JOSÉ CABRERA NPP
SECURITY IN DECOMMISSIONING PROJECT

Vienna, November 20-21, 2019

GOBIERNO DE ESPAÑA
MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA

enresa

Guillermo Martín García

SUBJECTS

1. GENERAL INFORMATION ENRESA
2. INSTALLATION MAIN DATA.
3. DECOMMISSIONING MAIN STEP.
4. LEGAL FRAMEWORK SECURITY IN SPAIN.
5. SECURITY EVOLUTION IN DECOMMISSIONING.
6. LESSON LEARNING.

1. GENERAL INFORMATION ABOUT ENRESA

- State OWNED Company - RD 1984

- **Duties:**

  - The management of all RadW - SPAIN
  - The DECOMM of Nuclear Installations

- **Framework:**

- Responsible for implementation of activities contemplated in the General Radioactive Waste Plan, prepared by the Ministry for Ecological Transition and approved by the Government

GENERAL INFORMATION - ENRESA

High Level Waste (HLW)

Decommissioning of Nuclear Installations

Very Low Level Wastes (VLLW) and Low and Intermediate Level Wastes (LILW)

GOBIERNO DE ESPAÑA · MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA · enresa

2. INSTALLATION MAIN DATA

Type:	**Westinghouse -** 1-Loop PWR	
Net Electrical Power:	160 MW_e	
Net Thermal Power:	510 MW_{th}	
Fuel Elements:	69 – 14x14	
Fuel Type:	UO_2 – enrichment 3,6% (U-235)	
Mass UO_2 (core)	20,76 t	
Control Rod (Banks):	17	
Reactor Vessel (Diameter):	2,82 m	
Reactor Vessel (Height without Head):	5,87 m	
NSSS (Diameter):	70 cm	CNJC Building Related Activities

Containment:

Reinforced concrete

Stainless Steel Head

Spent Fuel Pool:

In Containment

Final cooling:

Tajo River


Madrid
Guadalajara
Guadalajara. JOSE CABRERA NPP (ZORITA)
-Project length: 2010-2021
-Reactor type: PWR
-E. Power: 160 MWe
-Status: Dismantling

LIFE CYCLE

FIRST NPP IN SPAIN
DEVELOPING the SPANISH NUCLEAR INDUSTRY
BASE for TRAINING

TRANSFER of RESPONSIBILITY (Feb, 11, 2010)

SITE RETURN to the OWNER

1963 | 1968 | 2006 | 2010 | 2021

ENGINEERING & START UP	COMMERCIAL STAGE	FINAL SHUTDOWN TRANSITION STAGE	D&D EXECUTION PROJECT

Build up Starting – Jul-65
1st Criticallity – Jun-68
1st Electrical Net Connection – Jul-68
Commercial Status– Oct-69

ELECTRICAL NET DISCONNECTION
NSSS DECONTAMINATION
SPENT FUEL MANAGEMENT
SPENT FUEL CASKS at the ISFI

STRATEGY BASIC STUDIES
DOCUMENTATION + EIS
LICENSING
D&D PLANNING
"LANDING" PLAN

CLAUSURE

ENRESA`s RESPONSIBILITY

OTHER RESPONSIBILITIES

GOBIERNO DE ESPAÑA MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA enresa

3. DECOMMISSIONING MAIN STEP

4. LEGAL FRAMEWORK SECURITY IN SPAIN

- **Ley Energía Nuclear. 25/1964. (Nuclear energy law)**

First nuclear energy law in Spain, requires the physical protection of nuclear materials. This law does not specify anything.

- **Real Decreto 1308/2011 de 26 de septiembre** *"Sobre protección física de las instalaciones y los materiales nucleares, y de las fuentes radioactivas".*

It describes how the physical protection systems (PPS) of nuclear facilities and materials and radioactive sources are.

- **Real Decreto 1086/2015, de 04 de diciembre,** *por el que se modifica el Real Decreto 1308/2011 de 26 de septiembre* **"**

Modifications of the law 1308/2011. Introduce State security forces (National Guard) in NPP in operation and Centralized Interim Storage Facility (CTS). Not in decommissioning and in Individualised temporary storage (ISFSI).

- **Instrucción Técnica IS-09, del CSN de 14 de junio de 2006, "***por la que se establecen los criterios a los que se han de ajustar los sistemas, servicios y procedimientos de protección física de las instalaciones y materiales nucleares***"**

Technical instructions TI's 09, Nuclear Safety Council (CSN). Describes the design, development, implementation, operation, maintenance, and upgrade of the On Site physical protection measurements of nuclear facilities.

5. SECURITY EVOLUTION IN DESMANTELING.

In the dismantling of a NPP Jose Cabrera with a security approach we distinguish the following stages:

A. **Nuclear power plant shutdown.** *(2 years)*

B. **Remove the fuel in order to begin decommissioning. Load the cask and move to Independent spent fuel storage installation (ISFSI).** *(2-3 years)*

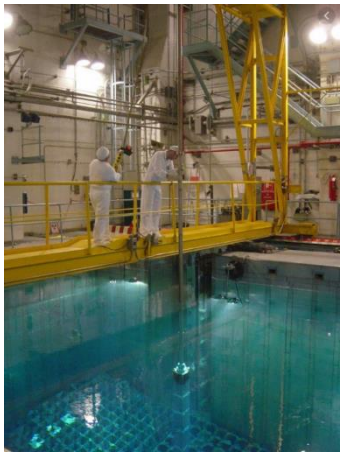
C. **Dismantling NPP** *(10 years).*

   C. 1. Load de cask contain HLW (metal pieces from the segmentation of the reactor internal) (6 month)

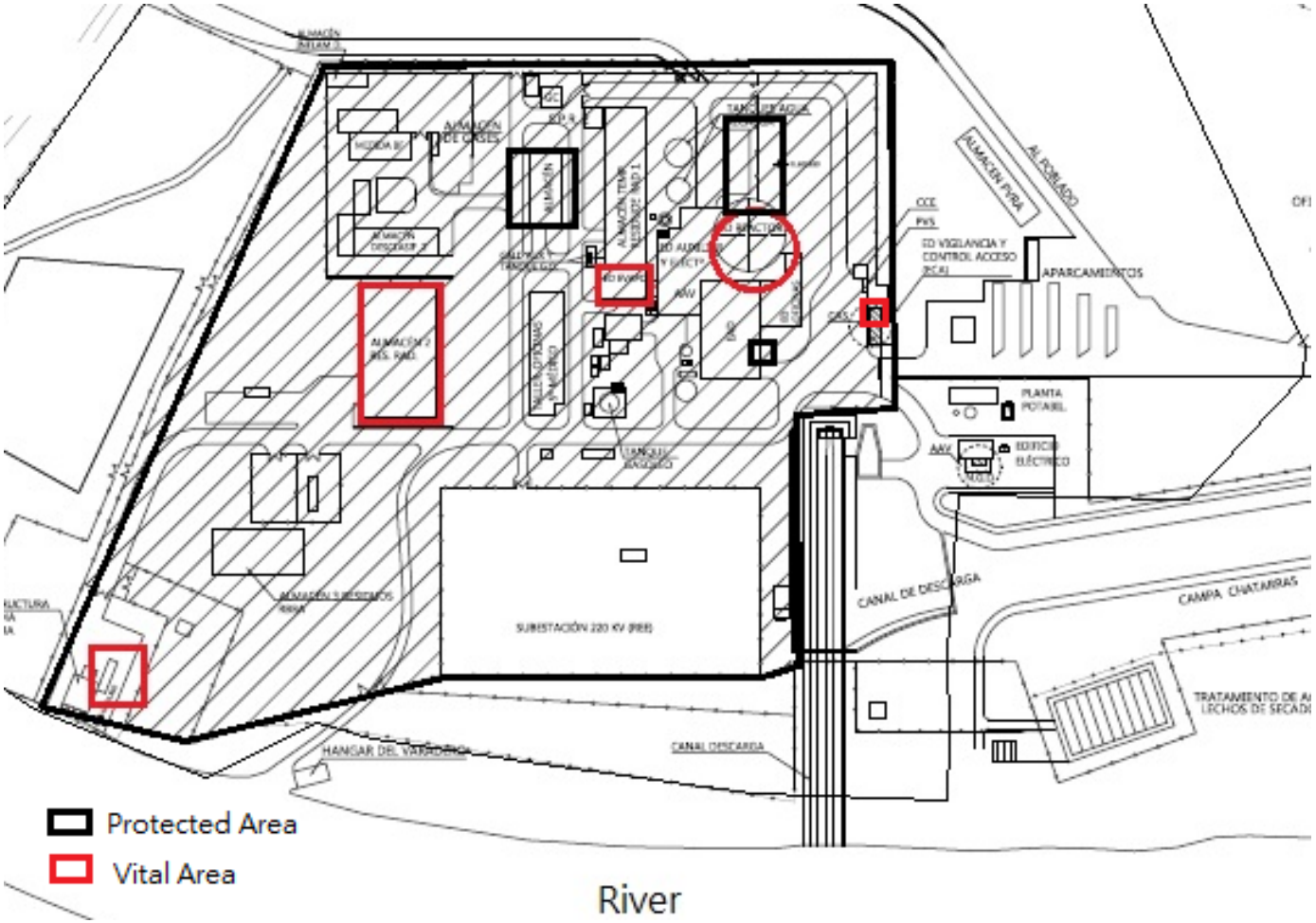
D. **Transport to Centralized spent fuel Storage installation (CSFSI).** *Future*

5. A. NUCLEAR POWER PLANT SHUTDOWN

NPP	Security
• Nuclear Fuel is in pool • Main systems are operative. • There are high activity radioactive sources. • Normal number of entry and exit. Employees, visitor , equipment, supplies, waste etc….	• The Physical Protection System (PPS) as an operational NPP • same security areas (protected and vital). • Do not change sensor systems, structural barriers, number of guards (private security), etc …



NPP EXAMPLE

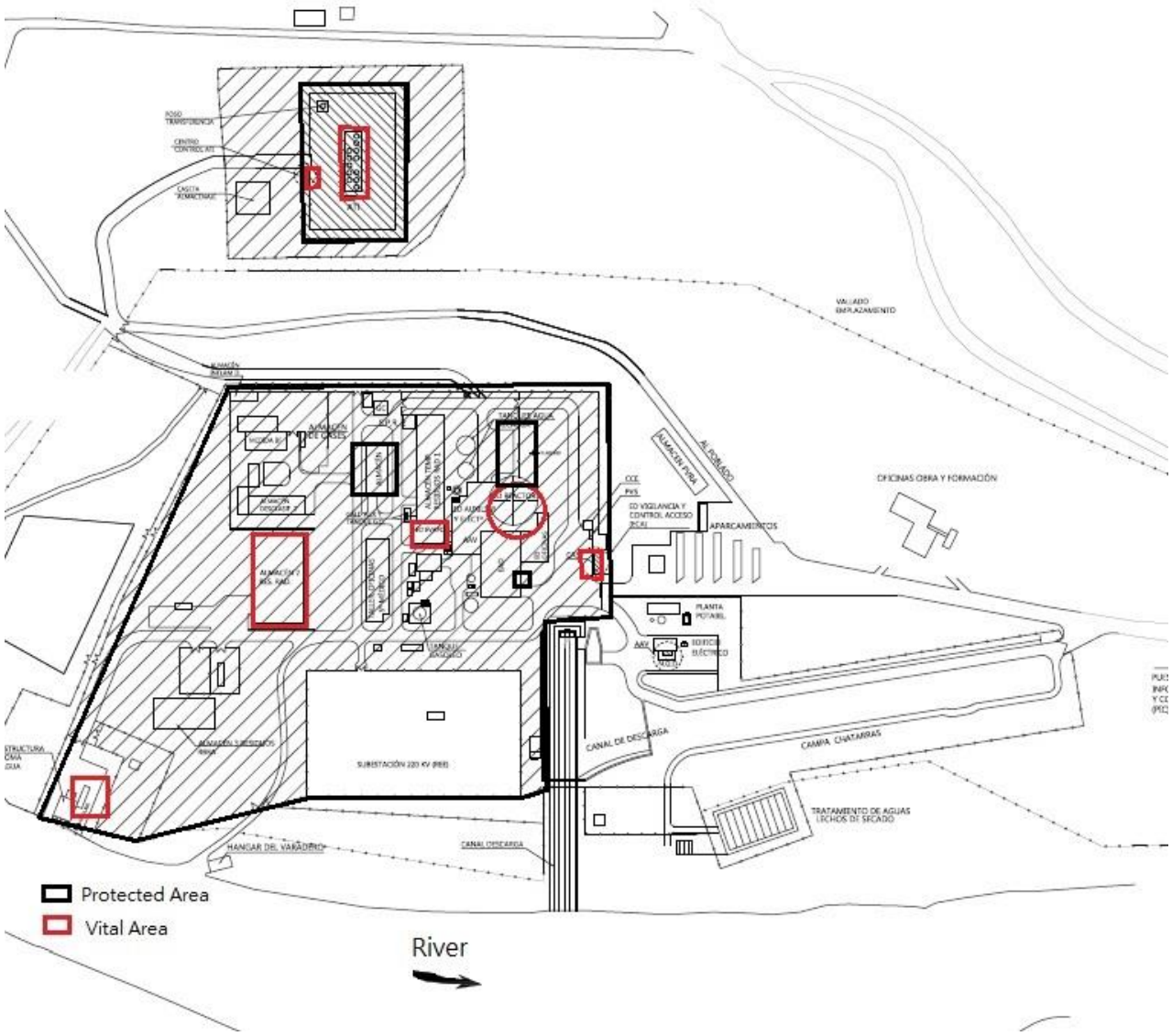

Protected Area
Vital Area
River
ALMACÉN PIRA
APARCAMIENTOS
PLANTA POTABIL
EDIFICIO ELÉCTRICO
SUBESTACIÓN 220 KV (REE)
CANAL DE DESCARGA
CAMPA CHATARRAS
HANGAR DEL HELICÓPTERO
CANAL DESCARGA

5. B. REMOVE THE SPENT FUEL / LOAD THE CASKS

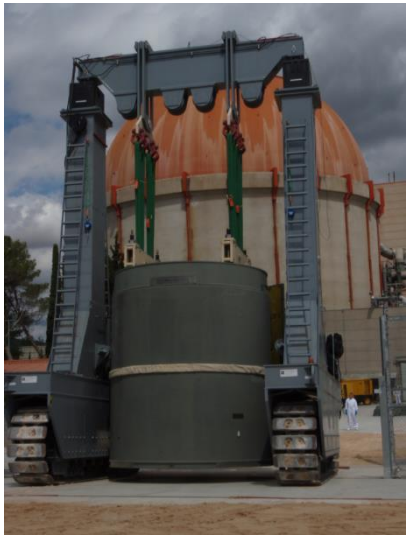
NPP	Security
• ISFSI (independent spent fuel storage installation) constructed close to the plant. • Remove nuclear spent Fuel in pool. • Load cask and move to ISFSI. • Main systems are operative. • Significant increase access to vital and protected area. • There are high activity radioactive sources.	• Increase security areas (protected and vital). ISFSI. • Incorporate new security systems (sensor systems, fence, structural barriers). • Control of employees with access to jobs with nuclear spent fuel. • Special security operations at the move the cask to ISFSI. Private guards and coordinate with state security forces.

All modifications to the PPS are authorized by the nuclear safety council and the ministries involved.

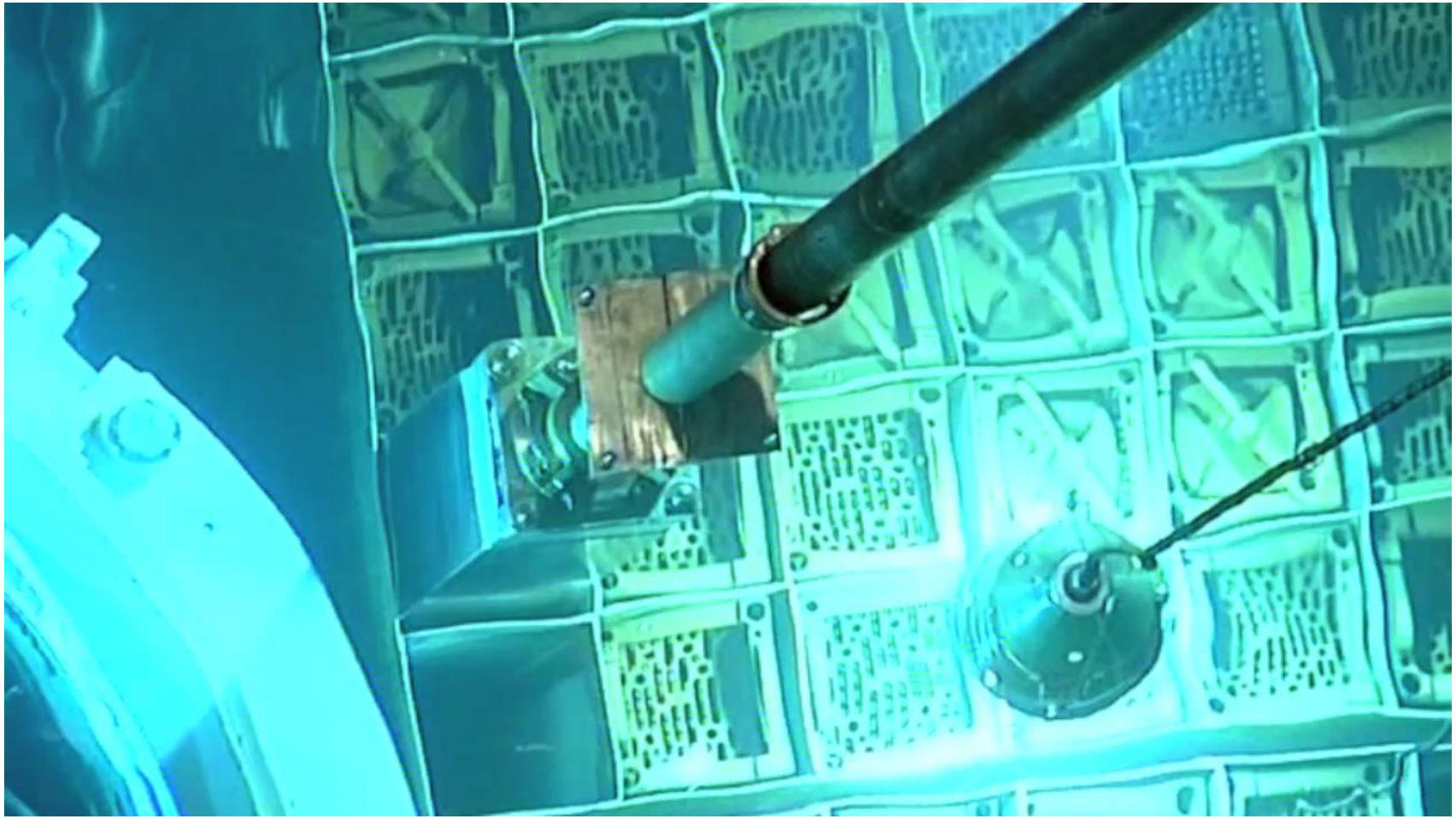
NPP EXAMPLE


Protected Area
Vital Area
River
OFICINAS OBRA Y FORMACIÓN
APARCAMIENTOS
CANAL DE DESCARGA
CAMPA CHATARRAS
TRATAMIENTO DE AGUAS
LECHOS DE SECADO
HANGAR DEL VARADERO
CANAL DESCARGA


TCR 00:25:11:08



INDEPENDENT SPENT FUEL STORAGE INSTALATION (ISFSI)

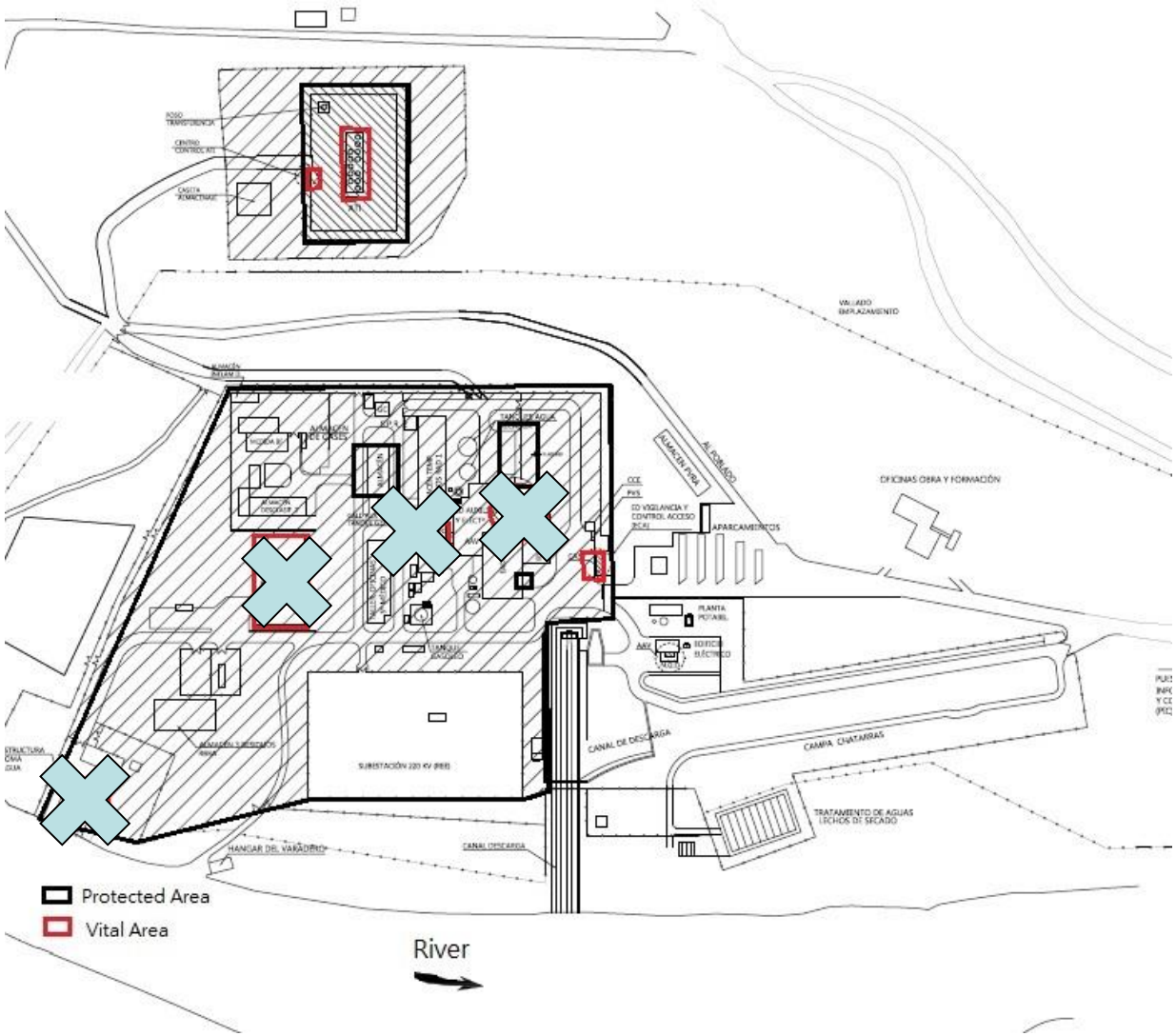


5. C. DISMANTLING NPP

NPP	Security
• The casks are load on ISFSI (independent spent fuel storage installation). • The fuel pool is empty. • Dismantling systems operative. • access increases for disassembly, decontamination, radiological measurements or demolition. • Increase in outputs and inputs of supplies, equipment, waste, etc. • Increase in shipments of radioactive waste (VLLW, LILW and high activity sources)	• Reduction of vital areas in NPP (not ISFSI). • Uninstall security systems (sensor systems, fence, structural barriers). • Employees reduction with access to jobs with nuclear spent fuel. • Reduction of security guards. • Communication and coordination with the state security forces in the expeditions of radioactive waste.

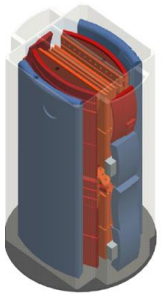
All modifications to the PPS are authorized by the nuclear safety council and the ministries involved.

NPP EXAMPLE

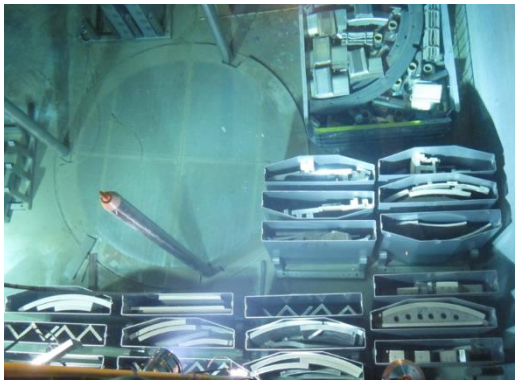

Protected Area
Vital Area
River
CANAL DE DESCARGA
CAMPA CHATARRAS
OFICINAS OBRA Y FORMACIÓN
APARCAMIENTOS
HANGAR DEL VARADERO

5. C. 1. LOAD DE CASK CONTAIN HLW (METAL PIECES FROM THE SEGMENTATION OF THE REACTOR INTERNAL)

NPP	Security
• Load cask and move to ISFSI (independent spent fuel storage installation) .	• Control of employees with access to jobs with nuclear spent fuel. (ISFSI). • Temporary increase of security guards • Special security operations at the move the cask to ISFSI. Private guards and coordinate with state security forces.



GWC-1



5. D. Transport to Centralized spent fuel Storage installation (CSFSI).

Spain does not currently transport any high level radioactive waste or spent fuel. These materials remain in the power plants' onsite pools or ISFSI.

Security:

- **Special security operations at the move the cask to ISFS.**
- **Communication and coordination with the state security forces in the expeditions of nuclear spent fuel.**
- **Control of employees with access to jobs with nuclear spent fuel.**

6. LESSONS LEARNED

- Include in the Physical Protection System (PPS) future modifications and special operating situations, according to the evolution of the dismantling. (increase or reduction security areas).
- Specific control of jobs with access to spent nuclear fuel (including guards).
- Different communication lines and action protocols with national security forces.
- Remove communication and power security lines from the areas in disassembly.
- Move laboratories with high activity radioactive sources from the disassembly areas.
- Control of the material with value, inputs outputs (equipment, copper, tools, etc.).
- Publication of photos with security systems (open sources).

THANK YOU VERY MUCH FOR YOUR ATTENTION