



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 50 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 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 companies: ENRESA.
 - Fuel companies: ENUSA.
 - Utilities: Endesa, Iberdrola y Gas Natural Fenosa.
 - Universities, represented by UPM*.
 - Services companies, represented by TECNATOM*.
 - Equipment companies, represented by ENSA*.
 - Engineering Companies, represented by Empresarios Agrupados*.

* Companies representing the sector for 2 years.

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 most members of CEIDEN (three or more entities).
 - ✓ 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.

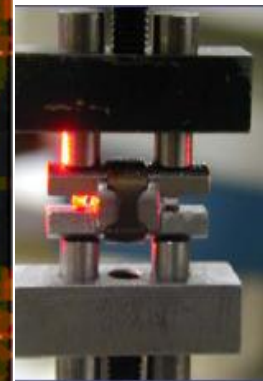
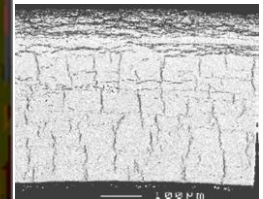
Current Programs at CEIDEN

- 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.- Materials Recovery and Study of Reactor Vessel Internals of the José Cabrera nuclear power plant.
 - 2.2.- Recovery Working Group and Study of Concrete of Central Nuclear Jose Cabrera.
 - 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	Colaboración académica con: ▪ IRSN ▪ universidades japonesas
Rotura por impactos de baja velocidad	Determinación y análisis de los modos de fallo (en colaboración con UPM, Caminos)	
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

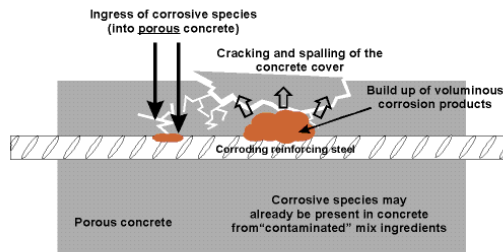
- Participants: SOCOIN, CSN, ENRESA, ENUSA, UNESA/CCNN, CIEMAT, TECNATOM



- 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.

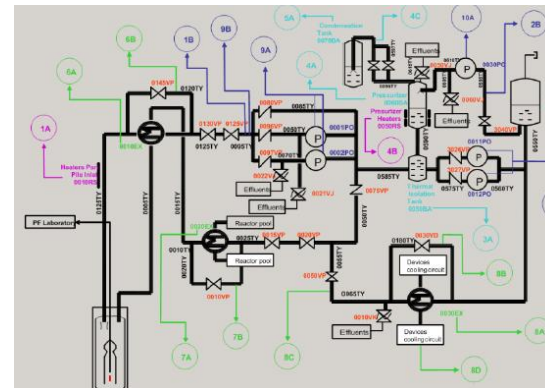
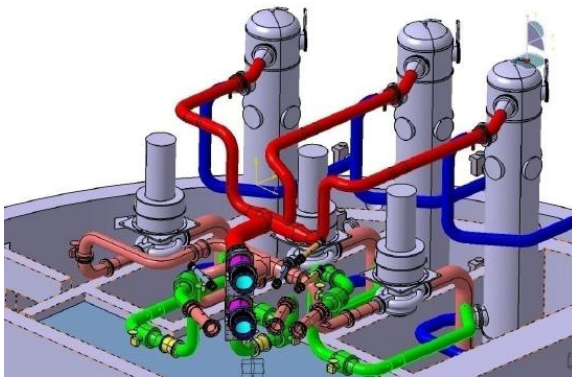
Concrete Recovery and Study of Jose Cabrera NPP: Concrete

- 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

- Participants: Endesa, Gas Natural Fenosa, Iberdrola, Foro Nuclear, Westinghouse, GE-Hitachi, Areva.
- Objective. Analysis of the capabilities of the spanish nuclear industry for a new nuclear project.

LISTADO ACTIVIDADES NUEVO PROYECTO NUCLEAR	ENTIDAD	EMPRESA PROYECTOS XY	EMPRESAS ESPAÑOLAS - 1987														Observaciones
	Situación Actual	Situación tras 5 años	Justificación de la Experiencia	EMPRESAS Y ASOCIACIONES	1	2	3	4	5	6	7	8	9	10	11	12	
1 ESTUDIOS DE VIABILIDAD Y PRELIMINARES				ABB ESPAÑA (BROWN BOVERI DE ESPAÑA)							X	X					Zorita / Cofrentes
1.1 Estudios de viabilidad				ABENGOA								X	X				
1.2 Formación del personal de gestión de proyectos (eléctrica)				ACCESORIOS BABCOCK TUBOS REUNIDOS							X						
1.3 Formación del personal de construcción de la planta (eléctrica)				ACCIONA (ENTRECANALES Y TAVORIA)									X				Está en este listado
1.3 Otros (especificar)				ACTUATOR (FUSION CON NPS IBERICA)												X	
				ADIMI													Cofrentes
				ADIMI				X									Cofrentes
2 ESTUDIOS DE EMPLAZAMIENTOS				ADRIERMAN (FUSION FERROVAL)						X							Podría considerarse
2.1 Selección de emplazamientos				AGUT (ES UN GRUPO DE GE)								X					
2.2 Estudios técnicos de emplazamientos				AIMEN-VIGO-PONTEVEDRA										X	X		Centro tecnológico I+D-200 pers-986 344 000
2.2.1 Estudios geotécnicos				AIRESA						X							Vandellós I
2.2.2 Otros estudios relacionados con la seguridad del emplazamiento				ALSTHOM ESPAÑOLA				X									Vandellós I
2.3 Apoyo a licenciamiento del emplazamiento				ALTUR								X					Carpintería-Maq Manipulación Fluidos
				AMERCOAT									X				Sustituido por Valentine-935 656 600
				AMERICAN AIR FILTER ESPAÑOLA								X					
3 SELECCIÓN DE TECNOLOGÍA				AMVI								X					
3.1 Preparación de especificaciones de petición de ofertas del suministrador principal	X		1. Proyecto XY para la empresa YZ. Brev...	ANISA (ANGLO NAVAL E INDUSTRIA)							X	X					Aplicaciones Mecánicas Ind de Vahualas-917 242 21
3.2 Evaluación técnica y económica de ofertas del suministrador principal				ANGLO NAVAL E INDUSTRIA							X	X					Cofrentes
3.3 Negociación y evaluación financiera de ofertas del suministrador principal				ASOC. ESPAÑOLA DE CONTROL CALIDAD								X	X			X	
4 APOYO A LICENCIAMIENTO Y PERMISOS DE LAS ADMINISTRACIONES PÚBLICAS				ATIAS					X								
4.1 Generación de documentación de Licencia Nuclear				ATLAS COPCO								X					Zorita
4.2 Estudios de Seguridad				AURRERA INDUSTRIAL								X					Zorita
4.2.1 Aproximación determinista. Análisis de Accidentes y estimación radiológica				AUSTRIK								X					Cofrentes
4.2.1.1 Análisis de transitorios				AUMESA				X					X				Vandellós I
4.2.1.2 Análisis LOCA				AUXITROL IBERICO								X					Vandellós I
4.2.2 Análisis Probabilista de Seguridad				AUXIME								X					Auxiliar de Montajes Eléctricos-916 55 88 70
4.3 Especificaciones Técnicas de Funcionamiento				AUMA								X					
4.4 Estudio de Impacto Ambiental				BABCOCK & WILCOX								X		X			391 pers- SEPI asegura los puestos hasta 2011 / Zorita
4.5 Otros aspectos del licenciamiento de Instalaciones Nucleares o Radiactivas				BECHTEL ESPAÑA				X									Cofrentes
4.6 Otros permisos administrativos				BENEDICTO Y REDONDO								X					Zorita
				BOMBAS GUINARD								X					
5 DIRECCIÓN DE PROYECTO				BOMBAS TUR								X					
5.1 Isla Nuclear		X		BOSE-BARCELONA									X				Zorita
5.2 Isla Turbina-BOP				BOSTICHER Y NAVARRO								X					Zorita
5.3 Otros (especificar)				BOURDON ESPAÑOLA								X					
6 INGENIERÍA Y DISEÑO				BROWN BOVERI DE ESPAÑA								X					
6.1 Preparación de planos, especificaciones, cálculos, informes, etc.	X			BUREAU VERITAS				X									91 270 22 00 / Cofrentes
6.1.1 Ingeniería mecánica				CAMPISA				X									Cofrentes
6.1.2 Ingeniería eléctrica				CANTAREY REYNOSA								X					Vandellós I / Zorita
6.1.3 IAC				CANZLER IBERICA									X				Zorita
6.1.4 Obras civiles				CASALS CARDONA INDUSTRIAL									X				93 872 11 22 - Ventilación, Aspiración, etc.
6.2 Ingeniería de factores humanos: Interfase Hombre-Máquina	X			CEISA				X									Zorita
6.2.1 Diseño y suministro de Sala de Control e interfase hombre máquina				CELESAT				X									Cofrentes
6.2.2 Acrovisionamiento del simulador				CENEMESA (AHORA CANTAREY REYNOSA)								X					Vandellós I / Zorita
6.2.3 Suministro de sistemas de ayuda a la operación				CENIM (CENTRO NACIONAL IND. METALÚRGICAS)													CSIC - 156 personas - Vandellós I
6.2.4 Diseño de pantallas y displays				CENSA								X			X		Caldería Pesada - 986 346 000
6.2.5 Otros (especificar)				CFA-GEVAERT										X	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 partners.
 - ✓ 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