convened Group. The second direction by the Convened Group was to provide an overall statement that presents the results from both the cost/schedule and safety performance impact surveys and provides the cost of performing the pilot. The Cost Estimate Summary is provided in Appendix M.

3.2 Standards to Be Developed

The final column in the Issues/Standards Matrix (Appendix N) identifies a number of internal standards that the team recognized need to be prepared and approved by ANL. Details on the individual issues are presented in the completed Issue Documentation Forms (Appendix D).

4 Boundary Issues

Boundary issues are critical assumptions or decisions that require special consideration. Three issues required significant effort on the part of one or more focus groups. Because of their importance, these issues and the development of associated standards are described in more detail here than could be provided on the Issue Documentation Forms. The issues are RP-11 Characterization, RP-12 Final Release Criteria, and EEM-02 Safety Analysis.

4.1 Issues RP-11 Characterization and RP-12 Final Release Criteria

After discussions with the EEM Group, the RP Group created new issues to address the topic of release criteria. These new issues involved (1) release of material from radiologically controlled areas when the material had the potential for surface contamination only; (2) release of material from radiologically controlled areas when the material had the potential for volume contamination or activation; (3) final release of the CP-5 D&D project site; and (4) the characterization of radioactivity. The RP and EEM Groups met to discuss material release and agreed to the continued use of existing practices and standards. The RP Group identified standards for the release of material with the potential for surface contamination only (Issue RP-09), and the EEM Group identified standards for the release of material with the potential for volume contamination or activation (Issue EEM-20).

The RP Group reviewed several approaches for complying with release criteria to verify the cleanup of radioactively contaminated sites. For several decades, regulators have attempted to achieve radiological protection from surface and volume contamination by establishing lower limits for unrestricted release or by demonstrating an acceptable dose or risk. Various de minimis limits have been proposed but have not been universally adopted by regulatory agencies because there is no consensus over what constitutes a "trivial" level of dose or risk. For the past 4 years, DOE has operated under the concept that before materials from radiation materials management areas can be released for unrestricted use, it must be demonstrated that no radioactivity added by past DOE operations or activities remains. The language in the draft 10 CFR Part 834 released for comment in late August 1995 indicates a possible change in this policy through the application of the ALARA (as low as reasonably achievable) concept combined with a pathway release exposure analysis. This change could allow some residual radioactivity distinguishable from background to remain.

The U.S. Nuclear Regulatory Commission (NRC) has proposed a revision to 10 CFR Part 20 providing radiological criteria for decommissioning. The proposed rule is supported by an environmental impact statement and several NRC documents that address various aspects of the proposed rule. The RP Group obtained copies of the proposed rule and associated documents and reviewed them. The NRC has expended considerable thought and effort on the proposed rule, including entering into agreements with other government organizations, such as the EPA and DOE, in an attempt to reach a consensus on specific items. As documented in Document NUREG-1501, the NRC extensively evaluated using a return-to-background threshold criterion (i.e., similar to the DOE policy of "no radioactivity added"). It concluded the criterion was not cost-effective because

it was so difficult to demonstrate that it was fully met. The proposed NRC rule accepts that some residual radioactivity distinguishable from background may remain, as long as the resultant annual total effective dose equivalent (TEDE) to an average member of a defined critical group does not exceed 15 mrem a year. The NRC is developing regulatory guidance for defining the critical group and performing the associated dose analyses, including establishing a set of de minimis values for radionuclides that could be used instead of performing detailed exposure analyses. A properly planned and implemented sampling program for characterizing the site and its environs is a key requirement.

The RP Group also reviewed a recently issued national consensus standard on the decommissioning of research reactors, ANSI/ANS-15.10-1994. The standard provides release criteria in the form of de minimis values for specific radionuclides or classes of radionuclides. The de minimis values are based on past NRC acceptance of specific site decommissioning criteria.

As a further complication to an already complex issue, the CP-5 D&D project site is enclosed by a much larger DOE controlled site, the ANL-E site. The overall ANL-E site must meet requirements for matters related to sitewide impact on public health and safety and environmental releases. Although the N&S standards pilot project was limited in its scope to just the CP-5 D&D project, the recommended CP-5 D&D project site release criteria must remain bounded by the operational release criteria applied to the entire site. The operational criteria are defined by DOE Order 5400.5 and limit public annual exposure from all site activities to less than 100 mrem. In addition, the ANL-E site must comply with the more restrictive limits given in 40 CFR 61, Subpart H, for airborne radioactivity and in 40 CFR 141 for drinking water as part of the 100 mrem total. The CP-5 D&D project site cannot be considered a separate site that is independent from the larger site requirements, and the final project release criteria must result in an impact that does not unduly effect the overall site's impact on the general public and environment.

In addition, at some future date, the entire ANL-E site may be released from DOE control. Defining release criteria for an entire site, such as ANL-E, is far beyond the scope of this N&S standards identification pilot project, and such criteria have yet to be fully defined by DOE. The criteria must integrate radiological cleanup criteria with the current DOE policy on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the existence of multiple D&D and/or remediation programs within a larger site. The RP Group could only consider the CP-5 D&D project as being within the existing ANL-E overall site operations. It could not factor in the potential for future ANL-E site releases, since this has not yet been fully defined by DOE and was not necessary for the CP-5 D&D N&S standards identification pilot project.

DOE Order 5400.5 provides necessary radiation exposure limits for the public from all DOE activities conducted at ANL-E. However, this standard does not provide sufficient guidance for determining the residual radioactivity levels distinguishable from background that can be permitted to remain upon completion of D&D activity at a single facility located within a larger DOE-controlled site containing multiple facilities. Standard ANSI/ANS-15.10-1994 provides generic de minimis residual radioactivity levels, but these may not be sufficient for specific sites or

radionuclides if a detailed pathway release analysis is performed to determine public dose. The NRC-proposed radiological criteria for decommissioning are still in final development, and the associated guidance is not complete enough to use as a full standard with full confidence.

Given the insufficiency of the evaluated standards, the RP Group recommends that a project-specific standard be developed. For the major radionuclides currently identified as being present for the CP-5 D&D project, the ANSI/ANS-15.10-1994 de minimis residual radioactivity levels should provide a good basis for an interim standard. A detailed pathway release analysis based on a 15-mrem annual TEDE should be performed once the NRC has more fully developed its guidance and the results have been compared with the interim project standard values. A final project standard can then be prepared.

A proper characterization study must be performed to demonstrate that the release criteria have been met. The RP Group identified the need for a new issue to address this aspect of characterization. They also decided to include the characterization necessary for project planning and monitoring of ongoing activities and identified sufficient standards related to this characterization. However, a project-specific standard must be developed for the characterization needed to demonstrate that the CP-5 D&D project site release criteria have been met. The NRC is in the process of developing guidance for facility/site characterization to accompany the proposed radiological criteria for decommissioning. Preliminary NRC guidance is available in draft NRC Regulatory Guide 8017. A project final release standard should be developed to provide guidance for a characterization of the CP-5 facility that is based on the issued version of Regulatory Guide 8017. Until Regulatory Guide 8017 is released, the draft version can be used to produce an interim release standard.

4.2 Issue EEM-02 on Safety Analysis

This issue was the one most discussed and debated within the EEM Focus Group and also within the Standards Identification Team as a whole. It is an issue in which DOE has sole authority under the Atomic Energy Act. The EEM Focus Group could not identify any clear industrial standard that defined the details and requirements of a safety analysis based solely on hazard categorization. The current DOE system requires that a hazard assessment be conducted per the guidance provided by DOE-STD-1027-92. This standard presents a means of classifying facilities containing radioactive material as radiological or hazard Category 1, 2, or 3. CP-5 underwent such an assessment and was determined to be Category 3 (i.e., the hazard analysis shows the potential for only significant localized consequences). Under DOE Order 5480.23 on nuclear safety analysis reports (SARs), a formal SAR has been submitted to DOE for review and approval as the authorized safety basis for the project. DOE has yet to approve it, but has granted that the submitted SAR may serve as the basis for interim operation (BIO). In August 1995, proposed Rule 10 CFR Part 830, Nuclear Safety Management, was republished for public comment. The portion of the proposed rule addressing SARs for nuclear facilities does not require a SAR for Category 3 nuclear facilities. This proposed change to the current DOE system makes the actual N&S standard for this issue difficult to ascertain. The proposed rule provides no guidance on safety analysis for low-hazard nuclear

facilities such as CP-5. The Standards Identification Team proposed the draft rule as an external standard for this issue. The Confirmation Panel and Convened Group requested the draft rule be deleted due to the likelihood that further changes will result in the rule prior to issuance. The EEM Focus Group then reconsidered the issue using the definition of safety analysis from DOE Order 5480.23. Based on the three elements addressed in the definition, the EEM Focus Group concluded that documents already required by other standards listed in the Standards Set were sufficient. The Issue Documentation Form was revised to identify these standards. The EEM Focus Group concluded that producing a SAR in accordance with DOE Order 5480.23 was not necessary from an ES&H perspective (i.e., safety analysis was required by other standards), but DOE may require its retention as an integrated part of the authorization basis.

5 Lessons Learned

This section, which summarizes the lessons learned by the Standards Identification Team during its 2 months of operation, can be used by the personnel of other organizations or projects to help them conduct their N&S standards identification process.

5.1 CP-5 Project Scope

5.1.1 Project-Level Considerations

There is limited value to conducting an N&S standards identification process for a project within a site for a number of reasons.

- As recognized in other pilot projects, the standards identification process is expensive and very person-intensive.
- The learning curve is much longer for a project-focused than a sitewide N&S standards identification process because of the added complication of defining the project. One reason is that a project generally relies (sometimes extensively) on the sitewide infrastructure and matrix organizations. This reliance causes confusion, both in defining the scope of the issues and in determining whether a standard is applicable to the project or, more commonly, the matrix organization. For example, in emergency management, emergency response is probably not a project responsibility, but some level of project cooperation and assistance may be necessary.
- Enforcement/oversight of compliance with standards is complicated when one site element follows a different set of standards than the rest of the site. For example, the CP-5 project representatives repeatedly expressed concern regarding future audits. (The team's recommendation in this regard was that the project personnel provide the internal or DOE audit team with a set of the N&S standards and a copy of the executed contract modification at the preaudit conference, thus demonstrating that the N&S standards approval process provides for site management "buy-in." Buy-in can also be addressed through establishment of an expedited "N&S-specific waiver process.")
- The N&S standards identification process for a single site component may necessitate reinventing the wheel in some cases. Frequently the CP-5 N&S Standards Identification Team had to choose between

directing the project to use an existing procedure as the standard (when the existing standard was not project-specific and therefore possibly more than necessary) or directing it to develop a project-specific standard at whatever additional cost.

- The unique set of standards creates an extra administrative burden on project personnel to obtain copies of any standards that may not be used elsewhere on the site. It is a project responsibility to locate and obtain copies of the standards it needs as project resources.
- It is a major problem to define expectations for a project when performance measures apply to the site. Although the Convened Group attempted to define the expectations and outcomes for the CP-5 N&S standards identification process, it was unable to fully define what would be an "excellent rating on ANL ES&H performance measures" to a project that would have only a minor impact on sitewide performance.

For projects or small sites, it would be cost-effective to limit the scope to problem issues and include all management processes. Almost all (90%) of the team's time was spent on 10% of the issues. One way to make the identification of N&S standards more practical, especially for projects or small sites, is to limit its scope to less than "ES&H." Once the hazard analysis has been completed, N&S standards identification could be initiated for only a limited number of issues, such as those for which there are questions about what the appropriate standards are. This tactic would save time spent on identifying N&S standards for certain topical areas (for instance, occupational safety issues, a subject area for which standards are already well-accepted). The CP-5 project personnel on the Standards Identification Team indicated that what they needed now and in the future was a team of experts on whom they could call to identify standards for certain selected problem issues.

Similar to the consideration of whether it is cost-effective to undertake an N&S standards identification process for one element of a site is the consideration of the value of doing it for just one set of criteria (ES&H). For the CP-5 project, cost-effectiveness would have been enhanced significantly if the process had been expanded to include all standards, including all management processes, and not just the "gray areas."

5.1.2 Application of Industry Standards to DOE Activities

DOE project hazards are largely equivalent to general industry-type hazards; therefore, industrial standards could easily be applied. Specialized standards should be reserved for truly

unique DOE hazards. One concern expressed was that the CP-5 D&D project might represent unique hazards not addressed by industry standards. However, the Standards Identification Team concluded that the hazards of the project were indeed mainly standard industry (construction-type) hazards. To the extent that the project represented unique hazards, the team expanded the issue list to include them. The acknowledged "void" for this project was the unique hazards that might be created by technology development activities. For this reason, the team focused on ways in which to use the contract modification to establish a process for reconsidering those activities when they are sufficiently defined. Sections 1.2 and 6.1 of the report address that concern. However, the team recommends that future N&S standards identification teams first focus on defining issues that are common to private industry and then look for additional issues that are project- or site-specific.

5.2 Standards Identification

5.2.1 Team Creation, Expansion, and Assignments

The criteria for selecting team members should include a willingness or ability to (1) work well with others in a group, (2) accept empowerment under the N&S concept and process, (3) be innovative, (4) be open-minded, and (5) be active participants in the process.

The team can be efficiently expanded through use of SMEs. For example, the CP-5 D&D Standards Identification Team membership expanded over its 2-month operation. The major expansions, which occurred in the EEM Focus Group and OS Focus Group, were necessitated by the great amount of effort involved to determine what standards were applicable by law. Other focus groups used SMEs rather than adding members to the team. Future N&S standards identification projects should be careful to weigh the benefit of additional "hands" against keeping the team and focus groups to a workable size.

The Convened Group assigned the Standards Identification Team members to specific focus groups. Some members were "floaters," and sometimes the same member was assigned to two different focus groups. The team concluded that use of floaters and double assignments was inefficient and not necessary given the use of additional team members and SMEs.

5.2.2 Meetings and Information Exchange

Regularly scheduled Standards Identification Team meetings were very good for planning purposes, since they provided a specific date and time to discuss issues. It would have expedited and

simplified creation of the team documentation (issue/standards matrix) and compilation of issue documentation forms if all team members had been on the ANL local area network (LAN) and used the same software.

Focus group working meetings should be held where reference resources are readily accessible. For example, after its first meeting, the EEM Focus Group met in the General Law Department library. This location gave members immediate access to necessary resources, so most questions could be resolved immediately rather than assigned to team members and tabled for future discussion. It also made team members less accessible to supervisors and others who might interrupt them from the N&S standards identification task. It is important that when team members are sequestered, they not be isolated from their reference resources.

5.3 Resources, Priorities, and Support

Resource needs should be identified and provided for early so that the resources are available when needed. The Standards Identification Team concluded that there would have been a significant advantage to having had an informal meeting before the first formal meeting to determine needs for resources, SMEs, etc. Such a meeting could be composed of the Process Leader, Identification Team Leader, focus group leaders, or the whole team. It should focus on resource needs, appropriate allocation of the team members among the focus groups, and the need for revising the issues list.

The N&S standards identification process should be the highest-priority activity for team members, and this priority must be respected by each team member's organization. The process is time-consuming and person-power-intensive. The CP-5 D&D standards identification process could have been more efficient if it truly had been treated as the highest priority task of team members. The main problem was that focus groups had trouble scheduling meetings and reaching consensus because some members still had to satisfy their management's expectations about their normal duties.

Sequestering the Standards Identification Team for the entire process is neither necessary nor desirable; however, sequestering the focus groups for brief periods is recommended. Some suggested that the process could have been completed more expeditiously if the team was sequestered off-site. However, a team off-site would not have had access to additional SMEs and resources. A compromise would be to have the team set aside blocks of time off-site for 2 days a week, so members could come back and review resources and then return to contribute to the group.

Administrative support is necessary for a Standards Identification Team. The CP-5 team benefited from individual team members volunteering for administrative tasks, such as recording meeting minutes, developing and revising forms, revising issue lists, preparing the old and new issues "roadmap," and preparing the report. However, future teams should seriously consider (e.g., during the initial resource analysis) the cost-effectiveness and other benefits of arranging for dedicated clerical and other administrative support.

5.4 Process

5.4.1 Issues List

At the direction of the Convened Group, the initial list of issues was determined by the CP-5 D&D Project personnel. The list was reviewed by the Convened Group who requested and approved a revision which was made available to the Standards Identification Team. Several more revisions were required before the Identification Team considered it to be the final list.

5.4.2 Standards Set

The guidance provided by DOE puts a preference on non-DOE requirements. As a result, many DOE Orders were determined to be not necessary. However, this determination more likely indicates that an Order is redundant than that it lacks quality. The CP-5 team recognized that the DOE Orders that were not included in the set were not necessarily bad orders but simply did not provide a benefit for this project. It should not be assumed that because an Order does not provide a benefit for one project, it will not provide a benefit for another.

CP-5 D&D project personnel were concerned about the focus on external standards when internal standards (which have already been implemented) are sufficient. Although a strict focus on internal standards might save some effort and avoid confusion (since project employees are already familiar with the ANL manuals), it is not consistent with the hierarchy mandated by the closure process, which is based on DOE's preference for external consensus standards. Internal standards were considered primarily as implementing procedures and not as standards in and of themselves. Also, since "necessary" includes compliance with applicable (by law) requirements, a top-down evaluation is necessary. However, a top-down process might make more sense for a sitewide project; for a specific project, a bottom-up process might be more cost-effective. Putting lines through irrelevant parts of ANL manuals and procedures would have been a much easier way to distill requirements for a project than starting from scratch by identifying the standards that are applicable by law, then determining whether they are sufficient, and finally determining whether the internal procedures provide adequate assurance of compliance with those standards.

Because the priority was to look at external standards first, there was no opportunity to identify the savings (net benefits) that would result from not including DOE Orders in the set. Future N&S standards identification processes should consider listing the DOE Orders that are not included in the set but are in the contract, and the net benefit (positive or negative) of including them. Consideration should be given to the fact that it is not only the DOE Order that is burdensome (generally the base requirements are not significantly different than those of some law) but also the manuals and implementing guidelines that interpret these requirements. What adds to the burden is having to demonstrate that (1) an activity complies with a DOE Order or (2) a DOE Order does not apply. It would also be useful to identify unnecessary requirements in DOE Orders (as was done for

the legally applicable requirements) and the net benefit from omitting them from the set of N&S standards. The proposed Issues/Standards Matrix is provided in Appendix N.

5.4.3 Terminology

Future Standards Identification Teams would be well-advised to define terminology early in the process to avoid misinterpretations at the conclusion of the process (see Appendix S).

6 Implementation Considerations

6.1 Contract Modification

Implementation of the set of N&S standards will be accomplished through modification of the performance-based management contract (W-31-109-Eng-38, Modification No. M269) between DOE and the University of Chicago. A new special article, *Environmental Protection, Safety and Health Requirements ;or the CP-5 D&D Project*, will be added to the contract. Because this was not a site-wide N&S process, articles currently contained in the contract that relate to ES&H (Article 69, Permits or Licenses; Article 71, Nuclear Safety; Article 72, Safety and Health; Article 76, Environmental Protection; Article 77, Environmental Compliance; and Article 80, DOE Directives) will not be modified.

The proposed modification addresses future management of the N&S standards. For example, the modification defines criteria, assign responsibilities, and establishes an expedited process for "revisiting" the set in the event of changes. Two types of changes are of particular importance. First, a change in circumstances could affect the continuing validity of the list of issues that is the basis for the set of N&S standards. For example, technology development activities, which were not considered during the N&S standards identification process, will need to be considered once they are adequately defined (minutes of Identification Team meeting on October 18, 1995). The contract modification provides that ES&H issues in each technology development proposal receive an evaluation. If an emerging technology creates an issue that was not on the final list considered by the Standards Identification Team, the new issue will need to be reviewed to determine if additional standards are necessary for the set of standards to be sufficient. Note that this type of change requires a focus on the issues list and not on the standards set itself. The second type of change is a change in a standard in the set. The contract modification that implemented the Fermilab set of N&S standards provided that changes to standards that were applicable by law would be implemented immediately, but it allowed more flexibility in the implementation of external standards that were not applicable by law. A similar approach is proposed for the CP-5 standards.

The contract also will reflect the assumption that the version of an external standard that is included in the set is the one that is in effect at the date the contract modification is executed, unless "most current version" is specified. If internal laboratory procedures are revised to include a version of an external standard that is more current than the one that is in effect for the rest of the site, project and DOE personnel can decide if the revised standard is necessary.

6.2 ES&H Standards

Consistent with the scope of the CP-5 N&S standards identification process, the contract modification will implement a new set of ES&H standards. However, the modification will not affect the applicability of non-ES&H standards that are identified in the contract to the project. As

previously discussed (Section 1.2.2), the Standards Identification Team was aware of the potential for confusion over what current DOE Orders (beyond those in the old 5400, 5480, 5481, and 5482 series) are ES&H and are superseded by the N&S standards for CP-5. This issue did not arise in connection with the Fermilab pilot project, since it was a sitewide activity; nonapplicable ES&H DOE Orders were merely deleted from the contract as part of the implementing modification. Since the CP-5 D&D is only one minor activity on the ANL site, the list of applicable orders in Appendix I of the contract must be retained; therefore, implementation of the CP-5 N&S standards necessitated that DOE Orders that would not be applicable to CP-5 be identified in some other way. On the basis of guidance provided by the Convened Group after the Confirmation Team meeting, the Standards Identification Team drew up a list of all orders in the 5400, 5480, 420, 440, 450, and 460 series. This list was compared with the topics addressed by 10 CFR 820, 10 CFR 830.120, and 10 CFR 835, as well as those covered by proposed 10 CFR 834 and the 10 CFR 830 series. The comparison assured that topics deemed applicable to nuclear safety per the Price-Anderson Amendments Act were considered for the N&S standard set. A review then determined which listed orders were not necessary for the protection of people or the environment in connection with the CP-5 issues list. The list of orders was then provided to the attorneys drafting the contract modification (see Appendix T, Applicability of ES&H Orders to CP-5 D&D Project).

To avoid confusion, three DOE Orders require additional discussion: DOE Order 231.1 on ES&H reporting (previously DOE Order 5484.1), DOE Order 151.1 on a comprehensive emergency management system, and DOE Order 225.1 on accident investigation. Some of the requirements in these Orders were included not because they would have a direct effect on the safety of project personnel or others (e.g., requirements that would assure that project personnel cooperate with ANL Emergency Management personnel in the investigation of and response to accidents) but rather to assure the completeness and consistency of sitewide data. However, it was deemed simpler to include these requirements than to argue that they do not promote ES&H performance objectives and therefore are outside the scope of this N&S standards identification pilot project, and then to somehow indicate that they are still intended to be applicable to the project even though they are not part of the set of N&S standards.

6.3 Buy-in

The Standards Identification Team has assumed that the modification of the contract and the approval of the set of N&S standards by the approving officials of the customer, responsible, and resources organizations will constitute buy-in of these organizations. Buy-in is important, since each of these organizations provides some level of oversight for this project and must therefore assure that any performance measurement activities make use of the set of N&S standards rather than other standards that apply to the rest of the Laboratory under the contract. Moreover, as previously discussed, buy-in of the top management of the responsible organization (the contractor) should expedite waiver of sitewide procedures and other requirements that the team has determined are not necessary to assure an adequate level of protection.

6.4 Implementing Procedures

As previously discussed (Sec. 2.5.3), the Convened Group expected that the last step in the CP-5 N&S standards identification closure process would be a comparison of the set of N&S standards with the ANL-E ES&H Manual and other internal procedures (minutes of Convened Group meeting, September 20, 1995). The Standards Identification Team determined that a commitment to this level of effort was beyond its resources; however, the team did agree to consider internal procedures when possible. For example, if a team member was aware of an internal procedure related to a specific issue and knew that past adherence to the procedure had resulted in compliance with the standards identified as necessary for that issue, that information was reported in the documentation form for the issue. For issues and standards for which no information on internal procedures is included in the documentation, the implementing assumption is that the project will prefer use of existing internal ANL procedures over the development of new, project-specific procedures. Thus, project personnel will have to review any topically relevant internal procedures and determine whether they can cost-effectively assure levels of safety and environmental protection that are consistent with performance expectations and management goals of the CP-5 project.

To a certain extent, the preference for internal standards is driven by a recognition that it is more cost-effective to continue to use existing processes than to develop and adopt new ones. To a larger extent, this implementation approach is driven by a recognition that since the CP-5 project is on the ANL site, it will rely on existing ANL matrix organizations (waste management, etc.). Cooperation with such matrix organizations will require compliance with their internal procedures and requirements. However, it is recognized that the project will not be subject to all of the same standards as the rest of the site (because of differences between the set of N&S standards and those standards that apply to ANL generally by contract).

Project implementing procedures also will need to provide for change control as new D&D technologies are introduced (minutes of Convened Group meeting on August 2, 1995).

6.5 Proposed Standards

Proposed standards constitute another implementation consideration. For some issues, the proposed standard was included in the standards set. For other issues, the proposed standard was identified on the documentation form (in Block 3, 13, or 14), with the notation that it will become applicable when final. In still other cases, the proposed standard was used as guidance for the development of an internal standard. The different treatment depended in part on whether the proposed standard would be applicable by law when final and in part on whether the Standards Identification Team believed that the final standard would be substantially the same as the proposed standard. If the proposed standard will be applicable by law when final, but a nonlegally applicable standard has been included in the set in the interim, the Standards Identification Team intends that the continued necessity of the external standard be considered when the applicable standard is final.

6.6 Issue Focus

The Standard Identification Team cautions that the standards set be implemented on an issue-by-issue basis, as the set was developed. Unlike the Fermilab N&S standards identification process, the CP-5 standards identification process did not result in a "roll-up" of the standards for inclusion in the contract, because this could be misinterpreted to mean that the entire set applies to every CP-5 activity or issue. Relevance of a particular standard to the project must be qualified by the scope of each issue and by the assumptions provided for each issue and issue-specific standard. This qualification is imperative, since standards that apply to some issues (e.g., hazardous waste) do not apply to other issues (e.g., radioactive waste).

6.7 Extrapolation to Other Projects

The Standards Identification Team agreed that application of the standards set needed to be limited to the CP-5 D&D project. Because of the careful limitation of the scope of the project and the numerous project-specific assumptions involved, it would be inappropriate and potentially hazardous to apply or extrapolate this set of standards to, for example, another D&D or reactor project at another site and with other conditions. This caution is consistent with the experience of the team, which was that the issues lists and sets of standards from other N&S standard identification pilot projects provided were very limited in their relevance and assistance to this project. Also, it is consistent with the N&S standards identification closure process, which is a bottom-up process that uses site-specific and project-specific conditions and proposed actions to define site- and project-specific hazards and issues and thereafter the necessary ES&H standards. Even a minor difference in site conditions or project activities could mean a difference in issues and thus undermine the sufficiency of the set for another project. The team encourages future standards identification project personnel to (1) consider the issues raised by this project and other projects to confirm the completeness of their own list of issues and (2) study the lessons learned from as many N&S standards identification pilot projects as possible as an important early step in their own process. It does not imply that this set of standards is generic, and it does not advise that it be used outside the boundaries delineated above.