CEIDEN

NUCLEAR FISSION R&D
TECHNOLOGY PLATFORM

¿What is the CEIDEN Technology Platform?

- CEIDEN Technology Platform is a coordinating body of needs and R&D efforts in the field of nuclear fission technology in Spain. Their work allows projects raised and addressed jointly by the entities that are affected by the problems they seek to solve, and present a single national position against the proposals or the international commitments.

- In the Platform CEIDEN are represented all sectors related to nuclear R&D in Spain and its scope includes both currently operating plants and new reactor designs.

CEIDEN Organization

- Currently, more than 60 entities belong to the Technology Platform CEIDEN. These entities include the entire nuclear sector: utilities, service and engineering companies, Universities, Research Centers, Regulators, Administration, etc.
- The Management Council is the executive branch of the CEIDEN Platform. The Council meets 3 to 4 times a year, and this is where executive decisions are made on the platform.
- Once a year, the General Assembly of the Platform is celebrated. In this Assembly the CEIDEN informs all the participating entities of the activities of the platform, news, etc.

Management Council Composition

- The President and General Secretary of the CEIDEN Platform are:
  - President: D. Francisco Fernández (CSN)
  - General Secretary: D. Pablo T. León (ENDESA)
- The following entities belongs to the CEIDEN Management Council:
  - Consejo Seguridad Nuclear.
  - Ministerio de Industria, Turismo y Comercio.
  - Ministerio de Educación y Ciencia.
  - Research Centers: CIEMAT e INASMET.
  - Nuclear waste company: ENRESA.
  - Fuel companies: ENUSA.
  - Utilities: Endesa, Iberdrola y Gas Natural Fenosa.
  - Universities, currently represented by UPM.
  - Servicies companies, currently represented by TECNATOM.
  - Equipment companies, currently represented by ENSA.
  - Engineering Companies, currently represented by Empresarios Agrupados.

Objetives of the CEIDEN Technology Platform

- The overall objective of the Platform is to coordinate and develop CEIDEN R&D aimed at the safe, reliable operation of existing nuclear plants and the development of technological knowledge in new designs.

- The specific objectives are:

  - ✓ Promote the growth of scientific and technological basis of nuclear fission.
  - ✓ Form a coordinating entity for R&D at the national level.
  - ✓ Suggest the National Plan for R&D Sector technological preferences.
  - ✓ Forming an advisory and coordinating body at national level capable of dealing with international projects in a coherent manner.
  - ✓ Identify the decision-making bodies or committees of international projects to suggest the Spanish institutional participation in these bodies.
  - ✓ Promotion of Spanish technology in the appropriate forums.

Launching a Program at CEIDEN Platform

- To include a program or project in the CEIDEN activities, it must meet the following requirements:

  - ✓ Interest to three or more entities members of CEIDEN.
  - ✓ Be of considerable technical and economic importance.
  - ✓ Relate to areas in which the Spanish nuclear industry can add value on the activities being developed in the international context.

- The implementation of programs or projects are often managed in a specific working group, helping each entity concerned to the costs as agreed in the Group.

Current Programs at CEIDEN

- The current programs in the CEIDEN are: :

1.- Program on storage and transportation of spent fuel.

2.- Use of materials C.N. Jose Cabrera.

2.1.- Recovery and Study of Reactor Vessel Internals Materials of the José Cabrera nuclear power plant.
2.2.- Recovery and Study of Concrete of Central Nuclear Jose Cabrera Working Group.

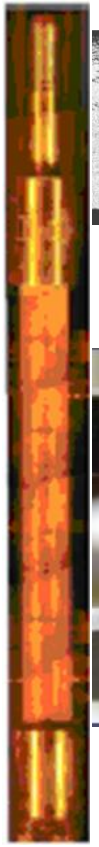
3.- Jules Horowitz Reactor Program.

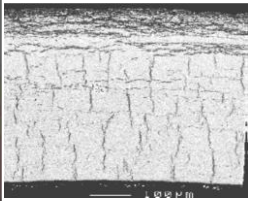
4.- Capabilities of the Spanish Nuclear Industry for a New Nuclear Project

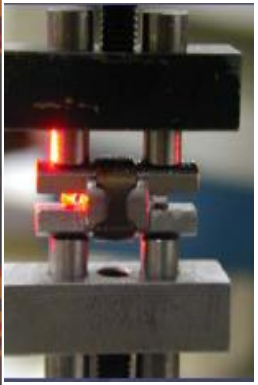
Dry Storage and Transport of Spent Fuel

- Participants: CSN, ENRESA, ENUSA, UNESA/CCNN, CIEMAT, SOCOIN, ENSA, TECNATOM

Proyectos	Comentarios	Colaboración internacional
Fluencia de la vaina PWR de Zirlo con alto quemado	Determinación de leyes de fluencia del material mediante ensayos en celda caliente de barras irradiadas (variables: temperatura, tensión,[H])	Intercambio con programa EDF/Wh/EPRI
Fluencia de la vaina BWR de Zircaloy 2		
Isotopía del combustible **PWR** con alto quemado	Determinación en celda caliente de la composición isotópica de pastillas irradiadas y contraste con las predicciones de modelos disponibles (justificar el "**crédito al quemado**")	Acuerdo con DOE/ORNL Acuerdo con NEA/OCDE
Isotopía del combustible **BWR**		Acuerdo con Vattenfall Acuerdo con DOE/ORNL
Criterios de fractura del material de vaina	Determinación de la energía de rotura del material según la carga de H Determinación y análisis de los modos de fallo (en colaboración con **UPM, Caminos**)	Colaboración académica con: ▪IRSN ▪universidades japonesas
Rotura por impactos de baja velocidad		
Modelización de la cinética del **hidrógeno** en la vaina	Modelo de acumulación, difusión, solución, precipitación,.. del H en la vaina (en colaboración con la **UPM, Minas**)	







Recovery and Study of Internals of Jose Cabrera NPP: Internals

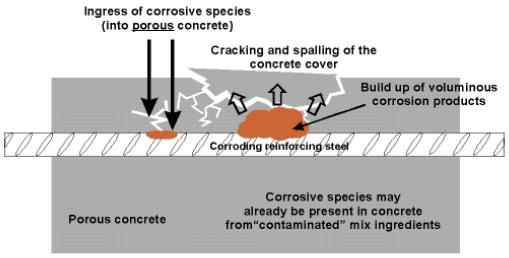
- Participants: SOCOIN, CSN, ENRESA, ENUSA, UNESA/CCNN, CIEMAT, TECNATOM

- Phase 1 – ZIRP Project Spain
  - ❖ Feasibility Study
  - ❖ Sample Extraction and Associated Activities: Documentation for Implementation, Cut of Vessel Internals and Final Project Documentation.
  - ❖ Material Characterization:

    Detailed analysis of Neutron Fluence and Temperature.
- Phase 2 – International Program
  - ❖ Transport of Samples.
  - ❖ Laboratory tests for Studies Mechanical, Microstructural and Microchemical. Compilation and Analysis of Results.
  - ❖ Final Storage of Samples.

Concrete Recovery and Study of Jose Cabrera NPP: Concrete

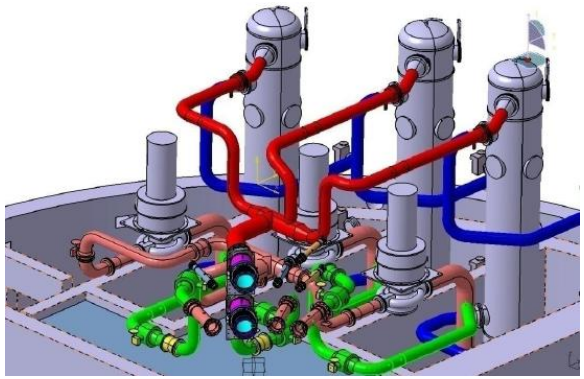
- Participants: Acciona, Ciemat, Geocisa, Iberinco, Iberinsa, Instituto Torroja, Socoin, Tecnatom, UPC, Enresa, CSN
- Objective of the 1st phase. Defining the technical specifications of potential projects of interest to the Concrete Irradiated.
- Potential areas of interest for R&D projects identified can be divided into two activities :
  - ✓ Durability and aging studies.
  - ✓ Validation techniques of auscultation, Non-Destructive Testing (END)

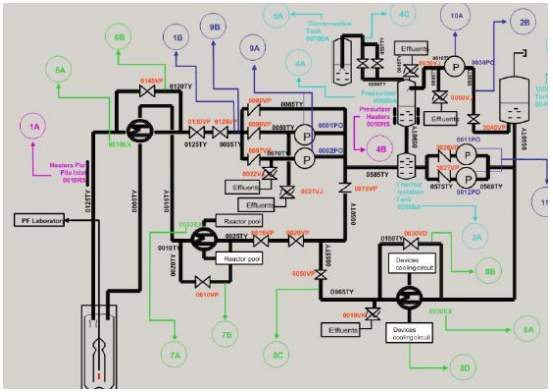


Spanish Participation in the Jules Horowitz Reactor

- Participants: CSN, EEAA, ENSA, ENUSA, SOCOIN, TECNATOM, CIEMAT, ENRESA.
- The “in-kind” spanish participation in the project includes:

  ✓ Development of primary Heat Exchangers.
  ✓ Development of simulator for experimental loop (EXSIMU).
  ✓ Technical support of CSN and CIEMAT.
  ✓ CIEMAT coordination of Spanish participation.





Capabilities of the Spanish Nuclear Industry

- Objective. AParticipants: CIEMAT, TECNATOM, CSN, UPM, UAB, U Pais Vasco, UP València, Titania, ENUSA, Foro Nuclear, Thunder, INDRA y Endesa
- Analysis of the capabilities of the spanish nuclear industry for a new nuclear project.

LISTADO ACTIVIDADES NUEVO PROYECTO NUCLEAR			ENTIDAD	EMPRESA PROYECTOS XY	
			Situación Actual	Situación tras 5 años	Justificación de la Experiencia
1	ESTUDIOS DE VIABILIDAD Y PRELIMINARES				
1.1.	Estudios de viabilidad				
1.2.	Formación del personal de gestión de proyectos (eléctrica)				
1.3.	Formación del personal de construcción de la planta (eléctrica)				
1.3.	Otros (especificar)				
2	ESTUDIOS DE EMPLAZAMIENTOS				
2.1.	Selección de emplazamientos				
2.2.	Estudios técnicos de emplazamientos				
2.2.1.	Estudios geotécnicos				
2.2.2.	Otros estudios relacionados con la seguridad del emplazamiento				
2.3.	Apoyo al licenciamiento del emplazamiento				
3	SELECCIÓN DE TECNOLOGÍA				
3.1.	Preparación de especificaciones de petición de ofertas del suministrador principal		X		1.- Proyecto XY para la empresa YZ. Brev
3.2.	Evaluación técnica y económica de ofertas del suministrador principal				
3.3.	Negociación y evaluación financiera de ofertas del suministrador principal				
4	APOYO A LICENCIAMIENTO Y PERMISOS DE LAS ADMINISTRACIONES PÚBLICAS				
4.1.	Generación de documentación de Licencia Nuclear				
4.2.	Estudios de Seguridad				
4.2.1.	Aproximación determinista. Análisis de Accidentes y estimación radiológica				
	4.2.1.1 Análisis de transitorios				
	4.2.1.2 Análisis LOCA				
4.2.2.	Análisis Probabilista de Seguridad				
4.3.	Especificaciones Técnicas de Funcionamiento				
4.4.	Estudio de Impacto Ambiental				
4.5.	Otros aspectos del licenciamiento de Instalaciones Nucleares o Radiactivas				
4.6.	Otros permisos administrativos				
5	DIRECCIÓN DE PROYECTO				
5.1.	Isla Nuclear			X	
5.2.	Isla Turbina-BOP				
5.3.	Otros (especificar)				
6	INGENIERÍA Y DISEÑO				
6.1.	Preparación de planos, especificaciones, cálculos, informes, etc.		X		
6.1.1.	Ingeniería mecánica				
6.1.2.	Ingeniería eléctrica				
6.1.3.	I&C				
6.1.4.	Obra civil				
6.2.	Ingeniería de factores humanos. Interfase Hombre-Máquina		X		
6.2.1.	Diseño y suministro de Sala de Control e interfase hombre máquina				
6.2.2.	Aprovisionamiento del simulador				
6.2.3.	Suministro de sistemas de ayuda a la operación				
6.2.4.	Diseño de pantallas y displays				
6.2.5.	Otros (especificar)				

EMPRESAS ESPAÑOLAS - 1987													
EMPRESAS Y ASOCIACIONES	1	2	3	4	5	6	7	8	9	10	11	12	13	Observaciones
ABB ESPAÑA (BROWN BOVERI DE ESPAÑA)							X							
ABENGOA						X	X							Zorita / Cofrentes
ACCESORIOS BABCOCK TUBOS REUNIDOS								X						
ACCIONA (ENTRECANALES Y TAVORA)					X									
ACTUATOR (FUSIÓN CON NPS IBERICA)								X						Está en este listado
ADEMI												X		
ADMI		X												Cofrentes
AGROMAN (FUSIÓN FERROVIAL)					X									Podría considerarse
AGUT (ES UN GRUPO DE GE)							X							
AIMEN-VIGO-PONTEVEDRA											X		X	Centro tecnológico I+D-200 pers-986 344 000
AIRESA		X												Vandellós I
ALSTHOM ESPAÑOLA		x												Vandellós I
ALTTUR								X						Carpintería-Maq.Manipulación Fluidos
AMERCOAT									X					Sustiuido por Valentine-935 656 600
AMERICAN AIR FILTER ESPAÑOLA								X						
AMVI								X						Aplicaciones Mecánicas Ind de Valvulas-917 242 21
ANISA (ANGLO NAVAL E INDUSTRIA)						X		X						Cofrentes
ANGLO NAVAL E INDUSTRIA						X		X						Cofrentes
ASOC ESPAÑOLA DE CONTROL CALIDAD												X		
ATISAE				X										
ATLAS COPCO								X						Zorita
AURRERA INDUSTRIAL						X								Zorita
AUSTINOX								X						Vandellós I
AUXIESA			X											Vandellós I
AUXITROL IBÉRICO							X							
AUXIME							X							Auxiliar de Montajes Eléctricos-916 55 88 70
AZMA								X						
BABCOCK & WILCOX								X			X			391 pers- SEPI asegura los puestos hasta 2011 / Z
BECHTEL ESPAÑA			X											Cofrentes
BENEDICTO Y REDONDO								X						Zorita
BOMBAS GUINARD								X						
BOMBAS ITUR								X						
BOSE-BARCELONA											X			
BOSTICHER Y NAVARRO								X						Zorita
BOURDON ESPAÑOLA							X							Zorita
BROWN BOVERI DE ESPAÑA							X							
BUREAU VERITAS				X										91 270 22 00 / Cofrentes
CAMPSA		X												Cofrentes
CANTAREY REYNOSA							X							Vandellós I / Zonta
CANZLER IBERICA								X						Zorita
CASALS CARDONA INDUSTRIAL								X						93 872 11 22 - Ventilación, Aspiración, etc.
CEFISA			X											Zorita
CELESAT		X												Cofrentes
CENEMESA (AHORA CANTAREY REYNOSA)							X							Vandellós I / Zonta
CENIM (CENTRO NACIONAL IND.METALURGICAS)											X			CSIC - 135 personas - Vandellós I
CENSA								X						Caldedería Pesada - 986 346 000
CFA-GEVAERT											X			Vandellós I

Other activities within CEIDEN

- In addition to R&D programs that are coordinated in the technological platform, performs the following activities:

  - ✓ Monitoring of activities of the European Sustainable Nuclear Energy Technology Platform (SNE-TP).
  - ✓ Monitoring nuclear fission energy Framework Programme in Europe.
  - ✓ Tracking Innovation plans of the Ministry of Science and Innovation.
  - ✓ Organization of technical workshops.
  - ✓ Making a Spanish R&D map for nuclear.
  - ✓ Increased relations with Latin America in the field of R&D nuclear.
  - ✓ Participation in working groups to search for synergies between the different Spanish technological platforms.

CEIDEN Relations with Latin America

- Aware of the importance of the region in the nuclear field, CEIDEN has undertaken actions for approaching Latin America institutions, for the purpose of:
  - ✓ Identify associations and counterparts in the field of nuclear R&D, which can cooperate with CEIDEN or its members.
  - ✓ Learn and share skills and experience.
  - ✓ Explore the possibility of participating in programs and projects.
- To this end, CEIDEN are getting in touch with partners identified in the regulatory bodies, research centers and nuclear sector of different countries in Latin America