DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

Preparation for decommissioning symposium
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Cristina Correa Sáinz ccos@enresa.es
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RESPONSIBILITIES AND ORGANIZATION IN SPAIN

VANDELLÓS 1 NPP
1998 / 2003

JOSE CABRERA NPP
2010 / 2018
Responsibilities during the transition period:

**Plant Operation**
- Operator
  - Hold License
  - Remove SF from pools to safe storage
  - Condition operational waste
  - Maintain records

**Transition Period**
- Prepare plans for D+D
- Provide SF Storage
- Perform Preparatory Activities for D+D

**Plant Decommissioning**
- ENRESA
DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

RESPONSIBILITIES AND ORGANIZATION IN SPAIN

Operational License → Shutdown period → Amendment of operational License → Decommissioning License → License Termination → Return site to owner
DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

DECOMMISSIONING STRATEGY

- **Plant Operation (40 years)**
- **Transition Period (3-5 years)**
- **Plant Decommissioning (7-10 years)**

- Remove fuel from pool
- Immediate Total Dismantling (except V-1)
- Condition Operational Waste

Images: [Plant Operation](#), [Transition Period](#), [Plant Decommissioning](#)
DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

PLANNING FOR DECOMMISSIONING

• Planning, Engineering and Licensing of the Project
  • Basic Strategy Study
  • Basic Engineering and Licensing Documentation
  • Detail Engineering
• Radiological Characterization
• Preparation for decommissioning
PLANNING FOR DECOMMISSIONING

- Planning, Engineering and Licensing of the Project
  - Basic Strategy Study
  - Basic Engineering and Licensing Documentation
  - Detail Engineering
Radiological Characterization is essential for a good D&D planning:

- Facility
- Environment
PREPARATION FOR DECOMMISSIONING

Activities required by regulation

Removal of Spent fuel

Preparatory Activities for D&D

Removal of operational Waste

Adapt organization to D&D
PREPARATION FOR DECOMMISSIONING - Preparatory Activities for D&D

- Discharging systems and components
- Draining circuits and systems
- Removal of non-radiological components and hazardous components
- Decontamination of systems
- Construction/adaptation of auxiliary systems / facilities (for waste storage, decontamination)
### EXAMPLES OF JOSÉ CABRERA-PREPARATORY ACTIVITIES. Shutdown period

<table>
<thead>
<tr>
<th>1963</th>
<th>1969</th>
<th>2006</th>
<th>2010</th>
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<tbody>
<tr>
<td>CONSTRUCTION</td>
<td>OPERATION</td>
<td>TRANSITION</td>
<td>DISMANTLING &amp; DECOMMISSIONING</td>
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</tbody>
</table>

- Decontamination of the primary system (Enresa & plant operator)
- Radiological characterization of the plant (Enresa & plant operator)
- Preparation of decommissioning plan and licensing documentation (Enresa)
- Licensing and fabrication of spent fuel cask (Enresa)
- Construction of on-site interim spent fuel storage (ISFSI) (Enresa & plant operator)
- Transfer of spent fuel to ISFSI: 12 casks from 19 January to 3 September 2009 (Plant operator)
EXAMPLES OF JOSÉ CABRERA-PREPARATORY ACTIVITIES.

SPENT FUEL – CASK LOADING

MOVEMENT OF THE HI-TRAC LOADED TO THE AUXILIARY CASK VAULT

LOAD FUEL ASSEMBLIES

HI-TRACK – EXIT of CONTAINMENT BUILDING

TRANSPORT THE HI-STORM TO ISFSI
INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

12 HI-STORM Z CASKS
Installations: New use of Turbine Building and the Cooling Towers Pad

Systems: New design of water supplies (Fire, general services and effluent dilution), electrical supply, instrumentation and control, ventilation, etc. Others were modified (Radwaste Treatment, ventilation systems, radwaste stores etc.)
PREPARATION FOR DECOMMISSIONING- Adapt organization to D&D

- New organization is required with new competences.
- D&D requires an appropriate mixture of experienced workers with operational memory and new workers with D&D experience.
- Plant records and as-built documentation are generally not complete and the use of experienced operating personnel is beneficial to D&D.

- New licenses for the operating personnel and for the head of radiological protection.
DOCUMENTATION FOR THE DECOMMISSIONING LICENSE

Document should be adapted to the new risk profile (significant reduction in safety systems).

Nuclear Regulation:

• Safety Analysis Report
• Operating Regulations
• Technical Specifications
  • Nuclear Safety (ISFSI)
  • Surveillance Programs (Ventilation systems, Fire protection systems, others systems)
• On-site Emergency Plan
• Quality Assurance Manual
• Radiological Protection Manual
DOCUMENTATION FOR THE DECOMMISSIONING LICENSE

Document should be adapted to the new risk profile (significant reduction in safety systems).

Nuclear Regulation:

- Security Plan
- Radioactive Waste and Spent Fuel Management Plan
- Plan for the control of material for clearance
- Site Restoration Plan
- Economic Study

- Outside Dose Calculation Manual
- Environmental Radiological Surveillance Plan
## Type of accidents considered in the Safety Analysis

<table>
<thead>
<tr>
<th>Type of Accident</th>
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<tbody>
<tr>
<td>Accidents related to the handling of radioactive material (spent fuel excluded)</td>
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<tr>
<td>Accidents related to the decommissioning activities. Loss of containment and / or HEPA filtration</td>
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<tr>
<td>Accidents related to the decommissioning activities. Explosions</td>
</tr>
<tr>
<td>Accidents related to the decommissioning activities. Accidental liquid spills</td>
</tr>
<tr>
<td>Accidents related to the decommissioning activities. Fires</td>
</tr>
<tr>
<td>Accidents involving spent fuel</td>
</tr>
</tbody>
</table>
OTHER DOCUMENTATION FOR DECOMMISSIONING

- Environmental Impact Assessment
- Surface Water Release Authorization
- Health and Industrial Safety regulation
  - Labor Risk Prevention Plan
- Local Regulation
  - Work License Project
- European Commission
  - Data Required by the Art. 37 of EURATOM Treaty
  - Data Required by Regulation 302/2005
CONCLUSIONS AND LESSONS LEARNED
DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

**Operation**

- Routine operations
- Primary hazards associated with nuclear fission process
- Risks associated with nuclear safety

**D&D**

- Non-routine operations/changing work environment
- Reduction of hazards in a systematic and progressive way
- Risks associated with radiological protection and industrial safety
• Cooperation between plant operator and ENRESA is essential to ensure a gradual decrease of regulatory requirements from operation to D&D.

• The licensing documents should be adapted to the new risk profile (significant reduction in safety systems). Licensing documentation is extensive.

• A good response to regulatory requirements reduce the authorization times.
Adapt organization to D&D

• D&D requires an appropriate mixture of experienced workers with operational memory and new workers with D&D experience

• Change mind setting from operation to D&D

• New organizational challenges must be addressed (relocation, motivation, integration of old and new personnel, training, knowledge retain and transfer, …)

• Licenses for the operating personnel
Thank you for your attention