NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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No. S-04-006

Spent Fuel, A "Critical" Element of the Nuclear Fuel Cycle

The Honorable Jeffrey S. Merrifield
Commissioner
U.S. Nuclear Regulatory Commission

at the
Dry Storage Fuel Forum 2004 Conference
Naples, Florida

May 3, 2004

Introduction

Good morning. Thank you for the opportunity to be one of the keynote speakers for this session of your conference. This morning I would like to discuss what I believe will be one of the greatest challenges in the history of the Nuclear Regulatory Commission: the review of an application for a high-level waste repository. While the Commission has been preparing for this challenge for many years, there is always a frenzy of last minute preparations at the dawn of any great landmark occasion. With the Department of Energy (DOE) representing that it will submit an application for a High-Level Waste repository at Yucca Mountain by December of 2004, both the NRC and DOE are actively preparing for that submission.

Today, I would like to discuss our role as the regulator of DOE. To put the significance of our role into perspective, it's useful to consider that DOE has a strong presence in Washington with more than 25 times the workforce of the NRC, and a budget of nearly $25 billion, compared with the NRC's budget of $600 million. Like David faced with the proverbial Goliath, our agency is faced with a significant challenge dealing with a much larger agency.

In addition to discussing this challenge, I would also like to take this occasion to review the multiplicity of fuel cycle activities in which the NRC is currently involved.

The Atomic Energy Commission

The DOE application will mark a significant change in the relationship between the NRC and DOE. Before the NRC was created, nuclear regulation was the responsibility of the Atomic Energy Commission (AEC). Beyond its principal role as the steward of our nation's nuclear stockpile, the AEC was charged by Congress with the mission of encouraging the use of nuclear power as well as regulating its safety. By 1974, however, the AEC had come under such strong attack for its internal conflicts of interest that Congress decided to abolish the agency. Both supporters and critics of nuclear power agreed that the promotional and regulatory aspects of the AEC needed to be assigned to different agencies. As a result, the NRC was created as an independent agency in 1975 and assumed the regulatory responsibilities for civilian uses of nuclear material from the former AEC. DOE, for its part, was the agency that inherited the AEC's promotional function.

To date, the NRC and DOE have coexisted and interacted as separate federal agencies. There are slight overlaps in jurisdiction between the two agencies, but it is rare that NRC has been in the position to regulate DOE. Congress has periodically required pilot programs to evaluate if the NRC should serve as the external regulator of DOE, although none of these pilots resulted in a definitive conclusion upon which both agencies could agree. For my part, I think the NRC could do a very good job of providing external regulation for a broad range of DOE activities. Nonetheless, in my view this has never gone beyond the pilot phase, principally because there remains within DOE a strong reluctance to be subject to external regulation. This 30-year relationship is about to change. Congress declared that the NRC will regulate any high-level waste repository.

For the NRC, reviewing a high-level waste repository license application will be a much larger licensing project than we are used to, but for the most part, the NRC will be acting in its traditional role as the regulator. DOE on the other hand will have to take on the unfamiliar role of an NRC license applicant. In order for the NRC and DOE to meet Congress' expectations, DOE must shift from the role of an independent operator to the role of NRC license applicant. The rules of our interaction with DOE have changed and the sooner DOE's managers and staff come to terms with this, the smoother this application process can proceed.

This change will clearly prove challenging for the DOE to accept, but they have no choice in the matter. Until now, DOE has been an independent actor, unilaterally determining what was necessary for their programs and implementing those determinations without interference from any other agency. Now, the NRC will be questioning their decisions and analyses and requiring that they submit very detailed information in support of their application just as the NRC does with all other license applicants. Everything DOE submits must be sufficiently descriptive to convince both the NRC and the public that their proposals are protective of the public health and safety.

Although we have not yet received the license application, we have received other materials from DOE for NRC review. Some of these have been of insufficient detail or have contained technical problems, and the NRC has been working with DOE to improve the standard of submitted documents. This experience is somewhat analogous to that of the early pioneers of spent fuel cask production. The applicants for the original spent fuel cask designs were unfamiliar with how to deal with a government regulator or the NRC licensing process. Early on, there were a number of problems that were solved only after the applicants better understood what the NRC required in an application and the NRC better articulated these requirements. To be perfectly frank, some of the early problems were not resolved

until power reactor licensees, who are very familiar with the NRC licensing process, became more directly involved in the cask certification process.

We, the NRC, are again struggling to become accustomed to regulating a new licensee, as well as becoming accustomed to the idea that DOE must be treated like any other licensee. The bottom line in this situation is that we cannot accept a half-hearted effort from any of our license applicants, including DOE. Our ability to meet the 3-4 year application review deadline, which has been mandated by Congress, is dependent on DOE submitting a high quality application. The NRC cannot be held responsible if DOE fails to meet this challenge. We are working diligently to meet the challenges facing the NRC, and I am confident we will be ready by December to perform an efficient, effective and timely review of the license application.

NRC Preparations for the License Applications

Turning inward toward our Agency, I am pleased to say that the NRC has been working full bore to prepare for DOE's application. Staff in almost every office of the agency are working diligently to ensure we have the appropriate infrastructure in place to support NRC's review. Once the application is docketed, the NRC must conduct extensive technical reviews, as well as public hearings which will be overseen by the Atomic Safety and Licensing Board. After completion of the hearings, the Board will forward its initial decision to the Commissioners for their review. The NRC is engaging the challenges presented by this process head-on.

The technical staff who will be responsible for reviewing the application are currently familiarizing themselves with the key technical issues that will be part of the application review, as well as attending technology exchanges with DOE to enable them to understand DOE's submission and to formulate questions on the application materials. They are also participating in public outreach activities and tribal workshops in the state of Nevada. Concentrated efforts are also being made to hire experts in technical areas where the NRC does not already have staff available.

The legal staff who will be responsible for representing the NRC in the public hearings are also gearing up for receipt of DOE's application. The Office of the General Counsel recently created a High Level Waste division that currently contains four attorneys dedicated to the Yucca Mountain project. The number of attorneys in this division will grow over the next two years to an ultimate total of twelve attorneys. The legal staff is also working to become more familiar with the technical and legal issues that are likely to be the subject of litigation, and counseling the staff in the application of NRC's High Level Waste regulations.

The Atomic Safety and Licensing Board (ASLB) faces the challenge of presiding over multiple, in-depth hearings related to the Yucca Mountain application. There will most likely be at least three panels simultaneously handling the numerous contentions expected in the hearing. To meet these resource needs, the ASLB will be hiring approximately four new legal judges and four new technical judges. The ASLB is also actively working with the agency's information technology staff to establish the Digital Data Management System (DDMS). The DDMS is a state of the art information management system that will allow any document or piece of evidence submitted in the case to be pulled up electronically at desktop computers in the hearing room. It is a web-based system with an audio-visual component that will allow real time court reporting and webstreaming so those who

cannot be present in the hearing room can have real time access to the proceedings, while also allowing parties access to information from any computer on which they have access to the internet.

Agency staff involved with information technology are working very hard to ensure that the Licensing Support Network (LSN) is up and running in time to receive documents submitted by DOE, the NRC, and other parties participating in the public hearings. The LSN is an electronic information management system that will hold documents related to the Yucca Mountain proceeding so that parties have access to those documents at any given time. The LSN is designed to provide full text search and retrieval access, as well as providing for electronic submission of filings by the parties and orders and decisions of the Atomic Safety and Licensing Board. The LSN is the largest database ever created by the agency and it poses many new technical hurdles that must be tackled by the staff in the near future.

Finally, the Commission is readying itself for receipt of the application and related legal proceedings. One major step we have taken is to establish the Commission Adjudicatory Technical Support Program. This division is home to the technical experts that will advise the Commission during its review of the Atomic Safety and Licensing Board's initial decision on the application. These staff members will be segregated from the rest of the agency to prevent any predecisional interactions between them and those staff performing the initial review of DOE's application. This is necessary to guarantee that the Commission's final decision on the application is impartial and untainted by improper communications between the Commission and the staff conducting the first-line review of the application.

All of these activities are aimed at achieving a fair, efficient and timely review process. This is the most significant application we have received in the history of the NRC, and we will be ready to meet the many challenges that such an application is likely to generate.

Other Fuel Cycle Activities

Today I would also like to highlight for you NRC's activities related to the nuclear fuel cycle. Spent nuclear fuel storage and transportation activities are extremely important to support the overall national picture of nuclear power. We currently have several applications in-house that could have significant impacts on fuel fabrication and storage in the U.S.

Louisiana Energy Services has submitted an application to build a new centrifuge enrichment facility in New Mexico, and we anticipate receiving a second equivalent application from the U.S. Enrichment Corporation in late summer. This is a significant step forward in fuel enrichment in the U.S. considering that there is currently only one plant operating in Paducah, Kentucky, and it utilizes gaseous diffusion technology rather than centrifuge technology. These are important applications and they will receive a focused and disciplined review by our agency.

Currently, we are reviewing an application filed by Duke, Cogema, and Stone and Webster to operate a mixed oxide fuel fabrication facility in South Carolina. If approved, this facility would disposition 25 metric tons of weapons grade plutonium into mixed oxide fuel, which could then be used in commercial reactors. There are both technical and regulatory issues associated with using MOX fuel that the NRC and the industry must resolve before this endeavor can move forward.

We are also reviewing an application from NFS Erwin to operate a blended low-enriched uranium facility in Tennessee that would be capable of dispositioning highly-enriched uranium from our weapons program that could also be used as fuel in commercial reactors. The NRC has issued a notice of opportunity to request a hearing and the staff has prepared the necessary hearing file. If the schedule follows those of similar hearings, the entire process will take approximately one year to complete.

Private Fuel Storage has submitted a first of a kind application for an Independent Spent Fuel Storage Installation (ISFSI), not co-located with a reactor, to be built on the lands of the Goshute Indian tribe in the State of Utah. This facility would be capable of storing 4,000 spent fuel canisters until a permanent repository can be completed. Hearings on all environmental and safety contentions were held in 2000 and 2002. The sole remaining issue involves aircraft crash hazards which will be the subject of hearings to be held later this year. The Commission should make a final decision on this application later in calendar year 2004.

Dry Cask Storage and Transportation Activities

At the moment, the NRC regulates 30 operating independent spent fuel storage installations. This number has more than doubled from what it was about five years ago. Based on current projections, there could be approximately 50 independent spent fuel storage installations by 2010. One indication that this projection is accurate is the continued interest the NRC has experienced in new cask designs from the industry. I would like to note that the dry cask storage industry is a maturing industry which is producing robust and safe products.

To date we have certified 14 cask designs, submitted by 5 vendors, that are approved for storage of spent fuel. Some of these designs are dual purpose and are approved for transportation as well as storage. Evolving cask designs are pushing the technical envelop and require that a more detailed technical analysis be performed by NRC staff when reviewing new design applications. This requires considerable NRC resources, as well as resources on the part of the applicant. In addition, the public is exercising its right to a hearing for some sites, which can also be resource intensive. A few notable examples of recent site specific license applications which have received considerable public interest and have typically involved significant, technically complex issues include Private Fuel Storage, Diablo Canyon, Humboldt Bay, and the Spent Fuel Facility at the Idaho National Engineering and Environmental Laboratory.

Emerging technical issues that evolve from new cask designs must be addressed to provide our staff with the necessary technical basis to support regulatory decisions on whether to accept or reject applicant requests. This regulatory guidance focuses on ensuring the safety of dry cask storage and transportation of spent nuclear fuel. Some examples of issues in this area that the staff continues to address are:

–High burnup fuel thermal issues
–Allowance for burnup credit
–Moderator exclusion for transport

I expect all three of these technical issues will be discussed at this conference, if not in direct presentations, then at least in the halls during the workshop. I will note that for high burnup fuel

thermal issues and allowance for burnup credit, the NRC has provided partial burnup credit but needs more data to justify further credit. The issue of moderator exclusion for transport is more complex in that it will require a change in the philosophy of the NRC. Up until now, our philosophy has been that criticality will not occur even if water should get into the transportation cask. If the Commission were to approve excluding the moderator for transport, it would allow each cask to transport more spent fuel, but it would also allow for the possibility of a criticality if sufficient water were to get into the cask. Moderator exclusion would require a sound technical basis to remove the requirement with associated assurances that a cask would not flood with water after a severe accident, and it would also need to be addressed through rulemaking.

In response to the event of September 11, 2001, the NRC has been evaluating the response of spent fuel storage casks and transportation packages to a terrorist event. I am limited on any details that I can discuss of these classified studies in a public, open forum, but I can assure you that these studies are receiving high priority attention by both management and staff. These studies are to be completed this year, and based on their outcome, may or may not result in staff proposed mitigative measures. At an appropriate time, we will communicate with the industry our assessment of the results of these analyses, and will interact with industry on implementing any potential mitigative measures that the Commission believes are necessary.

As I mentioned earlier, the Commission is actively preparing for a license application from DOE on Yucca Mountain. This action will trigger significant interest in transportation of spent fuel. The Commission has committed to Congress that we will perform some type of package performance study which will be a full scale test of a transportation cask or casks. NRC staff conducted several open public meetings soliciting input on what type of tests should be performed. The meetings had wide ranging stakeholder response including national, state, and local governments as well as several interest groups. The staff submitted a proposal which addressed all the public concerns and the action is now up before the Commission for a decision. The Commission is currently considering various options for the package performance study, taking into account significant stakeholder comments, study objectives, use of study results, and costs.

In closing, I would like to recognize that this assembled group is involved in a dynamic aspect of the nuclear industry. I would commend you for the significant improvement you have made in addressing regulatory issues in an appropriate manner. You have technical issues that must still be addressed, but I am sure you will strive to be successful in this area as well. Thank you again for your time and attention.