

# CEIDEN: R&D SPANISH NUCLEAR PLATFORM



## ¿What is CEIDEN?

¿What is?

- **CEIDEN is a Spanish Organization for the coordination of the efforts and needs of Nuclear Fission Technology R&D.**

¿What does?

- **Definition and development of joint projects, and the presentation of a common position for national and international commitments and proposals in the Nuclear Fission R&D field.**

¿Who?

- **CEIDEN includes all sectors related to R&D Nuclear Fission in Spain.**

# CEIDEN ORGANIZATION

## Consejo Gestor CEIDEN: Executive Committee

- President: Rosario Velasco (CSN)
- Secretary: Pablo T. León (ENDESA)

<b>SECTOR</b>	<b>ENTIDAD</b>	<b>SUPLENTE</b>
Utilities(3 rep):	ENDESA	
	IBERDROLA	
	GNF	
Fuel Cycle(2 rep):	ENUSA	
	ENRESA	
R&D Institutions(2 rep):	TECNALIA	GDES
	CIEMAT	
Universities (1 rep):	UPM	UPC
Eng & Const. Companies (1 rep):	GNF ENG	IBERD.ING.
Equipment Companies(1 rep):	ENSA	
Services Companies(1 rep):	TECNATOM	ENWESA
REGULATOR(2 rep):	CSN	
ADMINISTRATION (1 rep):	MINETUR	
ADMINISTRATION (1 rep):	MINECO	

**General Assembly**



- N° Ceiden Members: 97
- N° Contributors: 16

## **VISION of CEIDEN Technology Platform**

**Foster R&D activities focused on the safe, reliable and competitive operation of actual nuclear installations and the fuel cycle, and the development of new nuclear projects**

### **Objetives**

- **Boost growth of scientific and technological basis of nuclear fission**
- **Promote and coordinate nuclear R&D initiatives among Companies, Government Agencies, Research Centers and Universities**
- **Suggest the National R&D Plan strategy guidelines in the Nuclear Fission Sector.**
- **Advise and coordinate the participation in international projects**
- **Promote the Spanish nuclear technology in appropriate forums.**

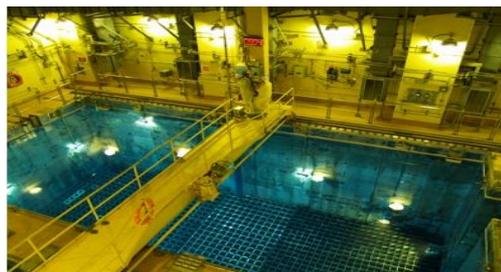
# STRATEGIC AGENDA

1.- Long Term Operation



Nuclear  
Sector  
Challenges

2.- Spent Fuel and Waste Management



3.- New Projects & Technologies



# MATERIALS DEGRADATION

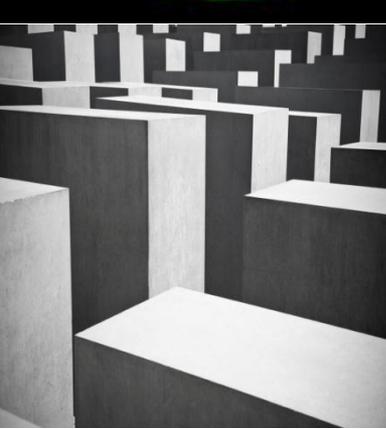
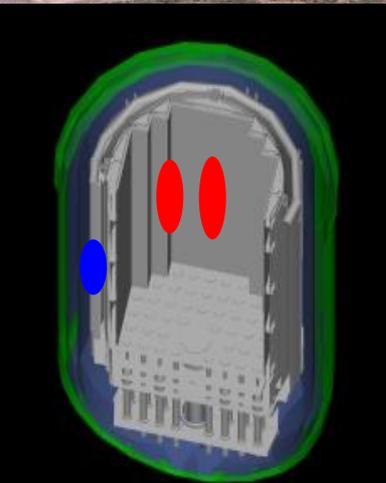
## Materials Studies from Jose Cabrera (Zorita) NPP, currently beign dismantled

### ZIRP Project

- ❖ **Objetive:** Cut and remove part of the Internal Reactor Vessel, for laboratory testing, and evaluating the extracted materials degradation and aging properties
- ❖ **Participants:** CSN, ENRESA, Gas Natural, UNESA/CCNN, CIEMAT, GNF Engineering, ENSA and TECNATOM
- ❖ **2nd Phase:** Lead by EPRI, with Westinghouse, Studsvik, US NRC participation

### Concrete Project

- ❖ **Objetive:** Cut and remove some of the concrete structures of the plant, to experimentally study the variation of the characteristics of these materials
- ❖ **Participants:** CSN, ENDESA, ENRESA, GNF-GNF Engineering, IBERDROLA, and IETcc (CSIC)



# NUCLEAR FUEL

## Storage and Transport of Spent Fuel Program

- ❖ **Objective:** Forum to promote and coordinate research projects on used nuclear fuel, which support an optimized management
- ❖ **Participants:** CSN, ENRESA, ENUSA, UNESA/CCNN, CIEMAT, GNF Engineering, ENSA, TECNATOM, ETSICM

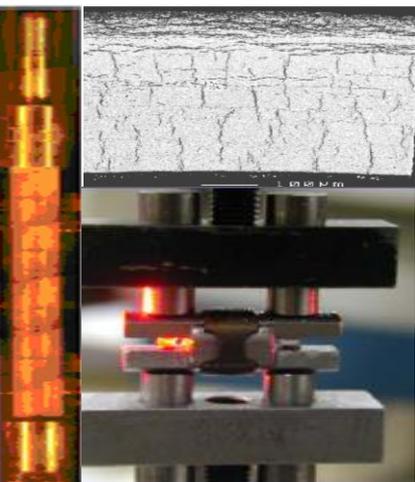
**Projects:** based on domestic gap analysis some Projects were launched  
**Completed**

- ❖ **Zirlo cladding creep in high burnup PWR fuel**
- ❖ **Zry-2 cladding creep in BWR irradiated fuel**
- ❖ **Isotopy assay characterization of high burnup PWR fuel**
- ❖ **Isotopy assay characterization of BWR fuel**
- ❖ **Failure modes and criteria of the irradiated cladding**
- ❖ **Irradiated cladding fracture under low-speed impacts**

**On-going**

- ❖ **High corrosion PWR irradiated fuel rods behavior under severe conditions of dry storage /transport**

- Some projects were further extended under different agreements with other international partners, such as: EPRI, WEC, DOE, ORNL, IRSN, EDF, Vattenfall, NEA/OECD,...
- Active participation in the "Extended Storage Collaboration Program (ESCP)" promoted by US nuclear industry



Almacenamiento temporal centralizado de residuos de alta actividad



Bóvedas (en diseño preliminar)



# RADIATION PROTECTION AND DOSIMETRY



## Development of in vitro methods for internal dosimetry

- ❖ **Objective:** To increase national capacities for assessment of internal doses from alpha & beta emitters in the body through biological samples
- ❖ **Participants:** CIEMAT, UNESA, ENUSA, ENRESA, CSN, Tecnatom, Geocisa, Medidas Ambientales, Iberdrola Ingeniería and GNF Engineering.



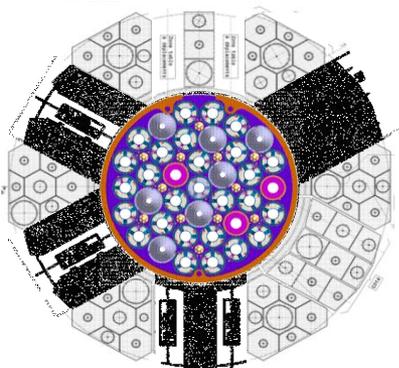
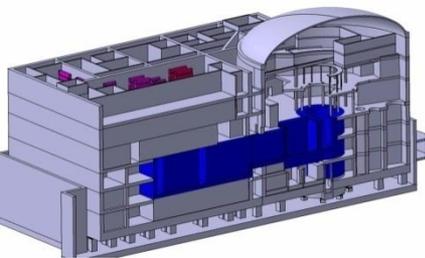
## Neutron measurements and standards laboratory

- ❖ **Objective:** To coordinate users of the neutron standards laboratories (at CIEMAT & UPM), helping to specify proposed applications and promoting industrial and R&D applications of neutron instruments
- ❖ **Participants:** CIEMAT, UPM, UAB, USAL, USE, ESS-Bilbao, GDES, NPPs/UNESA, SEPR, Univ. Hospitals 12 October & Rio Hortega.



# NEW NUCLEAR PROJECTS

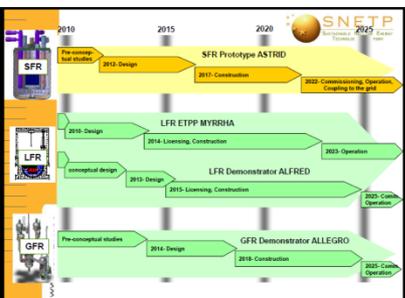
## JULES HOROWITZ REACTOR PROJECT



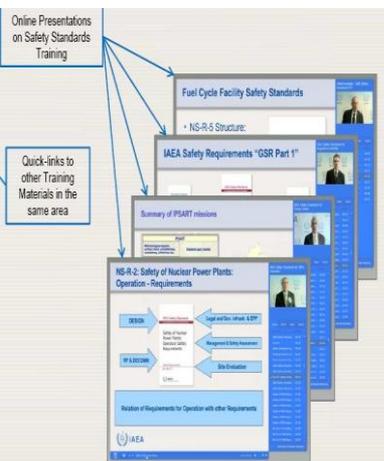
- ❖ **Objetive:** Participate in the design, construction and operation of experimental fission reactor Jules Horowitz (JHR)
- ❖ **Participants:** Spanish consortium: CIEMAT, CSN, EnuSA, TECNATOM, Employers Grouped, ENSA and GNF Engineering
- ❖ **Spanish contribution:** € 10 M, gives the consortium a 2% of the rights of use of the facility for future R&D projects that require irradiation of samples

## ESNII PROGRAM

- ❖ **Objetive:** Participation in the European Sustainable Nuclear Industrial Initiative program (ESNII)
- ❖ **Participants:** CIEMAT, Iberdrola, Tecnatom, Empresarios Agrupados, ENSA, GNF Engineering, UPM and UPV



# CROSS-CUTTING TOPICS (1/2)



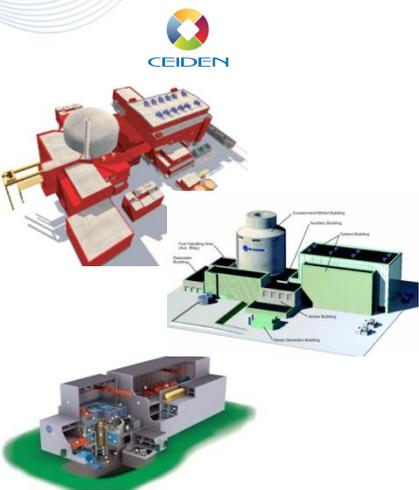
## EDUCATION/TRAINING GROUP: FORMACION +

- ❖ **Objetives:** Promote coordination of education and training nationally, and Spanish participation in international programs and networks (EU EUROSAFE, IAEA, Latin America)
- ❖ **Participants:** CIEMAT, TECNATOM, CSN, UPM, UAB, UPV/EHU, UPV, UPC, UNED, Titania, ENUSA, Foro Nuclear, Thunder, INDRA and ENDESA

CAPACIDADES  
ESPAÑOLAS PARA  
AFRONTAR UN NUEVO  
PROYECTO NUCLEAR

## CAPABILITIES PROJECT

- ❖ **Objetives:**
  - Phase 1: Analyze the current capabilities of the Spanish industry to face a new nuclear project
  - Phase 2: Promote that the Spanish suppliers have the necessary skills to participate in new nuclear projects
- ❖ **Participants:** Endesa, Iberdrola, GNF, Foro Nuclear W, GE, AREVA



## CROSS-CUTTING TOPICS (2/2)



### HORIZON 2020

- ❖ **Monitoring** European Euratom programs within the Horizon 2020 program, in order to inform CEIDEN members of opportunities for R&D in Europe, and promote a coordinated Spanish participation



### SNE-TP

- ❖ **Monitoring** of activities of the European Technology Platform for Sustainable Nuclear Energy, which define the strategic lines of support for R&D in Europe Nuclear Fission



### NATIONAL R&D BUDGET

- ❖ **Analysis** of the annual budget for Nuclear R&D in Spain

**45 M€**

# Conclusions

- ❖ The CEIDEN technology platform is an entity coordinating the needs and efforts of R&D in the field of nuclear fission technology, nationwide
- ❖ Nearly 100 public and private entities participate in CEIDEN, which represents the majority of the players in this field in Spain
- ❖ CEIDEN develops 8 lines of specific work, with 25 entities involved. The majority of CEIDEN programs have relationships with equivalent international programs, being highly valued in this environment
- ❖ CEIDEN has established cooperative ties with Latin American institutions with similar objectives, especially in the field of education & training
- ❖ CEIDEN objective is to transmit to the Administration and to the Spanish companies the idea that the promotion of R&D supports nuclear Spanish industrial exports, and the safe operation of short, medium and long term of our nuclear power plants

# Thank you for your attention

