TRAINING CAPABILITIES ANALYSIS OF THE SPANISH NUCLEAR INDUSTRY

Authors:

José Luis Delgado

Juan Ignacio González

Juan Manuel Camarero

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1. INTRODUCTION

Fission Technology Platform (PT CEIDEN) was set up in 2007 with the main objective to coordinate the needs and R & D efforts in the field of nuclear fission technology in Spain. CEIDEN seeks to raise and address projects jointly by its members, and submit a single national position against the proposals or international commitments

CEIDEN comprises all sectors related to R & D and Innovation in Spain and its scope includes both plants currently operating and new reactor designs.

Currently, more than 89 companies belong to the Technology Platform CEIDEN and 8 singular programmes are being carried out, involving 25 entities. The CEIDEN partners include the entire nuclear sector: utilities, service and engineering companies, Universities, Research Centres, Regulators, Administration, etc.

CEIDEN MEMBERS

Utilities

- Asociación Española de la Industria Eléctrica (UNESA)
- Endesa
- Gas Natural Fenosa
- Iberdrola Generación SAU

Engineering Companies

- Acciona Ingeniería
- AMPHOS21
- Analisis-dsc
- AQUAGEO
- ARRAELA
- Chemtrol Proyectos y Sistemas
- Coapsa Control
- CT3 Ingeniería
- Empresarios Agrupados
- Gas Natural Fenosa Engineering
- Iberdrola Ingeniería y Construcción
- INDRA
- INESCO Ingenieros
- Ingeciber S.A.
- Ingeniería IDOM Internacional
- INITEC Nuclear
- Intecsa. Inarsa
- SEA Ingeniería y Análisis de Blindajes
- Sener Ingeniera y Sistemas
- SynerPlus
- Técnicas y Servicios de Ingeniería S.L.
- Técnicas Reunidas

Equipment companies

- Equipos Nucleares
- Ingeniería y Diseño Europeo
- Leading Enterprises Group
- OBEKI Electric Machines
- Vector & Wellheads Engineering

Fuel cycle

- ENRESA Soluciones Ambientales
- Enusa Industrias Avanzadas

Universities

- Universidad Autónoma de Madrid
- Universidad Carlos III
- Universidad Complutense de Madrid. Departamento de Estudios Avanzados
- Universidad de Burgos
- Universidad de Cantabria
- Universidad de Huelva
- Universidad de Murcia
- Universidad de Zaragoza
- Universidad del País Vasco
- Universidad Nacional de Educación a Distancia
- Universidad Politécnica de Cataluña
- Universidad Politécnica de Madrid
- Universidad Politécnica de Valencia

Service companies

- CIC Consulting Informático
- Cometec
- Construcciones Técnicas de Radioterapia
- Desarrollo v Aplicación de Sistemas (DAS)
- Enwesa
- Geotecnia y Cimientos (Geocisa)
- Indizen Technologies
- InnoBAN Red de Inversores Ángel para la Innovación
- Instalaciones Inabensa SA.
- IPM Ingenieros
- Logística y Acondicionamiento Industriales (Lainsa)
- Norca S.L.U.
- Medidas Ambientales.
- Suministros y Planificación Industriales
- Tecnatom
- Tecnologías Asociadas Tecnasa
- Thunder España Simulación

Institutional Organizations

- Consejo de Seguridad Nuclear
- Ministerio de Economía y Competitividad
- Ministerio de Industria, Turismo y Comercio

R&D + innovation Institutions

- AIMPLAS
- Centro de Estudios e Investigaciones Técnicas de Guipuzkoa (CEIT)
- Centro para el Desarrollo Tecnológico Industrial (CDTI)
- Centro Tecnológico AIMEN (Asociación de Investigación Metalúrgica del Noroeste)
- CIEMAT
- Fundación CTM Centro Tecnológico
- Fundación Centro Tecnológico de Componentes
- Imdea
- INNOBE AIE Centro Tecnológico
- Instituto Catalán de Investigación Química
- Instituto de Ciencias de la Construcción Eduardo Torroja
- INTE
- Tecnalia

Other members:

- Clúster de la Energía de Extremadura
- Clúster de la Energía del País Vasco
- Foro de la Industria Nuclear Española
- Sociedad Española de Protección Radiológica
- Sociedad Nuclear Española

CEIDEN CONTRIBUTORS

R&D + innovation Institutions

- AIMPLAS

Institutional Organizations

- AUTORIDAD REGULADORA NACIONAL EN RADIOPROTECCIÓN, MINISTERIO INDUSTRIA, ENERGÍA Y TURISMO DE URUGUAY
- COMISIÓN NACIONAL DE SEGURIDAD NUCLEAR Y SALVAGUARDIAS DE MÉXICO
- FAEPAC

Other Contributors

- Wonuc España

One of the CEIDEN programmes is the CEIDEN F+ working group. The objectives of this group are to promote the coordination of Education and Training (E&T) programmes at national level and provide support for Spanish participation in international programmes and networks (EU EUROSAFE, IAEA, Foratom, Latin America, among others).

CEIDEN F+ is currently composed of representatives of CSN, MINETUR, ENUSA, Thunder España, Foro Nuclear, UPM, UAB, Universidad del País Vasco, Indra, Endesa, CIEMAT and TECNATOM (the latter two acting as coordinators of the group).

The main activities of the CIEDEN are as follows:

- Promote the coordination of national nuclear energy E&T programmes, both to discern strengths and weaknesses, assessing if they meet current and future needs, and to facilitate exports abroad.
- Assist the launch of advanced R&D and Innovation projects in E&T to enhance the nuclear capabilities available nationwide in the nuclear sector.
- Support and Coordinate Spanish participation in international E&T programmes (UE, EUROSAFE, Foratom, Latin America) by creating and participating in national and international networks and organisations.
- Boost the accreditation of on-the-job training.
- Update the Nuclear Masters Catalogue derived from the work of the previous phase of the CEIDEN F+.

2. PURPOSE OF THE ANALYSIS

In 2007, CEIDEN set up a working group called FORMACION (CEIDEN F+). In its first phase, this group, coordinated by the representatives of Universities, made a compilation and analysis of degree studies (Masters) in nuclear topics that are being taught in Spain. This analysis was completed in 2010. CEIDEN F+ identified 12 Master courses that include topics related to nuclear energy. The catalogue contains all the relevant information on each of the Masters. The result of this work has been included in the CEIDEN website.

In 2011, the CEIDEN Steering Committee decided to expand the scope of this initiative to include the collection and analysis of nuclear job-oriented training capabilities in Spain. We understand job-oriented training as the set of training activities specifically focused on training workers to perform their jobs in the nuclear sector. Usually these activities correspond to traditional classroom training, on-the-job training, in workshops or laboratories or specific training environments (such as simulators). This training is complementary to that received at Universities or Colleges and is necessary to meet the specific guarantees of jobs in the sector.

This study is the result of that work and the analysis is twofold:

- Create the first catalogue of training capabilities in the Spanish Nuclear Industry.
- Identify the potential strengths and weaknesses of these capabilities.

3. APPLIED METHODOLOGY

In order to establish a taxonomic reference to classify job-oriented training capabilities we have consulted three sources: the European system "European Credit System for Vocational Education and Training" (ECVET) and the data produced by the OECD NEA and EHRO-N in their reports on nuclear education and training and needs of job profiles in the nuclear industry.

The taxonomy of the CEIDEN F + itself has been developed using these references and other supplementary references derived from training experience in the Spanish nuclear sector. This distributes nuclear activities by the area of activity in which the jobs in the nuclear sector are organised and the corresponding area of expertise.

Following development of the taxonomy, the survey for collecting data from Spanish companies was elaborated. The survey includes topics regarding training and developable training courses, and inventory and potential development of tools and training resources. This survey was sent to the CEIDEN Members and companies that reflect training capabilities included in the nuclear directory of the Spanish Nuclear Society (SNE).

The data received were processed in order to develop a catalogue of training capabilities and to analyse the strengths and weaknesses of the Spanish industry in this area.

The capability catalogue is recorded in a database that is accessible to the public through the CEIDEN website. The web search engine allows the user to query and retrieve data relative to training and developable training courses, and inventory and potential development of tools and training resources.

The analysis of the strengths and weaknesses of the Spanish industry has focused on training courses and activities, as well as training facilities. The findings are described in the analysis section of this report.

Figure 1 shows an overview of the methodology applied in this study.

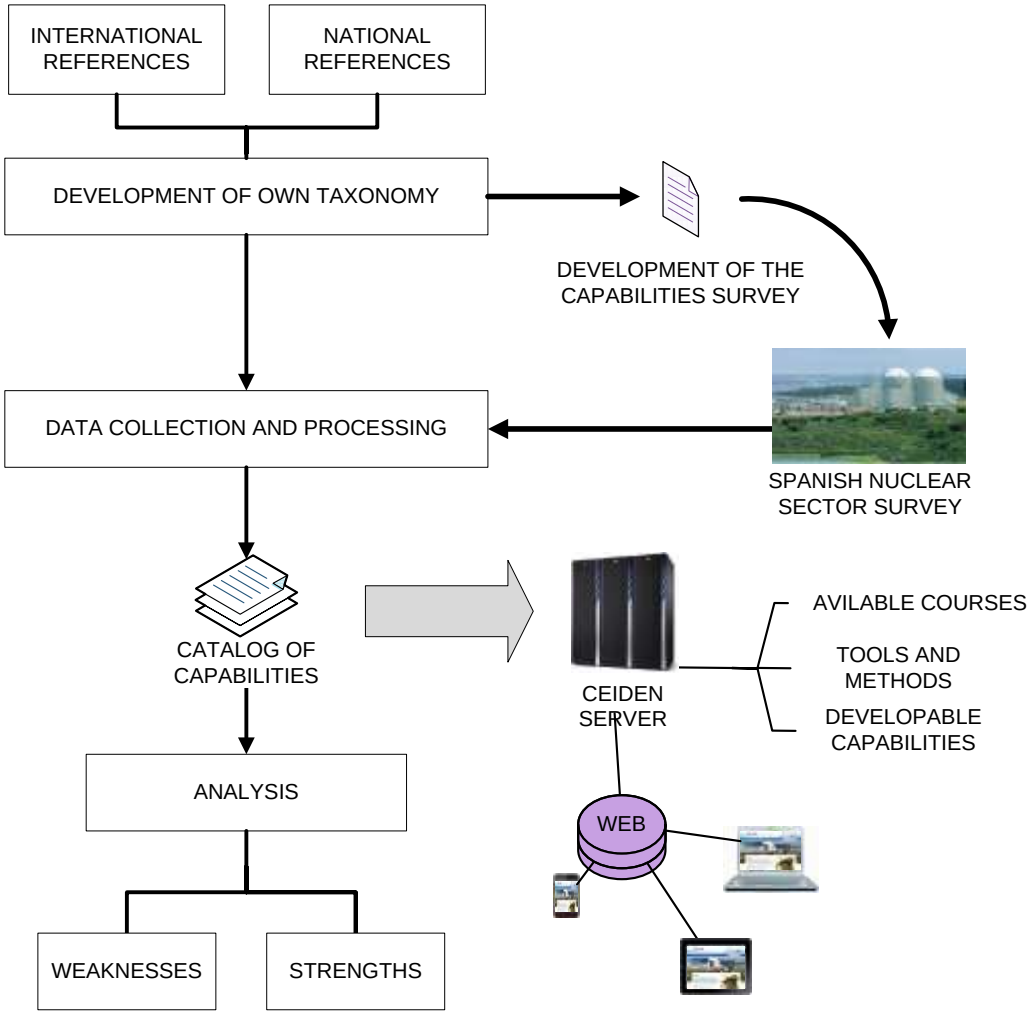

Figure 1 Overview of the analysis methodology

4. INTERNATIONAL REFERENCES IN TRAINING CAPABILITIES

4.1. INTERNATIONAL WORKFRAMES USED AS REFERENCES

The following international references have been consulted with the aim of establishing a taxonomic reference for the classification of job-oriented training capabilities:

- OECD-NEA: ”Nuclear Education and Training: From Concern to Capability”
- IAEA: “Status and Trends in Nuclear Education“
- EHRO-N: “Putting into perspective the supply of and demand for nuclear experts by 2020 within the EU-27 nuclear energy sector”
- Job function classification of the European Credit System for Vocational Education and Training (ECVET)

According to the report from the OECD-NEA “Nuclear Education and Training: From Concern to Capability” the competencies necessary to run a nuclear power plant are categorised in of the following categories

- “nuclear” people with a specialised formal education in nuclear subjects (e.g. nuclear engineering, radiochemistry, radiological protection, etc.);
- “nuclearised” people with formal education and training in a relevant (non-nuclear) area (e.g. mechanical, electrical, civil engineering, systems) but who need to acquire knowledge of the nuclear environment in which they have to apply their competences;
- “nuclear-aware” people requiring nuclear awareness to work in the industry (e.g. electricians, mechanics, and other crafts and support personnel).

This can be visualised in terms of the pyramid of competence in Figure 2. Generally there will be a larger number of employees from top to bottom.

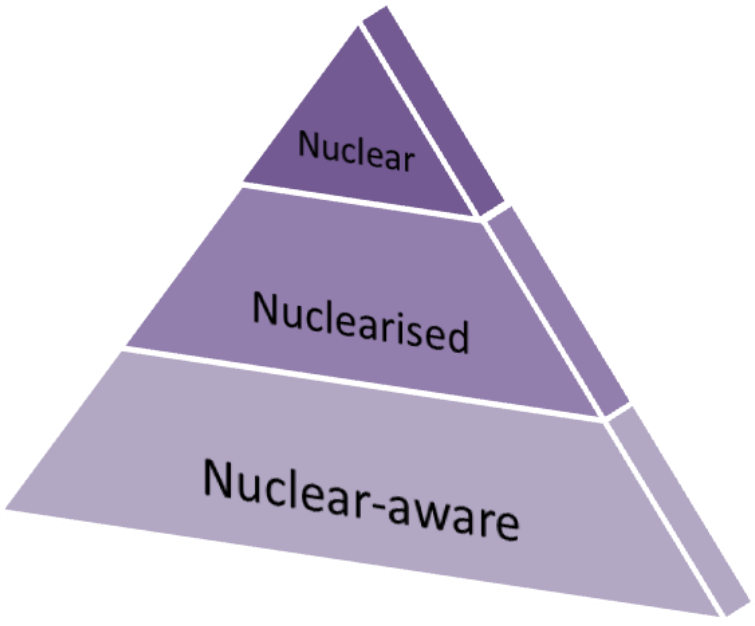

Figure 2 The pyramid of nuclear competences. OECD/NEA reference

Typically, as one moves from the base to the tip of the pyramid, the acquisition of competences shifts from training focused on a particular job, task or set of tasks, towards education, developing more in-depth underlying principles that, when properly acquired, may be applied to a less predefined set of circumstances.

Traditionally, vocational entrance has been associated with a stronger training component, while professional routes employ a more educative approach:

- education refers to the in-depth acquisition of knowledge in the discipline; it includes theoretical courses (e.g. mathematics and physics), laboratory sessions, practical applications, and may include theses and internships;
- training refers to the acquisition of skills, including all necessary knowledge (i.e. focused education) to achieve a competence to work in a particular specific environment.

Although sometimes held as two distinct processes, education and training are often intertwined for the preparation of a competent nuclear workforce. Progressively pathways have become less rigidly separated, with a degree of interchange to match the development needs of employees. Industry has, for instance, reacted to the shortage of a technical workforce by also recruiting people with adequate competences in relevant areas but without a nuclear background, which is later imparted through specific training.

According to the study performed by EHRO-N "Putting into perspective the supply of and demand for nuclear experts by 2020 within the EU-27 nuclear energy sector", in the EU-27, the workforce in the nuclear energy sector is divided as follows:

- 16% nuclear engineers, nuclear physicists, nuclear chemists, radioprotection specialists (or, in short, nuclear experts),
- 74% nuclearised engineers, other graduates and technicians, made up of the following:
  - 35% non-nuclear engineers: civil, electrical and mechanical, design, Instrumentation & Control.
  - 27% other graduates: metallurgy and CND, chemists and environment, concept and process
  - 38% technicians: general installations, industrial informatics, electrical and mechanical technicians
- • 10% nuclear-aware employees that perform support and other activities (e.g. commercial, etc.)

This study agrees with the classification of the OECD. Figure 3 , extracted from the report of EHRO-N, shows how the nuclear job profiles are distributed in EU-27 by their percentage and nuclear E&T.

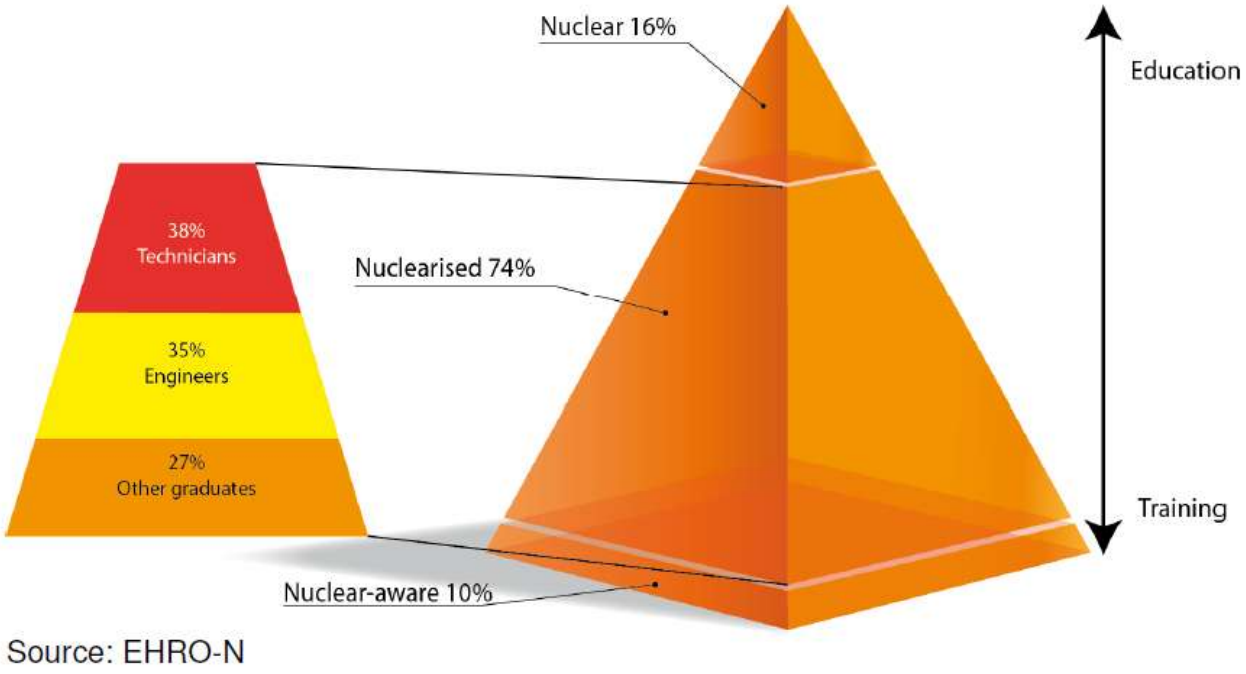

Figure 3 Hypothetical graphical representation of the nuclear energy sector in the EU-27 by type of employees

Interconnections between different aspects of the process are represented in Figure 4, which reflects the important interactions between industry, universities and government in producing a competent workforce with the right mixture of knowledge and skills. The IAEA publication Status and Trends in Nuclear Education, from which the figure is derived, points out that co-operation is critical in both creating and maintaining education and training programmes. Equally importantly, it allows the skills demand to tune educational programmes to provide a better match with industrial needs. With the generic underpinning established, industry is then able to focus on the specific additions required in the work place.

In practical terms, industrial and academic co-operation may take a number of forms involving the exchange of students and staff, internship programmes, joint R&D projects which may also be conducted at research centres. The significant point is that it is the efficient delivery of the two learning strands, education and training, which is at the heart of a steady flow of competent workers.

As an example of this, in Spain the position of Reactor Operator requires a bachelor's degree related to the nuclear industry and, later, the skills and knowledge of the worker are complemented with the necessary job-oriented training to carry out his activities with sufficient safety guarantees (In this case the job-oriented training may last about thirty months)

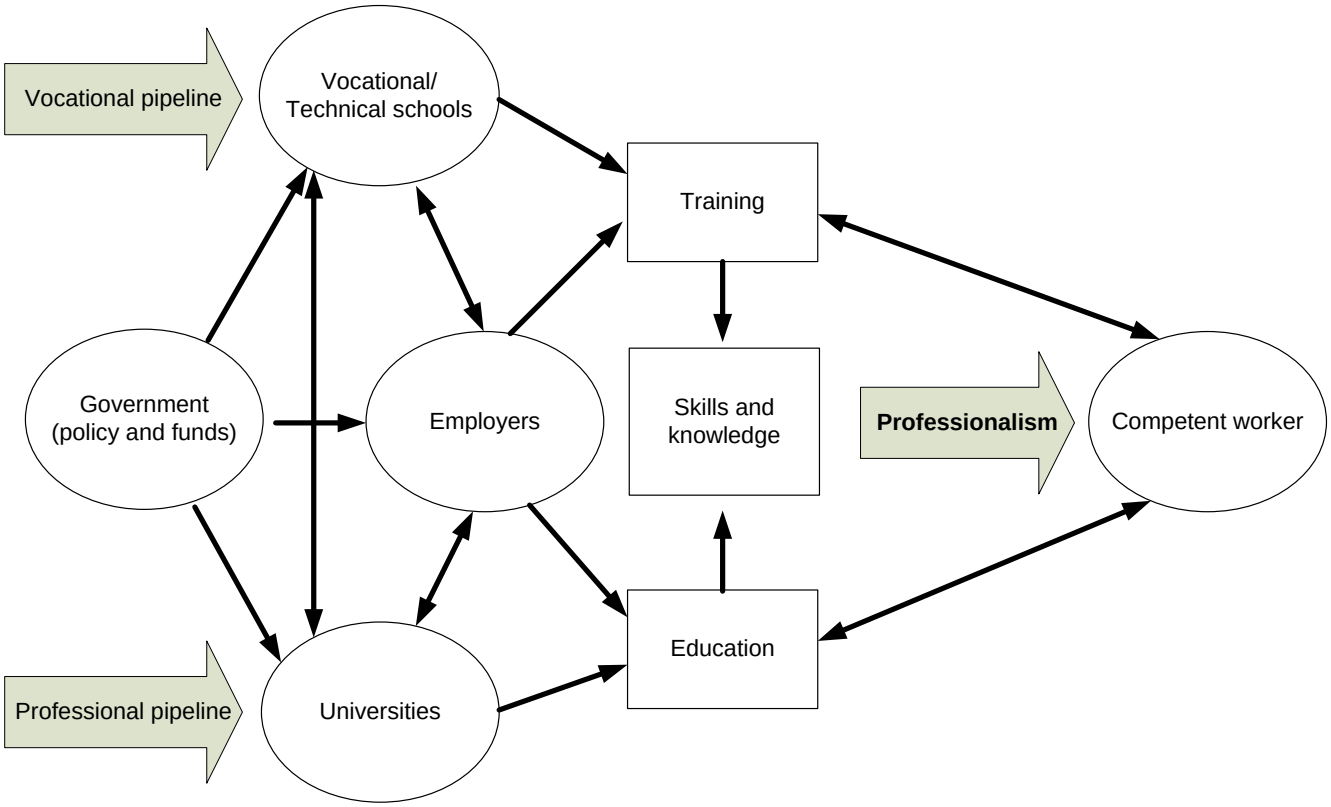

Figure 4 Competence pathway. OECD-NEA reference.

4.2. INTERNATIONAL STANDARD CLASSIFICATION OF TRAINING AREAS

The NEA OECD study "Nuclear Education and Training: From concern to capability", following a previous study, assesses the current state of Higher Education and Training to develop nuclear skills and identifies the possible gaps and the actions required at this time to address the workforce needed for the development of a nuclear programme in NEA member countries or supporting the current and planned projects for the building of new power plants and the decommissioning of existing facilities.

The programmes and tools for human resources development have been analysed in the report of the OECD NEA in three parts:

1. through a review of initiatives that have been taken over the last ten years by the various actors internationally;
2. through a parallel survey on the use of research facilities for education and training; and
3. through the development of a framework for classifying and typifying a selection of nuclear job profiles

Source: OECD-NEA

A job taxonomy is an in-depth skills classification system which allows for the mapping and characterisation of discrete job profiles according to the specific tasks, responsibilities and activities the role entails, the competences needed to fulfil them, as well as the associated entry level qualification, training and experience requirements.

The scope of the OECD NEA taxonomy is bounded by the lifecycle of a nuclear reactor, i.e. new build, operation and decommissioning, but includes the closely related areas of research reactors, and nuclear regulation (covered in the present study to a lesser degree of detail). It is noted that the nuclear fuel cycle is further reaching than this and that the scope of this approach thereby excludes areas such as ore mining, uranium extraction and enrichment, fuel processing and reprocessing. The reason is that only a few countries either have or are likely to deploy a full capability across the entire nuclear fuel cycle, yet most established and aspiring civil nuclear nations would require at least the identified fields of new build, regulation, operation and decommissioning.

The way in which these gaps are covered with the CEIDEN taxonomy is described later on in this document.

The sector and functions identified in the OECD NEA report are the following, Table 1

Sector	Function
Nuclear power plant New build	○ Design ○ Supply ○ Construction ○ Commission
Nuclear power plant Operation	○ Operation ○ Maintenance ○ Waste management ○ Safety and environment
Nuclear power plant Decommissioning	○ Decommissioning operation ○ Maintenance ○ Waste management ○ Safety and environment
Nuclear research reactors	○ Design and engineering ○ Utilisation ○ Operation and control
Nuclear regulation	○ Assessment and review ○ Authorisation ○ Inspection and enforcement ○ Regulation and guidance

Table 1 OECD NEA taxonomy . Sectors and functions

The second international framework analysed is the European Credit System for Vocational Education and Training (ECVET).

ECVET, supported by the European Commission, is a common methodological framework to facilitate the transfer of learning outcomes between the different vocational education and training (VET) systems in place across Europe and their qualifications, as well as to promote transnational mobility.

It is not intended to replace national qualification systems, but to achieve better comparability and compatibility between them. ECVET applies to all outcomes obtained by an individual from various education and training pathways, which are then transferred, recognised and accumulated with a view to achieving a qualification. This initiative makes it easier for European citizens to gain recognition of their training, skills and knowledge in another Member State.

The ECVET approach to the description of a job taxonomy results from the adoption of the concept and competence and its application to the definition of the job requirements, see Table 2.

Sector	Function
Nuclear power plant New build	○ Design ○ Construction ○ Commissioning
Nuclear power plant Operation	○ Nuclear Operations and Waste Management ○ Chemistry ○ Safety and Security ○ Maintenance ○ Engineering
Nuclear power plant Decommissioning	○ Management ○ Decontamination ○ Preparatory work for Decommissioning ○ Dismantling/ Equipment ○ Demolition /Site Clean Up and Release ○ Maintenance ○ Health, Safety and Environment

Table 2 ECVET taxonomy. Sectors and functions

As occurs with the OECD NEA taxonomy, the ECVET Taxonomy has a gap in activities related to mining and uranium enrichment activities, which are included in the nuclear fuel cycle functions, as well as spent fuel reprocessing tasks.

5. DEVELOPMENT OF THE CEIDEN TAXONOMY REGARDING TRAINING CAPABILITIES

The classification proposed by the CEIDEN not only draws on the international classifications identified in the preceding paragraphs, but also includes the activities performed by the Spanish nuclear industry.

The taxonomic approach that has been taken is to identify the training capabilities according to areas of activities, which have been identified in the different job positions, and their area of expertise

The CEIDEN taxonomy, Table 3, includes the areas of activity carried out during the fuel and nuclear life cycles. Moreover, activities related to "Promotion of nuclear energy and safety" are comprised in a specific area within the taxonomy,

AREA OF JOB POSITION
• Nuclear Power Plant (NPP) Operation
• Nuclear Fuel Cycle
• Radioactive Waste Management
• Design, Engineering, Construction, Assembling, Licensing and Start-Up of Nuclear Facilities

• Common Areas
  ○ Nuclear Safety Management
  ○ Radiological Protection and Dosimetry
  ○ Fuel
  ○ Training
  ○ Materials & Inspection and Testing Methods
  ○ Other Knowledge Areas

• Promotion of nuclear energy and Safety

Table 3 CEIDEN taxonomy – Areas of job position

It must be pointed out that this taxonomy neither recognises any specific reactor technology dependence (e.g. reactor type: pressurised water, boiling water, gas-cooled, etc.), nor includes conventional engineering areas such as structural steelwork, concreting or mechanical installation, unless nuclear codes or components are involved. Furthermore, office support positions such as accounting, personnel management, legal, commercial, etc., are excluded from the CEIDEN taxonomy.

Specific areas of expertise have been identified for each principal area as the result of analysis of the different job positions. Table 4 is the outcome of this analysis.

Area of Job Position		Area of Expertise
NPP OPERATION		Licensed Operator Training
		Non-Licensed Operator Training
		Maintenance
		Engineering
		Chemistry
		Radiological Protection
		Nuclear Safety and Licensing
		Nuclear Materials
NUCLEAR FUEL CYCLE		Mining and Extraction of Uranium Concentrates
		Management and Supply of Enriched Uranium
		Nuclear Cycle Management
		Fuel Manufacturing
		Refuelling Engineering
		Fuel Engineering
		Fuel Operation Support
		Radiological Protection
		Radiochemistry
		Handling of Fresh and Spent Nuclear Fuel
		On-Site Fuel Inspection
		Onsite Fuel Repair
		Isotopic Inventory Calculation, Neutronic, Montecarlo
RADIOACTIVE WASTE MANAGEMENT		Decommissioning
		Engineering
		Radiological Protection
		Operation and Maintenance of Waste Storage Facilities
		Decommissioning of Uranium mines and Uranium Production facilities
		Spent Fuel Isotopic Characterization
		Radioactive Waste Management
		Radioactive Waste Characterization
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES		New Reactors
		Nuclear Safety and Licensing
		Probabilistic Safety Analysis
		Engineering
		New Nuclear Power Plant Projects
		Analysis of Severe Accidents
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Nuclear Safety and Licensing
		Risk Prevention
		Safety Culture
		Human Factors Engineering
		Leadership Development
		Total Quality Management
		Operating Experience Analysis Methodologies
		Failure Analysis
		Innovation strategies
		Emergency Preparedness and Response
		Security
	RADIOLOGICAL PROTECTION AND DOSIMETRY	Radiological Protection
		Dosimetry
		Hot Cells
		Radiation Shielding
		Photon and Neutron Detection Systems
	FUEL	Logistic and Transport of Nuclear Materials.
		Criticality
		Thermomechanics of the Fuel Assembly
		Neutronic
		Monte Carlo Simulation Methods

Area of Job Position		Area of Expertise
COMMON AREAS	TRAINING	Knowledge Management
		Instructors Certification
		Training Methodology
		On-the-Job Training
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods
		Materials, Analysis and Applications
		Corrosion
		Calibration
		Welding Process
		Inspection of Welded constructions
	OTHER AREAS	Environmental Impact Assessment
		Waste Water Treatment
		Energy Efficiency Management
PROMOTION OF NUCLEAR ENERGY AND SAFETY		Dissemination of the Nuclear Energy and Safety.
		Radiological Protection

Table 4 CEIDEN Taxonomy – Areas of job position and expertise

The CEIDEN Taxonomy has been compared with the other two international frameworks (OECD NEA, Table 1, and ECVET, Table 2).

Table 5 shows a comparative chart between the CEIDEN taxonomy and the other two international frameworks identified in this report: OECD NEA and ECVET. Most of the functions and sectors identified in the international frameworks have been defined in the CEIDEN taxonomy. However, the area of research reactors (A topic contained in the OECD classification) has not been selected for our taxonomy owing to the fact that this area is included in the training activities of education and masters.

CEIDEN F+			OECD NEA		ECVET	
Job Position		**Area of Expertise**	**Sector**	**Function**	**Sector**	**Function**
NPP OPERATION		Licensed and Non-licensed Operator Training	NPP: Operation Nuclear Regulation	Operation	NPP: Operation	Operations/Waste Management
		Maintenance		Maintenance		Maintenance
		Nuclear Safety and Licensing		Safety and environment		Safety and Security
		Engineering				Engineering
		Chemistry				Chemistry
		Radiological Protection	**NOT COVERED BY THE INTERNATIONAL TAXONOMIES**			
		Nuclear Materials				
NUCLEAR FUEL CYCLE		Mining/Extraction of Uranium Concentrates	**NOT COVERED BY THE INTERNATIONAL TAXONOMIES**			
		Management and Supply of Enriched Uranium				
		Nuclear Cycle Management				
		Fuel Manufacturing				
		Fuel and Refuelling Engineering				
		Fuel Operation Support				
		Radiological Protection				
		Radiochemistry				
		Handling of Fresh and Spent Nuclear Fuel				
		On-Site Fuel Inspection and Repair				
		Isotopic Inventory Calculation				
RADIOACTIVE WASTE MANAGEMENT		Decommissioning	NPP Decommiss.	Decommissioning operation Safety and environment	NPP Decommiss	Decontamination ,Preparatory work for Decommissioning Dismantling/ Equipment Demolition /Site Clean Up and Release
		Engineering				
		Radiological Protection				
		Operation/Maintenance of Waste Storage				
		Decommissioning of Uranium Mines and Uranium Production Facilities		Maintenance		Management and Maintenance
		Spent Fuel Isotopic Characterization	NPP: Operation Decommiss	Waste management	NPP: Operation.	Operations and Waste Management
		Radioactive Waste Management				
		Radioactive Waste Characterization				
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES		New Reactors	NPP New Build	Design and engineering Utilisation Operation and control	Central Nuclear Construction	Design Construction Commissioning
		Engineering				
		New Nuclear Power Plant Projects				
		Nuclear Safety and Licensing	Nuclear Regulation	Assessment and review Authorisation Inspection and enforcement Regulation and guidance	**NOT COVERED BY ECVET**	
		Probabilistic Safety Analysis				
		Analysis of Severe Accidents				
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Nuclear Safety and Licensing	NPP: Operation Decommiss Nuclear Regulation	Safety and environment. Authorisation Inspection and enforcement Regulation and guidance	NPP: Operation Decommiss	Safety and Security Health, Safety and Environment
		Risk Prevention				
		Operating Experience Analysis Methodologies				
		Failure Analysis / Innovative Strategies				
		Emergency Preparedness and Response				
		Security				
		Safety cultura and Human Factors Engineering				
		Leadership Development	**NOT COVERED BY THE INTERNATIONAL TAXONOMIES**			
		Total Quality Management				
	RADIOLOGICAL PROTECTION AND DOSIMETRY	Radiological Protection / Dosimetry				
		Hot Cells				
		Radiation Shielding				
		Photon and Neutron Detection Systems				
	FUEL	Logistic and Transport of Nuclear Materials.				
		Criticality				
		Thermomechanics of the Fuel Assembly				
		Neutronic				
		Monte Carlo Simulation Methods				
	TRAINING	Knowledge Management				
		Instructors Certification				
		Training Methodology				
		On-the-Job Training				
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods				
		Materials, Analysis and Applications				
		Corrosion				
		Calibration				
		Welding Process				
		Inspection of Welded constructions				
	OTHER AREAS	Environmental Impact Assessment	NPP: Operation	Safety and environment	NPP Decommiss	Health, Safety and Environment
		Waste Water Treatment				
		Energy Efficiency Management	**NOT COVERED BY THE INTERNATIONAL TAXONOMIES**			
PROMOTION OF NUCLEAR ENERGY AND SAFETY		Dissemination of Nuclear Energy and Safety.	**NOT COVERED BY THE INTERNATIONAL TAXONOMIES**			
		Radiological Protection				
NOT COVERED BY CEIDEN F+			Research reactors		**NOT COVERED BY ECVET**	

Table 5 Comparative chart between the CEIDEN taxonomy and ECVT - OECD NEA taxonomies

6. DATA COLLECTION AND PROCESING OF THE TRAINING CAPABILITIES

A survey has been carried out to collect data from Spanish companies using the CEIDEN Taxonomy as a reference.

This survey contains five sections and four appendices related to the chapters.

- Section 1. Available Courses and Development Capability. Appendix 1. Course docket
- Section 2. Consulting training services. Appendix 2 Training Consultancy docket.
- Section 3. Tools and Training Methods Development Capability. Appendix 3. Development Capabilities Docket.
- Section 4. Tools and Training Methods Development Availability. Appendix 3. Tools and Methods available Docket.
- Section 5. Other training capabilities not included in the preceding sections.

Each section specifies what type of training resources are available or might be developed, while the function of the appendices is to explain in detail the training resources specified in their respective chapters. Both sections and appendices are composed of various descriptive characteristics that have to be selected by marking the boxes with crosses, as applicable or not applicable in each case.

This survey was sent to all companies belonging to the CEIDEN platform and to operators offering training or training support in the Spanish nuclear market (list obtained from the "Nuclear Business Directory, Activities and Masters" of the Journal of Nuclear Society Spanish No. 322, October 2011). These companies cover most industrial and institutional sectors related to the nuclear industry, from regulatory bodies to engineering companies, services, equipment, specialist fuel cycle companies, universities, etc... Therefore the study covers all sectors and training functions within the Spanish nuclear industry.

The survey may be found in APPENDIX 1, as well as in the CEIDEN website. Currently, the following companies have responded to the survey:

1. ACPRO (Asesoría y Control en Protección Radiológica)
2. Asociación de Investigación Metalúrgica del Noroeste (AIMN)
3. CIEMAT
4. CMG Consultores
5. Consejo de Seguridad Nuclear (CSN)
6. ECOQUIMICA
7. Empresarios Agrupados
8. ENSA
9. ENUSA Industrias Avanzadas

10. ENWESA
11. Foro Nuclear
12. Iberdrola Ingeniería y Construcción
13. Laboratorio de la División de Ciencia de los Materiales (LADICIM) de la Universidad de Cantabria
14. LAINSA
15. PROINSA
16. Tecnatom
17. Universidad Politécnica de Cataluña (UPC)
18. Thunder España

The conclusions of the next section are the result of the analysis of the responses of these companies.

7. DATA ANALYSIS

The following section describes the analysis methodology used to detect not only the strengths but also the possible weaknesses. Courses and Tools are analysed independently.

7.1. COURSES AND DEVELOPMENT CAPABILITIY ANALYSIS

The following methodology has been used to analyse the data on the Spanish training capabilities regarding available courses or the possibility of developing them:

- Identification of Weaknesses:
  - Areas of expertise that have neither available courses nor a development capability.
  - Areas of expertise that do not have available courses but do have a sufficient development capability in that area.
  - Areas of expertise either with an insufficient number of training hours or a small number of companies capable of developing courses to deal with these weaknesses.
- Identification of Strengths
  - Areas of expertise either with a large amount of hours of available courses or with a large number of companies with development capabilities in this area

The data for the companies regarding courses are included in Table 6. This table includes the data for each area of specialisation as follows:

- Courses available: total number of course hours for all the companies and the number of the latter.
- Courses open to development: total number of companies with the resources required to develop the courses.

Area of Job Position		Area of Expertise	Available Courses		Developers of courses Total Companies
			Total hours	Total companies	
NPP OPERATION		Licensed Operator Training	4306	2	1
		Non-Licensed Operator Training	1030	1	1
		Maintenance	865	2	1
		Engineering	563	2	2
		Chemistry	67	1	2
		Radiological Protection	994,5	6	5
		Nuclear Safety and Licensing	236	2	3
		Nuclear Materials	100	1	3
NUCLEAR FUEL CYCLE		Mining and Extraction of Uranium Concentrates	0	0	2
		Management and Supply of Enriched Uranium	15	1	1
		Nuclear Cycle Management	27	2	3
		Fuel Manufacturing	0	0	1
		Refuelling Engineering	101	3	3
		Fuel Engineering	36	1	1
		Fuel Operation Support	36	2	2
		Radiological Protection	810.5	2	5
		Radiochemistry	102	3	1
		Handling of Fresh and Spent Nuclear Fuel	120	3	1
		On-Site Fuel Inspection	16	1	2
		Onsite Fuel Repair	16	1	1
		Isotopic Inventory Calculation, Neutronic, Montecarlo	0	0	2
RADIOACTIVE WASTE MANAGEMENT		Decommissioning	33	2	5
		Engineering	0	0	2
		Radiological Protection	861.5	3	6
		Operation and Maintenance of Waste Storage Facilities	861	1	4
		Decommissioning of Uranium mines and Uranium Production facilities	0	0	4
		Spent Fuel Isotopic Characterization	0	0	2
		Radioactive Waste Management	51	1	3
		Radioactive Waste Characterization	30	1	2
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES		New Reactors	48	3	4
		Nuclear Safety and Licensing	72	1	4
		Probabilistic Safety Analysis	72	1	4
		Engineering	814	4	3
		New Nuclear Power Plant Projects	204	1	3
		Analysis of Severe Accidents	68	2	3
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Nuclear Safety and Licensing	246	2	3
		Risk Prevention	100	5	5
		Safety Culture	195	3	4
		Human Factors Engineering	103	3	4
		Leadership Development	78	1	2
		Total Quality Management	133	4	3
		Operating Experience Analysis Methodologies	70	2	3
		Failure Analysis	0	0	2
		Innovation strategies	0	0	2
		Emergency Preparedness and Response	0	0	2
		Security	0	0	1
	RADIOLOGICAL PROTECTION AND DOSIMETRY	Radiological Protection	854	5	7
		Dosimetry	92.5	4	7
		Hot Cells	0	0	3
		Radiation Shielding	32	2	6
		Photon and Neutron Detection Systems	25	1	1
	FUEL	Logistic and Transport of Nuclear Materials.	119	2	5
		Criticality	0	0	4
		Thermomechanics of the Fuel Assembly	16	1	3
		Neutronic	0	1	2
		Monte Carlo Simulation Methods	0	1	2

COMMON AREAS	TRAINING	Knowledge Management	8	1	2
		Instructors Certification	304	2	1
		Training Methodology	36	1	2
		On-the-Job Training	39	2	2
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods	826	4	5
		Materials, Analysis and Applications	0	0	2
		Corrosion	0	0	2
		Calibration	16	1	2
		Welding Process	0	0	2
		Inspection of Welded constructions	0	0	2
	OTHER AREAS	Environmental Impact Assessment	74	3	5
		Waste Water Treatment	0	0	2
		Energy Efficiency Management	0	0	2
PROMOTION OF NUCLEAR ENERGY AND SAFETY		Dissemination of the Nuclear Energy and Safety.	79	1	2
		Radiological Protection	61	2	3
		TOTAL HOURS	16017		

Table 6 Summary Table regarding courses and development capability

Figure 5 depicts the percentage of each area of job position and hours over the total number of course-hours.

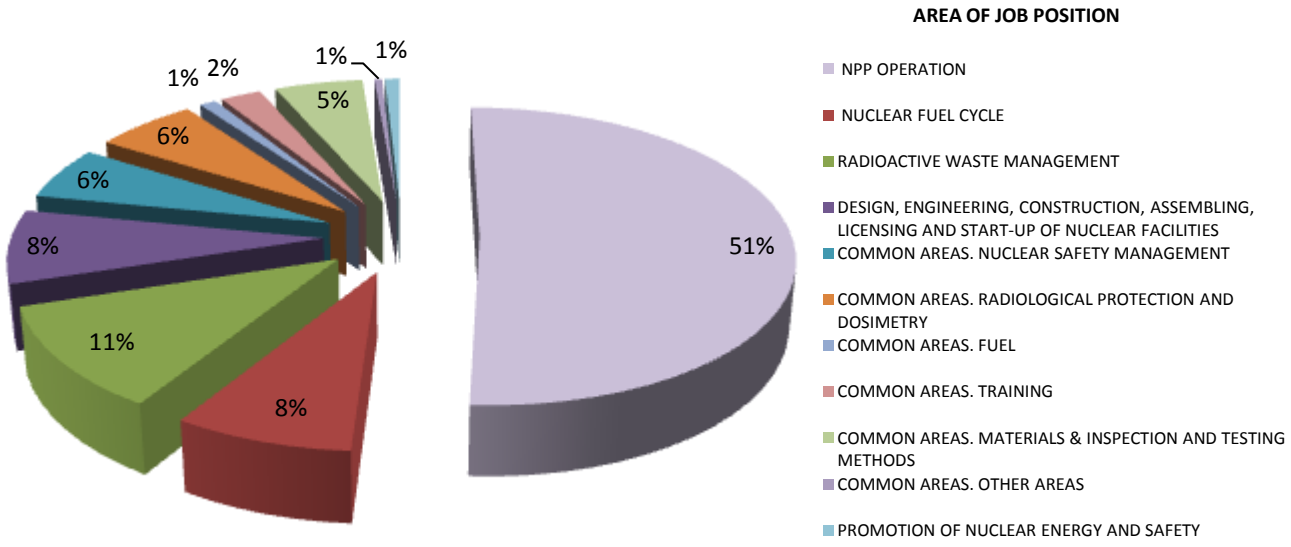

Figure 5 Percentage Graph in hours of each of area of job positions

The following subsections describe the analysis of the data contained in Table 6, with the purpose of identifying the strength and weaknesses.

7.1.1. WEAKNESSES ANALYSIS

The weaknesses analysis focuses on identifying the areas of expertise with either no courses available or in which Spanish companies have a limited development capability.

Firstly, the areas of expertise with no courses currently available were identified. The results are shown in Table 7.

Area of Job Position		Area of Expertise
NUCLEAR FUEL CYCLE		Mining and Extraction of Uranium Concentrates
		Fuel Manufacturing
		Isotopic Inventory Calculation, Neutronic, Montecarlo
RADIOACTIVE WASTE MANAGEMENT		Engineering
		Decommissioning of Uranium mines and Uranium Production facilities
		Spent Fuel Isotopic Characterization
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Failure Analysis
		Innovation strategies
		Emergency Preparedness and Response
		Security
	RP AND DOSIMETRY	Hot Cells
	FUEL	Criticality
		Neutronic
		Monte Carlo Simulation Methods
	MATERIALS & INSPECTION AND TESTING METHODS	Materials, Analysis and Applications
		Corrosion
		Welding Process
		Inspection of Welded constructions
	OTHER AREAS	Waste Water Treatment
		Energy efficiency management

Table 7 Areas of Expertise with no courses available

The next step was to evaluate whether there are companies that are able to develop courses in these areas of expertise, Table 7. If so, there is a critical weakness in such area. Table 8 lists the areas of specialisation without available courses and the number of companies that might develop a course to cover that area.

Area of Job Position		Area of expertise	Companies with development capability	Total Developers
NUCLEAR FUEL CYCLE		Mining and Extraction of Uranium Concentrates	ENUSA and IBERDROLA INGENIERÍA	2
		Fuel Manufacturing	ENUSA	1
		Isotopic Inventory Calculation, Neutronic, Montecarlo	CIEMAT and CSN	2
RADIOACTIVE WASTE MANAGEMENT		Engineering	EMPRESARIOS AGRUPADOS and TECNATOM	2
		Decommissioning of Uranium mines and Uranium Production facilities	CIEMAT, CSN, ENUSA and IBERDROLA INGENIERÍA y CONSTRUCCIÓN.	4
		Spent Fuel Isotopic Characterization	CIEMAT Y CSN	2
ACTIVIDADES TRANSVERSALES	NUCLEAR SAFETY MANAGEMENT	Failure Analysis	AIMN and TECNATOM	2
		Innovation strategies	AIMN and TECNATOM	2
		Emergency Preparedness and Response	CSN and TECNATOM	2
		Security	CSN	1
	RP AND DOSIMETRY	Hot Cells	EMPRESARIOS AGRUPADOS, ENUSA and TECNATOM	3
	FUEL	Criticality	CSN, CIEMAT, ENUSA and TECNATOM	4
		Neutronic	CIEMAT and CSN	2
		Monte Carlo Simulation Methods	CIEMAT and CSN	2
	MATERIALS & INSPECTION AND TESTING METHODS	Materials, Analysis and Applications	AIMN and TECNATOM	2
		Corrosion	AIMN and TECNATOM	2
		Welding Process	AIMN and TECNATOM	2
		Inspection of Welded constructions	AIMN and TECNATOM	2
	OTHER AREAS	Waste Water Treatment	AIMN and TECNATOM	2
		Energy efficiency management	AIMN and TECNATOM	2

Table 8 Matrix with areas of expertise without courses available and companies with development capability for that area

The main conclusion of this first analysis is that there are NO critical weaknesses in the catalogue of courses of the Spanish nuclear industry, due to the fact that even if there is no available course in one area of specialisation, at least there is one company which might develop it.

The other two situations that may present a weakness are the areas of specialisation that have limited resources in terms of courses.

That is, either the number of course hours is small or there are few companies capable of developing the material for an area without courses available. Therefore, the analysis will now focus on the following cases:

- Areas of expertise without existing courses and just one company capable of developing courses in that area, Table 9
- Areas of expertise with a total amount of course hours amounting to less than 30 hours and with a limited development capability, due to the fact that the company which offers the course is the same enterprise that might develop it, Table 10.

Area of Job Position		Area of expertise without available courses	Companies with development capability	Total Developers
NUCLEAR FUEL CYCLE		Fuel Manufacturing	ENUSA	1
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Security	CSN	1

Table 9 Areas of expertise without existing courses and just one company capable of developing courses in that area

Area of Job Position		Area of expertise without available courses	TOTAL HOURS	COURSE OWNER	DEVELOPER
NUCLEAR FUEL CYCLE		Management and Supply of Enriched Uranium	15	ENUSA	ENUSA
COMMON AREAS	RP AND DOSIMETRY	Photon and Neutron Detection systems	25	CIEMAT	CIEMAT

Table 10 Areas of expertise with a total amount of hours of courses less than 30 hours and just one company capable of developing courses in that area

The areas showing some weakness are those belonging to activities regarding the nuclear fuel cycle and the security of nuclear facilities.

Table 11 summarises the training weaknesses of the Spanish nuclear industry. The areas of expertise that currently do not have courses available are highlighted in yellow. Cells marked in orange are areas of expertise with a small number of hours and only one company capable of developing the course.

Area of Job Position		Area of expertise	Are there available courses in this area of expertise?
NUCLEAR FUEL CYCLE		Management and Supply of Enriched Uranium	**YES**
		Fuel Manufacturing	**NO**
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Security	**NO**
	RP AND DOSIMETRY	Photon and Neutron Detection systems	**YES**

Table 11 Summary of training weaknesses

As a general conclusion, it may be stated that there are no critical weaknesses in the Spanish training capabilities, since all areas of expertise have courses available or the potential for their development.

CEIDEN F+ aims to highlight these apparent weaknesses to be considered in a complete sector-specific analysis. Nevertheless, It cannot be directly interpreted from the CEIDEN F+ report that there are gaps on a national level in the areas of expertise identified, since there may be other companies with courses or capabilities who have not completed the CEIDEN F+ survey. CEIDEN F+ will continue its efforts to ensure that the largest number of Spanish organisations in the nuclear training sector are involved in the catalogue.

7.1.2. STRENGTHS ANALYSIS

The strengths analysis of the areas of expertise focuses on those that present a total number of course hours in excess of 500. Areas above this cut-off ratio have a greater depth of the subjects to be taught as well as a larger number of companies that are able to deliver the course. The cut-off ratio was chosen owing to the clear separation in terms of the total amount of hours that are above and below this value, see Figure 6

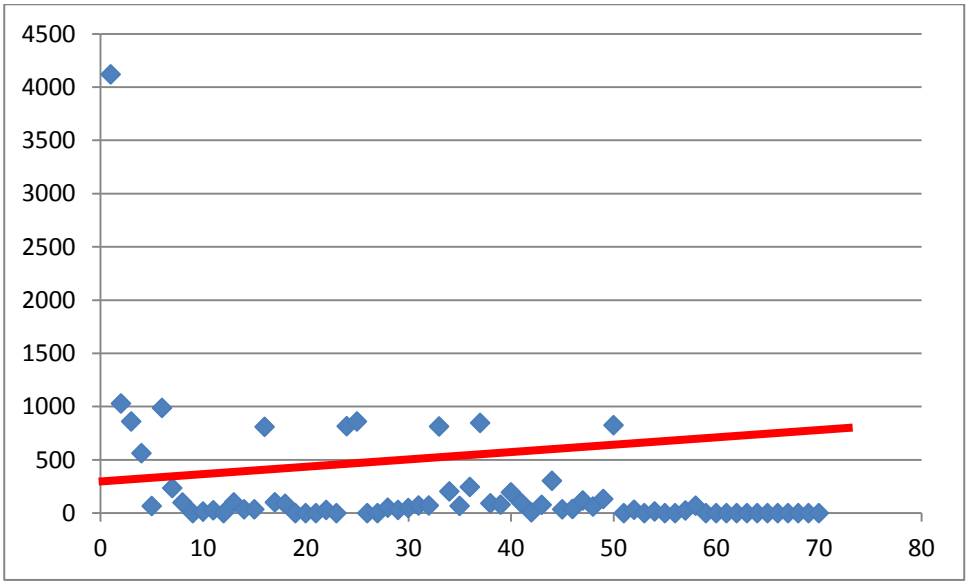

Figure 6 Total number of hours of available courses for each area of expertise

Table 12 shows the areas of expertise that have strengths according to the criterion established above. It shows the areas of expertise, companies that have courses for those areas (ranked by the number of hours for each business-area) and the total number of hours of available courses.

Area of Job Position	Area of expertise		Companies	Total number of hours of available courses
NPP OPERATION	Licensed Operator Training		TECNATOM	4306
	Non-Licensed Operator Training		TECNATOM	1030
	Maintenance		TECNATOM and ENWESA	865
	Engineering		TECNATOM and LADICIM	563
	Radiological Protection		CIEMAT, TECNATOM, LAINSA, ENWESA and PROINSA	994,5
NUCLEAR FUEL CYCLE	Radiological Protection		CIEMAT and TECNATOM	810.5
RADIOACTIVE WASTE MANAGEMENT	Radiological Protection		CIEMAT and TECNATOM	816.5
	Operation and Maintenance of Waste Storage Facilities		TECNATOM	861
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES	Engineering		TECNATOM, EMPRESARIOS AGRUPADOS, IBERDROLA ING/CONSTRUCCION and CMG CONSULTORES	814
COMMON AREAS	RP AND DOSIMETRY	Radiological Protection	CIEMAT, TECNATOM, AIMN, ENWESA and IBERDROLA ING/CONSTRUCCION	854
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods	AIMN, CIEMAT TECNATOM and LADICIM	826

Table 12 Areas of strength due to the total number of available courses

The areas of strengths are oriented towards positions relating to the operation of NPPs or nuclear waste storage facilities (with or without license in the case of nuclear power plants), maintenance and radiological protection. Also, in general the Spanish nuclear industry shows great strength in the areas of engineering, as well as in inspection and testing methods.

Figure 7 depicts the percentage in hours of areas of expertise that have greater strengths regarding the total number of hours of available courses.

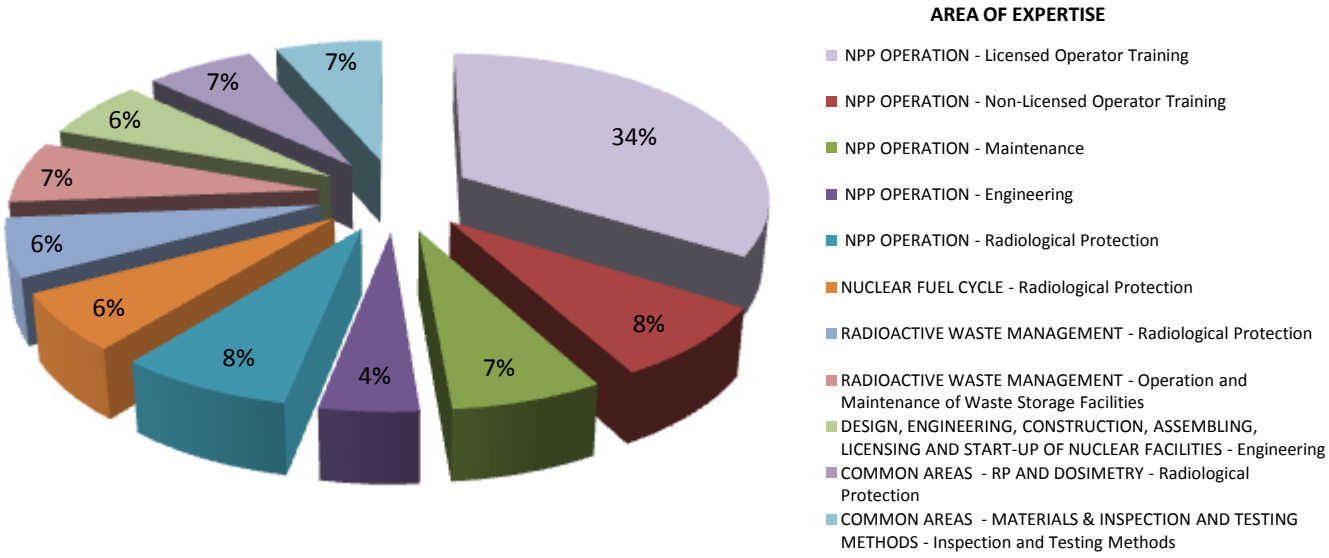

Figure 7 Percentage graph in hours of areas of expertise that have greater strength regarding the total number of hours of available courses

The capability of the Spanish companies in terms of their development capabilities in the different areas of expertise has been analysed using a cut-off ratio of areas of specialisation with at least four companies that might design and develop courses in that area, see Table 13.

Area of Job Position		Area of expertise	COMPANIES	TOTAL
NPP OPERATION		Radiological Protection	ACPRO, CIEMAT, CSN, ENWESA and TECNATOM	5
NUCLEAR FUEL CYCLE		Radiological Protection	ACPRO, CIEMAT, CSN, ENUSA and TECNATOM	5
RADIOACTIVE WASTE MANAGEMENT		Decommissioning	CIEMAT, CSN, EMPRESARIOS AGRUPADOS, ENSA and IBERDROLA ING/CONSTRUCCION	5
		Radiological Protection	ACPRO, CIEMAT,CSN, EMPRESARIOS AGRUPADOS, LAINSA and TECNATOM	6
		Operation and Maintenance of Waste Storage Facilities	CIEMAT, ENSA, IBERDROLA ING/CONSTRUCCION and TECNATOM	4
		Decommissioning of Uranium mines and Uranium Production facilities	CIEMAT, CSN, ENUSA and IBERDROLA ING/CONSTRUCCION	4
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES		New Reactors	CIEMAT, EMPRESARIOS AGRUPADOS, ENSA and TECNATOM	4
		Nuclear Safety and Licensing	CIEMAT, CSN, EMPRESARIOS AGRUPADOS and TECNATOM	4
		Probabilistic Safety Analysis	CIEMAT, CSN, EMPRESARIOS AGRUPADOS and TECNATOM	4
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Risk Prevention	CIEMAT, ENUSA, ENWESA, PROINSA and TECNATOM	5
		Safety Culture	CSN, EMPRESARIOS AGRUPADOS, ENUSA and TECNATOM	4
		Human Factors Engineering	CSN, EMPRESARIOS AGRUPADOS, ENUSA and TECNATOM	4
	RADIOLOGICAL PROTECTION AND DOSIMETRY	Radiological Protection	ACPRO, CIEMAT, CSN, ECOQUÍMICA, EMPRESARIOS AGRUPADOS, ENWESA y TECNATOM	7
		Dosimetry	ACPRO, CIEMAT, CSN, EMPRESARIOS AGRUPADOS, IBERDROLA ING/CONSTRUCCION, PROINSA and TECNATOM	7
		Radiation Shielding	CIEMAT, CSN, EMPRESARIOS AGRUPADOS, ENUSA, PROINSA and TECNATOM	6
	FUEL	Logistic and Transport of Nuclear Materials.	CIEMAT, ENUSA, PROINSA and TECNATOM	5
		Criticality	CIEMAT, CSN, ENUSA and TECNATOM	4
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods	AIMN, CIEMAT, ENUSA, LADICIM and TECNATOM	5
	OTHER AREAS	Environmental Impact Assessment	CIEMAT, CSN, ENUSA, PROINSA and TECNATOM	5

Table 13 Areas of strength due to the number of companies with development capability

The areas of strength in terms of development capabilities are not homogeneous. The following list shows those identified in the analysis:

- Risk prevention
- Radiological Protection and Dosimetry
- Inspection and testing methods
- Decommissioning of radioactive facilities such as uranium mines and uranium production facilities
- Operation and maintenance of waste storage facilities
- New reactors
- Nuclear safety and licensing
- Probabilistic safety analysis
- Safety culture
- Human factors engineering
- Radiation shielding
- Logistics and transport of nuclear materials.
- Criticality
- Environmental impact assessment

Table 14 contains a summary of the areas of strength in terms of either the total amount of course hours or development capability.

			STRENGTH DUE TO	
Area of Job Position		**Area of expertise**	Number of hours of available courses	Number of companies with development capabilities
NPP OPERATION		Licensed Operator Training	X	
		Non-Licensed Operator Training	X	
		Maintenance	X	
		Engineering	X	
		Radiological Protection	X	
NUCLEAR FUEL CYCLE		Radiological Protection	X	
RADIOACTIVE WASTE MANAGEMENT		Decommissioning		X
		Radiological Protection	X	X
		Operation and Maintenance of Waste Storage Facilities	X	X
		Decommissioning of Uranium mines and Uranium Production facilities		X
DESIGN, ENGINEERING, CONSTRUCTION, ASSEMBLING, LICENSING AND START-UP OF NUCLEAR FACILITIES		New Reactors		X
		Nuclear Safety and Licensing		X
		Engineering	X	
		Probabilistic Safety Analysis		X
COMMON AREAS	NUCLEAR SAFETY MANAGEMENT	Risk Prevention		X
		Safety Culture		X
		Human Factors Engineering		X
	RADIOLOGICAL PROTECTION AND DOSIMETRY	Radiological Protection	X	X
		Dosimetry		X
		Radiation Shielding		X
	FUEL	Logistic and Transport of Nuclear Materials.		X
		Criticality		X
	MATERIALS & INSPECTION AND TESTING METHODS	Inspection and Testing Methods	X	X
	OTHER AREAS	Environmental Impact Assessment		X

Table 14 Summary table with the areas of strength

7.2. TOOLS AND TRAINING METHODS ANALYIS

The survey also included the tools and training methods that are used by the Spanish nuclear industry during their training activities; these are as follows:

- E-learning Platform
- Full or Partial Scope Control Room Simulator
- Interactive Graphics Simulator (IGS)
- Computer-based Training (CBT)
- Human Factors Simulator (Field Simulator)
- Use of Computer Codes
- Facilities for Specific Practices
- On-site Coaching and Mentoring

Table 15 describes the results of the survey regarding the tools and training methods. This table identifies the total number of companies that are not only capable of providing the respective tool or method to be used during the training outcomes, but also of developing and building it.

TOOLS AND TRAINING METHOD	TOTAL COMPANIES	
	Availability	Development Capability
E-learning Platform	6	5
Full or Partial Scope Control Room Simulator	1	2
Interactive Graphics Simulator (IGS)	1	3
Computer-based Training (CBT)	4	6
Human Factors Simulator (Field Simulator)	1	1
Use of Computer Codes	2	5
Facilities for Specific Practices	3	3
On-site Coaching and Mentoring	3	4

Table 15 Summary of the tools and training resources. Availability and development capability

Analysis of the above data shows that the Spanish nuclear industry possesses all the training facilities necessary to conduct the training activities for professional profiles.

8. WEB SEARCH ENGINE

The training capability catalogue of the Spanish industry is accessible to the public through the CEIDEN website.

The web search engine is structured as follows:

- Available courses.
- Job oriented training capabilities that may be developed by companies.
- Tools and training methods.

Public users may look for any of the Spanish capabilities by browsing in the search forms: companies, training areas according to Area of Job Position and number of course hours, see Figure 8.

Figure 8 Example of search in the training capability catalogue – Search form

The result of the search lists the courses that meet the requirements selected, and by clicking in one of the fields, the corresponding data are shown on screen, Figure 9

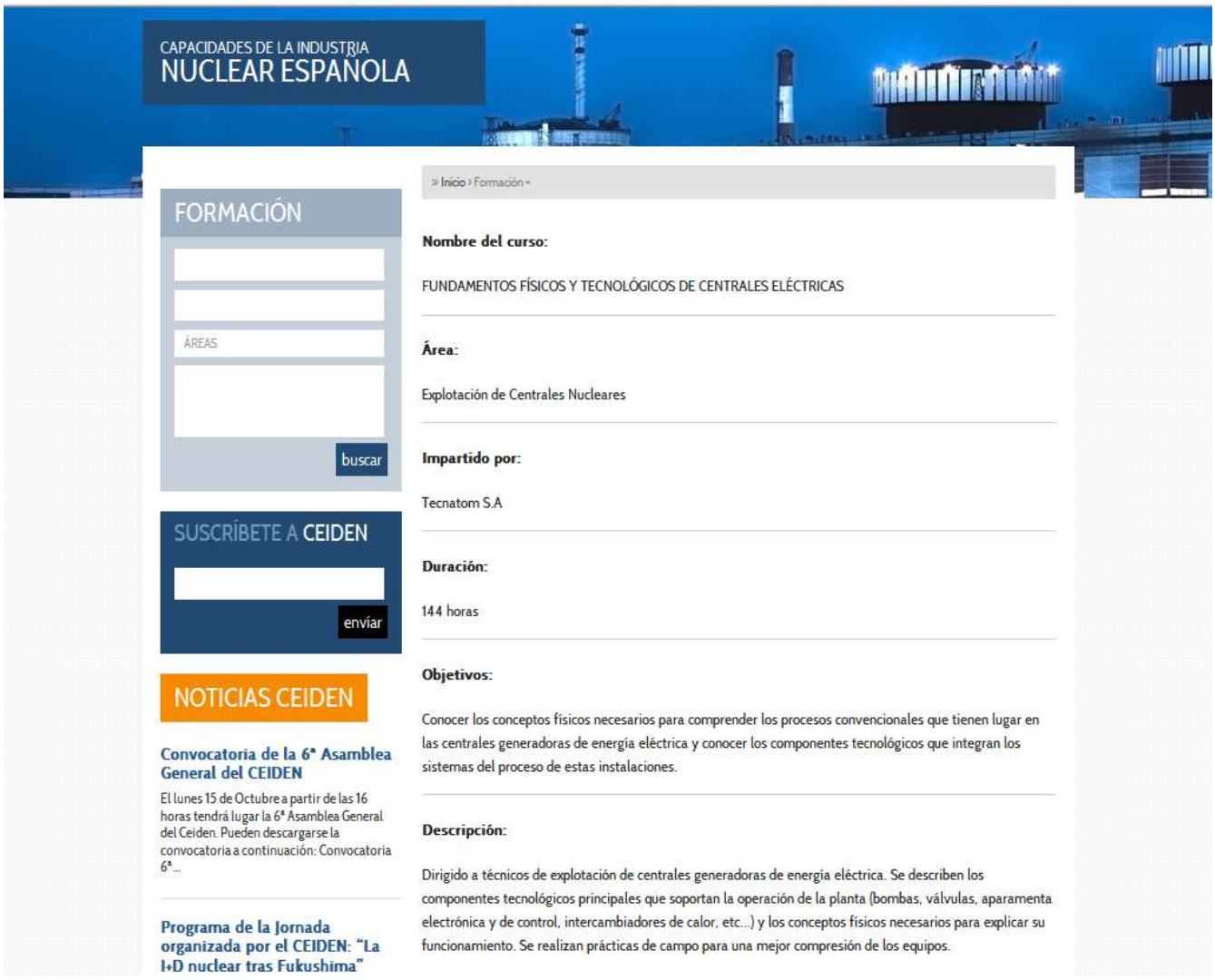

Figure 9 Example of search in the training capability catalogue – Result of the search

9. ACRONYMS

CEIDEN F+ = Eduaction and Training Working Group of CEIDEN.

NPP = Nuclear Power Plant.

DOE = Department of Energy (US).

ECVET = European Credit System for Vocational Education and Training.

EHRO-N = Human Resource Observatory in the Nuclear Energy Sector.

IAEA = International Atomic Energy Agency.

PT CEIDEN = Technological Platform of Nuclear Fission Energy

OECD NEA = Organisation for Economic Co-operation and Development Nuclear Energy Agency.

SNE = Spanish Nuclear Society.

10. REFERENCES

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APPENDIX 1 NUCLEAR TRAINING CAPABILITIES QUESTIONNAIRE

EXPLANATORY GUIDE ON THE TRAINING CAPABILITIES DOCKET

INTRODUCTION

The objective of the PT CEIDEN Training Working Group is to promote the coordination of Education and Training programmes on nuclear energy at national level and to showcase these programmes with a view to possible international collaboration at the level of the EU and Latin America. In this respect, one of its functions is to set out the resources, strengths and weaknesses of Spanish companies having education and training capabilities relating to nuclear energy, identifying possible shortcomings and drawing up a "catalogue" serving as a letter of introduction for the entire sector and to facilitate overseas exports.

The objective of this **Training Capabilities Docket** is to draw up an orderly and exhaustive list of the currently existing training courses, tools and resources, as well as of the capabilities required to generate them were the demand identified.

Bearing in mind that the information provided will be used to draw up the aforementioned "Catalogue of Spanish initial and on-going training capabilities" in the nuclear field, the information included in the docket should be as precise and accurate as possible, such that it be possible to issue a responsible offer of what we in fact can provide.

The academic aspects of education (Master courses) relate to a parallel line of work and are not included in the scope of the replies to these dockets, which refer only to **"training".**

In this respect, training is defined as the preparation of persons having an adequate academic education and requiring specific professional training in order to access or undertake a specific job in the nuclear sector.

STRUCTURE OF THE INFOMATION DOCKET

Firstly, the name, main business and number of employees of the company filling in the form should be included. If the contact person is different from the CEIDEN representative, the data on this person should also be included.

The docket is made up of 5 sections and 4 related appendices:

- **Section 1.** Courses available and capabilities → **Appendix 1.** Courses docket
- **Section 2.** Training consulting services → **Appendix 2**. Training services docket
- **Section 3.** Training tools and resources development capability → **Appendix 3.** Training resources development docket
- **Section 4**. Training resources, tools and means available → **Appendix 4.** Available training resources, tools and means docket
- **Section 5**. Other possible capabilities

Each section specifies the type of training resources that are actually or potentially available, while the function of the appendices is to explain in detail the training resources specified previously in the chapters. Both the sections and the appendices are made up of a series of descriptive characteristics that are completed by marking the corresponding boxes with a cross, depending on whether or not they are applicable in each specific case.

Section 1. Courses available and course development capability:

In this section there are two columns whose boxes are to be marked, one referring to the actual availability (now) of a training course (with trainee and instructor material developed) for the different AREAS of the JOB POSITIONS identified, and the other referring to the capability to develop such a course if there were a specific demand.

If any of the boxes in the first column, AVAILABILITY, is marked, the same number of course dockets: Appendix 1 as there are courses available should be filled in.

If any of the boxes in the second column, DEVELOPMENT CAPABILITY, is marked, information on the type of capability should be provided in Section 3.

Appendix 1. Courses docket: The function of this appendix is to specify in detail the characteristics and nature of the course in question, as a complement to Chapter 1. One docket should be filled in for each course available ("off the shelf").

Section 2. Training consulting services:

If the company filling in the form provides training consulting services, Appendix 2 should be completed directly.

Appendix 2. Training services docket. This is a complement to Chapter 2. It details the consulting services relating to personnel training that the company is able to develop.

Section 3. Training tools and resources development capability:

This section will specify the capabilities of the company for the development of training tools and resources in any of the AREAS identified in section 1. If any of the tools is selected, information on it should be included in Appendix 3.

Appendix 3. Training resources development docket: The function of this appendix is to specify in detail the characteristics and nature of the capabilities to develop training courses or tools not currently available, as was the case in Appendix 1.

Section 4. Training resources, tools and means available:

This section will specify the type and availability of the resources currently available (now) to deliver training in any of the AREAS identified in section 1. If any of the tools is selected, information on it should be included in Appendix 4.

Appendix 4. Available training resources, tools and means docket: The characteristics of the currently available ("off the shelf") training tools are specified here in greater detail.

Section 5. Other possible capabilities:

Described here will be those training capabilities that are possibly available and that have not been specified in any of the previous chapters.

SUBMITTAL OF COMPLETED DOCKETS

The end date for the filling in and submittal of these dockets will be Friday April 6th

The filled in dockets should be sent by e-mail to the CEIDEN Training+ Group coordinators.

José Luis Delgado: jldelgado@tecnatom.es

Marisa Marco: marisa.marco@ciemat.es

We would ask you also to notify the Training+ Group coordinators if you do not have the capabilities specified or do not wish such capabilities to appear in the "Catalogue" as an offer to third parties.

Thank you very much.