Policy Analysis

The Hanford Nuclear Waste Site:

A Legacy of Risk, Cost and Inefficiency

Since the cessation of plutonium production in 1987, the Hanford Nuclear Waste facility has been the site of the largest and most expensive environmental cleanup project in history. Without prior knowledge of the dangers associated with radiological wastes, the Department of Energy disposed of millions of gallons of these wastes directly into the soil and the nearby Columbia River. Though the federal government bears the financial responsibility for the Hanford cleanup, it has often found itself locked in dispute with the local government over the degree of remediation required. While the federal government attempts to strike a balance between personal and environmental safety and economic feasibility, the local government has consistently pushed for more extensive measures. The result of these conflicting interests has been the most expensive and arguably most inefficient cleanup project in environmental history.

Noah Lichtenstein

In 2004, the United States Department of Energy (DOE) will spend over $2 billion on the cleanup of the Hanford nuclear reservation—the nation's largest existing federal nuclear waste storage site (DOE, 2002). Located in southeastern Washington state, the Hanford site serves as a storage site for radioactive waste produced during the Manhattan Project and throughout the Cold War. With limited knowledge of the dangers associated with radioactivity, DOE officials at Hanford disposed of millions of gallons of highly radioactive materials directly into the soil. Today, large quantities of these radioactive substances have been detected in the groundwater beneath the site, contaminating the water that feeds the Columbia River. Faced with this enormous threat to personal and environmental safety, the federal government is now struggling with financing and implementing the estimated 50 year, $60 billion remediation plan—the largest and most expensive environmental cleanup project in history (DOE, 2002)

Amidst a myriad of political, economic, and environmental challenges that accompany the cleanup effort, the federal government is struggling to appropriate funds in a manner that both provides a reasonable reduction of personal and environmental risk and remains economically feasible in a system operating with limited resources. This paper provides a history of the Hanford legacy and an analysis of the conflicting cleanup incentives between the local and federal government that contribute to the project's inefficiency.

Background and Cleanup Challenges

The Department of Energy's Hanford site is a 560 square mile nuclear reservation located in southeastern Washington, 35 miles north of the Oregon border. The Columbia River flows through the northern portion of the site and forms much of its eastern boundary. Approximately 175,000 people live directly downstream, in and around the cities of Kennewick, Pasco and Richland, and the site is located 215 miles upstream from Portland, Oregon. Between 1944 and 1987, Hanford continually expanded its operations and came to play a pivotal role in the nation's defense, accounting for approximately 74 tons of plutonium for the U.S. nuclear weapons arsenal, almost two-thirds of the total plutonium production for use by the federal government (DOE, 2002).

During the course of Hanford's nearly fifty years of production, separation, and purification of plutonium for the nation's nuclear weapons, the DOE estimates that the Hanford site produced approximately 450 billion gallons of liquid waste (GAO, 1998). The vast majority of this waste was released directly into the ground through about 300 cribs,[1] ponds, and unlined trenches, while liquid wastes of varying levels of contamination were often pumped directly into the Columbia River (DOE, 2002). Studies show that these waste releases, though having met the then-existing disposal standards, have led to

the contamination of about 270 billion gallons of groundwater spread over 80 square miles beneath the site (DOE, 2002).

In addition to these releases directly into the soil and groundwater, the DOE is currently storing approximately 54 million gallons of the most radioactive and hazardous wastes[2] in 177 underground tanks, many of which were built in the 1940s to 1960s and have far exceeded their design life of 10-40 years (Hanford Group Inc, 2003). According to the DOE's reports, 67 tanks have leaked over 1 million gallons of highly radioactive wastes, and the DOE acknowledges that these wastes have also contaminated the groundwater that feeds into the Columbia River (GAO, 2003).

The cleanup of the Hanford site is guided by the *Hanford Federal Facility Agreement and Consent Order*, commonly referred to as the Tri-Party Agreement (TPA), signed on May 15, 1989 by the DOE, the EPA, and the Washington State Department of Ecology. The TPA seeks to achieve compliance with applicable federal regulatory provisions, and furthermore, it establishes legally binding deadlines for the completion of specific actions, defines and ranks cleanup commitments, and provides the basis for achieving full regulatory compliance and remediation (WA State Dept, 2003).

Costs of Remediation

From the outset, the institution and operation of the Hanford site was a national project, aimed at providing collective benefits to the entire country through the establishment of a nuclear defense arsenal. Throughout its construction and its nearly 50 years in operation, the Hanford site received complete federal funding and was overseen by the federal DOE. Today, with the focus of the facility having switched from plutonium production to extensive cleanup and remediation, the federal government is still responsible for bearing the entirety of the monetary burden.

Although the figures continue to fluctuate from year to year, complete remediation costs are currently estimated at $50-60 billion (DOE, 2002). Additionally, over the past several years, the costs of remediation for the Hanford site have steadily increased; in 1998, the DOE received $1.07 billion for cleanup programs at Hanford compared with $1.78 billion in 2002 and $1.95 billion in 2003 (Congressional Research Service, 2003). With such soaring costs, the annual process of allocating funds for the site's cleanup is naturally a very complex and hotly contested issue. While the DOE submits a budget in accordance with what it deems as necessary for the fulfillment of its cleanup requirements under the TPA, the amount of money allocated to the DOE by Congress is often much less than requested. This disparity in funding has widespread implications, often making it difficult, if not impossible, for the DOE to meet its "established milestones." For example, while the $1.78 billion allotment for 2002 was an increase of $320 million over the previous year, it still fell $56 million short of what the DOE's calculations indicated was necessary to meet its legal cleanup obligations (Congressional Research Service, 2003). As a result, each of the DOE's divisions responsible for specific cleanup procedures was expected to achieve the same level of remediation with less funding than was reportedly needed.

Faced with growing public dissatisfaction with project inefficiency and spiraling costs, President Bush has pushed to reduce federal funding for the cleanup project in each of the past three fiscal years. However, due to the efforts of a bipartisan nuclear cleanup caucus led by Washington Senator Patty Murray, a member of the Senate Appropriations Committee, the President's funding reduction proposals have been repeatedly thwarted (Webster, 2002). Following this series of intense budget wrangling from 2000-2003, the funding arrangement for Hanford underwent significant changes in fiscal year 2004. The Bush Administration called for the creation of a new Defense Site Acceleration Completion Account which would provide Hanford funding (Congressional Research Service, 2003). As passed by the House and Senate, the conference agreement on the Energy and Water Development Appropriations Act for FY2004 would provide $5.65 billion for this new Account, which is nearly $164 million less than the requested $5.81 billion (Congressional Research Service, 2003).

Analysis of the Problems Associated with the Hanford Cleanup

One of the most frustrating realities for policy-makers involved in the Hanford cleanup is that it is the most expensive, and arguably the least efficient, project ever conducted by the DOE. At a current cost of over $2 billion a year, and likely to take at least another 20 years to complete, the Hanford remediation has been, and barring a miracle, will continue to be, an excessive drain on Congress's checkbook. While a number of factors contribute to this problem, the principal cause is a conflict of motivation between those who bear the costs and those who bear the risks associated with remediation.

The primary bearers of risk in the Hanford cleanup are the members of the local population in and around the cities of Kennewick, Pasco, and Richland. It is the workers from these communities that are employed at the Hanford site and who have the greatest potential exposure to radiation. However, though the local populace is clearly at the greatest risk, there remains in the community a distinct lack of incentive to expedite the cleanup process. The reasoning behind this apparent divergence from rational thought has

been posited by Robert Budnitz, the chairman of the National Academy of Sciences (NAS) former Committee on Buried and Tank Waste (1993-1998). According to Dr. Budnitz, because the dangers accompanying the site are not clear and present, the local citizens feel little pressure to push for immediate cleanup; since nobody can see the direct effects of contamination on the community, the citizens feel little pressure to combat the problem quickly (Budnitz, 2002). In other words, if not enough people are getting sick *today* as a result of contamination, the local community sees little reason why it matters if the site is cleaned up in 3 years or 30 years.

While undoubtedly the people living near Hanford want to see site remediation, the lack of an immediate tangible threat assigns the risk of contamination a lower priority than that of other issues concerning the community. Thus, the decision of whether to expedite or to prolong the cleanup effort flows from a simple evaluation of individual costs and benefits. Prior to the cessation of plutonium production in 1987, Hanford employed approximately 8,000 workers; in contrast, there are currently over 11,000 employees working on the cleanup effort (Budnitz, 2002). In an area that has grown alongside Hanford and has been economically dependent upon it since the beginning of World War II, the shutdown of the facility and completion of the cleanup will certainly bring economic downfall for the surrounding communities. While the remediation efforts are taking place, the local communities have not only sustained their existence but have also thrived, with the cleanup project's creation of over 3,000 new jobs. Without any clear and present danger posed by the site, the finite costs associated with the completion of Hanford's cleanup far outweigh the seemingly intangible benefits of remediation (Budnitz, 2002).

In addition, the local community would like to see the site completely uncontaminated, free of Hanford's footprint, an economically enormous, if not impossible task. In the absence of economic responsibility, the only choice the local government has to make is, "Would we prefer to have the site restored to prior greenfield status or to have large portions of the reservation fenced-off and unusable?" In contrast, Congress, working with limited resources, has to decide what degree of remediation provides the correct balance between reduction of health and environmental risk and economic feasibility.

Though the local communities' incentives for prolonging the cleanup efforts are understandable, they stand in direct conflict with the remediation goals of the federal government. Distinct from the objectives of the local citizenry, Congress's primary aim is to complete the remediation of the Hanford site in both an expedient and cost-effective manner. While safety is publicly stated to be the most important aspect of the Hanford cleanup, the goal of the federal government from a Congressional standpoint is to strike an appropriate balance between the reduction of risk at Hanford and the most economically reasonable remediation plan. However, because of the local benefits that accompany a prolonged remediation, coupled with the federal government's bearing of the entire monetary burden for the project, the local government has the incentive to manipulate the availability of federal funding. With proposed measures being paid for with federal funds, often the policies that the local government judges to be cost-effective for the community are inconsistent with the balance Congress is attempting to strike.

In addition to its attempts to restore Hanford to prior greenfield status, the local population has employed the issue of worker safety as a means for prolonging the cleanup efforts. While the local government pushes for a zero marker in worker exposure, Congress again turns to cost-benefit analysis to find the level of policy implementation that adequately balances worker protection with economic feasibility. However, because the issue at hand deals with personal health risk, as opposed to land use, the local community has achieved a greater level of success in receiving sympathy in the form of federal funds. Because the local community is worried about its citizens' exposure to risk, the reasoning behind conducting these studies is valid. But in practice, the studies have added to the overall inefficiency of the Hanford cleanup. In order to ensure the highest degree of personal safety, the local community has questioned all aspects the DOE's decisions and has insisted that the federal government conduct repeated studies of all cleanup procedures used. In doing so, the local government is ensuring that cleanup measures will come as close to the desired zero standard policy as possible. At the same time, local governments are adding a hitch to the remediation process, resulting in long delays and higher costs (Budnitz, 2002). Working with limited resources, and with annual cleanup costs for Hanford now in excess of $2 billion, it seems logical that Congress would be very concerned with the current level of project inefficiency. However, due to internal politicking and congressional logrolling, Congress has for the most part, failed to address the issue. Because Congress is in charge of appropriating funds, the process of allocating money for the Hanford cleanup is extremely complex, with every dollar specifically assigned. To add to the complexity of the issue, each of these specific allocation decisions is, in turn, influenced by the individual special interests of each Congressional member. Thus, in order to benefit from the proposal, a representative from one state might try to negotiate, promising to vote favorably on this issue on the condition that the waste is shipped to her state's treatment facility, an action that would benefit the economy and please her constituents

(Budnitz, 2002). Unfortunately, a great deal of economic inefficiency often accompanies this system of trade-offs because sending the waste to another state instead might save the government millions of dollars.[3]

Additionally, Congress is also under enormous public pressure to find the proper balance between risk-prevention and remediation cost—if Congress errs in either direction, the consequences can be severe. If a member of Congress is portrayed as being in support of reducing cleanup funds, the effects of such negative exposure could be politically devastating. Few politicians want to take on this risk. At the other end of the spectrum, Congress is expected to allocate funds efficiently, and eliminate wasteful spending. If the public becomes disenchanted with the Hanford cleanup effort and believes that there is a great imbalance between the risks involved and the remediation costs, then policy-makers risk alienating their constituents. As a result, when making appropriations decisions, members of Congress must find an acceptable balance to avoid being portrayed as tight-fisted or as excessive spenders.

Conclusion

After nearly a half century of waste management procedures that threatened both personal and environmental safety, the federal government is now faced with a cleanup task more complex than any other remediation project in environmental history. Not only are wastes that were dumped directly into the soil permeating the groundwater, but also over one-third of Hanford's storage tanks are leaking, adding to the flow of radioactive substances into the groundwater. The risks associated with exposure to these wastes are substantial; the effects of the Columbia River's contamination would not only be devastating to the local community, but would also impact all who live downstream and who depend on the Columbia for their livelihood.

In the face of all these risks, Congress and the local government have often been at odds regarding their goals for remediation. While the federal government wants to ensure the safety of the cleanup workers and the local citizenry, it also has to counter the challenges and criticism made by those who have to help bear Hanford's cleanup costs. At the same time, the local government is pushing to increase the extent of remediation beyond what is economically feasible for Congress. With so much of the local economy tied up in the remediation effort, the local government has a strong incentive to prolong the cleanup procedure.

The Hanford cleanup project has become a platform for Congressional logrolling. The local government and Congress are locked in dispute. Collectively, both parties must also counter the influence of special interest groups trying to benefit from the cleanup. In the upcoming year, with a new and increased budget from the federal government, the TPA stands ready to fulfill its end of the bargain. However, it remains to be seen whether this increase in funding will result in a safer and more efficient cleanup or in a more costly and prolonged remediation.

"Noah Lichtenstein, The Hanford Nuclear Waste Site: A Legacy of Risk, Cost, and Inefficiency, 44 Natural Resources Journal (forthcoming 2004)"

Author Notes

[1] A crib is an underground structure designed to allow liquid wastes to percolate to the soil.

[2] The waste in these tanks contributes about 215 million curies to Hanford's inventory of high-level waste.

[3] Coincidentally, instead of transporting all of its low-level wastes to existing treatment sites, DOE is constructing a new on-site facility specifically tailored for wastes at Hanford.

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Noah Lichtenstein

Noah Lichtenstein is a senior majoring in American Studies, with a minor in Political Science. He was first introduced to the Hanford Nuclear Waste Site while taking Professor Rosnecranz's Environmental Policy and Law course. While serving as Legislative Intern for Oregon Senator Ron Wyden (as part of the Stanford in Washington Program), Noah continued to pursue his interest in the politics surrounding the cleanup of Hanford. While in Washington DC, he produced this manuscript—the complete version of which will appear in the Summer 2004 issue of the Natural Resources Journal. He would like to thank his mentor Armin Rosencranz.