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INSTITUTE FOR DEFENSE ANALYSES

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PREFACE

In accordance with section 3140 of the National Defense Authorization Act for fiscal year 1997, and section 302 of the Energy and Water Development Act, the Department of Energy (DOE) was required to conduct a study of how it manages the nuclear weapons program, to include an analysis of the functions performed at Headquarters Defense Programs, operations offices, and applicable area and site offices.

DOE contracted with the Institute for Defense Analyses (IDA) to perform this study. IDA was asked to review all available material bearing on this topic, interview participants in headquarters and the field, interview selected customers, and prepare a report for submission to the Deputy Secretary and the Assistant Secretary for Defense Programs. The report was to contain an analysis of findings and options for making changes to management and organizational structures, along with the pros and cons of those options. This report is submitted in fulfillment of the requirements of the task order.

From the very start, DOE's senior executives made clear their desire to have IDA conduct a completely independent and objective analysis. There were no restrictions placed on the issues that should be evaluated, or on the potential solutions that should or should not be considered. At no time did anyone at the Department of Energy waiver from this commitment.

The primary source of information for this study was interviews with official throughout the Department of Energy and its contractors, supplemented by a review of relevant internal DOE documents. Senior managers and their employees at every organization visited were not only cooperative, they were forthcoming and often passionate in their concerns and criticisms (and praise) of the management and organization of Defense Programs and the Department of Energy.

Because of the extensive number of briefings conducted by IDA prior to the completion of this report, it has benefited from the comments and criticisms of scores of people throughout the Department of Energy, and among its contractors. The authors wish to thank all of them for their time, interest, and forthrightness, though they are too numerous to list here by name. Formal reviews of this paper were provided by external IDA reviewers Everett Beckner and Steve Guidice, and internal IDA reviewers Michael Leonard and Victor Utgoff. Their many helpful comments and criticisms are gratefully acknowledged. Their status as reviewers does not imply in any way their agreement with or endorsement of any of the analysis, conclusions, or recommendations in this study.

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A. INTRODUCTION

This review of Defense Programs' roles, responsibilities, and organizations was commissioned by the Department of Energy (DOE). It addresses the question of whether Defense Programs' current management practices and organization are the most effective for supporting its core responsibilities for the management and long-term stewardship of the enduring nuclear weapons stockpile, and for trusteeship of the weapons production and laboratory complex.

This report provides a brief baseline description of current management practices in Defense Programs (Chapter I). It then describes findings with regard to the management of Environment, Safety, and Health concerns (Chapter II). Several additional findings are presented in Chapter III. Options for reengineering Defense Programs' management processes are provided in Chapter IV. Options for reengineering the Defense Programs organization follow in Chapter V.

B. FINDINGS: ENVIRONMENT, SAFETY, AND HEALTH

The largest single problem uncovered in this study is that Defense Programs'—and, more generally, DOE's—practices for managing environmental, safety, and health (ES&H) concerns are constipating the system. The Department's ES&H practices are based on a hybrid of centralized and decentralized management practices that have evolved over the past decade. For example, in Defense Programs' review of key documents defining a contractor's safety envelope, the current system can best be described as one in which everybody reviews everything until everyone is satisfied. The "process" is ad hoc; there is inadequate discipline regarding who should participate and how that participation should take place.

Compounding these process problems, there is no consensus among all these reviewers and checkers, and checkers of checkers regarding the desired end-state for a facility. That is to say, there is no agreement on what it means to be safe. Consequently, each of the organizations that review a document, decision, or process does so from its own perspective and insists that the facility meet *its* priority requirements for safety. At any time during what could be a multi-year process, the area office or contractor might, for example, receive a hundred pages of comments from just about anyone that must then be addressed. When conflicts arise between two or more reviewers, there is no formal method for resolving them.

These practices undermine accountability and prevent timely decisions and their implementation. Plants and equipment remain idle awaiting various approvals, or they age and become obsolete or expensive to maintain without ever having been used for

productive purposes. Defense Programs has a critical job to do—maintenance of the U.S. nuclear deterrent—which is not well served by ES&H review and approval processes that drag on forever.

C. OTHER MAJOR FINDINGS

Eight additional findings are detailed in Chapter III. These findings concern Defense Programs' management of its work force; the lack of clear chains of command; and the weak integration of programs and resources within Defense Programs, as well as across DOE.

1. *Too many people.* There are too many people working in Defense Programs, both in headquarters and the field. In and of itself, this is a problem, because good people find things to do. They end up creating work not only for themselves, but for others as well, undermining attempts to establish disciplined management processes. Headquarters and the field find themselves competing with one another for roles and responsibilities.

2. *Concerns over the expertise and training of people.* Many managers expressed concerns over their ability to attract, retain, train, promote, and otherwise employ the right people in the right jobs. Some managers worry that the federal work force is "contracting out its brains;" i.e., people are losing their technical edge as they become little more than contract administrators. The restrictive nature of the civil service system creates enormous problems in trying to craft a work force with the right skill mix. Before concluding that these concerns are completely correct, however, one must ask if it is the case that there are not enough experts in the DOE system, or is it that the talents of the experts who do exist cannot be brought to bear on important problems, because the management systems for doing so are broken?

3. *Confusion over the difference between line and staff.* People throughout Defense Programs confuse the power and influence that comes from being a staff person working for a powerful line manager, with line management responsibility. This is generally the result of a failure to carefully define and adhere to assigned roles and responsibilities.

4. *Two headquarters for Stockpile Management.* Almost everyone in Defense Programs believes that there are two headquarters for Stockpile Management—Washington and Albuquerque—and that there only needs to be one. Most of the contention revolves around ES&H, rather than programmatic, issues.

5. *Weak integration of programs and functions within Defense Programs.* Over the past four years, Defense Programs has built a strategic management framework that effectively integrates missions, programs, and organizations. However, there is still substantial room for improvement. In particular, although the Stockpile Stewardship program has a well-articulated vision in Science-Based Stockpile Stewardship, it lacks sufficient high level planning and guidance. Furthermore, the Stockpile Stewardship program has yet to be fully integrated with the Stockpile Management program. Another

problem is the need to integrate the Stockpile Stewardship and Stockpile Management programs with Defense Programs' responsibilities for "Weapons Complex Trusteeship." The latter refers to ES&H management, investments to maintain the physical infrastructure, and investments in people.

6. *Weak integration of programs and functions across DOE.* The ability of the Secretary, Deputy Secretary, and Under Secretary to provide meaningful guidance and resolve disputes that cut across programmatic and functional areas is limited by the lack of formal systems and processes with which to do so. The problems associated with coordinating budget guidance provide a case in point—there appears to be no meaningful DOE budget guidance provided to the field. Coordination between programs is worked out in an undisciplined, uncoordinated, essentially ad hoc process between the field managers and each of the assistant secretaries. An analogous story can be told regarding the imposition of guidance on the field for contracting, safeguards and security, ES&H, personnel and other "functional" requirements.

7. *Weak link between requirements and budget direction.* There is in the Department of Energy no single, disciplined process for ensuring that all decisions with resource implications are weighed against one another in a complete and consistent fashion. When programmatic or functional requirements overlap, there is no formal means by which to evaluate and resolve disagreements. There is no formal planning, programming, and budgeting system (PPBS).

8. *Wide variations among field activities in relationships and processes.* Although most of the findings summarized above are applicable to all the sites in the nuclear weapons complex, including headquarters, there were a number of interesting exceptions. The conduct of and attitudes towards Facility Representatives, for example, show wide variation between sites, from cooperative teamwork at the Livermore Site Office and Lawrence Livermore National Laboratory, to a more confrontational relationship between the Los Alamos Area Office and Los Alamos National Laboratory.

D. BASELINE REFORMS: REENGINEER CORE PROCESSES

The first order of business in addressing these management problems is for Defense Programs to reengineer its core management processes—Stockpile Stewardship, Stockpile Management, and Weapons Complex Trusteeship—and provide a framework for integrating across these areas.

1. Management Process Principles

In designing these core management processes, Defense Programs needs to incorporate several key management principles derived from the findings and problems discussed in the first three chapters. These principles imply the need for dramatic changes in some of Defense Programs' management processes.

1. *Have confidence in the field—trust but verify.* Senior DOE leadership must decide to trust the line managers in the field, and resist the temptation to duplicate their capabilities and responsibilities elsewhere. Such delegation requires that competence and capabilities be commensurate with responsibilities. At the same time, the legitimate requirements for guidance and oversight by headquarters must be fulfilled.

2. *Complete the transition of ES&H from a management overlay to an embedded part of line management—implement Integrated Safety Management.* The stovepipe management structure for ES&H must be removed, and ES&H management must be integrated into program management and resource allocation processes. Everyone agrees that the safest system is one in which line managers are fully accountable for safety—in which line managers are managing work safely themselves. The Department has committed itself to move in this direction with its initiative to adopt the Integrated Safety Management system.

3. *Ensure that long-term military requirements drive the Stockpile Stewardship and Stockpile Management programs.* Ultimately, everything that is done as part of the Stockpile Stewardship or Stockpile Management programs must be based on meeting military requirements. Even very long-term basic research projects can—and must—be justified on the basis that the knowledge they are expected to produce will help meet the needs of the enduring stockpile. The Science-Based Stockpile Stewardship (SBSS) program and the Stockpile Life Extension Program (SLEP), together with other initiatives and programs (especially ASCI, ADaPT, and tritium production) that are all drawn together in the *Stockpile Stewardship and Management Plan* (the *"Green Book"*), provide a clear indication that Defense Programs is emerging from the shadows of the cold war and has a strong vision and plan for its future. While this study has some suggestions on how to improve the implementation of this vision, the direction and purpose of the program are affirmed.

4. *Establish Weapons Complex Trusteeship as a core mission.* Defense Programs' role as trustee of the weapons complex and its people—including responsibility for long term infrastructure investments and the proper management of ES&H practices—is so central to its stewardship and management responsibilities that Weapons Complex Trusteeship should be viewed as a third core responsibility, on a par with the programmatic responsibilities for Stockpile Stewardship and Stockpile Management.

5. *Fewer people in a streamlined organization can do a better job.* Reengineered processes and organizations will allow fewer people to accomplish more work more efficiently. There are also too many people in headquarters, too far removed from the "real" work. The principle to be followed should be that all functions and positions that do not absolutely need to be performed in headquarters should be performed in the field.

6. *Strong management is needed to integrate across programs and functions.* Strong managers and management systems are needed to ensure that cross-cutting issues

are thoroughly addressed, and to ensure that everyone is working together as a team. In Defense Programs, this means having a strong, knowledgeable principal deputy assistant secretary. In DOE, this means the Office of the Secretary must install management systems and exercise authority to mold the assistant secretaries into a more effective management team.

2. Baseline Reforms

Six baseline process reforms are needed to address the problems identified in this review, in a manner consistent with the process principles outlined above.

1. *Reengineer ES&H review and approval processes.* (i) Use single, integrated, field-led, Defense Programs reviews of contractors' safety documentation and processes; (ii) streamline but maintain strong headquarters oversight; and (iii) decide on the appropriate role of Facility Representatives. (These baseline reforms assume DOE adopts Integrated Safety Management principles and practices.)

2. *Streamline Stockpile Management.* Streamline processes and reduce the number of people (reengineer).

3. *Improve the integration of Stockpile Stewardship.* (i) Improve the linkages between Stockpile Stewardship and Stockpile Management; (ii) prepare an annual high level Defense Programs R&D plan; and (iii) integrate the programs of the three national weapons laboratories.

4. *Install a disciplined resource allocation process.* (i) Strengthen the connection between requirements and budgets; and (ii) improve infrastructure planning and investment.

5. *Install strong management.* The principal deputy assistant secretary in Defense Programs (DP) will be responsible for running DP headquarters and integrating policy and oversight decisions.

6. *Improve the management of people and their careers.* (i) Reevaluate training, education, and career development programs; (ii) rotate large numbers of field people, including management and operating (M&O) contractors, through headquarters, and vice versa.

E. OPTIONS FOR ORGANIZATIONAL REENGINEERING

Two options are presented for reengineering Defense Programs. Both assume the adoption of the baseline process reforms presented above. Option I sharpens the focus of headquarters and the field by assigning oversight of the Stockpile Management program to headquarters and assigning its implementation to Albuquerque. Stockpile Stewardship oversight and management responsibilities would remain in headquarters. Option II assigns both oversight and implementation of Stockpile Management to headquarters.

A set of organizational principles provide the general guidance used in developing the options: (1) Functions and positions that do not have to be performed in headquarters should be transferred to the field; (2) implement a world-class organizational model for ES&H management; (3) maintain DOE staff core competencies by reducing the reliance on support service contractors; (4) manage the workload associated with DOE headquarters, Congress, the White House, and other overseers; (5) increase the flow of field, and M&O contractor personnel through headquarters positions, and vice versa; and (6) streamline and reduce headquarters and field staffing—federal employees and support service contractors—by at least 20-30 percent.

1. Options I and II—Reorganize Defense Programs

Under Option I, Albuquerque would become the operational focus for the Stockpile Management programs, and for Defense Programs' Weapons Complex Trusteeship responsibilities. Most functions and positions in Headquarters DP dealing with ES&H and facilities operations issues would be eliminated or transferred to the field. Offices responsible for Stockpile Management, Stockpile Stewardship, and major programmatic initiatives would be streamlined, with as many functions and positions as possible eliminated or transferred to the field.

Under Option II, the functions of headquarters, particularly Germantown, would be merged with those of Albuquerque, and everyone would report directly to headquarters. Thus, for example, all offices responsible for Stockpile Management, including the Office of National Defense Programs in Albuquerque, would be merged and report to the Deputy Assistant Secretary for Stockpile Management (DP-20) in Headquarters DP. Similarly, all offices responsible for Stockpile Stewardship would be merged under the Office of Research and Development (DP-10), and all offices responsible for ES&H matters would be merged under the new Deputy Assistant Secretary for Safety and Operational Oversight. The Amarillo and Kansas City Area Offices would report directly to headquarters, as would the Los Alamos, Kirtland, and Livermore Area and Site Offices. Albuquerque would cease to be an Operations Office, becoming instead a "Business and Operations Support Center."

2. Options III and IV—Operations Office Reporting Chains

Two additional options are presented which deal with the reporting relationships of Operations Offices. Both assume the adoption of the baseline reforms above, and the adoption of either Option I or II. Option III would have each Operations Office report directly to a single assistant secretary. Option IV would have the Operations Offices report directly to a new Under Secretary acting as a chief operating officer (COO). The program assistant secretaries would be relieved, under Option IV, of all contracting, ES&H, personnel, security, and other administrative functions. They would become pure customers, in essence purchasing products and services at each site.

E. SUMMARY

This study seeks to describe the management issues facing Defense Program today, drawing on the experience and perspectives of officials throughout the Department of Energy and the weapons complex. The issues raised here should resonate with the reader experienced with the nuclear complex, since the goal for this report has been to provide a structured presentation that distills and clarifies issues that have been debated within the complex for many years.

While a review such as this necessarily focuses on continuing problems and unfinished business, it is important to emphasize the progress Defense Programs has made in adapting to the new demands being placed on the weapons complex. The *Stockpile Stewardship and Management Plan* and a number of major initiatives, such as ASCI, ADaPT, and tritium options are laying the groundwork for meeting Defense Programs' core responsibilities for Stockpile Stewardship and Stockpile Management.

Many of the concerns raised in this review, and the corresponding options for reform, reflect the fact that less progress has been made in recognizing the trusteeship of the weapons complex as a responsibility on a par with stewardship and management. From a Department-wide perspective, DOE has struggled to implement an effective management system for addressing ES&H concerns. As described in Chapter II, DOE's approach to these issues has been in flux for at least a decade. The Department now appears to be converging on a sound approach with its concept for Integrated Safety Management.

Within Defense Programs, headquarters has not established a strategic management framework for Weapons Complex Trusteeship responsibilities that parallels the *Stockpile Stewardship and Management Plan.* It has not established a systematic requirements process for this area, and roles and responsibilities throughout the complex remain ambiguous. Progress is being made on all these fronts, and the options presented in this report are intended to be helpful in accelerating this progress.

Another general observation underlying several of the specific findings of this review is that, in many respects, there is no "Department of Energy." This no doubt reflects the history of the Department, since it was formed some twenty years ago by merging numerous ongoing federal programs and regulatory responsibilities under a single roof. Those familiar with other multi-functional departments (e.g., the Department of Defense, the Department of Transportation), will recognize that the problems DOE leaders face in integrating across program areas and functional responsibilities are extremely challenging, and addressing them will require considerable investments in management and personnel systems. Discussions with field officials repeatedly underscore how the lack of headquarters integration imposes unnecessary burdens and costs on DOE's field operations. Creating the necessary management framework is a daunting challenge, but one that sorely needs to be taken on.

The options outlined in Chapters IV and V are intended to address the major problems found in this review. Some are targeted at specific problems, some address deeper systemic problems within Defense Programs, and others address broader DOE-wide issues. In every case, the options are intended to suggest a general direction of change that the Department could follow by forming implementation teams that could, relatively quickly, determine specific courses of action.

CHAPTER I
MISSION, ORGANIZATIONS, AND CHAINS OF COMMAND

The Department of Energy's Office of Defense Programs (DP) is responsible for ensuring the safety, security, and reliability of the nation's nuclear weapons stockpile—a vital element of U.S. nuclear deterrent capability. As the sole supplier of nuclear warheads to the U.S. military, it oversees an extremely broad range of activities. These include basic scientific studies and experiments; nuclear reactor operations; manufacturing operations involving nuclear materials, high-explosives, and high-technology electronics and mechanical components; testing, surveillance, assessment, and certification of weapons; and storage and transportation of weapons and hazardous materials. Defense Programs performs its mission with a federal work force of approximately 2,000 people, who oversee the work of about 25,600 contract personnel who manage and operate the government-owned weapons complex. The Defense Programs' budget is about $4 billion per year.

This review was commissioned to examine Defense Programs' management processes and structures, and to offer options that might improve its ability to carry out its responsibilities. The review sought first to establish a baseline understanding of the Office of Defense Programs' mission and its current management approach. The overview provided in this chapter identifies the management issues facing Defense Programs today, and provides a context for the detailed findings and options discussed in subsequent chapters. The first section describes how Defense Programs has responded to its changing mission in the post-cold war era. The second section describes its current organizational structure. The third section examines the chains of command associated with Defense Programs' major management processes. The final section summarizes the broad issues facing Defense Programs today, and outlines how these issues are addressed in the ensuing chapters of this report.

A. DEFENSE PROGRAMS' MISSION AND THE EVOLVING SECURITY ENVIRONMENT

With the end of the cold war have come radical changes in the nature of the work Defense Programs must accomplish to fulfill its basic mission. Current and planned arms reductions will dramatically reduce the size of the stockpile, along with the number of warhead types that will need to be maintained. As a result of the START I and START II agreements, the U.S. may decide to reduce its active stockpile to fewer than 5,000 warheads, and U.S. officials are contemplating START III proposals that would reduce the stockpile to 2,000 or fewer warheads. In the decade of the 1980s, Defense Programs produced roughly 1,000 new warheads each year. Today, it is dismantling approximately 1,000 warheads per year, in order to bring the stockpile down to levels consistent with those agreed to in conjunction with START I.

Although the stockpile is being reduced, post-cold war policies have created significant new challenges that must be overcome to maintain nuclear deterrent capabilities. The President's 1994 Nuclear Posture Review stipulates that the U.S. will no longer perform underground nuclear tests, will produce no fissile materials, and will produce no newly designed warheads.[1] Defense Programs therefore must now ensure the nation's nuclear deterrent posture by maintaining a small number of warheads over an indefinite life span. Moreover, it must accomplish this without relying on underground nuclear explosive testing, which, in the past, served as the ultimate fallback for ensuring reliability and safety. These changes have forced a shift from the traditional focus on designing, testing, and manufacturing successive generations of new warheads every several years, to one of identifying and implementing the programs and policies needed to ensure the continued viability of the "enduring stockpile."

Defense Programs' emerging approach to the post-cold war challenge is laid out in its classified *Stockpile Stewardship and Management Plan* (the "Green Book"). The Green Book establishes two core programmatic responsibilities: Stockpile Management and Stockpile Stewardship. Stockpile Management refers to the near-term tasks needed to sustain the stockpile. This includes surveillance, component manufacturing, disassembly, dismantlement and re-assembly, and related activities. Stockpile Stewardship includes the tasks needed to address Defense Programs' longer-term challenges. These include the laboratories' core research programs, along with projects to develop the experimental facilities and computational capabilities needed to survey and assess the stockpile, to address aging problems, and to provide annual certifications of stockpile safety and reliability without nuclear explosive testing. The *Stockpile Stewardship and Management Plan* provides a credible vision for meeting the mission of Defense Programs, and constitutes an important turning point in reorienting the Department of Energy and its contractors toward the needs of the post-Cold War era.

In parallel with the development of the new programmatic approach outlined in the Green Book, Defense Programs has begun reconfiguring the weapons complex. The number of sites has been reduced and production activities have been consolidated in existing production facilities and the laboratories. Today, the weapons complex includes four production sites, three laboratories, and the Nevada Test Site (see Table I-1).

Under current plans, the existing production sites will continue to "downsize in place." By the year 2002, the complex will be sized to sustain a stockpile commensurate with START II goals (with a hedge for START I), and will provide a surge production capability adequate to address reliability and other problems that might develop. Tritium

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[1] The President's Nuclear Posture Review (NPR) states that DoD requires DOE to "maintain the capability to design, fabricate, and certify new warheads." While making clear that there will be "no new-design nuclear warhead production" at this time, and that the U.S. has no requirement to produce new warheads, the U.S. will be producing replacement warheads based on new designs of existing warheads.

Table I-1. The Nuclear Weapons Complex

LABORATORIES AND THE NEVADA TEST SITE
Sandia National Laboratories (Lockheed Martin) Conduct research and engineering activities Conduct experiments on nuclear weapons effects Design non-nuclear components and perform related systems engineering Manufacture selected non-nuclear components Provide safety and reliability assessments of the stockpile
Lawrence Livermore National Laboratory (University of California) Conduct R&D in basic sciences, mathematics, and computing Conduct experiments on physics of nuclear weapons Maintain capability to design nuclear explosive packages Design and test advanced technology concepts Provide safety and reliability assessments of the stockpile
Los Alamos National Laboratory (University of California) Conduct R&D in basic sciences, mathematics, and computing Conduct experiments on physics of nuclear weapons Maintain capability to design nuclear explosive packages Design and test advanced technology concepts Provide safety and reliability assessments of the stockpile Manufacture and conduct surveillance on selected non-nuclear components Conduct pit surveillance and intrusive modification for reuse; fabricate pits
Nevada Test Site (Bechtel Nevada) Maintain capability to conduct underground nuclear tests, and evaluate effects Conduct experiments on physics of nuclear weapons Support emergency response and radiation-sensing activities
PRODUCTION SITES
Kansas City Plant (Allied Signal) Produce, procure non-nuclear components (electrical, electronic, mechanical) Conduct surveillance testing on and repair non-nuclear components
Pantex Plant (Mason & Hanger) Assemble, maintain, and conduct surveillance on warheads Disassemble nuclear warheads being retired Fabricate chemical high-explosive components Store plutonium components from dismantled warheads Establish capability for non-intrusive modification pit reuse
Oak Ridge/Y-12 (Lockheed Martin Energy Systems) Maintain capability to produce secondaries and cases Conduct surveillance on and dismantle secondaries Store and process uranium and lithium materials and parts Provide production support to weapons labs
Savannah River/Tritium Operations (Westinghouse Savannah River Co.) Recycle (unload/purify/load) tritium from dismantled warheads Conduct surveillance on and reclaim returned tritium reservoirs Support tritium source projects

Source: Based *on Summary Stockpile Stewardship and Management PEIS and Record of Decision*, 1996.

supplies will rely on existing inventories and supplies drawn from dismantled warheads until later in that decade, when new tritium production sources are scheduled to come on line.

In addition, Defense Programs and DOE have struggled to establish consistent concepts and management approaches that will implement modern practices for clean, safe, and healthy operations. These efforts have culminated in the development of a concept for Integrated Safety Management, which, when fully implemented, should provide an effective framework for managing environmental, safety, and health (ES&H) concerns.

One of the broad themes that emerged from this review is that Defense Programs' role as trustee of the weapons complex and its people—including the associated responsibilities for managing ES&H concerns—is central to its long-term Stockpile Stewardship and Stockpile Management responsibilities. DOE must continue to maintain and develop the capabilities of its facilities and people, and must meet the demands of the public, Congress, and external regulators for safe, clean operations. In fact, it poses such an important set of challenges that management of the complex should be viewed as a third core responsibility, on a par with the programmatic responsibilities for Stockpile Stewardship and Stockpile Management.

This review thus defines three core responsibilities as the appropriate management focus of Defense Programs: *Stockpile Stewardship, Stockpile Management,* and *Weapons Complex Trusteeship*. The fundamental question addressed here is how best to meet these core responsibilities in the changed national security environment.

B. THE DOE HEADQUARTERS AND FIELD STRUCTURE

The federal oversight structure for the weapons complex begins with the Washington headquarters operation, and extends to local offices collocated with each of the eight government-owned facilities described in the preceding section. The structure has three tiers. The headquarters tier includes the personnel in the Forrestal headquarters building, plus the personnel located at DOE's Germantown, Maryland office complex. The second tier includes five operations offices. The most important of these, from the standpoint of this review, is Albuquerque, which has responsibility for the Pantex and Kansas City production facilities, Sandia National Laboratories, and Los Alamos National Laboratory. Albuquerque has operational control for Stockpile Management programs, and is focused almost entirely on weapons-related work funded by Defense Programs.

The remaining four operations offices are each associated with a single weapons complex facility. These are the Nevada Operations Office for the Nevada Test Site, the Oakland Operations Office for the Lawrence Livermore National Laboratory, the Oak Ridge Operations Office for the Y-12 plant, and the Savannah River Operations Office for tritium operations. Unlike Albuquerque and Nevada, most have extensive missions with DOE programs sponsored by other headquarters program secretarial officers

(primarily Energy Research and Environmental Management). The third tier includes the site or area offices collocated with each laboratory or production facility.

A summary of the roles assigned to each of the three tiers is presented in Table I-2. These roles are discussed below, along with indicated areas where potential overlaps, or ambiguities, in the assignment of roles among the three tiers were identified.

1. Headquarters Roles

The role of headquarters is to provide policy, guidance, and oversight. In the textbook definition of roles and responsibilities, headquarters should focus on those areas that are crucial for the success of the organization, and should delegate operations and any other activities that can be done elsewhere.[2] This management approach helps to ensure that headquarters remains focused on appropriate top management tasks, while operational expertise is located as close as possible to where the operational work is done.

This textbook definition identifies several kinds of tasks that should be done by top management. Most are relevant to Defense Programs, and provide a useful point of reference for describing current practice.

Shape and Guide the Organization. Headquarters Defense Programs is responsible for providing the strategic leadership for each of the organization's core responsibility areas: Stockpile Management, Stockpile Stewardship, and Weapons Complex Trusteeship. It has taken the lead in shaping the organization through the development of the *Stockpile Stewardship and Management Plan*, and through issuing budget and program guidance for field implementation. In addition to providing general guidance, it is appropriate for top management to take the lead on major initiatives that are crucial to the future of the organization. Major programmatic initiatives such as advanced computing, tritium production, or the development of major experimental facilities are examples of initiatives that are appropriately being led from headquarters.

Manage External Relationships. The responsibilities of headquarters include maintaining close communications with the customer—the Department of Defense—Congress, the White House, other DOE organizations, other government agencies, and non-governmental organizations. Headquarters' staff must provide leadership in establishing programmatic requirements and in budget deliberations. It must also represent the complex in the development of DOE-wide policies and regulations, and interact with external bodies that establish policies and requirements governing the operations of the weapons complex.

Build the Human Organization. The third major top management task is that of building the human organization, and setting leadership standards. Top management is ultimately responsible for selecting and developing capable people. This is always a challenge in the government because of the significant restrictions placed on human resource managers. Nevertheless, DP has attracted many talented, dedicated people over

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[2] Peter Drucker, *Management: Tasks, Responsibilities, Practices* (New York, Harper Business, 1993).

Table I-2. Federal Roles and Responsibilities in the Nuclear Weapons Complex

Major Responsibilities	Selected Duties	Overlap
HEADQUARTERS DEFENSE PROGRAMS		
Manage Stockpile Stewardship and Stockpile Management Program	Provide program policy, direction, and technical guidance Prepare Production and Planning Directive (P&PD) Establish objectives and assess programmatic performance Integrate Stockpile Stewardship and Stockpile Management	
Formulate, allocate, and oversee execution of budget	Issue planning and budget guidance and allocate funds Plan and execute Stockpile Stewardship budget Integrate Stockpile Stewardship and Stockpile Management budgets	
Provide liaison with other Washington area organizations	Provide liaison with DoD, OMB, Congress, DNFSB, other federal agencies Coordinate activities with other DOE assistant secretaries	
Help formulate and apply corporate policy for support functions	Interpret ES&H policies and ensure programs comply	*
OPERATIONS OFFICE		
Serve as contracting officer for M&O contract	Negotiate, award, administer, provide business oversight for M&O contract Integrate and coordinate funding, program direction, functional policy direction, and guidance from multiple DOE offices and non-DOE customers Review and approve facility safety framework Consider site-wide institutional issues, health of contractual relationship Ensure infrastructure, facilities, and operations are in place to support programs	 * * * *
Execute programs on behalf of DOE program offices	Develop performance measures and performance expectations for determining contractor accomplishment of performance objectives Implement program and assess M&O's execution Coordinate and approve HQ's work authorization Provide planning input and support budget formulation and execution Provide matrix technical support to programs (and area offices), including ES&H and business operations Provide field project management for construction projects	* * *
Act as field program integrator for Stockpile Management (Albuquerque)	Direct and integrate field-level production, surveillance, dismantlement activity Prepare Program Control Document (PCD) and other program guidance for plants and labs Plan and execute the Stockpile Management budget for the plants and labs Plan and implement reconfiguration of weapons complex as assigned Coordinate Production Capability Assurance Program (PCAP)	 *
AREA OFFICE		
Administer M&O contract on behalf of contracting officer	Negotiate changes to contract Administer budget and work authorization directives Administer award fees and property and financial management systems Act as DOE spokesman and coordinate with stakeholders, including regulatory agencies and community organizations	 *
Execute program direction provided by operations office	Serve as focal point for disseminating guidance to contractor Oversee planning, scheduling, and control systems for production activities Assess contractor's budget preparation and execution process, funding priorities Manage site development programs and long-range planning	* *
Provide management oversight of contractor operations	Assure day-to-day implementation, verification, and reporting of all activities Oversee maintenance activities, utilities, energy conservation Provide project management for construction, environmental restoration projects Coordinate emergency preparedness, occurrence reporting, and duty officer programs	 *
Ensure compliance with ES&H orders	Provide program direction and oversight for nuclear facility safety Maintain operational awareness and perform independent management oversight of DOE facilities through Facility Representative program Conduct performance-based assessments of ES&H, safeguards and security Serve as DOE signatory to major environmental permits	* * * *

the years. The changes in mission and the security environment, and the overall reductions in the work force, will make it increasingly difficult for DOE to maintain needed expertise.

Lead During A Crisis. The fourth top management task is to lead the organization in times of crisis. At the strategic level, the development of Science-Based Stockpile Stewardship and the *Stockpile Stewardship and Management Plan* have served to lead the complex through the "crisis" of defining its new missions and responsibilities in the post-cold war era. At the operational level, Defense Programs has organizations and programs in place for addressing environmental, safety, or health accidents or other (nuclear-related) crises.[3]

2. Field Roles

The role of the field—operations offices, area offices, and site offices—is to implement the guidance provided by headquarters and to oversee the work carried out by the management and operating (M&O) contractors. The operations office managers are the formal contracting officers responsible for administering the contracts of M&O contractors. Operations office managers should therefore provide the focal points for interactions between the government and the contractor. They act as the landlords of the government-owned facilities, and they are the agents of headquarters for executing programs in the field. The site and area offices provide day-to-day interactions with the contractor, and maintain awareness of operations and issues within the government's facilities. The operations, area, and site offices also maintain relationships with local citizens' groups, state and local regulators, and with the field officials from federal regulatory agencies.

3. Issues—Defining Vertical Relationships

The entries in the third column in Table I-2 indicate areas where there is potential for overlap and ambiguity in the roles played at headquarters, the operations offices, and the site or area offices. One of the central management dilemmas facing Defense Programs is determining in practice where policy, guidance, and oversight end and detailed program implementation begins. Previous efforts to resolve overlapping or conflicting roles and responsibilities have foundered because they have failed to move beyond generalities that everyone can agree with, but that do not resolve jurisdictional disputes. Everyone seems to agree that broad program guidance is the responsibility of headquarters while detailed program execution is the responsibility of the field, but there is no agreement on what distinguishes the two, or on what specific responsibilities are contained in one and not the other.

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[3] The final top management responsibility not discussed in the text is representing the organization ceremonially. This is a very important function in some organizations, but it is not central to the success of Defense Programs.

A second management dilemma—one obviously related to the ambiguity in roles and responsibilities—is the confusion surrounding the chain of command. In particular, throughout the organization there is a misunderstanding of the appropriate definitions and roles of line versus staff.

An effective articulation of roles and responsibilities requires a clear assignment of specific tasks to specific parts of the organization. The chain of command must be clearly articulated and understood by everyone. A prerequisite for achieving this is a clear delineation of the management processes that will be employed in carrying out responsibilities. People need to know what the organization's goals are, how the organization accomplishes its work, and what each person's role is. People must know whether they are line or staff, and understand the difference between the two. One goal of this study is to describe these problems in greater detail, and suggest potential solutions.

C. OBSERVED CHAINS OF COMMAND

DOE and contractor officials were asked to help define the current chains of command in the weapons complex by describing their responsibilities and their working relationships with other organizations throughout the complex. Figure I-1 summarizes the current situation, focusing on the Pantex plant as an example. It presents a selective and simplified view of current interactions in order to focus on a few main points. The overall picture that emerges is one of considerable confusion over vertical relationships and the roles of line and staff officials. All three of the management dilemmas described above—overlapping roles and responsibilities, lack of clarity with respect to the chain of command, and confusion over the roles of line versus staff—are illustrated in this figure.

In addition to conveying this overall picture, the figure also provides an organizing framework for understanding many of the more subtle problems that are the "root causes" of these big picture issues. The ensuing discussion therefore describes the figure and its implications in some detail.

Four key groups of organizations are included in the figure. At the top are the two groups of organizations that shape the programs, budgets, and policies that govern the operations of the weapons complex. Within DOE, these include the Office of the Secretary of Energy and several of the key assistant secretaries who either sponsor program work performed in the field, or maintain policy or administrative responsibility for field operations. Shown are the offices of three assistant secretaries: Defense Programs, Environmental Management, and Environment, Safety, and Health. External to DOE, the bodies with regulatory or advisory authority over operations include the Defense Nuclear Facilities Safety Board, the Environmental Protection Agency, the Occupational Safety and Health Administration, and state and local regulators.

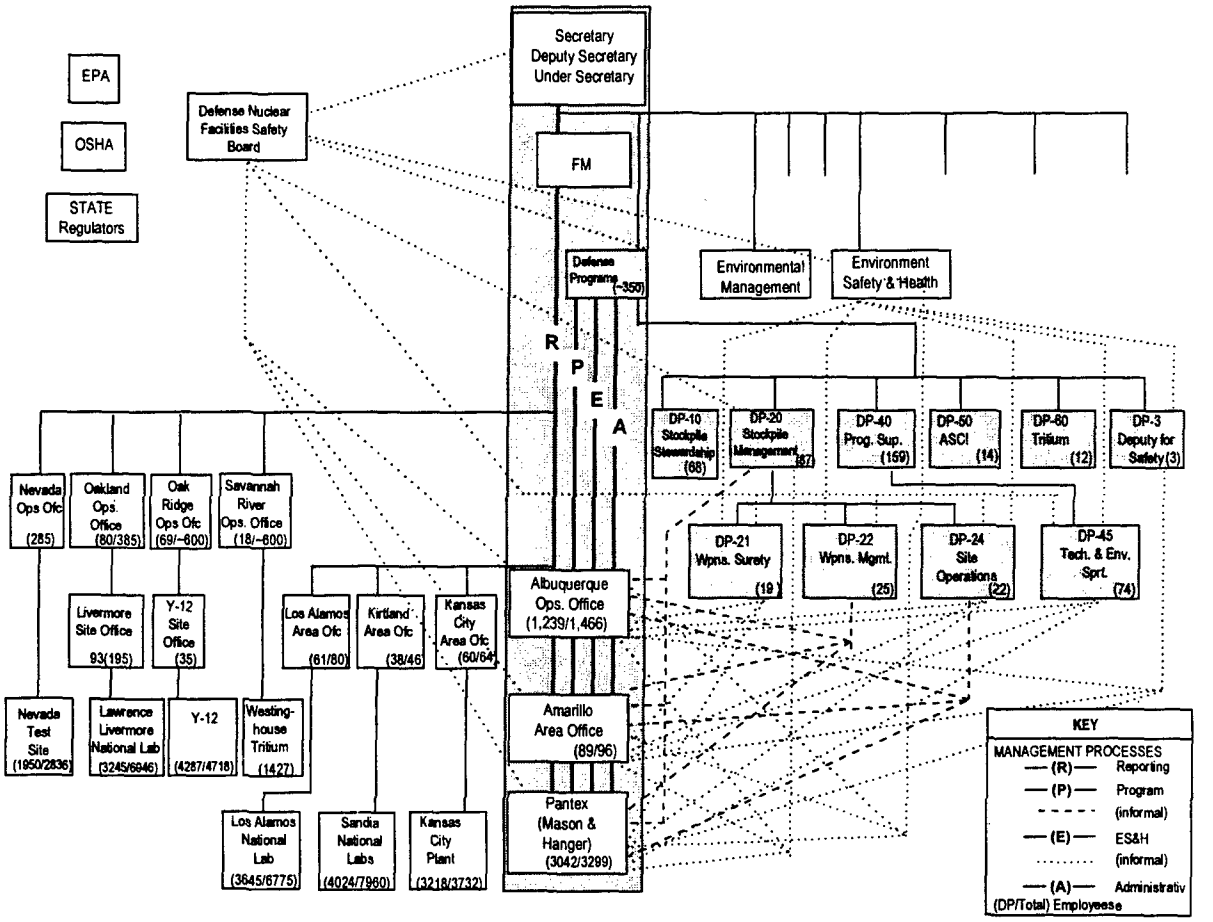

Figure I-1. Formal and Informal Chains of Command: Pantex Example

The third group includes representative elements of the DP organization. (These are shaded to highlight their relationship with the Office of the Assistant Secretary for Defense Programs.) The six deputy assistant secretaries are shown, along with four of the key directorates that have extensive dealings with the weapons complex. Finally, the fourth group includes the government and contractor organizations comprising the field structure of the weapons complex. Each of the five operations offices described earlier is presented, along with their site or area offices, and each of the eight complex facility managers.

The figure presents the interactions among these organizations for four important management processes:[4]

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[4] Other important management processes are not represented in the figure. In particular, the extensive technical interactions between the laboratory designers and Pantex are excluded. Also excluded are other interactions such as those relating to the Stockpile Stewardship program and those relating to emergency response activities.

- reporting,
- programmatic requirements and budgeting,
- environmental, safety, and health (ES&H), and
- administrative.

To simplify the illustration, Figure I-1 focuses on the chains of command associated with the operations of the Pantex plant in support of work funded by Defense Programs, which is Pantex's primary programmatic sponsor. (Programmatic chains from other headquarters' sponsors are thus excluded.)

A solid line indicates the formal chain of command in each area. Each of the formal chains of command runs through the shaded box extending vertically through the center of the figure. A broken line indicates an informal chain of command. The informal chains of command are shown only for two of the management processes: programmatic requirements and budgeting, and ES&H. This was done to simplify the illustration, while still conveying the message that the informal chains of command create a very diffuse and ambiguous management system. Each of the four chains of command is discussed in turn.

1. The Reporting Chain

Beginning with the bottom of Figure I-1, the manager of Mason and Hanger, the Management and Operating (M&O) contractor, at Pantex reports to the Manager of the Amarillo Area Office. The manager at Amarillo reports to the manager of the Albuquerque Operations Office, who in turn reports to the Associate Deputy Secretary for Field Management (FM) in Washington.

This is a chain of command only in the technical sense of whose performance evaluation is signed by whom. FM exercises no programmatic, budget, or other formal control over any organization in the chain; rather, it serves as a facilitator to broker disagreements and improve coordination among customers (i.e., DOE programs and functions) in their dealings with the field. Its influence is directly dependent on the incumbent's influence with the senior leadership of the Department.

Although the Assistant Secretary for Defense Programs provides roughly 80 percent of the budget support for the Albuquerque Operations Office, the manager of the Albuquerque Operations Office does not work for him. Generally, operations office managers are responsible to DP for the programs it funds, and, at the same time, to other program sponsors. For example, Oak Ridge has major activities funded by Defense Programs, Environmental Management, and Energy Research. At Savannah River, Defense Programs funds tritium operations, but the majority of the site's funding comes from Environmental Management.

The significance of this chain of command, in which field offices report to the Field Management organization, is that it highlights a long-standing concern in DOE regarding how best to define the relationships between operations offices and the

headquarters program offices that sponsor work. Parallel issues exist in the relationships between the collective set of program sponsors and the other headquarters' organizations that are responsible for setting policies for field operations. For example, the Office of Environment, Safety, and Health sets policy and oversees the implementation of ES&H-related activities. Similarly, there are bodies responsible for safeguards and security, financial management, human resources, and other functional areas.

Historically, several alternative reporting relationships have been tried as a way to integrate the activities of the various headquarters' entities responsible for establishing policy, programmatic requirements, and budgets. These include having the operations offices report to an Under Secretary who, as the "chief operating officer" for DOE's field activities, would be responsible for integrating across programs and functions. Another alternative has been to have the operations offices report to their primary programmatic sponsors. The responsibility for integration at the headquarters level would then fall to the assistant secretaries with programmatic responsibilities. The current approach is a hybrid: operations offices now report to a single headquarters entity in Field Management, but FM serves as a coordinator and facilitator rather than as a chief operating officer. Much of the burden for integration at the headquarters level thus continues to fall on the shoulders of the responsible assistant secretaries and office directors.

This long-standing management concern is responsible for one of the specific findings discussed in subsequent chapters: there is weak integration across DOE's offices that sponsor programs, as well as between these program offices and the functional organizations that set operational policies. From the perspective of an operations office, site office, or plant manager, DOE does not speak with a single voice or provide unified direction. This issue is discussed in Chapter III, and some related options are presented in Chapters IV and V.

2. The Programmatic Requirements and Budgeting Chain

The formal chain of command for programmatic direction—i.e., establishing requirements and budgets for Stockpile Management—is shown by the solid line labeled with a "P" in Figure I-1.[5] The chains along which additional, informal, program guidance is provided or received are shown by dashed lines. As noted above, the formal chain of command for program requirements is not the same as the reporting chain.

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[5] It should be noted that the chain of command in the illustration relates to Stockpile Management requirements and budgets. The process is significantly different for Stockpile Stewardship. First, none of the operations offices is in the chain of command. Programmatic direction is established through an informal collaboration between headquarters and the laboratories. As with the Stockpile Management requirements process, there are no significant violations of the chain of command for setting stewardship requirements. Second, there is no formal headquarters directive for guiding the core research element of the stewardship activities (as provided by the Production and Planning Directive for Stockpile Management).

Overall, the lines of communication and command for Defense Programs' Stockpile Management requirements process appear to be clear, because there is a formal process for defining Stockpile Management requirements. Headquarters participates in the development of the Presidential guidance for the stockpile, and translates the President's guidance into the Production and Planning Directive (P&PD). Albuquerque prepares the operational plans for implementing this guidance, in the form of the Program Control Document (PCD). This document factors in requirements for all planned maintenance and surveillance activities. It provides the programmatic direction for all of the management activities within the laboratories and production facilities.

Outside this formal chain, there are ongoing interactions involving the headquarters, field offices, and contractors. Sometimes these give rise to "informal" direction from staff or other officials outside the formal chain. This direction can take many forms—questions posed directly to field personnel, visits, suggestions, decision-making delays, etc.—but in many cases, it is direction, nonetheless. As indicated by Figure I-1, informal program direction to Pantex comes from two primary offices within Defense Programs' headquarters: the Office of Nuclear Weapons Management (DP-22), and the Office of Site Operations (DP-24). People in these offices talk directly with federal managers in Albuquerque and Amarillo, and with the contractor's personnel at the Pantex Plant. However, while there are some problems and room for improvement, most officials maintain that the programmatic chain of command for Stockpile Management is not broken, and it does not pose a serious problem.

The main issue concerning the requirements and budgeting chain of command stems from the legacy of "level-of-effort" funding in Defense Programs. Until recent years, the ethos and mission of the program dictated that people did what needed to be done to meet the requirements of the program. Money was a separate issue, and each field activity was allotted a certain fraction of the overall budget without any tight linkage with specific programmatic requirements. Moreover, it was always assumed that if something needed to be done, the money would be found. While this produced a highly responsive organization that could move quickly to solve unanticipated problems and accomplish complex tasks, it also left a cultural legacy that placed mission accomplishment first, concerns about the resources second, and little emphasis on clear linkages between the two. This issue is discussed in Chapter III, and some options for process reform are outlined in Chapter IV.

3. The ES&H and Facilities Chain

The formal chain of command for ES&H and facilities—as shown by the solid line marked by an "E" in Figure I-1—runs from the manager of the M&O contractor at the Pantex Plant, to the manager of the Amarillo Area Office, to the manager of the Albuquerque Operations Office, to the Assistant Secretary for Defense Programs, DP-1. The chains along which additional, informal ES&H and facilities requirements or guidance is provided are shown by dotted lines. The multitude of dotted lines in the figure illustrates the lack of well-defined processes and corresponding chains of command for ES&H.

ES&H and facilities guidance and requirements are provided to Albuquerque, Amarillo, and the contractor by several offices within Defense Programs headquarters. These include the Office of Weapons Surety (DP-21), the Office of Site Operations (DP-24), the Office of Technical and Environmental Support (DP-45), and the Deputy Assistant Secretary for Quality (DP-3).

Guidance and requirements also come from outside Defense Programs, particularly from the Office of the Assistant Secretary for Environment, Safety, and Health. Still more guidance is received from the Defense Nuclear Facilities Safety Board and other external bodies such as the Environmental Protection Agency, the Occupational Safety and Health Administration, and state and local regulators. Many of these organizations have people visiting or staying at Pantex, conducting reviews, evaluating procedures, looking around, and otherwise "helping" or directing the work at Pantex. To complicate matters further, they typically do so independently, without coordinating with one another, and they often attempt to impose different understandings of what is "safe."

In some cases, the resulting breakdown of the chain of command takes the form of explicit direction; in other cases, however, the breakdown is due to implicit direction. For example, someone from headquarters may ask a manager at Pantex, "Why are there only two warning signs on these doors, instead of four?" If, as a result of this question, the Pantex manager issues instructions to have additional signs posted, one might ask whether there is a difference between asking a question and giving an order. When a person with power or influence asks a question or otherwise expresses an interest in or an opinion of how something is done, it is reasonable for people subject to that power or influence to anticipate what that person wants, and respond to it if they can. At the same time, it is equally unreasonable and disingenuous of the person with power or influence to say, "But I was only asking a question, not giving an order."

Such violations of the chain of command can be found in any organization, but they are exacerbated—not simply in the nuclear weapons program, but in the Department of Energy as a whole—due to the ad hoc, undisciplined nature of ES&H decision-making processes and the sheer number of organizations and people involved. DOE's lack of well-defined processes, and organizational roles and responsibilities, for ES&H is the most significant problem identified in this review. It is the focus of Chapter II.

4. The Administrative Chain

The fourth chain of command might more properly be labeled the "Other Administrative" chain, in that it covers all functional responsibilities, i.e., non-programmatic responsibilities other than ES&H and facilities. These include contracting, safeguards and security, human resources, and finance and accounting. This review did not examine the requirements and decision-making processes in these functional areas in sufficient depth to judge the degree to which chains of command are being violated. The main issue identified in connection with these functional areas is the problem of DOE-wide program integration, discussed earlier and reviewed in more detail in Chapter III.

D. SUMMARY AND PREVIEW

Defense Programs' strategic leadership has been effective in charting a new direction for the organization. It has led the development of the *Stockpile Stewardship and Management Plan*, which provides an effective framework for reshaping the program to meet future national security requirements. Because environment, safety, and health concerns, and other operational issues, pose major future challenges, a parallel strategic management approach could usefully be applied to Defense Programs' Weapons Complex Trusteeship responsibilities.

Although strategic mangement has been strong, a number of management problems continue to plague the organization at the operational level. The discussion surrounding Figure I-1 identifies three broad classes of problems. First are those stemming from the ill-defined vertical relationships involving headquarters, the operations offices, and the site or area offices. These problems are especially pronounced in management processes for addressing ES&H concerns. This involves several interrelated issues, which are the subject of Chapter II of this report.

Second are those stemming from the weak integration across the four chains of command shown in the figure. Headquarters does not systematically link requirements and budgets, leaving field personnel to attempt to reconcile inconsistencies when they arise. One reason for this is that DOE has not established an effective top-level resource allocation process. These issues are discussed in Chapter III.

Third, there are those problems stemming from constraints on DOE's ability to efficiently define and manage work force responsibilities. This contributes to the problems associated with ambiguous chains of command. Headquarters' staffs often adopt an operational focus, even when their responsibilities should cause them to focus on the policy, guidance, and oversight tasks outlined at the beginning of this chapter. One reason for this is that there are too many people in the Defense Programs management structure, and good people try to fine useful work to do, which often gets them involved in operational matters. Another is that some of these people are not always properly trained or motivated to perform the kinds of tasks that headquarters' assignments require.

DOE's efforts to address these specific findings should focus first on needed process improvements. Several management principles and process recommendations are presented in Chapter IV to illustrate the kinds of improvements needed.

As these process improvements are being made, there will be an opportunity to make organizational changes that will increase effectiveness and efficiency. Some principles and options for organizational change, along with an assessment of their pros and cons, are presented in Chapter V.

CHAPTER II
FINDINGS: ENVIRONMENT, SAFETY, AND HEALTH MANAGEMENT

Defense Programs' practices for managing environmental, safety, and health (ES&H) concerns have been a central focus of this review. Many officials advised the review team that an understanding of Defense Programs' current practices requires placing them in the historical context of DOE-wide environmental, safety, and health policies. Indeed, ES&H practices within DOE and its predecessor agencies have been a focus of concern and debate since the inception of the Manhattan Project. These policies have evolved in response to advances in knowledge about the risks associated with weapons complex operations. They also have been driven by changes in public attitudes as well as changes in internal management strategies. Throughout the last decade, the Department's ES&H management practices have been in constant flux—a consequence of growing public scrutiny of the weapons complex since the mid 1980s, the varied management philosophies employed by the three secretaries since that time, and increased external pressures from such bodies as the Environmental Protection Agency, state regulatory agencies, and the Defense Nuclear Facilities Safety Board.

This chapter briefly reviews the most recent decade of this history, describes Defense Programs' current management practices, and outlines the operational consequences of current management problems in this area.[1] At the conclusion, several baseline reforms are outlined; these reforms are intended to accelerate Defense Programs' efforts toward implementing clearer, more rational organizations and processes for managing ES&H concerns. The principles of Integrated Safety Management, described below, have found wide support throughout DOE and offer the framework needed to address the management concerns identified here. Until this new system is fully defined and implemented, the weapons complex will remain hamstrung by the ad hoc, undisciplined ES&H management system that has evolved over the last decade.

A. BACKGROUND

Defense Programs' current practices for managing ES&H are an amalgam of the management approaches and initiatives of Secretaries Herrington (1985-1989), Watkins (1989-1993) and O'Leary (1993-1997). These secretaries have overseen the nuclear weapons complex through a decade of significant change, during which the management of ES&H concerns has evolved from being a low-profile, routine administrative matter to

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1 This report focuses on the Defense Programs' organization, but inevitably the issues raised here touch on relationships with other programmatic organizations, such as Environmental Management; with DOE organizations having functional responsibilities, such as the Office of Environment, Safety, and Health; and with external bodies such as the Environmental Protection Agency or the Defense Nuclear Facilities Safety Board. These organizations were not studied in depth and no assessment is presented of their current practices or their appropriate roles and responsibilities.

one presenting a highly public, politically charged set of issues. An understanding of traditional practices and the changes brought about by these three secretaries is needed to provide a context for assessing today's management practices.

For the first thirty years of civilian control over the nuclear weapons complex, the program maintained a very low public profile, and ES&H concerns were managed internally. To a great extent, the complex relied on an "expert-based" system for managing ES&H. Issues that emerged were analyzed by laboratory or production experts and courses of action were agreed upon by them. This approach lacked formality, was not consistent from one facility to the next, and often did not provide adequate documentation of compliance with basic safety principles.

There continues to be debate within Defense Programs, and throughout DOE, over how well safety and health were managed by DOE and its contractors under this traditional approach. On the one hand, many officials maintain that the historical safety and health record of the nuclear-weapons complex is quite good, citing the fact that reportable health and safety incidents have always been well below the average for U.S. industry.[2] Other officials counter that a comparison with large industrial firms shows that DOE's performance lags behind commercial firms with world-class ES&H programs. They believe DOE's facilities are not as safe as they could, or should, be, and that regardless of the validity of any such statistical comparisons, DOE has long needed to address ES&H concerns much more systematically and aggressively than was done under its traditional expert-based approach. This basic disagreement over the significance of health and safety concerns and the appropriate actions defines a deep cultural divide within the staff of Defense Programs, and, indeed, throughout DOE.

The legacy of DOE's environmental management is not a matter of debate—there is universal agreement that the cold war nuclear arms race created a massive and costly set of environmental problems. Throughout most of the nuclear era, the government, its contractors, and its Congressional sponsors placed pressing national security considerations over long-term environmental concerns. Although the long-term dangers and risks of radiological and chemical wastes were generally understood, the complex tended to rely on interim storage measures, rather than addressing long-range problems with disposition. Over time, DOE accumulated requirements for cleanup and waste disposition, the total costs of which are expected to be several hundred billion dollars. This overall management approach toward environmental concerns prevailed until the end of the 1980s. Since then, DOE has initiated major efforts to clean up the pollution generated during the cold war arms race.

Since the 1980s, DOE's evolving practices for managing ES&H have followed the growing national awareness of environmental and safety concerns. Public attention first began to focus on these issues with the Three-Mile-Island incident, which, in March 1979, brought the potential risks of nuclear operations to the forefront of public attention, and led to the Kemeny Commission review of commercial reactor safety.[3] DOE

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2 DOE performance indicators, July 1996.

3 In addition to project interviews, the discussion in this section draws on Terrence R. Fehner and F. G. Gosling, "Coming in From the Cold: Regulating US Department of Energy Nuclear Facilities, 1942-

commissioned a parallel internal review of DOE reactor operations, under the leadership of John Crawford. While the Crawford Committee found no evidence of unsafe operations in defense reactors, it found DOE's safety programs to be deficient in view of changing commercial standards and the findings of the Kemeny Commission. The Crawford Committee recommended bolstering DOE's technical capabilities for managing safety, establishing an independent safety overview group within DOE, and creating a panel of independent safety advisors for the Secretary of Energy.

1. Herrington

When Secretary Herrington took office in 1985, he inherited public health concerns involving the discharge of mercury at the Oak Ridge Y-12 facility, and the release of uranium from the Fernald, Ohio facility. He commissioned John Kane to review DOE's programs for environmental, safety, and health protection in order to assure the public that DOE had its house in order. Kane found that there was no evidence that DOE operations were unsafe or endangering public health. But he did find DOE's oversight programs to be a "disgrace," providing no sound oversight of ES&H issues across the weapons complex.

In response to this report, Secretary Herrington established an Assistant Secretary for Environment, Safety, and Health, responsible for establishing a focused internal oversight program. In the following years, DOE took several steps to bring its facilities into compliance with broader public environmental requirements, and opened them to greater public scrutiny. In particular, DOE dropped its long-standing opposition to coverage of its facilities by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 ("Superfund"). It entered into negotiations with the Environmental Protection Agency and several states to establish compliance agreements and schedules.

The issue of nuclear safety arose again in the mid-1980s, following the Chernobyl reactor accident in the Ukraine in April, 1986. A National Academy of Sciences panel commissioned by Secretary Herrington to review the implications of this accident echoed the findings of the Crawford Committee. It reported that the weapons complex reactors at Savannah River and Oak Ridge had operated safely for several decades, but that the oversight of safety remained deficient. The committee recommended that DOE clarify its safety requirements, strengthen the internal oversight role of the Assistant Secretary for Environment, Safety, and Health, and establish an external advisory panel. In response, Secretary Herrington established the Ahearne advisory panel in early 1988. Congress acted in parallel to form the Defense Nuclear Facility Safety Board (DNFSB—generally referred to as "the Board") in the fiscal year 1989 Defense Authorization Act.

As Secretary Herrington and Congress were acting to create these external advisory bodies, public awareness and sensitivity to ES&H concerns in the nuclear weapons complex reached an all time-high. In late 1988, problems with the P and K Reactors at Savannah River created a public outcry, and DOE's operations came under a

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96," *Environmental History*, Vol. 1, No. 2, April 1996.

level of public scrutiny and litigation beyond anything experienced before. Federal agents raided the Rocky Flats plant in June of 1989, investigating alleged violations of environmental laws. DOE officials still debate whether the actions taken at these sites were overreactions to the long-standing conditions in these facilities; nevertheless, these events left no doubt that the public environment in which DOE operated had undergone a fundamental change.

2. Watkins

Early in 1989, the incoming Bush administration tasked Secretary James Watkins to take charge of DOE and the nuclear weapons complex, and to regain the public's trust in DOE's operations. As did his predecessors, Secretary Watkins concluded that DOE's expert-based approach to ES&H was inadequate to demonstrate that DOE was on top of the highly public safety concerns plaguing the complex. He brought to the job an understanding of the management system that had proven successful in the nuclear Navy, and worked to adapt this approach to the defense nuclear complex. The Navy approach, based on detailed, command-and-control standards established by the central Office of Naval Reactors (NR), was in direct contrast to the traditional, highly decentralized management of DOE, which relied heavily on the expertise and experience of weapons designers and facility operators to maintain safety.

There were three main thrusts of the Watkins approach: to establish clear lines of responsibility for ES&H in program offices by designating a "Program Secretarial Officer" (PSO) to be responsible for the operations of each DOE facility; to establish assessment activities within the program offices, as well as an Office of Nuclear Safety reporting to the Secretary; and to focus intense scrutiny on the day-to-day operations of the complex, insisting that headquarters' officials be fully aware of operational issues.

Secretary Watkins built up staffs in headquarters and the field, adding large numbers of experts on facilities and ES&H management. Many of these experts had backgrounds in commercial nuclear power or in the nuclear Navy, and little experience with the nuclear weapons complex. In Defense Programs, a Principal Deputy Assistant Secretary for Facilities was established.

Secretary Watkins increased the field presence of DOE dramatically. In the immediate aftermath of the Rocky Flats incident, he commissioned "Tiger Teams" that were charged with reviewing the ES&H status of about three dozen DOE facilities. Teams of up to 25 experts (and sometimes more) were detailed to each facility for a few months each to address pressing safety concerns, and to report corrective actions back to headquarters. Secretary Watkins also increased DOE's permanent presence by expanding the area and site offices, and he instituted the Facility Representatives program, which, for the first time, stationed DOE officials within defense nuclear facilities on a day-to-day basis.

To address the daunting task of cleaning up the weapons complex, Secretary Watkins created the Office of Environmental Restoration and Waste Management (EM) in November, 1989. In the following years, this organization took over landlord responsibilities for several facilities that had been closed, including Hanford, Idaho, and

Rocky Flats. EM also took overall landlord responsibilities for Oak Ridge and Savannah River, which continued to be responsible for important defense missions. (EM has always used the kind of highly centralized, command-and-control organizational model that Secretary Watkins tried to institute throughout DOE.)

Secretary Watkins significantly strengthened DOE's focus on ES&H matters. Many officials credit him with forcing DOE facilities to begin to seriously address long-standing problems with facilities' operations and safety. However, he accomplished this by building new, and highly centralized, federal organizations, thus undermining the authority and responsibility of the field to manage ES&H concerns. As one field representative observed, "No one from headquarters ever came to the field and said, let's solve these problems together." Instead, for example, headquarters' officials essentially took over the restart efforts at Savannah River and, more generally, dictated new ES&H approaches throughout the complex. Progress was achieved, but at the cost of creating organizational stovepipes isolating the management of ES&H from the management of mainline programs, and fostering a culture of conflict across those communities responsible for ES&H and those responsible for operations. This organizational dysfunction has remained both pervasive and costly.

3. O'Leary

When Secretary O'Leary assumed office in 1993, she applauded the progress Secretary Watkins had made, but sought a very different approach for managing ES&H problems. She favored a more decentralized management system that empowered line managers in the field, consistent with the principles of total quality management. As a first step, to enhance the authority of field managers, she eliminated PSO oversight of the Operations Offices, and created an Associate Deputy Secretary for Field Management to whom the field managers formally reported. Within the Defense Programs' organization, the assistant secretary eliminated the Facilities Office in headquarters, in order to emphasize that operational responsibility belongs in the field. The operational and ES&H experts brought in during Secretary Watkins' tenure to staff the Defense Programs' Facilities Office either were integrated within the Defense Programs' offices responsible for Stockpile Stewardship (the Office of Research and Development, DP-10) and Stockpile Management (the Office of Military Application and Stockpile Management, DP-20), or became part of the technical support activities (particularly the Office of Technical and Environmental Support, DP-45).

At the same time that Secretary O'Leary realigned the relationships between headquarters and the field, she also revamped DOE's internal oversight functions. She consolidated the Office of Nuclear Safety with the oversight activities of the Assistant Secretary for Environment, Safety, and Health (EH), giving the department a single focal point for internal oversight independent of the line program offices. Creating this single oversight office for ES&H addressed the concerns, expressed by the National Academy of Sciences in the late 1980s, that DOE's ES&H oversight lacked focus. In addition to serving as DOE's oversight arm, this headquarters ES&H office has taken the lead in a number of key policy initiatives designed to improve safety and productivity; these include the development of DOE's "work smart" standards, enhanced work planning, and

an independent oversight template. Most importantly, as discussed below this organization helped foster the development of the Integrated Safety Management System.

Secretary O'Leary also recommended steps to further open DOE's facilities to external oversight and regulation, proposing that DOE submit to external regulation from the Occupational Safety and Health Administration (OSHA), and inviting OSHA to begin inspecting nuclear facilities. (OSHA has not acted on this recommendation, citing resource constraints as a barrier to assuming additional responsibilities.)

Secretary O'Leary also raised the question of whether nuclear safety should be brought under the external regulation of the Nuclear Regulatory Commission. She commissioned the Advisory Committee on External Regulation of Department of Energy Nuclear Safety. In January, 1996, the committee issued several recommendations: nuclear facilities should be regulated externally; one agency, either the Nuclear Regulatory Commission or the Defense Nuclear Facilities Safety Board, should regulate nuclear safety; OSHA should regulate worker safety; and the EPA should regulate environmental protection. Secretary O'Leary recently recommended that the Nuclear Regulatory Commission take on the responsibility of external regulator for nuclear safety. This will require Congressional action, and it is not clear whether Congress will enact the proposed changes.

During Secretary O'Leary's tenure, DOE worked to forge a strategy for breaking down organizational stovepipes and integrating ES&H management with line management. These efforts culminated in the plan for instituting Integrated Safety Management (ISM), issued early in 1996.[4] DOE's goal for Integrated Safety Management is to embed ES&H considerations within the programmatic requirements setting and resource allocation processes. The basic philosophy is to place the responsibility for safety in the hands of the people who are actually doing the work, to provide them will a well-understood safety management system, and to establish a streamlined oversight process to verify that sound management processes are in place and being used.

DOE has established a headquarters-field team, reporting to the Under Secretary of Energy, to implement Integrated Safety Management. If appropriately implemented, ISM promises to resolve many of the ambiguities and conflicts observed in current practices. Implementing Integrated Safety Management is thus central to the baseline reforms proposed in this review. The broad outlines of the proposed ISM framework will be discussed in the final section of this chapter.

4. The Defense Nuclear Facilities Safety Board

It is impossible to understand how the DOE management system has evolved in recent years without considering the role of the Defense Nuclear Facilities Safety Board.

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4 Some other important initiatives include: Albuquerque's SS-21 dismantlement approach, based on systematic work planning; ES&H's pilot oversight programs, designed to consolidate and streamline oversight; and the Voluntary Protection Program, designed to institute industrial compliance practices in facilities with excellent health and safety performance.

The Board has been a powerful force in shaping ES&H practices within the nuclear complex over the decade of the 1990s. Established in the fiscal year 1989 Defense Authorization Act, the Board is responsible for advising the Secretary of Energy on public health and safety issues at the Department's defense nuclear facilities.[5] While lacking independent regulatory enforcement authority, the Board has exerted a strong influence through a series of more than 30 formal recommendations that have been issued to the Secretary of Energy since 1990.

A central thrust of the Board has been to move DOE from its traditional "expert-based" safety system to a "standards-based system." This has increased the formality and discipline of the processes for identifying and assessing hazards, for defining mitigation strategies, and for establishing facilities and operations consistent with safety requirements.

The Board has provided external pressure for DOE to adopt a more systematic framework for addressing ES&H concerns. Beginning with its second recommendation to the secretary (Recommendation 90-2), the Board advocated that DOE (1) identify the particular standards that should apply to DOE facilities; (2) provide its views on the adequacy of these standards; and (3) establish the extent to which these standards are being observed in DOE facilities.[6] Over the years, the Board's pressure and involvement has continued, and both the Board and DOE have debated and refined the concepts for defining a facility safety envelope.[7] This creative tension between the Board and DOE culminated in the articulation of the philosophy of Integrated Safety Management in the Department's implementation plan for Board Recommendation 95-2. The Board also has been a leading proponent for enhancing DOE's hiring flexibility to strengthen the Department's technical capabilities in the ES&H area.

Most DOE officials acknowledge these contributions of the Board; some maintain, however, that the ongoing tensions between the Board and DOE have retarded progress at the operational level. Such officials assert that the Board has been too inflexibly committed to ES&H approaches which may be inappropriate for parts of the weapons complex. They cite as one example the running debate over how best to implement an approach for tailoring ES&H requirements to be commensurate with

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5 The enabling statute of the Board (42 U.S.C. § 2286 *et seq.*) defines its principal function as follows:

> *The Board shall review and evaluate the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy (including all applicable Department of Energy orders, regulations, and requirements) at each Department of Energy defense nuclear facility. The Board shall recommend to the Secretary of Energy those specific measures that should be adopted to ensure that public health and safety are adequately protected. The Board shall include in its recommendations necessary changes in the content and implementation of such standards, as well as matters on which additional data or additional research is needed.*

6 This synopsis is drawn from DNFSB Recommendation 95-02, reproduced in Defense Nuclear Facilities Safety Board, *Sixth Annual Report to Congress*, March 1996.

7 The issues addressed in Recommendation 90-2 were again raised in Recommendations 92-5 and 93-3. In addition, the Board outlined concepts for safety management in technical reports DNFSB/TECH-5 and DNFSB/TECH-6, published in 1995.

workplace hazards; and they believe the Board's press for a rigorous standards-based approach may be disproportionate and insufficient to fully address all safety concerns in the weapons complex. From the perspective of officials working in the field, the Board presents one more voice (some would argue several different voices) among the chorus attempting to set priorities and give direction. Indeed, consistent with its mandate, the Board continues to press for implementation of its vision of a standards-based safety framework. It continues to pressure DOE and its contractors on the implementation of those DOE orders and requirements that it believes to be most important for addressing ES&H concerns at high-priority facilities.

5. The Galvin Report

The Galvin report highlighted the costs to DOE and the public of the confusion, ambiguity, and redundancy in the federal management of DOE's laboratories. It crystallized many of the criticisms of DOE practices, the inefficiencies they cause, and how the DOE mission is undermined by an undisciplined and clumsy bureaucracy. The Commission was helpful because it convinced many within DOE that the Department needed to get its house in order.

6. Observations: DOE's Management Environment

DOE is operating under a hybrid of management philosophies and centralized and decentralized management practices that have evolved over the past decade. Secretary O'Leary tried to reestablish the responsibility and authority of field managers, but this effort was resisted by the large DOE staffs of ES&H experts built up during the Watkins era. Their concern has been that the management cadre who grew up in the era of the cold war is not well versed in modern ES&H management techniques. Within Defense Programs, and across the Department, such differences in personnel backgrounds and organizational incentives have created deep cultural barriers.

There is no disagreement that the efforts over the last decade have improved the overall ES&H performance of the complex. But conflicts—in the basic approach for defining the safety envelope, in field versus headquarters leadership, and in organizational cultures—have made these gains more costly than necessary. There remains confusion and fuzziness in the lines of responsibility, authority, and command over ES&H matters; a lack of uniformity in practices across the complex; and a lack of clarity in the relationships between officials responsible for ES&H-related programs and policies and those officials responsible for the Stockpile Stewardship and Stockpile Management programs and policies.

Fortunately, it appears the Department has found a way forward in this area. The cure for today's confused management environment is to expeditiously define and adopt the Integrated Safety Management System. It provides a rational framework for addressing ES&H management issues, and represents a practicable rallying point for unifying and focusing the Department's programs and policies. We shall return to discuss ISM in the final section of this chapter.

B. CURRENT PRACTICE

The evolution of Defense Programs' approach to ES&H and the basic conflicts that have emerged within the ES&H management system manifest themselves in a number of day-to-day activities and working relationships. A review of one component of safety management—practices for safety documentation—illustrates how basic organizational problems translate themselves into day-to-day inefficiencies and frustrations.

1. Establishing Facility Authorization Bases

Many DOE facilities are operating under an interim basis of authorization, while DOE is establishing the analyses and documentation needed to establish permanent authorization bases. This effort is being hindered significantly by DOE's inability to settle on a clear definition of the authorization basis, and by inefficiencies in the processes for preparing the analyses and the documents that comprise an authorization basis.

a. Defining the Elements of an Authorization Basis

Current differences between DOE and the Board on the appropriate definition of a facility's authorization basis stem from two interrelated issues. The first relates to problems the Board has raised with respect to DOE's current efforts to rewrite its orders relating to nuclear safety. The Board has closely monitored DOE's efforts to streamline and simplify its orders. It is maintaining its vigilance to ensure that new orders and rules do not omit important safety requirements. In addition, the Board has criticized DOE's failure to "establish a single organization within DOE with technically competent individuals as the focal point responsible for the rule and order development effort. At present there is no single organization within DOE responsible for carrying out this key assignment."[8]

A second issue that has slowed the process of establishing authorization bases stems from the ongoing debate noted earlier over the appropriate process for tailoring safety requirements to be commensurate with workplace hazards in defining this safety envelope.

As an illustration of the Board's position, its 1996 Annual Report cites several deficiencies it finds in existing authorization bases:

- Gaps exist in the set of safety elements; this is true even though specific Board interventions at certain facilities have corrected many deficiencies;
- Plans do not cover the entire spectrum of risks, because they focus on bounding accidents; and
- Worker safety is consistently poorly addressed.

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8 DNFSB, *Sixth Annual Report to Congress*, March 1996, pg. 9.

The Board also cites some examples of the kind of safety system it would like to see adopted throughout the weapons complex. DOE officials report that Savannah River and Hanford have done systematic analyses of safety requirements that the Board credits with providing major improvements in their safety management programs. This approach provides, in their view, the model the Board is recommending DOE adopt for all its facilities. One thrust of the Integrated Safety Management System will be to implement this kind of approach; it will establish a systematic process for defining the "safety envelope" for a facility, including the standards and controls needed to ensure safe operation.

In the meantime, the absence of an agreed upon definition of safety conditions and requirements creates uncertainty and confusion in ES&H management and oversight. Traditionally, the DOE orders defining safety requirements were not tailored to site conditions, but in practice DOE officials adopted a "don't-ask, don't-tell" approach to enforcing the elements that were deemed inappropriate for a site. This informal approach has broken down, as the involvement of headquarters and external oversight activities has grown. The Board, for example, states that, in the absence of an effective and agreed upon safety envelope, it focuses on pressing for the requirements *that it believes* are most pertinent to its legislative mandate.

There remains a gap between formal requirements and reasonably enforceable expectations, as well as a lack of consensus within the government on what should be enforced. These ongoing disagreements are retarding progress in establishing agreed-upon safety systems and documentation.

b. Preparation and Approval Processes

Each of the elements of the authorization basis is subject to DOE review and approval. Many officials within the complex agree with the characterization of the process for review and approval of ES&H documents as, "everybody gets to review everything until everyone is satisfied." The process, such as it is, is ad hoc.

In the formal process, the Assistant Secretary for Defense Programs designates a responsible official for approval. For instance, most SARs (Safety Analysis Reports) are approved by the responsible Operations Office Manager (the exception is SARs involving nuclear explosive safety issues, which are approved by the Assistant Secretary). The overall authority for authorizing operations lies with the Operations Office Manager, since he is the official responsible for administering the management and operating contracts for the sites under his jurisdiction.

While these approval responsibilities seem clear, there is no clear delineation of who can and should review documents or who should be required to concur in their approval. Many officials report that there is no disciplined process for reviewing and approving the documents comprising the authorization basis. As a result, documents and approvals can seemingly take forever to work their way through the system. For example, Los Alamos National Laboratory officials report that the SAR for the TA-55 plutonium facility took a year and a half to be reviewed and approved; the SAR for the Chemistry

and Metallurgical Research (CMR) facility is still undergoing review, revisions, and discussion after one and a half years.

Government officials note that one reason for the lengthy reviews is that SARs often are deficient when first submitted by the contractor. SARs frequently are prepared by subcontractors who may be more familiar with generic safety requirements than they are with the specific operational requirements of defense nuclear facilities. In addition, SARs sometimes are viewed as a paper exercise by contractors, so their view is, why bother spending lots of time and effort at the very beginning of a long, drawn-out exercise that will take the government months or years to respond to. Why sweat the details of a SAR before submitting it to the government, when it is simply going to enter into a multi-year "black hole." Better to put something together and get the process started.

But perhaps more relevant to Defense Programs' management concerns, problems with SARs often occur because the government's expectations are not clear. Contractors miss the mark simply because they don't understand what DOE is looking for. Of course, this lack of clarity in guidance also reflects the persistence of the kinds of unresolved conflicts within the staff that were described earlier. When policy issues are not resolved in issuing guidance, these issues will emerge to be debated in the context of SAR approval processes, making the review of authorization basis documents a battleground for resolving bureaucratic policy and turf battles among the several layers of DOE organizations involved. This can add significantly to the time required to prepare and approve SARs.

Several initiatives are under way to address these problems with the review and approval of authorization basis documents. Albuquerque reports that it has improved the administration of the SAR review and approval process; it has created a Safety Authorization Management System (SAMS), which tracks ongoing actions, and permits management to schedule and prioritize staff reviews. Albuquerque is working to become more customer oriented. Their officials believe they need to focus added attention on improving the substance of SARs, and emphasizing the accountability of contractors for the quality of analysis included in the SARs.

At the Oakland Operations Office, a new team-based process has been instituted for approving Lawrence Livermore's SARs. Oakland reports that the SAR for Building 332 at Lawrence Livermore, which houses plutonium operations, languished for more than six years (1988-1994). In 1994, the Assistant Secretary for Defense Programs delegated SAR approval to the Operations Office; the SAR was then revised and approved within a year.

Several officials have provided examples of innovative process improvements for the environmental elements of the authorization basis. For example, the Los Alamos Area Office has been very helpful with the National Environmental Policy Act (NEPA) process for the Los Alamos Neutron Science Center (LANSCE). The environmental impact statement for the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility at Los Alamos National Laboratory is considered a very successful collaboration between the contractor and the government. Several field officials also have reported that the Office of Technical and Environmental Support (DP-45) has been very helpful in coordinating needed work in Washington. Teamwork is the model for NEPA reviews (although this

often breaks down in practice). Similarly, teaming has worked very well for Operational Readiness Reviews. These examples are encouraging. They offer models for how DOE ought to be conducting business throughout the complex.

In summary, DOE has struggled to establish an effective management process for defining and executing authorization basis documents, in order to provide an agreed upon safety envelope for its facilities. Ambiguity remains regarding the appropriate processes and criteria for deciding which requirements and controls should be incorporated in the authorization basis, and no disciplined process exists for the review and approval of the documents required for obtaining an approved authorization basis. Clearing up these ambiguities, and fixing review and approval processes, will do more than anything else to streamline and improve DOE's management of the nuclear weapons complex.

2. Facility Representatives

Traditionally, DOE delegated on-site responsibility for facility operations to its management and operating (M&O) contractors; DOE did not maintain an on-site presence. Indeed, many officials can recall a time when DOE had to ask permission from the contractors to visit defense nuclear facilities. Included with all the changes beginning in the mid-1980s, outlined above, came the recognition that DOE's responsibility as owner of these facilities required a much greater level of awareness of operational conditions within the facilities. Site and area offices were expanded to accomplish this.

In the early 1990s, DOE established the "Facility Representatives" program, which, for the first time, placed DOE representatives on site, within certain high-hazard nuclear facilities, on a day-to-day basis. A Facility Representative is an individual "assigned responsibility by the Head of the Field Organization for monitoring the performance of the facility and its operations. This individual will be the primary point of contact with the contractor and will be responsible to the appropriate Secretarial Officer and Head of the Field Organization."[9] To do this job right requires that the representative walk a very fine line between active involvement to maintain awareness, and crossing over into operational direction and decision making. M&O contractors are responsible for operating facilities safely, and any dilution of their sense of authority and responsibility at the working level could jeopardize safety.

There are significant variations across the complex in the approach of Facility Representatives to their tasks, and a corresponding difference in opinion regarding their value added. The various area and site offices take different views of the responsibility of the Facility Representatives, and they adopt very different approaches for interacting with the contractors. Some of the sites indicated they carefully train Facility Representatives in order to avoid counterproductive encroachment of M&O contractor responsibility, confrontation, and nit-picking. These representatives strive to resolve safety issues at the lowest level possible. At such sites, Facility Representatives are viewed as valuable contributors to safety, and their roles are respected by contractors.

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9 Department of Energy, "Establishing and Maintaining a Facility Representative Program at DOE Nuclear Facilities," DOE-STD-1063-93, August 1993.

At other sites, or for other individuals working on the same site, contractor officials believe that some Facility Representatives view their jobs as on-site policemen. For example, instances are cited in which Facility Representatives have required occurrence reports for trivial matters. Facility Representatives also have been involved in levying Price Anderson enforcement penalties against contractors, or using the threat of Price Anderson to make contractors respond to their wishes. More generally, some contractors believe Facility Representatives have crossed the line between oversight and operational control within the facility.

Another concern is whether the qualifications and training of Facility Representatives are always commensurate with their responsibilities. Contractors question whether some representatives are sufficiently prepared to make judgments regarding the safety of certain operations. In 1992, the Board surveyed each of the facilities in the weapons complex and found wide variations in the qualifications of their Facility Representatives.

Some contractors believe the Facility Representative program has grown too large, and has inappropriately expanded coverage into relatively low-risk facilities and operations. Having too many Facility Representatives tempts them into crossing the line from oversight into directing operations. Contractors and others believe Facility Representatives should be assigned to areas where there are risks that major, irreversible harm could occur to workers or to the general public, because it is in such areas that day-to-day cognizance is required to ensure safety. Similarly, in facilities that are undergoing significant change, or in the laboratories' nuclear facilities where an ongoing change control process is the key to safety, day-to-day cognizance may be required to satisfy DOE that the safety envelope is maintained. In less risky, ongoing operations, a periodic check on work planning procedures and execution should be adequate to ensure the safety envelope is being maintained. One would have to ask why, in particular, there should be representatives in facilities such as the Kansas City plant or in many areas of Sandia National Laboratory.

The Facility Representative program is essential to ensure DOE's awareness of current operations, operational or facilities changes that might affect safety, and quickly emerging safety concerns. It has always been the intention that the program would leave operational control with the contractor, but it appears now that the program is not meeting this goal consistently across the facilities in the weapons complex. A reassessment is needed that systematically links the assignment of Facility Representatives, and the definition of their duties, to the risks inherent in facilities and operations.

3. Oversight and Audits

Because of the large number of DOE and external organizations that have some responsibility for managing or overseeing ES&H concerns, defense nuclear facilities are subject to a wide range of oversight and audit requirements. These activities suffer from the same kinds of problems described above for the documentation review and approval process. Facilities are subject to oversight from their Facility Representatives, the site or area office, the operations office, the program-sponsoring secretariat, other headquarters activities, the Defense Nuclear Facilities Safety Board, and other federal and state

regulators. Often these are uncoordinated, as there is no central authority below the Office of the Secretary that can discipline the activities of the internal oversight elements; nor are these coordinated with the activities of the external regulators. Moreover, as has been shown, there is no common agreement on the definition of safety or the priority issues that facilities should address.

Many DOE and contractor officials describe Defense Programs' oversight as creating an inverted management pyramid, because the number of reviewers exceeds the number of hands-on workers. For example, contractors have cited examples where work done by two or three people becomes the subject of review meetings involving 40 or more Defense Programs' officials. Often only a handful of these officials will actively participate in the meetings. Many interviewees have asked, "What are all these people doing in these meetings? Who are they, and what are their jobs?"

Contributing to these complaints about oversight is the cultural divide between the ES&H experts brought in by Secretary Watkins to work in the line program offices and the officials overseeing operations in the field. Some officials have argued that a mistake Secretary Watkins made was, having brought in good people, to put them two levels away from the real work. This created an environment where they tended to act as "Inspectors General" rather than problem-solvers. This difference in attitude and perspective has contributed significantly to the cultural divide between Headquarters DP and the field.

There is substantial agreement that oversight could be accomplished far more effectively and efficiently. Today's counterproductive oversight practices stem from three root causes. First, because there is no agreed upon definition of what constitutes safety at these facilities, oversight officials set their own agendas. Second, there is no agreed upon process that defines appropriate oversight tasks, assigns clear responsibility, and precludes free-lancing by those without assigned responsibility. Third, there are simply too many people in the system, and lacking controlled processes, people inevitably will make themselves busy by engaging in oversight activities.

Defense Programs' practices are worlds apart from the approaches used by companies who are recognized leaders in addressing ES&H concerns. Benchmarking studies done by the Assistant Secretary for Environment, Safety, and Health show that world leaders focus ES&H responsibility at the local operational level, and maintain a headquarters organization of fewer than 50 people. Headquarters' main tasks are to set clear expectations for field operations, and to periodically assess compliance, In such lean organizations, there simply are no people in headquarters or regional offices with significant time available to meddle in operations.

DOE has recognized this problem and has taken some steps to address it, but more basic reform is needed to address the root causes of the problem. There is strong support within the senior leadership for shifting to a system that uses more of the features of a corporate model. DOE also has initiated a pilot ES&H program for the laboratories to institutionalize a coherent, managed appraisal process. This was done, in part, to address the concerns expressed in the Galvin Report that DOE's ES&H oversight program is neither effective nor efficient. Under the pilot program, DOE suspended ES&H appraisals and audits, except those defined in the pilot. Under the pilot, contractors performed self-appraisals. DOE performed ongoing monitoring by facilities

representatives, supplemented with a single, annual, coordinated team review over a two-week period. The scope of the reviews was based on the findings of the internal appraisal and operational performance, as indicated by agreed-upon metrics, as well as the findings of ongoing monitoring by the Facility Representatives.

Despite DOE's initiatives in this area, there appears to be little movement in Defense Programs toward the resolution of problems with multiple levels of uncoordinated oversight and audits. Progress in improving oversight and audits will require clarifying reforms that address the root causes outlined above. Disciplined processes and a lean organization are needed to create a DOE system for oversight and audits that is appropriate and effective.

4. Requirements and Budgets

One important consequence of DOE's current stovepipe management system is that the requirements coming from the various organizations with responsibilities for ES&H are neither unified nor integrated with the requirements and funding flowing through the organizations responsible for the core programs. (In the case of Defense Programs, these are the Stockpile Stewardship and Stockpile Management programs. Similar relationships exist for other programmatic sponsors such as Energy Research or Environmental Management.) DOE simply does not speak with one voice. Several contractor officials concerned with this lack of integration between ES&H requirements and programmatic requirements describe a general pattern as illustrated by the flow of program and safety requirements and funding shown in Figure II-1.

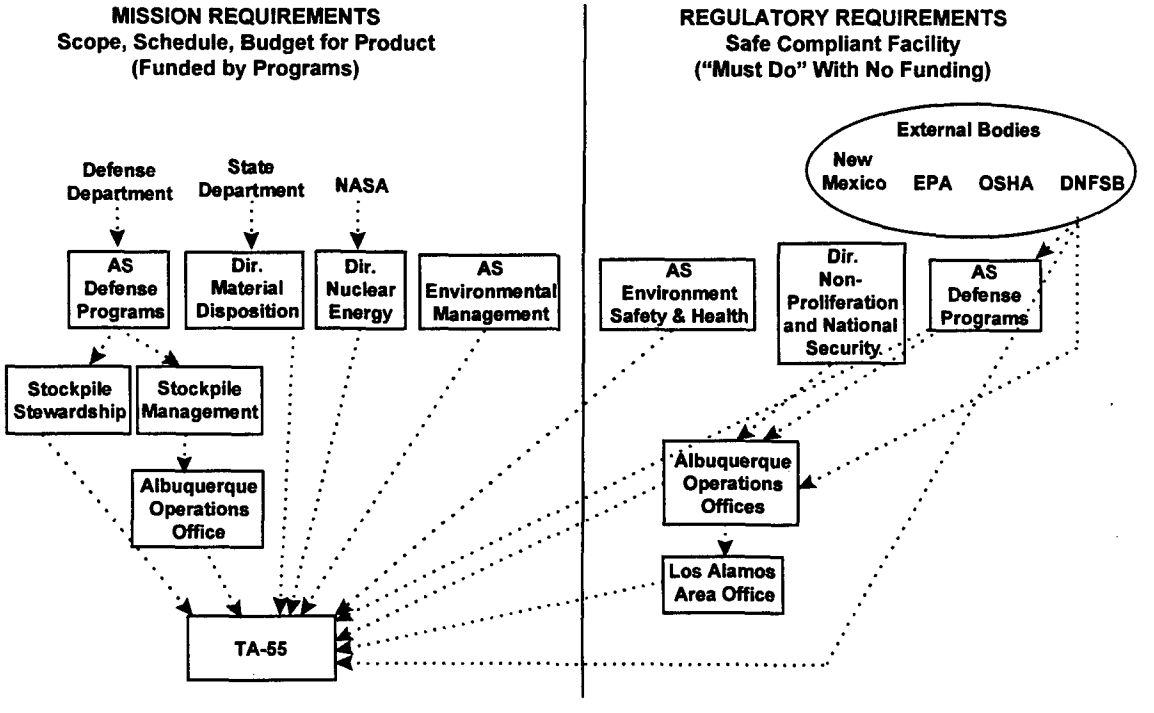

Figure II-1. TA-55 Mission Requirements and Budgets versus Regulatory Requirements

Contractors feel obliged to respond to the ES&H requirements, but they also remain committed to meeting their programmatic obligations. This creates dilemmas that often require significant amounts of time and effort to resolve. In effect, the contractor or local site office must do the work of integrating requirements and funding by negotiating with the relevant program, budgeting, and ES&H organizations in the operations office and headquarters. Presently, no one below the Office of the Secretary of Energy is in a position to bring ES&H and programmatic activities into alignment.

C. OPERATIONAL CONSEQUENCES

One Defense Programs' official summed up the current organizational problems within the Department's ES&H program with the observation that, in many areas of the Department, "...no one perceives the consequences of inaction." Indeed, as Figure II-1 illustrates, many of the organizations with ES&H responsibilities have no responsibility for accomplishing the Stockpile Stewardship or Stockpile Management mission. This gives rise to bureaucratic inertia, with its attendant inefficiencies, and it undermines the real work needed to improve safety and accomplish the other missions of the Department.

1. Inefficiencies

The problems cited above relating to the "inverted pyramid," the ambiguity in responsibilities, and the disconnect between requirements and funding can make it difficult to get programmatic work done in Defense Programs. In part, the difficulty has stemmed from turf battles over possible loss of authority and tasking that would occur were more effective, streamlined processes adopted. Large staffs attend meetings, review and concur in memorandums and documents, and issue guidance and tasking to each other and DOE's contractors. The activity level is high, but the real product is small. Unfortunately, DOE's contractors also get pulled into this web of activity. They may be required to provide extensive information or analyses, or they may be directed to modify operations or facilities. The costs of responding to the government are significant, and often divert contractor resources from tasks that could improve safety or support the core Stockpile Stewardship and Stockpile Management programs.

2. Slower Progress in Improving Safety

The Galvin Report concluded that government ES&H activities could actually reduce safety in some cases, because they divert resources from the most significant safety issues. It was noted earlier that ES&H expectations remain ambiguous, and, because many sites are operating under interim authorization, there is no agreed upon definition of the conditions and requirements for safe operations at many DOE facilities. Consequently, managers and oversight organizations will focus on issues that are most important from their perspective. Regulators' focus areas may overlook important safety issues. By way of contrast, several officials have noted that nuclear explosive safety has really never been a problem, because DOE and the contractors long ago developed a systematic approach for addressing these safety issues. Yet the central focus on nuclear explosive safety issues overlooks that fact that most worker accidents are relatively mundane industrial accidents.

Cumbersome guidance, oversight, and review processes for SARs and other authorization basis documents also undermine safety, in the sense that they limit progress in upgrading the documentation for existing facilities, and postpone the start-up of new facilities. In both instances, safety is undermined because the process is slowing the move to more modern facilities and safety approaches. As examples, the Device Assembly Facility at the Nevada Test Site, and explosives fabrication and machining facilities at Pantex, are sitting idle, awaiting approval of their authorization bases.

3. Risks to the Stockpile Stewardship and Stockpile Management Mission

The high visibility of DOE's operations, and the extensive external scrutiny under which DOE operates today, require that weapons facilities meet modern ES&H expectations. While these demands may be overridden in certain national emergencies, as a practical matter, the ability of the complex to operate today depends on DOE's ES&H performance. ES&H concerns have shut down Rocky Flats, Hanford, Savannah River, Pantex, and Y-12. Vital capabilities are not available within the complex today. DoD officials are concerned with gaps in weapons complex capabilities that are preventing the production of pits, slowing surveillance and life-extension programs, and limiting the rate of dismantlement. Public pressures or internal concerns could cause operations to cease elsewhere as well, if DOE cannot bring those operations up to acceptable standards.

The voluntary maintenance shutdown at Pantex in 1996 provides a prime example of how dependent DOE is on sound ES&H performance. Pantex is the main facility for executing the Stockpile Surveillance program, which is key to the maintenance of the enduring stockpile. Pantex is also the central facility for the ongoing dismantlement program. DOE needs Pantex to execute the Stockpile Stewardship and Stockpile Management programs. Despite this priority, very recently certain operations were again shut down at Pantex, demonstrating again the degree to which the capabilities of the complex are contingent upon good ES&H performance. ES&H issues also cloud the future of operations at the Los Alamos TA-55 plutonium operations, as well as the uranium operations at the Oak Ridge Y-12 complex. Both of these capabilities are essential for the Stockpile Management program, and are central to national security.

Looking to the future, the effective management of ES&H concerns is a necessary precondition for executing the Stockpile Stewardship and Stockpile Management programs. Key facilities must be maintained and operated consistent with the most modern practices, and meet public demands for excellent ES&H performance. Most DOE officials recognize this relationship, and therefore acknowledge the need to take the necessary steps to get DOE's ES&H house in order.

D. BASELINE REFORMS

The proposed Integrated Safety Management System provides the foundation for an effective management system that addresses the major problems identified in this review. Therefore, the baseline reforms outlined here focus on steps needed to implement

this fundamentally new approach—an approach that most DOE officials (and the Defense Nuclear Facilities Safety Board) agree needs to be put in place.

Three related categories of baseline reform are described. The first is completing the implementation of the Integrated Safety Management System, a task on which the Department is hard at work. Several of the key characteristics of the system are discussed below. The second category concerns the process reengineering that needs to accompany the implementation of ISM. The third category includes a broader set of baseline reforms that are not explicitly targeted at ES&H problems (such as reforms in the resource allocation processes), but that are needed to effectively implement Integrated Safety Management.

1. Implement Integrated Safety Management

ISM is designed to implement seven management principles established by safety and management professionals: (a) line management is responsible for safety; (b) clear roles and responsibilities are established; (c) competence is commensurate with responsibilities; (d) resources are effectively allocated to address ES&H concerns; (e) appropriate safety requirements are identified and established; (f) hazard controls are tailored to the work being performed; and (g) both the government and the contractor clearly define and agree upon the conditions and requirements for commencing and conducting safe operations.[10]

Integrated Safety Management will employ two key elements. First, DOE's contractors' responsibilities for safety will be clearly established using contract clauses incorporated in DOE's management and operating contracts for each facility. Contractors will prepare a documented Safety Management System that describes how safety issues will be identified and addressed. Second, contracts will also identify certain high-hazard facilities within a site. For these, the contractor will also prepare an explicit authorization agreement as a condition of operation. These mechanisms are discussed in turn.

a. The M&O Contract

The Department will manage safety through a contractually binding process that identifies and incorporates the requirements that provide for safe operation of all the facilities and activities within a site. This process identifies appropriate requirements for managing safety, tailoring controls to the associated hazards, and establishing approval levels for safety documents.

The contractors' Safety Management System will implement the safety management principles outlined above, and include a systematic management framework for identifying and addressing risks. Figure II-2 summarizes the framework. The essential first step is work definition, a systematic review of the nature of the tasks to be undertaken. A hazards analysis examines the potential risks associated with this work, and a corresponding hazard mitigation strategy is developed. Taken together, these first

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10 Department of Energy, "Department Implementation Plan: Integrated Safety Management," April 18, 1996, pg. 9.

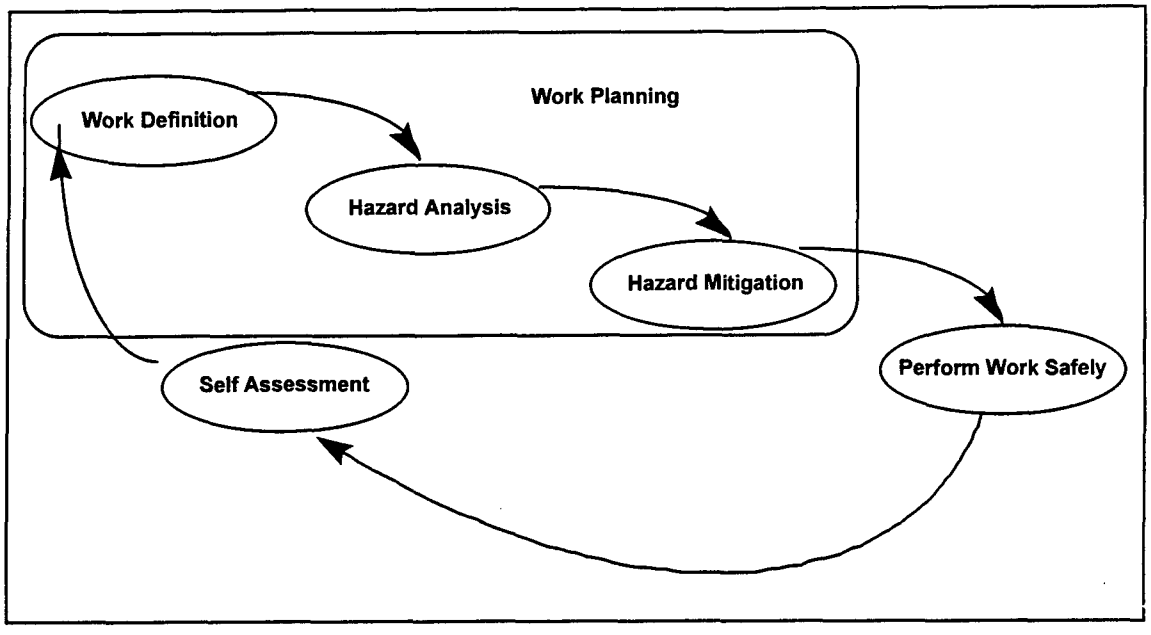

Figure II-2. Integrated Safety Management Framework

three steps constitute "work planning." Proponents of ISM maintain that an effective work planning process is essential for safety in the nuclear weapons complex, because the nature of the work is continually evolving. Consequently, any approach based solely on a static view of the facility or the work is inadequate to fully address safety requirements.

Self assessments include ongoing examination of the adequacy and efficiency of implemented ES&H controls. An essential component of ISM is that information about work hazards and the effectiveness and efficiency of implemented controls drawn from experience is continuously monitored, and the resulting lessons learned are used to improve the planning of future work. Eventually, contracts will explicitly define the characteristics and frequency of the "assessments" DOE wishes the contractors to perform; they also will stipulate the kinds of information to be reported to the Department. The goal is to provide a flow of information monitoring the contractor's management of ES&H concerns, which, when augmented with periodic on-site inspections, will be sufficient to demonstrate that the contractor's and DOE's trusteeship responsibilities are being met.

A strength of the Integrated Safety Management framework is that the work definition and hazards analysis steps provide a systematic approach for identifying potential safety issues. The framework emphasizes that safety requires the involvement of the workers and hands-on line managers. At the task or shop floor level, processes would be examined by workers and laboratory experts to determine safe work practices and other hazard-mitigating requirements. Many within the complex emphasize that such detailed worker involvement is crucial for ensuring safety. Neither headquarters oversight or intervention, nor any documentation requirements, can substitute for having good people doing good work in the field.

In the ISM framework, the formality of analysis and controls, the requirement for DOE approvals for operations, and the degree of DOE oversight involvement will be tailored to be commensurate with the hazards associated with specific tasks or programs. It is anticipated that low- and moderate-hazard activities will be adequately handled within the safety management framework outlined above. High-hazard tasks, however, would require more formal documentation, formal DOE review and approval, and perhaps ongoing, real-time monitoring of implemented work controls.

b. The Authorization Basis and Authorization Agreement

One aspect of a hazard control strategy, applicable to certain high-hazard facilities, is that contractors will be required to augment their Safety Management Systems by entering into an explicit agreement on the conditions and requirements to be satisfied in operating the facility. These define the comprehensive "safety envelope" for the facility.

A central element of these agreed upon conditions and requirements is the *authorization basis*; it defines the conditions and requirements under which the facility will be operated, and describes the basis for establishing them (see Table II-1). In the area of safety, the main elements of the authorization basis cover requirements for the physical facility, operational restrictions or administrative controls needed to maintain safety, a process for addressing newly arising safety questions, and DOE's statement of acceptance of the contractor's safety documentation.

The authorization basis also includes necessary environmental permits and assessments, along with a required pollution prevention and waste minimization plan. Any rules, orders, or laws that are essential for establishing the safety envelope for the facility also are included in the authorization basis, as are any additional commitments made to ensure the safe operation of the facility. DOE currently is reviewing the elements of the authorization basis in order to determine any additional provisions that might be needed to properly address worker health and safety. It is intended that the authorization basis will include all of the information needed to demonstrate that a high-hazard facility and planned operations meet all ES&H requirements. DOE's line managers would authorize operations based largely on this documentation, and would ensure that contractor operations continue within the safety envelope.

Once an authorization basis establishes the safety envelope for a high-hazard facility, the contractor and DOE line managers will formally enter into an *authorization agreement*. It provides a contractually binding commitment to the conditions and requirements for safe operations. (For low hazard facilities, a specific authorization agreement will not be required, because the contractual provisions implementing the Contractor's Safety Management System above are sufficient for authorizing operations.)

At the time of this review, DOE has committed to implementing the Integrated Safety Management System, and a headquarters-field implementation team is at work on the needed guidance and implementation documents. The implementation plan for Integrated Safety Management, published in April 1996, has six key elements, which provide a blueprint for ongoing implementation efforts:

Table II-1. Elements of an Authorization Basis (Category 2 or 3 Nuclear Facility)

Elements	Description
Safety	
Safety Analysis Reports	Documents the safety analysis needed to ensure a nuclear facility can be safely constructed, operated, and maintained
Technical Safety Requirements	Defines required operating limits, surveillance requirements, and administrative controls
Unreviewed Safety Questions	Defines the process for identifying and assessing operational or facility changes that might affect safety
Safety Evaluation Reports	Documents DOE's basis for approving a safety analysis report
Environment	
Local, State, and Federal Permits	Demonstrates compliance with external regulators
National Environmental Policy Act Documentation (e.g. Environmental Impact Statements)	Demonstrates compliance with federal environmental laws and regulations
Pollution Prevention and Waste Minimization Plan	Demonstrates compliance with federal regulations
Rules, Orders, and Laws	Applicable Standards or Orders that are not general requirements are identified in the Standards/Requirements Identification Document
Facility "Commitments"	Commitments are made to comply with orders or policies, and documented in formal correspondence.

Source: Table III-1, Components of Authorization Basis, Hazard Category 2 & 3 Nuclear Facilities with Long-Term Lifetimes. In Victor Reis, "Interim Guidance in Development and Approval of Authorization Basis for Defense Programs Facilities," DOE Memorandum, August 21, 1995.

1. Institutionalize through Department Directives the Safety Management System, including:
   - Department-wide safety management objectives, guiding principles, and functions;
   - Guidance for tailoring ES&H requirements and hazard controls to be commensurate with the work, the hazards, and the potential environmental impact; and
   - Guidance for establishing authorization bases and agreements;

2. Reconcile and integrate existing directives and ongoing initiatives;
3. Establish roles and responsibilities consistent with the Integrated Safety Management System, and publish these in a revised Functions, Responsibilities, and Authorities Manual (FRAM);
4. Ensure adequate technical expertise is available to implement the safety system;
5. Develop contractual mechanisms to implement the Integrated Safety Management System and to convey ES&H expectations and incentives to DOE's contractors; and
6. Implement the Integrated Safety Management System initially at the key priority DOE sites and facilities.

The plan provides a useful framework for evaluating the current status of DOE's ES&H programs. It also sets an extremely ambitious agenda. Years of work are still needed at many major facilities before DOE anticipates having signed authorization agreements in place.[11] The Integrated Safety Management plan makes a major contribution in showing where the Department needs to head, and, if followed, provides needed focus to DOE's management improvement efforts. But the plan is only a beginning, and while it is an important step forward, it also serves, ironically, to underscore the point that, despite the progress DOE has made over the last decade, it still is a long way from achieving a fully effective and efficient ES&H management system.

Consistent with the plan for Integrated Safety Management, the Department has made several attempts to clarify roles and responsibilities for ES&H. Although there is general agreement among DOE's leaders that the Department needs to integrate ES&H responsibility into line management, it has been unable to reach agreed-upon statements of DOE staff functions and responsibilities. DOE has simply been unable to integrate the specialized staffs and organizational structures for ES&H created under Secretary Watkins with programmatic and field operations requirements. The Functions, Responsibilities, and Authorities manual has been drafted and redrafted several times in recent years in unsuccessful attempts to reconcile DOE's current approach with the staff and organizations built on philosophy of centralized command and control. One of the near-term goals of the Integrated Safety Management strategy is to solve this long-standing problem by using this strategy as the framework for defining future roles and responsibilities.

2. Reengineer Defense Programs' Processes and Clarify Roles of Facility Representatives

The second reform is process re-engineering of ES&H activities to clarify what tasks need to be accomplished in implementing and operating under the Integrated Safety

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11 See, "Priority Facility Safety Management System Implementation Milestones," DOE memorandum, 1/15/97. Milestones are established for ten facilities that have been identified as priorities in DOE's response to DNFSB Recommendation 95-2.

Management System. Another reform is to reassign roles and responsibilities to simplify and clarify the integration of responsibilities for programs and ES&H concerns. The final reform focuses specifically on the roles of the Facility Representatives. It is essential to establish well-structured roles and tasks for Facility Representatives in order to ensure their work preserves the sense of responsibility and authority for ES&H within the staff of the management and operations contractor. These will be discussed in some detail in Chapter IV.

3. Adopt Other Baseline Reforms that Support Integrated Safety Management

Several other findings detailed in the next chapter contribute to the problems Defense Programs has had in managing ES&H. In particular, many of these problems stem from the finding that there are too many people who remain in the government organizations—reducing the number of people involved in ES&H processes is a necessary complement to the process reengineering outlined above. The process reforms outlined in Chapter IV complement the specific ES&H process reforms described here.

Additionally, the findings regarding the stovepiping of ES&H concerns need to be addressed through process reforms that strengthen Defense Programs' headquarters management, that better integrate across Defense Programs' programmatic and functional activities, and that strengthen the resource allocation process. All of these changes are needed to embed ES&H requirements setting and resource allocation decision making within the programmatic chain of command. As noted in Chapter I, Defense Programs needs to adopt a strategic management approach for addressing ES&H challenges comparable to the approach adopted for Stockpile Management and Stockpile Stewardship. These ES&H concerns should be addressed within the strategic plans and programmatic roadmaps addressing Defense Programs' responsibilities in the area of Weapons Complex Trusteeship.

CHAPTER III
OTHER MAJOR FINDINGS

Although the findings on environmental, safety, and health issues are the most important findings in this study, a number of other issues do present modest to serious problems for Defense Programs. These include:

- Too many people
- Concerns over the expertise and training of people
- Confusion over the difference between line and staff
- Two headquarters for Stockpile Management
- Weak integration of programs and functions within Defense Programs
- Weak integration of programs and functions across DOE
- Weak link between requirements and budget direction
- Wide variations among field activities in relationships and processes.

A. TOO MANY PEOPLE

Too many people are employed by Defense Programs chasing too little work. No matter how committed, qualified, and hard working these people are, they end up creating work for one another. Each field office justifies its numbers based on the work requirements generated by headquarters and other field elements, while headquarters bases its work force needs (in part) on the requirements generated by the field.

In every organization—particularly large ones—good people trying to do good work sometimes find themselves in situations where larger goals get lost, or are difficult to discern. Everyone suboptimizes without realizing it or meaning to. This is a vicious cycle, in which everyone is kept busy and may be doing a good job, while the system as a whole is inefficient, dysfunctional, or failing.

This simple point is critical to any understanding of the problems facing DOE, and to any potential solutions. However, as will be argued below, it is not sufficient to simply cut away at the numbers of people without first reviewing and "reengineering" the work the remaining people are asked to do. Fewer people trying to do the same job is not the answer to the problem.

In reviewing the numbers of people, one must be careful to look at both federal employees and others who perform "Fed-like" functions. These other categories of personnel are support service contractors, detailees on temporary assignment from one of the management and operating (M&O) contractors, and military detailees. For example, Headquarters Defense Programs, in fiscal year 1996, had approximately 350 federal employees; it also had the equivalent of approximately 150 support service contractors,

plus approximately 20 M&O detailees, and 20 military detailees. In all, there were close to 550 "Feds and Fed-like" people in headquarters. A similar story can be told about most (though not all) of the operations offices as well. In evaluating figures such as these, one must be careful to distinguish between support service contractors who are performing non-federal functions (e.g., janitorial, cafeteria, security, and other services) and those who are hired to augment the federal work force directly involved in mission programs.

How did there come to be too many people? Simply stated, the amount of work to be done in Defense Programs has been declining faster than have the number of people. There are no longer any warheads in production, there are no longer any underground nuclear tests, and the number of warheads in the inventory has declined dramatically. Furthermore, there were large increases in staff initiated by Secretary Watkins in 1989 to deal with the severe environmental, safety, and health problems he inherited. With the progress that has been made in addressing those problems, many of these positions are no longer needed. Finally, when old Defense Programs missions were spun off—particularly large missions that went to Nonproliferation and National Security (NN) and Environmental Management (EM)—some of the people who were spun off to do those missions were replaced by new people to perform the narrowed enduring mission.

One manifestation of there being too many people chasing too little work is that headquarters finds itself competing with field offices for roles and responsibilities. Because there is literally not enough for everyone to do, headquarters is accused of trying to take back what had been delegated to the field, while the field is accused of trying to move "upstream" into policy planning activities. This problem is discussed in more detail in Section D, "Two Headquarters for Stockpile Management."

Another consequence of there being too many people is that federal employees have augmented themselves by hiring large numbers of support service contractors to assist them, particularly in the environmental, safety, and health review and approval processes. Aside from the simple problem described above of too many people creating, work for one another—and for one another's support service contractors—there is a risk of federal employees losing their technical expertise. This occurs when people spend most of their time supervising or managing contractors, rather than doing the real work themselves. The alleged atrophying of expertise is a widespread concern among senior managers. They worry that too many of their own people are getting sloppy, that they have "contracted out their brains."

Still another aspect of this problem is that there are now many people with narrow responsibilities who feel they need more and more information to do their jobs. Their demands for information get piled on top of everyone else's, and the sources of that information, who are usually in the field, spend a lot of time supplying information to and educating these people, who are usually in headquarters. A related and time-consuming task is the effort to try to find someone who is able to make a decision. This is a problem

that is quite common in large organizations, where people tend to concentrate on their stovepipes.

Senior managers, particularly those in the field, recognize that they have too many people. But until management processes are changed so that fewer people are needed to meet the requirements levied by headquarters, and until headquarters reduces its own head count, they would be foolish to reduce their staffs on their own. In order to succeed, an effort to reduce the number of people must occur simultaneously throughout the organization. Everyone has to jump in the pool together. The current targets contained in the Strategic Alignment Initiative will result in significant staff reductions. However, lower targets could be achieved more successfully if the work being done was reengineered so that work processes would change and fewer people would in fact be needed. To the extent that the SAI targets simply cause organizations to do the same work with fewer people, they can only be partially successful, and may actually do harm.

A reduction in the number of federal and Fed-like employees should allow for a reduction in the number of M&O contractor employees as well. Senior field managers and contractors complain that their people spend too much time taking care of the needs of higher echelon DOE people. If it is true, as one M&O contractor said, that "it takes two of my people to take care of each Fed," then reducing the number of federal and Fed-like workers should produce further downsizing throughout the nuclear weapons complex.

Finally, however, everyone in the nuclear weapons complex is concerned about the ability of DOE to retain the right people if and when it downsizes. This is the concern addressed in the next section.

B. CONCERNS OVER THE EXPERTISE AND TRAINING OF PEOPLE

The national laboratories have expressed concern over their ability to attract talented people to and retain them in the nuclear weapons program. This concern has increased in recent years as it has become clear that indeed the test ban is permanent and there may never be another new nuclear weapon designed in this country, and as senior people with a lifetime of design experience retire.

There is a parallel problem with the federal work force in Defense Programs. Here, too, there is no longer any production of new warheads, and senior people are retiring who have a lifetime of experience in various aspects of the management of the nuclear weapons complex. There is also concern in some quarters that the federal work force lacks sufficient numbers of highly trained experts in facilities operations, i.e., ES&H-related skills. More generally, managers express concern over their ability to retain, train, promote, and otherwise employ the right people in the right jobs, particularly given the restrictive nature of the civil service system. This is referred to as the "skill mix" problem. Many officials maintain they could operate effectively with fewer people—but only if they are the *right* people. One constraint on achieving such an organization is the federal personnel system, with its seniority rights and "bumping" rules,

which prevents DOE from retaining the right mix of people as it draws down the size of the work force.

This study did not evaluate the quality and skill mixes of DOE employees. Although the concern among senior managers is widespread, it also may be exaggerated or misplaced. Because some of the management processes are dysfunctional (especially those related to ES&H; see Chapter II) it is quite possible that managers confuse the inability of the system to bring a small number of talented people together to solve a specific problem with an absence of such people altogether. In other words, is it the case that there are not enough experts, or is it that the talents of the experts who do exist cannot be brought to bear on important problems, because the system for doing so is broken?[1]

If one takes a long-term perspective, many inadequacies that do exist in the skills of the federal work force may be seen as a failure of the Department of Energy to provide the necessary training, education, and career development for its employees. Many senior managers expressed concerns over the large numbers of people in the work force who are "young and smart" but who "don't know anything" about the product, only about rules and regulations and requirements. Many managers expressed concern over the tendency for people to stay in one place—either headquarters or the field—and thus not receive a sufficiently wide range of experiences. The tendency of young people to stay in headquarters rather than get some "real" experience in the field was a commonly expressed concern. At the same time, it is hard to get experienced people in the field to take jobs in Washington.

One manager cited as an example her own early career at DOE, when, for several years prior to moving to Defense Programs from another part of DOE, she was unaware that the Department of Energy had any role to play with nuclear weapons. Another manager pointed to the Defense Department's Strategic Command (STRATCOM) and Defense Special Weapons Agency (DSWA), who have decided that, in order to be educated customers, they need to send people for three-year tours to the national laboratories. And of course the military has an extensive education, training, and career development program for all its officers, for which there appears to be no counterpart at all in DOE.

The Department of Energy, and Defense Programs in particular, needs to ask what is being done to educate and train its people. Is there a strategy and a program in place to harness and develop talent, particularly that of younger members of the work force? Furthermore, the Department must approach with caution efforts to reduce the size of the work force, for such efforts might worsen the skill mix problem. A typical Reduction In

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[1] While not disagreeing with the elements of this assessment, the Defense Nuclear Facilities Safety Board, and some in DOE, emphasize that (1) there are too few experts, (2) people with inadequate skills are holding down key jobs, and (3) the system is inefficient in its use of the experts that do exist. DOE has recently begun taking an inventory of skills to determine the depth of this problem.

Force (RIF), for example, is not only highly demoralizing, but due to bumping rights and the broad qualifications for positions, organizations often end up with too many of the wrong people in the wrong positions. More creative solutions are required.

C. CONFUSION OVER THE DIFFERENCE BETWEEN LINE AND STAFF

Staff can have authority delegated to them by line managers, but they are still staff. By virtue of this delegation, or by virtue of their proximity to and influence with a line executive, a staff person may appropriately have a great deal of power and influence. But, again, they are still staff, and they must be conscious and careful of their efforts to influence activities that are the responsibility of line managers.

As is common in many organizations, people throughout Defense Programs confuse the power and influence that comes with being a staff person connected to a powerful line manager (in this case the assistant secretary) with line management responsibility. The people in headquarters are doing the jobs they believe they are supposed to be doing. The confusion over the roles of staff versus line, and the problems that ensue, are generally not the fault of the people in those staff positions. Fault lies with the system and with the expectations that the leadership explicitly and implicitly places on people.

Area or site office officials and contractors are visited by staff officials from throughout DOE. These officials sometimes direct action that has not been coordinated through the chain of command. Sometimes this is explicit; sometimes they ask questions that imply direction. For example, questions raised during an Inspector General (IG) audit at Pantex led local officials to dispose of tooling that later turned out to be needed for an upcoming dismantlement program. Because of the ad hoc, undisciplined approach to managing ES&H within DOE, these kinds of problems are most pronounced at sites where there are significant ES&H and facilities operations issues. Sites are subject to uncoordinated direction from different organizations, each having its own agenda and priorities.

The exceptions to this behavior are sites where the contracting officer insists that any direction to the contractor flow through him, allowing him to serve as a filter and to ensure that the contractor is presented with a single agenda and priorities. A few officials recognized that one responsibility of the contracting officer is to say "no" to government staff who are inappropriately exercising line authority. Perhaps the best example where a contracting officer has established a disciplined chain of command is at Savannah River. Here there seems to be a clear understanding between the contractor and the operations office manager; as the contracting officer, he is the only source of direction, and other government officials are expected to convey any direction through him.

The reader is referred to Chapter I, section C, for further discussion of this issue.

D. TWO HEADQUARTERS FOR STOCKPILE MANAGEMENT

There is widespread agreement in Defense Programs headquarters and the Albuquerque Operations Office that there are "two headquarters" attempting to run the Stockpile Management program—Washington and Albuquerque. There is also agreement that there only needs to be one such headquarters. The problem seems to be, as one senior official put it, that headquarters wants to be more involved in program execution, and the field wants to be more involved in high-level planning.

There is no question that the current responsibilities of Headquarters Defense Programs and Albuquerque do overlap, and that this overlap needs to be resolved. Six issues underlay this problem: (1) a lack of clarity on the assignment of ES&H responsibilities; (2) the alleged parochialism of Albuquerque; (3) the need to be responsive to changing customer requirements; (4) the tendency for organizations to engage in mission creep, particularly during a time of declining activity and resources; (5) the tendency for staffs near the center of power to blur the distinction between requests for information and the provision of direction; and (6) the reliance of the current assistant secretary on the Albuquerque Operations Office for some major policy initiatives.

1. ES&H Responsibilities

One legacy of the Watkins era is the large ES&H structure that was built up everywhere, particularly at headquarters. Many in headquarters continue to view it as their responsibility to ensure, in detail, that facilities and operations are in compliance with all ES&H rules and regulations. They hold this view in part because no one has told them not to any more, and in part because there is still a widespread view that the field cannot be entirely trusted—that the incentives and competence of the field are not to be fully trusted—when it comes to ES&H matters.

Washington headquarters, particularly the Office of Site Operations (DP-24), along with Albuquerque and the other field offices, all have overlapping responsibilities. Historically, Albuquerque stuck to weapons, and the other operations offices—Savannah River and Oak Ridge—managed their own facilities and projects. Now Washington (DP-24) seeks more extensive day-to-day information and sometimes duplicates the management responsibilities of the operations offices. Also, Albuquerque is attempting to get more involved in facilities management at other operations office sites.

There is no agreement—there are no uniform, disciplined processes—on the handling of ES&H issues (see Chapter II). Offices and managers at all levels are engaged in a constant struggle for control and influence. That this struggle is not completely debilitating in all cases is due solely to the efforts of conscientious individuals at Headquarters Defense Programs and in the field to work out accommodations with one another. The adoption of disciplined ES&H review and approval procedures (see Chapter IV) will go a long way towards resolving the problem of overlapping responsibilities. In fact, with the resolution of overlapping and poorly understood ES&H responsibilities and processes, much of the "two headquarters" problem should go away.

2. Parochialism

Is the Albuquerque Operations Office able to act as an honest broker? Kansas City, Pantex, Savannah River, and Oak Ridge (Y-12) have come to question Albuquerque's objectivity; they believe that Albuquerque favors New Mexico's interests at the expense of others. This is a natural concern, given the large cuts that have taken place in the nuclear weapons program in recent years, and the central role played by senior personnel at the Albuquerque Operations Office in making many of these decisions. These decisions were bound to create controversy, and whomever was involved in them could be expected to undergo criticism, particularly given the strong political interests in maintaining missions and funding at all the remaining nuclear weapons facilities. Whatever the objective merits of the arguments regarding its decisions, the perception by others that Albuquerque is parochial has increased the pressure on some people and offices in Washington to take a more active role in reviewing decisions that formerly may have been left to Albuquerque.

Whether in fact Albuquerque is parochial towards New Mexico in ways that are significant and detrimental to the nuclear weapons complex and program is difficult to say. Particularly during times of scarce and declining resources, and fears over future missions, there will be disagreements about the best decisions or courses of action to take. Such disagreements are not necessarily evidence of parochialism. If Albuquerque actually is, or is perceived to be, parochial in some of its decision making, then Washington may wish to establish forums which provide other actors sufficient visibility into decision-making processes so as to alleviate their concerns. Finally it must also be remembered that the alternative, in which Washington assumes greater responsibility for many detailed program decisions, leaves Washington headquarters open to the charge that it is being (unduly) influenced by political considerations, rather than what is best for the long-term health of the program

3. Customer Requirements

Washington headquarters must be sufficiently knowledgeable about and in control of the program to be responsive to the Defense Department's—the customer's—requirements. This used to mean working with DoD on their requirements for the design and development of new weapons, and on potential tradeoffs in production and delivery schedules. DOE officials would work with their DoD counterparts on the development of the annual Nuclear Weapons Stockpile Memorandum (NWSM). On the basis of the NWSM, Headquarters Defense Programs would prepare the Planning and Production Directive (P&PD) for issuance to Albuquerque, specifying the numbers and types of warheads that had to be available for the military by certain dates. Albuquerque, in turn, would prepare the Program Control Document (PCD), which specified in detail the work that needed to be accomplished by each part of the complex in order to meet the military requirements specified in the P&PD (and, by extension, the NWSM).

This is still how the system works today—the NWSM, the P&PD, and the PCD are still central documents in the process. Now, however, there is no new design, no production of newly designed weapons, no underground nuclear testing, and more limited resources. In addition, the customer's concerns have shifted—the military is now more interested in the details of how the safety, security, and reliability of the enduring stockpile will be maintained. Thus the military is more concerned now with the details of the Stockpile Life Extension Program (SLEP), and, in particular, with what it will take for the national laboratories to certify each warhead type every year. Tightening budget constraints have caused the military to devote increased attention to how DOE invests its budget, particularly for large facilities projects. Washington headquarters' concerns and responsibilities have thus shifted as the military's concerns have evolved in the last few years.

4. Mission Creep

There is a natural tendency for organizations to engage in mission creep, particularly during a time of declining activity and resources. The Washington view of Albuquerque includes the perception that, with the end of production, as well as the end of new designs for production, Albuquerque is looking to expand its mission by moving "upstream" into policy and planning issues. Furthermore, there are widespread concerns in headquarters regarding the technical competence of the work force in the field. Finally, there is the concern that the system must protect against the tendency for people in field offices to "go native," to identify more with the perceived needs of the local site than with the broader needs of the program.

The view in Albuquerque is that Washington headquarters is too involved in the details of program execution. According to this view, these production details have historically been Albuquerque's responsibility, and Washington's involvement is a recent phenomenon, coincident with the decline in other work for headquarters associated with no new weapons being in design or production. The Washington headquarters role, again according to this view, is to help with the Washington issues, not to provide technical expertise for use at the operational level that duplicates that of Albuquerque and the contractors. Some even go a step further and argue that the staffs in Washington are only as knowledgeable as the briefing charts they get from Albuquerque. In this view, Washington should focus on integrating Stockpile Stewardship and Stockpile Management, not on trying to integrate the pieces of the Stockpile Management program, which is Albuquerque's responsibility.

Having said all this, however, the problem of mission creep is not a serious one. It is an annoyance, to be sure, but it is exacerbated greatly by the problems in the ES&H system, and is minor by comparison to those ES&H problems.

5. Information vs. Direction

Another factor influencing Washington's behavior illustrates the fine line that sometimes exists between requests for information and the provision of direction, particularly when those requesting information are close to the center of power. One consequence of the Watkins-era reforms and emphasis on ES&H was that many people in Washington who were weapons experts and had field experience left the Department. They were replaced by people whose expertise instead was in the operation of facilities. Consequently, there are fewer people with weapons expertise in Washington. This coincided in recent years with an assistant secretary and a Deputy Assistant Secretary for Military Applications and Stockpile Management (DP-20), both of whom had a strong interest in having weapons experts on their staff in Washington. In an effort to educate his people and to ensure they were technically competent and informed, the deputy encouraged his staff to ask lots of questions—to get smart and to stay smart on the weapons program. Both senior officials asked lots of questions, and their staffs worked hard to not only get the information, but also anticipate future requests.

It is only natural for people in the field to try to be responsive to those from headquarters. If people working for someone powerful are asking a lot of questions, it is reasonable for people in the field to ask why these questions are being asked, and to speculate on and anticipate what it is that more senior people at headquarters must "really" want. Thus, inquiries often end up being interpreted as—and are sometimes intended as—direction, and headquarters is accused of micromanaging. This is not to argue that headquarters staffs should not ask questions, but that some of the consequences of this inquisitiveness must be carefully considered and guarded against. Again, this is a natural phenomenon in organizations, and it is closely related to the tendency towards mission creep.

6. Policy Initiatives

In recent years, the Assistant Secretary for Defense Programs has assigned important tasks to the Albuquerque Operations Office that appeared to some as tasks that should have been undertaken by Headquarters DP. The most important of these was the reconfiguration of the nuclear weapons complex. Part of the logic for giving Albuquerque primary responsibility appears to have been to try to minimize the amount of politics entering into these difficult decisions. However, another reason was the assistant secretary's confidence in specific people at Albuquerque. Other important post-Cold War initiatives undertaken by Albuquerque include dismantlement, interim storage of pits, pit manufacturing and surveillance, the production capability assurance program (PCAP), and the integrated weapons safety process (SS-21).

The assistant secretary's tendency to jump over his Washington staff to talk directly with, and assign tasks to, experts he has confidence in at Albuquerque is entirely appropriate, but it does have the side-effect of confusing the arrangement of roles and

responsibilities. Of course, it may also suggest where roles and responsibilities should be assigned formally.

E. WEAK INTEGRATION OF PROGRAMS AND FUNCTIONS WITHIN DEFENSE PROGRAMS

Many DOE and contractor officials identified management problems stemming from the lack of effective integration across Defense Programs' missions and organizations. Some of the problems they cited can be attributed to the absence of clear strategic guidance on priorities across programmatic missions, between programmatic missions and ES&H responsibilities, and between programmatic missions and investments needed to maintain the capabilities of the weapons complex. To a great degree, these problems reflect the difficult challenges Defense Programs has faced in adapting to the changes in its missions and priorities over the last half decade.

A second class of problems identified by field managers can be traced to weaknesses in program execution. Field managers have had to overcome a lack of effective coordination among Defense Programs headquarters organizations, as well as between the activities of headquarters and field organizations. Both classes of problem—at the strategic and the program execution levels—are summarized below.

1. Strategic Guidance

The Defense Programs leadership is making significant progress toward building a strategic management framework for integrating its missions and organizations, and for reorienting its focus from Cold War missions toward emerging missions. It has done this through a number of initiatives—such as the *Stockpile Stewardship and Management Plan*, the Service Life Extension Program (SLEP), Enhanced Surveillance, the Advanced Supercomputing Initiative (ASCI), the Advanced Design and Production Technologies (ADaPT) program, and various plans for reconfiguring the complex—that are building the strategic management framework needed to integrate Defense Programs' activities in support of its new missions. These initiatives appear to be well conceived, but as we shall see, some additional development is needed. It is essential to understand what has already been accomplished in order to properly assess the remaining problems with program integration, and to identify the steps needed to address these problems.

An illustration of this integrating framework is presented in Figure III-1. The figure presents Defense Programs' matrix organizational structure, and shows how its strategic management initiatives are tying together its missions and organizations. The row headings of the matrix present the three missions that comprise Defense Programs, as defined in Chapter I: Stockpile Stewardship, Stockpile Management, and Weapons Complex Trusteeship. Several key goals and responsibilities are identified for each mission.

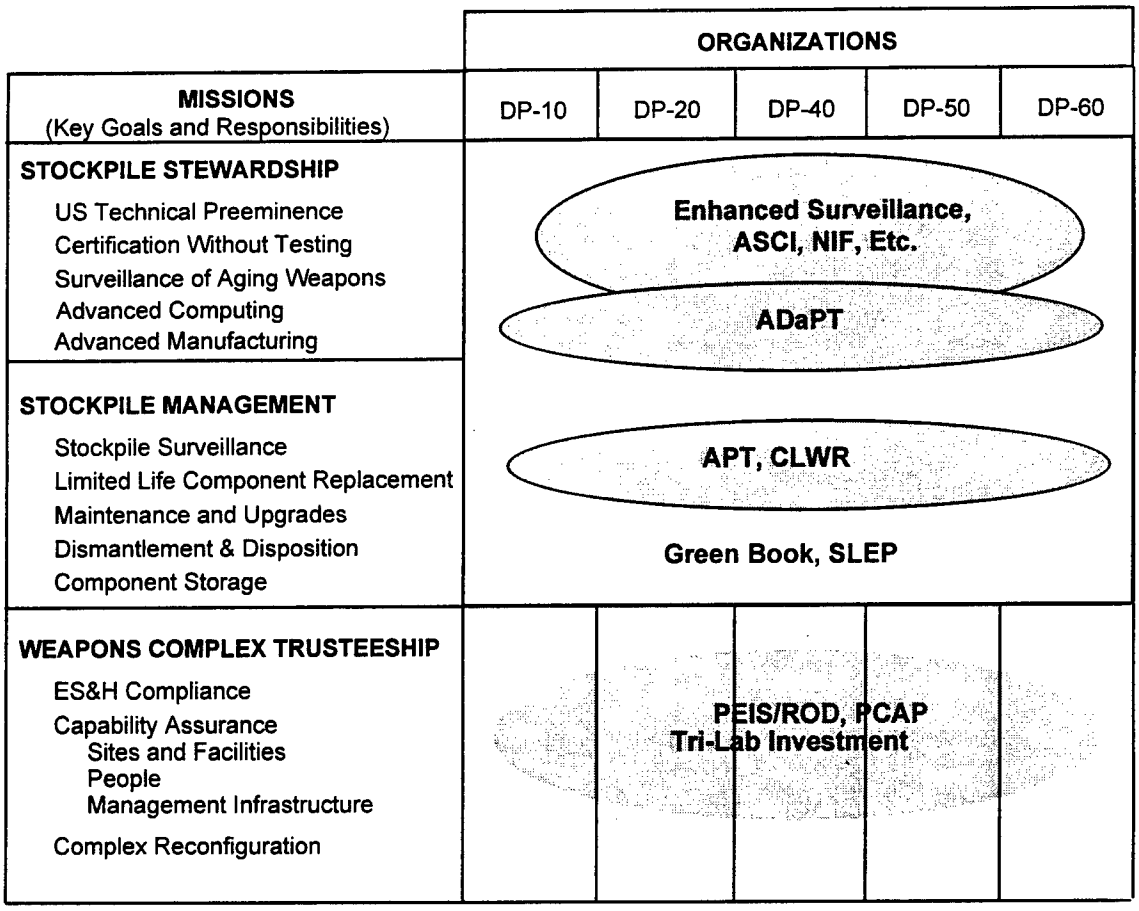

Figure III-1. Defense Programs' Integrating Initiatives

The column headings of the matrix include the main organizational elements that comprise Defense Programs. These elements are responsible for research and development (DP-10), stockpile management (DP-20), finance and administration (DP-40), advanced computing (DP-50), and tritium project management (DP-60). Defense Programs' structure is typical of most organizations in that it includes a mix of organizational elements focusing on missions, combined with elements focusing on key program initiatives or supporting functions. In Defense Programs, as in virtually any organization, there is not a one-to-one correspondence between missions and organizations. This underscores the essential role that top management must play in integrating the activities of its organizational elements in support of its core missions.

There is a third dimension to the Defense Programs management matrix, corresponding to the "vertical" relationships between the activities of headquarters and

the DOE field offices, which were discussed in Chapter I.[2] Effective "vertical integration" would result in effective teamwork between headquarters and the field, rather than competition to perform overlapping activities. Successful matrix management requires Defense Programs' leadership to integrate across all three dimensions of this matrix structure. It must balance priorities across the three mission areas, integrate the support of all the headquarters elements in support of the missions, and vertically integrate the work of headquarters and the field.

The centerpiece of Defense Programs' strategic management initiatives is the *Stockpile Stewardship and Management Plan* (the "Green Book"). The Green Book provides, for the Stockpile Stewardship and Stockpile Management programs, an overall vision and detailed explanations of the programs needed to maintain and certify the enduring weapons stockpile. It thus covers two of the three core missions. It also describes how several initiatives and major programs fit into the overall strategy for meeting stewardship and management responsibilities. The relationship between the Green Book and these initiatives is illustrated in Figure III-1. The open question is whether this plan is one that will truly guide programmatic decisions. Management systems to ensure the plans and programs in the Green Book are budgeted, tracked, and executed—management systems to hold people accountable—are still under development. Another important goal of the Green Book is to provide full accountability to DOE's customers in DoD.

Although an in-depth review was not made of every stewardship and management initiative, as a group they appear to cover the major challenges facing defense programs today. The Advanced Supercomputing Initiative (ASCI) is developing numerous tools, some of which are already in use, for assessing and certifying the stockpile in the future, without underground testing. Enhanced surveillance and the National Ignition Facility (NIF) are two additional programs that will provide critical capabilities. The Advanced Design and Manufacturing Program (ADaPT) is intended to provide a complex-wide perspective on the future requirements for complex capability, and to provide an integrated program of research and development to meet these requirements.

Missing from the Stockpile Stewardship program, however, is its most critical element: a strategic plan for the core research, or R&D, program. Such a strategic plan would provide three crucial pieces currently missing from the Stockpile Stewardship program:

(1) Integration of the programs of the three laboratories into a single program to improve coordination and minimize the unnecessary duplication of effort.

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2 A fourth dimension to consider in assessing the integration of Defense Program's activities is the relationship between Defense Programs and the other elements of the Department of Energy. These issues are addressed in section F, below.

(2) A high level statement of the goals of the R&D program, and a mapping of major research initiatives against those goals.

(3) An improved ability to integrate Stockpile Stewardship with Stockpile Management; i.e., ensure that the long term needs of the Stockpile Management program are what drives the Stockpile Stewardship program.

Stockpile Management and Stockpile Stewardship initiatives include the Stockpile Life Extension Program (SLEP), which provides a complex-wide plan for periodic maintenance of the enduring stockpile, and for upgrades to address known problems. For each of the weapons in the enduring stockpile, a SLEP chart identifies the nature and timing of anticipated maintenance and upgrade tasks. In concept, SLEP provides a strategic management framework for integrating all the activities needed to support the enduring stockpile, and for balancing the workload across weapons. Other Stockpile Management initiatives include the programs for Accelerator Production of Tritium (APT), and Commercial Light Water Reactor (CLWR) production of tritium, which are integrating Defense Programs' efforts to provide a long-term source of tritium after the turn of the century.

The reconfiguration of the production complex has been managed through a number of initiatives intended to estimate demands on the production complex and design a complex to meet those demands. The Programmatic Environmental Impact Statement (PEIS) for Stockpile Stewardship and Stockpile Management provided the vehicle for considering configuration alternatives, and for conveying decisions on the preferred options. Working in parallel, the PCAP program has attempted to identify specific production capabilities, or skills, for which special action is required to maintain needed capabilities.

Although described above primarily as an investment initiative, the Advanced Design and Production Technologies (ADaPT) program also could serve as the strategic management framework for shaping the future of the laboratory and production complex. ADaPT thus would supplant the strategic management roles that have been played by the PEIS and PCAP, and provide a focal point for the Complex Trusteeship mission. In this expanded role, ADaPT could provide the integrating linkage between Defense Programs' responsibilities as complex trustee and its programmatic responsibilities for stewardship and management.

ADaPT also may absorb elements of the Tri-Laboratory Investment Plan, which has provided a mechanism for the laboratories to coordinate and identify potential overlaps or gaps in their investment plans. As these improvements are made, the Green Book will continue to evolve as the basis for integrating across DP's three mission areas. Some officials observed that the logical goal for the next version of the *Stockpile Stewardship and Management Plan* ("Green Book III") is to integrate DP's three mission areas—Stockpile Management, Stockpile Stewardship, and Weapons Complex Trusteeship—into a single, overall vision and plan.

Finally, it is noteworthy that there is no strategic management framework in place for addressing environmental, safety, and health issues. This is consistent with the findings in Chapter II, which described the inadequacies of management structures in this area. As Defense Programs continues to evolve its strategic management framework, it would make sense to fold ES&H issues into the process.

2. Program Execution

It should not be surprising that Defense Programs has had problems in integrating its program execution activities, given that the strategic management framework is still under development. Three kinds of problems were observed: First, it often is cumbersome and time consuming to coordinate changes among the organizational elements with responsibility for directed programmatic work. Second, it can be very difficult to resolve discrepancies between programmatic work, regulatory requirements, and available funding. Third, there is no clear mechanism for establishing facility investment needs and balancing these against programmatic work. In each of these cases, contractors and field-level officials feel that, in too many instances, to get anything done they must laboriously "work the system" to build a consensus from the bottom up, rather than getting integrated, top-down leadership.

Several officials noted that Defense Programs' current missions require greater integration between the laboratories and the production facilities than has been the case in the past, and that often it is difficult to get this work coordinated within the government. When Defense Programs' primary mission was the design and production of nuclear weapons, the roles of the laboratories, production plants, and the Nevada Test Site were well understood. Correspondingly, there was a well understood assignment of roles and responsibilities within the government offices with programmatic responsibility.

Today's missions have blurred the traditional assignments of roles and responsibilities between the laboratories and production facilities. Consequently, the roles and responsibilities within headquarters also are somewhat blurred, and this has created a diffusion of responsibility across headquarters elements in some programmatic areas. Many of the dismantlement and stockpile management tasks being performed in the production facilities raise technical questions that require close collaboration with the laboratory designers and scientists. Hence, these programs require extensive interactions between the laboratories and production facilities. It has been observed, in particular, that no one has ownership of the dismantlement program. Consequently it is difficult to get resolution of programmatic issues.

Another set of integration issues has been created by the assignment of production tasks, which are managed under the Stockpile Management program, to the Sandia and Los Alamos Laboratories. These institutions now must deal on programmatic issues with Albuquerque and the headquarters offices responsible for both Stockpile Stewardship (DP-10) and Stockpile Management (DP-20). Similarly, Albuquerque must coordinate its Stockpile Management responsibilities at the laboratories with both DP-10 and DP-20.

Some argue that it would make sense, therefore, to merge these headquarters offices (DP-10 and -20) because a single organization would help promote integration of the laboratories and production complex. Their view is that the split between DP-10 and DP-20 is artificial, that the interfaces have not been worked effectively, and therefore that the current organization inhibits integration. They also note that these responsibilities used to be merged, under the old Deputy Assistant Secretary for Military Applications and Stockpile Management (DASMASM).

It must be emphasized that these integration problems primarily take the form of administrative inefficiencies, budget disputes, and problems with getting timely resolution of issues; they have not undermined technical integration and the quality of the hands-on dismantlement and Stockpile Management task work. Everyone seems to agree that technical collaboration between the laboratories and production facilities is not a problem. The laboratories maintain teams at Pantex and readily dispatch experts to address problems.

A second set of integration issues arises from the inherent conflict between directed program work and requirements that are funded out of overhead. Program managers in Defense Programs fund the directed workload of the weapons contractors, while other officials in DP or elsewhere in DOE regulate contractor operations in areas such as safeguards and security, ES&H, business practices, and personnel management. The funding needed to meet these regulatory requirements is not always reconciled at the headquarters level with the funding needed to meet the directed workload. When such requirements are levied in the field, contractors are once again forced to "work the system" to build a government consensus on how to balance the directed workload and regulatory requirements with available funding.

The split between those who manage the directed program and those who regulate operations exists at all levels of the government. Issue resolution requires consensus-building at every level, and across communities with different cultures and priorities. Several observers believe that the gulf between the Albuquerque offices responsible for the Stockpile Management program (the Weapons Program Division and the Weapons Quality Division) and the office responsible for ES&H is as wide as, if not wider than, the gulf that exists in headquarters. Several field officials observe that it is very difficult and time-consuming to reconcile the demands of these communities.

A third set of integration issues stems from Defense Programs' Weapons Complex Trusteeship mission. More effective mechanisms must be put into place to balance the priorities for directed programmatic work against the investments needed for maintaining the capabilities of production and laboratory facilities. Many people note that there is no effective proponent acting as the long-term guardian of the laboratory and production complex. One field official suggested that Defense Programs create a "Senior Mission Resource Council" to advise the assistant secretary on such broad investment decisions. The council would include the site and area office managers, who could provide feedback to the assistant secretary on the overall balance of resources available to

the facilities, and provide an integrated view of the capability of the complex to meet current and future directed program work.

Lacking this kind of resolution mechanism, Defense Programs is faced with an intense "beggar-thy-neighbor" competition for investment funding within the complex, which makes it more difficult to fulfill its Weapons Complex Trusteeship mission. Many of the area and site offices believe they are at a severe disadvantage in the current investment decision-making processes, and thus strongly support the adoption of alternative mechanisms that provide more top management focus on investment decision–making, and greater visibility into decision-making processes.

In the context of Figure III-1, all of these integration problems can be described as arising from a failure to "close the matrix." That is, DOE has not fully integrated across core missions, nor does it integrate the activities of its organizational elements in support of these missions. Moreover, the contractors and field offices find that they cannot get these issues resolved without "working the system" themselves to build a consensus. Too much integration is coming from the field upward, rather than from top-down leadership. Several of the field office managers said they viewed this integration task as one of their main value-added functions, because they were the only officials in a position to ensure the contractor heard a single voice from the government.

Defense Programs has a number of the needed management mechanisms in place for integrating program execution: weekly staff meetings, periodic deputy assistant secretary meetings, Navigator Meetings, and Quarterly Program Reviews all provide mechanisms for integrating the activities of the DP staff. Several officials have noted, however, that this spirit of collaboration quickly breaks down as issues move below the senior staff level. One missing component is a "chief operating officer" responsible for "closing the matrix," and for disciplining staff participation in management processes and decision making. Many observers have noted that while the current assistant secretary has succeeded in establishing the vision for the future of Defense Programs, his work should be complemented by a principal deputy focusing on day-to-day program execution.

In summary, Defense Programs is building a strategic management framework that promises to provide the basis for the effective integration of missions, programs, and organizations. The work thus far has succeeded in reorienting the weapons complex away from its Cold War missions toward its evolving mission of supporting the enduring stockpile. This framework has not reached maturity, however, and Defense Programs lacks a hands-on-manager able to resolve day-to-day integration issues. Consequently, many integration-related problems continue to be observed in headquarters and the field. Suggested reforms are discussed in Chapter IV.

F. WEAK INTEGRATION OF PROGRAMS AND FUNCTIONS ACROSS DOE

The essential problem of program integration in DOE appears to be the difficulty the Department faces in setting and enforcing priorities, resolving disputes, or settling

impasses between the programs overseen by the assistant secretaries and office directors. The ability of the Secretary, Deputy Secretary, and Under Secretary together to run a tight ship, to both set a course and to intervene, overrule, or adjudicate, is limited by the lack of formal mechanisms and processes for leading and controlling their assistant secretaries and office directors.

The Department of Energy is a multi-program organization. At the highest level, program management is overseen by the assistant secretaries. Many of the programs are executed at government-owned, contractor-operated facilities. Each program sponsors activities at several facilities, and most facilities have multiple programmatic customers.

The cross-talk between programs through the facilities has the obvious consequence that conflicts and duplications can arise due to the lack of integration between programs. The situation is even more difficult to manage in a time of reduced resources, when the facility contractors seek to broaden their individual customer base by marketing across program boundaries. This is the cause of the mission creep at the laboratories that has been widely proclaimed by other studies. It is also an important source of ambiguity in roles and responsibilities across the programs at the assistant secretary level.

Defense Programs provides a clear example of this ambiguity. Until the Watkins era, Defense Programs was, for all practical purposes, the sole customer of the weapons production facilities, and provided the majority of DOE funding for the national weapons laboratories.[3] No organizational mechanism for conflict resolution was required, from DP's perspective, since there was little opportunity for conflict. Today, Defense Programs' share of support is below 50 percent of the total laboratory budgets, but the mechanisms to resolve conflicts and improve coordination have not kept pace.

1. Program Guidance

The apparent lack of coordination among programs at DOE headquarters becomes quite apparent when viewed from the perspective of the field activities that must carry out the programs. The competing and conflicting demands placed on field organizations are strong evidence of the lack of coordination back at headquarters. At the same time, the field offices are all fighting to save their budgets by saving and/or expanding their missions. They compete with one another to attract program responsibilities from different assistant secretaries, but there does not appear to be an integrating force at headquarters that seeks an optimal allocation of responsibilities, resources, and capabilities. Is there any strategic planning for the entire DOE complex?

Some examples of the lack of programmatic coordination include the hand-off of

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[3] The major source of non-DOE funding is the Department of Defense. During the 1980s, DoD funding of DOE activities related to the Strategic Defense Initiative (SDI) was close to one billion dollars a year, much of it directed towards Lawrence Livermore and Los Alamos National Laboratories.

facilities between Defense Programs and Environmental Management (EM); the assignment of responsibilities between DP and EM for pollution prevention and waste minimization at DP sites; and the coordination between DP, EM, and Fissile Materials Disposition (MD) on certain materials disposition issues. Another example concerns the level of detail provided with program guidance. The consensus among field managers, for example, is that program guidance from DP is relatively broad, compared to the highly detailed guidance provided by EM. In DP programs, field managers are better able to make the decisions they feel are necessary to see that the guidance is implemented, whereas the guidance from EM is viewed as excessive and intrusive.

2. Budget Guidance

The budget formulation process that takes place at multi-program sites illustrates the extent to which the DOE program is a poorly coordinated collection of independent programs, rather than an integrated whole in which corporate objectives fully drive program objectives.

While the Department's Chief Financial Officer (CFO) does provide a unified budget call every year, it appears that the programs supplement this guidance such that, as a practical matter, field managers do not receive a single budget guidance and call from DOE headquarters. In fact, they essentially ignore this guidance, and instead act upon the guidance and directions they receive from each of the program areas. The guidance from each program comes in at a different time, is due to headquarters at a different time, imposes different formats than that of other programs, and may be incompatible in terms of electronic interchange. Furthermore, the guidance is often uncoordinated between and among programs.

Consider the following, somewhat simplified, example. A field office receives budget guidance from one large customer, Defense Programs, which must be returned to Headquarters DP before the guidance from a second large customer, Environmental Management, has been received or adequately clarified. Both customers must pay for some portion of the indirect costs at that field activity. Not knowing how large the budget will be from EM, and not knowing how much of that budget EM will agree to apply towards indirect costs, make it impossible to submit a budget estimate to DP without major caveats.

To add insult to injury (the injury being separate budget processes and documentation requirements), disagreements between Defense Programs and Environmental Management—or between any two program areas—regarding how much each will contribute towards the costs of doing business at a multi-program field activity are often fought with the field activity in the middle of the dispute, rather than through a formal, disciplined process managed by DOE headquarters. And, of course, these budget disputes often reflect underlying programmatic disagreements. The inability of programs to coordinate among themselves at headquarters manifests itself in dysfunctional processes being played out at the field activities. This problem is then exacerbated by the

efforts of the field activities to expand their budgets and missions, leading to more distrust and dysfunction.

Finally, the budgeting process appears to make no distinction between short-term program requirements and long-term investment requirements for infrastructure, facilities, and land. That is to say, the Department's resource allocation process appears to provide no effective mechanisms for supporting DOE decision-makers in their Complex Trusteeship mission. This subject is addressed more fully in Section G, which discusses the weak link between requirements and budget direction.

3. Functional Guidance

Each program area has its own contracting, safeguards and security, ES&H, human resources, and other functional offices. There is a tendency for each functional area in each program area to work independently of the other. This would be far less of a problem if each program area had its own sites or activities, rather than having multi-program sites and activities. When Defense Programs and Energy Research both pay for research at the same laboratory—at the same facility in the same laboratory—the problems of coordination will obviously be far greater. Rather than resolve these issues or coordinate guidance at headquarters before it goes to the field, however, there is a tendency to levy requirements on the field and then respond to the lack of coordination based on which howls of protest are loudest. Although one of the functions of the Office of the Associate Deputy Secretary for Field Management (FM) is to be an ombudsman and facilitator for the field on these kinds of coordination issues, it seems to provide more a reactive than a systematic approach to coordination between programs.

4. Caveat

The issue of poor program integration across DOE clearly presents serious problems for Defense Programs and DOE. However, this study was unable to do more than scratch the surface of these problems. Although it was impossible not to observe many of these problems, the focus of the study was not DOE as a whole, but Defense Programs. Senior DOE leadership will have to look elsewhere for more detailed and authoritative assessments of the numerous conflicts created by the lack of coordination and inconsistencies at the assistant secretary (program) level in DOE.

G. WEAK LINK BETWEEN REQUIREMENTS AND BUDGET DIRECTION

At the root of DOE's resource allocation problems is the absence of a formal, disciplined DOE-wide resource allocation process. There is no systematic process for ensuring that all decisions with resource implications are weighed against one another in a complete and consistent fashion. To put it another way, there is no system like the Planning, Programming, and Budgeting System (PPBS) found at the Department of Defense (DoD). While DoD's PPBS has its problems, and while DOE is in many

important ways different from DoD, the lack of a PPBS-*like* system at DOE is conspicuous by its absence. While the remainder of this discussion focuses on Defense Programs, the DOE context—or, one is tempted to say, the lack of context—must always be kept in mind.

To a large degree, control over the allocation of funds within Defense Programs parallels the assignment of programmatic responsibility, as it should. Accordingly, some of the budgetary concerns raised reflect overlaps and gaps in programmatic assignments themselves. For example, programmatic and budgetary influence over core Stockpile Management overlap somewhat between Headquarters DP and Albuquerque, while DOE's ability to integrate Stockpile Stewardship and Stockpile Management programs and budgets at a detailed level is limited.

Other concerns address possible disconnects between programs and funding. For example, concerns have been raised about support offices without programmatic responsibility influencing funding requirements for the programs. There also are concerns about whether funding and requirements are coordinated properly at the level of the management and operating (M&O) contractor. Finally, aggravating all of these concerns is the extreme complexity of budgetary relationships in the field.

1. Complex Budgetary Relationships

Budgetary relationships in the field are inherently complex because DOE relies on government-owned, contractor-operated (GOCO) facilities to meet the needs of multiple DOE programs. Because the facilities are government-owned, DOE has established operations offices to oversee designated production plants and laboratories. The managers of the operations offices serve as contracting officers, legally responsible for negotiating and managing the M&O contract for each facility. DOE programs and others that use a facility rely on the contracting officer to negotiate an amendment to the M&O contract rather than tasking the contractor by negotiating additional contracts.

The operations office develops an integrated budget request for each site, coordinating the requirements of the various programs and supporting DOE's long-term interests at the site. This requires some effort, since the various program offices (e.g., Defense Programs, Environmental Management, Energy Research) tend to have different budget processes, definitions, and timing. (See the discussion in Section F, above.)

Budgeting for infrastructure investments and improvements depends on a web of landlord relationships. Capital projects are funded by program budgets. Typically, a site's primary programmatic customer serves as its landlord, responsible for funding general-purpose infrastructure. Special-purpose infrastructure often is funded by the particular program that requires it. Funding for general-purpose infrastructure may suffer because of ambiguity over which program is responsible, and because such investments compete directly with operations for program funding. Once again, one sees how the Weapons Complex Trusteeship mission may be shortchanged.

The integration of programs across sites is generally the responsibility of program offices at DOE headquarters. However, in the case of Stockpile Management, much of this responsibility has been delegated to the operations office at Albuquerque. Accordingly, Albuquerque issues detailed program and budget guidance to all of the M&O sites that receive funding from this program. Albuquerque develops an integrated budget proposal and allocates appropriated funds among the sites. In the case of production facilities at Oak Ridge/Y-12 and Savannah River, Albuquerque works through the corresponding operations offices. Albuquerque funds special-purpose infrastructure investments needed for Stockpile Management at those sites. In the case of the plants at Kansas City and Pantex, for which Albuquerque is contracting officer and Stockpile Management is the primary mission, Albuquerque funds general-purpose as well as special-purpose infrastructure investments. In the case of the national laboratories at Los Alamos and Sandia, Albuquerque is the contracting officer, but Stockpile Management is not the primary mission, so Albuquerque funds only special-purpose infrastructure investments.

2. Overlaps in Core Stockpile Management Budgeting

There appears to be some confusion regarding the respective roles of Albuquerque and Headquarters DP in the integration of the Stockpile Management budget. This confusion both mirrors and constitutes an important part of the overlap in program responsibilities discussed elsewhere in this report.

Historically, Albuquerque exercised considerable autonomy in formulating and executing the Stockpile Management budget. Ten years ago, Albuquerque would receive a lump sum Work Authorization (i.e., spending authority) from Headquarters DP for production. Albuquerque was largely responsible for how the production budget was allocated among sites and tasks. This autonomy has since been eroded, as program managers at Headquarters DP have become more involved in program details.

Five-year program plans from Headquarters DP now include detailed projections by site, serving as guidance to Albuquerque in budget formulation. Headquarters DP program managers now review the details of Albuquerque's integrated budget submission and require that adjustments be made by site. This has particularly been true in the last two years, during which time a civilian with detailed program knowledge has been the Deputy Assistant Secretary for Military Applications and Stockpile Management (DP-20). (Traditionally, this position was held by military officers not nearly so familiar with the program.) During the formulation of the fiscal year 1998 budget, for example, the Deputy Assistant Secretary for Military Applications and Stockpile Management and his staff (DP-20), and the budget specialists in Program Analysis and Financial Management (DP-41), received briefings at individual plants, rather than the traditional integrated briefing at Albuquerque.

There are several reasons why Headquarters DP has become more involved in detailed budget integration. Importantly, site budgets have gained considerable political

visibility in this era of downsizing. Political actors concerned about employment at particular sites are uncomfortable with decisions made in New Mexico that may hurt employment at their plants. Further, there is a legacy of mistrust at Headquarters DP regarding the field's priorities and competence in handling ES&H and other non-production issues. Also, in some cases, coordination occurs at headquarters between Defense Programs and other DOE programs involved at a site.

In any case, as discussed elsewhere in this report, it can be both wasteful and counterproductive to permit redundant layers of responsibility. The existence of overlapping responsibilities makes it more difficult to resolve budget issues, and also invites the sites to manipulate Headquarters DP and Albuquerque to their own advantage.

3. Gaps in Integration of Stockpile Stewardship and Stockpile Management Budgets

DOE is handicapped in its ability to integrate the Stockpile Stewardship and Stockpile Management budgets at a detailed level. Albuquerque has detailed program knowledge for Stockpile Management, but neither Albuquerque nor Headquarters DP has the same detailed visibility into Stockpile Stewardship. Moreover, Albuquerque does not have programmatic responsibilities for Stockpile Stewardship, as it does for Stockpile Management.

Despite these asymmetries, working relations between the laboratories and plants appear close and effective. However, concerns have been raised about the integration of the two programs at the laboratories themselves. Sandia and Los Alamos, in particular, are doing a substantial amount of production within the Stockpile Management program. Interdependencies and gray areas exist between the Stockpile Management and Stockpile Stewardship budgets. In some cases, tasks logically could be funded under either program.

Because of the asymmetries mentioned above, Albuquerque is in an awkward position to work tradeoffs between the two budgets and ensure their proper integration. If the budgets are to be integrated, it must be lead by, if not done at, Headquarters DP. For example, Headquarters DP led consolidated DP budget reviews at the laboratories for the fiscal year 1998 budget, with at least partial success. However, even the program managers under the Office of Research and Development (DP-10) do not have the detailed visibility into Stockpile Stewardship that Albuquerque has into Stockpile Management.

Concerns also have been raised that a lack of visibility into the Stockpile Stewardship budget may hinder Albuquerque's ability to fulfill its responsibilities as contracting officer. This report did not develop sufficient information to evaluate this issue.

4. Undisciplined Support Requirements

Requirements are imposed on the field, in many cases without due consideration of their fiscal impacts. Frequently, these are ES&H requirements imposed by the Defense Nuclear Facilities Safety Board, the Office of Environment, Safety, and Health, or even Headquarters DP. The requirements may be communicated as DOE orders, as recommendations following audits, or as comments following special-purpose reviews. The concern is that these communications affect the workload of the contractor and the field, but the originators do not provide the needed funding. Nor are the originators required to justify the costs they impose on the budgets of other programs. Similar problems are evident with safeguards and security and other support functions.

5. Disconnects at the M&O Contractor Level

Reconciling the performance required from the M&O contractor to the level of funding available has been cited as a problem for the Stockpile Management program by both contractors and federal staff. From a contractor's point of view, DOE sometimes imposes new requirements without providing the requisite funding or a reprioritization of existing requirements. From DOE's perspective, some managers find that their requirements are crowded out by changes imposed by other managers. As shown in the following discussion, discrepancies between requirements and funding are inherent in the dynamic, budget-constrained DP environment. While contractors have traditionally been given wide latitude to resolve discrepancies themselves, their flexibility has been reduced in recent years by increasingly detailed tasking from DOE.

DOE's responsibility for reconciling requirements and funding for the M&O contractor is clearly assigned to the operations office manager, as contracting officer, who negotiates changes to the scope of work and estimated funding on behalf of the program managers. The program managers define and prioritize their own requirements and provide funding, while the contracting officer negotiates and enforces an agreement acceptable to the contractor and the program manager. When necessary to protect the contractor's ability to fulfill its primary mission for DOE, the contracting officer may also prioritize among programs; for example, rejecting non-DOE tasks deemed inappropriate. Albuquerque, as the field integrator for Stockpile Management, also acts as a program manager, prioritizing tasks within that program.

a. Discrepancies In Budget Planning Prior to Budget Year

The emergence of discrepancies between requirements and funding is inevitable. The primary causes prior to the year of budget execution include changes in funding levels and changes in requirements.

Funding levels change. The contractor's initial budget submission estimates the costs of meeting Defense Programs' requirements, and notes those that cannot be satisfied within the target level of funding. However, the contractor's proposal is subject to

change by Albuquerque, Headquarters DP, the Office of Management and Budget, and Congress. The link between funding and requirements is obscured as the higher echelons work in increasingly broad funding categories. The subsequent allocation of appropriated funds for the contractor may differ from the initial target, often without specific instructions on how the workload should be adjusted.

Requirements change. The contractor submits a budget proposal at least 18 months prior to the execution year. However, requirements in the Program Control Document (PCD) issued by Albuquerque continue to change—for example, as DOD's stockpile goals change or as stockpile surveillance identifies new maintenance requirements. New directives, ongoing audits, and incidents also may change requirements in areas such as ES&H and safeguards and security. Moreover, initial assumptions regarding inflation and wage settlements may prove wrong. Thus, even if appropriated funding matches the original target, the proposed workload may no longer be feasible or appropriate.

For these reasons, it is necessary to realign requirements and funding for the contractor at the beginning of the budget execution year. For Stockpile Management, Albuquerque asks the contractors to estimate the costs of meeting requirements based on current guidance, and develops an integrated program. The contracting officer for each site negotiates a contract modification incorporating the new scope of work, estimated costs, and the contractor's fee, including the bases on which the contractor will be evaluated for any award or incentive fees. The scope of work is defined in considerable detail at those sites, using the relatively new process known as Work Authorization Directives (WADs), which define tasks in 11 functional areas and include specific quantities and schedules.[4]

b. Discrepancies During Budget Year

During the budget execution year, there is a continuing need to align requirements and funding. Requirements may change for the same reasons cited above. Funding too can change, for example, if Albuquerque (as program manager) meets a funding emergency at one location by adjusting funds available for other sites. To some degree, the WADs serve as a change control system. They can be modified during the year when DOE or the contractor identify a need for change. At some sites, there are formal WADs councils to enhance coordination between the area office and the contractor. The WADs approach to defining the scope of work, which has been used for perhaps three years, is a more detailed and integrated approach than previous methods.

Even under the WADs system, however, the scope of work is sufficiently broad to give DOE some flexibility in changing requirements and to allow the contractor some

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4 Work Authorization Directives are used at Kansas City, Pantex, Y-12, (Oak Ridge) and Livermore. WADs should not be confused with the more general Work Authorizations issued by Headquarters DP to authorize spending.

discretion in adjusting workloads. For example, the contractor is expected to meet the requirements defined in Albuquerque's Program Control Document, even when the PCD changes. Similarly, the contractor must accommodate changes elsewhere in the production complex and respond to the findings of outside auditors. When such changes are expected to have a major financial impact, the contractor can request additional funding or relief from meeting other requirements. In theory, program managers and budget experts at Albuquerque work together to accomplish this for Stockpile Management program. In practice, however, program managers and others impose many changes and requests on the contractor without changing fiscal guidance, expecting the contractor to adjust workloads as necessary. To some extent, this is a negotiating tactic; for example, as DOE pressures the contractor to reduce indirect costs.

In fact, contractors do have some discretion to modify their workloads to accommodate changes in the required scope of work. Of course, they must meet production quantities and schedules and comply with ES&H requirements, and they have greater flexibility in meeting some other requirements. For example, while contractors are expected to maintain facilities and equipment, they are given some leeway in defining the level of preventive and remedial maintenance to provide: they might, for example, shift funds from maintenance to accommodate new production requirements. Similarly, contractors might delay ES&H tasks that have lower priority.

The contractor's discretion is limited by the concerns of DOE managers who oversee functions such as maintenance and ES&H. At one level, those concerns are expressed in the performance evaluation plan, which specifies (for plants only) the emphasis to be given such functions in determining the contractor's award and incentive fees. The fee determination process is designed to encourage a balanced contractor performance in line with DOE's stated priorities. This process helps the contractor know when to absorb new requirements and when to insist on increased funding or a clarification of priorities. At the same time, however, DOE's functional managers limit the contractor's discretion by objecting when the contractor goes too far in reducing the level of effort on agreed tasks. This too can lead to increased funding or a clarification of priorities. Ultimately, the manager of the operations office, as contracting officer, must ensure that disputes are resolved, and negotiate a satisfactory scope of work with the contractor. For the Stockpile Management program, the manager of Albuquerque also can resolve disputes among his own functional managers.

The process described above relies on the contractor to absorb small changes in the scope of work by readjusting workloads in line with known DOE priorities. The process also relies on the contractor to identify changes it cannot accommodate without further guidance or funding.

H. WIDE VARIATIONS AMONG FIELD ACTIVITIES IN RELATIONSHIPS AND PROCESSES

The eight findings outlined in the preceding sections and Chapter II capture the predominant patterns observed within the nuclear weapons complex. Some findings hold throughout the complex. This is true, for example, for the finding that there are too many people in the system. Some of the findings hold generally, with a few notable exceptions. For example, the relationships between Facility Representatives and contractors at Oakland and Savannah River appear to be quite different from those observed at other sites. In the case of other finding there was considerable variation throughout the complex. This is true in particular for ES&H issues and the practices for managing ES&H. Many sites have profound problems with ES&H, while at others ES&H less of a problem, or manifests itself in different ways. It is important to understand these variations, both because of the need to recognize the extent of diversity in circumstances and management practices across the complex, and because some of the exceptional sites provide valuable role models for the rest of the complex. Table III-1 summarizes the general findings, and identifies those sites where they apply and those that are exceptions.

Table III-1. Applicability of Findings to Sites

Findings	Applicable Sites	Exceptions
ES&H Processes Undermining Safety or Operations Processes are consuming huge amounts of resources and are unable to produce needed safety documentation missing or aging authorization bases facilities not operational	Pantex: SARs take years & are deficient; major new facilities idle LANL: SARs for TA-55 & CMR taking years Y12 at Oak Ridge: major effort for restart of uranium operations is drawing intervention from throughout the government	KC: operating under industrial standards/VPP SR: says it "invented ISM" during reactor restarts; has good ES&H system now Sandia: says it has ISM; but believes process is broken (e.g., Price-Anderson fines) LLNL: says it has ISM, completed streamlined review of Pu Operations (Bldg. 332) NTS: says it has ISM in contract
Facility Reps are Undermining GOCO Relationships On-site presence not always commensurate with risks—too many Feds for the job that needs to be done. Some reps are creating confrontational, watchdog practices and in some cases crossing over into operations	All sites affected to some degree Problems are pronounced at Sandia and Los Alamos where site reps have brought Price-Anderson enforcement actions	OAK: Careful training and management defining effective teaming approach. SR: Good working relationship; may be a model for the complex.
Concerns Over the Expertise and Training of People	All sites	None
Too Many People There are more people in the government system than are needed to accomplish missions using properly defined processes	All sites	None
Lack of Line-Staff Clarity Contractors get multiple, sometimes conflicting direction from throughout the government	All sites affected to some degree; Especially true where ES&H is a problem because intervention comes from all quarters	Some Operations Offices discipline chain of command in their roles as contract administrator (OAK and SR)
Two Headquarters HQs and Albuquerque both providing direction on SSM program, ES&H, and facilities investment	All sites	Sites with separate Operations Offices (SR, Y-12, NTS, LLNL) still deal with HQs and Albuquerque in establishing budgets and budget changes

Table III-1. Applicability of Findings to Sites (Continued)

Findings	Applicable Sites	Exceptions
Need Improved DP Integration Weak linkages across DP organizational stovepipes, so organizational elements not acting in concert to set priorities and requirements, and to allocate resources accordingly Program execution often must be coordinated from the field up. Getting work done is harder than it ought to be	All sites are affected when issues arise that cross DP organizational boundaries Significant for labs with both R&D and production missions Significant for sites with ES&H issues having significant SSM programmatic implications: LANL, Pantex, Y-12	None
Weak DOE Integration Lack of coordination at DOE level, especially among DP, NN, and EM. Requirements, policies, and funding are not integrated across these organizations. Data requirements are not integrated Program execution often must be coordinated from the field up. Getting work done is harder than it ought to be	All sites Significant for sites with large EM & DP programs: i.e., LANL, SR, Y-12 Significant for sites with multiple program sponsors: Labs and NTS	Not a major problem at sites dealing mainly with Defense Programs (KC and Pantex)
Weak Requirements-Budget Linkages DOE lacks a PPBS-like system for reconciling requirements and budgets. Non-programmatic requirements (ES&H, safeguards and security, etc.) are not subject to systematic tradeoff analysis	All sites	None
Linkages are made during reviews of proposed budget prior to execution year, but reviews do not forge tight linkages, and linkages often break down as things change during execution	All sites. Disconnects come from SSM program changes, or from new requirements imposed outside of SSM program funding chain of command	Some Operations Offices provide execution linkage in their roles as contract administrator (OAK and SR)

CHAPTER IV
BASELINE REFORMS: REENGINEER CORE PROCESSES

The previous chapters have identified numerous problems associated with the management and organization of Defense Programs. Although many of these problems reflect larger, DOE-wide problems—many aspects of which are beyond the ability of Defense Programs to solve on its own—viewed together, the findings suggest the absence of a clear set of management principles on which the organization and operation of Defense Programs (or DOE) rests.

In this and the following chapter, options for solving the problems found in Defense Programs, and DOE, are proposed. However, before outlining options for reengineering basic management processes and organizations, it is useful to articulate a set of management principles upon which such reengineering should be based. These management principles underscore and are, to some extent, derived from, the problems and findings discussed in the previous chapters. They then lead naturally to the options for reengineering core processes (Section B) and reengineering organizations in Defense Programs (Chapter V). Although an effort has been made to build on the many strengths and successes of the program and its management, the proposals made here do not shrink from suggesting the need for dramatic changes.

A. MANAGEMENT PRINCIPLES

The leadership of Defense Programs and DOE should adopt the following principles, as a means of guiding itself away from some of the problems described earlier in this report, and towards options for solving them.

Principle #1: Have Confidence In The Field—Trust But Verify

Senior DOE leadership must decide to trust the line managers in the field, and resist the temptation to duplicate their capabilities and responsibilities elsewhere. Part of trusting the field means putting people in the field who can be trusted. It also means maintaining an appropriate degree of oversight from headquarters—trust but verify. The difficult balance to achieve is that the legitimate needs of headquarters to be kept informed, and to exercise oversight, must not become sources of micromanagement and mistrust.

Parts of the current management structure in Defense Programs are left over from the reforms of the Watkins era, during which there was a mistrust of the incentives of people in the field. Leaving aside the question of whether this mistrust at one time was warranted, it is not warranted today. Trust is an essential part of any successful management system.

An analogy with the Department of Defense will serve to illustrate this point. The Office of the Secretary of Defense (OSD) is a large organization established, in part, on the premise that the military departments cannot be entirely trusted. That is to say, the military are known to have incentives and objectives that are inconsistent with the broader, "corporate" objectives of the Secretary of Defense. The military services have strong incentives to "buy in" to weapons programs, to "gold plate" (purchase equipment with excessive and expensive capabilities), and to resist cooperating with one another on joint programs. In other words, the incentives they face lead them to suboptimize with respect to corporate objectives. Thus, it makes sense that the OSD management structure is designed to overcome the differing incentives between OSD and the military departments.

In the Department of Energy, the management structure is built upon a similar assumption of mistrust, in this case between headquarters and operations in the field. The problem, however, is that in Defense Programs there is not a significant disconnect between the incentives facing the field and those facing headquarters. While field elements may be parochial at times in their outlook, this is not at all the same as having conflicting objectives. Particularly with respect to ES&H considerations, the objectives of headquarters and the field are not significantly different.[1]

One cannot, of course, ignore the fact that DOE's history with respect to environmental, safety, and health issues has been full of problems, problems for which both the field and headquarters must be held responsible. The admonition here to trust the field must not be interpreted as an endorsement of the view that the field is more "competent" than headquarters, or that headquarters does not have a crucial role to play. The statement to "trust the field" has been qualified by the additional statement "trust but verify" to reinforce the point that each part of the organization has an important, but different, role to play.

Principle #2. Complete The Transition Of ES&H From A Management Overlay To An Embedded Part Of Line Management

The response of Secretary Watkins (1989-1993) to the problems he inherited was to install an ES&H overlay on line management. Once again, whatever the merits of that approach during the Watkins era, it is an approach that is no longer appropriate. There is widespread agreement that ES&H responsibilities, in order to be properly executed, must be embedded in line management. Achieving day-to-day safe operations can only be achieved by the people close to the work, and within a well understood safety management system. This means giving line managers the responsibility and authority they need, holding them accountable, and then letting them do their jobs—with, of

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1 The same may not be true of other parts of DOE. For example, Environmental Management (EM) sites have strong incentives to perpetuate their cleanup missions—so as to protect jobs and income to their region—rather than to clean up a site as quickly and efficiently as possible.

course, appropriate oversight. The Department has been moving in this direction during the O'Leary administration—this is, after all, the essence of Integrated Safety Management—but more needs to be done to complete this transition of authority and accountability to line managers.

Principle #3. Ensure That Long-Term Military Requirements Drive the Stockpile Stewardship and Stockpile Management Programs

Ultimately, everything that is done as part of the Stockpile Stewardship or Stockpile Management programs must be based on meeting military requirements. Whether it is replacing neutron generators (Stockpile Management), designing new hydro experiments (Stockpile Stewardship), or fashioning the Advanced Supercomputing Initiative (ASCI—Stockpile Stewardship) every productive activity can be traced back to the need to meet some current or future warhead requirement. Even very long-term basic research projects can—and must—be justified on the basis of the knowledge they are expected to produce that will help meet the Stockpile Stewardship and Stockpile Management needs of future scientists, engineers, and designers. In the end, anything that must be done to ensure that the laboratory directors can certify each warhead next year, and that their successors will be able to certify each warhead 10 or 20 or 30 years into the future, constitutes a legitimate requirement.

The focus of the Science-Based Stockpile Stewardship program is to maintain the safety and security of the enduring stockpile, and to maintain the technical expertise required to do so far into the future. As a result of this program and related efforts, Defense Programs is well on its way towards transforming the nuclear weapons program into one that fully understands the implications of (a) no production of newly designed weapons, (b) no underground testing, (c) a diminishing stockpile and thus a smaller numbers of warheads and warhead types that need surveillance and maintenance, (d) a temporary bulge in the number of dismantlements, and (e) what it means for a warhead to last "forever."

All these factors underlay not only Science-Based Stockpile Stewardship, but also the *Stockpile Stewardship and Management Plan* (the Green Book) and the Stockpile Life Extension Plan (SLEP). The enunciation of this principle here should not be interpreted as a criticism of the current program; rather, it is an affirmation of the vision and direction the program has taken in the last four years.

Principle #4. Establish Weapons Complex Trusteeship As A Core Mission

Defense Programs' role as trustee of the weapons complex and its people—including the associated responsibilities for managing ES&H concerns—is so central to its stewardship and management responsibilities, and poses such an important challenge, that it should be viewed as a third core responsibility, on a par with the programmatic responsibilities for Stockpile Stewardship and Stockpile Management. The weapons complex is the foundation of DOE's ability to meet its long-term Stockpile Management

and Stockpile Stewardship responsibilities. DOE must continue to maintain and develop the capabilities of its facilities and people, and must meet the demands of the public, Congress, and external regulators for safe, clean operations.

Principle #5. Fewer People In A Streamlined Organization Can Do A Better Job

There are too many people in Defense Programs (and DOE) chasing too little work. If processes are reengineered and fewer people are involved, those remaining people will be able to focus more clearly and efficiently on accomplishing the most important work of the organization. There will be less inclination or opportunity to create work for others, work that is not essential to accomplishing the mission of the organization.

There also are too many people in headquarters, too far away from the "real" work of the organization. The principle that should be followed is: *all functions and positions that do not absolutely need to be performed in headquarters should be performed elsewhere*. Moving people closer to the organization's core work improves their focus and their ability to stay informed. It is particularly crucial to managing and performing operations safely. At the same time, removing people from the center of power leaves them without the temptation of using that proximity to influence events and decisions that often do not genuinely require headquarters intervention.

Teamwork is a much overused phrase and concept, and thus one used reluctantly here. Given that caveat, however, increased management attention to creating and using teams, and encouraging people and organizations to work together more cooperatively, will pay large dividends in Defense Programs. Senior managers should be working together to solve problems and address complex issues, thereby setting an example for the people who work for them. In addition, peer review is a good way to spread best practices and should be employed as a management practice, wherever feasible.

Principle #6. Strong Management Is Needed To Integrate Across Programs And Functions

Integration of the day-to-day program execution in an organization as complex as Defense Programs will always be a challenge. Even in an organization with stable mission priorities, there is no once-and-for-all assignment of responsibilities that will ensure it can run on autopilot. The Defense Programs leadership must reassess and reprioritize missions as events dictate, must attend to relationships across DP organizations to ensure that conflicts are resolved and gaps in coverage do not emerge, and must ensure that headquarters and the field are supporting commonly understood mission priorities. In a static environment, customary working relationships and tested ways of doing business can make this management task manageable. Even in the best of times, however, maintaining a well-integrated organization requires continual nurturing and discipline.

It is not sufficient to have strong managers in charge of individual program and functional areas. There also must be strong managers and management systems to ensure they all are pulling together as a team, and to ensure that all cross-cutting issues are thoroughly addressed. In Defense Programs this means having a strong principal deputy, in addition to the other deputy assistant secretaries. In DOE, this means the Office of the Secretary, to include the Deputy Secretary and the Under Secretary, must install management systems and exercise their authority to mold the assistant secretaries into a more effective team. This includes the establishment of common management information systems and clearly defined, DOE-wide, programming and budgeting development processes and formats.

B. BASELINE REFORMS

Regardless of which options for organizational reform are adopted (see Chapter V), there are several process reforms that are required to address some of the most serious findings presented in earlier chapters. Table IV-1 summarizes the relationship between the principles enunciated above and the baseline reforms, discussed in this section required to address them.

Table IV-1. Principles and Baseline Reforms

Principle	Baseline Reform
1. Trust the Field 2. Complete ES&H Transition (Implement ISM) 5. Fewer People, Streamlined Processes	1. Reengineer ES&H Review and Approval Processes 6. Improve Management of People and Careers
3. Military Requirements Drive Stewardship and Management 5. Fewer People, Streamlined Processes	2. Streamline Stockpile Management 3. Improve the Integration of Stockpile Stewardship 4. Install A Disciplined Resource Allocation Process
4. Establish Complex Trusteeship As A Core Mission	1. Reengineer ES&H Review and Approval Processes 4. Install A Disciplined Resource Allocation Process
6. Strong Management Needed To Integrate Across Programs and Functions	4. Install A Disciplined Resource Allocation Process 5. Install Strong Management

1. Reengineer ES&H Review and Approval Processes

The baseline reforms suggested for ES&H management assume DOE's adoption of Integrated Safety Management principles and practices.

Use single, integrated, field-led Defense Programs reviews of contractors' safety processes and documentation.

Streamline but maintain strong headquarters oversight.

Decide on the appropriate role of Facility Representatives.

a. Single Review

Recall that the root problem with ES&H review and approval processes is that everyone reviews everything until everyone is satisfied. The process is so ad hoc that it can hardly be called a system at all. A solution to this problem is to empower the local DOE field office manager to conduct a single, integrated review without subsequent reviews from higher headquarters. Such a system would work in the following manner.

Step 1: *Assemble a panel.* The operations office manager—or, in the case of Pantex, Kansas City, Sandia, and Los Alamos, the area office manager—assembles a small panel of experts. This panel might be asked to focus narrowly on the approval of a Safety Analysis Report (SAR) or other document related to the authorization basis of a facility, or it might be asked to look at any other set of issues surrounding the establishment of a safety framework or safety management system for a facility.

The composition of the panel and the selection of its members is perhaps the most critical step in the process. It is the responsibility of the local federal manager to assemble a qualified team. The panel would be composed of experts not only from the local federal office, but also from other DOE field offices, Headquarters DP offices, DOE headquarters offices, and private individuals, as appropriate. The desirability of peer review and the spread of best practices should be considered important elements of the review process and the composition of a panel.

Step 2: *Approve the panel.* Prior to beginning its work, the composition of the panel must be approved by the Deputy Assistant Secretary (DAS) for Safety and Operational Oversight (Defense Programs) or by the Assistant Secretary for Defense Programs. This advance concurrence means that the assistant secretary shares the field office manager's confidence in the team's competence and its ability to complete its work. In essence, this concurrence says, *in advance*, that once the panel is satisfied (with the SAR, or authorization basis or safety framework, or whatever task the panel was assigned) so too will the assistant secretary be satisfied. One implication of this step is that the DAS for Safety and Operational Oversight will need to work with field managers to establish a set of guidelines or procedures for field managers to follow in setting up these panels. The appropriate role for the Assistant Secretary for Environment, Safety, and Health (EH) must also be defined.

Step 3: *The panel of experts conducts its work.* Some general processes and procedures by which this work is done may need to be established by the DAS for Safety and Operational Oversight, again, in conjunction with the Assistant Secretary for Environment, Safety, and Health. While working on a panel, the members of the panel work for the panel leader, and by extension the local field manager. They are not there "representing" their parent organization, and they must be empowered by their parent organization to act and make decisions independently. While some team members may wish to use their parent organization as a resource from which to collect information or supporting analyses, no one in that organization, including the panel member's boss or bosses, may instruct them on what positions to take while on a panel. These restrictions

will be reinforced by the fact that no one's parent organization will be in the approval chain for the work and recommendations of the panel.

Step 4: *The panel recommends approval.* When the panel has satisfied itself that all outstanding issues with the contractor have been resolved, it recommends to the local field manager that the authorization basis—or safety framework, or safety management system, or whatever task has been assigned to the panel for review—be approved. (There would, of course, have to be an appeals or minority report procedure built into the panel process.) The local manager must either sign his approval or send it back to the panel for further work, but he must do so without having his staff review the work of the panel. The panel *is* the staff. The signature of the local manager signals his approval of the agreement between DOE and the contractor, and indicates that the field manager will use that agreement as the basis for evaluating or enforcing the contractor's performance.

Step 5: *No additional approvals.* No additional approvals are needed beyond that of the local field office manager. Once he signs, the process is complete. In many cases, it may be appropriate for the panel to conduct periodic site visits and reviews to ensure that the facility continues to operate within the desired safety framework.

b. Headquarters DP Oversight

As indicated above, a major responsibility of the DAS for Safety and Operational Oversight is to establish procedures for setting up panels and for their conduct. It is specifically *not* that office's responsibility to review the work and recommendations of the panels. Of course, this DAS would have the authority to review anything on a "for cause" basis. Another important responsibility of the DAS for Safety and Operational Oversight is to track the status of the authorization base and safety frameworks of all major facilities in Defense Programs. In this way, the DAS can spot facilities that are perhaps moving too slowly, others that have developed problems which require assistance, and issues that appear to be affecting numerous facilities and sites. Since field offices also have—or should have—responsibility for tracking the same information, it must be understood that the Headquarters DP interest is broader, focusing on high level policy and programmatic issues appropriate to the assistant secretary.

An additional responsibility of the DAS for Safety and Operational Oversight would be to provide policy and guidance on periodic reviews for facilities, and perhaps to be the organizing force for those reviews. The staff of the DAS would be kept very small—6-10 people—to help this office resist the temptation to move downstream into the responsibilities of field offices, or upstream into the responsibilities of the Assistant Secretary for Environment, Safety and Health. The precise delineation of roles between this DAS and the Assistant Secretary for Environment, Safety, and Health would need to be worked out.

c. Facility Representatives

There is widespread agreement that the role of Facility Representatives is to act as the eyes and ears of the area or operations office manager at a facility, and that this is an important and appropriate role for federal managers to play. However, there is little uniformity between sites in the actual conduct of their work. The activities of Facility Representatives range from a constructive, teamwork, oversight approach at Lawrence Livermore National Laboratory (Oakland Operations Office), to a contentious, detailed involvement in day-to-day activities approach at Los Alamos National Laboratory (Los Alamos Area Office). The former approach seems the more appropriate one: the role of the federal government is to satisfy itself that appropriate safety management systems are in place and are being followed, not to second guess, micromanage, or usurp the authority, responsibility, and accountability of the contractor responsible for the facility. It is important for DOE to develop a common understanding of the roles, responsibilities, minimum skills and training, and conduct of Facility Representatives.

2. Streamline Stockpile Management

Streamline processes and reduce the number of people (reengineer).

Overall, the management structure for the Stockpile Management program is in good shape. Leaving aside the concerns and problems raised by ES&H processes and management procedures, the actual programmatic side of Stockpile Management appears to be working well. The development of the *Stockpile Stewardship and Management Plan,* the development of the Stockpile Life Extension Program (SLEP), the non-nuclear reconfiguration of the complex, and numerous other initiatives have helped immensely in reorienting and strengthening the program. Specifically, the management and technical problems associated with the end of underground nuclear testing, large reductions in the numbers of warheads in the inventory requiring maintenance and surveillance, the implications of having to make warheads last "forever," and the end of new weapons designs for production, are much improved over the past two to three years.

While the remaining management problems are not on a par with those having to do with ES&H and facilities management, there is still room for improvement. In particular, Defense Programs needs to make SLEP a real program and not simply a planning concept, and it needs to continue making the Green Book less of a report and more of a plan against which people and organizations can be held accountable. Finally, the organization, positions, and staffing of the Stockpile Management program should be scrubbed, along with the rest of Defense Programs, to ensure that staffs are appropriately lean, and that only those functions and positions which must be performed in Headquarters DP (versus the field) remain.

3. Improve the Integration of Stockpile Stewardship

Develop improved integrated top level strategic planning.

- *Improve the linkages between Stockpile Stewardship and Stockpile Management.*
- *Prepare an annual high-level Defense Programs R&D plan.*
- *Integrate the programs of the three national weapons laboratories.*

The current management structure for the Stockpile Stewardship program, in which the Office of Research and Development (DP-10) provides program direction directly to the national laboratories, is appropriate. No changes need to be made in this basic structure. However, there are three things that need to be done to improve the management of this program. All are associated with the need to provide a better answer to the question: What are we getting for the 1.8 billion dollars spent every year in core research?

First, efforts under way to improve the linkages between the Stockpile Stewardship and Stockpile Management programs should be strengthened. This includes efforts to improve coordination between the Office of Research and Development and the Office of Military Applications and Stockpile Management (DP-20). The Stockpile Life Extension Program should be of considerable help if it is taken seriously as a program and not treated simply as a concept or a slogan.

Second, Defense Programs needs a single, annual, high-level R&D plan. While the inclusion in the most recent Green Book of the contributions of the R&D program to the overall program is an important step forward, it is not sufficient. All this does is to provide, for any part of the overall Defense Programs mission, information on how R&D contributes to the accomplishment of certain objectives. While useful and important, it is not a substitute for what a real R&D plan needs to provide, which is a comprehensive, top-down plan that lays out in appropriate and enforceable detail the goals and objectives of the R&D program. (By "enforceable" is meant that it is possible to hold the laboratories accountable for the commitments they make in the plan.)

Third, and quite clearly related to the second point, more needs to be done to integrate the programs of the three national weapons laboratories into a single, cohesive research program. This must not be interpreted as a call to diminish the appropriate degree of overlap and flexibility in the programs of the three laboratories. However, every effort must be made to ensure that each laboratory is contributing fully and appropriately to the larger goals of the nuclear weapons program. Laboratory managers are frankly dismissive of headquarters efforts to characterize the sum of the three laboratories' programs as a single or integrated program. For example, the "physics program" as understood by headquarters is understood by laboratory managers to be nothing more than a collection of all the things that look like physics that some headquarters staff person has gleaned out of the programs of each of the laboratories.

If the Office of Research and Development (DP-10) is to provide comprehensive guidance and oversight of the entire R&D program—to ensure that the program has the right goals, that it is organized, planned, and programmed to meet those goals, and that there is no unnecessary overlap—then it must take a more structured approach to strategic planning and management.

4. Install A Disciplined Resource Allocation Process

Strengthen the connection between requirements and budgets.

Improve infrastructure planning and investment.

The Department of Energy needs an integrated system for planning, programming, and budgeting that is responsive to the overall objectives of the Department, as determined by the Secretary. Such a system must force all "requirements" that have resource (budgetary) implications to be weighed against all other such requirements so they can be prioritized. While many, if not most, of these decisions can be made at the assistant secretary level or below, there are a number of issues that require a Department-wide perspective. There are also issues that, for some reason, cannot be resolved at lower levels, and so must be pushed up the chain for someone above the level of assistant secretary to decide.

While the Planning, Programming, and Budgeting System (PPBS) used by the Department of Defense is far from perfect, it could serve as a model for the construction of a similar system at DOE. Its key feature—one which should be adopted by DOE—is a system in which the Comptroller is "joined at the hip" with the Deputy Secretary. Together they run a highly disciplined process—built around common management information systems, common programming and budgeting processes, and multi-year programming and budgeting—that ensures all major decisions are made within the formal resource allocation (i.e., planning, programming, and budgeting) process.

As part of establishing a formal resource allocation process, DOE must establish improved methods for carrying out its Weapons Complex Trusteeship responsibilities. It must ensure that adequate investments are being made in the people, facilities, infrastructure, and land within its domain. Insisting that the laboratories and plants decide for themselves how to divide annual budget resources between current operations and long-term investments is short-sighted and self-defeating. There are few organizations, public or private, that will not short-change the future to pay for the present when faced with very tight budget constraints and pressing operational (production) goals.

This tension is exacerbated by competition and a lack of coordination between the program areas in DOE, which are reluctant to pay for non-programmatic investments that other programs might conceivably pay for, or that other programs might benefit from without having to pay their "fair" share (e.g., roads, power, sewers). DOE's long-term corporate objectives with respect to Weapons Complex Trusteeship must be given a

higher priority by establishing and protecting investment accounts that will make DOE a better steward of the public's infrastructure and land resources.

5. Install Strong Management

The principal deputy assistant secretary in Defense Programs will be responsible for running DP headquarters and integrating policy and oversight decisions.

There should be one principal deputy assistant secretary in Defense Programs whose responsibility is to manage DP on a day-to-day basis in order to achieve the vision and goals of the assistant secretary. This person will be the staff and issues director for Defense Programs, and must have a strong technical and management background, rooted in the nuclear weapons program.

This job should be the highest non-political job in the weapons program. Candidates should be very senior individuals with extensive field experience in the government, a laboratory, and/or the production complex. This person would address the challenges of linking the strategic management system with program execution, integrate and resolve issues as they arise across missions or organizations, and discipline the staff to ensure that Defense Programs speaks with a single voice on programmatic and regulatory issues. This person also would provide continuity between political appointees.

An important role would be to close the gap within headquarters between the senior leadership and the staff—a problem that has been widely reported throughout the complex. The principal deputy would be the individual to whom the field can go so as to coordinate the government's support and to resolve discrepancies between regulatory requirements, directed workload, and funding. The principal deputy would complement the assistant secretary, focusing on internal management, while the assistant secretary focuses on strategic policy, planning, and management issues and conducts external relations with DOE, the Congress, and the Pentagon.

6. Improve the Management of People and Their Careers

Reevaluate training, education, and career development programs.

Rotate large numbers of field people, including M&O contractors, through headquarters.

Although this study did not focus on the skills and career development programs of Defense Programs employees, it did uncover widespread concern among senior managers on these issues. At the same time, the study did not see evidence of a strong and effective system for ensuring that DP employees receive the training, education, and career development assistance they need. In other words, while everyone is complaining, it is not clear what is being done about the problem.

The approach to these issues appears to stand in sharp contrast with the emphasis given these matters by—to mention just one example—Defense Programs' principal customer, the military. It is recommended that a serious, top-level review be conducted to ensure that Defense Programs, and DOE, are able to sustain the highly skilled work force required to successfully complete their mission. This is a critical element of Defense Programs'—and DOE's—Weapons Complex Trusteeship responsibilities.

In most military and private sector organizations, headquarters elements are staffed with people who spend a considerable portion of their careers in the field. By rotating through headquarters during the course of their careers, that staff is able to stay in better touch with its operations, as well as provide better career training and development for its managers and executives. A good example of this in the military is the Joint Chiefs of Staff, where the large staff consists of military personnel on two to three year assignments. They typically come from operational assignments in the field and then head back to field assignments when they complete their Joint Staff assignment.

Defense Programs should adopt the same principle by reserving large numbers of headquarters positions for DOE field employees and M&O contractors, particularly from the non-profit national laboratories. (The latter might serve under some sort of Intergovernmental Personnel Agreement—IPA—status.) At the same time, people whose home assignment is in headquarters should be rotated out to the field on a regular basis.

CHAPTER V
OPTIONS FOR ORGANIZATIONAL REENGINEERING

This chapter presents four options for reengineering the organizational structure of Defense Programs. These options are designed to address the major organizational concerns identified in this review. They are consistent with—and indeed would reinforce—the process reforms outlined in Chapter IV. Each is structured to serve as guidance that the Assistant Secretary for Defense Programs can provide to a reengineering team.

Sections A and B provide general guidance and some organizational principles that apply to each of the four options. Section C outlines the first two options, each of which defines a new relationship between Headquarters Defense Programs and the Albuquerque Operations Office. The first option would retain Albuquerque, and reengineer it to make it the single operational focus for Stockpile Management and many Weapons Complex Trusteeship responsibilities. Any operational activities within headquarters would be transferred to Albuquerque under this option. The second option would consolidate Albuquerque with headquarters; all organizational elements, including area offices, would report directly to headquarters. The reasoning underlying each alternative is presented, along with suggested guidance for implementing each one. The advantages and disadvantages of each option are presented and discussed.

Section D provides a short parallel treatment for two additional options focusing on field-headquarters reporting relationships. These options address the long-standing DOE concerns over the relationships among operations offices, the sponsoring secretariats in headquarters, and headquarters functional activities. Option III would have each operations office report to its primary sponsoring secretariat, rather than the Field Management organization. Option IV would have all operations offices instead report to an under secretary and chief operating officer who would be responsible for all field management activities.

A. COMMON ASSUMPTIONS AND GUIDANCE

A common set of assumptions and process steps form the basis for each of the options outlined in this section. The proposed general guidance is as follows:

1. Implement the Baseline Process Reforms

All organizational reengineering options assume the adoption of the baseline process reengineering reforms presented in Chapter IV. As a reminder, these are:

a. Reengineer ES&H review and approval processes
b. Streamline Stockpile Management
c. Improve the integration of Stockpile Stewardship
d. Install a disciplined resource allocation process
e. Install strong management
f. Improve the management of people and their careers.

2. ASDP Establish A Small Team To Reengineer DP

The Assistant Secretary for Defense Programs, with the assistance of senior DOE leadership, should assemble a small team of senior people intimately familiar with Defense Programs to develop a comprehensive reengineering plan. The reengineering of both headquarters and field offices must include a definition of the organizational elements (the "boxes" on an organization chart) and the responsibilities to be assigned each of those elements. Then, each position in each organization must be defined, including a position description. Finally, every effort must be made to fill each position with someone highly qualified for that job.

Because the total number of positions in the newly reengineered organization will be substantially fewer than in the current one, buyouts, other incentives, and additional methods may need to be used aggressively to reduce the number of people left without a position. The most critical point is that processes and organizations be reengineered first, in order to meet the needs of the program. Although the reduction in the number of people and positions required will be substantial, this reduction should be a fallout of the reengineering effort, not the starting point.

B. ORGANIZATIONAL PRINCIPLES

In developing and assessing the following options, reliance was placed on the findings of this review, the management process principles outlined in Chapter IV, and several organizational principles. The following organizational principles provide the general guidance used in developing the options presented in this chapter.

1. Functions and positions that do not have to be performed in headquarters should be transferred to the field.

This principle has two facets. First, to the greatest degree possible, people should be assigned to positions that are as close to the "real" work of Defense Programs as possible; i.e., as close to the field as possible. Second, it is not a good idea to allow people to work in close proximity to the center of power unless they absolutely need to. Thus, all headquarters organizations will be scrubbed so that the only remaining positions are those which absolutely must be performed in headquarters.

2. *Implement a world-class organizational model for ES&H management: Establish a Deputy Assistant Secretary for Safety and Operational Oversight, with a small staff to provide policy and oversight.*

The office of this DAS will have a small staff (6-10 people) to provide high-level policy and oversight for ES&H and other facilities operations issues. Its primary role will be to oversee the development of processes for use by line managers in the field to ensure sound ES&H operations. This office specifically will not review or have approval authority over ES&H documents and other approvals that are the responsibility of field line managers. It will provide expertise and assistance as requested by the field, or as deemed necessary by the assistant secretary. It also will provide the formal point of contact between the field and the office of the Assistant Secretary for Environment, Safety, and Health. All remaining ES&H functions in Defense Programs will be transferred to the field.

3. *Maintain DOE staff core competencies: Reduce the reliance on support service contractors.*

Support service contractors should be severely limited, except for "exempt" activities. Exempt activities are those services which are purely administrative or support in nature, and which are commonly subcontracted out by government organizations. Examples may include some data processing, janitorial and other maintenance support activities, and certain security activities.

The process of reducing support service contractors is already under way. Important as it is, however, it must not be overdone. There are legitimate needs for contractors, and managers who need and use support service contractors responsibly should not be handicapped.

4. *Establish an organizational focal point to manage the workload associated with DOE headquarters, Congress, the White House, and other overseers.*

There are numerous functions that must be performed in Washington simply to meet the demands of important customers and masters. While it may seem that the demands placed on Defense Programs by these outsiders are excessive, they must be met, whether or not they can be reduced. On the other hand, it should not be assumed that all things have to remain the way they are. In some cases, by reducing the number of people at headquarters, there will be fewer demands on headquarters—sometimes supply creates its own demand. Furthermore, consideration should be given to moving those functions which could legitimately be performed by field elements. For example, some Defense Nuclear Facilities Safety Board inquiries that currently come to headquarters can be redirected to the field.

5. *Build organizational competence and unity by increasing the flow of field, and management and operations, personnel through headquarters positions, and vice versa.*

Not only should field personnel rotate to headquarters for two to three year assignments, but headquarters personnel also should rotate to the field. Legislative relief may be required in order to increase the number of positions that could be filled by M&O contractors without violating conflict of interest and other restrictions. Consideration should be given to setting a high target—perhaps 50 percent for the number of headquarters positions filled by people rotating through from the field.

6. *Streamline by reducing headquarters and field staffing—federal employees and contractors—by at least 20-30 percent.*

This is a ballpark figure of what reengineering is likely to produce in the way of staff reductions. It is important to remember, though, that the goal is to reengineer; the staff reductions are a fallout. *It is critically important that Defense Programs not simply cut the size of the staff and then figure out how to do the work the same old way, with fewer people.*

C. OPTIONS FOR HEADQUARTERS AND FIELD OFFICE STRUCTURES

The process reengineering options outlined in Chapter IV clarify many of the roles and responsibilities issues that were identified in this study. As these process changes are made, Defense Programs should delineate the roles of headquarters versus operations offices, particularly between headquarters and Albuquerque. Two broad options are discussed. The first would focus headquarters on the kinds of top management tasks described in Chapter I, and move all operational tasks for Stockpile Management and Weapons Complex Trusteeship to the operations offices. Albuquerque would be the primary recipient of these functions because of the historical role it has played in these areas. The second option would move in the opposite direction: operational tasks presently done in Albuquerque would be shifted to headquarters, and the two organizations would, in effect, be merged.

Each option addresses the problems of turf overlaps and redundancy that were raised in this review, and each represents a feasible solution. They provide very different end states, and the merits and potential problems need to be weighed carefully before either is implemented. These options are described in turn, and then assessed.

1. Option I: Establish the Single Operational Focus for Stockpile Management and Weapons Complex Trusteeship In Albuquerque

The goal of Option I is to create a headquarters organization that is tightly focused on top management tasks, and to move all operational activities into the field, as close to the actual work as possible. This option has the most impact on those organizations in Defense Programs whose work relates to facilities operations or entails the review and

approval of safety processes and documentation. Remaining activities would focus on shaping and guiding the organization (strategic management, budget guidance, policy guidance, and process oversight), and on managing external relationships with the DoD customer, Congress, federal regulatory organizations, and other elements of DOE. The kinds of actions required to implement this option are summarized in Table V-1.

Table V-1. Summary of Reengineering Guidance for Option I

Management Area	Guidance
DP Leadership and Integration	DP-2: There will be a single principal deputy assistant secretary in DP responsible to the assistant secretary for integrating policy and oversight decisions, managing external demands on the organization, and disciplining staff participation in management processes and decision making. DP- 3: There will be a deputy assistant secretary for safety and operational oversight, with a small staff.
Stockpile Stewardship (DP-10)	Focus on strategic management of the Stockpile Stewardship program, and on turning the three laboratory programs into an integrated core research program.
Stockpile Management (DP-20)	DP-21: Some functions can be moved to Albuquerque/field. DP-22: Smaller, with focus on strategic management for Stockpile Management, and coordinating with the Department of Defense on military requirements.
Complex Trusteeship (DP-10, DP-20, DP-40)	DP-13: Focus on strategic management of Weapons Complex Trusteeship responsibility; operational responsibilities for facilities and ES&H will be transferred to the field. DP-24: Headquarters functions for strategic management of the complex will be transferred to DP-22; operational functions transferred to Albuquerque, or area or site offices. DP-40: Operational functions, particularly relating to construction management, should be transferred to the field. DP-45: Move operational functions relating to technical support for ES&H matters to Albuquerque/field. Retain limited slots for headquarters roles such as NEPA document coordination, etc., and assign these to Deputy for Safety & Operational Oversight.
Major Initiatives	DP-50, DP-60: Retain core leadership for major program initiatives such as ASCI, APT, CLWR, and NIF in headquarters. Streamline to place operational tasks in field as appropriate.
Field Offices	Must be reengineered in tandem with Headquarters DP. Reduce staffing levels to complement headquarters reductions.

The table includes for emphasis two baseline changes proposed in Chapter IV for Defense Programs' senior leadership. The first is the designation of a principal deputy for management. The person filling the principal deputy's position would be someone with extensive experience in the design and/or production of nuclear weapons; i.e., someone from the nuclear weapons complex. This deputy would be responsible for integrating across DP's core responsibility areas, managing external demands on the staff, and disciplining staff participation on processes and decisions. The second baseline change is the designation of a deputy for safety and operational oversight, who, with a limited staff, would ensure Integrated Safety Management and good teamwork practices are in place and used properly by the field offices.

Stockpile Stewardship organizations (in the Office of Research and Development, DP-10) would be reviewed for consistency with their responsibility for strategic management of Stockpile Stewardship programs. It is not anticipated that significant organizational changes would be required in this area.

Headquarters has been deeply involved in operational matters in the Stockpile Management area, particularly in the organizations responsible for site operations (DP-24) and, to a lesser extent, nuclear explosive safety (DP-21). Most of the activities in DP-24, and some of those in DP-21, would be transferred to the field under Option I. The only facilities responsibilities remaining in the Office of Military Application and Stockpile Management (DP-20) would be for strategic management of the complex, addressing such broad-gauged issues as whether Stockpile Management and military requirements can be met in the future with the facilities currently in place and planned. The addition of this strategic management responsibility to the Office of Nuclear Weapons Management (DP-22) may require that two or three positions from DP-24 be moved to DP-22.

Many of the technical support activities performed in the Office of Technical and Environmental Support (DP-45) and the construction management activities performed elsewhere in the Office of Program Support (DP-40) would be transferred to the field. Many of these are operational activities that often duplicate capabilities in the field, or simply do not need to be performed in headquarters.

There are often good reasons why a special projects office—e.g., ASCI, NIF, tritium—should be located in headquarters. The reengineering team should satisfy itself not only that the current roster of projects do indeed require a headquarters presence, but also that all of the positions currently maintained by those offices in headquarters do in fact need to be performed from headquarters.

All operations, area, and site offices with Defense Programs missions must also be reengineered at the same time. This study was not extensive enough, however, to suggest the details of how the field should be reengineered. Nonetheless, there is widespread agreement among field managers that significant reductions in the size of headquarters staffs would allow for significant reductions in the size of their staffs.

2. Option II: Consolidate Headquarters and the Albuquerque Operations Office

a. Main Features of Option II

The goal of the second option is to eliminate any jurisdictional ambiguity and overlap in operational roles between headquarters and Albuquerque by merging the two organizations. Where the focus in Option I was to address these problems by clearly delineating and separating top management functions from operational functions, here the goal is to create a tightly coupled, single organization within which these issues would be resolved.

The reengineering actions entailed by this option are summarized in Table V-2. The actions relating to DP leadership, Stockpile Stewardship, and major initiatives are the same under Option II as under Option I. Option II entails two major consolidations. First, the organizations responsible for Stockpile Management would be merged. A new organization would be built from Albuquerque's Office of National Defense Programs

Table V-2. Summary of Reengineering Guidance for Option II*

Responsibility Area	Reengineering Action
DP Leadership and Integration	DP-2: There will be a single principal deputy assistant secretary in DP responsible for integrating policy and oversight decisions, managing external demands on the organization, and disciplining staff participation in management processes and decision-making. DP- 3: There will be a Deputy Assistant Secretary for Safety and Operational Oversight, with a small staff.
Stockpile Stewardship (DP-10)	Focus on strategic management of the stewardship program, and turning the three laboratory programs into an integrated core research program.
Stockpile Management (DP-20)	*The Office of National Defense Programs (ONDP) at Albuquerque is merged with the headquarters DP-20 organization. The new organization reports to DP-20.*
Complex Trusteeship (DP-10, DP-20, DP-40)	*The Office of Technical Management Operations (OTMO) at Albuquerque is merged with DP-24, DP-45, and DP-13. The new organization reports to the DAS for Safety and Operational Oversight.*
Major Initiatives	DP-50, DP-60: Retain core leadership in headquarters. Streamline as appropriate.
Field Offices	Must be reengineered in tandem with Headquarters DP. Reduce staffing levels to complement headquarters reductions.

* Guidance in *italics* differs from the guidance for Option I. The remaining guidance is the same for both options. (See Table V-1.)

(ONDP) and headquarters' Office of Military Application and Stockpile Management (DP-20). This combined organization would report to DP-20 in headquarters.

The second major consolidation would merge the organizations responsible for facilities, operations, and ES&H. The Albuquerque Office of Technical Management Operations (OTMO) would be combined with the headquarters offices of the Office of Research, Development, and Testing Facilities (DP-13), DP-24, and DP-45, all of which have responsibilities for facilities, operations, and ES&H. The resulting organization would report to the Deputy Assistant Secretary for Safety and Operational Oversight. The remaining parts of Albuquerque would be either merged with Defense Programs offices in Germantown, or assigned to some other DOE headquarters office.

Under this option, Albuquerque would cease to operate as an operations office; nevertheless, several current organizations would remain in Albuquerque operating as a "business and operations support center." Albuquerque is a major business center for the complex, providing contracting, finance, and accounting services. This review did not examine these business functions; nevertheless, the DOE reengineering team will need to consider whether they should stay in Albuquerque as they are, should be reengineered, or should be consolidated with comparable headquarters activities under the Office of Program Support (DP-40). The Transportation and Safeguards Division would remain, and its operations would be unchanged.

b. Field Reporting Relationships

Consolidating headquarters and the Albuquerque Operations Office will necessitate a realignment of field reporting relationships for the area offices that currently report to Albuquerque. The following reporting relationships would result under this option:

- *The Amarillo and Kansas City Area Offices will report directly to the Office of Military Application and Stockpile Management (DP-20).*
- *The Los Alamos and Kirtland Area Offices will report directly to the Office of Research and Development (DP-10).*

c. Location(s) of the Merged Organization

There are two variants for locating the merged organizations created under Option II. The first is to locate operational activities of the newly created organizations in Albuquerque. In this case the resulting organization looks much like the organization outlined in Option I. Top management activities would be performed in Washington and operational activities would be done in Albuquerque. The main difference from Option I is that each activity residing in Albuquerque would be a component of an integrated headquarters organization, and would report directly to a deputy assistant secretary in headquarters.

The second variant is to create a virtual organization with the people remaining in their current locations. In other words, the merger of Albuquerque and Germantown still takes place, Albuquerque's Office of National Defense Programs (ONDP) and Office of Technical Management Operations (OTMO) still report to Headquarters DP, and Albuquerque is no longer an operations office. But no attempt is made to remove people from the center of power, or to move them closer to the work of the organization. In this case, there would continue to be a mix of people performing top management and operational functions in both headquarters and Albuquerque. The difference from today's organization is that people in both locations would report to the same boss, who would be responsible for coordinating their work.

3. Assessment of Options I and II

Options I and II address the principal organizational concerns raised in this study. Both remove the ambiguities and overlaps in the roles of headquarters and Albuquerque. The first option does this by clearly distingusihing the top management roles of headquarters from the operational roles played by Albuquerque, and moving operational functions in headquarters to Albuquerque. The second option does this by consolidating headquarters and Albuquerque into a single organization, thus creating a centralized organization for both top management functions and operations. Both assume that the adoption of the baseline reforms has resulted in improved integration of the Stockpile Stewardship and Stockpile Management programs by the Office of Research and Development (DP-10) and the Office of Military Application and Stockpile Management (DP-20). From this standpoint, both options have much to recommend them over the status quo organizational structure.

The two options have significant differences, however, and each has important strengths and some weaknesses. To provide a perspective, each option is assessed in terms of its consistency with and support for the management principals enunciated in Chapter IV and earlier in this chapter. A brief summary of this assessment is provided in Table V-3.

The first option sharply focuses operational control for Stockpile Management and Weapons Complex Trusteeship in the field. The main advantage of this is that it retains Albuquerque's traditional core competency for operational control of production operations and for weapons complex investments. Indeed, many officials have argued that one key to the success of the nuclear program over the years has been the physical separation of field operations from headquarters. In recent years, this relationship has been eroded as headquarters has increasingly become involved in operational issues. This option would reverse this trend in day-to-day operational involvement.

At the same time, the proposed baseline process reforms will strengthen headquarters' strategic management processes sufficiently that it will retain improved overall direction of the program in all three mission areas. The option is not a return to the good old days of hands-off management, but rather a modern, corporate style of headquarters strategic management coupled with empowered field-level operations.

Table V-3. Assessment of the Options

Management Principles	Option I Albuquerque the Operational Focus	Option II Consolidate Albuquerque and Headquarters
Process Principles:		
Trust the Field (But Verify)	+++ consistent with corporate management models	- - - This model creates a highly centralized management structure
Transition ES&H (implement ISM and teaming)	+++ consistent with world class ES&H model	- - The centralized management model is not consistent with world class ES&H model
Shift to Enduring Stockpile Culture	+ streamlined roles and responsibilities contribute to ongoing progress	+ Streamlined roles and responsibilities contribute to ongoing progress
Stockpile Management Drives Stewardship	+ Streamlined roles and responsibilities contribute to ongoing progress	++ Centralization may provide greater HQ control and ability to integrate programs
Fewer People in Streamlined Processes	++ improved delineation of responsibilities	+ Consolidating promotes development of seamless processes
Strong Management for Integration	+ Principal DAS will improve program integration	++ Principal DAS will improve program integration; centralization may bring greater control
Organizational Principles Operations Should be in the Field	+++ option designed for this	- - blurs organizational distinction between top management and ops.
Corporate Model for ES&H	+++ option designed for this	- - - the centralized management model is not consistent with world class ES&H model
Reduce Support Service Contractors	+ consistent with this goal	+ consistent with this goal
Establish Focal Point in HQ to Manage External Demands	+++ moving people to the field will limit headquarters work on external demands	+++ if ops moved to Albuquerque - - if people remain in HQ
Increase Flow of Field Personnel Through Headquarters	+ consistent with this goal	+ consistent with this goal
Reduce Defense Programs Staff by 20 to 30 percent	+++ consistent with this goal	+++ consistent with this goal
Other Considerations		
Transition Costs to DP and Staff	- - moves would be costly	- - - could destroy Albuquerque core competencies

Key: Option supports principle: +++ strongly, ++ moderately, + weakly
Option undermines principle: - - - strongly, - - moderately, - weakly

There are three potential disadvantages of the first option. The first is that by maintaining separate headquarters and Albuquerque organizations, it may limit Defense Programs' ability to reengineer processes into a single seamless structure. Additional process steps inevitably will be required to manage the interfaces between headquarters and Albuquerque. Arguably, this will make it harder, not easier, to integrate the Stockpile Stewardship and Stockpile Management programs. Second, this option will entail significant transition costs for the government and its people, since it will require a significant number of headquarters people to move to Albuquerque. Third, consideration must be given to the question of whether the transfer of large numbers of people from headquarters to Albuquerque would result in a diminution of headquarters' ability to control the program. This concern arises from the fact that the Operations Office manager reports to the head of Field Management, not the Assistant Secretary for Defense Programs. The counter to this argument is that with over 80 percent of the funding for Albuquerque coming from Defense Programs, the assistant secretary does not lack for influence there. A second counter is that the actual working relationships between Albuquerque and Headquarters DP are already quite good.

The main effect of Option II is that it centralizes, in headquarters, control over the strategic management processes and operational control over Stockpile Stewardship, Stockpile Management, and Weapons Complex Trusteeship. This has the advantage of providing headquarters with a broadened span of control over all three responsibility areas, and fostering a more tightly integrated approach. This option would unify the chains of command for Stockpile Stewardship, Stockpile Management, and Weapons Complex Trusteeship, since all field activities would report to headquarters. It would thus remove the traditional split in reporting relationships described under Option I.

A second advantage of Option II is that consolidating headquarters and Albuquerque fosters the reengineering of management processes, permitting processes to be designed without the traditional headquarters-field interfaces. This might contribute to process streamlining in the areas of Stockpile Management and Weapons Complex Trusteeship, where there have been extensive burdens associated with coordination between headquarters and Albuquerque. A third advantage of this approach is that all the field activities would report to and advise headquarters directly on long-term strategies for the complex. This should promote a coherent, complex-wide investment approach, and thus diminish some of the counter-productive competitive pressures within the complex.

There are some important disadvantages to this centralized approach as well. First, in eliminating Albuquerque as in independent operations office, this option could, in the process, destroy Albuquerque's traditional core competency for operational control of the weapons complex and its operations. Second, this option creates the risk that headquarters staff will drift into operational matters even more deeply than today. On both counts, there are concerns that breaking down the traditional separation between headquarters and operations could politicize operational decision making and slow the

responsiveness of the organization to operational needs, thereby undermining the long-term effectiveness of the organization. Finally, if people are moved to Albuquerque, this option would entail some of the same transitional costs as described for Option I above. The variant of this option, which creates a virtual organization, and initially retains most people in their current locations, would mitigate much of this transition cost.

Under Option II, the issue of the diminution of headquarters authority that might arise if large numbers of people are transferred to Albuquerque becomes moot. Regardless of whether people and positions stay where they are, or move, everyone in Albuquerque would report directly to headquarters. Arguably, this increases Headquarters DP control, relative to the current arrangements.

D. OPTIONS FOR OPERATIONS OFFICE REPORTING RELATIONSHIPS

The second class of options addresses the reporting relationships between operations offices and headquarters. Currently, the operations offices report to the Field Management office, which is headed by an associate deputy secretary. This reporting relationship provides a weak framework for vertically integrating the operations offices with their sponsoring secretariats, and for integrating across DOE's program-sponsoring secretariats and DOE's functional secretariats. Option III would emphasize strengthening the vertical relationships between the operations offices and their dominant headquarters sponsor, by having the operations offices report directly to their dominant sponsor. Option IV emphasizes improved integration across DOE by having operations offices report to a strong chief operating officer who is one of the top officials in the Department.

It is noteworthy that every reporting relationship that is discussed here—the status quo, Option III, and Option IV—have been tried by DOE. Each has strengths and weaknesses, and none is clearly superior to the others. At the field level, this review found considerable support for Option IV, because operations officers would like to be able to deal with a single senior official who can set uniform policy and resolve conflicts that arise across sponsoring secretariats, or between sponsors and the functional secretariats who set policy for ES&H, safeguards and security, and other business practices.

The main features of the options are described and then the options are assessed.

1. Option III: Operations Offices Report to their Dominant Assistant Secretary

Under this option, each of the operations offices would officially report to the dominant secretariat. For the operations offices involved with the nuclear weapons complex, the assignment would be as follows:

- Albuquerque — Defense Programs
- Nevada — Defense Programs
- Oakland — Defense Programs

- Oak Ridge — Energy Research or Environmental Management
- Savannah River — Environmental Management

This option would tighten the relationship between Defense Programs and its principal stewardship and management facilities operators. To a large degree, the reporting relationships under this option reflect current working relationships, since typically each of the predominant sponsoring secretariats already acts as the overall landlord for its sites. Thus, for example, Environmental Management is already the overall landlord for Savannah River, and so the operations office manager deals primarily with EM on many facilities and ES&H matters. Defense Programs has responsibility for its facilities within these sites, and coordinates its activities with the operations office and Environmental Management.

As described in Chapter III, the integration of programs and policies at the headquarters level has not been satisfactory, particularly from the field's perspective. Many in the field will argue that Option III is the least effective for promoting an integrated headquarters approach to field management, because the headquarters secretariats are so fragmented. A mechanism to facilitate integration is therefore proposed for this option, in the form of a headquarters Management Council. It would include all of the DOE assistant secretaries with programmatic or functional responsibilities for weapons complex facilities, the operations office managers, and the Comptroller, and would be chaired by the Deputy Secretary of Energy. The purpose of the council would be to provide consistent strategic direction for the complex, and improve the integration of program execution at the headquarters level.

2. Option IV: Operations Offices Report To Chief Operating Officer (COO)

The second approach for improving integration at the headquarters level is to create a chief operating officer who manages the facilities involved in the weapons complex for their sponsoring secretariats. The COO would in effect own the facilities and thus take on the complex trusteeship role for the Department. Program customers would use their appropriated funds to purchase the products and services they need from the operations offices. For example, to acquire tritium and tritium bottling services, Defense Programs would agree to pay an annual amount for the purchase of tritium and tritium services from Savannah River. It would have no responsibilities for the operation of the Savannah River Site. Although program assistant secretaries would retain small staffs with facilities and operations expertise, the purpose of these staffs would be to ensure that the assistant secretary was a smart and informed customer, not to provide direction or exercise control. In short, Defense Programs would retain its responsibility for Stockpile Stewardship and Stockpile Management, but would be relieved of its responsibility for Weapons Complex Trusteeship.

It is expected that the chief operating officer would be a senior member of the secretary's staff, most likely an under secretary. Operations office managers would report

directly to this COO on all matters relating to the complex, while still responding to their sponsoring secretariats on programmatic matters. It would become the responsibility of each operations office not only to deliver the agreed-upon products and services, but also to ensure that it possesses the facilities and infrastructure necessary to deliver those products and services.

The program assistant secretaries would have no responsibility for ES&H matters at any operating facility. These responsibilities would be invested in the line managers—in the operations office managers reporting directly to the COO at DOE headquarters. This includes most dealings with the Defense Nuclear Facilities Safety Board and other external regulators. In addition, the responsibility for all other non-programmatic matters—contracting, financial management, safeguards and security, personnel, etc.—would become the responsibility of the operations office managers, responsible to the COO. The assistant secretaries with functional responsibilities, such as Environment, Safety, and Health or Human Resources, along with the Comptroller and other functional organizations, would serve as staff to the COO in that official's oversight of the operations offices.

The one exception to this rule would be those specific safety concerns that are unique to Defense Programs facility operations, particularly weapons surety and nuclear explosives safety issues. It is appropriate that the Assistant Secretary for Defense Programs retain responsibility for these concerns.

A Management Council, such as outlined for Option III, would be established under this option as well. It would be chaired by the COO. The purpose of the council would be to improve coordination between the programs, and to ensure the needs of the programs are being met by the field operations.

GLOSSARY

ADaPT	Advanced Design and Production Technologies
AL	Albuquerque
ALOO	Albuquerque Operations Office
APT	Accelerator Production of Tritium
AS	Assistant Secretary
ASCI	Advanced Supercomputing Initiative
CLWR	Commercial Light Water Reactor
COO	Chief Operating Officer
DARHT	Dual Axis Radiographic Hydrodynamic Test
DAS	Deputy Assistant Secretary
DNFSB	Defense Nuclear Facilities Safety Board
DoD	Department of Defense
DOE	Department of Energy
DP	Office of the Assistant Secretary for Defense Programs
DP-1	Assistant Secretary for Defense Programs
DP-2	Principal Deputy Assistant Secretary
DP-3	Principal Deputy Assistant Secretary for Safety and Quality
DP-10	Deputy Assistant Secretary for Research and Development
DP-13	Office of Research, Development, and Testing Facilities
DP-20	Deputy Assistant Secretary for Military Application and Stockpile Management
DP-21	Office of Weapons Surety
DP-22	Office of Nuclear Weapons Management
DP-23	Office of Emergency Response
DP-24	Office of Site Operations
DP-40	Deputy Assistant Secretary for Program Support
DP-45	Associate Deputy Assistant Secretary, Technical and Environmental Support
DP-50	Deputy Assistant Secretary for Strategic Computing and Simulation
DP-60	Tritium Project Office

EH	Office of the Assistant Secretary for Environment, Safety, and Health
EM	Office of the Assistant Secretary for Environmental Management
EPA	Environmental Protection Agency
ER	Office of the Assistant Secretary for Energy Research
ES	Enhanced Surveillance
ES&H	Environment, Safety, and Health
FM	Office of the Associate Deputy Secretary for Field Management
GOCO	Government Owned, Contractor Operated
HQs	Headquarters
IG	Inspector General
ISM	Integrated Safety Management
KC	Kansas City Plant
LANSCE	Los Alamos Neutron Science Center
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
M&O	Management and Operating
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NIF	National Ignition Facility
NN	Office of Nonproliferation and National Security
NTS	National Test Site
NWSM	Nuclear Weapons Stockpile Memorandum
OAK	Oakland Operations Office
OMB	Office of Management and Budget
ONDP	Office of National Defense Programs
OSD	Office of the Secretary of Defense
OSHA	Occupational Safety and Health Administration
OTMO	Office of Technical Management Operations

PCAP	Production Capability Assurance Program
PCD	Program Control Document
PEIS	Programmatic Enviromental Impact Statement
PPBS	Planning, Programming, and Budgeting System
P&PD	Planning and Production Directive
Pu	Plutonium
R&D	Research and Development
SAR	Safety Analysis Report
SBSS	Science-Based Stockpile Stewardship
SLEP	Stockpile Life Extension Program
SR	Savannah River site
SSM	Stockpile Stewardship and Management
START	Strategic Arms Reduction Talks
WAD	Work Authorization Directive

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13. ABSTRACT (Maximum 200 words)

The Department of Energy was required by the Congress to conduct a study of how it manages the nuclear weapons program, to include an analysis of the functions performed at Headquarters Defense Programs, operations offices, and applicable area and site offices. IDA was asked by the Deputy Secretary and the Assistant Secretary for Defense Programs to conduct this study. It contains an analysis of findings and options for making changes to management and organizational structures.

Among the findings are that: review and approval processes for environment, safety, and health matters are broken; there are too many people; more attention needs to be paid to the expertise and training of DOE's employees; there is a lack of clarity regarding the roles of line vs. staff; the integration of programs and functions across DOE is weak; and the link between resources and requirements is broken.

The study suggests a set of management principles upon which to reorganize. It then suggests a set of baseline reforms for reengineering ES&H and other processes. Finally, a set of options are provided for reorginzing the Defense Programs organization itself.

14. SUBJECT TERMS
Department of Energy, Nuclear Weapons Program, Defense Programs, Assistant Secretary for Defense Programs, National Laboratories, Nuclear Weapons, Management Reform, Reengineering, Stockpile Management, Stockpile Stewardship, Weapons Complex Trusteeship, Complex Trusteeship

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