# DECOMMISSIONING LICENSING PROCESS OF NUCLEAR INSTALLATIONS IN SPAIN

**Preparation for decommissioning symposium**
**February 16-18, Lyon France**

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, ENERGÍA Y TURISMO

enresa

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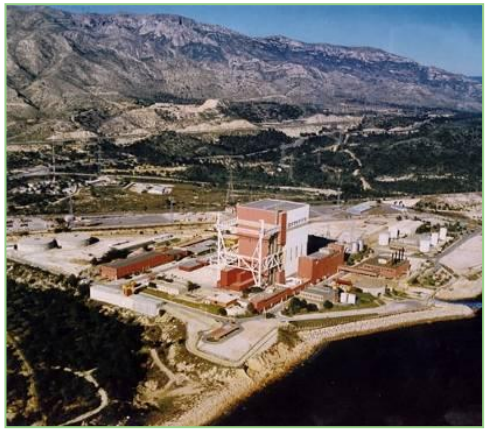
PREDEC 2016
International Symposium on PREparation for DECommissioning

## TABLE OF CONTENT

# RESPONSIBILITIES AND ORGANIZATION IN SPAIN



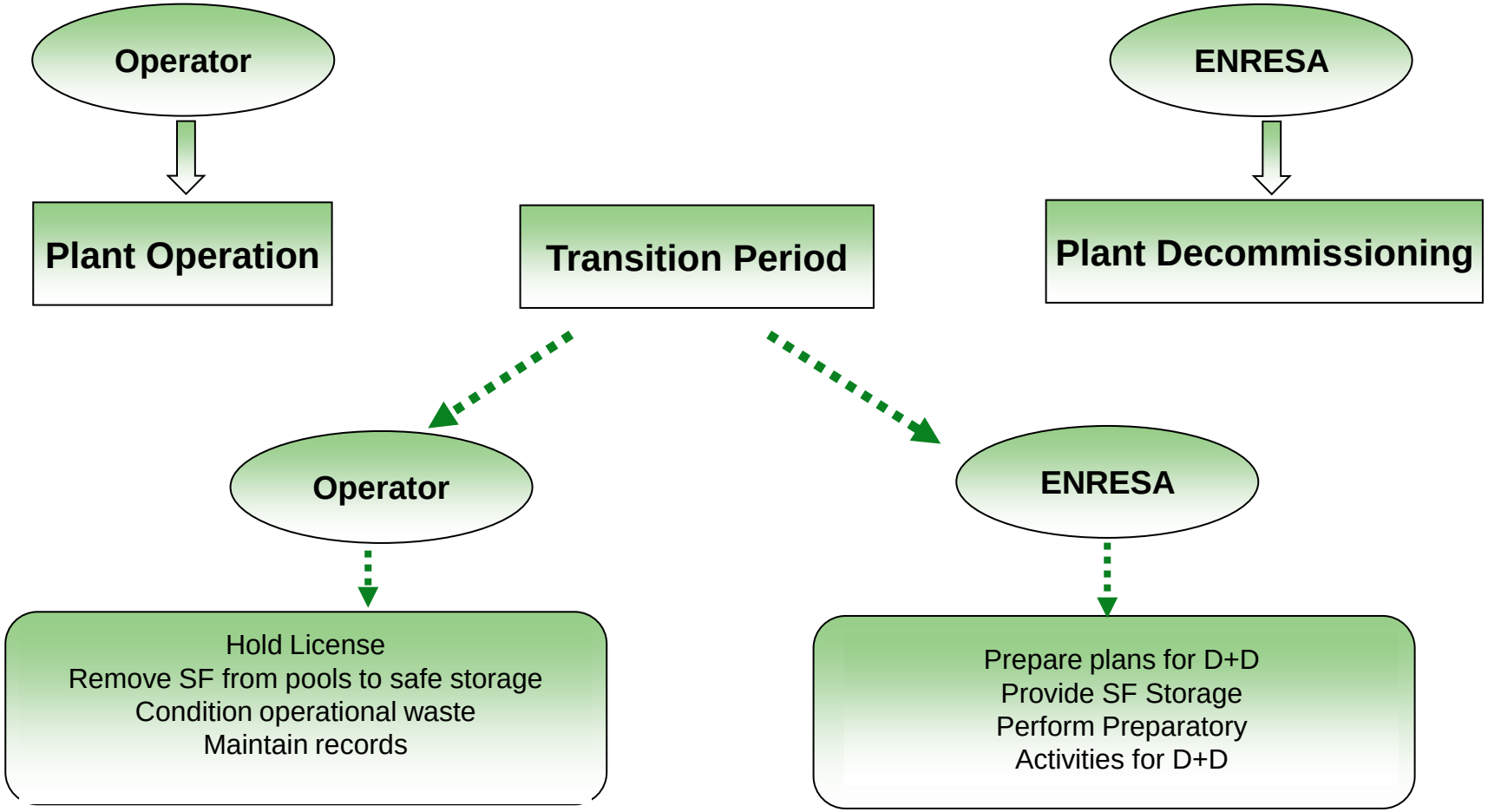
**VANDELLÓS 1 NPP**

**1998 / 2003**

**JOSE CABRERA NPP**

**2010 / 2018**

# RESPONSIBILITIES AND ORGANIZATION IN SPAIN



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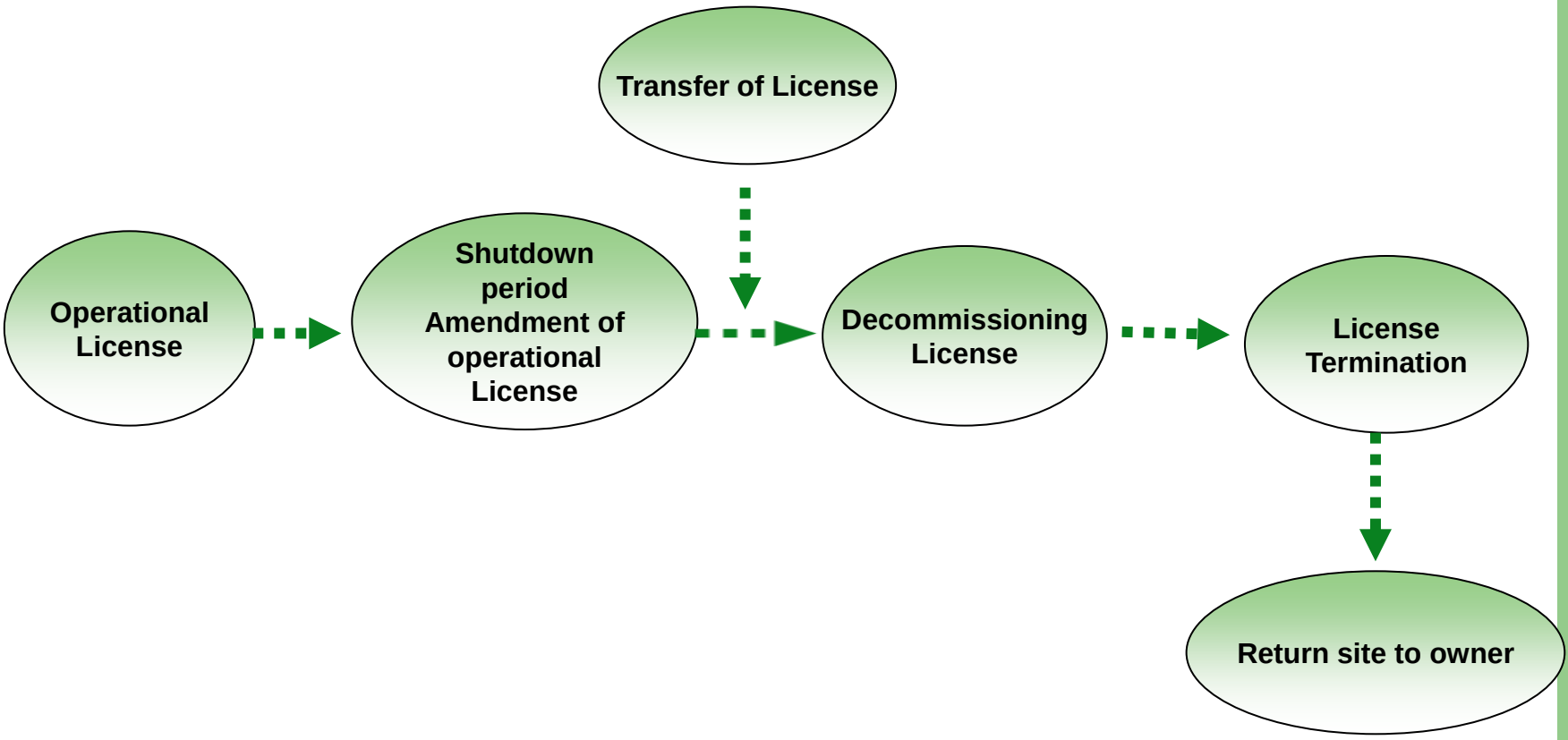

# DECOMMISSIONING STRATEGY

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

**Condition Operational Waste**

**Remove fuel from pool**

**Immediate Total Dismantling (except V-1)**

## 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

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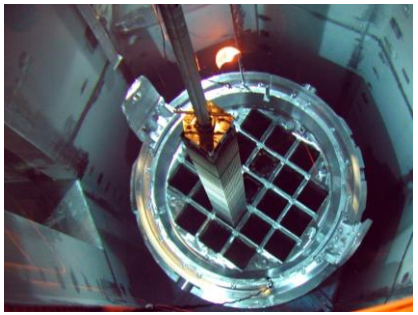
## PLANNING FOR DECOMMISSIONING-RADIOLOGICAL CHARACTERIZATION

Radiological Characterization is essential for a good D&D planning:

- Facility
- Environment

# PREPARATION FOR DECOMMISSIONING

## Activities required by regulation



**Removal of Spent fuel**

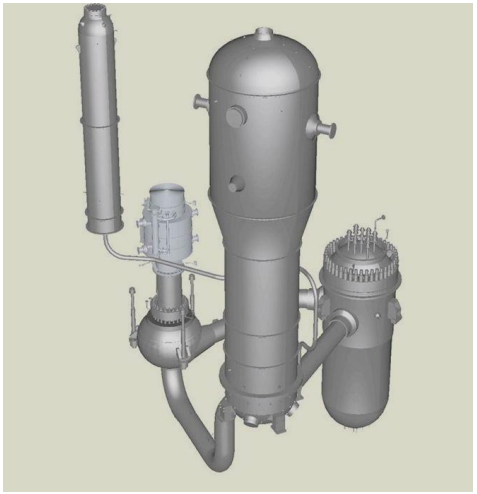

**Removal of operational Waste**

## Preparatory Activities for D&D

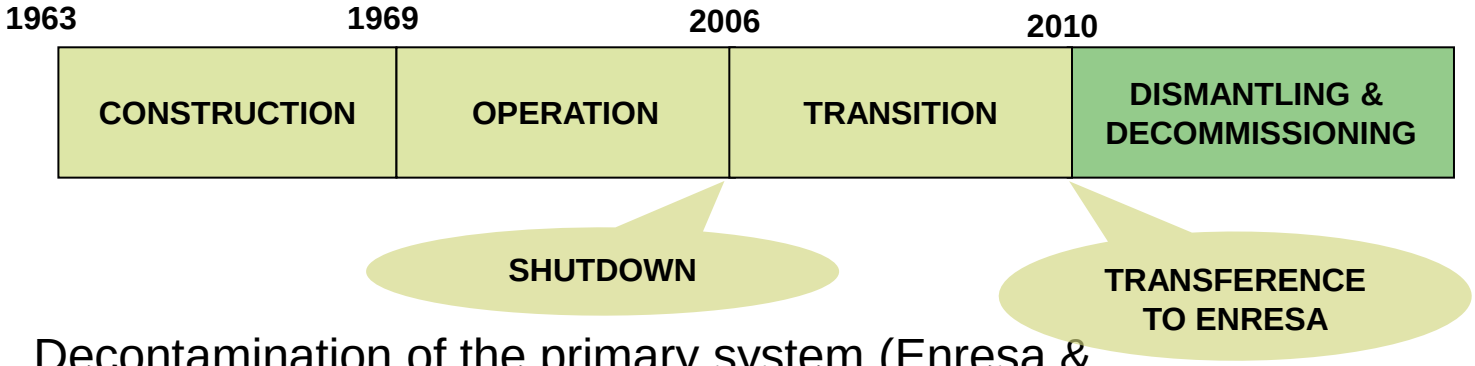
## Adapt organization to D&D

# PREPARATION FOR DECOMMISSIONING - **Preparatory Activities for D&D**

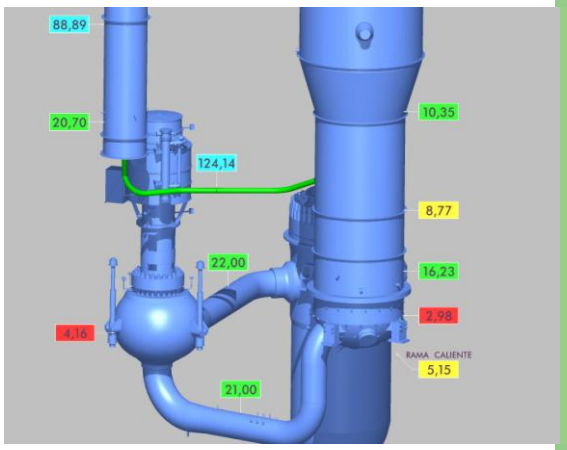
- Discharging systems and components
- Draining circuits and systems
- Removal of non-radiological components and hazardous components
- Decontamination of systems
- Construction/adaptation of auxiliary systems / facilities (for waste storage, decontamination)



# EXAMPLES OF JOSÉ CABRERA-PREPARATORY ACTIVITIES. Shutdown period



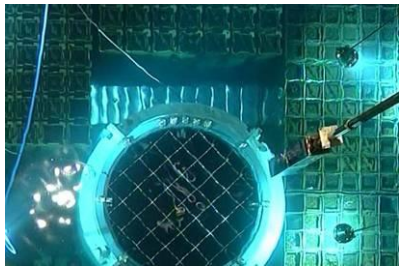

- Decontamination of the primary system (Enresa & plant operator)
- Radiological characterization of the plant (Enresa &plant operator)
- Preparation of decommissioning plan and licensing documentation (Enresa)
- Licensing and fabrication of spent fuel cask (Enresa)
- Construction of on-site interim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

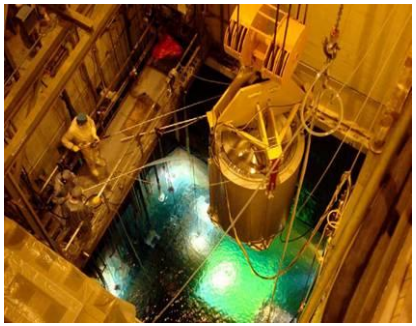


# EXAMPLES OF JOSÉ CABRERA-PREPARATORY ACTIVITIES.

## SPENT FUEL – CASK LOADING

### LOAD FUEL ASSEMBLIES





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

### HI-TRACK – EXIT of CONTAINMENT BUILDING

### TRANSPORT THE HI-STORM TO ISFSI

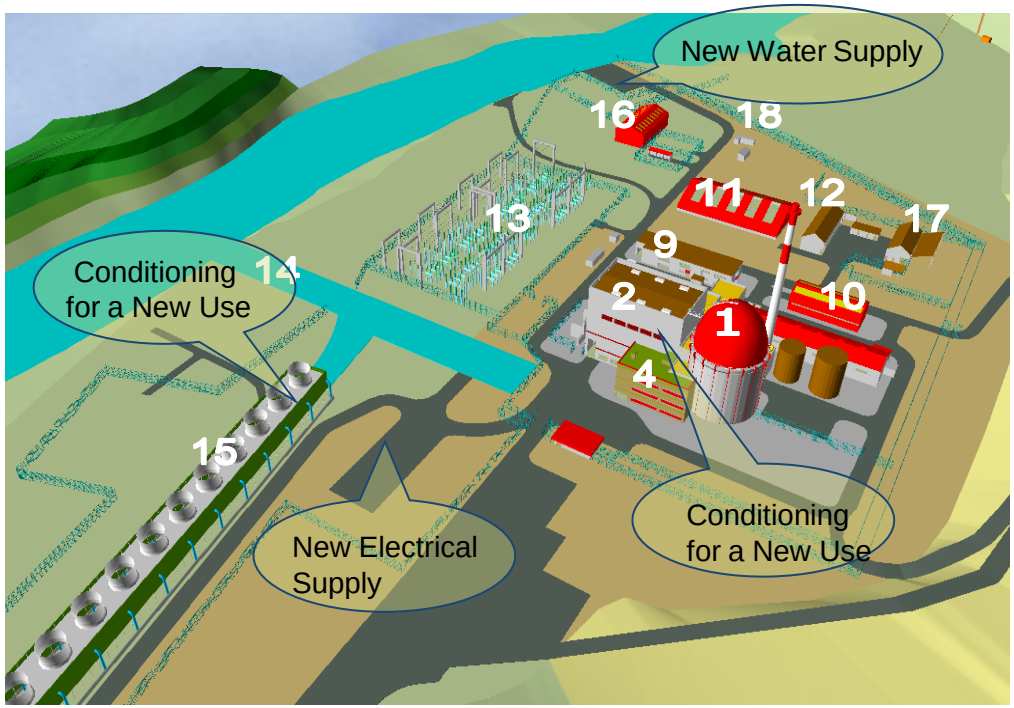
# INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

# EXAMPLES OF JOSÉ CABRERA-PREPARATORY ACTIVITIES. D & D period

| 1963 | 1969 | 2006 | 2010 |
|---|---|---|---|
| CONSTRUCTION | OPERATION | TRANSITION | DISMANTLING & DECOMMISSIONING |

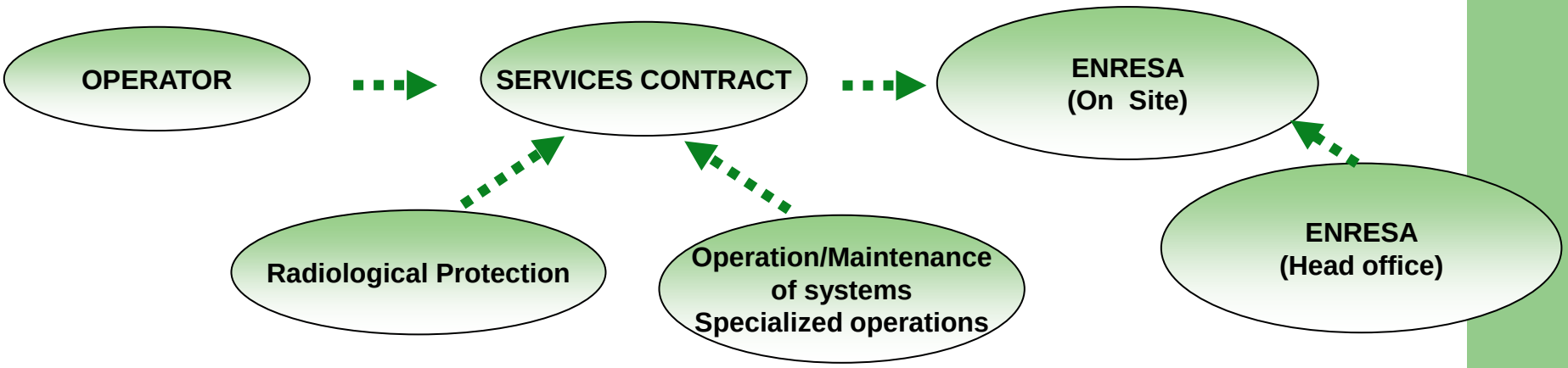
Installations: New use of Turbine Building and the Cooling Towers Pad

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

## DOCUMENTATION FOR THE DECOMMISSIONING LICENSE

# Type of accidents considered in the Safety Analysis

| |
|---|
| Accidents related to the handling of radioactive material (spent fuel excluded) |
| Accidents related to the decommissioning activities. Loss of containment and / or HEPA filtration |
| Accidents related to the decommissioning activities. Explosions |
| Accidents related to the decommissioning activities. Accidental liquid spills |
| Accidents related to the decommissioning activities. Fires |
| Accidents involving spent fuel |

## OTHER DOCUMENTATION FOR DECOMMISSIONING

- Environmental Impact Assessment

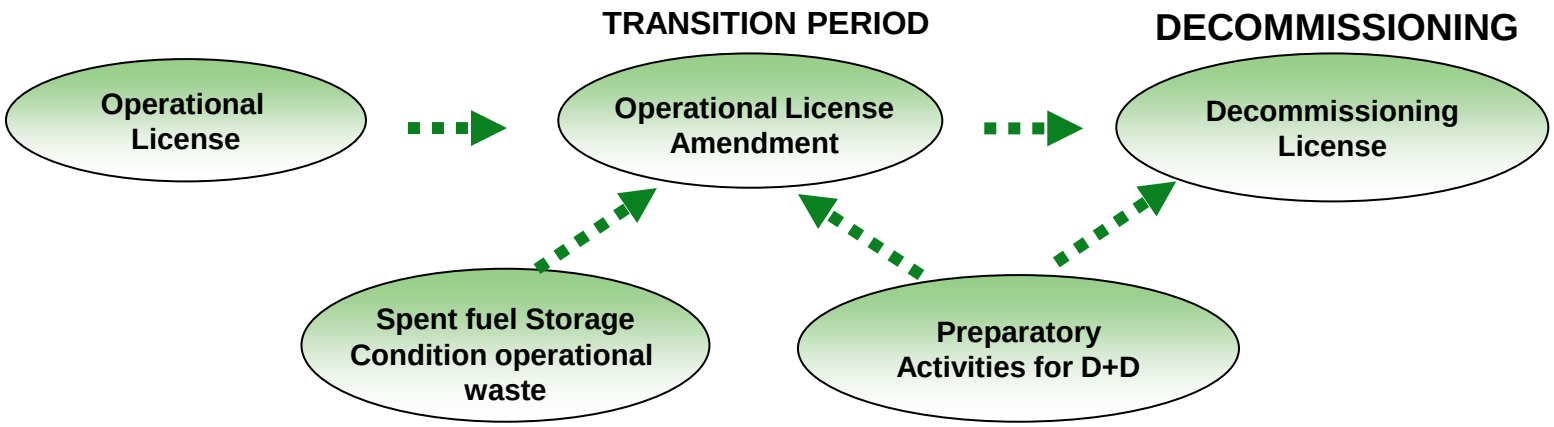
- Surface Water Release Authorization
- Health and Industrial Safety regulation
  - Labor Risk Prevention Plan
- Local Regulation
  - Work License Project
- European Commission
  - Data Required by the Art. 37 of EURATOM Treaty
  - Data Required by Regulation 302/2005

# CONCLUSIONS AND LESSONS LEARNED

| Operation | | D&D |
|---|---|---|
| Routine operations | → | Non-routine operations/changing work environment |
|  | |  |
| Primary hazards associated with nuclear fission process | → | Reduction of hazards in a systematic and progressive way |
| Risks associated with nuclear safety | → | Risks associated with radiological protection and industrial safety |

**OPERATOR** **ENRESA** **Regulatory authorities**

- 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

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