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The Honorable John H. Chafee
Chairman, Committee on Environment
and Public Works
United States Senate

The Honorable Robert C. Smith
Chairman, Subcommittee on Superfund,
Waste Control, and Risk Assessment
Committee on Environment and Public
Works
United States Senate

The Department of Energy (DOE) is engaged in a massive cleanup of the nuclear weapons complex that is scheduled to last well into the next century at an estimated cost of $227 billion in 1996 dollars. Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, (CERCLA) in addition to DOE's responsibility to clean up its sites, DOE is liable to natural resource trustees for monetary damages to compensate for injuries to natural resources that resulted from DOE's nuclear weapons production. Such natural resources include wildlife, fish, rivers and lakes, groundwater, and land. DOE's report entitled *The 1996 Baseline Environmental Management Report* indicates that many of these sites may not be fully cleaned up and that instead, because of cost and technological limitations, contaminants may be left in place and contained in some manner. This situation, together with DOE's releases of hazardous substances in the past, raises the possibility that DOE may be subject to liability for natural resource damages under CERCLA.

In August 1996, we reported that DOE's potential liability for natural resource damages could vary from $2.3 billion to $20.5 billion and that a more likely

range could be from $2.8 billion to $13 billion.[1] We reported that various unresolved legal issues could affect DOE's liability for natural resource damages, such as how certain of CERCLA's exemptions from liability may apply to circumstances at DOE's sites. As requested, this report identifies (1) factors other than unresolved legal issues that could affect DOE's potential liability and (2) DOE sites' efforts to integrate considerations about natural resource restoration into cleanup activities. This report also describes challenges that DOE faces in integrating these considerations into cleanup activities.

The following summarizes our results:

- Various factors, in addition to unresolved legal issues discussed in our prior report, that could increase DOE's potential liability for natural resource damages include (1) DOE's not fully cleaning up certain contaminated areas; (2) DOE's release of toxic contaminants over areas that extend beyond DOE's boundaries; and (3) DOE's release of toxic contaminants that adversely affect endangered species, are spread via the food chain, or adversely affect highly valued natural resources.

- DOE has begun efforts to integrate natural resource restoration considerations into its cleanup activities. For example, at the headquarters level, DOE issued guidance in 1991 recommending that natural resource restoration needs be considered in the selection and design of cleanup remedies. At the site level, DOE's largest sites are beginning efforts to integrate considerations about natural resource restoration into overall cleanup plans. If these efforts succeed, the Department's potential liability for natural resource damages could be reduced. However, practical considerations such as budget limitations may limit the extent to which DOE's initiatives can reduce natural resource damage claims.

BACKGROUND

In addition to requiring the cleanup of waste sites, CERCLA allows federal, state, and Indian tribal officials who have been designated as trustees to file claims for monetary damages for injuries to natural resources resulting from releases of hazardous substances. In this report, we use the term "injuries" to refer to hazardous substances' adverse effects on resources and the term

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[1]*Natural Resource Damages at DOE* (GAO/RCED-96-206R, Aug. 16, 1996). Our estimate in that report was in 1995 undiscounted dollars.

"damages" to refer to the monetary recoveries for such injuries. Damages are usually for injuries that were not rectified by the cleanup and are to be used to (1) pay for assessments of the extent and monetary value of injuries to natural resources, (2) restore the natural resources or acquire equivalent resources, and (3) compensate the public for the interim losses of the resources.[2] For example, a particular cleanup might remove a pollution source and much of the resulting contaminated soil but leave in the soil some contamination that continues to leach into a river. And if such contamination adversely affected fish populations, natural resource damages may be recovered for the restoration of the fish and their habitat.

DOE is a trustee for its own lands; however, other federal agencies, states, and tribes also have trustee interests in resources associated with DOE's facilities.[3] For example, the Department of the Interior (Interior) is the federal trustee for resources including migratory birds, certain fish, and endangered or threatened species, while the National Oceanic and Atmospheric Administration (NOAA) is the federal trustee for resources including fisheries, marine mammals, endangered or threatened marine species, and coastal habitats. Because one federal agency generally cannot sue another federal agency, the other federal trustee agencies cannot bring court action against DOE for natural resource damages but may participate in such activities as studying injuries to natural resources and planning restoration actions. With regard to states, CERCLA provides that a state may claim damages for injuries to natural resources that it owns, manages, or controls within its boundaries. In addition, Indian tribes are trustees for natural resources within their reservation's boundaries, and tribal treaties can provide rights for off-reservation uses of resources, such as hunting and fishing.

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[2]According to officials from the Department of Justice, all recoveries, including those for interim losses, are spent on restoring, replacing, or acquiring the equivalent of the injured natural resources. In addition, recoveries reimburse trustees for the cost of assessing injuries to natural resources.

[3]In some cases, DOE's exclusion of the public from its sites over the past several decades has resulted in the Department's preserving natural resources that otherwise would have been lost or changed because of farming or other development. For example, according to a DOE official at the Savannah River site, before DOE took control of the area, the land was used for farming and timber. When DOE took control of the site, the Department reforested the area and conducted soil conservation activities.

Under CERCLA, Interior has developed regulations for identifying and measuring injuries to resources and for determining the amount of monetary damages.[4] Interior's regulations encompass four phases. The first phase in the natural resource damage assessment process, *the preassessment screen*, is a study conducted by a trustee to determine whether a hazardous substance release justifies completing a natural resource damage assessment. The second phase, *the assessment plan*, identifies what scientific and economic methodologies are to be used and what data are to be collected. During the third phase, the actual *damage assessment* is performed. It consists of three steps: the determination of injury, quantification of effects, and determination of damages. The objectives of the fourth phase, the *postassessment* phase, are to recover the natural resource damages and develop a detailed plan for restoring or replacing the injured natural resources.

At DOE's facilities, conclusive information about possible injuries to natural resources is generally not yet available. This is because (1) the effects of contamination on resources have not yet been fully studied and (2) remedial actions have not yet been selected at many locations; therefore, residual effects that may remain after cleanup actions are not known. However, many of DOE's sites are conducting ecological risk assessments to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of DOE's releases of hazardous substances. Although valuable, the ecological risk assessments are not designed to include all the data necessary to determine that an injury, as defined in Interior's regulations, has occurred.

VARIOUS FACTORS MAY AFFECT DOE'S POTENTIAL LIABILITY

Various factors, in addition to the unresolved legal issues discussed in our prior report, may affect DOE's potential liability for natural resource damages. For example, the overall effectiveness of DOE's cleanup efforts may influence DOE's potential liability. At sites where DOE does not fully clean up contaminated areas, the potential liability may be greater because damages are usually for injuries that were not rectified by the cleanup. In addition, DOE's potential for liability could be greater if the contaminants that the Department has released are highly toxic, occur in large amounts, or migrate beyond DOE's

[4]The use of these damage assessment procedures is optional, but if the agencies designated as natural resource trustees implement the procedures fully, they are granted a legal presumption of correctness in a court of law that shifts the burden to the responsible parties to prove otherwise.

boundaries. DOE's potential for liability could also increase if the contaminants have an adverse effect on endangered species or if the contaminants are ingested by wildlife via the food chain. Other factors that may affect DOE's potential liability for natural resource damages include cultural and economic considerations. For example, DOE's potential liability could increase when natural resources that provide a service of high economic value to state or tribal trustees have been affected.

The overall effectiveness of DOE's cleanup activities may influence DOE's potential liability for natural resource damages. Monetary damages are usually for injuries that were not rectified by the cleanup, so DOE's potential liability may be greater at sites where DOE does not fully clean up contaminated areas. DOE's report, *The 1996 Baseline Environmental Management Report*, lists eight DOE sites where certain areas that have become contaminated with hazardous substances may not be cleaned up because (1) no feasible remediation approach is available, (2) the risks posed by the contamination do not warrant the ecological harm that feasible remedies would cause, or (3) the contaminants will decrease naturally. Enclosure I contains DOE's listing.

Because of the difficulty of cleaning up large bodies of contaminated groundwater and water sediments, many of the areas listed in DOE's report are water resources. For example, releases of contaminants to large bodies of surface water such as the Savannah River in South Carolina and the Clinch River/Lower Watts Bar Reservoir in Tennessee pose serious problems for which no feasible solutions are currently available. With current technology, the course of rivers would need to be diverted at great expense to remove contaminants present in sediments. In Washington State, groundwater that flows into the Columbia River is contaminated with hexavalent chromium. The contamination, which is a result of activities at DOE's Hanford site, occurs in salmon-spawning habitat. No feasible remediation approach is available for the affected areas of the river.

The toxicity of past releases of hazardous substances at DOE's facilities could increase the Department's potential liability for natural resource damages. For example, in the Lower Watts Bar Reservoir in eastern Tennessee near DOE's Oak Ridge site, fish are contaminated with polychlorinated biphenyls (PCBs) and pesticides, sediments are contaminated with arsenic and lead, and radioactive substances have been detected in the sediment, fish, and surface

water.[5] The greatest risk to human health from contaminants in the reservoir is the potential risk of cancer associated with the consumption of certain PCB-contaminated fish species. As a result, the state of Tennessee posts fish consumption advisories at approximately 50 public and private access points surrounding the reservoir.

The amount of contamination at DOE's facilities varies substantially from site to site. DOE's sites that involve larger areas of contamination may be more likely to incur natural resource damages than smaller sites that are less contaminated. For example, the 560-square-mile Hanford site in Washington State accounts for approximately two-thirds of all nuclear waste, by volume, in the DOE complex. The total estimated volumes of contaminated soil and groundwater at the Hanford site are very large–about 64 million cubic meters and 2.7 billion cubic meters, respectively. The Pinellas site in Florida, by contrast, is only about 0.4 square mile in size, and contamination is limited to the shallow groundwater aquifer and associated soils. Reflecting these differences, DOE's projected cleanup costs are much less at the Pinellas site than at the Hanford site.

At some DOE sites, contamination extends beyond DOE's boundaries, which could increase the likelihood of natural resource damage claims. For example, at the Oak Ridge site, contaminants are transported off-site to the Lower Watts Bar Reservoir by the Clinch River. Off-site contamination may also occur when wildlife such as deer or migratory birds move on and off a DOE site.

Some of DOE's sites contain very sensitive natural resources. The Department's potential liability for natural resource damages may be greater at sites where the contaminants could injure sensitive resources. For example, at the Rocky Flats site, the 5,882-acre buffer zone contains a rare tallgrass prairie and habitat for the Preble's meadow jumping mouse, a species that is under consideration for being listed as threatened or endangered. DOE plans to design cleanup activities in the buffer zone that protect the mouse and reduce the likelihood of natural resource damage claims.

Another factor that could increase DOE's potential liability for natural resource damages is contaminants that are spread via the food chain. For example, the bottom-dwelling organisms that are contaminated with hazardous substances

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[5]The contamination in the Lower Watts Bar Reservoir has resulted not only from past activities at DOE's Oak Ridge site but also from non-DOE sources, such as industries in the area.

in the Lower Watts Bar Reservoir near the Oak Ridge site are food to a variety of fish. These fish, in turn, are consumed by wildlife, such as mink and otters. As a result, wildlife that otherwise would not be exposed to the contaminants in the sediment of the reservoir may be contaminated through the food that they eat, which could increase DOE's potential liability.

Economic and cultural factors also may influence the decision of state and tribal trustees to pursue a natural resource damage claim against DOE. For example, the salmon in the Columbia River near the Hanford site are highly valued by state and tribal trustees. In addition to their economic value as a fishery resource, the salmon also have high cultural value, since they are used in Native American ceremonies. As a result, Native American tribes in the area may be more likely to pursue natural resource damage claims.

DOE HAS BEGUN EFFORTS TO ADDRESS CONSIDERATIONS ABOUT NATURAL RESOURCE RESTORATION

As a federal trustee for resources under its control, DOE has begun efforts to address considerations about natural resource restoration and reduce its potential liability for natural resource damages. At the headquarters level, DOE issued guidance in 1991 recommending that the Department's sites work with state, tribal, and other federal trustees to assess resource injuries during the remedial investigation phase of the cleanup process, avoid selecting remedies that harm natural resources, and select remedies with the least total costs, considering the combined costs of cleanup and natural resource restoration. At the site level, each of DOE's largest sites[6] is taking steps to work with the other natural resource trustees on natural resource restoration issues. Some of the sites are making plans to integrate considerations about natural resource restoration into overall cleanup plans and activities. These efforts may help to reduce the Department's potential liability for natural resource damages; however, practical considerations such as budget limitations and difficulties in identifying, prioritizing, and costing out natural resource restoration needs before cleanup activities are complete may limit the extent to which DOE's initiatives can reduce natural resource damage claims.

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[6]For the purpose of this report, we defined DOE's largest sites as the five that together represent 70 percent of DOE's cleanup cost projections.

DOE's Guidance Recommends Integrating Considerations About Natural Resource Restoration Into Cleanup Plans

In June 1991, DOE issued guidance entitled *Natural Resource Trusteeship and Ecological Evaluation for Environmental Restoration at Department of Energy Facilities* (DOE/EH–0192). The guidance has three objectives.

The first objective is to improve cleanup decisions by promoting decisions that are based on a more complete analysis of short- and long-term environmental risks and liabilities. To do this, the guidance recommends that project managers at DOE's sites work with the other trustees for natural resources at those sites (including state, tribal, and other federal officials) to expand the scope of the ecological risk assessments that are conducted as part of the CERCLA cleanup process. Specifically, the guidance recommends tailoring ecological risk assessments so that they include data that enable the trustees to evaluate potential injuries to natural resources. This would enable DOE to take natural resource impacts into consideration before cleanup remedies are selected.

While ecological risk assessments are not typically done with the data needed for a formal natural resource damage assessment in mind, ecological risk assessments do contain valuable data for evaluating the impact of hazardous substances on natural resources. For example, the assessments contain data on the types and extent of contamination. As envisioned in the guidance, ecological risk assessments that address considerations about natural resource restoration would include additional data designed to (1) link the release of a hazardous substance to a natural resource injury by demonstrating the pathway of the release to the resource, (2) measure the extent and severity of the actual injury, and (3) provide a basis for addressing the natural resource injury as part of the overall cleanup plans. Such expanded ecological risk assessments would provide most of the information needed for the first and second phases in the natural resource damage assessment process laid out in Interior's regulations, that is, the preassessment screen and assessment plan. For example, by following this guidance, the ecological risk assessment could demonstrate that specific injuries to fish populations in a river are the result of DOE's release of a hazardous substance. The trustees could then use the data developed in the ecological risk assessment to develop specific resource restoration plans for the injured fish. DOE could then agree to restock fish in a river after cleanup activities are complete or enhance the habitat of fish populations in an adjacent area of the river unaffected by the contamination.

The second objective of DOE's guidance is to reduce total life-cycle costs. DOE's guidance states that it may be more cost-effective over the long term to address natural resource restoration needs during cleanup activities instead of after them. The guidance recommends that DOE's sites consider the potential costs of natural resource damages associated with each of the cleanup alternatives in addition to the projected cleanup costs themselves. This would help DOE to select cleanup actions that provide the desired level of environmental quality for the lowest total cost, which is defined as the cost of implementing the cleanup action plus the natural resource damages associated with that action. According to DOE's former Office of Environmental Guidance (now the Office of Environmental Policy and Assistance), integrating considerations about natural resource restoration into cleanup activities can reduce or eliminate the potential for unplanned cost growth due to residual damages from the release of the hazardous substance or the cleanup actions. For example, a remedy that entails filling in a wetland might result in much higher damages than one that does not destroy the natural resource.

The third objective of DOE's guidance is to restore natural resources more rapidly than they would be restored if trustees were to file damage claims after the selection of a cleanup remedy. Since natural resource damages at federal facilities cannot be filed until the remedial action has been selected, the actual restoration of natural resources occurs later.[7] If DOE is able to restore natural resources in conjunction with cleanup activities, the Department may be able to avoid any additional costs associated with injuries that continue or worsen until the natural resource damages are recovered and restoration occurs.

DOE Has Begun Efforts at the Site Level

Reflecting DOE's guidance, the Department's largest sites are beginning efforts to integrate considerations about natural resource restoration into overall

[7]CERCLA 113(g)(1) bars the filing of a claim for natural resource damages at any site on the CERCLA National Priorities List, any federal facility, or any other facility at which a remedial action is scheduled until after the selection of the remedial action.

cleanup plans and activities.[8] For example, four sites have established natural resource trustee councils whose members include representatives from state environmental departments, Native American tribes in the area, Interior, and DOE.[9] Of these four sites, two have signed memorandums of understanding with the other trustees for natural resources at their sites that lay out the trustees' duties and responsibilities, while the other two are working on developing their memorandums of understanding. DOE attempts to work with the other trustees on the councils to obtain their advice and input into cleanup plans. Table 1 presents a profile of natural resource trustee councils at the DOE sites we contacted. In addition, DOE's largest sites have developed specific procedures (such as seasonal restrictions on activities that could disturb the breeding seasons of wildlife) to reduce or avoid adverse effects on natural resources during cleanup activities. While the sites' specific actions and initiatives vary, each of DOE's largest sites has undertaken some efforts to consider the impacts on natural resources in its cleanup activities.

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[8]We contacted the five DOE sites that together represent 70 percent of DOE's cleanup cost projections–Hanford, Idaho National Engineering Laboratory, Oak Ridge, Rocky Flats, and Savannah River–in order to learn about efforts they have made to reduce or avoid natural resource damage claims by integrating considerations about natural resource restoration into the cleanup plans. In addition, we spoke with DOE officials at the Fernald site, since this site is the only one where a damage claim has been filed. Activities related to natural resources are also occurring at a number of DOE sites that we did not include in our detailed review.

[9]NOAA is a federal trustee when coastal resources are involved. In addition, the Environmental Protection Agency is not a trustee for natural resources but has participated in some trustee council activities–for example, at DOE's Rocky Flats and Hanford sites.

Table 1: Profile of Natural Resource Trustee Councils at DOE's Sites

Site's name	Existence of formal trustee council	Status of memorandum of understanding among trustees	Council members
Fernald	No	None	Not applicable
Hanford	Yes	Draft memorandum of agreement	DOE, Interior, states of Washington and Oregon, Yakama Indian Nation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe
Idaho National Engineering Laboratory	Yes	Draft memorandum of understanding	DOE, Interior, state of Idaho, Shoshone-Bannock Tribes
Oak Ridge	Yes	Signed February 1995	DOE, Interior, state of Tennessee, Tennessee Valley Authority
Rocky Flats	Yes	Signed October 1994	DOE, Interior, state of Colorado
Savannah River	No	Draft memorandum of agreement	Not applicable

At DOE's Fernald and Idaho National Engineering Laboratory sites, DOE has made progress in developing plans with the trustees for integrating considerations about natural resource restoration into cleanup activities. In the case of the Fernald site, these plans have been made outside the purview of a natural resource trustee council. At the Idaho National Engineering Laboratory, the trustee council, despite its recent establishment, has begun the task of identifying the site's most important natural resource restoration needs. The trustees agreed that most of the emphasis should be placed on three cleanup areas where the most ecological risk exists. In September 1996, the council met to discuss the status of cleanup activities at these areas and to make initial plans for obtaining the trustees' input to the planned cleanup activities. In addition, the trustees agreed to work together to identify the data needs for the ecological risk assessment for the cleanup area that involves

most natural resources at the site. According to a DOE official at the site, obtaining the trustees' input into the ecological risk assessment will help enable DOE to integrate considerations about natural resource restoration into the cleanup plans for this area. At the Fernald site, although no formal trustee council exists, DOE and the other trustees have tentatively agreed to integrate natural resource restoration needs with future cleanup activities, incorporating the concerns raised in the state of Ohio's natural resource damages claim. Specifically, DOE plans to use an assessment of natural resource impacts at the site in order to develop agreements with the trustees about what types of restoration work will compensate for the impacts to natural resources that have occurred.

The trustee council at DOE's Oak Ridge site has focused on the first step in integrating considerations about natural resource restoration into cleanup plans: studying the effect of releases of hazardous substances on natural resources. Specifically, DOE has drafted an agreement with the state of Tennessee for the state to prepare a report identifying and, if possible, quantifying resource injuries at one unit within the site. At the Savannah River site, DOE officials reported that they have been working closely with the other natural resource trustees for over 5 years to obtain their input into cleanup and resource restoration decisions. For example, DOE officials told us that the natural resource trustees were involved in the decision-making process that DOE went through when some contaminated sediments in one of the site's holding ponds became exposed after a dam was undermined. DOE repaired the dam, refilled the pond, and continues to monitor contaminant levels. DOE officials at the Savannah River site also told us that they have discussed forming a natural resource trustee council with the other trustees and have developed a draft memorandum of agreement for organizing their activities.

At DOE's Hanford and Rocky Flats sites, DOE and the other trustees for natural resources who participate in the sites' natural resource trustee councils have long-standing working relationships but have experienced some challenges in working together to integrate considerations about natural resource restoration into cleanup activities. For example, at DOE's Hanford site, the large size of the council and the many diverse views of its members have made it difficult for the council to operate as a unit, according to a DOE official and an Interior official who participate in the council. Instead, participants have individually raised concerns to DOE about natural resources. According to a DOE official at the Hanford site, DOE is working on ways to improve the ability of the natural resource trustees at the Hanford site to operate as a unit. At the Rocky Flats site, one of the most challenging issues

facing the council is the practical considerations involved in balancing the need to protect human health with the need to protect natural resources. Specifically, the trustee council has discussed the competing interests surrounding water management at the site. DOE currently collects water in man-made ponds along natural drainage located within the site. To protect downstream users off-site, water is released in batches, following sampling and analysis, during routine operations. However, studies have found that this method causes minor depletions of natural water flows because of evaporation from the ponds and that these depletions may adversely affect the habitat of threatened and endangered species in the Platte River basin, such as the whooping crane. DOE is working on ways to manage the water so that the competing interests can be addressed.

In addition to the activities described above, the DOE sites we contacted described several other initiatives to integrate considerations about natural resource restoration into their cleanup activities. These initiatives range from a pilot project at the Savannah River site to demonstrate how resource restoration might be integrated into cleanup activities at a particular unit within the site to efforts at the Hanford and Rocky Flats sites to reduce or avoid adverse effects on natural resources during cleanup activities. Further details on these initiatives and on plans at the Fernald and Oak Ridge sites are included in enclosure II.

DOE Faces Challenges in Integrating Considerations About Natural Resource Restoration Into Cleanup Plans

According to a senior environmental protection specialist in DOE's Office of Environmental Policy and Assistance, the most important factor that could hinder DOE's ability to address resource restoration concerns during cleanup activities is budget limitations. Since traditional ecological risk assessments do not require DOE to demonstrate specific adverse impacts to natural resources, it may be difficult for DOE to obtain funding for the additional data gathering and analysis that would be needed. This official told us, however, that integrating considerations about natural resource restoration into cleanup activities could reduce total costs because DOE would be better equipped to consider the potential costs of natural resource damages associated with cleanup alternatives.

Depending on the complexity of the considerations and the number and diversity of interested trustees, trustee councils may find it difficult to work as a unit to identify and prioritize natural resource restoration needs. As a result, it may be difficult for the councils to provide focused, timely input to the

ecological risk assessments that DOE prepares. For example, although the trustee council at the Hanford site has been meeting for over 3 years, the large number of trustees and the many diverse views that they hold have made it difficult for the council to identify and prioritize natural resource restoration needs.

Another challenge facing DOE involves difficulties in estimating injuries to natural resources that will remain after particular cleanup actions are implemented. Such injuries and the potential damages associated with them cannot be precisely estimated before remedial actions are completed. As a result, it may be difficult for DOE to determine which cleanup alternatives result in the lowest total costs.

AGENCY COMMENTS

We provided DOE with a draft of this report for review and comment. We discussed the report with officials from DOE's Office of the General Counsel; Office of Environment, Safety, and Health; and Office of Environmental Management, including the Director of the Office of Environmental and Regulatory Analysis. Overall, the officials agreed that the report was factual and gave a fair presentation of the steps that DOE sites are taking to address considerations about natural resource restoration. In commenting on our report, DOE officials expressed concern that our use of the phrase natural resource restoration might be interpreted to mean that, in addition to conducting cleanup activities, DOE will develop specific restoration plans and conduct restoration activities at all of its sites. They noted that in some cases, natural resource concerns may be addressed through the actual cleanup.

We recognize that cleanup activities may encompass natural resource restoration needs. For example, we discuss DOE's guidance, which recommends integrating considerations about natural resource restoration into cleanup plans. However, we have made some changes in the report to further clarify this point. In addition, DOE officials provided us with some technical and clarifying comments that we have incorporated in the report.

SCOPE AND METHODOLOGY

We conducted our review primarily at DOE's headquarters in Washington, D.C., and through telephone interviews with officials at DOE sites in Colorado, Idaho, Ohio, South Carolina, Tennessee, and Washington. We contacted DOE's five largest sites as well as the Fernald site, since this site is the only one where a damage claim has been filed. To identify factors that might affect

DOE's liability for natural resource damages, we interviewed officials at the DOE offices responsible for environmental remediation and environmental policy and natural resource experts at Interior and NOAA. To identify DOE sites' efforts to integrate considerations about natural resource restoration into cleanup activities, we interviewed officials at and reviewed documents from DOE's Fernald, Hanford, Idaho National Engineering Laboratory, Oak Ridge, Rocky Flats, and Savannah River sites. Our work was performed from January 1996 through November 1996 in accordance with generally accepted government auditing standards. However, we did not independently verify the data that we received from DOE sites.

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As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 20 days after the date of this letter. At that time, we will send a copy to the Secretary of Energy. We will make copies available to others upon request. If you or your staff have any questions concerning this report, please contact me at (202) 512-3841. Major contributors to this report were James Noël, Kathy Hale, Rachel Hesselink, and Doreen Stolzenberg Feldman.

Victor S. Rezendes
Director, Energy, Resources,
and Science Issues

Enclosures - 2

REMEDIATION CHALLENGES EXCLUDED FROM *THE 1996 BASELINE ENVIRONMENTAL MANAGEMENT REPORT*

Installation	Project	Reason excluded
Fernald site	Great Miami River	No feasible remediation approach available
Hanford site	Columbia River, Hanford Reach Groundwater	No feasible remediation approach available Limited pump-and-treat followed by natural attenuation and monitoring
Idaho National Engineering Laboratory	Snake River Plain Aquifer	Limited pump-and-treat followed by natural attenuation and monitoring
Nevada Test Site	Underground Test Areas	No feasible remediation approach available
Oak Ridge site (includes Oak Ridge National Laboratory)	Clinch River Watts Bar Reservoir Poplar Creek Embayment White Oak Creek Deep Hydrofracture Grout Sheet (underground rock formation)	No feasible remediation approach available
Rocky Flats Environmental Technology site	Walnut Creek Woman Creek Great Western Reservoir Stanley Lake	No feasible remedy without causing collateral ecological damage
Sandia National Laboratory	Chemical Waste Landfill Groundwater	Natural attenuation and monitoring assumed
Savannah River site	L Lake Savannah River Swamp Par Pond	No feasible remedy without causing collateral ecological damage

Source: Department of Energy.

DOE SITES' EFFORTS TO INTEGRATE RESOURCE RESTORATION CONSIDERATIONS INTO CLEANUP ACTIVITIES

OAK RIDGE SITE

In 1996, the Department of Energy (DOE) prepared a draft agreement to provide the state of Tennessee with $75,000 to prepare a report identifying and, if possible, quantifying resource injuries at one operable unit–the Lower Watts Bar area of the Clinch River system and the Tennessee River. DOE acknowledges that the area has been affected by releases of hazardous substances from the Oak Ridge facility and that natural resource injuries may have been caused by these releases. The report is expected to evaluate existing data and estimate a range of possible natural resource damages. The trustee council recognized that a formal natural resource damage assessment done according to the Department of the Interior's regulations could be costly and time-consuming. The report is intended to test whether the smaller effort will enable the trustees to identify a dollar range of possible natural resource damages at a DOE site through a less costly methodology.

ROCKY FLATS SITE

DOE officials at Rocky Flats told us that the site has undertaken several initiatives to reduce or avoid the potential adverse impacts of cleanup activities on natural resources. These actions are called compensatory mitigation activities and include such things as avoiding an impact by not taking a certain action; minimizing an impact by limiting the magnitude of an action; rectifying an impact by repairing, rehabilitating, or restoring the affected resource; and compensating for the impact by replacing or providing substitute resources.

DOE's compensatory mitigation activities at the Rocky Flats site are focused on the buffer zone, which contains some rare and sensitive natural resources. In February 1996, the Colorado Natural Heritage Program reported that the buffer zone may contain the largest example of a special kind of tallgrass prairie remaining in Colorado and perhaps in North America.[1] The program believes that this type of prairie exists in less than 20 places globally. The buffer zone is also home to the Preble's meadow jumping mouse, an animal under consideration for being listed as a threatened or endangered species. To protect

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[1]This grassland, known as xeric tallgrass prairie, has been highly affected by urban and rural development. In addition, nonnative species such as cheat grass and knapweed have invaded and degraded the viability of many examples of this type of prairie throughout the West.

the Preble's meadow jumping mouse, DOE has designated areas of the buffer zone as "essential habitat." In May 1995, DOE established an interim policy that permits only necessary work in the essential habitat of the mouse. Necessary work is defined as that which is designed to study the species, is required to protect or enhance natural resource values, or is expressly required by regulatory direction or agreement. Should cleanup activities be required in any area of the site where the mouse or its habitat exists, DOE plans to try to avoid any adverse impact to the species.

Another example of DOE's efforts to integrate natural resource considerations into cleanup activities at the Rocky Flats site is a wetlands mitigation banking agreement signed in early 1996 by DOE and the other trustees.[2] Among the natural resources at the Rocky Flats site are some 1,100 wetlands covering approximately 191 acres. The wetlands are established in man-made drainage, are established around naturally occurring seeps and springs, and can occur as the result of spring run-off from melting snows and overflow from the site's drainage creeks. According to the Colorado Natural Heritage Program, the wetlands may retain nutrients and provide forage, cover, and nesting habitat for wildlife, including the Preble's meadow jumping mouse. The wetlands mitigation banking agreement provides a procedure whereby DOE can create or enhance existing wetlands in the area in order to compensate for cleanup activities that disturb or destroy wetlands.

HANFORD SITE

DOE's Hanford site in Washington State has initiated several efforts designed to reduce or avoid the potential adverse impacts of cleanup activities on natural resources. For example, DOE officials at the Hanford site stated that when cleanup activities at the site destroy vegetative cover, DOE revegetates the affected areas with native plant species. Revegetation with native species occurs for several reasons: (1) because of the need to avoid natural resource damages, (2) because of the need to prevent erosion, and (3) because DOE is a trustee for its own lands.[3]

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[2]Wetlands mitigation banking is wetlands restoration, creation, enhancement, and in exceptional circumstances, preservation undertaken expressly for the purpose of compensating for unavoidable wetlands losses in advance of development actions (or cleanup activities, in DOE's case).

[3]In March 1996, for example, a demonstration revegetation project was approved for a 3-acre area where the vegetation had been severely disturbed. The ecological goals of the project are to stabilize the area against wind erosion and encourage the succession of vegetation to allow the eventual restoration of a native shrub-steppe community. The overall goal of the project is to demonstrate the methods and practicality (e.g., cost and effectiveness) of revegetation methods that can be extrapolated to other locations at the

In another case, the feasibility study for an area at the Hanford site that contains many liquid waste disposal facilities includes an appendix that examines how cleanup alternatives may affect natural resources. The feasibility study found that cleanup activities could adversely affect sensitive wetlands habitat. The study pointed out ways to reduce the ecological risks, including the use of seasonal restrictions on construction and other activities that could disturb the breeding seasons of waterfowl and other wildlife. The Hanford site is also developing guidance on managing biological resources at the site that will lay out procedures for minimizing adverse impacts on key biological resources during site cleanup activities.

SAVANNAH RIVER SITE

In fiscal year 1994, DOE's Savannah River site undertook a project to demonstrate how natural resource restoration considerations might be integrated into environmental cleanup activities. In particular, the project highlighted several data needs for successfully integrating natural resource considerations into the cleanup plans for an old seepage basin. These data requirements included a description of the pathways linking hazardous substance releases to natural resource injuries; the type, extent, and timing of natural resource injuries and the lost usage of the natural resources; and the value of the services provided by the natural resources. DOE officials reported that the Savannah River pilot project has been used to help guide other sites seeking to integrate natural resource considerations into cleanup activities. For example, after the study was completed, DOE presented its results to its natural resource trustee steering committee, a group of headquarters and site officials who share information and advice on natural resource restoration activities.

FERNALD SITE

DOE's Fernald site near Cincinnati, Ohio, is the only DOE site where a natural resource damage claim has been filed. The claim was filed in 1986 by the state of Ohio in the United States District Court for the Southern District of Ohio. The claim alleged that DOE's releases of hazardous substances had injured and continued to injure natural resources including land, air, water, and groundwater. The claim was stayed under a 1988 consent decree between Ohio and DOE, pending completion of the remedial investigation and feasibility study for remedial action.

For the last several years, DOE has been working with natural resource trustee representatives from the state of Ohio and Interior to find a way to address the natural resource concerns raised in the lawsuit. In 1993, DOE initiated discussions with the

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Hanford site.

trustees to determine the feasibility of integrating the trustees' concerns with future cleanup activities. DOE and the trustees have tentatively agreed to integrate natural resource restoration needs with cleanup activities, incorporating the concerns raised in the lawsuit. This would enable the trustees to use a streamlined approach that avoids a formal natural resource damage assessment.

The DOE trustee representative at the Fernald site told us that the streamlined method for assessing injury and restoration needs at the site would avoid the determination of dollar figures associated with a natural resource damage assessment. Instead, DOE plans to use an assessment of the impacts on natural resources at the site in order to develop agreements with the trustees about what types of restoration work will compensate for the impacts on natural resources that have occurred. The objective will be to find a way to equate the impacts on natural resources with restoration plans without going through the difficult, controversial, and time-consuming process of assigning dollar values to every impact on natural resources. As of October 1996, DOE officials at the Fernald site were working on a document intended to help the Department and the other trustees to accomplish this objective.

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