European Commission

DG JOINT RESEARCH CENTER
INSTITUTE FOR ENERGY AND TRANSPORT

3rd Workshop for the preparation of an ECVET-oriented Nuclear Job Taxonomy

DEBRIEFING

Cedefop, Thessalonikki (Greece)   23-26 October 2012

1. INTRODUCTION

This Workshop is the third one of a series initiated in October 2011 with the objective of preparing a taxonomy of nuclear jobs, aimed to facilitate the implementation of the European Credit System for Vocational Education and Training (ECVET). At the present stage, the taxonomy covers the three phases in the life cycle of a nuclear power plant (NPP). Jobs in collateral activities such as fuel disposal or research are not included, neither nuclear jobs in sectors not related to fission energy production.

2. PARTICIPANTS

The Workshop was held at the premises of the European Centre for the Development of Vocational training (Cedefop) located in Thessaloniki (Greece), except for the last session, which took place in the hotel Makedonia Palace. It was attended by the following participants:

The invited experts

- Thomas BERKVENS, from SCK·CEN (Belgium)

- Mihail CECLAN, from University of Bucharest-UBA (Romania)

- Odile DERUELLE, from ISTP-IRUP (France)

- Jesús IGLESIAS MORÁN, from TECNATOM (Spain)

- Izabela KULPA, from PGE (Poland)

- Paul LIVOLSI, from CEA/INSTN (France)

- Salvatore LANZA, independent consultant (Italy)

- Marisa MARCO ARBOLI, from CIEMAT (Spain)

- Brian MURPHY, from the University of Salford (United Kingdom)

- Fulvia PASQUALONI, from ENEL (Italy)

- Lyubomir PIRONKOV, from Kozloduy NPP (Bulgaria)

The invited lecturer

- Loukas ZAHILAS, from Cedefop (EU)

The volunteer contributor

- Celine DUC, from ISTP-IRUP (France)

The internal expert

- Borislava BATANDJIEVA, from JRC-IET F.5 (EU)

The organizers

- César CHENEL RAMOS, from JRC-IET F.04 (EU)

- Bianca HIRTE, from JRC-IET F.04 (EU)

- María Alicia LACAL MOLINA, from JRC-IET F.04 (EU)

Mr. Daniele Giuffrida, from the JRC Ispra Site, and Mr. Enrico Bastianini, from Latina NPP, could not attend due to unexpected last moment circumstances.

3. SESSIONS

The workshop consisted of plenary sessions on the first and last day, being the participants split in two working groups for the rest of the time:

3.1. Opening session

The participants introduced themselves, explaining their professional background, their familiarity with ECVET and their preference regarding the NPP life-cycle phase in which they would contribute.

Mr. Zahilas gave a presentation about the European Credit System for Vocational Education and Training, explaining its relevance to ensure the quality of the VET in Europe, its significance in the frame of the other European initiatives in the area of E&T, necessary conditions and tools for implementation, the status of development and the immediate prospective.

This was followed by a presentation by the organisers focused in the main concepts, and the methodology for the preparation of the taxonomy and the drafting of the profiles. The approach adopted was compared with similar initiatives, such as the OECD-NEA[i] and the Cogent Job Contexts[ii].

Both interventions were followed by a turn of questions and comments.

3.2. Work sessions

Two groups were formed to work separately in the areas of New Build/Operation and Decommissioning respectively. Following the learning acquired from previous workshops, most of the time was allocated to the drafting of profiles individually, with punctual common discussions and review of the drafts.

NPP NEW BUILD/OPERATION

Moderated by C. Chenel and attended by the experts: T. Berkvens, O. Deruelle, C. Duc, J. Iglesias, I. Kulpa, F. Pasqualoni and L. Pironkov.

NPP DECOMMISSIONING

Moderated by M. A. Lacal Molina and attended by the experts, B. Batandjieva, M. Ceclan, S. Lanza, P. Livolsi, M. Marco Arboli and B. Murphy.

The work sessions were briefly stopped on Thursday morning, when Mr. Lettmayr, Director of Cedefop, came to welcome and address some words to the participants.

3.2. Closure

On Friday morning, immediately before the end of the Workshop, Ms. Btandjeva and Mr. Chenel summarised the results achieved and posed several methodological questions for considerations of the participants.

4. OUTCOME

Drafts were produced for the following job profiles:

NEW BUILD

- Civil Design Technician
- Mechanical Design Technician
- Safety Design Engineer

OPERATION

- Plant Manager
- Licensing Officer
- Production Manager
- Training Officer
- Quality Assurance Officer
- Reactor Operator
- Turbine Operator
- Chemistry Operator II
- Chemistry Operator I
- Safety and Security Manager
- Industrial Safety Supervisor
- Fire Protection Worker
- Fire Protection Supervisor
- Environmental Supervisor
- Electrical Technician
- Electronic I&C Technician
- Mechanical Maintenance Technician

- Electrical Worker
- Electronic I&C Worker
- Mechanical Worker
- Electrical Supervisor
- Electronic I&C Supervisor
- Process Equipment Technician

- Welder
- Maintenance Planning Officer
- Civil Engineer Technician
- Process Equipment Engineer
- Fuel Machine Operator
- System Responsible Operator

DECOMMISSIONING

- Project Manager
- Contractors Manager
- Management System Manager
- Training Manager
- Communication Manager
- Financial Manager
- Site Manager
- Decontamination Planner
- Decontamination Worker
- Decommissioning Planner
- Decommissioning Supervisor
- Decommissioning Operator
- Demolition Planner

- Demolition Civil Engineer
- Demolition Worker
- Transport Responsible
- Maintenance Engineer
- Maintenance Supervisor
- Maintenance Worker
- Radiation Protection Manager
- Safety Case Expert
- Environmental Manager
- Health Physics Technician
- Radiochemistry Manager
- Nuclear Laboratory Technician

The profiles Reactor Operator and Welder, both corresponding to the Operation phase, were group-reviewed.

The list of jobs in Operation and Decommissioning underwent some modifications.

5. MATTERS OF DISCUSSION

By the beginning of this third workshop the methodological approach had gone through thorough discussions and could be considered quite consolidated. Nevertheless the incorporation of experts who participated for first time made necessary an introduction to procedural and conceptual considerations and minor adjustments have been adopted. The participation of Mr. Zahilas provided also the opportunity to look into more general matters further to what strictly concerns the development of the nuclear taxonomy.

EXPLANATION ON THE ECVET SPECIFICATIONS

1. THE ECVET QUALIFICATION. ECVET uses the so called ECVET points which are not a core element of the system but only a tool to facilitate inter-comparison and mobility. The European Credit Transfer and Accumulation System (ECTS) have credit points based in estimated workload in terms of time, which are a central component of any qualification. ECVET set the focus upon the acquisition of competence expressed as learning outcomes. Therefore the assessed and validated learning outcome is the actual credit that can be accumulated and transferred.

2. LINK BETWEEN ECVET AND ECTS. Although ECVET is intended to be developed also at higher levels of the European Qualification Framework, what means that it is bound to be complementary with the European Credit Transfer and Accumulation System (ECTS) broadly applied at present for tertiary education programs. The way in which both systems could be mutually permeable is still to be defined, and represents a key issue in the nuclear area where the availability of highly specialised personnel poses a major challenge.

CONCLUSIONS AND IMPROVEMENTS ABOUT THE PREPARATION OF THE TAXONOMY

Some questions arose both during the preliminary and closure discussion, as well as during the sessions in the work groups; other observations stem from the subsequent assessment of the profiles produced.

KSC LIST

There is a need to continue the improvement and development of the catalogue of knowledge, skills and competence (KSC), incorporating the new items included in the job profiles and providing a more consistent structure. There are a number of new entries required to complete areas such as Chemistry and Radiochemistry.

On the other hand, it has been pointed out that some competence entries can be ambiguous when taken out from the context of the tables and brought to the job profiles; one example of this is the expression "Risk assessment", which can mean something very different when referred to project management, occupational safety or nuclear safety.

LIST OF JOBS

Following the NEA terminology, the phase Design/Construction was renamed as "New Build". The need to include in this phase some specific job for Ventilation / HVAC was brought up for consideration.

In this phase the sub-area Siting/Site Location was added, consisting of four positions. Other modifications were adopted, mostly in the phase Decommissioning, and the titles for some jobs were reviewed.

LEARNING FROM OTHER APPROACHES TO THE DESCRIPTION OF NUCLEAR JOBS

The given descriptions by the OECD-NEA and Cogent were used sources for some jobs. Furthermore, examples of job descriptions and from the Cogent's Job Contexts were taken for comparison in order to consider the adoption of concrete features. The attention was set in the labelling of the job requirements made in these two projects:

- Three degrees of "nuclearisation" (NEA)

- Classification of competences in Technical, Regulatory / Compliance, Business, Personal / Functional-Behavioural.

- Functional areas (Cogent)

Although the ECVET Job Taxonomy could adopt some modification in the future taking these models as example, the common opinion was that this was not necessary at the present stage.

DEFINITION OF JOB REQUIREMENTS – COMPETENCE ITEMS.

Although there is a common understanding about the meaning of the terms *knowledge*, *skill* and *competence* in the context of ECVET, the application to the draft of job profiles is still missing some harmonisation. The assessment of the profiles prepared shows several aspects to adjust:

- DIFFERENT DEGREE OF DETAIL IN THE DESCRIPTION OF THE JOB REQUIREMENTS. Some profiles refer very generic areas; at least for those competences marked with a high EQF level, it is desirable to list more specific items.

- LISTING OF COMPETENCE ITEMS ON THE WRONG PARAGRAPH. Especially under skills, some items seem rather to correspond with knowledge components, since the lack reference to activities resulting in the achievement of concrete outcome.

- UNBALANCED NUMBER OF ITEMS UNDER THE SECTION *COMPETENCE* (ATTITUDES). Distinctive key behavioural traits should be identified and shortlisted for each job up to an agreed maximum number.

- EQF LEVELS. In some profiles they are set the same for every competence, what seems to reflect the requirement of a certain academic level rather the factual need of competences for satisfactory performance of a job in real cases.

- INSUFFICIENT AMOUNT OF SKILLS LISTED.   Although this is very uneven, the overall picture shown too few items listed under *Skills* (technical competence). Typically at least one skill should be defined for every task linked to the job. Without an adequate description of this part the added value provided by the ECVET approach disappears, making the job requirements look much like a conventional knowledge-based training program.

- SIMPLIFICATION OF THE WORDING.   The job taxonomy aims to be brief, clear, and understandable, and to reduce vagueness as much as possible. For this purpose the formulation of the job requirements is meant to consist of very concise expression without any qualifying adjective –this is provided by the EQF descriptor.

JOB INFORMATION

The box "Job description" was found not to match in content with its heading. The heading has been removed and merging the content with "Roles/Functions" could be considered in the future.

The classification of the qualification entry level was suggested to be change from ISCED into EQF, given that both have similar levels at present. Nevertheless for the time being the classification adopted by Eurydice[iii]; this also allows to differentiate between the academic diploma –which in most cases involves mainly knowledge acquisition- and the actual competence requirements, including technical and personal components. The inclusion of experience as requirement, already discussed in other opportunities, came up on the table. For this respect it is worth to mention the competence-oriented nature of the taxonomy, and the fact that experience is not competence by itself, but rather a way of learning.

WORK PROCEDURES AND TEMPLATE

The objective is set in devoting future meetings to review of profiles drafted and possible peer-reviewed in advance. This would require the commitment of a number of contributors and/or the allocation of extra resources by the JRC-IET, either in-house or outsourced.

The job template has been modified to allow the inclusion of the sub-area, in addition to the NPP phase. Other box has been set to enter a systematic numerical reference for each job, following the solution adopted during the meeting in the Decommissioning work group.

5. ACKNOWLEDGMENTS

The organisers would like to express their gratitude for the commitment and motivation of the participants, as well as for the efficient support and kind hospitality received from the staff of Cedefop. They all made possible the success of the workshop, both in technical as in organisational aspects.

ANNEX: Updated list of job profiles

1. NEW BUILD		
1.1. SITE LOCATION	1.1.01	Site Characterisation Manager
	1.1.02	**Licensing Manager**
	1.1.03	Nuclear Engineer
	1.1.04	Health and Safety Officer
1.2. DESIGN	1.2.01	Design Manager
	1.2.02	**Civil Design Technician**
	1.2.03	Electrical Design Technician
	1.2.04	**Mechanical Design Technician**
	1.2.05	**Mechanical Design Engineer**
	1.2.06	**Civil Design Engineer**
	1.2.07	**Electrical Design Engineer**
	1.2.08	**I&C Design Engineer**
	1.2.09	**System Design Engineer**
	1.2.10	**Safety Design Engineer**
	1.2.11	Project Integration Engineer
1.3. CONSTRUCTION	**1.3.01**	**Construction Project manager**
	1.3.02	Transverse Engineer
	1.3.03	Mechanical Discipline Engineer
	1.3.04	Mechanical Construction Engineer
	1.3.05	Civil Construction Engineer
	1.3.06	**Electrical Discipline Engineer**
	1.3.07	**Electrical Construction Engineer**
	1.3.08	I&C Discipline Engineer
	1.3.09	I&C Construction Engineer
	1.3.10	Mechanical Construction Technician
	1.3.11	Civil Construction Technician
	1.3.12	Electrical Construction Technician
	1.3.13	I&C Construction Technician
	1.3.14	Mechanical Construction Worker
	1.3.15	Civil Construction Worker
	1.3.16	Electrical Construction Worker
	1.3.17	I&C Construction Worker
	1.3.18	Occupational Safety Manager
	1.3.19	Quality Control Manager
	1.3.20	Quality Control Technician
	1.3.21	Environmental Manager
	1.3.22	Welder
	1.3.23	Locksmith
	1.3.24	Test Engineers/Technicians/Workers
1.4. COMMISSIONING	**1.4.01**	**Electrical Commissioning Engineer**
	1.4.02	**Mechanical Commissioning Engineer**
	1.4.03	Civil Commissioning Engineer
	1.4.04	**I&C Commissioning Engineer**
	1.4.05	System Commissioning Engineer
	1.4.06	Commissioning Manager
	1.4.07	**Licensing Manager**
	1.4.08	Permission-to-work Officer
	1.4.09	Permission-to-energize Officer
	1.4.10	Commissioning Crew

2. OPERATION		
	2.0.01	**Plant Manager**
2.1. NUCLEAR OPERATIONS AND WASTE MANAGEMENT	2.1.01	Operation Planning Officer
	2.1.02	**Licensing Officer**
	2.1.03	**Production Manager**
	2.1.04	**Training Officer**
	2.1.05	**Quality Assurance Officer**
	2.1.06	**Engineering Manager**
	2.1.07	**Operation Manager**
2.2. OPERATORS IN CONTROL ROOM	**2.2.01**	**Shift Engineer**
	2.2.02	**Reactor Manager**
	2.2.03	**Operator**
	2.2.04	**Reactor Operator**
	2.2.05	**Turbine Operator**
2.3. OPERATORS IN THE FIELD	**2.3.01**	**Field Operator Technician**
	2.3.02	**Field Operator Worker**
2.4. WASTE MANAGEMENT & RP	**2.4.01**	**WM&RP Manager**
	2.4.02	**Radiation Protection Officer**
	2.4.03	**Radiation Protection Worker**
2.5. CHEMISTRY	**2.5.01**	**Chemistry Manager**
	2.5.02	Chemistry Supervisor
	2.5.03	**Chemistry Operator II**
	2.5.04	**Chemistry Operator I**
2.6. SAFETY AND SECURITY	**2.6.01**	**Safety and Security Manager**
	2.6.02	Industrial Safety Technician
	2.6.03	**Industrial Safety Supervisor**
	2.6.04	**Fire Protection Worker**
	2.6.05	**Fire Protection Supervisor**
	2.6.06	**Environmental Supervisor**
	2.6.07	Security Manager/Supervisor
2.7. MAINTENANCE	**2.7.01**	**Electrical Technician**
	2.7.02	**Electronic-I&C Technician**
	2.7.03	**Mechanical Maintenance Technician**
	2.7.04	**Electrical Worker**
	2.7.05	**Electronic-I&C Worker**
	2.7.06	**Mechanical Worker**
	2.7.07	**Electrical Supervisor**
	2.7.08	**Electronic-I&C Supervisor**
	2.7.09	Mechanical Supervisor
	2.7.10	**Process Equipment Technician**
	2.7.11	**Welder**
	2.7.12	Operational Locksmith
	2.7.13	**Maintenance Manager**
	2.7.14	**Maintenance Planning Officer**
	2.7.15	**Civil Engineering Technician**
	2.7.16	**Process Equipment Engineer**
2.8. ENGINEERING	2.8.01	Mechanical Design Engineer
	2.8.02	Civil Design Engineer
	2.8.03	Electrical Design Engineer
	2.8.04	I&C Design Engineer
	2.8.05	System Design Engineer
	2.8.09	Safety Design Engineer
2.9. CANDU	**2.9.01**	**Fuel Machine Operator**
	2.9.02	**System Responsible Engineer**

3. DECOMMISSIONING		
3.1. MANAGEMENT	**3.1.01**	**Project Manager**
	3.1.02	**Contractors Manager**
	3.1.03	**Management System Manager**
	3.1.04	**Training Manager**
	3.1.05	**Licensing Manager**
	3.1.06	**Communication Manager**
	3.1.07	**Financial Manager**
	3.1.08	**Site Manager**
3.2. DECONTAMINATION	**3.2.01**	**Decontamination Planner**
	3.2.02	**Decontamination Supervisor**
	3.2.03	**Decontamination Worker**
3.3. PREPARATORY WORK FOR DECOMMISSIONING	**3.3.01**	**Site Engineer**
	3.3.02	Spent Fuel Management Engineer
	3.3.03	**Engineering Support Manager**
	3.3.04	**Decommissioning Planner**
	3.3.05	**Decommissioning Supervisor**
	3.3.06	**Decommissioning Operator**
	3.3.07	**Decommissioning Worker**
3.4. DISMANTLING/ EQUIPMENT	**3.4.01**	**Dismantling Planner**
	3.4.02	**Dismantling Supervisor**
	3.4.03	**Dismantling Worker**
3.5. DEMOLITION	**3.5.01**	**Demolition Planner**
	3.5.02	**Demolition Civil Engineer**
	3.5.03	**Demolition Worker**
3.6. SITE CLEAN UP AND RELEASE	3.6.04	Clean up Supervisor
	3.6.02	Clean up Worker
3.7. RADIOACTIVE WASTE	**3.7.01**	**Radioactive Waste Manager**
	3.7.02	**Radioactive Waste Engineer-characterisation**
	3.7.03	**Radioactive Waste Engineer - processing**
	3.7.04	Radioactive Waste Worker - characterisation
	3.7.05	**Radioactive Waste Worker - processing**
	3.7.07	**Transport responsible**
3.8. MAINTENANCE	**3.8.01**	**Maintenance Engineer – Manager**
	3.8.02	**Maintenance Supervisor**
	3.8.03	**Maintenance Worker**
3.9. HEALTH, SAFETY AND ENVIRONMENT	**3.9.01**	**Radiation Protection Manager**
	3.9.02	**Radiation Protection Supervisor**
	3.9.03	**Radiation Protection Worker**
	3.9.04	**Industrial Safety Manager**
	3.9.05	**Safety Case Expert**
	3.9.06	**Environmental Manager**
	3.9.07	**Health Physics Technician**
	3.9.08	**Chemistry and Radiochemistry Manager**
	3.9.09	**Nuclear Laboratory Technician - Chemistry**

Draft profiles available for the items in bold

[i] OECD-NEA (2012): *Nuclear Education and Training: From Concern to Capability*
[ii] Cogent, Nuclear Industry Training Framework, n.d., http://www.cogent-ssc.com/industry/nuclear/nitfjs.php

[iii]http://eacea.ec.europa.eu/education/eurydice/documents/facts_and_figures/education_structures_EN.pdf