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STATEMENT OF

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AND

JAMES E. BEARD

ON BEHALF OF

Natural Resources Defense Council
Environmental Policy Institute
Energy Research Foundation
Environmental Action
Federation of American Scientists
Greenpeace USA
Hanford Environmental Action League
Nuclear Control Institute
Operation Real Security
Physicians for Social Responsibility
Professionals' Coalition for Nuclear Arms Control
Public Citizen
SANE/FREEZE: Campaign for Global Security
Snake River Alliance
Women Strike for Peace
Women's Action for Nuclear Disarmament

BEFORE

THE U.S. HOUSE OF REPRESENTATIVES
ARMED SERVICES COMMITTEE
DEPARTMENT OF ENERGY DEFENSE NUCLEAR FACILITIES PANEL

REGARDING

THE NEED FOR ACCELERATED FUNDING FOR ENVIRONMENTAL RESTORATION
AT DEPARTMENT OF ENERGY NUCLEAR WEAPONS FACILITIES

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My name is Jim Werner. I am a project engineer with the Natural Resources Defense Council. Prior to joining NRDC this year, I was a Senior Environmental Engineer at ICF Technology, Inc. At ICF, I was a consultant to the Department of Energy on the Environmental Survey Project, which involved performing field investigations of environmental problems at a number of DOE facilities. In addition, I have provided hazardous waste consulting services to a variety of government and private clients for almost ten years. I have a Masters degree in Environmental Engineering from the Johns Hopkins University.

Appearing with me today is James E. Beard, Director of the Nuclear Weapons Project of the Environmental Policy Institute. He has been directly involved in research and advocacy on Department of Energy issues since 1986. Mr. Beard has a Bachelor of Science degree in mechanical and electrical engineering from Swarthmore College, and 2 years experience in construction engineering.

NRDC is a national environmental organization with more than 100,000 members and contributors and a staff of about 120 lawyers, scientists, resource specialists and support personnel at offices in New York, Washington, and San Francisco. NRDC pursues a broad range of environmental, energy, and defense issues. The organization has long been concerned about safety and environmental problems at Department of Energy (DOE) nuclear

facilities. Over the past twelve years, the NRDC Nuclear Project has won a series of lawsuits to enforce federal environmental laws at DOE facilities including Hanford, Washington; Oak Ridge, Tennessee; and the Savannah River Plant, South Carolina.

The Environmental Policy Institute (EPI) is a public interest organization based in Washington, DC. For more than 15 years EPI has provided services to grassroots organizations, government officials, and the American public at large on a wide range of environmental issues. EPI's Nuclear Weapons Project has for the past eight years focussed on problems within the Department of Energy's nuclear weapons production complex, working to bring these critical issues to the attention of Congress and the public.

This testimony is also presented on behalf of the Energy Research Foundation, Environmental Action, Federation of American Scientists, Greenpeace USA, Hanford Environmental Action League, Nuclear Control Institute, Operation Real Security, Physicians for Social Responsibility, Professionals' Coalition for Nuclear Arms Control, Public Citizen, SANE/FREEZE: Campaign for Global Security, Snake River Alliance, Women's Action for Nuclear Disarmament, and Women Strike for Peace.

We are pleased to have this opportunity to present our views to the Subcommittee on the funding needs of the Department of Energy (DOE) for environmental restoration at its nuclear weapons facilities.

SUMMARY

The DOE must substantially increase its commitment to cleanup of the toxic and radioactive legacy of four decades of U.S. nuclear weapons production. The current DOE plan calls for a cleanup that stretches for more than 40 years. In contrast, the Department intends to fully modernize the nuclear weapons production complex in 20 years. DOE's half-hearted commitment to environmental restoration will allow contamination to spread, driving cleanup costs still higher. The Department's skewed priorities are well illustrated by its recent request to reprogram millions of dollars from environmental activities to weapons production. DOE's priorities must be changed.

Congress should set DOE on a path toward cleanup of the weapons complex that is at least as swift as modernization. The first step is to increase substantially the commitment to environmental restoration in the FY90 budget. Specifically, Congress should increase funding in FY90 for:

- o interim remedies to halt or slow the spread of contamination,
- o environmental monitoring, especially the establishment of new monitoring wells,
- o research and development on waste management techniques,

- o laboratory capacity to ensure adequate analytical capability for cleanup,
- o decontamination and decommissioning to reduce contamination, and
- o accelerated design and construction of defense waste processing facilities.

These measures will increase significantly the progress we can make on DOE cleanup in FY90, and will also add to the technical foundation for cleanup in future years. They can be undertaken with an additional \$300 million for environmental restoration (as recently recommended by the House Budget Committee), and an additional \$100 million for defense waste management in DOE's FY90 budget.

Additionally, Congress should disapprove the Department of Energy's recent requests to reprogram funds from environmental projects to weapons production activities. Finally, this panel should act favorably on H.R. 765, recently reported out of the Energy and Commerce Committee. The bill would establish a special temporary commission to review and make recommendations about the cleanup of DOE facilities.

A. DOE Needs to Accelerate Cleanup to Meet Long-term Needs

Over the past year the DOE and the General Accounting Office (GAO) have released reports^{1 2 3 4} estimating that environmental cleanup and compliance activities at DOE's nuclear weapons production complex could cost in excess of \$100 billion.⁵ A DOE report released in July 1988, estimates that the bill for cleanup and compliance could be \$66 to \$110 billion.⁶ The General Accounting Office (GAO) estimates that DOE cleanup and compliance costs could be higher still: \$100 to \$130 billion, or \$1.7 to \$2.2 million for every nuclear warhead the United States has produced.⁷ Subsequent DOE reports contain similar estimates, making it clear that environmental cleanup and compliance at

¹ Department of Energy, "Environment, Safety, and Health Needs of the U.S. Department of Energy, Volume 1: Assessment of Needs" (DOE/EH-0079), December 1988.

² Department of Energy, "United States Department of Energy Nuclear Weapons Complex Modernization Report: Report to Congress by the President," December 1988 (commonly referred to as the "2010 Report").

³ Department of Energy, "Environment, Safety and Health Report for the Department of Energy Defense Complex," July 1, 1988.

⁴ General Accounting Office, "Dealing with Problems in the Nuclear Defense Complex Expected to Cost Over \$100 Billion," (GAO/RCED-88-197BR), July 1988.

⁵ All figures are in FY90 dollars unless otherwise indicated.

⁶ Supra note 3, at 35. The \$66 to \$110 billion includes \$26 to \$40 billion for environmental base program activities.

⁷ GAO/RCED-88-197BR, July 1988, at 6. The U.S. produced approximately 60,000 nuclear warheads between 1945 and 1986 (Cochran, T.B. et al. U.S. Nuclear Warhead Production Volume II, Ballinger Publishing Company, Cambridge, MA, 1987, at 5).

DOE's nuclear weapons production complex is one of the most expensive environmental projects facing the nation.

DOE's most comprehensive estimate of the cost for the entire cleanup and compliance job at the weapons complex is contained in the December 1988 Needs Report. This report estimates that the total bill for cleanup and compliance will be \$48 to \$86 billion, plus an additional \$1.4 billion annually to cover the "base" environmental program. The DOE and GAO cost estimates are summarized in Table 1.⁸

⁸ The components and magnitude of these cost estimates are explained in the NRDC report, "One Hundred Billion Dollars and Counting: A Primer on the Costs of Cleaning Up the DOE Nuclear Weapons Production Complex", by Dan W. Reicher and Jason Salzman, Natural Resources Defense Council, March 1989.

Table 1DEPARTMENT OF ENERGY CLEANUP AND COMPLIANCE COSTS*

<u>Cleanup or Compliance Activity</u>	<u>Estimated Cost</u>	
	<u>DOE</u>	<u>GAO</u>
Corrective Action	6-14	20
Remedial Action	35-63	35-65
Radioactive Waste Management	4-5	30
Decontamination/ Decommissioning	3-4	15

TOTAL	48-86	100-130
Base Program (annual cost)	1.4	___**

* In billions of FY90 dollars

** GAO does not include base program funds in its estimate because it considers them a "normal cost of doing business that would be necessary whether DOE had any problems or not."⁹

⁹ GAO/RCED-88-197BR, July 1988.

Whatever the exact costs for cleanup and compliance, it is clear that current DOE funding plans for these activities are inadequate. The Bush Administration's Fiscal Year (FY) 1990 budget request for DOE's nuclear weapons production activities is about \$9.4 billion. Of this, just \$372 million, or some 4 percent, is earmarked for actual remedial action at DOE's 3,000 waste sites. While this is an \$81 million increase over the Reagan Administration's request and a \$230 million increase over the current level of funding, it falls far short of what is needed. Assuming DOE's \$65 billion estimate for remedial action and the proposed \$372 million funding level, it would take about 175 years--or until the year 2165--to complete remedial action.

DOE's response to its decontamination and decommissioning needs is also totally inadequate. Just \$29 million is allocated to these activities in DOE's proposed FY90 budget. At this spending level, decontamination and decommissioning projects will take over 135 years--or until the year 2125--assuming the Department's \$4 billion estimate for this work. And it should be noted that the Department does not include in its estimate the cost of decontaminating and decommissioning buildings currently in use. GAO does include these costs and its estimate for decontamination and decommissioning is \$15 billion. As Raymond Berube, DOE Deputy Assistant Secretary for Environment admitted at a recent Senate Armed Services Committee hearing, "Clearly our needs exceed what's in the Fiscal 1990 budget request."

Over the long run, DOE's plans for meeting projected cleanup needs are equally inadequate. Under the spending scheme outlined in the "2010 Report", the weapons complex would be fully modernized over 20 years at a cost of \$52 billion above current funding levels. By contrast, the "2010 Report" provides only a \$29 billion increase above current funding levels for remedial action and decontamination and decommissioning. And this increase would pay for less than half of the cleanup funding that DOE projects it will need.¹⁰ Thus the "2010 Report" makes clear that cleanup activities will continue to take a backseat to weapons production over the next two decades.

As part of its "2010 Report" the Energy Department proposed a two-phased cleanup program.¹¹ Figure 1 illustrates the DOE approach, referred to here as the "Proposed DOE Program".¹² Under this approach, environmental restoration spending would

¹⁰ Assuming the total bill for remedial action and decontamination at the complex is \$65 billion, as estimated in the December "Needs" report and DOE spends \$32 billion on these activities over the next two decades (\$29 billion plus \$3 billion cumulative current funding), as outlined in the "2010 Report", more than half the cleanup job would still remain in the year 2010. Based on GAO's estimate of \$80 billion, cleanup would be only slightly more than one-third complete by this date.

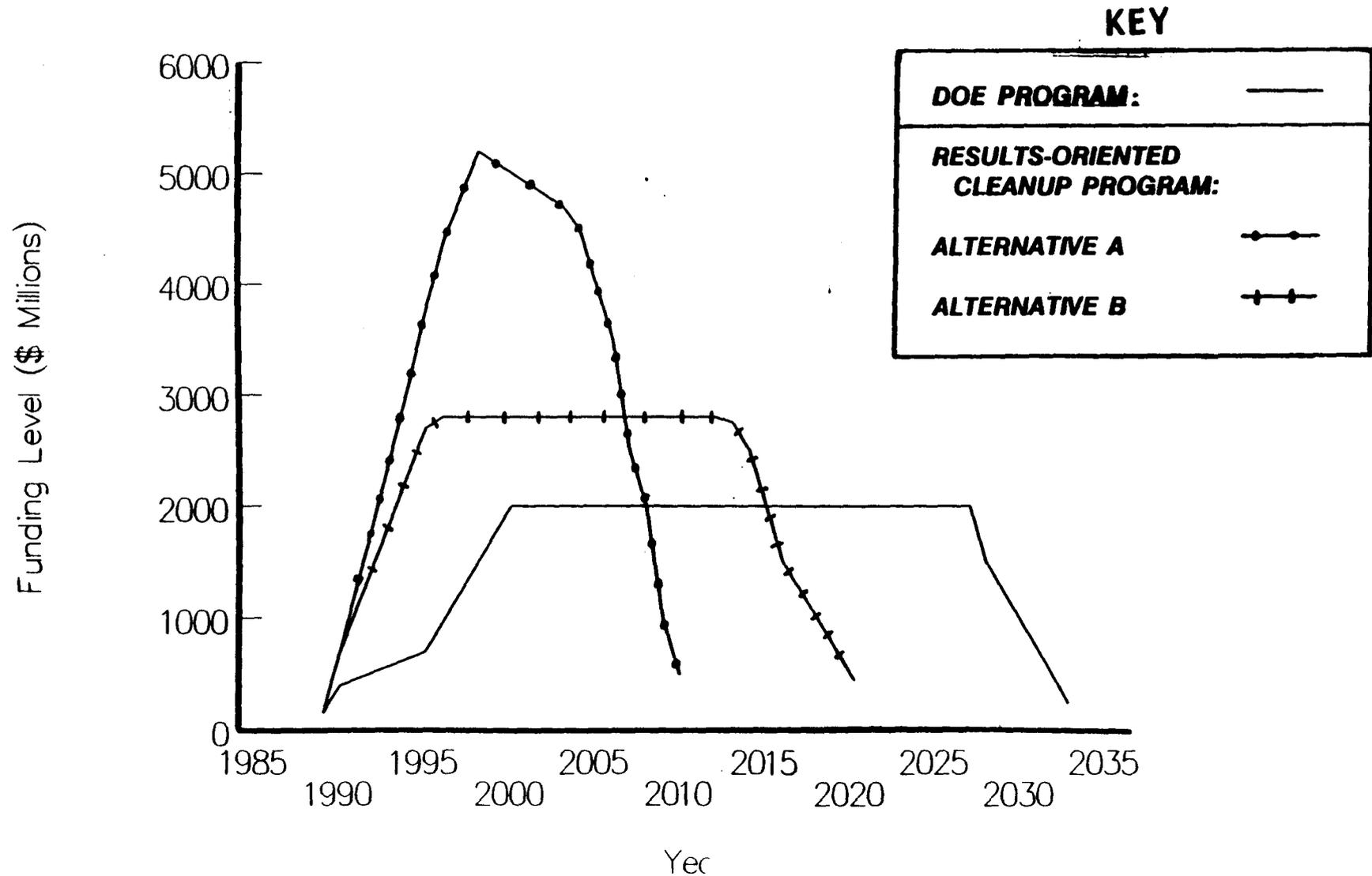
¹¹ DOE, Supporting Documentation to the President's Report on Nuclear Weapons Complex Modernization: Waste Management, Environmental Restoration and Operations Environment, Safety, and Health, December 1988, at 31.

¹² The specific annual expenditures are listed as the "DOE Program" in Table 1. These annual expenditures are derived from the benchmarks established for 1995 (\$700 million/year) and for 2000 and after (\$2 billion/year) as well as the total estimated cost of environmental restoration (\$70 billion) given in the "2010 Report".

FIGURE 1

Department of Energy

Environmental Restoration Funding



increase steadily (at \$60 million/year) to approximately \$700 million annually in FY95 (see specific annual funding listed in Table 2). Until 1995, only high priority remedial actions would occur, while studies were performed on the other sites. Between 1995 and 2000 DOE proposes to increase spending on environmental restoration at a faster rate (\$260 million/year) until a steady state level of \$2 billion per year is achieved in FY 2000. This spending rate would remain constant until the program is finished. The spending rate would decline between 2028 and 2033 at the same rate that it increased between 1995 and 2000 until an operation and maintenance level of \$200 million/year is reached in 2033.¹³

DOE's proposed program has troubling implications. If DOE's approach were to be followed, only twelve percent (\$8.8 billion) of the needed cleanup would be finished by the year 2000. In addition, the cleanup would stretch out for over 40 years -- until after the year 2030. This half-hearted approach would not only leave most of the cleanup yet to be accomplished after 20 years, it would also result in an escalation of the total cleanup cost as contamination spreads while action is delayed and the cleanup job gets bigger.

¹³ A mathematical error seems to have occurred in DOE's "2010 report" in summing the spending between 1990 and 2010. If the total annual environmental restoration spending between 1990 and 2010 is calculated, based on the benchmarks given in the Supporting Documentation of the "2010 report", then approximately \$31 billion would be spent. However, the executive summary (page v) of the "2010 report" indicates that only \$28.8 billion will be committed to environmental restoration.

The cleanup plan outlined in the "2010 Report" is inadequate. We believe that cleanup should occur at least as fast as modernization, which DOE projects will take 20 years to complete. Under a 20-year timetable, cleanup funding would increase steadily until 1998, when a funding level of approximately \$5 billion is reached (see Figure 1). The cleanup program would then scale down so that most of the cleanup is completed, and only operation and maintenance costs for treatment systems would be incurred after the year 2010.¹⁴ This cleanup strategy is listed as "Result-oriented Cleanup Program/Alternative A" in Table 2, and illustrated in Figure 1 as the upper curve.

We also considered an alternative cleanup program over a 30-year period ending in the year 2020. Under this timetable, the level of activity would grow steadily until the year 1996 when annual spending of \$2.8 billion would be reached. This cleanup rate would continue until 2012 when the cleanup program would scale down, and finish in 2020 except for a maintenance level of \$500 million. In Table 2, this approach is listed as "Results-oriented Cleanup Program/Alternative B" and illustrated in

¹⁴ The final annual operation and maintenance level for the "DOE Program" (\$200 million) is assumed to be less than that for the "Results-oriented Program" alternatives (\$500 million) because of the different program lengths assumed for performing the remedial construction activities. The 40-year DOE Program would include enough time to complete the operation and maintenance for many of the projects begun during the early part of the program, whereas, for a shorter program, much of the operation and maintenance will still be ongoing when remedial construction is completed.

TABLE 2

DEPARTMENT OF ENERGY ENVIRONMENTAL RESTORATION FUNDING

PROPOSED DOE PROGRAM

"2010" Report Assumptions:
 Delay 88% of Cleanup to After 2000
 Spend \$2 Billion/Yr. After 2000
 Finish \$70 Billion Cleanup 2033

RESULTS-ORIENTED CLEANUP PROGRAM

Alternative Assumption:
 Control Spread of Contamination Early
 Finish \$70 Billion Cleanup in:
 20-Year Period 30-Year Period

Fiscal Year	DOE Program Assumptions Amount (\$Millions)	Alternative Program A Amount (\$Millions)	Alternative Program B Amount (\$Millions)
1989	159	159	159
1990	400	700	700
1991	460	1300	1100
1992	520	1900	1500
1993	580	2500	1900
1994	640	3100	2300
1995	700	3800	2700
1996	960	4400	2800
1997	1220	4800	2800
1998	1480	5200	2800
1999	1740	5100	2800
2000	Subtot. = 2000	5000	2800
2001	\$8.86 Bill.	4900	2800
2002	2000	4800	2800
2003	2000	4700	2800
2004	2000	4500	2800
2005	2000	4000	2800
2006	2000	3500	2800
2007	2000	2500	2800
2008	2000	2000	2800
2009	2000	1000	2800
2010	2000	500	2800
2011	Subtot. = 2000	Total = \$70 Bill.	2800
2012	\$31 Bill.		2800
2013	2000		2750
2014	2000		2500
2015	2000		2000
2016	2000		1500
2017	2000		1250
2018	2000		1000
2019	2000		750
2020	2000		500
2021	2000		
2022	2000		
2023	2000		
2024	2000		
2025	2000		
2026	2000		
2027	2000		
2028	1500		
2029	1240		
2030	980		
2031	720		
2032	460		
2033	200		

Total = \$70 Billion

Total = \$70 Billion

Figure 1 as the middle curve. As shown in Figure 1, even this stretched-out cleanup program will require a significantly greater level of effort in FY90 than envisioned by DOE.

Comparing DOE's environmental cleanup needs with those of the Department of Defense further illustrates the inadequacy of DOE's plans. Figure 2 shows the Defense Department's plans to expand its cleanup program rapidly over the next several years. DOD's cleanup spending is expected to peak at nearly a billion dollars per year in 1994 and then decline again until it levels off in 2005. Although we are concerned that the cleanup of Defense Department sites is not being funded at planned levels, and that it underestimates the total cleanup costs, it is nonetheless useful as a benchmark in considering DOE's plans.¹⁵

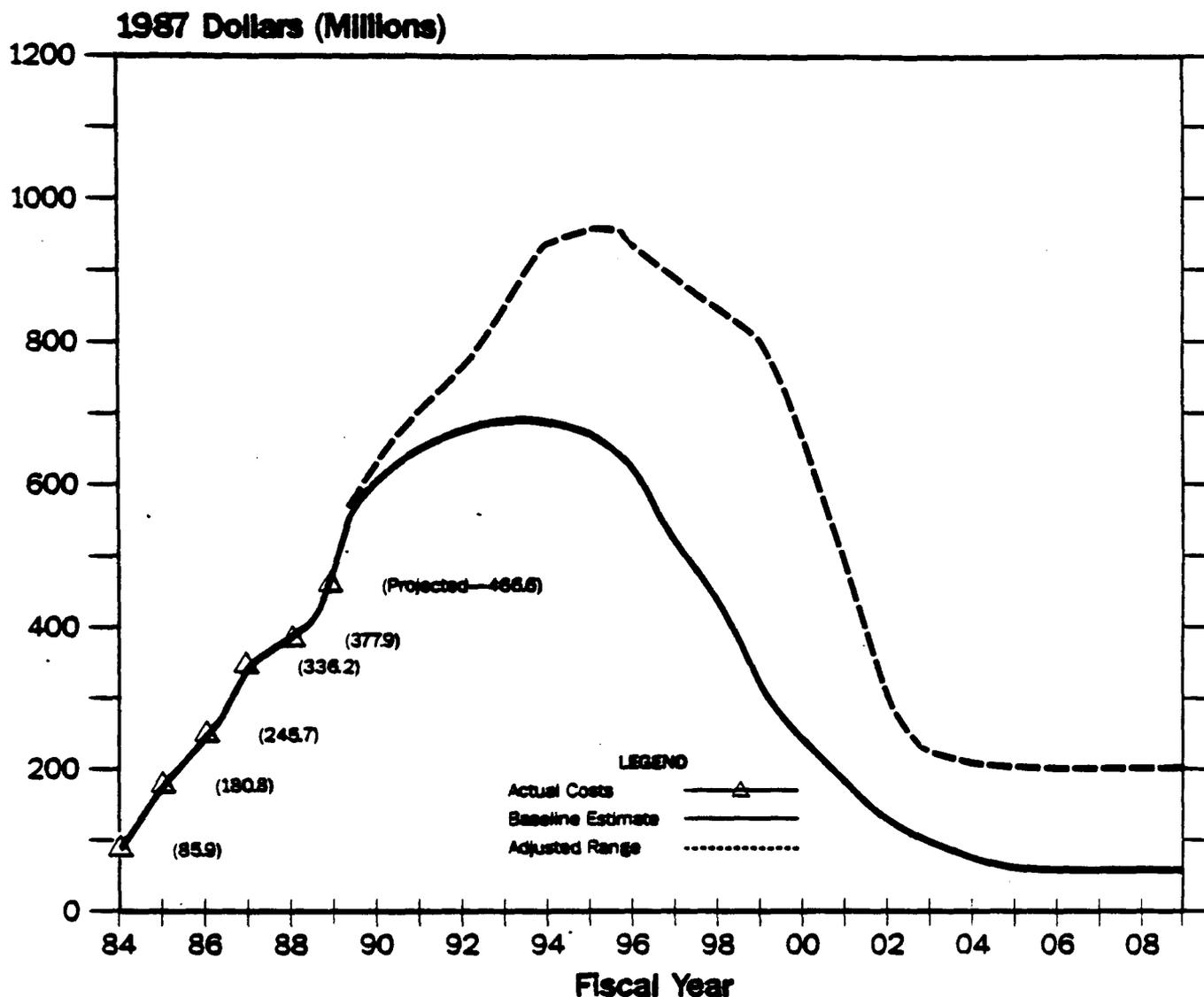
Admittedly, DOE's total cleanup task is almost five times larger than the Defense Department's.¹⁶ However, the DOE cleanup will occur simultaneously at hundreds of separate sites. Therefore, if substantial additional resources were devoted to the cleanup, the task could be accomplished in a timeframe similar to that projected by DOD.

¹⁵ The FY90 environmental restoration budget request of \$517 million for Defense Department sites was held at FY 89 levels (plus inflation) despite previous plans to increase spending for environmental restoration to more than \$600 million in FY 90. Also, the current estimates fail to account for the increased costs of using permanent remedies.

¹⁶ The cost of cleaning up DOD facilities is estimated to cost approximately \$9-14 billion, according to the Defense Environmental Restoration Program Annual Report, March 1989, compared to a total cost of \$70 billion estimated in DOE's "2010 report" for its nuclear weapons sites.

FIGURE 2

Department of Defense
INSTALLATION RESTORATION PROGRAM COSTS



NOTE: These figures do not include costs of Other Hazardous Waste, or Building Demolition/Debris Removal activities or Rocky Mountain Arsenal, CO cleanup.

Source: Office of the Deputy Assistant Secretary of Defense (Environment), Defense Environmental Restoration Program, Annual Report to Congress for Fiscal Year 1988, March 1989, at I-22.

B. There are a Number of Specific Areas Where Additional Cleanup Funding Can Be Effectively Spent in Fiscal Year 1990.

In recent hearings, DOE has claimed that it could not spend additional funds in FY90 if they were authorized. We believe, however, that significant additional cleanup work can and must be done. In addition to the general need to accelerate cleanup to achieve a reasonable level of activity in the 1990s, there are specific cleanup activities that require additional funding in FY90.

1. Interim Remedies

The lessons learned during the 1980s in the Superfund program should be applied to cleaning up DOE facilities. One important lesson was the usefulness of "interim remedies" i.e., remedies used to stabilize the spread of contamination and to reduce any short-term risks such as fire and explosion. Interim remedies are cleanup measures that can be taken now to halt or slow the spread of contaminants in groundwater and soil. Because of the overwhelming scope of cleanup needs at DOE facilities it makes a great deal of sense to employ interim remedies at some sites.

Perhaps the best illustration of the usefulness of an interim remedy is Times Beach, Missouri, where dioxin-contaminated soil was allowed to remain in ditches and on roads while the situation was being studied. Unfortunately, no interim

action was taken and a summer flood spread the contaminated dirt into nearby streets and yards. EPA eventually bought the entire town for approximately \$32 million and moved its residents to new homes. EPA is now planning a \$100 million cleanup involving incineration of contaminated soil. The application of some well-chosen interim remedies might have prevented this terrible waste of a town and the consequent exorbitant costs.

Similarly, a large area located at DOE's Oak Ridge reservation in the flood plain of the Clinch River is contaminated with thousands of pounds of uranium. The cleanup of the site was to begin last year, but was deferred because funding was denied. Flooding of the Clinch River could wash a large amount of the radioactively-contaminated soil into the river and adjoining fields and forests, greatly increasing the cost of cleanup at this site. This is a classic example of where an interim remedy such as "hot spot removal" or a retaining wall by the river would avoid serious future problems.

The ground water at many DOE facilities is contaminated with radioactivity and organic chemicals (e.g., Lawrence Livermore National Laboratory, Fernald, Savannah River Plant, Hanford, Rocky Flats Plant). In some cases, the contamination has spread off site and contaminated residential drinking water wells. The spread of contaminated groundwater can be halted or slowed with the use of "counterpumping" strategically located wells. Also, "hotspots" of highly contaminated soil or sludge can be removed

to eliminate the original source of the contamination thereby stemming its spread into the ground, air or waterways.

In addition to direct environmental benefits, interim remedies are likely to save money in the long-term by ensuring that the contamination does not spread before a permanent remedy can be implemented. The use of interim remedies has been recommended by the Office of Technology Assessment¹⁷ and by private contractors with significant experience in the Superfund program.¹⁸

Although interim remedies can provide quick, cost-effective responses, there are three important considerations concerning their use: (1) interim remedies should not be used as a substitute for permanent remedies; (2) distinct decision-making processes should be used for the interim and the permanent remedies so that interested citizens will have an opportunity to comment on both phases;¹⁹ (3) the implementation of an interim remedy should not interfere with any planned long-term remedy. For example, soil covers should be avoided in cases where subsequent exhumation of wastes might be necessary because excavation through this type of cover is more difficult and

¹⁷ Office of Technology Assessment (U.S. Congress) Superfund Strategies. April 1985, p. 39.

¹⁸ See e.g., testimony of William A. Wallace, CH2M Hill, and Gary A. Dunbar, CDM, before the Subcommittee on Commerce, Tourism, and Transportation, 1983, Ser. No. 98-128.

¹⁹ Environmental Defense Fund, et al. Right Train, Wrong Track: Failed Leadership in the Superfund Cleanup Program. June 20, 1988.

expensive. Such an interim remedy should also be avoided because it might serve as a disincentive for implementing the final cleanup.

2. Decontamination and Decommissioning

There are hundreds of DOE facilities contaminated with radioactivity and hazardous chemicals awaiting decontamination and decommissioning (D&D).²⁰ These facilities range in size and complexity from large production reactors and fuel reprocessing facilities to small laboratories and fabrication facilities. All of the facilities pose some potential hazard to the environment, and must be decontaminated and decommissioned.

Decontamination and decommissioning may be the biggest sleeping giant in the DOE budget. DOE estimates decontamination and decommissioning costs at approximately \$3-4 billion.²¹ The GAO, however, assigns a price tag of \$15 billion to D&D.²² Overall, we believe the costs will be far greater.

The FY90 budget request defers virtually all D&D activity by earmarking only \$29 million for this multi-billion dollar program. At this rate, it would take DOE over a century (DOE

²⁰ Rogers and Associates Engineering Co., Radioactive Contamination at Federally-owned Facilities, Prepared for the Environmental Protection Agency, RAE-23-1, June 1982 at 3-53.

²¹ DOE Needs Report, DOE/EH-0079, at 31.

²² GAO, Dealing With Problems in the Nuclear Defense Complex Expected to Cost Over \$100 Billion, GAO/RCED-88-197BR, at 6.

cost estimate) and over five centuries (GAO cost estimate) to complete the D&D of the weapons complex.

In the few instances where DOE has considered funding D&D plans, costs have been consistently underestimated. For example, DOE estimated the D&D costs for all eight of the retired Hanford production reactors at less than \$200 million total (\$25 million per reactor).²³ This estimate contrasts sharply with considerable evidence from commercial reactor decommissioning showing the costs to be substantially more than \$100 million per reactor.²⁴

Funding for decontamination and decommissioning must be increased sharply above the Bush FY90 request for a number of reasons. First, many of the facilities currently requiring D&D are over 40 years old. If DOE waits until buildings begin losing their structural integrity, it will have a crisis on its hands that could result in increased radioactive contamination. DOE recognized this potential in a recent report on reactor decommissioning:

No further action would result in deterioration of the reactor building, potential release of radionuclides to the

²³ DOE, Draft Environmental Impact Statement, Decommissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington, DOE/-0119D, March 1989, at 1.14.

²⁴ GAO, NRC's Decommissioning Cost Estimates Appear Low, GAO/RCED-88-184, July 1988, at 3; and Pollack, Cynthia, Decommissioning: Nuclear Power's Missing Link, Worldwatch Paper No. 69, April 1986, at 26.

environment, and potential human exposure to
radioactivity. . . .²⁵

Accelerating the necessary D&D work on these buildings will reduce the threat of radioactive releases, and will save money over the long run.

Second, D&D efforts must be accelerated so that EPA and state environmental agencies can begin to assess the environmental threats posed by contaminated facilities. For example, DOE has acknowledged that the 105-KE fuel storage basin at the Hanford facility leaked a significant amount of radioactivity into the soil column immediately adjacent to the Columbia River.²⁶ The contamination has not yet been fully characterized, however, awaiting the D&D of the basin and the entire KE reactor. Similar instances of environmental contamination could be occurring at other sites, but because of the lack of D&D they have not yet been identified. Delays in decontamination and decommissioning at these sites may allow contamination to spread with higher cleanup costs resulting.

Finally, the number of facilities requiring D&D will grow significantly in the near future as DOE begins retiring outdated facilities. DOE has proposed eliminating nuclear production activities at three facilities: Hanford, Fernald, and the Rocky Flats Plant. Massive shutdowns such as these will result in more facilities that will need D&D. By 1995, approximately 350

²⁵ DOE/EIS-0119D, at 3.7.

²⁶ DOE/EIS-0119D, at 3.4.

production facilities will be available for D&D.²⁷ Upon completion of the shutdowns and phaseouts discussed in the "2010 Report", there will be still more facilities requiring D&D. It is important to make headway on current D&D requirements if there is to be any reasonable expectation of coping with future D&D needs.

3. Waste Site Cleanup

In addition to decontamination and decommissioning, the cost of cleaning up thousands of hazardous and radioactive waste sites will be the largest single category of environmental funding needs for the nuclear weapons complex. Although smaller funding areas such as interim remedies and research and development are extremely important, actual waste cleanup will be the primary task on which DOE must focus. DOE should be gearing up for this task by fully funding the cleanups that are ready to be completed, and performing the necessary investigations at the other sites so that it is ready to complete those remedial action without delay. In addition, DOE should at least include in its annual budget request adequate resources to cover the immediate environmental needs expressed by the professionals in its field offices.

Cleanup is occurring or is ready to begin at many facilities for which funding is required without delay. But, at most sites

²⁷ Modernization Report, at 6.

the necessary studies and investigations about the existing problems have yet to begin. These studies are not mere paper exercises but are a critical first phase of the cleanup. Dozens of monitoring wells must be installed, pumping tests of aquifers must be performed, hundreds or thousands of soil, water and vegetation samples must be collected and analyzed, and the feasibility of proposed treatment technologies may require testing on a pilot scale. The cost of a remedial investigation/feasibility study of a typical Superfund site is approximately \$1 million. If DOE is to achieve a reasonable level of activity by the year 2000, as illustrated in Figure 1, then these necessary studies must be funded so that the cleanup is ready to occur.

Environmental officials at DOE field offices are required to submit annual requests for the funding they need for cleanup and environmental compliance through the so-called "A-106" process.²⁸ At many facilities the Bush Budget does not include enough funding to cover the requests made by professionals in the field offices. Table 3 shows the difference between the amount of funds included in the Bush budget and the amount requested by the field offices. For example, the Bush budget included less than half the amount of funding requested by the field office for the

²⁸ Section 3(a)(3) of Executive Order 12088 requires that federal agencies submit Pollution Abatement Plans (also known as Pollution Status Reports and Five-year Plans: EPA Form 3500-7). Requirements for complying with this Executive Order are outlined in OMB Circular No. A-106.

TABLE 3

**COMPARISON OF DOE FIELD OFFICE REQUESTS
FOR ENVIRONMENTAL RESTORATION FUNDS WITH BUSH REQUEST
(\$ Millions)**

<u>Facility</u>	<u>Field Office Request¹</u>	<u>Bush Budget²</u>	<u>Amt. (Needed) or Over Request</u>
Kansas City Plant	10.3	2.236	(8.064)
Los Alamos	25.079	7.480	(17.599)
Mound	18.119	10.266	(7.853)
Pantex	2.9	3.501	0.6
Pinellas	0.4	0.7	0.3
Rocky Flats Plant	27.5	17.850	(9.650)
SNL-Alb.	3.7	3.650	(0.05)
SNL-Liv.	0.5	0.9	0.4
Fernald	13.562	23.0	9.44
INEL	43.999	46.488	2.5
Lawrence Livermore	11.563	11.563	0
Nevada Test Site	2.985	2.630	(0.355)
Oak Ridge Nat. Lab.	70.180	32.845	(37.335)
Oak Ridge GDP	19.488	14.0	(5.488)
Oak Ridge Y-12	29.5	47.9	18.4
Savannah River	58.060	56.168	(1.892)
Hanford	66.683	80.223	13.5
TOTAL REQUESTS NOT MET = (\$88.286)			
TOTAL ABOVE REQUESTS = \$44.7			
NET = (\$43.5)			

¹ Compiled from Annual "A-106" (March 6, 1989 version) submittals from DOE field offices, Tom Zamora, Federation of American Scientists, Washington, D.C.

² Revised Congressional Budget Request, FY 1990, February 21, 1989.

Oak Ridge National Laboratory in Tennessee (\$32 million instead of \$70 million). Also, the Los Alamos National Laboratory (LANL) requested \$25.079 million dollars in FY90 for environmental restoration, but the Bush budget includes only \$7.480 million for LANL. The total amount of the requests not met in the proposed Bush budget is more than \$88 million.²⁹ This total represents only the amount included in the A-106 requests, which we understand from discussions with EPA and DOE officials do not reliably include all of the real environmental needs of a facility.

4. Research and Development of Waste Cleanup and Waste Reduction Technologies

New technologies to clean up waste as well as to reduce the amount of waste being created need to be developed if DOE is going to manage its environmental problems effectively. For example, at many sites where DOE has estimated funding needs in the "A-106 submittals" for environmental restoration, the cost estimates have assumed the use of a method called "capping" in which a dirt or clay cover is placed over a waste site. This technique, however, has frequently been proven inadequate. The clay or dirt cap tends to fail because of erosion, burrowing rodents, and tree roots; precipitation infiltrates the waste

²⁹ Although the amount earmarked in the Bush budget for several facilities exceeds the A-106 request amount, the net difference is more than \$43 million. This comparison can be misleading, however, since the funds dedicated to one site are not available to meet the needs of another site.

site, and contaminants are carried into groundwater or surface water. This migration leads to more extensive and widespread contamination and results in higher total cleanup costs. In addition, a cap can get in the way of subsequent efforts to treat or remove the waste permanently.

DOE must develop permanent cleanup technologies to actually detoxify or eliminate the waste rather than merely covering it up. "In situ biodegradation" is an example of a promising cleanup technology that could provide a lower cost, permanent solution to many waste site problems. One application of this technology is now being field tested by the U.S. Navy in cooperation with Stanford University at the Moffet Naval Air Station in California using microbes to degrade hazardous solvents in soil. We are encouraged by the Energy Department's recent plans to be on the "cutting edge" of developing new cleanup technologies,³⁰ but it will have a big job to merely catch up to level of technical sophistication already attained by many government agencies and private corporations during the 1980s.

EPA has developed a program to assist private and university scientists in developing new cleanup technologies, which provides

³⁰ Statement of Peter N. Brush, Acting Assistant Secretary for Environment, Safety and Health, DOE, Before the Subcommittee on Natural Resources and the Environment, Agriculture Research and Environment of the House Science, Space and Technology Committee, April 27, 1989, at 3.

up to \$3 million per project annually.³¹ Similar assistance may be appropriate for developing cleanup technologies for DOE facilities where unique technical challenges do not offer a private developer adequate assurance of recouping an initial research and development investment.

Another critical area where more environmental research is needed is in reducing the amount of waste being generated by redesigning processes to make them more efficient and substituting less toxic products. For example, non-toxic, water-based parts cleaning solutions can often be substituted for organic solvents. In addition, substitutes must be found for chlorofluorocarbons (CFCs) -- chemicals known to destroy the earth's protective ozone layer. The Paducah and Portsmouth plants annually emit over 150 and 100 tons of CFCs, respectively. CFCs are also used in degreasing operations at many DOE facilities. Because CFC substitutes must often be painstakingly tested for each application to ensure that they will be effective, the research process may take months or years. Therefore, the process of finding substitutes must begin now.

³¹ EPA, The Superfund Innovative Technology Evaluation Program: Progress and Accomplishments, A Report to Congress, EPA/540/5-88/001, February 1988, at 2-5.

5. Laboratories for Reliable Environmental Monitoring Results

We have significant concerns about DOE's ability to develop reliable environmental data. An adequate capacity to perform reliable environmental analyses will be vital to the design of an effective and efficient environmental cleanup program. DOE must significantly increase its available laboratory capacity if cleanup is to proceed in a timely and efficient manner. For example, DOE does not expect to complete characterization of the wastes in the Hanford single-shell tanks until 1998, in part due to a shortage of laboratory capacity. This delay could be reduced if funds for building laboratory capacity are increased in FY90 and following years. The General Accounting Office testified before a recent Senate hearing that DOE could use an additional \$50-100 million dollars in FY90 for environmental monitoring.³² Much of this additional environmental monitoring funding is needed for expanded and improved laboratory capacity.

DOE must also invest in improvements in its existing laboratories to ensure the reliability of the data used to support cleanup decisions. GAO has testified,³³ and based on our experience we find, that DOE places more emphasis on quality assurance and quality control (QA/QC) in its weapons production

³² Statement of Keith Fultz, General Accounting Office, before the Senate Armed Services Committee Subcommittee on Strategic Forces and Nuclear Deterrence, April 7, 1989.

³³ Peach, Dexter and Keith Fultz, General Accounting Office, Testimony Before the House Armed Services Committee, Subcommittee on Procurement and Military Nuclear Systems. February 24, 1989.

operations than in its environmental monitoring, and consequentially, serious QA/QC problems have occurred in environmental monitoring laboratories. For example, at several sites, samples that were intended to test the reliability of a laboratory's routine analytical procedures, were "flagged" for special attention. As a result, laboratory technicians knew that samples were intended for evaluating the lab's performance.³⁴ This special attention completely defeats the purpose of this QA/QC procedure. These problems may be partly related to the shortage of laboratory capacity. Technicians overburdened with routine analyses cannot carry out necessary quality assurance/quality control (QA/QC) reviews. Additional staff may be needed to cope with the increased QA/QC burdens.

Another recurring problem heard from EPA and state regulatory officials is the DOE facilities have greater expertise with analysis of radioactive than nonradioactive contaminants. For example, at several DOE sites a common problem was the failure to follow the standard practice of chilling water samples to prevent the volatile organic contaminants from evaporating.³⁵ Without following this procedure, it is not clear whether the

³⁴ DOE, Environmental Survey Preliminary Report Los Alamos National Laboratory, DOE/EH/OEV-12-P at 4-118 (January 1988); DOE, Environmental Survey Preliminary Report, Kansas City Plant, DOE/EH/OEV-11-P at 4-65 (January 1988).

³⁵ See e.g., Preliminary Survey Report, Pantex Plant, DOE/EH/OEV-06-P, September 1987, p. 4-61; and Preliminary Survey Report, Portsmouth Uranium Enrichment Complex, DOE/EH/OEV-04-P, August 1987, p. 3-72.

sample results indicate uncontaminated water, or improper handling that caused the contamination to evaporate before the sample could be analyzed. Similarly, GAO found problems with groundwater samples at the Savannah River Plant including mislabeled sampling sites and poor sampling methods.³⁶ To remedy these shortcomings, DOE will need to expand the abilities of its laboratories to analyze non-radioactive contaminants such as organic solvents and heavy metals. Specialized instruments such as gas chromatographs, mass spectrophotometers, and atomic absorption analyzers will have to be purchased. Until laboratory facilities are expanded and improved the pace of cleanup will be limited by DOE's ability to gather reliable data.

6. Monitoring Wells

Perhaps the single biggest environmental problem at DOE facilities is contaminated groundwater. Simply understanding the extent of this type of contamination can be an excruciatingly difficult task -- comparable to studying air pollution where you cannot see where the smoke stack is, which direction the wind is blowing or what is in the smoke. Literally thousands of new monitoring wells will be required. Each hazardous waste site requires a minimum of three monitoring wells.

At Hanford, where over 1,500 waste sites have been identified, DOE plans to install only about 50 monitoring wells

³⁶ GAO/RCED 88-197BR, at 19.

per year over the next few years. At this rate it could take several decades or more just to install the necessary monitoring wells to say nothing of actually cleaning up the sites.

Such delays in site characterization and cleanup can contribute to the spread of contamination, and hence to higher overall cleanup costs. For example, at DOE's Paducah Gaseous Diffusion Plant in Kentucky, cancer-causing solvents were found recently in off-site drinking water wells. Had the placement of groundwater monitoring wells been accelerated at this site, the spread of contaminants would have been detected much earlier, possibly preventing this wide-spread contamination, with the direct result of a lower overall cleanup cost for this site.

7. EPA and State Oversight Funding.

Without adequate funding for regulatory agencies like EPA, many cleanups will be delayed due to backlogs in review and approval. For example, EPA's Region VIII office has stated that it will need to triple its Federal facility oversight staff just to keep up with the oversight necessary for the cleanup of the Rocky Flats Plant in Colorado. Similarly, we understand that the staff of the South Carolina Department of Health and Environmental control is understaffed and underfunded in its regulation of the Savannah River Plant. Once again, an increase in funding could prevent unnecessary delays in cleanup, delays which can lead to increases in overall cleanup and environmental restoration costs.

8. Construction of Defense Waste Treatment Facilities Needs to be Accelerated.

The DOE is currently in the final stages of completing a \$1 billion high-level radioactive waste vitrification plant at the Savannah River Plant which will embed radioactive wastes in high-integrity, boro-silicate glass. This plant, known as the Defense Waste Processing Facility, will play a major role in easing the high-level waste problems at the Savannah River Plant.

Because of the important role that waste vitrification can also play in solving the critical high-level waste problems at the Hanford Reservation and the Idaho National Engineering Laboratory (INEL), DOE should be moving ahead on a rapid basis with the design and construction of vitrification plants at both of these facilities. Unfortunately, under current spending plans, a vitrification plant will not be operating at Hanford until the turn of the century. At the Idaho facility a vitrification plant will not even be under construction until after the year 2000. In fact, rather than using millions of dollars available from a completed waste storage facility at INEL to begin work on this new vitrification plant, DOE has requested that the money be reprogrammed to a new plutonium production plant in California.

Low-level radioactive waste disposal must also be better addressed. One example of a low-level defense waste facility for which funding should be increased is the treatment facility

(referred to as the "Pond-crete Plant") used for stabilizing wastes from the solar evaporation ponds at the Rocky Flats Plant. This facility is part of the cleanup of evaporation ponds at Rocky Flats which received low-level liquid radioactive wastes as well as hazardous wastes including carcinogenic solvents, hexavalent chromium, and cyanide solutions. These solar ponds are leaking into the Walnut Creek drainage, which leads to the Great Western Reservoir -- the source of drinking water for the town of Broomfield (population 8,000). Approximately 17,000 batches of "pond-crete" were recently found to require testing and remixing because of problems with the ratio of concrete used initially. Hence, merely to maintain the original schedule, the treatment facility needs to be expanded and improved.

C. Congress' Response

DOE has repeatedly demonstrated its inability to manage its environmental problems. Over the years, DOE environmental programs have taken a back seat to its weapons mission. DOE's insistence on asking for immediate funding for low priority weapons projects, combined with the Department's recent request to reprogram funds from environmental restoration to weapons production demonstrates that DOE's priorities have not changed. Congress must take charge.

In developing a comprehensive legislative approach to environmental problems at the weapons complex, Congress must make the following assumptions. First, DOE cleanup and compliance

costs will, over the next several decades, constitute a major new element in DOE's budget requiring substantial funding. Second, as explained above, the cost of cleanup will rise over time, especially if stabilization and remedial work is not begun immediately. Third, cleanup should be accomplished in at least the same amount of time as DOE's planned modernization of the weapons complex, and thus spending must be ramped up substantially over the next few years. Finally, the overall defense budget (the "050" account), from which funds for cleanup and compliance will come, will likely remain static in real terms. Operating under these assumptions, there are a number of important steps Congress must take in order to secure adequate funding for cleanup and compliance.

1. Congress Must Halt Lower Priority Weapons Projects.

First and foremost, Congress must scrutinize the Department's budget to a degree it has never done before and root out lower priority production activities. The "2010 Report" indicates that DOE is unwilling or incapable of accomplishing this task. From the perspective of this committee it would seem that ensuring an adequate supply of tritium over the next several years and an adequate capacity to recycle safely the existing supply of weapon-grade plutonium in warheads and scrap is of considerably higher priority than new production initiatives to obtain additional weapon-grade plutonium and highly enriched uranium (HEU). Therefore, if there is to be adequate funding for

cleanup and higher priority production initiatives, especially in an era of static defense budgets, Congress should cut or defer lower priority production activities.

There are a variety of lower priority nuclear weapons projects in DOE's FY90 budget request, including, but not limited to: construction of the second proposed new tritium production reactor (NPR) (any commitment to the first NPR should be deferred pending completion of adequate research and development on competing technologies and an assessment of START negotiations) development of nuclear directed energy weapons, modernization of the Fernald, Ohio weapons materials facility, renovation of existing plutonium and high-enriched uranium reprocessing facilities, restart of high-enriched uranium metal production, and construction of the Special Isotope Separation (SIS) plutonium plant in Idaho.

For example, DOE could save about \$115 million in FY90 alone by halting or deferring construction of the multi-billion dollar SIS plant proposed for construction in Idaho. Last year, the House and Senate wisely put the brakes on DOE plans to construct the SIS plant, which would refine plutonium for use in nuclear weapons and could cost \$3 billion or more to develop, construct, and operate. Serious concerns were raised about the need for and technological-readiness of the laser-based facility proposed for construction at the Idaho National Engineering Laboratory. Since the last Congress, the GAO has suggested that Congress reexamine the priority assigned to the SIS project.

2. Congress Should Increase DOE Environmental Funding for FY90 by \$400 Million Over the Bush Budget Request

For FY90 the Bush budget request for environmental restoration of \$400 million should be increased to \$700 million. This money should be directed to making real progress with actual cleanup, as well as strengthening the technical foundation for future cleanup in the areas such improved environmental monitoring and laboratory capacity that we have outlined. In addition, Congress should provide \$100 million for needed defense waste projects like waste vitrification projects at Hanford, and the Idaho National Engineering Laboratory.

3. Congress Should Allocate a Larger Percentage of the Overall Defense Budget to Cleanup.

Because the money saved from cutting low priority production projects and improving the efficiency of cleanup spending may not cover the full bill, DOE must be given a larger percentage of the overall defense budget for its environmental activities. DOE's staggering environmental problems are primarily the unpaid costs of supplying the Department of Defense (DOD) with warheads over the last several decades. As such, it is reasonable that DOD should shoulder part of the cleanup bill.

In fiscal years 1987 to 1989, DOE received about 2.5 percent of the 050 account to fund nuclear weapons production.³⁷ With

³⁷ U.S. Senate, Hearing Transcript, Senate Committee on Armed Services Subcommittee on Strategic Forces and Nuclear Deterrence
(continued...)

an increase of just one-third of a percent (.33%) in DOE's share of this account, an additional \$1 billion could be made available for cleanup and compliance. In this way, the total 050 account would remain unchanged but increased funds would flow to DOE for environmental programs. Congress would have to mandate that all funds generated from such an increase are allocated to cleanup and compliance, and not production activities.

4. Congress Should Disapprove DOE's Request to Reprogram Environmental Funds to Nuclear Weapons Production

The Energy Department's recent request³⁸ to reprogram millions of dollars from defense waste and environmental compliance projects reflects a continuation of the skewed priorities that has led to today's massive environmental problems. Existing environmental funding should be maintained to ensure completion of necessary projects. In those cases where funding remains after an environmental project is complete, the money should be used for environmental cleanup and compliance, not low-priority production activities.

³⁷(...continued)

(S. Hrng., 100-790 Pr. 6), March 1988, at 360. DOE's portion of the overall 050 account is designated the 053 account, while DOD's portion is called the 051 account. A small portion of the 050 account is allocated to other federal agencies for activities relating to civil defense, selective service, and the strategic mineral reserve.

³⁸ Letter from Elizabeth E. Smedley, Controller, DOE, to Representative Samuel Stratton, January 6, 1989.

5. Congress Should Direct DOE to Clarify Its Budget.

DOE's Budget Request has been improved this year, making it easier for Congress and the public to understand what cleanup activities DOE is undertaking. But DOE's improvements have not gone far enough. The Department's budget still does not clearly spell out how much is being spent on what DOE refers to as "Corrective Action" in its Needs Report. Essentially, this category includes upgrades to existing facilities to bring them into compliance with environmental, safety, and health standards. The hundreds of millions of dollars of corrective action funds, which are currently spread out among DOE budget categories entitled "Weapons Activities" and "Nuclear Materials Production," should be consolidated in the budget and the specific projects at each facility listed.

6. Congress Should Support Legislation to Improve DOE Environmental Management and Compliance.

In light of DOE's environmental management problems, we strongly urge Congress to adopt a bill (H.R. 765) recently introduced by Rep. John Dingell (D-MI), and over 37 Democratic and Republican cosponsors, that would establish a temporary commission to make recommendations to the President and Congress regarding approaches to effective and efficient cleanups. We also urge Congress to enact H.R. 1056 introduced by Rep. Dennis Eckart (D-OH) which would increase the authority of EPA, states

and citizen groups to enforce DOE compliance with the Resource Conservation and Recovery Act (RCRA).

CONCLUSION

It is clear that there are serious, widespread environmental problems throughout the DOE's nuclear weapons production complex. It is also clear that the DOE's skewed priorities -- placing production ahead of cleanup -- will lead to more widespread environmental contamination, increased threats to the public health and safety, and ultimately to higher overall cleanup costs. We have outlined here several important steps which we feel Congress must take to ensure a more timely, and efficient cleanup process. We stand ready to assist Congress in any way we can to ensure that these steps are taken.