

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: Janice Dunn Lee, Director /RA/
Office of International Programs

SUBJECT: VISIT OF DR. MICHEL LIVOLANT, DIRECTOR, INSTITUTE OF
PROTECTION AND NUCLEAR SAFETY (IPSN), OCTOBER 24, 2000

Attached is the schedule and information for use during the visit of Dr. Michel Livolant, Director, IPSN, of France. Dr. Livolant will be attending the Water Reactor Safety Information Meeting, October 23-25, 2000. Dr. Livolant has interacted with the NRC research staff for many years and previously met the Commissioners in 1997 through 1999.

Dr. Livolant requested appointments with Chairman Meserve and Commissioner Dicus and would be honored also to meet Commissioners on the margins of the WRSM or at the Tuesday evening reception. A description of the many research related activities between IPSN and NRC is included in the background material that follows.

By copy of this memorandum, SECY, OGC, OPA, EDO, and RES are being advised of the meeting arrangements.

- Attachments: 1. Meeting Schedule
2. Biographical Information
3. Background
4. Suggested Talking Points

cc: SECY
OGC
OPA
EDO
RES

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FRANCE

France has a nuclear capability and maturity equivalent to the U.S. on an industrial, commercial basis, including all aspects of the nuclear fuel cycle. In 1998, France generated 78 percent of its electricity by nuclear power as well as exporting significant amounts of electricity to other countries in Europe. The French government is proud of its successful nuclear program which greatly reduces France's dependency on conventional fuel imports and provides environmental benefits.

France is a nuclear weapons country.

One national utility, Electricite de France

58 licensed PWRs

1 Licensed LMFBR (Phenix)

1 advanced PWR planned (EPR)

Average capacity factor for 1998 was more than 80%

Uranium ore: Mines and processing plants in France, Africa and North America

3 uranium conversion plants

1 large uranium enrichment plant

4 LWR fuel fabrication plants

1 MOX fuel fabrication plant

2 fuel reprocessing plants

3 vitrification facilities

2 low level waste storage facilities

2 sites undergoing suitability characterization for possible HLW repositories

Long history of regulatory and research cooperation with NRC

Regulatory Organizations

Directorate for the Safety of Nuclear Installations, DSIN

Director: Andre-Claude Lacoste

responsible for the licensing and inspection of nuclear facilities

Institute for Nuclear Safety and Protection, IPSN

Director: Michel Livolant

provides technical, safety expertise to DSIN; conducts safety research

Office for Protection Against Ionizing Radiation, OPRI

Director: Jean-Francois Lacronique

responsible for regulation and oversight of radiation protection matters

Activities/Issues

NRC has regular interactions, from the Commissioners to staff specialists, in the regulatory and research areas with most of the nuclear organizations in France. Initially, activities were focused in the reactor area but they have now expanded to include waste management, spent fuel storage, decommissioning, and fabrication and use of Mox fuel.

BACKGROUND AND TALKING POINTS

IPSN

Organizationally, IPSN is part of the Atomic Energy Administration (CEA). IPSN has a threefold mission. It conducts nuclear safety and radioprotection research, analyzes the safety of nuclear installations and carries out assessments of safety analyses on behalf of the government (DSIN), and inspects facilities relating to safeguards and physical protection. The organization participates in a number of international activities. IPSN has a staff of 1250 persons and an annual budget of \$200 million. A.C. Lacoste, the Director of DSIN, is Chairman of the Management Committee that oversees the IPSN program. Dr. Livolant was named Director of IPSN in March 1997; previously, he had been Deputy Director for Research.

IPSN personnel interact with the NRC staff in two different ways. The research staff of IPSN deal directly with the RES staff. However, the safety analysis and assessment staff do not interact directly, but they work through the staff of DSIN since their work supports the regulatory effort and they are funded by DSIN.

NRC-IPSN RESEARCH COLLABORATION

The French are one of the NRC's best partners in cooperative activities in the area of nuclear reactor safety. Besides the Japanese, the French have one of the largest programs in the area of nuclear reactor safety research, mainly conducted through the IPSN and its research facilities which include the test reactors PHEBUS and CABRI.

We currently have specific cooperative agreements in the following areas:

1. Severe Accident Research

Provides a framework for collaboration on the NRC's nuclear safety research programs and IPSN's PHEBUS FP experiment program; including investigation related to fuel damage, fission product release, and transport and containment performance. The French (IPSN) are also members of NRC international Cooperative Severe Accident Research Program (CSARP).

2. T-H Code Development and Assessment Program

The NRC and the French (IPSN and CEA/DTP) research programs include integral-effects and separate-effects testing and model development with similar goals. This research collaboration while complementary will exchange technical information, data, and analytical codes and will minimize duplicative thermal-hydraulic research efforts.

3. High Burn Up Fuel Behavior Under Accident Conditions

The French are conducting a series of in-pile experiments of interest to the NRC, They would like NRC to continue this cooperation in the future. In particular they are soliciting NRC financial support to modify the CABRI sodium cooled test reactor to a water cooled configuration and continue their testing program. A final NRC review of the multilateral "Umbrella" Agreement on the OECD-IPSN Cabri Water Loop Project has been

completed. It is expected that the Agreement will be signed by the EDO by the end of October 2000. Final negotiations are also currently on-going to develop a bi-lateral Cabri Water Loop Agreement between USNRC and IPSN in order to conduct tests in Caderache France to validate a broad spectrum of fuel and cladding characteristics under accident conditions. The total cost of the program is expected to be approximately \$64M, with NRC contributing a total of \$3.5M (\$500K per year). This program is expected to run through 2008, and will include other OECD member countries as well as EPRI.

4. Cooperative Probabilistic Risk Assessment (COOPRA) Program

The French (IPSN) are members of the NRC international COOPRA program providing financial as well as in-kind technical information exchange that includes: methods development, probabilistic analysis of operating events, fire analysis, regulatory applications of PRA, and human reliability assessment.

5. Seismic Engineering Research

The French through IPSN have participated in a project to investigate the propagation of strong earthquake ground motions at Garner Valley. This program continued through 1999. Discussions are currently ongoing with IPSN for their possible continuation in the program.

In addition to the above bilateral cooperative activities, the French are active in working with the USNRC and other countries in resolving the following outstanding safety research issues:

• Source Term Research

The NRC has been participating for the last 8 years in the PHEBUS in-pile experiments which are now being used to confirm our general understanding of fission product release and transport. This is a major French contribution to nuclear safety research. This activity is supported by the European Community.

• Molten Reactor Fuel-Lower Head Pressure Vessel Interaction Research:

The French (IPSN) have been an active participant with the NRC and thirteen other OECD/NEA member countries in the RASPLAV project. This project, conducted at the Kurchatov Institute, in Russia, was initiated in 1994, and was completed in June 2000. The new MASCA Project is the continuation of the severe accident research that was started under RASPLAV. The NRC and IPSN intend to participate in the new program. The MASCA Agreement is currently in house and is under NRC final review. The MASCA Agreement is expected to be signed by the EDO in the near future.

• Lower Head Failure Project

The French are participating with the NRC in a new OECD/NEA supported project to characterize the timing and sizes of the lower head failure under pressurized conditions (with large differential temperatures across the lower head wall) without external cooling

of the reactor pressure vessel. This project is conducted at Sandia National Laboratory and will continue through 2001.

- Fuel-Coolant Interaction Program (FARO) at ISPRA (ITALY)

NRC participated in this program under a technical exchange agreement with the Joint Research Center (JRC) of the European Commission. IPSN also participated in the program. A proposed follow on program (ECOSER) is currently under NRC review for possible participation.

- Structural Integrity Tests of a Prestressed Concrete Containment Model

The French (IPSN and CEA/Saclay) are participating in a joint USNRC/NUPEC (Japan) analysis and testing program by performing pre-test predictions and post-test analysis of the integrity of a concrete containment. Other international organizations are also involved. The pre-test meeting to discuss the analytical predictions was held at the SANDIA National Laboratory with all participants in October 1999. The test to failure was completed in September 2000. Post test analysis will now be performed.

- OECD Halden Project

Electricite De France (French Utility) is a participant with the NRC and other organizations of the OECD member countries in the Halden Reactor Project. The OECD Halden Project was renewed for another three year period - through year 2002. Research programs include: High Burn-Up Fuel Performance, Safety and Reliability; Reactor Operation for Test Fuel Irradiation; Man-Machine Research; and, Degradation of In-Core Reactor Materials,

TALKING POINTS

The Commissioners may wish to:

- Acknowledge the long history of beneficial research cooperation between NRC and IPSN and note the numerous activities we are presently involved in.
- Inquire as to the status of the research activities include IPSN and NRC are jointly involved and plans for future cooperative projects.

IPSN PERSONNEL ASSIGNMENTS TO NRC

Over the many years of collaboration with France, IPSN has sent seven staff members to NRC on temporary assignments. Typically, these assignments there one year in duration. The most recent IPSN assignee, Eric Debec-Mathet, returned to France in September 1999 following a two year assignment. During his stay, Mr. Debec-Mathet worked with the Materials and Engineering Branch, NRR.

During the week of October 16, Mr. Pascal Regnier, a digital instrumentation and control software specialist of IPSN, started a one year assignment with the NRC staff. Mr. Regnier will spend six months each with NRR and RES.

The Commissioners can expect Dr. Livolant to repeat the message delivered previously by Andre-Claude Lacoste, DSIN, namely that DSIN/IPSN are very interested in hosting a long term assignee from NRC in France.

TALKING POINTS

The Commissioners may wish to:

- Thank Dr. Livolant and IPSN for the many skilled assignees that they have sent to NRC.
- Indicate that the Commission and staff are seriously assessing the possibility of sending a long-term assignee to France.

MAJOR REVISIONS TO THE NUCLEAR REGULATORY STRUCTURE IN FRANCE

On December 9, 1998, Prime Minister Lionel Jospin announced that the French government would propose a bill to the parliament revising to the nuclear regulatory structure in France. The key features of the bill are summarized below.

- A new, administrative and independent safety authority would be established to carry out the regulatory function for nuclear installations. The authority would be directed by a five member, full-time Commission. It would be expected to be staffed by personnel of the current Directorate for the Safety of Nuclear Installations (DSIN).
- Regulation of radiation protection would be transferred to the new regulatory Commission. Currently, radiation protection is regulated by the Office for Protection Against Ionizing Radiation (OPRI) within the Ministry of Health.
- The technical Institute for Protection and Nuclear Safety (IPSN) would be separated from the Atomic Energy Administration (CEA) and become a stand-alone public entity. It would continue to provide technical expertise to the regulatory Commission.
- A new emphasis would be placed on transparency with the formation of a High Council for Nuclear Safety Information and the institution of local information centers.

The proposal was based on a report prepared by Jean-Yves Le Deaut, a Parliamentarian and chairman of the Parliamentary Office for Evaluation of Scientific and Technological Options. Mr. Le Deaut visited NRC in April 1998 and met with Commissioner McGaffigan to obtain background information on the U.S. regulatory program for his report.

Mr. Le Deaut's report recommended the formation of an independent safety commission and assembling both nuclear safety and radiation protection within this commission as is done in the U.S. However, he rejected the U.S. approach of combining the regulatory authority and their

supporting technical experts into a single organization. Instead, he advocated a similar system to Belgium and Germany where the functions are separated into different organizations. Consequently, he proposed that the technical body, IPSN, be separate and independent from both DSIN and CEA.

The bill was planned to be delivered to the Council of Ministers for final review in June 1999. This was not done because of an unexpected hitch. The Conseil d'Etat, the French supreme administrative court, issued an unexpectedly critical opinion of the proposed bill. The court objected that it is unconstitutional for the government to delegate its sovereign regulatory responsibilities in matters of public health and safety to an independent authority. The future of the legislation is not clear. The government could revise the bill to conform to French law and resubmit it. However, disagreements between the Ministries of Environment, Health, and Industry regarding oversight of the new regulatory Agency have resulted in a stalemate in revising the legislation.

Reportedly, one point that appears resolved is to separate IPSN from CEA and to form a single technical institute combining both nuclear safety and radiation protection. In a related and recent move, the IPSN budget for 2001 was transferred from the Ministry of Industry to the Ministry of Environment.

TALKING POINTS

The Commissioners may wish to:

- Express support for the government's plan to provide a legal basis for the nuclear regulatory safety structure in France.
- Inquire as to the current status of the situation and the likely future outcomes as they may effect IPSN.
- Inquire as to the impact to IPSN of transferring funding authority from the Ministry of Industry to the Ministry of the Environment.