

February 6, 1996

SECY-96-027

FOR: The Commissioners

FROM: James M. Taylor /s/
Executive Director for Operations

SUBJECT: EVALUATION OF ISSUES NECESSARY TO DETERMINE THE FEASIBILITY OF LICENSING, AND LEVEL OF INVOLVEMENT IN, THE DEPARTMENT OF ENERGY PROPOSED HIGH-LEVEL RADIOACTIVE WASTE SOLIDIFICATION SYSTEMS

PURPOSE:

To inform the Commission of the staff's evaluation of issues, raised in SECY-95-305, "Request to Evaluate Issues Necessary to Determine the Feasibility of Licensing and Level of Involvement in Planned Future Department of Energy High-Level Radioactive Waste Solidification Systems," that affect the staff's licensing of privatized waste treatment systems constructed for the solidification of high-level waste (HLW) from Hanford tanks, and to seek the Commission's approval of the staff's recommended level of involvement in the regulation of the Department of Energy's (DOE's) proposed High-Level Radioactive Waste Solidification Systems.

DISCUSSION:

On December 4, 1995, the Department of Energy (DOE) briefed the staff on plans to privatize two future Hanford tank waste remediation systems (TWRS), possibly using different technologies. These TWRS will be designed, constructed on the Hanford reservation, owned, and operated by government contractors in two phases: Phase I, pilot-scale facilities; and Phase II, full commercial operations. DOE has proposed that the Nuclear Regulatory Commission license Phase II and has requested NRC to determine the appropriate level of NRC involvement in Phase I before DOE's issuance of a request for proposal on February 15, 1996.

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In SECY-95-305, the staff notified the Commission of its intention to evaluate NRC options for involvement in Phase I and to characterize four issues that could affect NRC's role in Phase I and Phase II operations. These issues include: (1) the sufficiency of current NRC regulations for licensing such operations; (2) the availability of information and experience necessary for the staff to develop appropriate regulatory guidance in the time frames available; (3) the resource requirements and availability for participating in these activities; and (4) NRC's legislative basis for licensing privatized DOE contractors;

Based on the staff's past involvement in licensing new projects and technologies, the staff believes that full and early interaction with DOE is desirable for the development of staff experience in the utilized technologies. This NRC interaction would include coordination with DOE during the design review, construction, and operation of Phase I through the assignment of onsite NRC observers and dedicated resources at NRC Headquarters. A description of the work expected under this strategy, alternatives to this strategy, and associated resource commitments may be found in the attachment.

The staff has characterized four main issues that could affect NRC's role in following the proposed strategy.

Issue one involves a review of the current regulations to determine their sufficiency for regulating these new processes, which were not specifically envisioned during regulatory development. The existing 10 CFR Part 70 is clearly intended for regulation of receipt, possession, use, and transfer of special nuclear material in any form. Further, it is general enough in structure and content that a variety of chemical processing activities could be licensed within the rule's provisions. A similar argument can be made for 10 CFR Parts 30 and 40, which regulate the receipt, possession, use, and transfer of byproduct and source material, respectively. 10 CFR Part 20 provides standards for protection against radiation and again there is no reason to expect that the regulation would be inadequate or require revision for application to these technologies. It should also be noted that the staff is currently working on a proposed revision to 10 CFR Part 70 that would provide an enhanced regulatory tool because it focuses on establishing requirements that are based on an integrated analysis of the risk from potential hazards with protective measures graded in stringency in accordance with risk levels. The proposed revision will also have improved rule structure and language and will address specific safety areas not addressed by the existing rule such as fire protection, chemical safety, and management controls such as maintenance, quality assurance, configuration management, and audits and assessments. This new rulemaking could also address radioactive waste remediation activities.

Issue two is the availability of staff experience and other information that would be required in developing licensing guidance for these proposed DOE facilities. The staff is experienced in the various disciplines that would be necessary to oversee and regulate most aspects of any selected solidification technologies. However, the staff's direct experience with any such expected technologies is limited to its oversight, since 1980, of the vitrification process at the West Valley Demonstration Project (WVDP). Hot operations at WVDP are not expected to begin until sometime in late 1996. The staff will also draw on the experience of foreign governments, such as the French and Japanese, that already have commercial vitrification facilities operating. If DOE opts to use solidification technologies other than vitrification, NRC's

experience base and access to information on such technologies may be more limited. At the time of operation, since the staff will have worked closely with the designers of these processes, the staff believes that with the use of a limited number of outside technical specialists, and some augmentation of staff resources, it would have the requisite expertise and experience to regulate the operation of these facilities. If the technology option chosen by DOE is radically different from technologies expected by the staff, the staff may need to revisit this issue and will inform the Commission accordingly.

Issues three and four are related to resources and the authority to expend NRC resources on this effort. The staff has explored the level of and the availability of resources needed to develop regulatory guidance, oversee Phase I activities, and license Phase II. An assessment of resource usage for Phase I and Phase II activities is presented in the attachment. As noted in Chairman Jackson's January 18, 1996, letter to Mr. T. J. Glauthier, the resources to review these efforts are not in our current planning base. The fourth and clearly a fundamental issue that must be addressed in deciding the NRC role in either Phase I or II is the authority by which NRC may license or provide regulatory oversight of DOE contractor-owned facilities. The General Counsel provided initial views to the Commission on this issue in SECY-95-304. OGC is forwarding a separate paper to the Commission clarifying to what extent NRC has a statutory basis and authority to expend appropriated funds to license the solidification of the Hanford tank wastes.

RECOMMENDATION:

For the benefit of DOE's program, the staff proposes to interact with DOE during Phase I to gain useful experience in the utilized technologies. If the forthcoming OGC analysis indicates that the NRC has the requisite statutory authority to license or if Congress specifically legislates such authority, and assuming that sufficient resources are appropriated, the staff proposes to interact closely with DOE during the design, review, construction, and operation of Phase II. This close interaction will be through the assignment of onsite NRC observers and dedicated resources at NRC Headquarters. During Phase I, NRC personnel will provide general consultation with DOE and DOE contractors on technical and regulatory issues affecting the proposed facilities as described in the proposed strategy in the attachment. During Phase II, the staff will license the DOE contractor's commercial facilities using applicable NRC regulations. Since it is not likely that the level of involvement in Phase I can be decided before DOE's issuance of a request for proposal on February 15, 1996, the staff proposes to monitor DOE's initial procurement activities pending the Commission's decision. This level of effort will be 1 FTE or less unless otherwise directed by the Commission.

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Attachment: Options for Involvement
in Phase I and
Licensing of Phase II

OPTIONS FOR INVOLVEMENT IN PHASE I AND LICENSING OF PHASE II

On December 4, 1995, the Department of Energy (DOE) briefed the staff on plans to privatize two future Hanford tank waste remediation systems (TWRS), possibly using different technologies. The purpose of the TWRS is to immobilize highly radioactive tank waste from the Hanford site in a safe, environmentally sound, and cost-effective manner. These TWRS will be designed, constructed on the Hanford reservation, owned, and run by government contractors in two phases: Phase I, pilot-scale facilities and Phase II, full commercial operations. DOE has proposed that the Nuclear Regulatory Commission license Phase II and has requested NRC to determine the appropriate level of NRC involvement in Phase I before its issuance of a request for proposal on February 15, 1996.

The objective of Phase I will be to demonstrate the "proof-of-concept" and commercial viability of the contractor proposals. During Phase I, two pilot-scale plants will be designed and constructed by separate competing contractors to demonstrate separation of "low-activity" waste (LAW) from high-level waste (HLW) sludge and to immobilize the LAW. DOE's current schedule requires: (1) selection of two contractors in December 1997, (2) construction of facilities beginning in December 1999, and (3) hot operations starting in June 2002 and ending in 2012. DOE proposes to undertake Phase I with a level of involvement from NRC that NRC determines is appropriate.

Phase II will involve the construction and operation of two full-scale commercial HLW immobilization facilities by separate competing contractors. These facilities will be owned and operated by the contractors. DOE proposes that NRC license the Phase II facilities. Procurement for these new facilities is not expected to begin until 2002, with hot operations starting in December 2009.

Based on DOE's request, the staff has evaluated various strategies in which to involve itself in the Phase I activities and determined a proposed strategy. A description of the proposed strategy and its alternatives, as well as resource commitments, is shown below. Figure 1 is a summary of the resource commitments.

Proposed Strategy

The staff does not propose to license Phase I; however, much of staff's involvement would be similar to preparing an actual license. NRC and DOE would enter into a procedural agreement to establish arrangements for review and consultation by NRC with respect to Phase I activities. This agreement would provide minimally for the following: (1) a description of the responsibilities of both parties; (2) submission of documents, or other information, for review that would be expected to be provided in a normal licensing process; (3) arrangements for meetings under NRC's policy for "open meetings"; (4) access and space at the site as necessary to monitor project activities for onsite NRC observers; and (5) guidelines for issue resolution. This agreement would likely be in the form of a Memorandum of Understanding (MOU) similar to those MOUs previously arranged with DOE for oversight of the West Valley Demonstration Project and the High-Level Waste Repository Program (HWRP).

During DOE's procurement process, the staff would begin development of an overall review strategy, similar to that presented in NUREG-1495, "Overall Review Strategy for the NRC HWRP," which would be available as guidance for DOE's contractors in December 1997. This document would be developed in relation to the staff's expectations of future licensing and may require

multiple revisions throughout Phase I as the staff becomes more experienced with the technologies selected for solidification. Throughout Phase I, the staff would be expected to perform reviews (similar to safety evaluation reports) in response to DOE submittals. These documents would be expected to be referenced during licensing activities for Phase II.

Before completion of DOE's procurement process for Phase II (not expected to begin before 2002), the staff would expect to have gained enough experience in the pilot projects to expedite review of Phase II. This experience would be used to develop regulatory guides during Phase II that would be provided to DOE contractors and to implement any necessary changes to current NRC regulations.

Under the proposed strategy, the staff will expend only minimal resources, expected not to exceed 1 full-time equivalent (FTE), unless specific resources are appropriated for further action during FY 1996. These resources will be used to monitor the DOE procurement process. During FY 1997, the staff will require approximately 13 FTE and 2,000,000 dollars contract support for the development of generic information, including a review plan. After selection of DOE contractors in December 1997, the staff is expected to commit, on average, approximately 15 FTE and 2 million dollars contract support per year in total funds. After the onset of Phase I hot operation in the year 2002, the resource requirements dedicated for Phase I would be reduced to approximately 6 FTE per year to continue onsite monitoring of the facilities and to facilitate review of any changes resulting from operating experience.

In the year 2002, resources dedicated for Phase II review are expected to increase to levels similar to those used in Phase I. Despite the larger scope of the project, experience gained from Phase I interaction should help reduce overall resource needs. The largest commitment of these resources would be for the development of National Environmental Policy Acts (NEPA) documents and hearing preparation (if necessary). However, DOE has suggested that they may not limit Phase II technologies to those used in Phase I. This may require a larger outlay of resources for Phase II review beginning sometime after 2002.

Alternatives to the Proposed Strategy

Licensing Phase I

Based on the staff's evaluation, if licensing were required during Phase I the staff would not consider the licensing of the Phase I effort to be viable on the schedule proposed by DOE. NRC regulations would require adherence to certain prescribed processes, including compliance with NEPA requirements and public involvement, which would effectively preclude the staff from licensing Phase I on a time schedule consistent with DOE's planned schedule.

The licensing of Phase I would require as much as an additional 5 FTE and 1 million dollars per year above the commitments in the proposed strategy, primarily for NEPA activities and public interaction. Such activities would likely also extend the need for the resources for a longer period than the proposed strategy as it is unlikely that the staff could meet the current DOE schedule. Resources for Phase II would likely be slightly reduced from those used in the proposed strategy because much of the NEPA information prepared in Phase I could be used.

Monitoring Approach

The staff would commit resources necessary to review documentation and progress of the Phase I activities. The staff would not be committed to make

any formal reviews or document the results of such reviews. The staff does not consider this the optimal approach because it allows minimally committed resources to be easily sidetracked and does not permit the staff to gain the expertise and experience which greater interaction would allow. This approach could cause delays in licensing Phase II because much of the guidance, information, and staff experience would need to be developed in the early stages, thus extending the overall review period.

Phase I would require as little as 3 FTE per year to keep pertinent staff aware of the developments during Phase I. However, resources for Phase II could increase by as much as 6 FTE and 2 million dollars per year over those resources used in the proposed strategy for the development of guidance and staff experience. Furthermore, it is expected that the required resources would be necessary over a longer time than that in the proposed strategy because of the delays from lack of appropriate guidance for DOE's contractors.

No Interaction Approach

The staff would not become involved in the review of Phase I activities. DOE would be expected to submit an application for Phase II in the future, at which point the staff would become involved. At that point, the staff would begin developing guidance and become familiar with the technologies used. The impact from this approach could be greater delays to licensing of Phase II activities than would result from the monitoring approach because the staff would not be cognizant of DOE's plans.

No resources would be required for this project through FY 2002. In the year 2002, an additional 12 FTE and 4 million dollars per year over the resources used in the proposed strategy would be expected to be necessary for the development of guidance and staff expertise. The requirement for these resources would likely be longer than that for monitoring.

	PH.I	PH.I	START	PH.II	PH.II	START	END	
END	PROCURE. (02/96)	CONTRACT AWARDED (12/97)	PH.I HOT OPS (06/2002)	PROCURE. (09/2002)	DESIGN (2004-8)	PH.II (2008)	PH.I HOT OPS (2011)	PH.II OPS (2028)
	FY 1996	1997	1998	2002	2004	2008	2028	
1) PROPOSED STRATEGY								
PHASE I FTE	*	13	15/yr	>6/yr				>5*/yr
PHASE II FTE	0	0	0	0	12/yr	>20/yr	>6/yr	
CONTRACT SUPPORT						[-\$2,000,000.00/yr		
2) LICENSING								
PHASE I FTE	*	20/yr		>6/yr				
		>5**/yr						
PHASE II FTE	0	0	0	0	12/yr	>18/yr	>6/yr	
CONTRACT SUPPORT			[-\$3,000,000.00/yr][-2,000,000.00/yr		
3) MONITORING								
PHASE I FTE	3/yr							
PHASE II FTE	0	0	0	0	26/yr	>6/yr		
CONTRACT SUPPORT						[-\$4,000,000.00/yr		
4) NO INTERACTION								
PHASE I FTE	0							
PHASE II FTE	0	0	0	0	32/yr	>6/yr		
CONTRACT SUPPORT						[-\$6,000,000.00/yr		

* Resource expenditure depends upon allocation of additional resources from OMB, otherwise only minimal resources (expected not to exceed 1 FTE) will be expended.

**Decommissioning Reviews

FIGURE 1. RESOURCE COMMITMENTS FOR VARIOUS LEVELS OF INVOLVEMENT