Cleaning Up the Nuclear Weapons Complex: Does Anybody Care?

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The impetus for this research came from many conversations the authors have had over the past few years with those concerned about the rate of progress cleaning up the sites in the U.S. nuclear weapons complex, and why it is that these issues get so little attention on the national policy scene.

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Executive Summary

Cleaning up the nation's former nuclear weapons facilities is one of the costliest and most intractable legacies left from the Cold War. The Department of Energy (DOE), which leads the cleanup through its Office of Environmental Management (EM), estimates that addressing the risks resulting from five decades of nuclear weapons production will cost the nation at least another $150 to $200 billion—and take 70 years to complete. This is in addition to over $50 billion already spent. And, even after all this money is spent, long-term stewardship will be required at most of the 100 sites in EM's portfolio, to ensure that people do not come into contact with the hazards that will remain at these sites.

Despite the costs—and in the face of some serious environmental and health hazards for those working in and living near contaminated sites—very little attention has been paid on the national level to DOE's cleanup program. Although there have been sporadic attempts by Congress and others to hold DOE's feet to the fire, there has been little sustained effort to address fundamental questions, such as whether the Office of Environmental Management is focused on appropriate goals, whether it is effective in meeting them, or whether the $50 billion expended on the EM program since 1989 has been wisely spent. In fact, the EM program has largely escaped the kind of sustained scrutiny paid to other environmental issues by advocates, the media, Congress, and administrations of both parties.

The reasons for this lack of attention are many. First, it is difficult to focus on an environmental problem that is so large in scope, and so technically complex, that it almost defies comprehension. Second, most of the former nuclear weapons production facilities are in remote areas, far from major population centers. Third, funding and much of the oversight of DOE's environmental program fall under the defense committees in Congress, where even huge environmental outlays pale in comparison with other defense programs. Finally, DOE's environmental management program has become an important job-creation engine in the communities that once employed many in the nuclear weapons enterprise, making it a politically popular program.

This paper concludes that increased national attention to and public scrutiny of the environmental management program at DOE is long overdue. DOE sites harbor contamination that will remain hazardous for thousands of years, and billions of dollars will be spent to reduce these risks in the coming decades. Mismanaged or misguided projects have cost taxpayers millions—perhaps even billions—of dollars in the past 10 years. Unless the

environmental management program is held accountable, we as a nation may never know what we are buying for $6 billion per year—a budget nearly as high as that of the entire U.S. Environmental Protection Agency.

What can be done to improve the workings of the nation's largest environmental cleanup project? A number of things. Specifically, we recommend that the Department of Energy, Congress, and the administration take the following four steps.

1. Clarify EM's mission and separate DOE's "job creation" and economic transition functions from EM programs and contracts.

The EM program's mission has evolved to include not only environmental restoration and waste management, but also, indirectly, creating jobs and easing economic transition at former nuclear weapons production sites. All of EM's current individual missions should be evaluated, and core missions clearly stated. Changes are also needed in internal accounting and budgeting processes to clarify how money is spent and to improve the accountability of the program's federal employees and its 36,000 contractors.

2. Decide which sites will—and which will not—have a future DOE mission.

The United States stopped producing nuclear weapons 10 years ago, yet has not decided which former weapons sites and facilities will have a future use and remain in operation. This uncertainty about the future of DOE facilities hampers cleanup efforts. Congress should enact legislation, modeled on the Base Closure Realignment Act, that defines a process for deciding which sites will have future missions, and which will be closed—a step that ultimately could speed cleanup and help crystallize appropriate environmental goals at each site.

3. Require annual reports to Congress on the EM program.

Even though $50 billion has been spent on environmental management activities since 1989, it is still difficult to determine the extent of contamination at some of the major sites and to understand the possible alternatives for addressing them. At some sites, it is also difficult to understand what progress has been made. Congress should require DOE to provide annual reports that detail progress made to date, identify how resources at each site were spent, and estimate future costs of cleanup and stewardship. Congress will need to ensure that this reporting requirement is taken seriously. These reports are important, because they can provide a foundation for effective congressional oversight.

4. Create an independent commission to evaluate the current EM organizational structure and identify needed reforms.

Congress or the president should create a high-level commission with the charge of evaluating the EM program and making recommendations for change. The commission should focus on establishing a clear mission, streamlining lines of authority, encouraging greater internal and external accountability, and protecting the environmental management program from parochial interests. One key question such a commission should address is

whether the environmental management of former nuclear weapons sites truly belongs in the Department of Energy.

National leadership is needed—who will heed the call?

Ultimately, the prospects for reform will hinge on whether senior leadership in the executive branch and Congress truly support the need to bring about change in the EM program. Given that most of the task of cleaning up these sites lies still lies before us, embarking on meaningful change today will bring benefits for many decades to come. Absent such leadership, our children will likely be asking the same questions 20 years from now that we are asking today.

SECTION 1

Introduction

The task of cleaning up the nation's nuclear weapons complex is so enormous that, in many ways, it defies comprehension. A small army of nearly 36,000 contractors is employed by the U.S. Department of Energy (DOE) to rectify the environmental hazards that are the result of five decades of nuclear weapons production. These include contaminated soil, water, and groundwater; stored radioactive and hazardous wastes; excess plutonium and other fissile materials; and aging, contaminated structures. Their presence is a matter of great concern to people residing in DOE's host communities, many of whom were exposed to radioactive and hazardous releases into the air or drinking water, or faced occupational exposures. For example, one community downstream of DOE's Rocky Flats site abandoned its drinking water reservoir due to concerns over radioactive contamination.[1]

Throughout the complex, DOE and contractor employees have been exposed to radioactive and other hazardous substances—nearly 150 current and former workers have been diagnosed with Chronic Beryllium Disease[2]—and DOE estimates that between 250 and 700 DOE contractors will develop radiation-induced cancers over the next 30 years, of which 60% may die.[3] Releases of radon gas from a DOE facility in Fernald, Ohio over its 37-year operation are expected to result in an estimated 85 deaths from lung cancer among residents downwind of the plant.[4] Although decreased production activity and increased environmental and safety controls in the complex have reduced direct releases and exposures, many legacy wastes and hazards remain.

The nuclear weapons complex comprises 3,750 square miles[5] and, although the overwhelming majority of this land is uncontaminated (less than 15% of the land at the five major sites[6] is contaminated), the contamination that does exist presents difficult technical challenges because of the presence of radionuclides.[7] Seventy-five million cubic meters of

[1] Colorado Department of Public Health and the Environment, 1999, 1.

[2] U.S. DOE, 1999d.

[3] U.S. DOE, Office of Environmental Health and Safety, 1999.

[4] U.S. Centers for Disease Control and Prevention, 1998, 1.

[5] U.S. DOE, Office of the Chief Financial Officer, 1999b, 3.

[6] These are the Hanford Site (WA), the Savannah River Site (SC), the Rocky Flats Environmental Technology Site (CO), the Oak Ridge Reservation (TN), and the Idaho National Engineering and Environmental Laboratory (ID).

[7] U.S. DOE, Office of Environmental Management, 1996b, 7.

soil are contaminated, enough to cover the entire island of Manhattan more than five feet deep. There is currently no effective technical solution for remediating much of the 1.8 billion cubic meters of contaminated groundwater in the complex (enough to cover Manhattan with 135 feet of water). In addition, millions of cubic meters of radioactive and mixed waste (waste that is both hazardous and radioactive) left over from decades of weapons production are in need of disposal.[8] There is little chance that disposal of many of these wastes will be completed any time soon, because of lack of agreement among experts regarding how the waste should be disposed, the enormity of the task, and a shortage of certain kinds of disposal capacity.

The nuclear weapons complex also includes nearly 20,000 buildings and structures, at least half of which are no longer in use and have been declared "excess" by DOE. Many of these are contaminated. Decontaminating and decommissioning these structures—which often also means demolishing them—is a formidable undertaking.[9] Plutonium and other fissile materials left over from the Cold War are stored at some of these sites, raising issues of national security and requiring special disposal and safeguarding procedures.

Since its creation, the Office of Environmental Management (EM) has been given responsibility for cleanup of more than 100 sites in more than 30 states across the country.[10] Currently 48 of these sites in 19 states have active EM projects underway.[11] Because of the presence of radionuclides—which can remain hazardous for literally thousands of years—DOE (or its successors) will have long-term responsibilities for maintaining and monitoring waste disposal units, as well as for monitoring environmental and other risks after engineering remedies are put in place.[12] These responsibilities, referred to as long-term stewardship, are already underway at some sites and will be needed at the majority of the 100 sites in EM's portfolio.[13]

DOE has estimated the remaining cost of "cleaning up"[14] its sites to be somewhere between $150 and $200 billion, and the task is expected to take 70 years to complete.[15,16] Even this figure underestimates the total cost. For example, it does not include the cost of remediating facilities that are still in operation, nor the cost of addressing some contamination problems that do not currently have viable cleanup technologies, such as most groundwater contamination. It also does not include the costs of monitoring and maintaining site remedies over the thousands of years that hazards will remain. More than three-quarters of this money will be spent at just five sites: the Hanford Site (WA), the Savannah River Site (SC), the Rocky Flats Environmental Technology Site (CO), the Oak Ridge

[8] U.S.DOE, Office of Environmental Management, 1997c, 58–80.

[9] U.S.DOE, Office of Environmental Management, 1997a, E-1, E-2.

[10] Ibid., 2–14.

[11] U.S.DOE, Office of Environmental Management, 1999, 5.

[12] U.S. DOE, Office of Environmental Management, 1999a, 26–27.

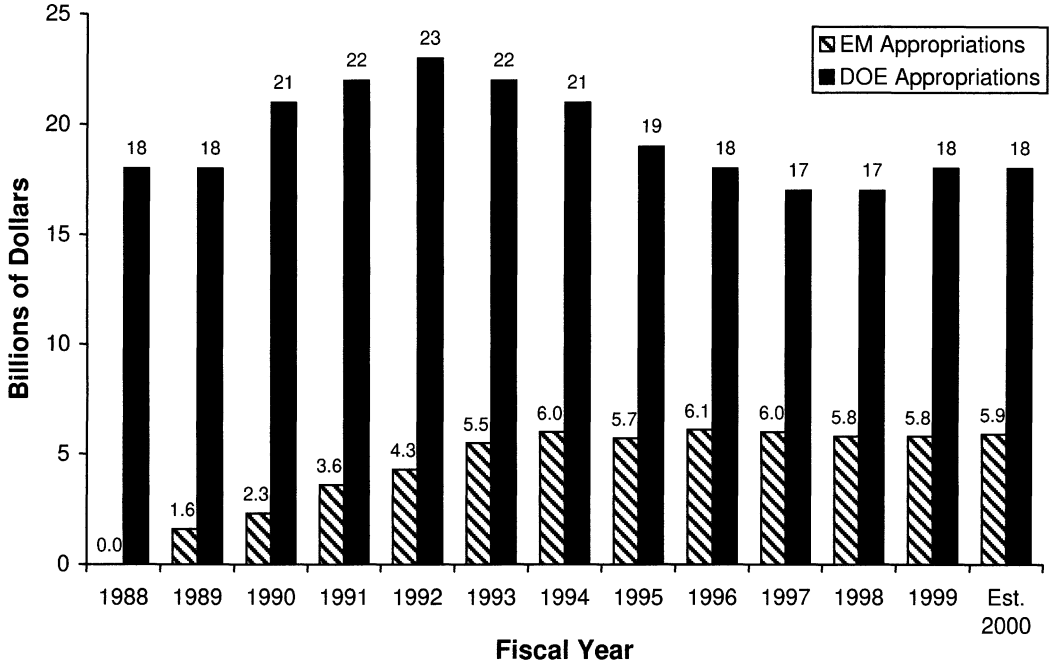
[13] For more information on DOE's long-term stewardship needs see: U.S. DOE, Office of Environmental Management, 1999a, and Probst and McGovern, 1998.

[14] "Cleaning up" in this context usually refers to engineering solutions to keep contaminated wastes and materials from coming in contact with humans or the environment. Given the nature of radioactive substances, "cleaning up" in the sense of "rendering harmless" is not possible.

[15] U.S. DOE, 1999a, "Principal Financial Statements," 68; U.S. DOE, Office of Environmental Management, 1998b; U.S. DOE, Office of Environmental Management, 1996b, vol. 1, i.

[16] For more information on the range of estimates, see Table 6-4 of Schwartz, 1998, 382.

Figure 1. DOE and EM Annual Appropriations, FY 1988–FY 2000



Sources: FY 1988–FY 1998 DOE appropriations from "DOE Historical Funding" in U.S. DOE, Office of the Chief Financial Officer, 1998, 11; FY 1999–FY 2000 (est.) DOE appropriations from U.S. DOE, Office of the Chief Financial Officer, 1999a,16; FY 1989–FY 1990 EM appropriations from Congressional Budget Office, 1994; FY 1991–FY 2000 (est.) EM appropriations from U.S. DOE, Office of Environmental Management, 1999b, 2.

Reservation (TN), and the Idaho National Engineering and Environmental Laboratory (ID).[17]

Four changes in the 1980s helped shape environmental management at the nuclear weapons complex: the end of the Cold War, increasing information on the enormity of the task, the increase in public concern about environmental issues in general, and public concern about the environmental consequences of nuclear weapons production.[18] With the end of the Cold War, DOE's original mission of producing nuclear weapons became obsolete. As a result, in the early to mid-1990s, increasing amounts of DOE's budget were shifted from its Office of Defense Programs, which manufactured nuclear weapons, to EM,[19] which is responsible for addressing environmental contamination at DOE facilities and sites. (See Figure 1, DOE and EM Annual Appropriations, FY 1988–FY 2000.)

[17] "Exhibit 2-8: Baseline Life-Cycle Costs and Completion Dates by State" in U.S. DOE, Office of Environmental Management, 1998b, 2–15.

[18] It is fair to say that the increased national attention to this issue came in large part as a result of a major series of articles by Keith Schneider of the *New York Times* in the late 1980s (see Lanouette, 1990) and as a result of the FBI raid at the Rocky Flats site outside of Denver, Colorado. The accident at Chernobyl in 1986 had initially drawn attention to the aging and deteriorating nuclear materials production reactors at Hanford and Savannah River, which did not meet commercial nuclear reactor safety standards (see Schwartz, 1998, 496–498).

[19] EM was originally called the Office of Environmental Restoration and Waste Management. Its name was shortened to the Office of Environmental Management in FY 1995. For ease of reading we use EM and Environmental Management throughout the paper.

With an annual budget of just less than $6 billion, EM is the largest single office in DOE. In fact, its annual budget is almost as large as that of the *entire* U.S. Environmental Protection Agency (EPA) and twice as large as *total* estimated annual public and private expenditures on nonfederal Superfund cleanups.[20] Despite this, few in the environmental policy community or in the general public would identify DOE as having one of the largest environmental programs in the country, if not the world. In fact, a recent public opinion poll asking respondents to identify the largest polluting industries in the United States did not even ask about the contribution to pollution of the federal government or the Department of Energy.[21]

The debate about the nation's environmental policy all but ignores the environmental concerns raised by the contamination and environmental risks resulting from the past nuclear weapons production and the Cold War. These issues have been called to the attention of national policymakers in DOE, Congress, and the White House. A wide array of organizations in and outside of government have issued reports—including the Alliance for Nuclear Accountability, the Congressional Budget Office, the now defunct Congressional Office of Technology Assessment, the Institute for Environmental and Energy Research, the Natural Resources Defense Council, the U.S. General Accounting Office, academics, and others—decrying the lack of clear goals of the EM program, effective mechanisms for internal and external accountability, and progress and transparency within the cleanup program.[22] In the past decade, millions if not billions of dollars have been wasted on EM projects that were mismanaged or misguided.[23]

There is a lot of attention paid to these issues at the local level. Yet here in Washington very little attention is paid to the very important environmental concerns at DOE sites by traditional environmental groups, and there is almost no one focusing on the national issues common among individual DOE sites. Even when the occupational and environmental hazards at a DOE site—the Paducah Gaseous Diffusion Plant in western Kentucky—are on the pages of the *Washington Post*[24] and other papers at least once a week, there is still little focus inside the proverbial beltway on assessing the strengths and weaknesses of the program and trying to figure out what we as a nation are buying for $6 billion a year. Few at the state and local levels have the resources to conduct independent evaluations of the EM program, and there is a dearth of such independent evaluations generally.

Even when watchdog groups can muster the resources to conduct a major assessment of the EM program, there is little effect. Recent reports by two of the most active environmental organizations, the Alliance for Nuclear Accountability and the Institute of Energy and Environmental Research, suggesting the need for major structural changes in the EM program have been largely ignored. Typically the response to each new report or each embarrassment is a flurry of hearings on Capitol Hill, but there is little real change. The

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[20] U.S. DOE, Office of Environmental Management, 1999b, 2; U.S. EPA, 1999, 11; Probst, Fullerton, and others, 1995, 24.

[21] Public Agenda Online citing Wirthlin Worldwide survey data, 1998.

[22] See Congressional Budget Office, 1994; Fioravanti and Makhijani, 1997; Alliance for Nuclear Accountability, 1998; U.S. GAO, 1999c.

[23] U.S. GAO, 1996, 1997, 1998, and 1999d.

[24] The *Washington Post* has published more than 20 articles, most by staff writer Joby Warrick, on occupational and environmental hazards at Paducah since it broke the story with a front page investigative article on August 8, 1999.

issues are so difficult, both politically and bureaucratically, that few members of Congress or senior administration officials (no matter which administration) are interested in expending the political capital to solve them. Few Americans are aware of or interested in these complex and often difficult issues affecting remote areas of the United States. Almost no one, inside or outside the bureaucracy, has an incentive to "ask the right questions."

Why is there so little national attention to these issues? There are three major culprits. The first is a lack of clear policy about the purpose and direction of both DOE in general, and the EM program in particular. The second is disinterest among senior officials—both in the administration and within Congress—in clarifying EM's goals and assuring taxpayers that EM funds are wisely spent. The third is the continued support for using the EM program as an engine for economic development to keep federal jobs at sites that once created nuclear weapons. Perhaps the time has come to take the risk of a major evaluation and restructuring of the EM program so that we will not look back 10 years from now, having spent another $50 billion on the program, and find that it is still not clear what we have to show for it.[25]

The key to fundamental reform of the EM program is leadership. This leadership could come from many places: Congress, the White House, or the Secretary of Energy. Without leadership at very senior levels[26]—someone making it a personal priority to address the myriad problems that plague DOE and its EM program—there is likely to be little real change in the status quo. One way to get someone to pay more attention to the issues and challenges of DOE's environmental management program is increased national visibility, as a result of congressional attention and media attention. Attention could also come as a result of the efforts of those in government (including agencies, such asEPA, that regulate DOE) or as the result of concerted efforts on the part of nongovernmental organizations to focus on the need for reform. Attention *per se,* of course, will not solve the problems in the nuclear weapons complex, but it may be the needed catalyst to assure what is needed—national leadership on this issue and a major effort and commitment to a new way of doing business in the EM program.

If history is any guide, increased attention and leadership are likely to result only from a crisis at one of the sites in the nuclear weapons complex, whether that crisis is "real" or "perceived." As a result of just such a crisis, Congress recently directed DOE to conduct a major reorganization to create a new agency within the department—the National Nuclear Security Administration (NNSA). In this case, allegations of Chinese spying in a DOE laboratory led to widespread outrage over DOE's lax security and management systems. A high-level committee, the President's Foreign Intelligence Advisory Board (PFIAB), conducted a review of the alleged problems and made recommendations for ways to address them. The report that was issued by PFIAB, referred to as the Rudman Report (after the commission's chairman, Warren B. Rudman) cited, as one of the must fundamental problems, DOE's institutional culture. Interestingly (yet not surprisingly), its recommendations

[25] Based on DOE budget documents, EM had spent approximately $51 billion by the end of FY 1999. Schwartz (1998, 376) estimates that DOE obligated nearly $33 billion on EM (in constant 1996 dollars) from FY 1989 through FY 1996. DOE has spent nearly $6 billion a year during FY 1997 through FY 1999.

[26] Many a past EM assistant secretary at DOE has tried but, absent true political support from the White House or Congress, has failed to make more than incremental or temporary changes.

do not tackle the issue of how to effect cultural change—perhaps the most difficult kind of change to accomplish.

The challenge for DOE's environmental program is to be ready with a well-thought-out solution when such a "crisis" occurs, or to take proactive action to ward off a crisis by enacting fundamental changes in the mission, structure, and oversight of the EM program.

The goal of this paper is to garner increased interest and attention to DOE's environmental management program and to highlight the need for fundamental change in the EM program. What is desperately needed is a change in the basic culture of EM and of DOE. Why does it matter whether people pay attention to the EM program? Absent that attention it is unlikely that actions will be taken to assure a more focused, effective, and efficient program for what is a big problem—addressing contamination and risks at the sites in the nuclear weapons complex. Of course, EM is not the only less-than-perfect government program where there is desperate need for leadership. Still, the EM program is a very large and costly program, with potentially very serious environmental risks, and it is more flawed than many. To address the problems facing EM may well require major changes in the way the program is structured, staffed, and held accountable.

It should be noted that this is not a "typical" RFF piece of research. Although this paper builds on the authors' prior research on the weapons complex conducted over the past four years, the purpose of this paper is to highlight important policy dilemmas, not to convey the results of new research.

This section has provided a brief overview of the many challenges that EM faces cleaning up the sites in the nuclear weapons complex. The second section describes why there is so little political will to address these problems, while section three looks at the economic and political incentives of various members of Congress, local communities, DOE employees, and government contractors to maintain the status quo. Section four addresses the structural reasons why EM receives so little scrutiny and describes its Byzantine bureaucratic culture. Finally, section five recommends specific solutions for improving the EM program, and includes a plea for greater national leadership on this issue as a critical component of our commitment to environmental cleanup of the nation's former nuclear weapons production sites.

SECTION 2

Why Environmental Cleanup at the Weapons Sites Get s SoLittle National Attention

In many ways, the lack of attention to and scrutiny of DOE from a national perspective is a legacy of the days of the Manhattan Project. The very structure of the organization—decentralized decisionmaking; reliance on outside contractors; location in remote, relatively unpopulated areas; lack of external regulation; culture of secrecy; highly technically trained staff—all of these factors contribute to why these issues garner so little national attention. In this section, we first provide some background on the EM program and then discuss several specific reasons that so little attention is paid to the challenges and problems of the program on a national level.

EM in Context

EM was created in 1989, with an annual budget of $1.6 billion, less than 10% of DOE's total budget at that time.[27] EM's annual budget climbed to $6 billion in FY 1994, nearly one-third of the department's budget that year.[28] Since then, EM's annual budget has been essentially flat. These numbers, which suggest a huge environmental management program, however, are somewhat misleading. Many of the activities being paid for out of the EM budget have little to do with what most consider "environmental" activities. This is because once responsibility within DOE for a facility is transferred to EM, EM becomes responsible for a host of "landlord" activities—maintaining existing infrastructure, security operations, emergency and fire response services, and utilities—and these costs become part of the EM budget.[29] According to DOE's own estimates, in recent years

[27] Congressional Budget Office, 1994, 7; U.S. DOE, Office of the Chief Financial Officer, 1998, 11.

[28] U.S. DOE, Office of Environmental Management, 1999b, 2; U.S. DOE, Office of the Chief Financial Officer, 1998, 11.

[29] Previous assistant secretaries of EM, Tom Grumbly and Al Alm, devoted much effort to trying to bring down the landlord costs at EM sites.

nearly half of EM's annual appropriations have gone to these landlord costs.[30] Another significant EM responsibility is to safeguard and secure "special nuclear materials," that is, substances that can be used to make atomic bombs.[31] This too takes up a sizable portion of the EM budget.

Whether DOE spends too much or too little on these nonenvironmental costs is not the subject of this paper. However, the fact that these costs and activities are all lumped together makes it difficult to figure out how the money is being spent. Few in the general public or the media, in fact, realize that EM's mission is not just environmental cleanup.

Internal accounting and budgeting processes often obfuscate what funds are being used for, making it difficult for the site operations managers and their contractors to be held accountable—either internally or externally. The competition within DOE (and the contractor community) among different EM missions is mostly hidden, but it is an extremely important element of the bureaucratic problems plaguing the weapons complex.

Many experts both in and outside DOE are convinced that the mantle of environmental protection is being used to assure continued employment at EM sites and fund the economies of the communities neighboring DOE sites. Some would argue—as has Milton Russell of the University of Tennessee in his provocative paper, *Toward a Productive Divorce: Separating DOE Cleanups from Transition Assistance*—that cleanup and job creation should be explicitly separated to assure greater transparency, increased accountability, and more effective efforts toward both goals.[32] The whole question of DOE's role and responsibility in terms of job creation is one that deserves much greater attention from those members of Congress who do not have DOE sites in their districts and from others in the policy process. This is a topic we return to later in this report.

Some also believe that the EM budget and programs are being used as a cover for maintaining weapons production capacity. That issue is beyond the scope of this work but is also a topic that deserves a full hearing.

Few stakeholders have an incentive to draw attention to the large EM budget—and to question how it is being spent. And those that do have the incentive often have few resources and little political clout. Each stakeholder—local government, contractors, DOE, EPA, states, citizens' groups, even arms control groups—is understandably concerned that any cut in the EM budget would come at the expense of programs dear to them, or that cuts would not be made surgically and would instead damage the entire EM program. Those who do try to shine a light on the EM budget are largely unsuccessful, as there are so many more powerful stakeholders lobbying to maintain site budgets and local employment.

The result is a lack of scrutiny that has now gone on for more than a decade. In many ways the fundamental problems facing EM are the legacy of the department's origins—the legacy of the Manhattan Project.[33] These include inscrutable budget allocation and accounting processes and a lack of effective mechanisms for internal and external accountability, which is made all the more troubling by the lack of external regulation of the

[30] Testimony of Alvin L. Alm, Assistant Secretary for Environmental Management, as recorded in U.S. Congress, House Committee on Appropriations, 1997; Congressional Budget Office, 1994, 51.

[31] Due to decreases in the size of the nuclear weapons arsenal, DOE has "excess" plutonium and highly enriched uranium, the primary metals used to manufacture nuclear warheads.

[32] Russell, 1997, 4.

[33] See Probst and McGovern, 1998, 14–23.

facilities and activities at the weapons complex sites.[34] At the same time, EM is supposed to comply with an almost overwhelming number of federal and state regulations and internal DOE requirements. One result of this tangled web of overlapping regulation is that DOE and its contractors can ignore some of them. Moreover, federal and state regulators often feel overpowered by DOE and its army of contractors, who have more resources, staff, and political influence than they do.

Why So Few Understand the Issues

Given the enormity of the task, the large amount of federal tax dollars already invested in it, the likely future costs, and the potential for catastrophic events to people and the environment, why does the issue of cleaning up the sites in the nuclear weapons complex get so little attention on Capitol Hill, in the national press, from the White House and the executive branch—and even from professional analysts at environmental and other nonprofit organizations? The issues are complicated, the communities that are affected are geographically remote, and oversight and funding of the EM program falls more under the defense committees in Congress than the environmental committees.

The Issues Are Technically Complex

The scientific and technical issues surrounding the cleanup of the sites in the nuclear weapons complex are complicated and difficult. In many ways, the EM program is still in its infancy. Much of the past decade has been spent by EM trying to better understand and disclose to the public the nature and extent of contamination at its sites. Although many types of contamination can readily be addressed, there is still little understanding of the extent of contamination at some of the large sites, which is where most of the money is going. Moreover, there is little agreement among experts about what constitutes the best approach to reduce the risks of contamination and protect human health and the environment. The sheer dimensions of the problem and technical knowledge needed to understand some of the more daunting challenges make this an unappealing topic for many.

Even for many experts in the environmental field, the terms and issues at DOE sites are in fact quite distinct from what most environmental engineers encounter at privately owned sites that are subject to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (better know as Superfund) and the Resource Conservation and Recovery Act, the two major federal environmental laws that address hazardous substances and hazardous wastes. And for those not conversant with "things nuclear" or without a technical background, jargon about nuclear fuel cycles and nuclear weapons production is difficult to understand.

Added to this is a lack of technology to address some of the most worrisome problems found at DOE sites.[35] Some of the most expensive and important undertakings, such as reducing the risks posed by the volatile mix of chemicals in the Hanford Tanks, have no

[34] U.S. DOE, Advisory Committee on External Regulation of Department of Energy Nuclear Safety, 1995; U.S. DOE, 1996; U.S. GAO, 1999b; U.S. Nuclear Regulatory Commission, 1999.

[35] National Research Council, 1999.

easy solution.[36] There are 177 underground tanks at Hanford, many of them already leaking and threatening to contaminate groundwater and the nearby Columbia River. For years experts have disagreed about how to treat the waste in the tanks and put it in a more stable form. Until DOE constructs the necessary treatment facilities, all it can do is to continue to manage the wastes in the tanks, and try to reduce leaks and the chances of a disaster. This is a considerable challenge, as the wastes in the tanks are extremely volatile and have not been fully characterized. There is simply no precedent for such a task. In fact, there is no precedent for an environmental program of the magnitude of that at the weapons complex. Many of the most difficult and expensive problems at DOE's sites are unique, like the Hanford Tanks, and there are no proven technologies for some of the most risky and expensive problems.

Weapons Sites Are Remote

DOE facilities are concentrated geographically, remote, and virtually invisible to the general public. Many of the weapons production sites were in fact selected for this very reason. Of the five most costly and prominent sites, only one (Rocky Flats) is near a major city. Often the surrounding communities and the local tax base are heavily dependent on DOE jobs.[37] Although issues about the site's environmental and employment status are of great concern to nearby residents, there are few people—from a national perspective—who are directly affected by these sites, and typically only those local papers near DOE sites carry stories about related issues. Local papers in DOE communities place little emphasis on site hazards and risks.[38] This is in stark contrast to press coverage of private sites cleaned up under the Superfund program.[39] Even when national papers do carry stories about cleanup issues at DOE sites, there is usually a flurry of attention but little lasting change in the way DOE does business.

Congress and the EM Program: Small Fish in a Big Defense Pond

Congressional funding and oversight of the EM program is fragmented and EM competes for attention with other, more visible programs. The lack of public scrutiny and knowledge about the EM program is compounded by the fact that Congress itself has historically failed to conduct adequate oversight of the environmental activities taking place at the nuclear weapons production complex.[40]

Congressional jurisdiction over DOE, and the EM program specifically, is split across many committees in both the Senate and the House. In both chambers there are two

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[36] Zorpette, 1996, 88–97.

[37] See Greenberg and others, 1999, 183–204.

[38] See Lowrie and Greenberg, 1999.

[39] A number of DOE sites, including the five major sites, are on the National Priorities List, EPA's list of sites needing federal attention under Superfund. Although federal facilities cleaned up under Superfund are generally subject to the same regulations, the cleanup process is somewhat different from that for sites not owned and operated by the federal government. The requirements for federal sites are articulated in the federal facility section of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, as amended, U.S. Congress, 1986, Public Law 96-510, Sect. 120.

[40] See "Congressional Oversight of the Bomb" in Schwartz, 1998, 484–517.

committees that share primary authority over the EM program: Armed Services and the energy-focused committees (Senate Energy and Natural Resources, and House Commerce). Congressional jurisdiction over DOE is formally split between defense-related and nondefense-related nuclear programs. In practice both assert authority over the EM program and, in the Senate, share responsibility for confirming the administration's nominees for DOE secretary and assistant secretary for environmental management.[41] Under the current congressional committee structure, EM must compete for congressional attention with Air Force bombers, missile defense systems, disposal of spent nuclear fuel from civilian power plants, and politically popular water resources projects in the West.

The primary legislative vehicle used to mandate changes in the EM program (and other DOE defense programs) is the vast annual National Defense Authorization Act, written by the Armed Services Committees in both the House and Senate. This enormous piece of legislation, which was nearly 500 pages long for FY 2000, provides legislative and spending authority for all Department of Defense programs as well as the defense-related activities of DOE. For EM, the defense authorization bill codifies legislative directives and sets maximum spending levels. As defense accounts represent 90% of EM's budget, the defense authorization bill is equally as important for EM funding as the energy and water development appropriations bill, which provides the actual budget authority for all of EM.

Even this year, with a major reorganization of DOE due to national security concerns, the DOE section of this bill occupied only 58 pages out of 465, with all discussion of EM taking up only a half dozen pages.[42] While EM's $6 billion annual appropriation seems huge in comparison with other environmental programs, the fact is that this is a small amount in the context of defense spending. EM's budget constituted just 2.1% of the total defense authorization amount in FY 1999.[43]

The appropriations committees' energy and water development subcommittees in both the House and the Senate write the annual Energy and Water Development Appropriations Act, which funds the vast majority of DOE programs and the entire EM office. DOE funding comprised three-quarters of the total amount appropriated in the act in FY 1999 (EM alone represented nearly 30%).[44] More than half of the appropriations allocated in the Energy and Water Development Act are from defense budget accounts, which also fund military operations, equipment, and construction.

Over the last six congressional sessions, covering 1987 through 1998, the armed services committees have held only a handful of oversight hearings specifically on DOE's EM and environmental, health, and safety programs, aside from their annual reviews during the drafting of the defense authorization bill.[45] For a few years starting in 1989, the

[41] In addition, the House Science Committee has jurisdiction over DOE scientific research and the national laboratories, thus sharing jurisdiction over DOE's environmental programs with the Commerce Committee. It participates in the annual appropriations process and has also held a number of oversight hearings, particularly concerning external regulation of nuclear safety at DOE facilities in recent years. In the Senate, the Governmental Affairs Committee has at times undertaken oversight and investigations of DOE's management of environmental programs.

[42] U.S. Congress, 1999, Public Law 106-165.

[43] U.S. Congress, 1998b.

[44] U.S. Congress, 1998a.

[45] RFF analysis of listings of congressional hearings from the 100th–105th sessions.

House Armed Services Committee formed a special panel to oversee DOE nuclear facilities. After a flurry of hearings in its first few years, the panel was disbanded in 1994. Generally, the armed services committees are methodical with their program oversight—calling DOE officials before the committee once a year to review progress. The energy-focused committees, however, are more responsive to management crises, holding hearings whenever major policy changes are imminent or newsworthy. The House Commerce Committee's recent hearings on worker exposures and environmental contamination at the Paducah Gaseous Diffusion Plant are an example of this. The energy-related committees also receive DOE testimony during the annual appropriations process. In both the House and the Senate, the energy-related committees have held far more oversight hearings than any other committees. Few legislative measures impacting EM have cleared the energy-related committees, however, in contrast to mandates that the armed services committees insert annually into the defense authorization bill.

Superfund Sites Get More Attention

Superfund, in comparison to the EM program, garners a lot of media attention. With more than 1,200 sites on EPA's list of top priority sites, the National Priorities List (NPL), many communities have a site within or near their borders. Many members of Congress also have a Superfund site in their districts, and are likely to have constituents express concerns about health risks, the slow pace of cleanup, the high cost of cleanup, or all three. Corporate America has expended a lot of resources lobbying to change the Superfund law and has been adept at keeping stories of the unfairness of the law's liability system and cleanup standards in the press and on the news. Environmental groups are equally adept at countering these stories. Public opinion polls continue to show that many members of the public believe that cleaning up toxic waste sites is one of our highest environmental priorities.[46] Although the major DOE sites are also on the NPL, stories about Superfund almost never mention the contaminated sites owned by the federal government.

Although people living and working on or near DOE sites are very concerned about them, most Americans are almost completely unaware of these facilities and the environmental and security concerns they pose. Most of the work on the part of local citizens has been, understandably, to call attention to the specific concerns at their sites. When there are national stories, such as the recent ones concerting the Paducah site in Kentucky, coverage is often the result of litigation, an entrepreneurial investigative reporter, or both.

An unfortunate result is that there is a dearth of independent analysis and focus on the big picture—on those technical and policy issues that are common to all (or many) of the sites in the weapons complex. Although a few national groups have tried to focus attention on environmental issues at DOE sites, many of the most effective lobbyists for national environmental groups went to work for DOE or its contractors at the beginning of the Clinton administration, leaving a gaping hole in the already small activist community at the national level.

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[46] Public Agenda Online citing Gallup polls, 1989, 1999. In a survey of 1,025 adults, 55% stated that they personally worried a great deal about "contamination of soil and water by toxic waste." This category was the highest ranked problem—along with water pollution—exceeding air pollution, global warming, and many other environmental problems.

SECTION 3

The Economic Benefit s ofDOE's Environmental Management Program: Jobs

The economic benefits of the EM program are huge and concentrated. Approximately 70% of DOE's current environmental management budget goes to five sites in five states.[47] Thus, local public officials as well as members of Congress from these states have a keen interest in keeping money flowing to these sites, because DOE is a major local employer for many of the communities.

Congressional Interest in the EM Program: Holding the Pursestrings

Not surprisingly, many of the members of congressional committees that oversee the EM program are from states with major DOE facilities. Senator Pete Dominici (R-NM), chairman of the Senate Appropriations Subcommittee on Energy and Water Development has four major DOE facilities in his state, including two major DOE laboratories (Los Alamos and Sandia National Laboratories). Senator Patty Murray (D-WA) represents the state that is home to the Hanford Site; she is also on the Energy and Water Development Subcommittee of the Appropriations Committee. Representative Floyd Spence (R-SC), whose district includes the Savannah River Site (SRS), chairs the House Armed Services Committee, which has legislative authority and oversight over DOE. On the Senate side, the powerful Senator Strom Thurmond (R-SC) also watches over the interests of the SRS, through his seniority on the Armed Services Committee, which he used to chair. Senators from Colorado and New Mexico, hosts to other major DOE sites, also sit on the Senate Armed Services Committee.

To ensure that DOE funding continues to flow to their constituencies, senators with DOE sites in their states have been quite effective over the last decade in wining seats on the Energy and Water Development (EWD) Subcommittee of the Appropriations Committee. Senators from the seven states receiving the largest amounts of EM funding (Washington, Idaho,

[47] U.S. DOE, Office of Environmental Management, 1999b, 25–29.

Tennessee, Colorado, South Carolina, New Mexico, and Ohio—representing 80% of FY 1999 EM funding) have held nearly *one-third* (25) of the available seats on the EWD Subcommittee since 1989. With random assignments, only 14% (11 members) of the subcommittee would be expected to be from seven states. A number of senators from other states with DOE sites have also served on the subcommittee, watching over DOE's funding.[48]

Reliance on Private Contractors

DOE's most direct economic benefit to local communities is jobs. The Department of Energy has a history of reliance upon private contractors dating back to the early days of the Manhattan Project, when leading industrial concerns aided in the wartime efforts to develop the atomic bomb. Defense contractors, nuclear and chemical concerns, and university research divisions have historically held most DOE contracts.

The vast majority of DOE funding is spent via "facilities management" contracts, where "prime contractors" manage and operate government facilities. During FY 1998, DOE financial obligations through its facilities management contracts totaled $13.27 billion, the equivalent of 80% of the agency's FY 1998 appropriation.[49] The top three prime contractors (Lockheed Martin, University of California, and Westinghouse) received over half the funds obligated through facilities management contracts. These three firms have long histories with DOE: Lockheed Martin is the world's largest defense contractor; University of California has run nuclear weapons laboratories since their creation; and Westinghouse is one of the world's leading nuclear engineering concerns. Other large defense contractors that dominated DOE's contracts in the past included Rockwell, EG&G, and Martin Marietta. Among the large nuclear and chemical concerns in DOE's history are Union Carbide and DuPont.

DOE currently employs about 100,000 prime contractors, the people who work for the firms that manage and operate DOE facilities. The EM program employs over one-third of these contractors, or nearly 36,000 people.[50] When the EM program was created in 1989, it functioned as an entirely new mission for DOE—adding more than 20,000 prime contractor employees in the first four years.[51] As a result, at the end of FY 1992, DOE prime contractor employees totaled 150,000, more than were employed at the height of the Cold War when the Atomic Energy Commission was beginning large-scale nuclear weapons production and constructing vast new production, testing, and research facilities.[52] Nuclear materials production had increased rapidly during the 1980s, so DOE contractor employment was already running high when the complex was shut down due to reactor safety problems and the rapid conclusion of the Cold War starting in 1988. It was not until 1993 that the non-EM workforce began to shrink, though the economic

[48] RFF analysis, using congressional directories covering the 101st (1989–1990) through the 106th (1999–2000) congressional sessions.

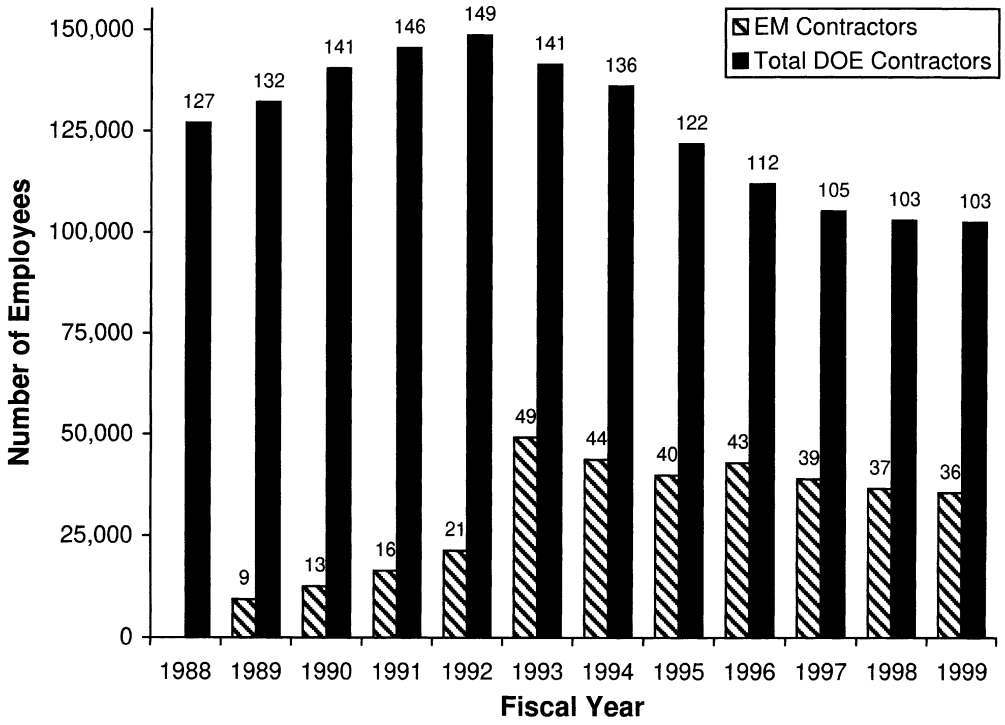
[49] U.S. DOE, Office of Procurement and Assistance Management, 1999; U.S. DOE, Office of the Chief Financial Officer, 1998.

[50] U.S. DOE, Office of Worker and Community Transition, 1999a.

[51] U.S. DOE, Office of Environmental Restoration and Waste Management, 1993, I-82.

[52] U.S. DOE, Office of Worker and Community Transition, 1999a; Schwartz, 1998, 358, citing Cochran and others, *Nuclear Weapons Databook*.

Figure 2. DOE and EM Prime Contractor Employment, FY 1988–FY 1999



Sources: FY 1988–FY 1998 DOE prime contractor employment from U.S. DOE, Office of Worker and Community Transition, 1999b; FY 1999 DOE prime contractor employment from U.S. DOE, Office of Worker and Community Transition, 1999a; FY 1989–FY 1992 EM prime contractor employment from U.S. DOE, Office of Environmental Restoration and Waste Management, 1993; FY 1993 EM prime contractor employment from U.S. DOE, Office of Environmental Management, 1994, 2; FY 1994–FY 1999 EM prime contractor employment from U.S. DOE, Office of Worker and Community Transition, 1999a.

blow to DOE host communities was eased by an increasing EM workforce.[53] (See Figure 2, DOE and EM Prime Contractor Employment, FY 1988–FY 1999.)

Since then, EM has essentially had two workforces. In the annual Defense Authorization Act of 1993, Congress directed DOE to retain and retrain not only current federal employees, but DOE contractors as well.[54] The result has been that DOE had little choice but to hire additional contractors to get employees with expertise in environmental contamination and cleanup. Many external observers note that they cannot figure out what all the federal employees and contractors at a site are doing. Without good information on job categories, skills, and tasks, of course, it is difficult to conclude that employment levels should be cut—but without such information it is also hard to justify current employment levels. It is worth noting that DOE and contractor employment at the weapons sites peaked in the early years of the EM program, when more people were employed at the facilities than when the United States was in full nuclear weapons production.[55]

[53] U.S. DOE, Office of Environmental Management, 1994, 2; U.S. DOE, Office of Worker and Community Transition, 1999a.

[54] U.S. Congress, 1993, 3161.

[55] U.S. DOE, Office of Worker and Community Transition, 1999b.

Job Creation as a Criterion for Contracts

Interestingly one of the stated goals of DOE is "stimulating economic productivity," an odd goal for the Department of Energy, much less for EM.[56] Local citizens and elected officials as well as members of Congress with large EM budgets are quite blunt about the importance of EM dollars and are constantly looking for new DOE missions to keep jobs alive. This interest in money is not even hidden. In September 1999, DOE Secretary Bill Richardson and the governors of four states with former nuclear weapons plants signed an agreement regarding cleanup of waste and contamination at these sites, an important milestone.[57] The agreement requires the states and the federal government to cooperate in completing site cleanups. As part of the agreement, however, DOE agreed to individual goals at each of the four sites. For the Savannah River Site in South Carolina, the statement of principles calls for: "working together to define a long-term mission and long-term comprehensive plan for the Savannah River Site (SRS) consistent with the needs of DOE, the state, and the surrounding communities; and *assuring funding adequate to support new missions and offsite waste/materials processing handling and storage"*[58] (emphasis added). In other words, DOE is committed to finding some new mission at SRS to assure continued employment.

There is little protection for senior DOE managers from congressional interest in the location of DOE (and contractor) jobs. All the incentives are to maintain the status quo and in fact, over the past decade the percentage of EM dollars going to sites has been remarkably constant. According to many, there is an unwritten rule guaranteeing sites a constant percentage of EM dollars. In the six states that get the most EM funds, each state's share of EM funding has remained relatively constant over the past eight years, with the only major change being a shift in funds between sites in Washington state and South Carolina (see Figure 3, EM Funding in Six States, FY 1992–FY 1999). Maintaining level funding for sites makes any effort to set priorities based on risk, or any other factor, quite difficult. In fact, two recent assistant secretaries tried to develop and implement more structured and transparent means of allocating funds, but were largely unsuccessful. One former senior DOE manager gave the example of parochial interests on Capitol Hill blocking an attempt to move 14 positions from a facility in one state to a facility in a different state.

Concern about future DOE employment pervades the program. For example, the request for proposals (RFP) for the environmental management contract at DOE's Oak Ridge site has stimulating local employment as one of the major criteria for evaluating contractor applications; in the RFP for the management and operations contract for Idaho National Engineering and Environmental Laboratory, one of the criteria is identifying a new mission for the facility.[59] This practice of including economic development tasks in

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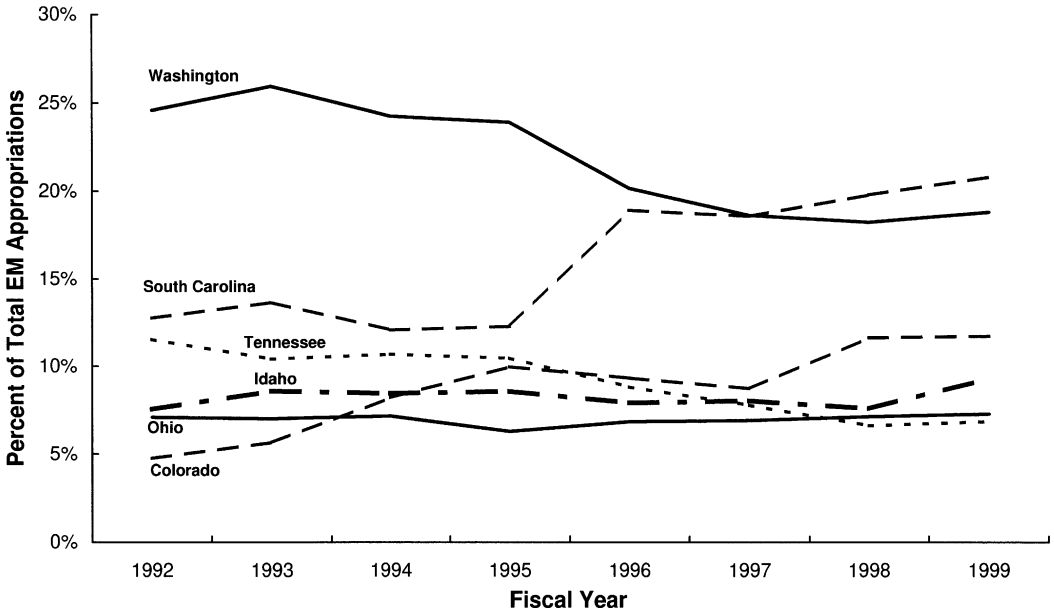
[56] U.S. DOE, Office of the Chief Financial Officer, 1999b, p. 3. The authors have been told by some experts that EM is explicitly not allowed to have economic development as a goal, yet it is clear that job creation is included in EM contracts and initiatives—EM's Oak Ridge environmental restoration management contract with Bechtel, for instance, provides monetary incentives for Bechtel to lure other companies to the Oak Ridge area.

[57] Janofsky, 1999, A7.

[58] U.S. DOE, 1999c, 2.

[59] U.S. DOE, Oak Ridge Operations Office, 1997; U.S. DOE, Idaho Operations Office, 1999.

Figure 3. EM Funding in Six States, FY 1992–FY 1999



Sources: FY 1992–FY 1996 from U.S. DOE, Office of Environmental Management, 1996a; FY 1997–FY 1998 from U.S. DOE, Office of Environmental Management, 1998a; FY 1999 from U.S. DOE, Office of Environmental Management, 1999b.

EM contracts is not limited to the Oak Ridge contract. Kenneth Reinschmidt, head of a recent National Research Council study on improving project management at DOE, criticized project-oriented contracts as not being appropriate vehicles for job creation.[60] Some of DOE's own contractors also want to get job creation out of EM contracts, as those contractors with expertise in environmental contamination do not tend to be experts in economic development.[61]

Reliance on Outside Contractors without Adequate Oversight

With a relatively small federal EM workforce of approximately 2,750 employees, and an EM prime contractor workforce of nearly 36,000,[62] federal employees make up less than 8% of the total EM workforce, making effective contractor oversight almost impossible.[63] This imbalance is one of the legacies of the Atomic Energy Commission and the days of the Manhattan Project.[64]

[60] Exchange/Monitor Publications, Inc., 1999b, 5–6.

[61] Ibid., 11.

[62] U.S. DOE, Office of Worker and Community Transition, 1999a; U.S. DOE, Office of Chief Financial Officer, 1999a.

[63] These numbers do not include subcontractors, as this information is not available from DOE. The imbalance would be even larger if subcontractors' employees were included.

[64] Schwartz, 1998, 358.

Under the complex contractor system that has developed at DOE, contractors supervise other contractors, with the result that federal DOE employees are often those with the least direct knowledge about what is going on at DOE's own sites and facilities. This can result in what one state regulator terms "malicious compliance." EM facilities and sites are subject to many environmental requirements—under federal and state laws, as well as under DOE's own internal rules.[65] Because the same contractors who are going to do the work to comply with the requirements are also telling DOE what needs to be done to obey the laws, there is every incentive for contractors to inflate the amount of work that needs to be done to comply with regulatory requirements. Adding to the chaos, the major site contractors have traditionally been defense or nuclear engineering contractors, although the major environmental contractors have begun to make inroads, as discussed at the end of this section.[66]

In recent years, there have been a number of well-publicized project management fiascoes at DOE. Major projects have experienced huge cost overruns, project delays, and in a few instances program termination.[67] EM has been plagued by such management failures in recent years. A few of the most notorious ones are:

- **Spent Fuel Project at Hanford.** Corroding spent nuclear fuel has been stored underwater for decades in two basins at Hanford. Described in the early 1990s as "imminent hazards" to public health and the environment, a project to remove the fuel and safely store it was initiated in 1995, with fuel removal to begin in December 1997 and removal to be completed by December 1999. Two contractors and four and a half years later, no fuel has been removed from the basins and fuel removal is not expected to be completed until August 2003. Cost estimates have nearly doubled to $1.4 billion.[68]

- **In-Tank Precipitation at Savannah River.** This project was designed to separate three radioactive elements from large amounts of liquid waste stored in underground tanks, reducing the amount of high-level waste that will be vitrified from 31 million gallons to approximately 3 million gallons. The project was initiated in the early 1980s, and the treatment facility was finally completed in 1995 (seven years late), but was cancelled in 1998 due to intractable safety hazards. By then, almost $500 million had been spent. Ineffective management and oversight and lack of technical understanding were blamed for the continued pursuit of a failed technology.[69]

- **Pit 9 Remediation at INEEL.** This project was intended to excavate an inactive hazardous and radioactive waste disposal area used for less than two years in the late 1960s. A fixed price contract was negotiated to clean the pit up for $200 million by February 1999. The contractor has already spent $257 million, yet the waste retrieval and processing facilities have not even been completed. DOE has been fined for miss-

[65] U.S. DOE, Advisory Committee on External Regulation of Department of Energy Nuclear Safety, 1995, 21–29; and Probst, Pilling, and Dunn, 1996, 11–17.

[66] U.S. DOE, Office of Procurement and Assistance Management, 1999. Environmental firms identified by rankings in Wright and Rubin, 1998, 37.

[67] U.S. GAO, 1996.

[68] U.S. GAO, 1998.

[69] U.S. GAO, 1999d.

ing compliance schedules, and no excavation of wastes has begun. The project is now expected to cost another $200 million and take at least two more years to complete.[70]

Many of DOE's contractors are among the most effective lobbyists on Capitol Hill, and their resources to influence Congress overwhelm the extremely limited resources of the nonprofit community, and even DOE itself. There is little incentive for contractors to complete cleanup—and every incentive to ensure that site studies and remedial actions take as long as possible. Some EM contractors, however, are creating well-deserved reputations for breaking this mold.

A Gradual Shift In Contractor Expertise

Increasingly, in recent years, construction and engineering firms known for their environmental remediation expertise have received major facilities management contracts from DOE, especially at sites where EM represents the primary or sole mission. The result is decreased reliance by EM on defense contractors. Environmental firms[71] now represent five of the nine companies with major facilities management contracts at the top 10 sites receiving EM funding:[72]

- Bechtel (Hanford Environmental Restoration Management; Oak Ridge Environmental Restoration Management and Idaho National Engineering and Environmental Laboratory as part of joint ventures);
- Fluor Daniel (Hanford Management and Integration, Fernald);
- Jacobs Engineering (Oak Ridge Environmental Restoration Management joint venture); and
- ICF Kaiser and CH2M Hill (Rocky Flats joint venture of two environmental firms).

These environmental firms hold 6 of the 13 major contracts to operate these ten sites. Two nuclear engineering firms, Westinghouse and Babcock & Wilcox, remain active DOE facilities management contractors. Lockheed Martin is the last defense contractor operating a major DOE site—and is decreasing its role in DOE contracting. The University of California's future as a facility contractor is somewhat cloudy over concerns about its management of nuclear security issues.

[70] U.S. GAO, 1997.

[71] Environmental firms identified by rankings in Wright and Rubin, 1998, 37.

[72] U.S. DOE, Office of Procurement and Assistance Management, 1999.

SECTION 4

The Tragedy of the Commons

Perhaps the best way to sum up the lack of external scrutiny regarding the EM program is to say that no one is representing "the taxpayer," that is, the general public. Funds for the EM program come from general revenues and, of course, are supposed to be used for the "public good." But who is it that represents the public interest in the debate about the proper use of these funds and decisions about site remediation? National environmental organizations that do try to influence DOE's spending priorities have little clout. Most of the stakeholders have focused their attention, understandably, on getting funds for projects they deem a high priority—not on the big picture. And, there is a lot of attention to the budgets, issues, and concerns at individual sites. Even when problems at individual sites—at Hanford or Paducah—garner congressional attention (and hearings), rarely does this translate into concrete and lasting actions to address the underlying problems.

Cleaning Up Nuclear Weapons Sites Is Not Politically Sexy

The environment as a hot policy issue is in decline generally, and cleaning up the weapons sites is not even on the radar screen. A number of representatives of national environmental groups contend that environmental issues generally are not as popular with the public now as they were 5 to 10 years ago.[73] Certainly the focus for many nonprofit organizations and the private foundations that fund them has turned from the "old line" issues of air, water, and waste to the newer concerns of climate change and biodiversity. And, there has never been much foundation funding for overseeing the implementation of environmental programs generally. In addition, the number of philanthropic foundations providing grants for policy analysis and education related to the weapons complex has declined in recent years, resulting in a smaller cadre of external observers. Much of the philanthropic funding in the area of nuclear weapons goes to the fight against nuclear proliferation and to international issues, not to cleanup of the nuclear weapons complex in the United States.

There are many nonprofit groups active at individual sites, but their focus has been primarily on the specific concerns at their sites, not on national policy. This void in the

[73] Based on confidential interviews conducted by the authors. Some public opinion polls document this trend, with the level of concern over many environmental problems falling by approximately 25% since 1989. See Public Agenda Online citing Gallup polls, May 1989 and March 1999.

Washington community is important, because environmental groups have always played (and continue to play) an extremely important role in holding government agencies accountable for implementing the nation's environmental laws.

For nearly 10 years—almost since the EM program's inception—there have been myriad reports documenting the difficulty of the undertaking, as well as the department's failure to focus on the mission of environmental cleanup and achieve progress. One of the first major outside evaluations of the cleanup program, a report issued in 1991 by the now-defunct U.S. Office of Technology Assessment, *Complex Cleanup—The Environmental Legacy of Nuclear Weapons Production*,[74] described in broad terms the scope of the problem and warned about its complexity. Even then, the authors cautioned that DOE was making unrealistic estimates about how long it would take to clean up the weapons sites and decried the lack of congressional oversight of the EM program.[75] Just four years later, the President's Council on Environmental Quality and the Office of Management and Budget issued a joint report on federal facilities cleanup that described the magnitude of contamination of facilities owned and operated by the federal government, including DOE.[76] The report called for a series of statutory, regulatory, administrative, and management reforms but did little to address some of the fundamental institutional barriers to a more effective—and cost-effective—EM program. Although the past decade has seen many new initiatives and improvements in the way EM does business, in many ways, little has changed. Cleanup of the former nuclear weapons production sites does not appear to be on the radar screen of the president, the White House staff, or other senior administration officials.

Moreover, expertise in these issues does not appear to be a requirement for the job of DOE secretary. Although EM is the largest program in DOE, none of the past three department secretaries has had any expertise in nuclear weapons, or in the cleanup program that is now needed to address the environmental problems resulting from their production. Nowhere was the lack of visibility, knowledge, and concern about the EM program more apparent than in the recent debate in Congress about the new National Nuclear Security Administration (NNSA). This debate all but ignored the existence of EM. In fact, the report by the President's Foreign Intelligence Advisory Board recommending a new agency contained a proposed organization chart for DOE that did not even include EM.[77] More important, the initial proposal to reorganize DOE to assure increased security and a secure future for the major DOE weapons labs did not even mention how this reorganization would affect the EM program or cleanup activities at facilities that would be moved to the new agency.[78] Many former DOE officials and the National Governors' Association opposed the reorganization, largely because it appears that the NNSA will be "largely on its own to make sure plants and labs meet environmental, health, and worker safety laws."[79] This is a grave cause

[74] U.S. Congress, Office of Technology Assessment, 1991.

[75] Ibid., 7, 9.

[76] Council on Environmental Quality and Office of Management and Budget, 1995.

[77] President's Foreign Intelligence Advisory Board, 1999, 50.

[78] Note that Secretary Bill Richardson, Representative Tom Bliley (R-VA), Representative John Dingell (D-MI), and others have since raised these issues, as have some of the independent organizations that have testified, such as the Alliance for Nuclear Accountability.

[79] Eisler, 1999.

for concern and underscores the extent to which the issues that created EM are still largely being ignored in the halls of Congress and the White House.

What appears to be missing is some person (or organization) who takes a big picture view and has the incentive to truly question where the money is going and where it should be going from a broader societal perspective. As one analyst has written, "There is no one in the process who has a serious incentive to ask whether the cleanup overall makes reasonable sense, as against the possibility that a cleanup effectively as good could be done with half the budget. There is no place at the table for concerns about how far money is being spent on projects with no discernible effect on the well-being of either people or the environment."[80]

Many of the organizations that have repeatedly raised these kinds of issues—the U.S. Office of Technology Assessment, the Congressional Budget Office, the U.S. General Accounting Office, independent researchers at think tanks and in academia—are research organizations that do not have much clout in the policymaking process. They issue their reports, try to get people to pay attention, and then move on to the next project.

In addition, the traditional dynamics between a regulator and the organization that is regulated do not apply in this case. In the traditional case, the regulated entity wants to keep costs down, while the regulator focuses on what is needed to assure the desired level of protection, sometimes ignoring cost. Where the regulated entity is DOE, and appropriations for "environment" allow DOE to keep money flowing to DOE field offices and their contractors, retain DOE jobs at facilities, and provide a new mission for DOE facilities, the incentive is for the regulated organization to keep costs up—and never to complete the job. In fact, almost all of the stakeholders benefit in some way from a high EM (and site) budget. Unfortunately, a dearth of data and a confusing internal budgeting process make it almost impossible for anyone outside of DOE to figure out what the money is being used for and to recommend what it should *really* be used for.[81] To its credit, Congress has tried to get this type of information on occasion. In the 1994 Defense Authorization Act, Congress required DOE to prepare an annual "baseline environmental management report" (BEMR) that would include estimates of the future costs of the EM program.[82] This extremely useful analysis, which was issued in 1995 and 1996, has since been suspended. It was replaced by the *Accelerating Cleanup: Paths to Closure* report, which divided the universe of EM tasks at all sites into 353 discrete projects and established a baseline schedule and cost for each project. Although a useful document, *Paths to Closure* does not include BEMR's straightforward presentation of basic site conditions and budget implications, nor does it include a description of possible cleanup options and identify important trade-offs among alternatives. In addition, many critics have voiced concerns that *Paths to Closure* is based on inaccurate and inconsistent data and faulty assumptions.[83]

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[80] Margolis, 1996, 197.

[81] Richanbach, Graham, Bell, and Silk, 1997.

[82] U.S. Congress, 1993, Public Law 103-160, 1353.

[83] Alliance for Nuclear Accountability, 1998.

EM's Bureaucratic Culture

Most external reviewers have concluded that many of the problems with the EM program stem from an inefficient bureaucracy that is unwieldy at best, and, at worst, completely unmanageable. The fundamental problems are a lack of a clear mission, reliance on private contractors without adequate oversight, few effective mechanisms for holding the field accountable, and a program still not focused on cleanup and on completing the job.

These problems are not unique to EM, but a number of reports suggest that they are found in many parts of DOE. In July 1999, a truly astounding document, the Rudman Report, *Science at Its Best: Security at Its Worst,*[84] was issued by PFIAB. What makes the Rudman Report so unusual is the stark language used to describe the culture and bureaucracy that pervade DOE. Although this report focuses on the weapons laboratories and issues of secrecy, not on the EM program, it sums up many of the institutional challenges facing the department. Many of its findings could easily describe EM. The language used is startling:

> The Department has been the subject of a nearly unbroken history of dire warnings and attempted but aborted reforms. A cursory review of the open-source literature on the DOE record of management presents an abysmal picture. Second only to its world-class intellectual feats has been its ability to fend off systematic change. Over the last dozen years, DOE has averaged some kind of major departmental shake-up every two to three years. No President, Energy Secretary, or Congress has been able to stem the recurrence of fundamental problems. All have been thwarted time after time by the intransigence of this institution. The Special Investigative Panel found a large organization saturated with cynicism, an arrogant disregard for authority, and a staggering pattern of denial.[85]

While not everyone would agree with the panel's reorganization recommendations, few have quibbled with its findings. Many have read them with glee. The Rudman Report and many of the independent evaluations and critiques of the EM program point to a few core problems that must be addressed for any meaningful reform to take place. Such reform is a necessary prerequisite if the EM program is to be worthy of the tax dollars invested in it.

The EM program has seen major changes in policy with each new assistant secretary for Environmental Management, and a new reorganization is yet again underway.[86] Each assistant secretary has felt the need to create his or her own blueprint for how to improve the workings of the program, with the result that the staff knows they can just wait out each new initiative until the next assistant secretary arrives, typically every two or three years. The general perception is that the field offices (where the real work gets done) constitute individual fiefdoms and are resistant to any outside direction, even from headquarters. This is exacerbated by the fact that the heads of the individual site offices did not,

[84] President's Foreign Intelligence Advisory Board, 1999.

[85] Ibid., ii.

[86] As discussed later in this report, the reorganization now underway appears to be addressing some key organizational problems.

until the most recent reorganization, report to the EM assistant secretary. The lack of a clear policy direction, mission, and mechanism for holding the field offices accountable is only exacerbated by the decentralized organizational structure and reliance on outside contractors.

Senior management's inability to implement effective internal systems is directly related to the political environment surrounding the cleanup program—and many view EM primarily as a "pork barrel" program. The lack of substantive oversight of the EM program, except for a flurry of hearings after a major debacle, has been pointed out repeatedly by external observers as a major flaw in the system of checks and balances.

The result is a huge bureaucratic structure in Washington and its environs made up of federal and contractor employees, with myriad headquarters policies and directives coming together at the sites—with little or no coherent vision of the program's goals, policies, and operating procedures. Like Burger King, each site can "have it your way" when it comes to cleanup standards, risk reduction goals, community involvement, and priority setting. Many have suggested that a much more efficient program would result from eliminating the flexibility of each site, and that headquarters could do a much better job of streamlining its policy and management functions. With on-the-ground work taking place at only 48 sites and the majority of the funds going to just a handful, the program would benefit from a leaner bureaucracy and better internal accountability.

A recent DOE management reform created a structure where field offices of four of the five EM sites report directly to the assistant secretary of EM for the first time—a much needed change.[87] Prior to this, site managers reported to a headquarters Office of Field Management, with no direct line of accountability to EM—even though most or all of their funding (and program responsibilities) came from EM. Assistant Secretary Carolyn Huntoon recently reorganized EM headquarters functions as well. The focus of this reorganization is on eliminating past functional offices (such as waste management, environmental restoration) in favor of a structure where each site reports to only one EM headquarters office.[88] On paper, these reforms provide a more streamlined management structure and a much-needed single point of contact in headquarters for each site. It is too soon to tell whether these reforms will be successful.

[87] U.S. DOE, 1999d.

[88] Exchange/Monitor Publications, Inc. 1999c, 8.

SECTION 5

What Needs to Be Done

Two types of actions are needed for the EM program to be worthy of the tax dollars invested in it. First are internal management and structural reforms. At least in theory, many of these are in the purview of senior DOE management, although support and involvement of Capitol Hill and senior administration officials will be needed for these reforms to be successful. In some cases, legislation may be needed as well. The second type of change that is needed is much more elusive—the need for leadership.

Recommendations

1. Clarify EM's mission and separate DOE's "job creation" and economic transition functions from EM programs and contracts.

Currently, the EM program has multiple missions, some stated and some unstated. It is tremendously important that all of these individual missions be evaluated, that some be explicitly moved to other offices in DOE or eliminated, and that the core missions be clearly stated. Once this is done, internal accounting and budgeting processes need to be revised to ensure that it is possible to assess how much money is being spent on different activities and document progress being made over time. One of the first steps that is needed is to develop a "zero-based" budget and eliminate any notion of a percentage guarantee of EM funds to sites on an annual basis.

In addition, mechanisms need to be put in place to hold employees (both federal and contractor) in both DOE headquarters and the field accountable for achieving core missions. The recent reorganization of EM is a much needed step in this direction.

Of paramount importance is divorcing EM's job creation functions from its cleanup function.[89] A fundamental question that needs to be examined is whether the job creation mission should be entirely eliminated from DOE. These two functions require different types of expertise and cloud the cleanup issues at individual sites. Another issue that deserves attention is whether the task of addressing risks from past activities should be separated bureaucratically from the task of environmental management activities for ongoing operations, such as managing newly generated wastes. Finally, senior management needs to put in place incentives and systems to assure that environmental responsibilities

[89] See Russell, 1997.

are integrated into the day-to-day responsibilities of line managers in other (non-EM) parts of DOE. One of the most crucial aspects of this is for the line DOE programs to take on financial responsibility for environmental management activities that result from the operations of their primary mission. Many internal reforms will be necessary to create an enduring structure and management system to accomplish the goals of the EM program. These include:

- assessing the size and complexity of the cleanup and stewardship tasks,
- identifying areas where more information or research is needed to address contamination problems,
- identifying a range of possible cleanup alternatives,
- assessing the pros and cons of each alternative,
- assigning priorities to tasks,
- making decisions in a transparent fashion,
- assuring that responsibilities are clearly defined and that different parts of the organization are held accountable for achieving results, and
- involving stakeholders constructively in key decisionmaking processes.

None of this is easy. One of the difficulties of making concrete suggestions for reform of EM is the very Byzantine nature of the way it currently functions. Without transparent and reliable information on how EM's funds are allocated, specific changes are hard to define, but what clearly is needed is transparency in all facets of the EM program's operations.

One critical need is to create clear lines of authority and accountability within EM and within DOE and ensure that the "right" workforce—one with expertise in environmental cleanup—is in place. The role of contractors needs to be evaluated, because it has become clear that the old DOE management structure is not well suited for cleanup, closure, and stewardship activities. This assessment should include a review of whether the size of the federal workforce is in fact adequate to conduct needed oversight of contractor activities. The qualifications of all EM and contractor employees should also be reviewed to assess whether EM and contractor staff have the training and expertise needed to manage, oversee, and implement environmental management activities. In addition, all EM sites and field offices should report directly to the Assistant Secretary for Environmental Management.

2. Decide which DOE sites will—and will not—have a future DOE mission.

One reason it is so difficult to get on with the business of "cleaning up" sites is the uncertainty about future DOE missions. At sites that have decided to "close" (that is, that have no future DOE missions), such as Fernald in Ohio and Rocky Flats, there appears to be a greater focus on getting sites cleaned up quickly and getting on with the job at hand. At these sites, where the local community knows that DOE will no longer be providing jobs after cleanup is complete, the focus of local, state, and DOE efforts is on getting the cleanups done as quickly as possible and moving on to life without DOE. It is almost certain that the EM program could be much improved if, in the next year or two, decisions were made about future missions at all EM sites. This would enable EM to set clear goals for

each site and to more easily evaluate and measure site progress. It would also liberate other parts of DOE, or perhaps another federal agency, to address economic transition issues directly.

The Base Closure and Realignment Act[90] (BRAC) provides a useful model. BRAC, in essence, provides political cover for members of Congress, the Defense Department, and the president to make difficult decisions about the closure of military installations across the country. Under this legislation, the Department of Defense makes recommendations for base closures to the independent, bipartisan Defense Base Closure and Realignment Commission (also referred to as BRAC). BRAC then publicly deliberates on the closure plan, alters the list as it sees necessary, and sends it to the president. The president then must accept or reject the entire slate of recommended closings—he is not allowed to add or delete individual sites from the list of sites to be closed. If approved, Congress then must reject the list in its entirety, or it becomes law. BRAC explicitly addresses issues of economic transition, and separates this from the closure decision. BRAC also defines an explicit process for environmental cleanup and base redevelopment.

The United States stopped producing nuclear weapons materials 10 years ago and yet has not explicitly addressed which sites and facilities should remain operating facilities. In fact, DOE has no formal definition of what facilities are considered excess to program needs, nor a process for forcing that decision.[91] Enacting legislation adopting a BRAC-like approach for DOE sites may well provide the best way out of what is an extremely difficult task. Making these decisions now would enable DOE to greatly reduce landlord costs, and also to accelerate cleanup—as well as address the legitimate issue of economic dislocation more directly and efficiently.

3. Require annual reports to Congress on the EM program.

It is disturbing that for all the billions of dollars that have been spent on EM programs since 1989, it is still difficult to determine the extent of contamination at the major sites and to identify the possible alternative approaches for addressing these risks.[92]

The internal EM budget system, also a frequent target of criticism and reform, continues to be structured in a way that makes it unwieldy as both a management and accountability tool. Current DOE planning and budgeting initiatives, such as *Accelerating Cleanup: Paths to Closure* (EM's major planning document) and the Integrated Planning and Budgeting System focus on project management and performance monitoring. They present the "path forward" and thus are not strategic planning documents that describe trade-offs among alternatives. The budgeting system is still obtuse, and individual sites are free to structure their site budgets as they see fit. The result is a lack of consistency in how budgets are structured, making external review difficult.

Without good information on the problems at individual sites and the real choices in terms of remediation, it is difficult for senior DOE managers, much less the public, to figure out the best course of action. The congressionally required *Baseline Environmental Management Report* (BEMR) provided some of this information and alternatives analysis, but

[90] U.S. Congress, 1988, Public Law 100-526; U.S. Congress, 1990, Public Law 101-510.

[91] Dahling, 1998, 4–5.

[92] Probst, Pilling, and Dunn, 1996.

was discontinued by DOE after two years. This requirement needs to be reinstated. In addition, Congress should require an annual report from EM that identifies how resources at each site were spent; estimates future costs for site cleanup and stewardship; describes what progress has been accomplished, whether the progress outlined in earlier reports was in fact achieved, and, if not, why not. Although there are a number of requirements on the books for annual reports to Congress regarding the EM program, few are complied with—in terms of both the letter and the spirit of the requirement. Reporting requirements must be taken seriously by EM in the future to provide the basis for effective congressional oversight.

4. Create an independent commission to evaluate the current EM organizational structure and identify needed reforms.

A high-level commission is needed to evaluate the EM program and make recommendations for change to accomplish the goals of a clearer mission, streamlined lines of authority, greater internal and external accountability, and protection of the EM program from parochial interests. This approach, which could be modeled on the charge given to PFIAB (the authors of the Rudman Report), has the benefit of building political prestige and credibility into the group conducting the analysis and making recommendations.

There are a number of options for who would be on the commission and how it would be chartered, such as a congressional commission or a presidential commission. What is critical is that there be involvement at the highest levels of the administration. Given the proximity of the presidential election, it could well be that this is a topic that should be the focus of the next presidential transition team as it examines DOE and the new administration's environmental goals**.**

Including current or former members of Congress increases the chances that recommendations will be taken seriously by their peers. In addition, with a commission it is possible to hire paid staff dedicated to the evaluation. If neither the president nor congressional leaders deem EM important enough to take on the issue of how to reform it, another approach would be for a group of independent experts to raise funds to conduct either a stakeholder process or an independent analysis with the same objectives described above. This would have the benefit of assuring independence, but might suffer the same fate as previous external studies—garnering little serious attention. Joining these two approaches—preparing an issue paper on the strengths and weaknesses of different approaches and then making that paper the subject of a stakeholder process—offers another approach. Although this latter approach might well have fuller representation from a broad array of stakeholders, it is likely to take longer and is more prone to becoming bogged down in reaching consensus rather than identifying innovative approaches.

One of the key questions such a commission should address is whether the EM program truly belongs in DOE. Given that this program will be with us for the next 70 years and, in some form, for the indefinite future, it is worthwhile to conduct an assessment of organizational alternatives for implementing EM activities. This is all the more important in light of the reorganization that will be implemented to create the NNSA.

Many of those seeking to reform EM have suggested radical organizational change, such moving EM out of DOE. Options include:

- moving the EM program to the Department of Defense or EPA,
- creating a new federal agency to implement EM activities at DOE sites,
- creating a new government corporation to implement EM activities at DOE sites, and
- giving responsibility for EM activities at sites with no future DOE mission to states or to some new regional authority charged with site cleanup.

What all of these approaches have in common, except the case of moving EM to the Department of Defense, is that they would take EM out of the defense culture and institutions. What makes these approaches attractive is the hope that by requiring a major organizational change, a major cultural change will also occur. This may or may not be the case. Typically, when a government agency or program is moved to another agency or department, the staff is moved along with it and the result is more one of *grafting* an existing program onto a new organization, than of really restructuring the program from scratch. Still, many outside experts believe that only a dramatic organizational change will allow the kind of major management and institutional reforms needed. One experiment in this type of reform has been the transfer of responsibility for the 22 remaining "formerly used sites remedial action program" sites from EM to the Army Corps of Engineers Environmental Restoration Division. While these sites are generally smaller and less complex than the major EM sites, early reviews of this effort have been positive.[93]

The most drastic change would be to create a government corporation—perhaps modeled on the Resolution Trust Corporation—whose sole mission is environmental management of DOE sites and facilities. This would assure a separation of EM functions from other elements of the DOE mission, and could foster an organization with a unified purpose, and an organizational structure designed with that purpose in mind.Typically, government corporations are created to assure the delivery of a public service and to allow more flexibility and efficiency in how these services are provided—that is, to try to get the best of the public and private sector approaches in one organization.[94] Although this harnessing of market forces might well benefit the EM program, one of the crucial elements in the rationale for creating a government corporation is missing: the ability to generate revenues.

The drawback to all of these alternatives is that each would require tremendous political will to implement. Yet there is currently little political interest in EM and little appetite for a major overhaul of the program. History tells us that it is unlikely that there will be a major restructuring of the EM program unless there is a real or perceived crisis. Of course, there is no way to predict when or if that will happen. We also know that if it does happen, Congress or the administration will want to act quickly and decisively. This means that it is important to identify and evaluate a range of alternatives for truly reforming EM *now*, in the absence of a crisis atmosphere, so that when action is demanded, the policy mavens are ready with a solution. It is critical that someone—either in or outside of government—be ready with a proposal for reform that has been well thought out, truly addresses the program's current ills, and can be implemented.

[93] U.S. GAO. 1999a, 18.

[94] Moe, 1995.

The Need for Leadership

A final item—perhaps the most important one, and one that *cannot* be legislated—is that leadership is needed at the most senior levels of the administration and Congress to give EM the political support it needs to make the changes that are so desperately needed. Whether these changes are internal or external, the political and economic incentives to maintain the status quo are so strong that no assistant secretary alone, no matter how determined and gutsy, can make the kinds of changes that are needed. The assistant secretary would need tremendous political support.

The challenge, of course, is to implement reform in a lasting and meaningful way. There is no doubt that implementing any reforms will slow down the program in the short term, and have other transition costs. A review of the past decade, however, shows that even without dramatic reforms the program has experienced a series of fits and starts. It is difficult to imagine that much will really be lost by taking the time to reorganize and restructure EM to assure a more efficient and effective program.

Regardless of what approach is taken, the time has come to frankly and openly assess the problems with the EM program and try to identify some enduring and effective solutions. If we do not do this now, we are likely to find some years down the road that major changes are adopted in the wake of a crisis. We can try to ward off such a catastrophe, or wait for it to come. The choice is ours.

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This publication is a product of RFF's Center for Risk Management, J. Clarence Davies, director.

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