

June 30, 2005

MEMORANDUM TO: Jack R. Strosnider, Director  
Office of Nuclear Material Safety  
and Safeguards

THRU: C. William Reamer, Director **/RA/**  
Division of High-Level Waste Repository Safety  
Office of Nuclear Material Safety  
and Safeguards

FROM: Timothy J. Kobetz, Senior Project Manager **/RA/**  
Division of High-Level Waste Repository Safety  
Office of Nuclear Material Safety  
and Safeguards

SUBJECT: MAY 23-25, 2005, FOREIGN TRAVEL TRIP REPORT:  
VISIT TO LA HAGUE SPENT FUEL REPROCESSING FACILITY NEAR  
CHERBOURG, FRANCE

Attached is a copy of the trip report describing a trip to the COGEMA-La Hague spent fuel reprocessing facility near Cherbourg, France. Participants for the trip included C. William Reamer, Robert Johnson, Tae Ahn, and myself.

The objective of the visit was to interact with the Direction Générale de Sûreté Nucléaire et de la Radioprotection and COGEMA personnel to obtain first hand knowledge of the design, operation, and the potential risks associated with the facilities and understand challenges that may be associated with handling high burn-up spent nuclear fuel.

The content of this report may be of interest to the Commission, and it is recommended that the report be forwarded to the Commission.

Attachment: NRC Foreign Trip Report

cc: W. Dean, EDO/AO  
M. Federline, NMSS  
J. Dunn Lee, OIP  
T. Rothschild, OGC  
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## **NUCLEAR REGULATORY COMMISSION FOREIGN TRIP REPORT**

### **Subject**

Visit to the COGEMA La Hague Spent Fuel Reprocessing Facility near Cherbourg, France.

### **Dates of Travel and Countries/Organizations Visited**

May 23, 2005: Direction Générale de Sûreté Nucléaire et de la Radioprotection (DGSNR) in Paris, France.

May 24-25, 2005: COGEMA-La Hague Spent Fuel Reprocessing Facility (COGEMA-La Hague) near Cherbourg France.

### **Author, Title, and Agency Affiliation**

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### **Background/Purpose**

The design of the spent nuclear fuel handling facilities and operations at COGEMA-La Hague are expected to be similar to facilities that the Department of Energy is proposing for the potential geologic repository at Yucca Mountain, Nevada. The objective of the visit was to interact with DGSNR and COGEMA personnel to obtain first hand knowledge of the design, operation, and the potential risks associated with the facilities and understand challenges that may be associated with handling high burn-up spent nuclear fuel.

This trip supported two of NRC's Strategic Plan Goals: 1) using domestic and international operational experience and events to enhance decision making to ensure public health and safety; and 2) use state-of-the-art methods and risk insights to improve the effectiveness and realism of NRC actions. This experience will significantly assist the staff in performing a risk-informed and effective license review of Yucca Mountain fuel-handling facilities, and enhance staff expertise and credibility for potential Atomic Safety Licensing Board hearings.

### **Abstract: Summary of Pertinent Points/Issues**

On May 23, 2005, C. William Reamer, Tim Kobetz, Tae Ahn, and Robert Johnson, visited the Direction Générale de Sûreté Nucléaire et de la Radioprotection in Paris, France, and on May 24-25, 2005, visited the COGEMA-La Hague spent fuel reprocessing facility near Cherbourg, France. The design of the spent nuclear fuel handling facilities and operations at La Hague are expected to be similar to facilities that the Department of Energy is proposing for the potential geologic repository at Yucca Mountain, Nevada. The objective of the visit was to interact with DGSNR and COGEMA personnel to obtain first hand knowledge of the design, operation, and the potential risks associated with the facilities and understand challenges that may be associated with handling high burn-up spent nuclear fuel. Mr. Reamer presented an overview of the NRC licensing process for a geologic repository under 10 CFR Part 63 to both DGSNR and COGEMA.

The DGSNR provided an overview of its organization and mission, and described its licensing and inspection process as they relate to the COGEMA-La Hague facility. Several technical presentations were made including: 1) the general operation of the La Hague facility; 2) an overview of the risks associated with the fuel handling operations; 3) an analysis of the criticality risks; and 4) an overview of safety evaluations for using burn-up credit. In addition, DGSNR staff discussed inspection findings associated with fuel handling events at the La Hague facility. These included fuel handling machine software issues, hot cell ventilation issues, and contamination control. It was noted that no major event related to casks and fuel assembly movements had occurred since the fuel handling facility was commissioned in 1986.

During the visit to the La Hague facility COGEMA presented an overview of the facility operation and capacity which was followed by a tour of the transportation cask receipt area, the dry and wet unloading facilities, the transportation cask maintenance areas, and the centralized control room. At the completion of the tour, COGEMA discussed the dry fuel handling facility safety analysis. The discussions focused on the risks associated with the facility and a brief history of events at the facility and lessons-learned during two decades of operation.

The objective of the visit was achieved. The interactive discussions allowed NRC to understand the design, spent fuel handling risks, and operating experience of the La Hague facility. These insights will be valuable during a review of a potential license application for a geologic repository at Yucca Mountain, Nevada.

There are no policy matters that need to be brought to the Commission's attention nor issues that need management attention.

## **Discussion**

### Visit to DGSNR, May 23, 2005

C. William Reamer, Tim Kobetz, Tae Ahn, and Robert Johnson, visited the DGSNR which carries out nuclear safety supervision assignments for the French Nuclear Safety Authority (ASN). The ASN reports to the Minister of Industry, Minister of the Environment, and the Minister of Health. The ASN supervises nuclear activities to ensure that all users of ionizing radiation fully comply with their responsibilities and obligations with regard to radiation protection. The purpose of the visit was to gain an understanding of DGSNR's role in the supervision of activities at COGEMA-La Hague.

Jean-Luc Lachaume, Deputy Director General, DGSNR, presented an overview of the organizational structure and how it provides oversight for a variety of nuclear operations including the COGEMA-La Hague facility. Mr. Reamer presented an overview of the risk-informed licensing process, as governed by 10 CFR Part 63, that NRC would use to review a potential license application for a geologic repository at Yucca Mountain, Nevada (this presentation was repeated the next day at COGEMA-La Hague).

Various ASN staff made several technical presentations including: 1) the general operation of the La Hague facility; 2) an overview of the risks associated with the fuel handling operations; 3) an analysis of the criticality risks; and 4) an overview of safety evaluations for using burn-up credit. In addition, DGSNR staff discussed inspection findings associated with fuel handling

events at the La Hague facility. The following are insights that may be applicable to similar operations at Yucca Mountain:

- COGEMA-La Hague has the capability to unload fuel in both dry and wet environments. Handling spent nuclear fuel (SNF) in a dry environment is preferred over a wet environment because it takes less time and staff, requires fewer heavy load lifts, and generates less radiological waste. The SNF is only handled in a wet environment if the fuel is damaged or the dry transfer facility cannot accommodate the transportation cask.
- Once the spent fuel assemblies are removed from the transportation casks they are placed in movable storage racks that contain nine assemblies. The racks are then moved to SNF pool complex and stored until the facility is ready to reprocess it.
- Currently, burnup credit is only calculated based on actinides. However, the Directorate General for Nuclear Safety and Radiation Protection (IRSN) of ASN is assessing the use of both actinides and fission products for giving burnup credit. This would result in an increase of approximately 2% <sup>a</sup> k.
- There have been no major events related to the handling of cask and fuel assemblies since the commissioning of the facility in 1986. The following are some events that have occurred:
  - ASN inspectors identified concerns with the ability of the ventilation system to accurately maintain cooling for safeguards components to ensure their operability in the hot cell. As a result COGEMA enhanced the temperature monitors.
  - In September 2004, a failure of the fuel handling machine gripping device resulted in a SNF assembly not being completely removed from a transportation cask. Only the bottom edge of the assembly remained in the cask and was cocked at approximately 20 degrees. The assembly was recovered without incident. No radiological release resulted. The ASN determined that even if the assembly had been dropped and damaged the cooling system HEPA filters would have prevented any radiological release. The failure of the fuel handling machine was caused by a software modification in 1997 that had not been adequately tested

#### Visit to COGEMA-La Hague, May 24-25, 2005

Mr. Blanc, La Hague Operations Director, provided an overview of the operations performed at the facility, the through put of the facility, and transportation of the SNF to the facility. This was followed by a tour of the transportation cask receipt area, the dry and wet unloading facilities, the transportation cask maintenance areas, and the centralized control room. At the completion of the tour, COGEMA discussed the dry fuel handling facility safety analysis. The discussions focused on the risks associated with the facility and a brief history of events at the facility and lessons-learned during two decades of operation. The following are insights that may be applicable to similar operations at Yucca Mountain:

- The facility receives 12 different types of transportation casks. However, COGEMA-La Hague does not have mating collars between the cask and the hot cell to unload all of these

cask types in the dry facility, therefore, it is important for them to have a wet handling facility (see Figure 1 to view mating of the cask to the hot cell).

- There is SNF pool storage for between 14,000-16,000 MTU depending on the burnup. At the time of the visit there were approximately 8,000-9,000 MTU in storage. The SNF is stored until its specific composition is required for blending with other SNF during the reprocessing process.
- Damaged SNF that is sent to COGEMA-La Hague is “bottled” at the utility prior to shipment and then handled in the wet handling facility. To date, no unexpected damaged SNF has been received at the facility and no oxidation of SNF has occurred from handling it in a dry air environment. To help ensure that COGEMA does not receive unexpected damaged fuel it has staff at each utility that ships fuel (both French and foreign) to COGEMA-La Hague to observe fuel loading operations, testing of SNF for damage, and review SNF records.
- Design and safety reviews performed by utilities and ANS are performed using deterministic methods as apposed to risk-informed.
- The “golden rule” of facility design is to prevent, detect, and mitigate operating events.
- Design for criticality prevention is that no one failure of systems or procedures should result in an inadvertent criticality.
- Hot cell cooling systems are required to prevent damage to transportation cask neutron absorber resins, maintain concrete walls within operable temperature limits, prevent SNF cladding failures, and maintain equipment within operable temperature limits.
- To address the potential for aircraft crash hazards COGEMA performed both a probabilistic screening and a consequence analysis of structural barriers. The consequence of a light plane crash under wet storage conditions was minimal. While an aircraft crash is not considered a credible event, COGEMA has included a response to the event in its Emergency Plan.
- The COGEMA-La Hague has a safeguards electrical system that relies on backup batteries, two emergency diesel generators, and two independent off-site power sources.
- During the early operation of the facility, problems were encountered with the SNF handling gripper. COGEMA experienced difficulties obtaining design information from fuel manufactures to ensure that the grippers could safely move the SNF. This resulted in the drop of two assemblies. The no damage occurred to the individual fuel rods which were safely recovered (see Figures 2 and 3 for fuel movements).
- Operators receive 6 months of team training. Annual refresher training involves 5 days of general training and 3 days of nuclear safety training.

**Pending Actions/Planned Next Steps for NRC**

The objective of the visit was achieved. The interactive discussions allowed NRC to understand the design, spent fuel handling risks, and operating experience of the La Hague facility. The HLWRS staff and its contractor, the Center for Nuclear Waste Regulatory Analysis, will consider this information as it prepares to review a potential license application for a geologic repository at Yucca Mountain, Nevada.

**Points for Commission Consideration/Item of Interest**

There are no policy matters that need to be brought to the Commission's attention. The Commission may have interest in this meeting because of the current attention on geological disposal at Yucca Mountain.

**Attachments**

None

**"On the Margins"**

None



Figure 1

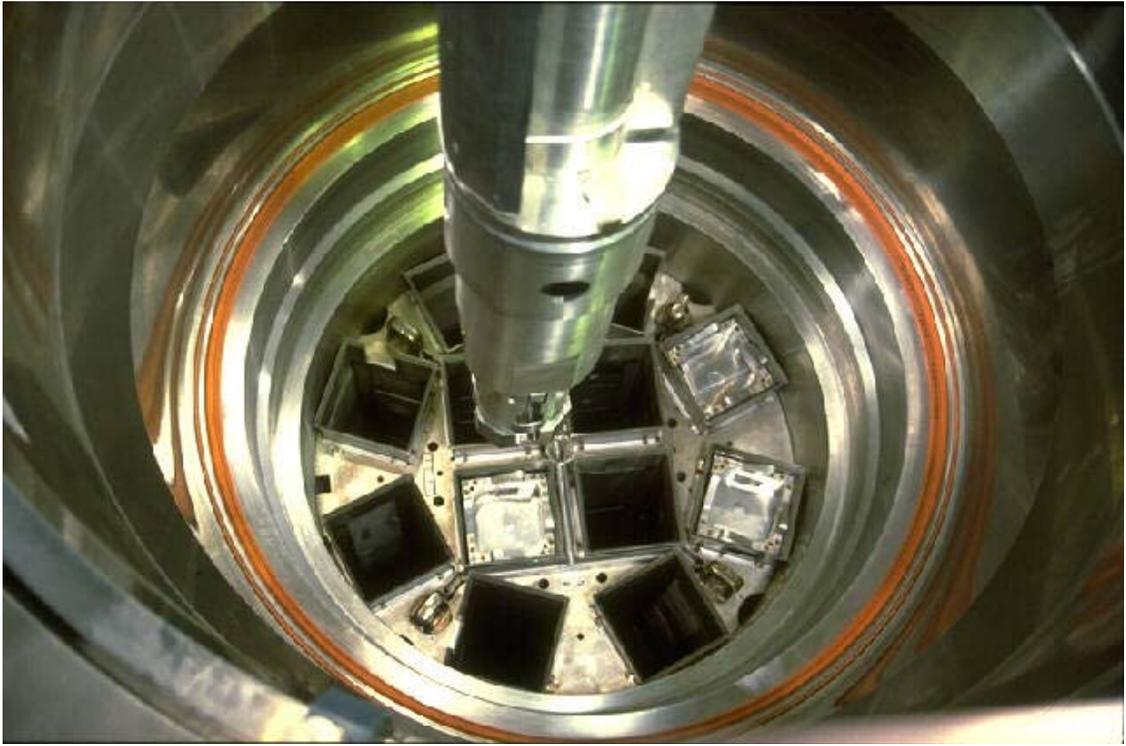


Figure 2



Figure 3

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