CMET report on the feasibility study on the informal or sector internal accreditation body DELIVERABLE (D-N°:3.4) Work Package 3

Palmu, M.; Oy, P.; Paiva, I.; Vardon, Phil

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CMET report on the feasibility study on the informal or sector internal accreditation body

DELIVERABLE (D-N°: 3.4)
Work Package 3

Author(s): **Marjatta Palmu, Posiva Oy, Isabel Paiva, IST, and Phil Vardon, TU Delft**

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Review comments

The draft D3.4 report was reviewed in the CMET no 6 meeting by the meeting participants and it was sent for a review round with replies and approval was asked by the 16 November 2015. Three sets of comments were received and a comment from the IGD-TP Executive Group (in the following). Some of the new review comments after the CMET no 6 meeting were added to this report, but not all as they could not be discussed within the group within the timeline available.

The IGD-TP Executive Group states as follows:
"The IGD-TP Executive Group acknowledges the work carried out in the CMET Group and recognizes the importance of Competence Maintenance for the sustainability of our activities. Actually, there is a need to maintain certain skills over very long timescales and for the need for knowledge capture from experienced experts.
However, the IGD-TP EG considers that the accreditation scheme, as discussed during the EF5 and proposed in this report is not deemed to address WMOs' needs. As a consequence, the accreditation scheme is not endorsed by the IGD-TP EG. Thus, the content of this report should be seen as the acknowledgement of the CMET Group's work and a SecIGD2 project product."

Approved for submission to the EC database by December 31, 2015

Project coordinator, Jacques Delay, Andra

SecIGD2

IGD-TP CMET Working Group

D3.4 CMET report on the feasibility study on the informal or sector internal accreditation body

31 December 2015

Authors:
Marjatta Palmu, Posiva Oy
Isabel Paiva, IST
Phil Vardon, TU Delft

Preamble

The purpose of this document is to address the potential feasibility of an informal or sector internal accreditation in geological disposal. This report on the implementation feasibility of such a system is the result of the discussion and actions carried out by the IGD-TP and Working group on Competence Maintenance, Education and Training (CMET). The main inputs are derived from the discussions within the group, the conference papers produced by the group members, and from the interactive forum carried out with the stakeholders at the IGD-TP's 5th Exchange Forum in October 2014. The aim of accreditation or more specifically the promotion of mutual recognitions of learning outcomes in geological disposal aims to provide European level value added for promoting mobility, quality of education and training and lifelong learning. The first step towards mutual recognition is the identification of learning outcomes needed to support the IGD-TP Vision "2025". The underlying framework that provides the basis for the views in this document is the discussion in the IGD-TP's SRA 2011 that in RD&D the needs are different at the different stages of the repository development. And that the maturity of the waste management programmes defines, which questions still require additional RD&D work for new knowledge, skills and potential competence creation prior the Vision 2025 is achieved. For several stages of the repository development, the identification of required learning outcomes would be feasible resulting from the long experiences in geological disposal RD&D. The outcome is that preparedness to implement such a system does not currently exist.

The CMET working group, whose activities and discussions have resulted in this report, was established in 2012. The CMET working group has been supported under the FP7 SecIGD2 project with the EURATOM grant and with a direct contribution from the IGD-TP Executive Group members during 2013-2015. This document is a deliverable under the SecIGD2 project's Work Package 3 "Support for the development, implementation, and coordination of CMET, Task 3.2: Studying the feasibility of an informal or sector internal accreditation body within the IGD-TP for approving learning outcomes, which can then be applied to the various existing training schemes and concepts in geological disposal in Europe".

The final contents of this report represent only the views of the authors coming from the CMET Working Group. The terminology used in this document is based on the CEDEFOP terminology[1] (2008) and on the definitions of the Council Directives referred to in this document.

Regarding this report please note the message from the IGD-TP Executive Group regarding this report:

"The IGD-TP Executive Group acknowledges the work carried out in the CMET Group and recognizes the importance of Competence Maintenance for the sustainability of our activities. Actually, there is a need to maintain certain skills over very long timescales and for the need for knowledge capture from experienced experts.
However, the IGD-TP EG considers that the accreditation scheme, as discussed during the EF5 and proposed in this report is not deemed to address WMOs' needs.As a consequence, the accreditation scheme is not endorsed by the IGD-TP EG. Thus, the content of this report should be seen as the acknowledgement of the CMET Group's work and a SecIGD2 project product."

[1] CEDEFOP. 2008. Terminology of European Education and Training Policy. A selection of 100 key terms. Luxembourg, Office for Official Publications of the European Communities.

EXECUTIVE SUMMARY

Background

Two European policy objectives are directly linked with the work carried out for producing this report.

First, in the European internal market, free movement of labour on the European Union level is at the core of the Union. Mobility faces several barriers; one of them is the recognition of degrees, diplomas and professional qualifications earned in one Member State and their acceptance in another Member State.

The second policy relates directly to the nuclear safety objectives under Euratom Treaty. Everywhere in the European Union, each Member State should implement in its nuclear and other ionising radiation related activities a common minimum level of safety in all such activities.

In response to the first policy, DG[2] Education and Culture (DG EAC) has developed mechanisms[3] to promote transnational mobility, quality of education and training, and lifelong learning for European Union, where the legal framework in education is under national subsidiary.

DG Energy (DG ENER) has addressed the safety requirements by developing several directives[4] (e.g. (4)) for the Member State's approval and adoption in the field of radiation safety. The availability of education and training programmes is one of the measures to ensure safety.

For the geological disposal community additional requirements and challenges include:

1. Licensing authorities for geological disposal facilities' construction and/or operation require confidence in the human capability of the implementers to construct and operate geological disposal facilities safely.
2. The required human competencies change at the implementers, regulatory authorities and at subcontractors, when a waste management organisation moves from a selected site to a safely operating repository. For other programmes, too, the competency framework in geological disposal changes as the stage where the programme is in advances to the next stage.
3. The supply of highly competent personnel is integral to the development of cost effective industrial schemes and to the continued improvement of safety of repositories and related nuclear facilities.

What the Competence Maintenance, Education and Training (CMET) Working Group wished to address with its activities towards studying the feasibility of voluntary accreditation are the mutual recognition of professional competences, identification of the required learning outcomes at the different stages of the repository development for ensuring competent staff, and the developing systematic needs' based education and training programmes.

Objectives and purpose

The objective of the work reported on the feasibility of a voluntary accreditation scheme was to build and complement the experiences from the FP[5]6 and later FP7 European Fission Training Scheme (EFTS) projects related to geological disposal. In several projects that have already finished (e.g. ENEN II and PETRUS II) and in some on-going projects, learning about the ECVET system for identifying and recognising learning outcomes, and its development and adaptation into geological disposal took place. The European wide development work has reached a stage where mutual recognition mechanism exists for acquired formal learning in the higher education setting. Non-formal and informal learning (NFIL), including training and other forms of informal learning e.g. on-the-job or in projects in geological disposal, are not yet formally recognised. Accreditation bodies, too, exist in some specific areas and these are mainly set up by professional associations (or learned societies) or other types of associations. As an authority in geological disposal, the IGD-TP was seen by the CMET group as a suitable body for such a purpose, too.

[2] DG = Directorate-General in European Commission
[3] E.g. Bologna process (including ECTS credits - European Credit Transfer and Accumulation System), European Qualification Framework (EQF), Copenhagen process (including ECVET - European Credit System for Vocational Education and Training)
[4] Directives on nuclear safety, radiation protection, and nuclear waste management
[5] FP = Framework Programme

However, for being able to make any conclusions about the feasibility of activities that could contribute to the mutual recognitions of knowledge, skills and competences in our sector, the prerequisites for this task needed a more general mapping by the geological disposal community. The IGD-TP Exchange Forum provided a good source of input for this purpose.

This task of assessing the feasibility and state-of-the-art of an accreditation scheme builds thus on the experiences of the EFTS (e.g. ENEN III, PETRUS III), ENEN association, and similar initiatives like the activities organised by EHRO-N in identifying and validating learning outcomes irrespective and independently of the way they are acquired. An accreditation scheme's purpose is to be applicable to multiple training concepts and therefore the starting point was to follow the ECVET system that applies the learning outcomes independent of the way of they have been acquired by the individual. No predetermined training concept is mandatory for implementing such an accreditation scheme.

CMET group wished to complement the existing training panorama from the end-users' demand side perspective without carrying out any overlapping work with the existing EFTS's or training providers. From the four objectives for the CMET as defined in the groups' Terms of Reference[6], the Task 3.2 of the SecIGD2 project addresses the second objective "Quality assurance of training for professionals with the support of a voluntary accreditation scheme".

During the process, the continuous change in the competence needs depending on the programme stage became an evident starting point. Each stage builds up a solid knowledge base regarding that stage of repository development: This knowledge, skills and competence acquisition has already been addressed and the stages have been identified as requiring different approaches from the previous or following stages by the programmes, which are now closer to licensing. For the existing knowledge base, the challenge is to maintain and transfer to this knowledge to the future professionals. This knowledge has been built up through multidisciplinary international cooperation. Such an activity would be feasible to carry out in the community providing the resources would be pooled for such a task..

Related to the continuous changes in the waste management programmes, it is important to identify the baseline for the "learning outcomes" (LOs) of the current geological disposal community. The ECVET system provides a good tool for documenting the knowledge base from the personnel's capabilities point of view. The Knowledge, Skills and Competence (KSC) framework is able to provide such a systematic framework for identifying and collecting the existing knowledge base and for the design of training in alignment with the Systematic Approach to Training (1) promoted by IAEA. The main differences between the European Union and the IAEA are in the used terminology and in the approach taken towards the recognition of the learning outcomes.

A new challenge is to identify the competence needed at the pioneering stages of the repository construction and operation. In these stages more focussed qualifications are needed and at the same time there is a need to understand the cross-disciplinary requirements that need to be met at all programme functions needed for the implementation. These cross-disciplinary competences requirements are in general much wider in their scope than in more traditional engineering projects or even in nuclear new-build.

Originally in the planning phase of SecIGD2, it was also foreseen that this feasibility study would include a pilot body for accreditation and quality assurance of learning paths in geological disposal. This had been already tried out in a small scale for the FP6 PETRUS II Pilot Professional Development Programme, but not developed further since the end of the project. Neither was it proven feasible under the CMET activities of SecIGD2 WP3. The aim of this task was to make a recommendation for establishing such a body within the IGD-TP based on the feasibility study results and to provide practical working guidelines for such a group. The result from this study was that such a body would not be feasible at the moment.

[6] Four objectives were: 1. Transfer of the state-of-the-art and the new competence needs of the geological disposal community to reach “Vision 2025”; 2. Quality assurance of training for professionals with the support of a voluntary accreditation scheme; 3. Compile E&T approaches and content into a type of curriculum/curricula for professionals in geological disposal; 4. Ensure indirectly that both providers and new personnel will be available, now and in the future. The CMET Terms of Reference are included into the SecIGD2 deliverable D3.2 Strategy and Action Plan. See SecIGD2 deliverable report D3.2 (8)

The role of Europass[7] as an instrument was to be included into the feasibility study as it provides an evidence tool of Knowledge, Skills and Competence by providing a standard format record of the individual's learning achievements. The latest developments in Europe are introducing new tools in addition to the Europass i.e. the European Professional Card (Directive 2013/55/EU amending Directive 2005/36/EC (2 & 3). The European Professional Card is intended to ensure more efficient and transparent recognition of professional qualifications in another Union state after they have been obtained in one Member State. The implementation of the electronic certificate European Professional Card needs to be supported by Internal Market Information System (IMI) into which the recognised professional qualification is filed. The use of the card is still pending the European Commission's implementing acts on e.g. how, when, and which documents need to be provided for obtaining the card. The implementing acts will impact also how a voluntary accreditation scheme could work in geological disposal, because the relevant stakeholders need to express a sufficient interest before such a card would be adopted for particular professions unless predefined in the national adoption of this directive.

Actions and findings

The work related to accreditation has been carried out in interaction between the CMET group and the PETRUS III project group. The CMET working group members (**in Appendix 1**) have contributed to the content of this report either directly via email commenting, by participating in the work group meeting discussion and as co-hosts of the IGD-TP Exchange Forum no 5 (EF5) walkabout session, contributing to the content of this report. The authors mentioned on this report's front page have been the persons who have authored this report document from the inputs and produced the conclusions. The final views presented in this report are the views of the authors being CMET working group members, too.

Within PETRUS group, the Bologna process for higher education is applied, since the main partners that provide both education and training (E&T) are universities. The ECTS credits are used in translating and recognising the learning outcomes between the consortium partners according to mutual agreements. For acknowledging the learning outcomes, a steering board has been set up within the PETRUS III project and the integration with a European label is envisaged in the project in cooperation with ENEN association.

For recognition of non-formal and informal learning (NFIL) such a body does not exist and as a result of this study it is not yet feasible. As a part of this feasibility study the views of the geological disposal community stakeholders were solicited on this topic by a set of questions that were produced by the CMET meeting no 3 in cooperation with the PETRUS III project. Part of the questions originated from the Cordoba ECVET seminar in January 2011 organised by the European Commission (DG-RTD Energy, unit Fission). These questions were submitted to the IGD-TP Executive Group (EG) for their views first in 2011. The IGD-TP EG transferred the responsibility to produce these replies to the CMET working group when it was established.

The interactive session with the community stakeholders took place in connection with the IGD-TP Exchange Forum no 5 (EF5) in Kalmar, Sweden in 2014. The immediate response of the stakeholders who participated this "walkabout" session was in general favourable towards the idea of a voluntary accreditation scheme, though the participants acknowledged that they were not familiar with the accreditation or with the ECVET system. The response of the IGD-TP Executive Group (EG) was not in support of an accreditation system or in support of activities that would be needed towards its implementation.

The findings of the vast amount of the detailed inputs from the EF5 walkabout session was first discussed and then further screened by the CMET group members in the two consecutive CMET meetings no 4 and no 5. The main conclusions of this screening of the EF5 session results are presented in this report. They attempt to address the main prerequisites for such a system: like how, by whom, for whom, at what cost, and how complex or reliable would any scheme be. Such a system could also been seen as a way of building trust in both the regulator and the public in addition to being a way of ensuring that needed skills exist.

[7] http://europass.cedefop.europa.eu/en/home

As main prerequisites for having such as system and an accreditation body in place there is a clear need for a comprehensive identification of the learning outcomes needed to work in geological disposal. Further these learning outcomes need to be valid in practice and therefore they need the recognition by the industry and other employers in the community. Mutual recognition needs either a strong endorsement of an accreditation body by all relevant stakeholders and/or acceptance of the results/certificates from such a body, or a national legal framework that puts a competent body in place to recognise the learning outcomes. All approaches towards the accreditation also require solutions related to the resourcing of the identification work of the learning outcomes and to operating such body. As identified at the EF5, a co-funding from public sources, companies and individuals themselves seems to be the most favourable solutions to the resourcing question.

According to the changes planned for European level implementation to the recognitions of professional qualifications, mutual recognition would be done via formal procedures according to European level directives like described in 2013/55/EU amendment (3) to the Directive 2005/36/EC on the recognition of professional qualifications. In the amendment the former national contact points are transformed into assistance centres, which can also carry out aptitude tests for recognition of professional qualifications. If the professionals take this card into use, this new European Professional Card could enhance lifelong learning and the individual's interest in taking responsibility of one's own learning, knowledge, skills and competence. As jobs and industries change on a continuous basis, this is a valid alternative for securing needed competencies in Europe.

Recommended future contributions to this development

European level

Competence maintenance, education and training in Europe and especially in European Union are attributed directly to the national level. Several policy decisions related to education and qualifications are made under the DG EAC and the Euratom policies are not necessarily always in the same timeline with the developments that take place in other fields of education and training. The difficulties of using e.g. the Erasmus+ and Marie Skłodowska-Curie action funding for nuclear or geological disposal education and studies widens the gap between the educational development trends even further. This can certainly not be of European value added. The "Waste" directive 2011/70/Euratom (4) requires that education and training programmes exist. Same requirement is included in the BSS (Directive 2013/59/Euratom) and in the directive for nuclear safety (2009/71/Euratom). Even though it is advantageous to give the basic induction education or training into geological disposal in a national language, E&T is certainly an area where further studies into the topic either on university level or for professional benefit from international cross-fertilisation. The strength of competence acquisition and E&T is that it is an area of non-conflicting interested as it aims at providing solid scientific and technical basis related to the topics taught.

In addition to the new developments related to the recognition of the professional qualifications, the European Commission's role here would be to further bridge and integrate the developments in Education and Training across the different DG's especially in this case between the DG RTD in Fission and Fusion and the DG EAC for learning from the current good European practices faster. ECVET is one example area to take advantage of. In this way one can ensure that the community's different stakeholders like universities, research institutes, WMOs and other industry organisations are aware of European level developments in alignment with the European aspiration to avoid overlapping activities and maximise the existing opportunities.

To help in the identification of Knowledge, Skills and Competences (i.e. KSC and the ECVET system) and the wider implementation of them, access to the ECVET related sector specific content information should be made as open as possible e.g. with the help of

- Setting up an open access database for job functions' (KSC) input and use by the nuclear community (including waste management)
- Setting up an open access platform for the production of eLearning courses and other learning activities (open or limited access).

Such support tools would reduce the need to do overlapping work by the different organisations needing either knowledge about the needed Knowledge, Skills and Competence (KSC) or needing education and training. In the radiochemistry education, sharing of educational materials already takes place via a shared Wikispace. IAEA also provides access to its Moodle based Cyber Learning Platform for Nuclear Education and Training (CLP4NET) and CONNECT SharePoint data,

Since the current Euratom Horizon 2020[8] programme does not state that training courses or other educational activities are mandatory in the projects like it was in FP7, it is important to ensure that the new competence development is exchanged with the cross-cutting projects under the European Fission Training Schemes in the future calls.

IGD-TP level

Supporting the implementation of mutual recognition systems like ECVET would be proactive also in view of the European Union's Internal Market. The demand for all types of evidence on competence and qualifications is increasing in Europe (an example the spread of ISO 9000 certified quality systems). In the piloting phase it is possible to contribute and influence the final outcome.

Encouragement to produce of job functions' documentation by stages of repository development for different job functions in various discipline areas by the industry and research organisations, other employers would be beneficial for transferring knowledge and training new staff, and also for waste management programmes in a less mature stage. Following the developments in this field would include maintaining the links with EHRO-N[9] through active Senior Advisory Group (SAG) participation by contacting EHRO-N to ensure that an IGD-TP representative would be on board of the SAG. Further developing a more formal connection between ENEN and the IGD-TP is of value in integrating E&T activities to a wider competent European forum for sustaining the E&T provision. This interaction would enable the support to ENEN[10] activities in the current and future project proposals, thus linking the IGD-TP with ENEN and to enhance the cross-fertilization of the developments in E&T (like EFTS's), and especially around identification of learning outcomes. This way the IGD-TP can ensure that industry and especially WMOs are aware of European level developments in this area.

Recommendations for IGD-TP

#1 To continue to follow-up the complementary cross-cutting European initiatives in competence maintenance, education and training by maintaining links with ENEN and EHRO-N, and follow-up the adaptation of the amendments of the Directive 2005/36/EC by the IGD-TP. Develop a formal relationship with ENEN (e. g. a Memorandum of Understanding) and secure a representation at EHRO-N SAG.

#2 IGD-TP Executive Group to communicate to the project groups preparing the proposals that the organisation of individual training workshops as a part of the future Technical Projects (especially in the future Horizon 2020 projects) is desirable. The use of European mutual recognition principles in formulating the training learning outcomes would be a contribution to the geological disposal community.

#3 Encourage pooling of resources for the production of job functions' related KSC documentation by stages of repository development for different job functions in various discipline areas by the industry and research organisations, other employers in when initiating new measures for competence development, education and training.

The IGD-TP Executive Group acknowledges the work carried out in the CMET Group and recognizes the importance of Competence Maintenance for the sustainability of our activities. Actually, there is a need to maintain certain skills over very long timescales and for the need for knowledge capture from experienced experts.

However, the IGD-TP EG considers that the accreditation scheme, as discussed during the EF5 and proposed in this report is not deemed to address WMO's needs. As a consequence, the accreditation scheme is not endorsed by the IGD-TP EG. Thus, the content of this report should be seen as the acknowledgement of the CMET Group's work and a SecIGD2 project product from the IGD-TP EG's perspective.

The project and organisational level

[8] H2020 is European Union and Euratom research programme following FP6 and FP7
[9] European Human Resources Observatory for the Nuclear sector
[10] European Nuclear Education Network

The existing initiatives contributing to the ECVET system and mutual recognition need to be well documented and disseminated not only directly in geological disposal but also in its supporting disciplines. The EHRO-N and JRC/IET Petten are working on identifying the job functions related learning outcomes and documenting them in the form of working reports on their websites. The validation mechanism for the results still requires efforts and a wide stakeholder engagement.

The use of outcomes of the EHRO-N is dependent on the national conditions, and its use should be made as easy as possible to take into practical use. Plans to proceed in formulating the work into qualifications that would be available in the ESCO[11] database supports of their potential use in practice after the outcomes of the work have undergone a community wide validation and acceptance.

Further the organisations can ask for the training providers to ensure that their training provision includes the ECVET principles (Learning outcomes consisting of Knowledge, Skills and Competence) so that the completed training can at a later stage be recognised in an existing national or sector specific body as foreseen also in amendment to the Directive 2005/36/EC (3).

[11] ESCO - European Skills/Competences, qualifications and Occupations

Abbreviations

BSS	Basic Safety Standard (Council Directive 2013/59/Euratom)
CEA	Commissariat à l'énergie atomique et aux énergies alternatives in France
CEDEFOP	European Centre for the Development of Vocational Training
CLP4NET	Cyber Learning Platform for Nuclear Education and Training (IAEA NKM eLearning platform)
CMET	Competence Maintenance, Education and Training Working Group (IGD-TP)
DG	Directorate-General (in European Commission)
DG EAC	Directorate-General responsible for Education and Culture
DG ENER	Directorate-General for Energy
DP	Deployment Plan (IGD-TP publication)
EC	European Commission (formerly European Communities, now EU)
ECTS	European Credit Transfer and Accumulation System
ECVET	European Credit system for Vocational Education and Training
EF	Exchange Forum (IGD-TP's annual participant and stakeholder forum)
EFTS	European Fission Training Scheme (Euratom)
EG	Executive Group (IGD-TP decision making body)
EHEA	European Higher Education Area
EHRO-N	European Human Resources Observatory for the Nuclear Sector
ENEN	European Nuclear Education Network (Association)
ENSTTI	European Nuclear Safety Training & Tutoring Institute in France
EQF	European Qualification Framework
ESCO	European Skills/Competences, qualifications and Occupations
E&T	Education and Training
EU	European Union
EURATOM	European Atomic Energy Community
HR	Human resources
HRL	Hard Rock Laboratory
IAEA	International Atomic Energy Agency
IGD-TP	Implementing Geological Disposal of Radioactive Waste Technology Platform
IMI	Internal Market Information System (of EC)
IRSN	Institute de Radioprotection et de Sûreté Nucléaire in France
IST	Instituto Superior Técnico (TU in Portugal)
JRC/IET	Joint Research Centre/Institute for Energy and Transport
KSC	Knowledge, Skills and Competence
LLL	Lifelong Learning
LO	Learning Outcome
MoU	Memorandum of Understanding

NFIL	Non-formal and Informal Learning
NKM	Nuclear Knowledge Management
PETRUS	Programme for Education, Training and Research on Underground Storage (network)
PETRUS II	Towards a European training market and professional qualification in geological disposal, FP7 project
PETRUS III	Implementing Sustainable E&T Programmes in the field of Radioactive Wastes Disposal
RD&D	Research, Development and Demonstration
SAG	Senior Advisory Group (of EHRO-N)
SAT	Systematic Approach to Training
SCK•CEN	Belgian Nuclear Research Centre
SecIGD/SecIGD2	Euratom FP7 projects funding the IGD-TP Secretariat activities
SET-Plan	Strategic Energy Technology Plan (of EC)
SRA	Strategic Research Agenda (of IGD-TP)
STEM	Science, technology, engineering and mathematics studies
StrAP	Strategy and Action Plan for Competence Maintenance, Education and Training (D3.2 report)
URC	Underground Research Centre
URF	Underground Research Facility
URL	Underground Research Laboratory
ToR	Terms of Reference
TRL	Technology Readiness Level
TU	Technical University
VET	Vocational education and training
VNIL	Validation of Non-formal and Informal Learning
WMO	Waste Management Organisation

List of Contents

1. Introduction

The Implementing Geological Disposal of Radioactive Waste Technology Platform (IGD-TP) community according to its vision (Vision 2025) aims to proceed to obtaining licenses to construct and to operate deep geological repositories for spent fuel, high-level waste, and other long-lived radioactive waste in their respective Member States.

The IGD-TP's vision is that by 2025, the first geological disposal facilities for spent fuel, high-level waste, and other long-lived radioactive waste will be operating safely in Europe.

IGD-TP's commitment related to this "Vision 2025" is to:

- build confidence in the safety of geological disposal solutions among European citizens and decision-makers;
- encourage the establishment of waste management programmes that integrate geological disposal as the accepted option for the safe long-term management of long-lived and/or high-level waste;
- facilitate access to expertise and technology and maintain competences in the field of geological disposal for the benefit of Member States.

In 2009 a technological platform was launched in Europe to promote the sharing and pooling of resources to carry out jointly research, development and demonstration activities that are needed to address the remaining scientific, technological and societal challenges in deep geological disposal. This European wide cooperation was established by producing a common shared vision for the technology platform stating that the IGD-TP's vision (Vision 2025) is that by 2025, the first geological disposal facilities for spent fuel, high-level waste, and other long-lived radioactive waste will be operating safely in Europe (5). The vision was supported by three commitments. This vision led to the formulation of a Strategic Research Agenda (SRA) (6) and its Deployment Plan (DP) (7).

The commitment of the IGD-TP's founding organisations to the Vision 2025 includes developing joint means to facilitate access to expertise and technology and maintain competences in the field of geological disposal for the benefit of the European countries. The vision and commitments are shared by the organisations applying for participation in the IGD-TP.

The Working Group on Competence Maintenance, Education and Training (CMET), whose activities have provided the inputs for this report, was established in 2012 to address the Cross-Cutting Activity (CC2) on Competence Maintenance, Education and Training identified in the IGD-TP's SRA. The CMET working group has been supported under the EURATOM FP7 project grant no 323260 SecIGD2[12] and with a direct contribution from the IGD-TP Executive Group members during 2013-2015. This document is a deliverable under the SecIGD2 project's Work Package 3 "Support for the development, implementation, and coordination of CMET, Task 3.2: Studying the feasibility of an informal or sector internal accreditation body within the IGD-TP for approving learning outcomes, which can then be applied to the various existing training schemes and concepts in geological disposal in Europe".

The purpose of this document is to address the potential feasibility of an informal or sector internal accreditation in geological disposal. This topic falls under one of the CMET group's four objectives as stated in the group's Terms of Reference (see D3.2 deliverable report (8)). This D3.4 deliverable report on the implementation feasibility is the result of the discussion and actions carried out by the IGD-TP and Working group on Competence Maintenance, Education and Training (CMET). The contents of this report represent a combined view of the CMET working group members (**Appendix 1**) during the process and the final conclusions are those of the authors.

[12] Secretariat of the Implementing Geological Disposal of Radioactive Waste - Technology Platform, phase 2, e.g. www.igdtp.eu

2. Background to recognising knowledge, skills and competences

2.1 European developments leading to European Union wide recognition of professional and competence-based qualifications

European Union in response to the challenges it faces in terms opening up its internal market and enhancing the competitiveness of its industries and employment markets has implemented and continues to implement measures to remove the barriers to internal market. The structural barriers related to the recognition of qualifications or other attestations of competence slow down the free movement of graduates and labour force in general from one member state to another. At the same time, Europe undergoes major structural and demographic changes and is recently impacted with the migration of peoples from outside the Union either due to military conflicts or global climate change induced unfavourable living conditions. A new challenge is how the professionals coming from outside the European Union can demonstrate that they meet the level of common European training frameworks necessary to pursuit a profession in a European Union Member State. This can be addressed with the new amendments of the internal mechanisms related to professional qualifications.

European agreement mechanisms for mutual recognition of professional qualifications and validation of non-formal and informal learning are continuously developed and latest changes were included in 2013 (4) as amendments to the Directive 2005/36/EC on the recognition of professional qualifications (3). Further the approaches are intended to improve the quality of learning and qualifications and to reduce overlapping learning requirements in a labour market environment requiring lifelong learning and reskilling of labour force at a quickened pace. An agreement based approach is included into the directive to complement recognition of non-regulated professional qualifications. The directive recognises that national frameworks for regulated education and training are of national subsidiarity and that the European wide common training frameworks sets only the minimum KSC necessary for the pursuit of a specific profession.

The various European policy efforts directed by DG Education and Culture (EAC) already implemented in both higher education and through the directive amendment also for other professions, aim to lower the mobility barriers. The overall framework is first provided by the European Qualifications Framework (EQF)[13]. EQF makes the different national education and training framework levels comparable with each other and it consists of eight levels and is currently compatible with the Unesco ISCED classification 2011 for educational programmes and educational attainment (9).

For education leading to a diploma, the main mechanisms are the Bologna process[14] and the Copenhagen[15] process.

The focus in the Bologna process that is applied in the context of the European Higher Education Area (EHEA[16]) context is: the introduction of the three cycle system (bachelor/master/doctorate); a strengthened quality assurance and an easier recognition of qualifications and periods of study especially for those who pursue higher education diplomas[17] that include e.g. a study period in another EU Member State.

The Copenhagen process, launched in 2002 is applied in the context of vocational education and training (VET). The process aims according to the Declaration of the European Ministers of Vocational Education and Training, and the European Commission to improve the performance, quality and attractiveness of vocational education and training (VET) through enhanced cooperation at European level. The process is based on mutually agreed priorities that are reviewed periodically. ECVET[18] is one of the tools resulting from the Copenhagen process. More discussion about ECVET is included into the following chapters of this document.

[13] https://ec.europa.eu/ploteus/content/descriptors-page
[14] http://ec.europa.eu/education/policy/higher-education/bologna-process_en.htm
[15] http://eur-lex.europa.eu/legal-content/SK/TXT/?uri=URISERV:ef0018
[16] http://www.ehea.info/members.aspx
[17] Diploma = An official document, issued by an awarding body, which records the achievements of an individual following an assessment and validation against a predefined standard. (CEDEFOP 2008)
[18] http://www.ecvet-team.eu/en

One more European wide resource contributing to the transparency mechanisms is the ESCO[19] database occupations, skills/competences and qualifications in addition to the national databases and information resources. Such listings from the Member States will need to be notified to the EC and to the other Member States also in connection with the adaptation of the Directive 2005/36/EC amendments made in 2013.

Language skills still remain a mobility barrier, (10) and (11) that should not or cannot be removed from the professional context. The current recognition scheme under the Directive 2005/36/EC requires from a professional the knowledge of the language/s necessary to pursuit the profession, but without making the language requirements an unjustified barrier. It is thus necessary to know either a Member State official or administrative language providing it is also one of the official languages of the European Union. If the profession may endanger the safety of e.g. patients, the requirement can be set on a corresponding level that is generally higher than for other types of professions. Language skills of the graduates are promoted by providing for student exchange opportunities to another Member State.

The EC educational policies are responding to the ways in which the individuals' learning is in a rapid change. New ways to access knowledge, skills, and competence are increasing with the help of digitalisation. More and more different types of learning resources are available for access via mobile networks and broadband. The web search tools enable a wide access to different type of resources stretching from data and information to wider knowledge bases. Scientific data bases can be accessed also easily via the web either from one's one access tools or via public libraries. Open access to data, information and knowledge created with public funding is enlarging these opportunities on a continuous basis. Open eLearning resource development is also increasing among the education and training providers in the community. Database are set up to provide information on European wide education and training courses in the nuclear field (incl. radiochemistry, radiation protection and radioactive waste management, too). On the global scale, in the nuclear sector, the IAEA nuclear knowledge management (NKM) section is providing eLearning platform and document sharing system accesses for interested community members to develop shared training courses and information storages.

In this new environment also the role of the educational and training institutions can and will change. Changes will reflect on how students and professional will learn, what is the role of qualifications and the way of attaining them in the future, what will be the role of educational institutions and training organisations, how are the end-user organisations going to be impacted by these changes. The education and training providers are challenged to address these changes, too.

Taking into account the increased opportunities for informal learning and skills acquisition, competence-based qualifications can be efficiently supported by the development of mutual recognition mechanisms also for the validation of non-formal and informal learning (VNIL). These are currently endorsed by the European Union policies for easier mobility, mutual recognition and higher quality of education and training i.e. learning in Europe. The Directive 2005/35/EC addresses for example a common training framework meaning a common set of minimum knowledge, skills and competences, the attainment of a European Professional Card by individuals for pursuit of a profession in a Member State, and the ability to participate in standardised aptitude tests to attain such a card if e.g. the regulated education or training does not fully meet the formal qualification requirements, but the individual is in possession of the required knowledge, skills or competences (KSC).

With the development and piloting in the European Union on implementing the ECVET as an approach to recognise learning accumulated by individuals the attainment of knowledge, skills and competences can become more transparent. A need to make these more transparent requires also an acceptance mechanism. For this aim it is foreseen the European Commission may require[20] within few years (2017) each Member State shall have a system in place that can be used by individuals to have their NFIL recognised, too.

[19] https://ec.europa.eu/esco/portal/home?resetLanguage=true&newLanguage=en#modal-one

[20] information received at the Workshop on Qualifications for Nuclear Decommissioning in Lisbon (Portugal) 6 – 9 October 2015, organised by JRC Petten, Institute for Energy and Transport together with ECVET Team in Brussels.

2.2 Relevance of the developments to geological disposal

The generic demographic challenges taking place in Europe are also adversely impacting the geological disposal community as a part of the nuclear energy sector. Among the most influencing changes is the availability of new staff, which is influenced by the fluctuating interest of young people for science and technology studies in general. Even though the attractiveness of science, technology, engineering and mathematics studies (STEM) is varying, the total number of STEM students in the 2000's has been decreasing. Many sectors in the society compete for the STEM graduates also sectors not requiring a background in STEM studies. Sectors like finance and insurance are also looking for STEM students. This means that less human resources will be available not only for the industry, authorities and research organisations but also for the academia (12, pp. 56-63) and (13, p.16).

In geological disposal, RD&D started around 40 years ago and the experts at that time, who entered the field were bright young minds come from various disciplines. The majority of the experts' basic education disciplines were from physics, chemistry and geosciences. They were challenged with the multidisciplinary research questions and multitude of open issues about the processes, phenomena, events and features taking place around the nuclear waste issues and about the safe solutions to handle this long-lived dangerous waste. The different safety concepts of geological disposal emerged and the expertise of the people in the field increased over the years within their naturally multidisciplinary work context. Today they are in leading positions in the industry (if not yet retired) working more with a broader view related to the matters in geological disposal.

European Union level

The European policy developments are influential in the nuclear field in addition to the policy developments in education, training and professional qualifications. Three major European Council Directives have been approved in the recent years. The directives influence the geological disposal community directly despite the subsidiarity of the Member States in the legal educational framework and its requirements. The directives are

- Council Directive 2011/70/EURATOM[21] (4) also clearly states “ultimate responsibility of Member States for the safety of spent fuel and radioactive waste management” includes requirements on expertise and skills including arrangements for education and training (Article 8) ("Waste Directive")
- Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations amended by the Council directive 2014/87/EURATOM of 8 July 2014 includes requirements on expertise and skills including arrangements for education and training (Article 7) ("Nuclear Safety Directive")
- Council Directive 2013/59/Euratom[22] laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation ("BSS Basic Safety Standard").

It can be noted that in addition to certain licensing requirements, each of these directives requires that Education and/or Training (E&T) is available and provided for the personnel working in the organisations engage with nuclear and ionising radiation. The most descriptive of the directives is the BSS in its Articles 14-18, where the general E&T requirements in radiation protection for specific tasks (including emergency workers) and the recognition of listed professionals are explicitly stated. One could consider this in reflection with the requirement of the Directive 2005/36/EC that resulting from education and training arrangements a common set of minimum knowledge, skills and competences (KSC) necessary for the pursuit of a profession in the nuclear field should be attained.

In connection with the SET-Plan[23] an assessment report on education and training was prepared and the recommendations were published in the SET-Plan Education and Training Roadmap (14). The

[21] COUNCIL DIRECTIVE 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, OJ L199/48-56

[22] Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom

[23] European Strategic Energy Technology Plan COM2007(723) https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan

recommendations for the energy sector and for the nuclear energy field in both reports are in alignment with the general EU educational policies.

Geological disposal community and IGD-TP level

Today's challenges regarding the nuclear energy sector's human resources have been identified in various international events and reports of European and international organisations (e.g. OECD/NEA (15) and EHRO-N (12)). They include many general challenges related to the demographic developments in the European countries and specific challenges related to the nuclear energy sector; both which apply to the management of nuclear waste, too. The following recaps some of these general and nuclear waste management and geological disposal specific challenges.

The geological community itself is small. In a small community pooling resources and working together are the main means of creating critical number of learners and also of learning providers. This cooperation is faced with several challenges where the new technologies will partly assist in overcoming the barriers.

The in-depth expertise related to the interfaces and interactions between different disciplines may be dwindling due to retirement of those experts who have developed their knowledge since the start of the first concept developments for safe passive disposal of high-level nuclear waste and spent fuel. More expertise and personnel in nuclear waste management is available in the management of Low and Intermediate Level Waste and decommissioning of facilities. In this area of activities, the demand is likely to increase in the near future due to some countries energy policy changes. How can the interest for the future jobs in the industry be maintained if there is less interest in new build and more on dismantling? What was considered as a nuclear renaissance has turned to a sunset industry in a very short time period in several European Member States.

The structural industry changes in energy industries using fossil fuels are also a source of concern for employment and re-skilling. Other more active sectors of the energy industry are looked at as a potential employment market. If a sector has well defined the needed learning outcomes then the re-skilling of those no longer unemployed in an adjacent energy sector is likely to be faster.

Over the years many open RD&D issues have been answered as identified in preparing the IGD-TP's SRA. The new challenges are more and more related to the implementation of geological disposal i.e. large scale demonstration in-situ and further the cost effective development of industrial type solutions to operate the repositories. More people are continuously entering the industry; some are recent graduates and other more experienced professionals from other industries. The functions and jobs have become more specialised, but the multidisciplinary nature of geological disposal requires a good understanding of the interactions between the different disciplines. This is at the core of the "nuclearisation" (15) of a professional in geological disposal.

IGD-TP was established to enhance the cost effectiveness by pooling resources, too. In competence maintenance, E&T funding solutions are a major question for European wide cooperation. Financial constraints require solutions and call for cooperation. The cooperation in E&T provision is partly restricted by language barriers. Further the different interest levels for E&T content are influenced partly by the different stages where the programmes find themselves in. Also the different repository concepts and national regulations regarding geological disposal have an impact. Required human competencies change as the waste management organisations (WMOs) move from a selected site to a safely operating repository. The supply of highly competent personnel is integral to the development of cost effective industrial schemes and to the continued improvement of safety of repositories and related nuclear facilities.

The current personnel who have been employed less in the industry have more diversified backgrounds and their jobs tend to be more focused fewer discipline areas. Due to increase in the number of more functions and depth of expertise required for implementation of the repositories, for the number of tasks larger numbers of staff are needed. The expertise levels required in the functions are more specialized than before.

Traditional research questions now need to be turned into engineering solutions. The challenge is to maintain the awareness of the constraints and requirements coming from the earlier RD&D knowledge that has produced the bases of requirements that now have been formulated into the engineering solutions. However, there is no longer such a long time for the personnel to learn the various aspects in geological disposal, neither is there such a chance to learn over such a long time period the wider

multidisciplinary understanding of the nature of geological disposal. The wish is in a shorter time to increase the confidence in the quality of the diverse learning paths to ensure that they produce the required learning outcomes. The systematic approach to training quality assurance contributes not only to the confidence in the quality of the human resources at the implementers and other personnel working in the geological disposal community. It also provides the evidence that the licensing authorities need so that they can be confidence in the implementers human capability to implement safe geological disposal and about their own oversight competences.

Education and training provider level

A universal challenge of the education and training developers in nuclear and geological disposal relates to the cost of E&T infrastructures and general funding of the practical E&T activities. Universities and educational institutions are demanded to collect more external funding to support their activities and sometimes the different intellectual property right policies of training providers and their external funding sources can differ. This can also delay in some cases the speed to market of new knowledge i.e. the time in which the new research results are used as the basis of new teaching.

Hands-on learning and research however, needs to be carried out in large scale facilities supported by eLearning of the actual knowledge base. Learning in nuclear requires also large simulators and geological disposal requires the opportunities to work in underground research facilities. These facilities can be complement with the web learning unless even they can be replaced with virtual simulation tools (e.g. the Frauenhofer Institute[24]'s Virtual Lab for nuclear waste repository research) and with 3D learning environments. For the full-scale hands-on E&T opportunities, several of the underground research facilities like Äspö HRL in Sweden, Mont Terri and Grimsel in Switzerland, Josef URC and Underground Laboratory in Czech Republic, and Hades in Belgium are available as full-scale underground learning environments.

In all of the above areas, novel approaches, and resource and competence sharing related to the learning provisions are needed. Today, the information is much more available for the students (including internet, social media, research databases, eLearning courses) at any place on anytime and knowledge acquisition is supported by these new means. A smart student learns independent of teaching. Not necessarily only a traditional route to education and training is needed by attaining a diploma, but one can attain the knowledge by coming from any background (and at any age). Tutoring may still be required to ensure that the understanding and application of that knowledge is correct.

Several good practices have resulted already from the European and national cooperation. The ENEN association member universities provide education in nuclear field on the widest scale. In addition, training provision in terms of volumes seems to take place in the United Kingdom by universities (Dalton Nuclear Institute[25] since 2004) and by independent consulting companies. In the UK the nuclear sector training is also supported by the training and recognitions provided by the National Skills Academy for Nuclear[26]. Further active training providers are in France (CEA Saclay[27], ENSTTI[28], IRSN[29] and the universities especially the Ecole de Mines' both in Nantes and Nancy[30]) and in Belgium (SCK•CEN[31]) especially in radiation protection. Germany has also initiated a national co-operation for competence development between universities and also in cooperation with the Commission's Joint Research Centre. A full-time Master in Environmental Sciences and Radioactive Waste Management is available at TU Clausthal in Germany. The nuclear and radiogeochemistry group has established a new education & training network and they share e.g. content developed by network partners via Wikispaces[32] for use of all in the network and have a Moodle-based eLearning platform for the members' use. IAEA has also provided two forums, the Moodle based CLP4NET and the CONNECT Sharepoint application for training modules. Top ranked universities on the contrast are

[24] https://www.fraunhofer.de/en.html
[25] http://www.dalton.manchester.ac.uk/
[26] http://www.nsan.co.uk/
[27] http://www-centre-saclay.cea.fr/en/Employment-and-training
[28] http://www.enstti.eu/
[29] http://www.irsn.fr/EN/Research/Theses-post-docs/Pages/Theses-and-post-docs-1703.aspx
[30] see PETRUS network for details at www.enen-assoc.org pages
[31] https://www.sckcen.be/en/Education_training/SCKCEN_academy
[32] European Network on Nuclear and Radiochemistry Education and Training (European NRC Network)

offering voluminous distance learning (MOOC[33]s) via fully fletched videoconferencing studios circling the tutor with widescreen screen access to participants resembling more a primetime talk show on television than a traditional classroom.

In this environment of opportunities commercial training providers continue to have challenging times in recruiting sufficient number of participants to their training courses even though the training fees would be close to an "at cost basis". This lack of financial means does not only apply to commercial training, but also to publicly supported training courses that are not fully subscribed, since just the travel and accommodation costs are out of reach for many potential participant. At the same time the new ways of accessing learning are competing with traditional offering.

Sharing with and from good practices of other European initiatives in human capital development, competence maintenance and education and training (especially EHRO-N, PETRUS II as referred to later as the case examples) has been included into this report content as inputs, but a lot of work still remains to be done as addressed in the discussion part of this report.

3. Potential application of ECVET as a starting point for training development and mutual recognition of professionals in geological disposal

3.1 Introduction and benefits of ECVET in the different stages of geological disposal

Achieving a sufficient number of human resources European wide that possess the desired learning outcomes is a main favourable driver for promoting the mobility of the professionals in the geological disposal community. Several European instruments enabling this are now available.

CMET Terms of Reference (ToR) identified the "Quality assurance of training for professionals with the support of a voluntary accreditation scheme" as one of its main objectives. The group discussed and initiated activities on this objective since its first meeting. In addition to that the chair of the group and some other members of the group have participated in both the training related to the implementation of ECVET for the nuclear sector and worked with the identification of the relevant job profiles, KSC and qualifications required in the nuclear field. JRC IET[34] has been instrumental in organising these workshops.

With its input the CMET group wished to contribute to the quality of and confidence in the professionals' Knowledge, Skills and Competence (KSC) and of professional training in geological disposal. Further there was a desire to collaborate in establish high quality learning opportunities; formal or informal and to promote setting up voluntary accreditation scheme/s for geological disposal, targeting accrediting both for an individual's learning outcomes and for training programmes leading to specified Learning Outcomes in geological disposal. Also the need for the documentation of the KSC needed at the different stages of the repository development was seen to help in maintaining knowledge about the learning outcomes including KSC in geological disposal with the target to prevent the loss of capabilities. In hindsight, the ambition for the group with only resources available for the supporting work of the group was too high to be obtained during 2013-2015. The approach will help in formulating suitable training programmes for each stage based on prior learning in the geological disposal community.

An ideal would be to compile the content of training i.e. a type of "curriculum or curricula" for professionals in geological disposal for pooling joint training efforts or alternatively engaging educators and trainers to address the IGD-TP's RD&D work's education and training (E&T) needs and potentially wider the KSC needed at all stages of repository development. Identifying the current state of curricula that have already been developed for geological disposal is required and information on this was collected by the CMET group. Mapping their content in relation to the generic stages of repository development identified in the SRA 2011 (6) is the next towards this objective. Work is currently continuing in other European initiatives, but it is not directly related to geological disposal.

[33] Massive Online Open Courses
[34] Joint Research Centre Petten, Institute for Energy and Transport

Stages of repository development

	Generic studies and concept development	Selection of host rock & site	Technology development and repository design	Technology development and repository construction	Industrial-scale manufacturing and repository operation
Safety strategy and methodology	Development of safety assessment methodology	Application of methodology in safety case and improvement of methods	Application of methodology in safety case and improvement of methods	Application of methodology in safety case	Application of methodology in safety case
Long-term safety: Scientific and technical basis	Broad-based research	Research narrowed to deal with host rock-specific aspects and specific aspects associated with the selected EBS	In situ experiments and improvement of data bases and understanding	Scientific work sharply focused on small number of residual issues, large-scale in situ experiments and component tests	Confirmation studies on components under site conditions incl. monitoring
Facility and component design	Concept variant studies	Repository design concepts adapted to specific rock type	Component design and layout design Operational safety studies	Full-scale prototypes constructed Industrial scheme developed	Full-scale production and operation
Site-related characteristics	Surveys of potential host rocks and their characteristics based on available information	Host rock characterization and site-specific studies	Detailed site characterization Excavation	Construction of main underground facilities Confirmation of rock properties for final design	Construction, confirmation, monitoring

Figure 1. Stages of repository development from IGD-TP SRA 2011 (6, p.16). An example of changing needs with increased level of technology readiness (TRL).

For geological disposal all jobs are not necessarily encompassing a job profile to which one can be trained to, but several careers in geological disposal consist of various functions. The job functions change and evolve as the repository programmes progress i.e. move from one stage to the next as described in **Figure 1**. Thus various "curricula" can be formulated for the different stages for the individual specialist areas like the "Safety Case" KSC needs. The stages of repository development provide a good overall framework for highlighting the different needs and their evolution. Not everyone has to be educated in the same topics at the same level. The knowledge can be generic versus stage- or country-specific knowledge or be WMO's "in-house" knowledge (i.e. specific site, waste container specific). All of this can start from building on existing knowledge / experience / frameworks rather than to develop new structures or approaches. This suggestion was made by the CMET group during its first meeting to work according to a common co-operative European approach.

The units of learning defined for geological disposal also need to take the different needs of the stages into account. One can also consider the different stages of repository development to correspond to the different technological readiness levels (TRLs) towards implementing geological disposal. For example, conducting the work for a safety case (e.g. 16 & 17) has the same elements in all of the stages of the development, but the level of knowledge, skills and even competences changes from a more general/generic view to specialist work related to a specific technical or scientific discipline. And at the same time as the waste management programme advances, the need for interaction and for understanding the complex couplings between the different components of the safety case increases.

Other functions or jobs are, on the contrary, specifically related to one stage of the geological repository development, such as “component design and layout design” in the technology development and repository design. In such a case, the units of learning should provide the individual knowledge, skills and competences that are relevant to different projects and organizations and can be transferred across the borders, contributing in this way to the mobility of skilled professionals. The two examples show as the units of learning need to be thoroughly defined in the broad perspective of the repository life cycle and to respond to the needs and work practices of different organizations.

The CMET group outlined in its discussions what would need to be undertaken for all of the functions, topic areas and sub topic areas that they thought would be required for a successful delivery of a geological disposal programme over time. Such a time and resource consuming undertaking once

assessed against in house KSCs and any KSCs already available to a country or WMO would serve to highlight any KSC gaps or shortfalls that exist either to an individual country or WMO, or to the wider IGD-TP community. The KSC can be accessed e.g. through academic interaction or link or be included in the supply chains.

Discussions were then held concerning the timing of the requirements for certain KSCs related to the various topic areas discussed above. For example the KSCs required for 'Site Characterisation' will pass through a hiatus at the point that a national programme or WMO has a site and needs to characterise it. The key consideration acknowledges that the KSCs' requirements differ from topic to topic depending on the stage in which a WMO is with their respective disposal programme.

For developing quality assurance of training aimed at new and experienced professionals in the field of geological disposal the scheme was derived from the European Credit system for Vocational Education and Training (ECVET) system (18 &19) initiated by the Copenhagen process and already applied in the EFTS projects of Euratom. NFIL requires developing quality assurance procedures and criteria for the voluntary accreditation of training (and education) for the geological sector.

The CMET worked on carrying out a feasibility study for an accreditation scheme for NFIL that could be undertaken and applied to the formal setting as described in this document.

The first discussion in the meeting no 1 (subgroup 2) addressed the topic "voluntary accreditation" with the aim of providing as a final result preliminary guidelines for the accreditation scheme. The group recognised that the accreditation concerns the employer, student, and training provider organisation/s as target groups.

Main questions were about **how to implement a voluntary accreditation scheme** and the following points were emphasised. The discussion emphasis was on the recognition of a training programme, not on the recognition of an individual professional.

- It suggested that the training courses falls under one organisation for training i.e. a platform or an umbrella. A network of institutions working together on common accreditation process seems to be more efficient and should implement the related ECVET system for certification.
- The learning outcome process needs to be linked to this platform and some harmonisation is advisable, in order to satisfy a specific job profile or set of units of learning in geological disposal. Operationally, it is believed that a system should demonstrate that an adequate structure exists for analysing the training programme but harmonisation of goals/learning objectives and terminology meanings need still to be fixed.
- There is also a need to identify the national terminology and approaches related to the EQF and ECVET. A recent monitoring report by CEDEFOP[35] has addressed the progress in this area in the European Member States (18) in support of this action also a common terminology has been produced by CEDEFOP.

Further the implementation includes providing all courses under one organisation for training i.e. platform and setting up a network of institutions working together on common accreditation process by mutual agreement. The ECVET system would then be applied for certification of training for which the ECTS credits could not be applied. A prerequisite is also that the learning outcome process needs to be linked to this system and there is a need for some standardization. The learning outcomes need to satisfy some specific job profile or function's needs.

The operational requirements for such a system are; it needs to demonstrate that the adequate structure exists for analysing the training programme (standardisation and terminology meanings need to be fixed). I.e. an agreed taxonomy of KSC for the geological disposal sector exists. In addition European level common terminology needs to be applied and the national concepts related to the EQF and ECVET need to be addressed in terms of compatibility.

On the European level a proposal has been made to EHRO-N to look for an open access database that could include on a voluntary basis the work already done on defining the learning outcomes in terms of KSC and further used by all interested users and contributors to this work. The CMET group has followed JRC/IET and EHRO-N's developments in the nuclear sector related to ECVET and it taken advantage of their experience.

[35] CEFEFOP = European Centre for the Development of Vocational Training

The use of the ECVET system requires the definition of units of learning and related knowledge, skills and competence for each stage of the repository development combined with emphasis on the KSC needs of the Joint Activities. Currently the Joint Activity KSCs have been identified only within the FP7 DOPAS[36] project. If the accreditation approach would have been endorsed, then the next steps (outside the SecIGD2 project scope) could include:

- Accrediting or validating of the learning outcomes (LOs) or curricula produced and using the learning outcomes can be developed for geological disposal according to the ECVET principles.
- Producing the guidelines and models on the LOs from which to choose when designing training to meet the required LOs or refining the existing guides from other initiatives.

The main task identified in the discussions for the CMET to do was to identify the prerequisites related to the feasibility of a voluntary accreditation scheme for geological disposal using the ECVET system. For this purpose the ECVET system was looked at from the geological disposal perspective by members of the CMET group and this application analysis was presented at the NESTet13 conference (20). Much of this content is used as in following description.

The ECVET system was introduced as a voluntary approach in the European Vocational Training context as part of the Copenhagen process for a European wide piloting until 2014 (18) and several Member States already apply it in lower levels of EQF in vocational education and training (VET). The general objectives and the link to mobility, lifelong learning and mutual recognitions are described in **Figure 2**.

After the ECVET piloting also the Directive 2005/36/EC was amended with the Directive 2013/55/EU. When the description of work for the CMET group was produced in 2012, these developments did not exist. They have also produced new instruments that are potentially removing some of the challenges identified in this discussion about the feasibility of such a voluntary system in geological disposal.

The main impetus for the CMET feasibility study was the foreseen benefits for the geological disposal community and also for the wider nuclear and other industry sectors from having individual's learning outcomes recognised by the use of such a voluntary system.

[36] Demonstration of Full-scale Plugs And Seals (www.posiva.fi/en/dopas)

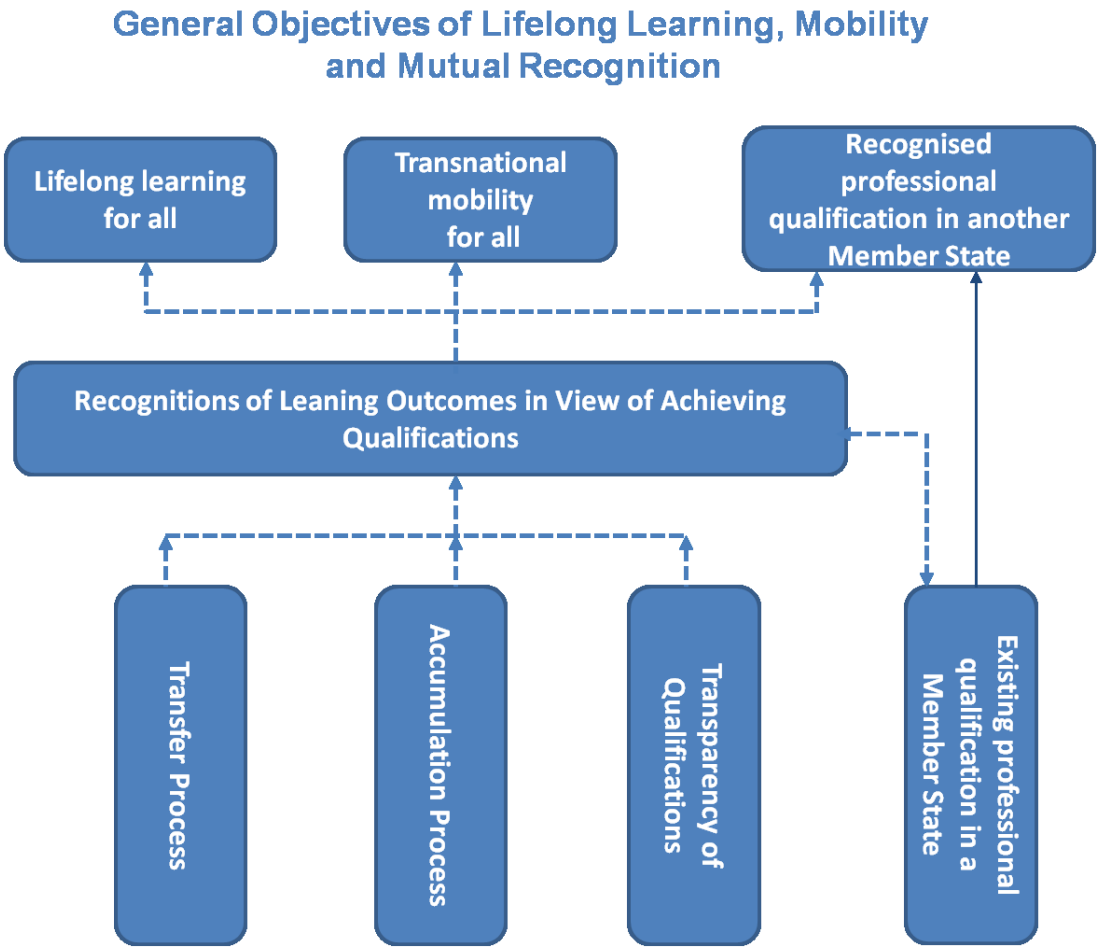

Figure 2. The general objectives of the ECVET system linked with the mutual recognition of professional qualifications. Adopted from the ECVET User Group 2012 (21, p.7).

The main reason for using ECVET system is to help in the development of a common understanding on standard job requirements to promote the mutual recognition of qualifications (19). Such benefits were identified in terms of the labour market, mobility and for flexible career pathways also in the 2012 ECVET Seminar for the Nuclear Energy Sector, see **Table 1** (22 & 23) that was initiated by EHRO-N.

The group saw that the ECVET benefits can also help the geological disposal community to overcome some of the main challenges related to the competence maintenance over the long timeframes inherent in the management of radioactive wastes. The challenges are presented in more detail in the Euradwaste2013 conference paper (10) by the CMET group members and in the SecIGD2 deliverable report D3.2 Strategy and Action Plan (8).

Table 1. Identified benefits from the use of the ECVET instrument (20 & 23). KSC = Knowledge, Skills and Competence; NIFL = Non-formal and Informal Learning.

Benefits of ECVET	
For the labour market in general	
	Competence gap analysis Training including on-the-job learning and mobility Mobility - higher safety culture Planning for the future needs
For the employer:	
	Enlargement of the recruitment area Broadening the Human Resources Management (internal flexibility) Mixed careers for young professionals (combining training and job)
For the individuals:	
	Enhanced career opportunities Intersectoral mobility Upward mobility and job rotation
For the education and training providers:	
	Fostering faster and improved employability of graduates and trainees
For mobility	
	Mobility of personnel at all levels Streamlining of human resources allocation to where needed Knowledge preservation about the needed KSC Tool for transparency, quality improvement and excellence Mutual recognition of KSC and qualifications Common assessment standards
For flexible pathways	
	Flexible pathways to qualifications Less overlapping training Faster way to qualification NIFL[5] can be assessed Harmonized terminology in use New perspectives on how to increase competence Recognition of learning (outcomes) acquired in various schemes Opportunity to be exposed to different cultures Access to different technical approaches

The role of the IGD-TP as a forum with authority on expertise could have if so willing also a significant role in the quality assurance of learning outcomes and their mutual recognition when provided with a developed implementation framework for such validation. A potential relevant body for the quality assurance of Learning Outcomes for such a system would naturally be the IGD-TP and more specifically it's Executive Group or a special group with the EG and EF mandate. As mentioned, the piloting of such a body was not carried out during the process as planned originally. IGD-TP EG responses are included in the Chapter 4 Discussion.

3.2 Application of the ECVET - units of learning and KSC and their development for geological disposal

The ECVET objectives (**Figures 2 and 3**) are both about transnational mobility and lifelong learning for all labour force in Europe independent of their status on the labour market or of their sector of work. In the core of ECVET is the recognition of learning outcomes in view of achieving qualifications. The ECVET contributes to these objectives by making the qualifications transparent, enabling the accumulation of learning outcomes and providing for a transfer and communication mechanism for the learning outcomes from one organisation to another and further from one context to another (21, p. 7).

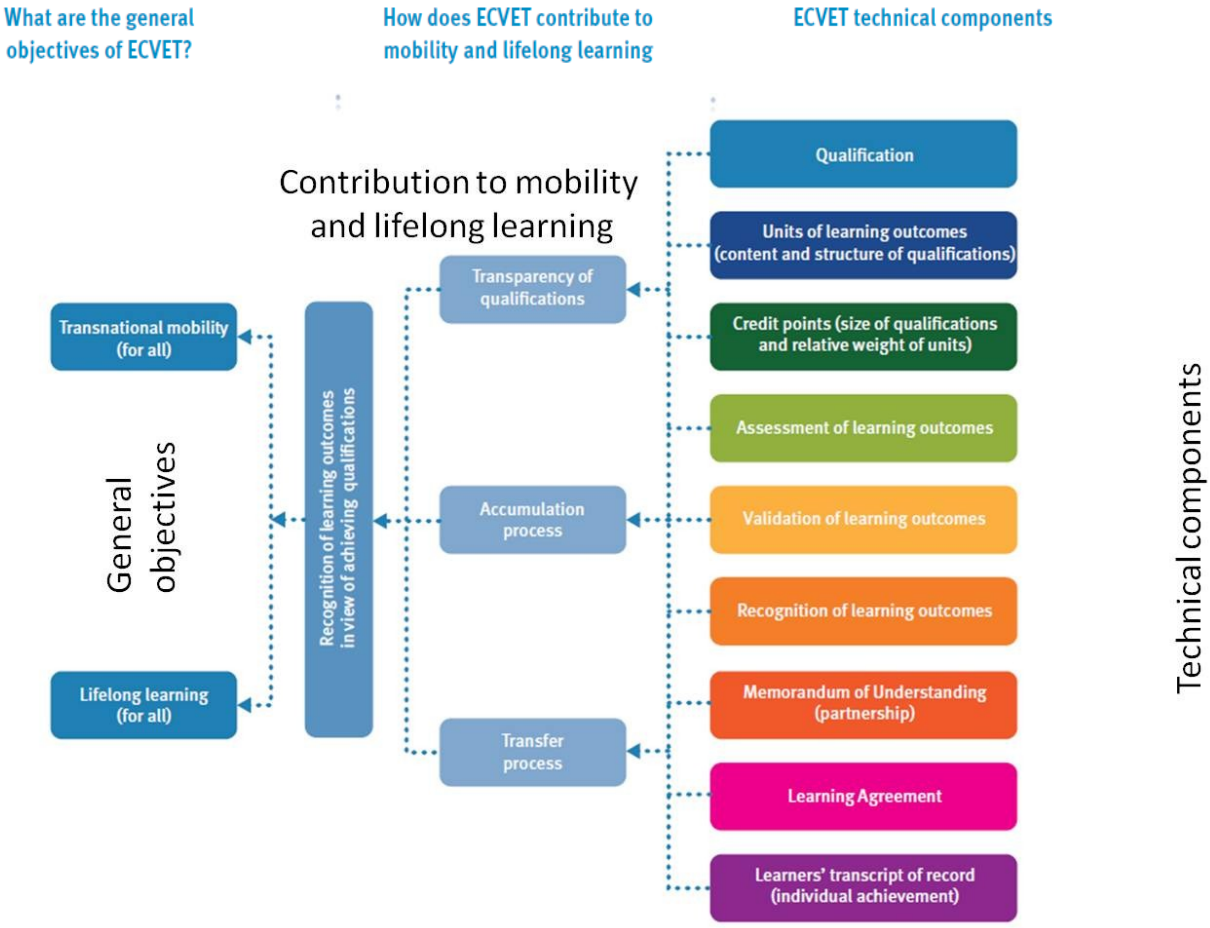

Figure 3: The ECVET objectives and technical components from ECVET User's Group 2012 (21, p.7). Using ECVET to Support Lifelong Learning.

The CMET feasibility study focus was to address also this gap with regards the validation and mutual recognition of the professional's learning outcomes using the ECVET system.

One emphasis in ECVET is that a person is able to reach the defined learning outcomes independent of the means by which one has acquired the KSC. Drivers to introducing the ECVET system have not only been the aim to have mutual recognition of vocational knowledge, skills and competence (KSC), but also motivating life-long learning of individuals by accumulating and recognising the learning they have acquired either by education, training, on the job learning, at free-time activities or as in the context of geological disposal in research and project activities. During the recent years, the ECVET system has also provided a good basis for piloting its use also on higher levels of qualifications in the European Qualification Framework (EQF) and especially on the EQF levels starting from level 5 to even to level 8 (Doctoral level) of KSC.

Since the implementation of ECVET system was still voluntary within the European Union until 2014, the main piloting of the system has been carried out within the educational system and apprenticeships and student exchange related to these in the VET levels. In some European Member States, the ECVET is currently and integral part of the national vocational education and training legislation like in Finland since 2015. The piloting was seen necessary due to the subsidiarity of the Member States regarding educational legislation. Regarding regulated professional qualifications, the Member States need to comply with the requirements resulting from the national adaptation of the amendments in Directive 2013/55/EU. Any bodies, national, sector specific or professional that could validate the learning outcomes of an individual that are not attached to a training or education provider does not exist yet. The approach and prerequisites of defining Units of Learning and the Knowledge, Skills and Competence (**Figure 4**) in geological disposal following from the ECVET are discussed in the following and in **Figure 5**.

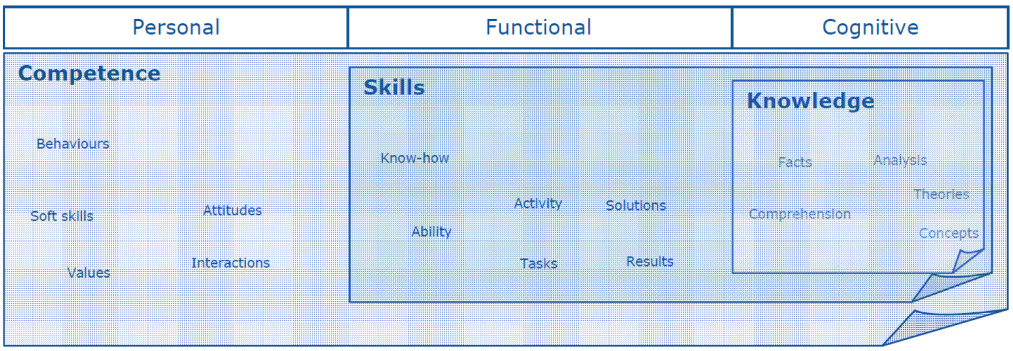

Figure 4: Content classification of KSC from EHRO-N Capture project report (19)

Under the ECVET, a Unit of Learning Outcomes (or unit) is defined as a component of a qualification, consisting of a coherent set of KSC, which can be assessed and validated. Before any KSC related to the learning unit can be defined, one needs to define the qualification level aimed at as an outcome of the learning. Under the European Qualifications Framework, qualifications are divided into 8 different levels. EQF levels 5-6 related to higher education qualifications like engineers at Bachelor level, the EQF level 7 relates to Masters and EQF level 8 relates to Doctoral Degrees. This is a simplified explanation of the levels and one should note that the levels are defined in terms of levels of learning mastered, not by a given degree even though in the national qualification framework context a specific level is often linked with a specific formal degree. The recent developments have also harmonised the EQF and the new ISCED 2011 (International Standard Classification of Education) levels used in the education statistics collection to correspond to each other (9).

After the qualification level for the units are defined, then the KSC related to this specific learning outcome is broken down using a suitable taxonomy. Within the nuclear sector ECVET pilots, first a specific job profile is described, which is an accumulation of the units of learning outcomes. The definition for the Knowledge is: Cognitive competence (occupational-conceptual), for Skill: Functional competence (occupational-operational) and for Competence: Personal competence (conceptual and operational), for more detailed definitions see e.g. reference (19). A taxonomy for nuclear was defined by JRC/IET, but it needs to be complemented to cover also geological disposal.

Subsequently, the development of the required qualifications in geological disposal starts by defining a basic educational level of a job. These qualifications are based on the national training/qualification frameworks defined by the national legislation regarding education and the issuance of diplomas for degrees. Depending on the maturity of the programme and national requirements further competence requirements are set either in the regulatory guides that in general state that according to the graded approach stricter requirements for competence are set for personnel dealing with tasks having a more significant impact on the nuclear safety than on tasks that do not influence nuclear safety. Meeting such requirements may also include taking training and passing the competent authorities exams. In addition, specific professions have requirements based on other national legislation than nuclear acts. For such positions, there are legal qualification requirements that need to be met by the job holder. Further professional associations and groupings qualify professionals according to certain criteria and state them competent within the national setting or among their peers. This is the type of voluntary accreditation of individuals and curricula that are based on the ECVET principles that was the model for the CMET action. Taking the competence requirement definition even further down the line, each nuclear energy organisation is able and often obliged by the authorities to set their own requirements for competence and training. Often it is easier to set the training requirements (24), as the methods of assessing the learning outcomes require more development work. Finally each individual staff member should address one's own development needs merely just from the point of view of the safety culture and to be able to contribute to the continuous improvement of safety and security. ECVET brings now a new perspective also to the Human Resource Management practices related to competence management.

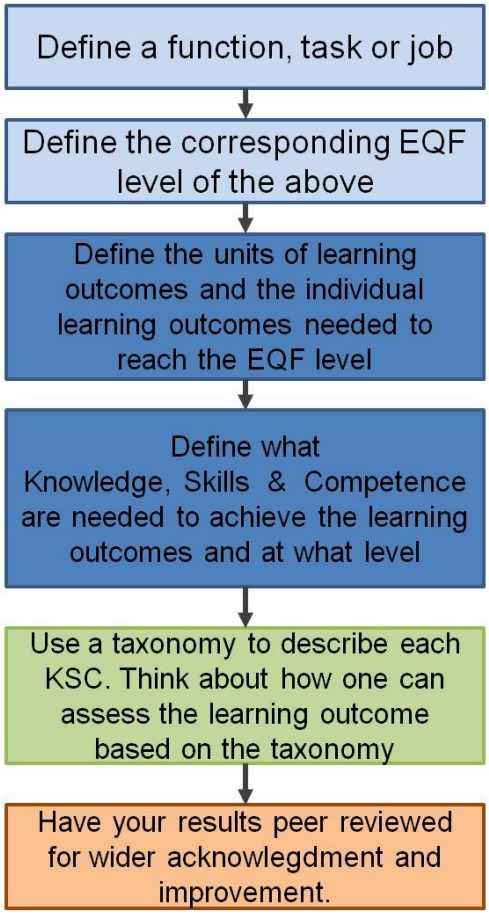

Figure 5. Schematic process (20) of defining the content of an ECVET based curriculum ultimately leading to e.g. to a certificate of attainment or portfolio of KSC like the EuroPass (and in the future the European Professional Card (3)).

In geological disposal, the number of job profiles is more challenging as at least prior the deep repositories are in operation. The personnel's job profiles consist of many different functions, which include often also knowledge and skills from different technical or scientific or cross-cutting disciplines. This makes a focus on the units of learning more attractive in the geological disposal compared with the wider requirements of a specific job profile. The needed job profiles can then be put together by each organisation needing them by accumulating the units into a full profile.

As a starting point for any pilot using the ECVET principles, the most feasible target is to focus on units of learning that have been used already extensively in some Member States, who wish to preserve the KSC and at the same time these units of learning could be applied in a Member State, which is taking its first steps towards the same stage of development. The process of formulating the KSC would provide for an ideal knowledge transfer, too.

The feasibility study for the voluntary accreditation looked at two points related to the ECVET objectives. First, how to provide for a voluntary accreditation of an individual's learning outcomes resulting in recognized and certified learning outcomes. Second, how to provide, following the ECVET principles, a quality enhancing voluntary accreditation system addressing the non-formal learning outcomes of education and training providers. In order to advance in developing a voluntary accreditation scheme within the geological disposal community, the issues related to the ECVET technical components or prerequisites for implementation that need to be addressed with practical solutions are listed in **Table 2**.

In addition to the ECVET technical components, several other solutions are needed like the actual accreditation body, the width of such a body's authority within the geological disposal community and the funding structure for the accreditation and the related attainment evidences or certificates

especially when the learning outcomes are acquired through informal learning and assessment of the learning outcomes against the set criteria need to be carried out by an accreditation body. The amendment of the Directive 2005/36/EC (2) on professional qualifications by the Directive 2013/55/EU (3) has now included tools for this like common training frameworks, aptitude tests and attestations of competence and also adaptation periods.

The further inputs to this work are described in Chapter 4, when the ideas and basis for the mutual recognition were consulted with the IGD-TP Exchange Forum no 5 in October 2014. The expected benefits were not share at a sufficient level to encourage future developments tackling the needed work. At this stage the feasibility of setting up a mutual recognition system or a relevant body with authority were not confirmed. Fortunate for the future development work, several other complementary initiatives on-going continue the development work. These are incorporated in the European Fission Training Schemes and in the work carried out in the ECVET workshops organised by JRC/IET.

The commitment of all stakeholders to the application of the ECVET system is needed. More communication and information about the different initiatives around it are needed, too. The practitioners themselves need more training and piloting of the different approaches and interaction between the pilots to meet the ambitious goal in the future.

Table 2. ECVET technical components to be addressed in developing voluntary accreditation /mutual recognition of Learning Outcomes in geological disposal. Adopted from (21, p. 7).

ECVET TECHNICAL COMPONENTS need for:	Voluntary Accreditation of an individual's LOs	Voluntary Accreditation of an ECVET training provider
Qualification	Yes. Recognition of mastery, but not a formal qualification (unless Directive 2005/36/EC applies). No requirement to have a home institution.	Not applicable. [Formal qualification of a legally recognized provider is outside the scope of voluntary accreditation.]
Units of learning outcomes (LO)	Yes, need to define tasks or functions in terms of EQF-level and KSC for the LO, for which the mutual recognition is sought. These definitions need to be approved by the geological disposal community.	Yes, production of units of learning corresponding to predefined KSC. Definitions should be universal for a unit of learning corresponding to an EQF-level. [Formal: For a degree full range of units of LOs is required for the desired EQF level.]
Size of qualifications	No (,but Member State legislation applies for regulated professions)	Yes. Weight of units or credit points for transfer between different provider parties are needed if included into the training provider's scope.
Assessment of LOs	Yes. Assessment criteria and demonstration of LOs needed See also validation.	Yes. Assessment criteria and demonstration of LOs needed.
Validation of LOs	Yes. An accreditation body needs to be set up or approved by the partners.	Yes. Done by an internal process, by MoU partners, or by an accreditation body.
Recognition of LOs	Yes. By the industry and institutions in the community and/or by training providers by signing an MoU.	Yes (see MoU).
Partnerships (MoU)	Yes. Wide coverage of partners to engage themselves in a MoU for voluntary approval of the recognised LOs.	Yes. Basis for transfer of the recognized LOs between various providers (a criteria for voluntary accreditation, too).
Learning Agreement	No	Yes, needed for exchange in the formal exchange between training providers or between a provider and a workplace.
Learner's transcript of record (e.g. Europass, supplement) or European Professional Card	Yes. A certificate needs to be provided of recognition of LO/s resulting from assessment => e.g. inclusion into Europass or European Professional Card for professional qualification .	Yes, provided by the training provider to the home institute and later into the Learner's transcript (achievements) and Europass CV. One example, the ENEN supplement to a diploma.

Legend: LO = Learning outcome, MoU = Memorandum of Understanding, KSC = Knowledge, Skills and Competence

4. Outcomes from actions addressing the feasibility

4.1 Exchange Forum no 5 presentation content and questions to the stakeholders

The CMET working group together with the PETRUS III project partners prepared a session for the IGD-TP's Exchange Forum (EF5). In the CMET meetings no 3 during March and April 2014, a set of questions was prepared (**Appendix 2**). Eight out of these nine question sets were direct inputs to the feasibility study. The questions were also posted on a web survey form for those participants of the IGD-TP unable to participate the EF5 session. Only two replies were received via the web questionnaire.

Prior the Exchange Forum the voluntary walkabout hosts met for a final briefing and for commenting the presentation given to the Exchange Forum at the 2nd day plenary as an introduction prior the walkabout (in **Appendix 3**, also published as a deliverable of the EF5 on the www.igdtp.eu). The presentation talked about the European level policy drivers, about the geological disposal community needs and about the ECVET system in general and gave instructions for the walkabout.

The walkabout is an interactive process first used for consulting the IGD-TP's SRA in 2010. In the walkabout a set of questions were posted on a flipchart and the participants of the session were divided to as many groups as there were walkabout stations. They were also given post-its to comment on the set of questions on each flipchart. These notes they posted on the station chart and then they discussed with the station host and with the other participants about the topics and asked for clarifications. After a specified time they changed to the next station until each group had provided input to all of the stations.

In total about 50 people of the EF5 participants joined the walkabout of the total 120 people who had signed up for the EF5. The main group missing from the actual walkabout was the IGD-TP Executive Group (EG) including the Secretariat due to another activity. Some of the EG members came to view the outcomes of the walkabout at the end of the session. The EG members were present at the preliminary reporting of the outcomes at the end of the Exchange Forum.

4.2 Walkabout session outcomes from EF5

After the walkabout, each station host produced a quick summary of the participants' responses to their station. A summary presentation (**Appendix 4**) was compiled for the afternoon's plenary from the walkabout hosts' summaries from each station and presented to the Exchange Forum audience. The participants' responses seemed cautiously positive towards the voluntary accreditation scheme even though many were unaware of the ECVET system and about accreditation in general. Part of the hosts mentioned that some participants were reserved in their views. Only couple of participants were directly against such a scheme and later it turned out that also the IGD-TP Executive Group rejected the idea.

The station results were collected and documented for further handling. The documented session's inputs were used for further discussions in the CMET group in both the CMET no 4 and CMET no 5 meeting. This assessment of the results took place in November 2014 with immediate feedback and continued with more detailed input in April 2015. The group members also highlighted the points that they considered most relevant as prerequisites for an acceptable recognition system. The walkabout session process is described in the SecIGD2 deliverable report D3.3 (25).

4.3 Assessment of the EF5 outcomes by the CMET group

The main responses by the stakeholders are included in the following text and complemented with the views of the CMET, especially the station hosts, who themselves did not submit replies in the walkabout. A total of nine CMET members were directly engaged in the commenting of the raw list of the outcomes, the others discussed during the meetings. The walkabout station questions are shortened in the text but the full question set is available in the **Appendix 2**. The compilation produced in the following may contain some inaccuracies in terms of the number of individual responses but the scope of the answers is correct. The intention is to highlight the main views and concerns and the readiness to embrace a voluntary accreditation scheme.

1 Do we need an accreditation system for geological disposal?

Ten identifiable replies where received, mainly the following statements were given by single individuals:

- The accreditation system should be for all professionals working in the area of geological disposal and especially for **companies selling services** to geological disposal.
- The main motivation identified is the recognition of the training courses developed under the Euratom projects. The accreditation or mutual recognition **enables comparability** between the different E&T providers.

The CMET group agreed with the statement that the **system should be for all professionals working in the area, the main group benefiting from it would however be new entrants to the industry including recent graduates.** Also the main purpose for such a system would be **to ensure a minimum knowledge base.** This would increase the general credibility and **enhance public confidence** in the personnel working in this area.

Motivations for such a system would include the employee's willingness to show their skills and to enhance to continue learning. Overall the stance towards the need of such a system was more toward a positive view, but cautiously.

2 *Do you understand what ECVET is? What are your views about the (increasing) need for borderless mobility and lifelong learning in geological disposal and nuclear waste management?*

The ECVET **system was very new** to the audience of the Exchange Forum. Therefore some of the questions at the stations were found to be difficult to answer. The overall view was that **mobility of the professionals is needed** for sharing knowledge and skills and if there are means to promoting it, than it is a good thing. **Lifelong learning** in geological disposal was seen **as a must** for the professionals. The general position was that **European accreditation would be favoured**, but ECVET system was not familiar. The views regarding the acceptance were dependent on the way any system is going to be implemented.

Regarding the views on mobility, over half of the respondents stated that they think that **mobility is increasing**. About 10% were neutral about mobility trend. Mobility was seen favourable for international exchange and knowledge sharing.

3 What is the current competence maintenance approach used in your organisation? Do you have one?

Most organisations **have a competence maintenance and development system**. The level of the systems varies, in most cases the main actions are targeted to new recruits. The respondents conclude that any **new system** should be **compatible with the existing systems**. Several internal assessment methods for performance and competence are in use. None of them that were stated are based on the assessment framework presented in ECVET (LOs/KSC). The assessment takes place in most cases annually. Several measures for assessing competence were listed depending on the type of organisation in question, major differences were between companies and academia and research institutes. The outcomes of this question are also discussed in the SecIGD2 report D3.2 (8).

Would you prefer/require/push your staff to be accredited? Would you require accreditation from new staff on entry, if accreditation was available?
Once again, the preferences would **depend on the implementation** and also on the potential cost of such a system. The level of staff to which accreditation would be applies potentially would be professionals/experts. The requirement of accreditation would not be applied to new entrants.

Would you be willing to integrate or do you see benefits in integrating your current system into a European accreditation system?
The majority of those responding to this would favour **a system that could be integrated** to the current competence assessment/management system.

4 What are the appropriate approaches to find out/to measure/ to distinguish (objectively?) if someone has achieved a required standard of mastering certain KSC (Knowledge, Skills and/or Competence)?

The main means of assessing the required standard include looking at the work experience, work portfolio, education including the curriculum studied and references combined with in-person

interviews. Part of the respondents favoured the accreditation approach in addition to this more "traditional" approach.

In which areas is the definition of learning outcomes most urgently needed, and why?

The main competence areas identified included **safety case and its interdisciplinary application** and connections. **Environmental impact** about the site followed as the second most urgent, and the special knowledge related to geosciences, construction and operations, and also mathematics were identified. For skills: quality assurance, project management, good knowledge of English and interdisciplinary thinking were preferred. In the area of competences, the top competences were independent learning ability, consideration of the international framework, and team working.

5 What is your interest in having a voluntary accreditation for the geological disposal community?

The main interest was in **having comparison methods and standards,** since KSC are not equal in the different countries or programmes. In the long-run, accreditation was expected bring about good for confidence-building, for preserving knowledge, and for training new employees. But the system should be based on **voluntarism**. At the same time it was recognised that there are too many training courses in the European countries that cost a lot of money, but the skills achieved from them are valid only in the country where the training is accomplished.

What constraints do you see for such an accreditation system? What type of risks do you see related to an accreditation system, if such a system existed?

Main constraints identified include:

- the definition of learning outcomes, definition of criteria and disciplines
- cost and time required to implement and maintain an accreditation system
- ensuring consistency between companies and countries
- the level of accreditation targeted might not work (levels EQF 6-8).

Would you see the implementation of such a European system as a risk of decreasing the flexibility of your existing (staff qualification) system? (E. g. administrative burden?)
If such a system would be **compatible with a national scheme**, most respondents did not foresee a risk.

What suggestions do you have to overcome the constraints and/or the risks (including resource constraints)?
To overcome the constraints and risks the following was suggested:

- to define and standardise common outcomes
- have dialogue and flexible boundaries
- have a continuous integration of all parties involved
- accept certain flexibility into the system and have a broad system for KSC
- run first international pilots and create networks for them
- do a strong analysis on what already exists
- make the system complementary to existing qualification systems, since the degrees and their descriptions have already been harmonised in European practice (in academia)

Regarding these questions some respondents were not able to give an answer or did not wish to state their opinion and were reserved in their responses.

The *Question 6* was about the needs related to the stages of the repository development that would benefit from the CMET actions. Unfortunately, the responses to this question actually covered the full scope (all stages) and from the responses it was **not possible to identify a priority topic** for the working group to focus on.

7 Who should make up the accreditation body [so that you would trust their decisions]? What type of credentials should the members possess, who make up such a body? Where should this body reside in order to be trusted by your organisation? What value and trust would you place on an accreditation document issued by such a body? What type of organisational form should the body have?

Whether an accreditation would be favoured is fully dependent on how it is implemented. The major concern was that the system **would be bureaucratic** and in such a case it would not be favoured. Also the **mechanism was not clear** at the moment. The value of the system would depend on the accreditation body, if it would be trusted. **A trusted accreditation body** would need to be international, independent, consisting of experts in the area and presenting multiple views. Regarding the body a quality assurance system covering would need to exist. Also the body should be **recognised by all relevant parties** and favourably be **a legal entity**. Members should come from regulators, IAEA experts, WMOs, academia, research and its chair should be rotating.

8 How should an accreditation scheme/system be financed? And by whom?

The financing model favoured is **cost sharing** - among EU, governments and stakeholders including the individuals seeking accreditation.

What would be your willingness to invest into getting an accreditation? For yourself? For a member of your organisation? For a training programme?
The willingness of the **EF participants themselves to acquire** an accreditation was very favourable and depending on the implementation of such a system, there was a willingness to invest by the respondents themselves to receive an accreditation. However, there was **also a desire** to keep the system **on a national level**.

9 Other thoughts and views you wish to share related to the questions above or to the voluntary accreditations scheme and competence maintenance in geological disposal?

The main proposals were that

- the system would need to be advertised to a broader group of stakeholders;
- the timetable for implementing any such system should be realistic;
- the system should be available for everybody equally;
- the risk related to the lack of flexibility should be considered in the implementation;
- a catalogue of accreditations would be needed; and
- piloting is preferred for collecting lessons learned prior wider applications.

Quite many answers to the views and opinions from the Exchange Forum are actually addressed by the amendments to the directive 2005/36/EC as described in the following section 4.5.

4.4 Case examples of ECVET application

The following pilot activities European Fission Training Schemes (EFTS) like PETRUS II and its continuation PETRUS III (26), ENEN III and several training schemes in radiation protection and radiochemistry have provided input and learning also for the CMET work towards the voluntary accreditation. These E&T case examples related to nuclear waste management and geological disposal using ECVET components include:

- FP6 PETRUS II project: Definition of job profiles' learning outcomes and mapping a training programme to a professional development programme leading to the profile, and implementing a pilot professional development programme (2009- 2011) resulted from this initiative.
- FP7 PETRUS III project: Defined more refined job profile with detailed ECVET learning outcomes and training plan for safety assessment.
- FP7 DOPAS project's Training Workshop 2015 and DOPAS staff exchange both used and further identified KSC resulting from these learning and knowledge sharing activities. The results were valid KSC from practical work related to plugging and sealing full-scale experiments that address the needed functions or individual K/S or C to set the requirements, plan for an experiment and implement it in full-scale in cooperation with a multidisciplinary project team. The results will be reported under the DOPAS[37] project in 2016.

One main ambition in the use of ECVET system by the CMET group is to help in the development of a common understanding on standard job requirements to promote the mutual recognition of qualifications (19). Such benefits were identified already in 2012 in terms of the labour market, mobility and for flexible career pathways also in the first ECVET Seminar for the Nuclear Energy Sector (see

37

Table 1 (22 & 23)) that was initiated by JRC/IET and EHRO-N. In total JRC/IET has run six ECVET workshops (19 & 27) and organised at least two Nuclear Sector specific seminars that have produced complete sets of Learning Outcomes for various nuclear new build job profiles and EHRO-N has also worked together with the ECVET team in DG-Education and Culture to train various stakeholders in the implementation of the ECVET principles (22, pp. 10-12).

The work initiated by JRC/IET and EHRO-N has produced a set of job profiles for new build and decommissioning, and for the potential qualifications for the jobs. The results are on a very detailed level of drafting. The finalisation of the results and their validation is still a work in progress for the future. The additional value added of this work has been that it has produced more generic approaches and tools for the wider implementation of the ECVET system in the nuclear sector.

The 2013 study by OECD on adult skills (16-64 years of age), the PIAAC study, also indicated that the skills and competences levels (in literacy, numeracy and problem-solving in technology-rich environments) have a positive correlation with the overall educational level but also with participation level in both formal and non-formal training activities independent of their context (job related or extra curriculum activities) has a favourable impact on the studied skills and competences (28, pp. 37-39 & 45-46). ECVET as an instrument can thus also contribute to making such non-formal and even informal learning activities more attractive to the European labour force and especially to the professionals already having a high basic education.

Further good case examples of the ECVET application from other industry sectors in Europe are provided in the CEDEFOP ECVET implementation monitoring report 2013 (18).

4.5 The requirements of the amended Directive 2005/36/EC regarding mutual recognition

The following text includes several direct quotations from the amended Directive 2005/36/EC (2 & 3) deemed relevant to the future of professional recognition. These also relate to geological disposal professionals, if so desired. Currently the main regulated professions directly mentioned in the directive are from the health care sector and architects. Note should be taken to the fact that the public's safety is the underlying reason for regulating these professions. In some Member States e.g. (Chartered) Geologist and Mining Professionals already are included under the regulated professions (UK draft legislation adapting the directive). The directive regulates e.g. the professional qualification levels (Article 11, p.28). Further the Article 13 (pp.30-31) addresses the **conditions for recognition**, which are:

- *"the competent authority of that Member State shall permit applicants to access and pursue that profession, under the same conditions as apply to its nationals, if they possess an attestation of competence or evidence of formal qualifications referred to in Article 11, required by another Member State in order to gain access to and pursue that profession on its territory.*
- *Attestations of competence or evidence of formal qualifications shall be issued by a competent authority in a Member State, designated in accordance with the laws, regulations or administrative provisions of that Member State.*
- *Access to, and pursuit of, a profession [...] shall also be granted to applicants who have pursued the profession in question on a full-time basis for one year or for an equivalent overall duration on a part-time basis during the previous 10 years in another Member State which does not regulate that profession, and who possess one or more attestations of competence or evidence of formal qualifications issued by another Member State which does not regulate the profession."*

Any attestations of competence and evidence of formal qualifications at minimum need to be issued by a competent authority in a Member State, designated in accordance with the laws, regulations or administrative provisions of that Member State; needs to attest that the holder has been prepared for the pursuit of the profession in question.

European Professional Card (Article 4, p.14.) can be applied online with an online tool (IMI) from the Commission by any individual who holds a professional qualification in one's Home State. This card is an addition to the Europass mostly used by students for mobility and learning unit recognition.

The directive also states how an automatic recognition (Chapter III A) of professional qualification can be given on the basis of common training principles. The actual professions to which this directive

article 7 (4) applies are listed by each Member State together with the related national laws, regulations and administrative provisions.

First in its Article 49a (pp.67-69) the directive defines "Common Training Framework" *as "means a **common set of minimum knowledge, skills and competences necessary for the pursuit of a specific profession. A common training framework shall not replace national training programmes unless a Member State decides otherwise under national law**. For the purpose of access to and pursuit of a profession in Member States which regulate that profession, a Member State shall give evidence of professional qualifications acquired on the basis of such a framework the same effect in its territory as the evidence of formal qualifications which it itself issues in alignment with the conditions stated* " [in the directive].

The compliance requirements for a common training framework are that

- *"the common training framework enables more professionals to move across Member States;*
- *the profession to which the common training framework applies is regulated, or the education and training leading to the profession is **regulated in at least one third of the Member States**;*
- *the common set of knowledge, skills and competences combines the knowledge, skills and competences required in the systems of education and training applicable in at least one third of the Member States; **it shall be irrelevant whether the knowledge, skills and competences have been acquired as part of a general training course at a university or higher education institution or as part of a vocational training course**;*
- *the **common training framework shall be based on levels of the EQF**, as defined in Annex II of the Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning;*
- *the profession concerned is neither covered by another common training framework nor subject to automatic recognition under [the directive]*
- *the **common training framework has been prepared following a transparent due process, including the relevant stakeholders from Member States where the profession is not regulated**;*
- *the common training framework **permits nationals from any Member State to be eligible for acquiring the professional qualification under such framework without first being required to be a member of any professional organisation or to be registered with such organisation**."*

In addition the directive's Article 49a (3-5, pp. 67-71) states that *"**Representative professional organisations at Union level, as well as national professional organisations or competent authorities from at least one third of the Member States, may submit to the Commission suggestions for common training frameworks** which meet the conditions laid down in paragraph 2."*

In addition, the Commission has powers to adopt delegated acts in establishing a common training framework for a given profession based on the conditions stated in the directive. A Member State shall be exempted from the obligation of introducing a common training frameworks, if *"there are no education or training institutions available in its territory to offer such training for the profession concerned;" or "the introduction of the common training framework would adversely affect the organisation of its system of education and professional training; or there are substantial differences between the common training framework and the training required in its territory, which entail serious risks for public policy, public security, public health or for the safety of the service recipients or the protection of the environment."*

Further the directive Article 49b introduces "**common training test**", which means *a standardised aptitude test available across participating Member States and reserved to holders of a particular professional qualification. Passing such a test in a Member State shall entitle the holder of a particular professional qualification to pursue the profession in any host Member State concerned under the same conditions as the holders of professional qualifications acquired in that Member State.*"

The conditions for a common training test / standardised aptitude test are as described previously and being in compliance with requirement of Article 49a stating additionally as follows that "the common training test has been prepared following a transparent due process, including the relevant stakeholders from Member States where the profession is not regulated". Exemption basis for a Member State exists if one of the following applies:

- the profession concerned is not regulated on its territory;
- the contents of the common training test will not sufficiently mitigate serious risks for public health or the safety of the service recipients, which are relevant on its territory; or
- the contents of the common training test would render access to the profession significantly less attractive compared to national requirements.

The Member State is obligated to notify the Commission of its available capacity for organising such tests or about its use of exemptions as listed above. Article 51 advises on the requirements related to the documentation and formalities needed in compliance with the directive.

The Commission may adopt an implementing act to list the Member States in which the common training tests are adopted and provide other information about the organisation of the tests according to the Directive. Further the directive regulates the use of academic and professional titles and addresses the professional's knowledge of languages (Articles 54, 52 and 53). The role of competent authorities is defined (Article 56, p.74) and the former national contact points are changed into assistance centres (Article 57b, p.79) providing guidance in getting recognised and in finding the relevant competent body. Further the transparency requirements related to the recognitions are stated in Article 59 (p.81) in detail.

The Directive 2005/36/EC in its current form gives good guidance for how a mutual recognition system can be implemented and acknowledges the fact that e.g. representative professional organisations on the Union level may submit the Commission suggestions for common training frameworks as a prerequisite for the recognition of specified professional qualifications.

4.6 Discussion

What strikes to be absent in the WMOs views related to the assessment or mutual recognition of the personnel's KSC, is that formal education or organised training does not seem to be considered equally important for competence development or maintenance of the professionals in the geological disposal community compared with research projects or on the job learning. At the same time the organisations provide a large amount of internal training to their staff. This view could be seen as a hypothesis on that it could be attributed to the experts' pioneering work and on how they themselves have experienced the building up of competences in geological disposal. The main source of the competences and of the knowledge base has been created by working together to address the open questions by research.

The main means of KSC acquisition historically in the geological disposal community after the completion of basic education (at Masters or doctorate, EQF levels 7-8) is non-formal and informal learning (NFIL). Taking this into consideration, it is a bit surprising that the potential of the mutual recognition is not valued or recognised for professionals. A further reason could be that additional recognitions do not necessarily produce an individual with a doctorate much added professional value, since the basic educational level is already so high.

The small size of the community has ensured that most professionals have learned to know and trust each other personally by working in the same RD&D projects and communities of practice. This is changing as the programmes advance and more new personnel enter the community with more specialised job descriptions. The area of how professionalism is built up in the geological disposal community might need to be addressed on a more philosophical level, too.

Earlier, the education and training programmes and providers beyond basic education and doctoral studies were few or none compared with the current availability for the geological disposal community. Now that these opportunities are available, they need to be recognised as an efficient and fast way to speed up learning in the geological disposal community by providing a solid state-of-the-art of the existing knowledge base. In the nuclear sector in general, the E&T solutions are more widely applied to KSC building.

The CMET's quality objective recognised the value of informal learning and thus the objective of having a potential voluntary accreditation scheme developed aiming at mutually recognising in the community was targeted at. This objective was supported indirectly by the stakeholder's views from e.g. the Euradwaste13 conference during the CMET presentation (10): informal learning opportunities on the job and in the projects were appreciated as the best, but not the only way of learning about geological disposal. The replies of the conference audience stated that the learning from a more experienced professional by informally or by mentoring was mostly favoured by them.

The desired successful outcome for the CMET would have been encouragement for collaboration between the IGD-TP EG and other participants in collecting and defining job functions and the related Learning Outcomes (ECVET framework) at different stages of repository development. Further encouragement would have been needed for initiating the pooling of resources for such collaborative work.

Unlike hoped for by the CMET group, IGD-TP the Executive Group was currently not in favour of the presented approach or in favour of a voluntary accreditation scheme. The piloting of an accreditation body was consequently not feasible either. Even though the timing of such a scheme now seems to be premature, taking into account the pioneering role in geological disposal related to unique competences and their definition, there is a need for a sustainable framework if not for more than merely for the knowledge transfer from one generation of experts to another.

As shown in the context of the amended Directive 2005/36/EC (2 & 3), the main requirements defined also by the stakeholders of the EF5 session are met and the framework for implementing a mutual recognition system on the Member State and European Union level has been set up during the time the SecIGD2 project has been running.

Actual implementation of accreditation scheme/mutual recognition would require the geological disposal community to take a systematic look at the learning outcomes that are required to implement the repositories for spent fuel, high level waste and other long-lived radioactive waste for establishing a common training framework. This would also enable individual professional to apply for the European Professional Card as evidence of their right to pursue a profession in the European Union. The Member States soliciting for a repository site need to know what is needed to know and at the same time in other Member States such experts are retiring. The documentation of the KSC would be away of transferring the "what needs to be known". As the repositories are developed in stages **(Figure 1)**, these learning outcomes also need to be identified by stages i.e. what is specific for the stage in question and what is needed throughout the lifetime of a repository.

On the other side of the geological disposal community's RD&D perspective are the human resource (HR) administrative practices that reflect the human performance objectives from the business management point of view. The HR perspective is expecting to receive value added solutions to business related objectives from the training providers. Also HR aims to recruit bright STEM graduates from the decreasing supply from the universities in competition with other industries. Somewhere in between these two falls the domain of education and training in promoting learning and applying the needed pedagogical approaches to enable the personnel to master their demanding work in the geological disposal, where many questions still require science and technology based problems solving and slow thinking[38] .

One underlying value of the CMET group members is the quality of learning and the desire to ensure by its contributions that competence is maintained by the provision high quality learning opportunities needed in the geological disposal community. Our vision is to have a sustainable community with competent professionals now and in the future in the face of changes in the European demographics, various changes in the political and public responses related to the nuclear sector and waste solutions, in the industry level changes and moving forward or backward in the stages of repository development.

5. Conclusions on the feasibility of a voluntary accreditation scheme and accreditation body and recommendations

CMET Working Group during its existence has tried to stimulate proactively the end-users and the providers in geological disposal to address the state-of-the-art of demand and its nature in the changing and emerging scene of merged informal and formal learning activities leading to qualifications. At the same time the need of having faster routes to learning and "certification"/proof of competence and capabilities is growing. The Exchange Forum 5 session introducing the ECVET system to a wider IGD-TP stakeholder forum was a main part of this effort by the group.

Asking about a feasibility of a voluntary accreditation scheme for geological disposal using the ECVET system was intended to assist in the recognition of training programmes to improve their attractiveness

[38] David Kahneman, 2011. Thinking Fast and Slow.

but also to wake up the awareness in the community towards the developments that the competence requirements related to the safety of geological disposal could be harmonised at least on some minimum level without being in conflict with the national subsidiarity in education.

As an input to the CMET work willing to produce demand driven information on future needs to the E&T providers, the end-users were quite limited in expressing their exact needs and even more limited in their capability or willingness to participate in such needs formulation potentially due to limited amount of staff, funding and other business related priorities occupying them.

The ECVET system related activities worked in the CMET group have not been successfully communicated / sold to the IGD-TP Executive Group and this has also resulted in the discontinuation of the CMET activity under IGD-TP. The future agenda of the CMET community of practice will be discussed in the group's next meeting in April 2016. The time does not yet seem right for the implementation of a voluntary accreditation scheme or a body. Potentially also this action could deem to be redundant taken into account the amendments to the Directive 2005/36/EC on the recognition of professional qualifications. The current requirement is for more pilot experiences either from the other complementary initiatives or by other potentially directive driven means.

Other industrial sectors in Europe are now more advanced in applying the ECVET system. The CMET group has learned and recommends further to learn from these experiences, so that a feasible scheme can be developed for acknowledging knowledge, skills and competence in geological disposal irrespective of the means by which an individual has acquired them **(Recommendation 1)**. The benefit seen is that the same scheme can support the acknowledgement of any training scheme that uses the ECVET principles for producing the desired learning outcomes.

Following the community tradition, the IGD-TP EG prefers that competence maintenance, education and training is carried out on-the-job projects and training is provided as individual training workshops under the Euratom projects. At the moment, such training workshops are not a requirement in the Horizon 2020 projects like they were under FP7. Therefore, it is recommended that the IGD-TP EG communicates to the project groups preparing the Horizon 2020 proposals that the organisation of training in the projects is desirable (**Recommendation 2**). When in the future new joint initiatives for E&T are implemented, it would be beneficial for the geological disposal community that their content is formulated using the ECVET principles. This approach would add to the knowledge base of the KSC for the geological disposal.

Further developing a formal link between ENEN and the IGD-TP e.g. in the form of a Memorandum of Understanding or by some other arrangement is of value in integrating E&T activities in geological disposal. Such a wider competent European forum for sustaining the E&T provision that can contribute to the preferences of the EG, too, is needed. This interaction would enable the support of the IGD-TP for ENEN's activities in the current and future project proposals that would complement the RD&D projects. This linking of the IGD-TP with ENEN enhance also other types of the cross-fertilization of the developments in E&T (like EFTS's), and especially around ECVET. Also the IGD-TP should take action to propose to the EHRO-N Senior Advisory Group as the end-user representative from geological disposal community.

The development of professional competences/qualifications would be an important task to continue in geological disposal by collecting information on existing learning outcomes and documenting such job functions (**Recommendation 3**).

The main impetus for the CMET feasibility study was the foreseen benefits for the geological disposal community and also for the wider nuclear and other industry sectors from having individual's learning outcomes recognised by the use of such a voluntary system (see Table 1). The existing case examples provide guidelines to how to continue the work. The use of learning outcome definitions (as in ECVET) will enable an individual to identify one's own learning path toward the needed knowledge or skill or competence or even towards a qualification. The comparison of one's existing KSC to the desired KSC enables this in a more systematic way also when an individual is not working in an organisation that uses a systematic competency framework for their staffing and staff development. The additional benefit for future knowledge transfer can be achieved by this documentation of the KSC that have been and are needed in the development of geological disposal programmes.

Ultimate success of such a system depends on the acceptance of such a system by the geological disposal community members and on the willingness of individuals or their employers to

acquire/support the acquisition of a qualification/recognition/accreditation for a job function or a job. The Directive 2005/36/EC recognises the potential also for other professions than the ones that are currently regulated by the Member States. A body for the mutual recognition is needed and a funding mechanism needs to be designed. By this time the implementation of the European Professional Card together with the IMI[39] is in practice, it may be so advanced that the mechanisms for mutual recognition exist and the already documented KSC can be directly taken into use.

When learning outcome (LO) documentation is carried out according to the ECVET principles, the system content needs to be followed up so that the relevance of the content is maintained over time. LOs and the related Knowledge, Skills and Competences need to be defined first, and then validated with the relevant geological disposal community stakeholders and also this action needs to be repeated at suitable intervals. For example an update of the IGD-TP's SRA could act as such a trigger for future LOs' updates.

During the past years, several European initiatives have addressed the different issues in quality assurance and mutual recognition of the professional competence and the CMET group work has contributed to them as one of the initiatives. The work is foreseen to continue in the other complementary initiatives in the future and these initiatives need to be followed by the IGD-TP (Recommendation 3).

Recommendations for IGD-TP	
#1	To continue to follow-up the complementary cross-cutting European initiatives in competence maintenance, education and training by maintaining links with ENEN and EHRO-N, and follow-up the adaptation of the amendments of the Directive 2005/36/EC by the IGD-TP. Develop a formal relationship with ENEN (e. g. a Memorandum of Understanding) and secure a representation at EHRO-N SAG.
#2	IGD-TP Executive Group to communicate to the project groups preparing the proposals that the organisation of individual training workshops as a part of the future Technical Projects (especially in the future Horizon 2020 projects) is desirable. The use of European mutual recognition principles in formulating the training learning outcomes would be a contribution to the geological disposal community.
#3	Encourage pooling of resources for the production of job functions' related KSC documentation by stages of repository development for different job functions in various discipline areas by the industry and research organisations, other employers in when initiating new measures for competence development, education and training.

The future will tell how the changes in the way learning takes place and how the repository programmes and other developments proceed whether this may speed up the formal processes of mutual recognition of Knowledge, Skills and Competence. The need is not removed despite that the time is not ripe for this CMET objective to move forward. The challenge of finding qualified experts to the remote repository locations will continue also in the future and competence based qualifications are one feasible approach to build-up future staff and improve the attractiveness of different lifelong learning paths.

[39] IMI = Internal Market Information System

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Appendices

1. Members of the CMET Working Group 2015
2. EF5 Walkabout Station Questions
3. Introductory presentation for the CMET session at EF5
4. Preliminary outcomes of the Walkabout session at EF5 (presentation)

Appendix 1

MEMBERS OF THE CMET WORKING GROUP (STATUS DECEMBER 2015)

JA no 14 CMET WORKING GROUP December 2015

Affiliation	Organisation	Country	Surname	First Name
EG	SURAO	Czech Republic	Dvořáková	Markéta
EF	CTU	Czech Republic	Pacovský	Jaroslav
EF	CTU	Czech Republic	Vašíček	Radek
EG	Posiva	Finland	Palmu	Marjatta
EF	Aalto University	Finland	Leveinen	Jussi
EG	ANDRA	France	Trentesaux-Hamamdjian	Christine
EF	LU Mines Nancy	France	Bazargan-Sabet	Behrooz
EF	WEFalck Scientific Consulting Services	France	Falck	W. Eberhard
EG	BMWi (KIT)	Germany	Steininger	Walter
EF	BGR	Germany	Fahland	Sandra
EF	Goethe University	Germany	Wittum	Gabriel
EF	TU Clausthal	Germany	Röhlig	Klaus
EF	JRC-ITU	Germany	Fazio	Concetta
EF	JRC-ITU	Germany	Buckau	Gunnar
Other	TU Braunscweig	Germany	Brewitz	Wernt
EF	REC CO Slovenia	Slovenia/ Hungary	Železnik	Nadja
EF	DICI - University of Pisa (CIRTEN)	Italy	Lo Frano	Rosa
EF	University of Milan	Italy	Cantone	Marie Claire
EF	Nidia srl	Italy/France	Vivalda	Claudia
EG	RWM Ltd	Great Britain	Winsley	Robert

JA no 14 CMET WORKING GROUP December 2015

Affiliation	Organisation	Country	Surname	First Name
EG	Nagra	Switzerland	Blechschmidt	Ingo
EG	Nagra	Switzerland	Martin	Andrew
EF	TU Delft	The Netherlands	Vardon	Phil
EF	IST/ITN	Portugal	Paiva	Isabel
EF	IST/ITN	Portugal	(Capucho dos) Reis	Mário
EF	ARAO	Slovenia	Hertl	Bojan
EG	SKB	Sweden	Rubio Lind	Lotta
EF	Stockholm University	Sweden	Pereira	Antonio
EF	UPM	Spain	Elorza Teneiro	Francisco Javier
EG	Enresa	Spain	Farias Seifert	Joaquin
EF	STUBA	Slovakia	Slugen	Vladimir
EG	SURAO	Czech Republic	Hanusová	Irena
EF	ENEN association	France	Dieguez Porras	Pedro
EF	Mines Nantes	France	Abdelouas	Abdesselam
EG	SÚRAO	Czech Republic	Nikol	Novotná
EF	CTU	Czech Republic	Lucie	Hausmannová

Appendix 2

EF5 Walkabout Station Questions

Nine (9) question sets about the feasibility of a voluntary accreditation scheme (EF5)

The CMET working group has identified in its Terms of Reference as the target of the accreditation either training programmes (outside the institutional setting) or individuals. Please comment also on the target of the accreditation in your replies.

Please **write your replies in print letters on the post-its for each station** separately and post them at the relevant station's flip chart.

Station no.	Station specific questions
1	Do we need an accreditation system for geological disposal? If we need it, why? If we do not need it, why not? For whom, for what purpose would we need such a system? What would motivate you to apply such a system?
2	Do you understand what ECVET is? Y/N What are your views about the (increasing) need for borderless mobility and lifelong learning in geological disposal and nuclear waste management? *If you replied "yes" to the first question:* What are your views about the proposed EU instrument ECVET (European Credit System for Vocational Education and Training)? Would you be willing to accept a European accreditation system (based on ECVET) now? Does your organisation currently collaborate with others in setting up a system using the ECVET tool?
3	What is the current competence maintenance approach used in your organisation? Do you have one? How competence is currently assessed in your organisation? What procedures are used to assess the staff's competence? To what extent would you/your organisation apply a competence assessment (accreditation) system, if a widely accepted scheme was available? Where in the job hierarchy of your organisation does accreditation fit? Would you prefer/require/push your staff to be accredited? Would you require accreditation from new staff on entry, if accreditation was available? Would you be willing to integrate or do you see benefits in integrating your current system into a European accreditation system?
4	What are the appropriate approaches to find out/to measure/ to distinguish (objectively?) if someone has achieved a required standard of mastering certain KSC (Knowledge, Skills and/or Competence)? In which areas is the definition of learning outcomes most urgently needed, and why?
5	What is your interest in having a voluntary accreditation for the geological disposal community? What constraints do you see for such an accreditation system? What type of risks do you see related to an accreditation system, if such a system existed? Would you see the implementation of such a European system as a risk of decreasing the flexibility of your existing (staff qualification) system? (E.g. administrative burden?) What suggestions do you have to overcome the constraints and/or the risks (including

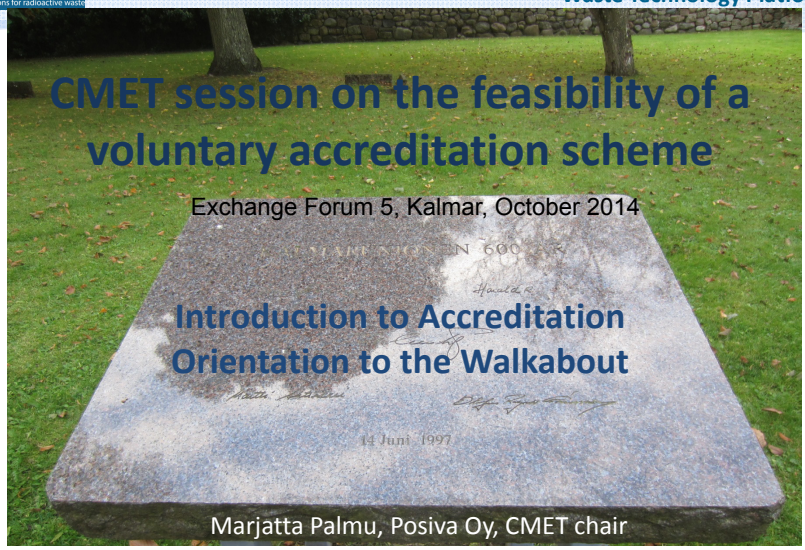
Station no.	Station specific questions
	resource constraints)?
6	Identify/What are the specific areas in relation to SRA (Strategic Research Agenda) and to all stages of the repository development (see CMET poster/ SRA p. 16) that would benefit from specific CMET action/s?
7	Who should make up the accreditation body [so that you would trust their decisions]? What type of credentials should the members possess, who make up such a body? Where should this body reside in order to be trusted by your organisation? What value and trust would you place on an accreditation document issued by such a body? What type of organisational form should the body have?
8	How should an accreditation scheme/system be financed? And by whom? What would be your willingness to invest into getting an accreditation? For yourself? For a member of your organisation? For a training programme?
9	Other thoughts and views you wish to share related to the questions above or to the voluntary accreditations scheme and competence maintenance in geological disposal?

You are welcome to complement your inputs to the Competence Maintenance, Education and Training (CMET) working group's session on the feasibility of a voluntary accreditation system for geological disposal by responding also to the questions on-line.

These open ended questions will be **available for your comments until the 6th November 2014** via the following link: https://www.webropolsurveys.com/S/30FAA4B6C4285645.par . Also available on http://www.igdtp.eu and the ProjectPlace post.

Thank you in advance for your contribution to the feasibility study. The feasibility study will be published on the IGD-TP webpage by the end of 2015.

Implementing Geological Disposal of Radioactive Waste Technology Platform



CMET session on the feasibility of a voluntary accreditation scheme

Exchange Forum 5, Kalmar, October 2014

Introduction to Accreditation
Orientation to the Walkabout

Marjatta Palmu, Posiva Oy, CMET chair

The research leading to these results has received funding from the European Union's European Atomic Energy Community's (Euratom) Seventh Framework programme FP7 (2007-2013) under grant agreements n°249396, SecIGD, and n°323260, SecIGD2.

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Orientation to Walkabout work

Purpose of today's session:

- In the introduction to give a brief overview of voluntary accreditation and about ECVET - "a credit system for professionals "
- Orient and assist you in preparing for the walkabout and to speed up the walkabout process: what is expected from you and what to do with the given post-it notes and handout during the walkabout and also afterwards

The walkabout is aimed to:

- Collect your multiple perspectives and to
- Contribute to the feasibility study of the voluntary accreditation scheme and related work by the CMET working group
  - *by soliciting input of the IGD-TP participants and*
  - *ensuring that crucial expert views are not excluded from the study*
  - *assist in the on-going work of the current EFTS projects (European Fission Training Schemes)*

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About Competence Maintenance, Education and Training Working Group (CMET)

- We are a permanent working group set by the IGD-TP in 2012 resulting from the SRA's Cross-cutting Activities (JA14).
- Our terms of reference (v.2)were revised at the end of 2013.
- We are ~ 30 geological disposal professionals from 13 different countries, 27 organisations, and representing 6 different type of stakeholder organisations.
- The activity is now lead by Posiva Oy and it is supported by the Euratom FP7 SecIGD2 project grant.
- One CMET action includes the feasibility study of a voluntary accreditation scheme – aiming to contribute to the **adoption of ECVET** as a tool **for improved borderless mobility**, **lifelong learning** and **quality of learning**.

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What is Accreditation and ECVET?

Accreditation is defined E.g by IAEA (2014, NG-T-6.4)[1]: *"the formal process of approval against established standards by an independent body"*

Accreditation within the ECVET[2] context would be

- *about a third party recognising your knowledge, skills and competence (KSC) achieved non-formally or informally*
  - *vs. a formal qualification that a national body/-ies recognises*
- *includes inherently an element of **trust** about the **objectivity of the recognition** of the units of learning, learning outcomes, KSCs*

Such accreditation in geological disposal does not exist beyond:

- *agreement based accreditation in specific disciplines: E.g. basic radiation protection training, NDT, welding, shotcreting, work safety, ENEN Master's supplement*

[1] *IAEA 2014 no NG-T-6.4 Nuclear Engineering Education: A Competence Based Approach to Curricula Development*
[2] *ECVET = European Credit system for Vocational Education and Training*

Why ECVET? It's Part of European Policy

The recent 2nd situation report on E&T in the Nuclear Energy field in EU[3] highlights e.g.

- the challenge that **human resources in the nuclear field** could be **at risk**;
- therefore one main goal of Euratom actions to contribute to the sustainability of nuclear energy by three means and one of them is ***"developing the required competences (training)."***

To improve European competitiveness, these Euratom actions aim

- *"to continuously **improve knowledge transfer and competence building**, in particular by fostering lifelong learning and borderless mobility, thereby **improving the employability** in the nuclear sector across the EU. " and*
- *"Euratom E&T actions are addressing primarily **research and industry workers with higher education, i.e. levels 6 to 8** of the European Qualifications Framework – **EQF** (= bachelor, master and doctorate levels or equivalent, resp.). The focus [] is on Continuous Professional Development (CPD), taking advantage of the **governance and best practices for E&T** that are **proposed in the EU higher education policy (DG EAC)**".*

[3] *EC 2014. Second Situation Report on Education and Training in the Nuclear Energy Field in the European Union. SWD(2014) 299 final, Commission Staff Working Document 3 October 2014.*

And further about the why!

Another recent European report

The SET Plan E&T roadmap (2014) (http://setis.ec.europa.eu/setis-deliverables/education-training-roadmap) *) that is a collective roadmap on E&T formulated by stakeholders, **puts forward a structural approach, calling for large-scale E&T actions** and is designed with the **following three main** guiding **objectives**:

1. *To **address knowledge, skills and competences needs and gaps** via building networks, pooling capacities and allowing quick and wide replication;*
2. *To **reinforce the E&T system's link with the business and research** environment;*
3. *To plan and enable skill **development and recognition**, at the same time facilitating the **dissemination** of new knowledge, techniques and tools.*

European ECVET pilot is ending in 2014 and will be evaluated:

The future can be a permanent system of ECVET.

Also for the professionals with nuclear sector being the flagship.

*) Extract from EC 2014. Second Situation Report on Education and Training in the Nuclear Energy Field in the European Union. SWD(2014) 299 final, Commission Staff Working Document 3 October 2014.

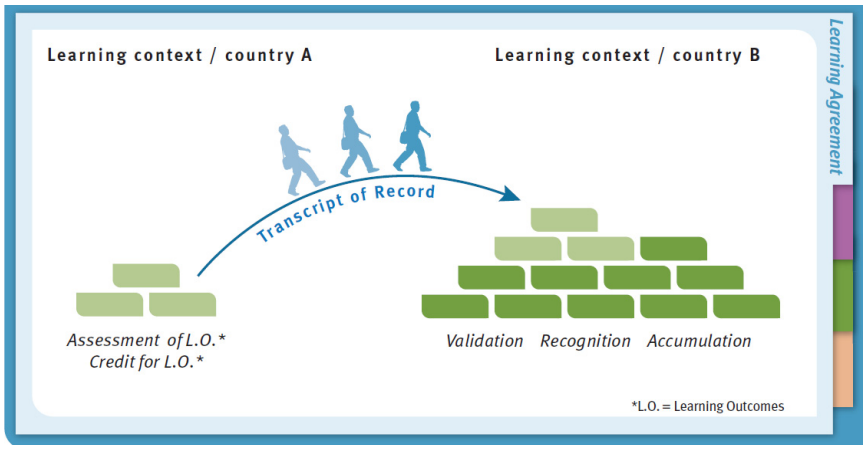
So what is ECVET?

ECVET – European Credit System for Vocational Training and Education is part of EU educational policy and **developed in the framework of the Copenhagen 2002 process** (vs. Bologna process for higher education)

- It starts from defining a **job**: a profile, function or task, which is
- is broken down to smaller **units of learning** and
- Each unit is defined by **learning outcomes (LO)** i.e. what is learned or mastered
- Each such unit of learning can then be recognised and exchanged between contexts
- The learning outcomes for each unit are targeted to **a specific level** of European qualification framework (**EQF**[4]), whose 8 levels act as a "translation tool " between different national qualifications, and
- Each LO is broken into **three types of components: KSC** i.e. Knowledge, Skills and Competence that are defined in a common language using a taxonomy (Bloom or sector specific) and
- The learning outcome/s and units can then be assessed and recognised irrespective of the way they have been acquired.

[4] complies with the ISCED 2011 levels (Unesco 2012)

Borderless Mobility and Accumulation of Learning Units/Outcomes



Source: ECVET brochure NC-80-09-607-EN-D, European Commission, DG EAC

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Explaining Knowledge, Skills and Competence (KSC)

Knowledge, Skills and Competence for Learning Outcomes - Examples

Knowledge	Cognitive Ability	Know what (conceptual, abstract)
Example:	Mathematics/ Calculus	Calculate differential equations
Skill	**Technical or Functional ability**	**Know how (to do, procedural)**
Example:	Engineering/ Nuclear Safety	Produce a nuclear safety documentation
Competence	**Attitude, behavioural or interpersonal ability**	**Know (how) to be, how to relate**
Example:	Interpersonal	Capacity to mobilise people

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Geological Disposal Example of Learning Outcomes

part of Unit	Coordination of safey analysis/case for geological disposal (some examples)	
LO	K	Understand and apply long-term safety requirements for achieving, demonstrating and presenting safety of geological disposal (including safety functions)
		Understand the concept of safety and the understand the impact of underlying physical and chemical processes.
		Understand probabilistic safety analysis principles and risk in the context of safety case
	S	Plan and structure a comprehensive safety case for a licensing stage
		Apply natural analogue information in a safety case in support of long-term safety arguments (complementarity)
	C	Able to steer and supervise the production of a safety case
		Able to coordinate interdisciplinary work in team

Source: Adopted from Petrus II (FP7) and ECVET seminar 2012

Why should this work be carried out for Geological Disposal?

Our state-of-the art of learning:

- Dedicated university education is available in some EU countries , but **most learning and accumulation of experience is informally acquired** (includes training, learning on projects, learning at work...).
- Informality is specific for learning in our community: either learning on the job and internal training. This includes professional development.
- Different learning outcome are needed at different stages of the repository development.
- The **learning outcomes already achieved,** they have **not been collected or documented** => Accreditation can act as a motivation to carry out such **memory keeping work**.
- With the long-timeframes of disposal – **knowledge preservation and transfer is needed** already **now** as the demographics change in Europe.
- Work on identifying the Knowledge, Skills and Competence has started, but the results are far from complete and have not been brought together yet.

This is were your views are now needed:

Do we need to proceed and how to proceed!

Some Implementation Need Examples

- KSC from the various stages of geological disposal need to be collected and documented => they will also form the assessment criteria or a standard for accreditation
- Standards/KSC defined need validation from the relevant stakeholders
- Accredited learning outcomes need recognitions from the relevant stakeholders/ the community . One needs a (broad) partnership/ partnerships (networks) like ENEN
- Transcripts are needed as a proof of recognition.

Recognition: Accreditation and ECVET Tool

Accreditation further requires for example

- an accreditation body/bodies – *professional, objective*
- agreed accreditation criteria – *a preset standard/s*
- target/object of accreditation – *unit of learning, learning outcomes – e.g. defined using ECVET*

ECVET is also tool for setting up the criteria

- A tool for setting the standards for what **an individual masters** or e.g. what **a training programme delivers**, if implemented according to the standards leading to the validated and accepted learning outcomes
- ECVET enables assessment **independently of the way** the learning outcomes are acquired
- In this way it contributes to lifelong learning and efficiency directly by **eliminating the need for overlapping training or education** when the assessment standard is met.

ECVET Framework: Objectives, Contribution and its Technical Components

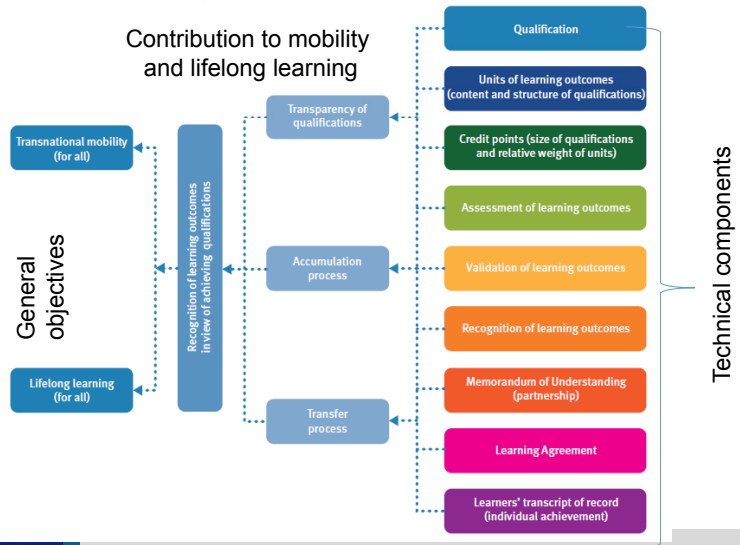

Figure from ECVET User's Group. 2011. Using ECVET to Support Lifelong Learning.

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Assessment of Learning Outcomes within Geological Disposal for Individuals and Training Providers/ Programmes

ECVET TECHNICAL COMPONENTS need for:	Voluntary Accreditation of an individual's LOs	Voluntary Accreditation of an ECVET training provider
Assessment of LOs	Yes. Assessment criteria and demonstration of LOs needed See also validation.	Yes. Assessment criteria and demonstration of LOs needed.
Validation of LOs	Yes. An accreditation body needs to be set up or approved by the partners.	Yes. Done by an internal process, by MoU partners, or by an accreditation body.
Recognition of LOs	Yes.,By the industry and institutions in the community and/or by training providers by signing an MoU.	Yes (see MoU).
Partnerships (MoU)	Yes. Wide coverage of partners to engage themselves in a MoU for voluntary approval of the recognised LOs.	Yes. Basis for transfer of the recognized LOs between various providers (a criteria for voluntary accreditation, too).
Learning Agreement	No	Yes, needed for exchange in the formal exchange between training providers or between a provider and a workplace.
Learner's transcript of record (e.g. Europass)	Yes.,A certificate needs to be provided of recognition of LO/s resulting from assessment => e.g. inclusion into Europass.	Yes, provided by the training provider to the home institute and later into the Learner's transcript (achievements). One example, the ENEN supplement to a diploma.

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Your Input During the Walkabout

Reflecting on **a potential for accreditation** in geological disposal based on what has been presented and based on the questions

- write down your opinions and ideas related to 8 set of questions on the hand-out – write **each idea on an individual post-it with print letters.**
- identify where you **consider benefits and constraints** and identify **what has** already **been implemented** in your organisation/ country in geological disposal in the area of accreditation.
- identify **what would still be needed or not** needed?

After the reflection, start by taking your station related post-its to the station closest to you

- submit your post-it note for the relevant station (questions) on the flip chart and discuss your views with the station host and other participants on that station;
- after ~10-15 minutes **move clock-wise to the next station** and repeat until you have covered all stations – **a clock/bell will ring** an alarm as a sign.

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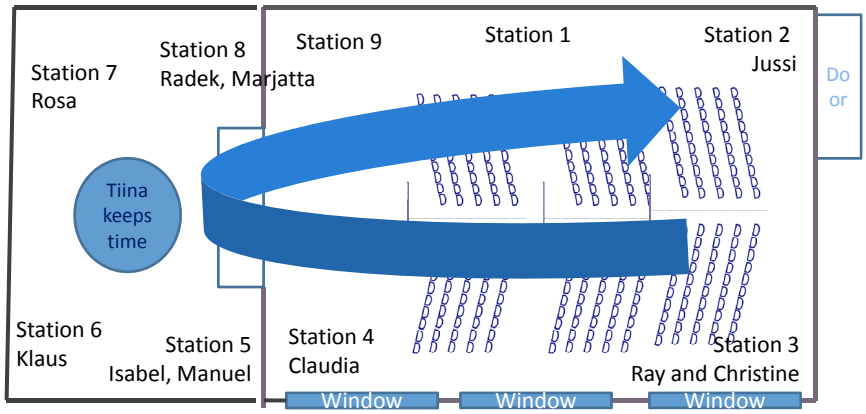
Direction of Walkabout - Clockwise



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Time to Start the Walkabout

- All views and inputs are most welcome, your own, your company, your neighbours, ... ☺
- Now please take your post-its and move to the flipchart station closest to you.
- A bell will signal for you to change the station.
- A coffee break will be at 10:30-11:00 hrs, please come back on time for the remaining stations.
- We will conclude the session for the lunch and come back with the session report in the afternoon.

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Is there a potential for a flagship action?

Now please take your post-its and move to the flipchart station closest to you for your inputs.

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Exchange Forum 5
CMET Session – Quick Report on the Outcomes of the Walkabout

CMET Working Group/
Marjatta Palmu

(c) Marjatta Palmu

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Recap of the CMET session objective

Purpose of today's session was:

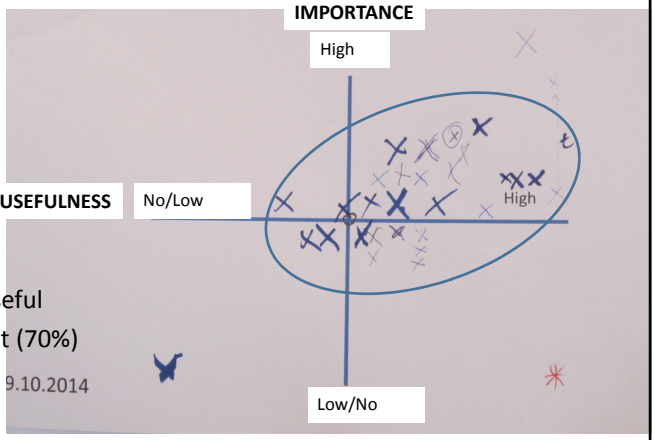
- To give a brief overview of voluntary accreditation and about ECVET and foremost
- To collect multiple perspectives that would contribute to the feasibility study of the voluntary accreditation scheme and related work by the CMET working group

The main outcomes from each walkabout station are presented in the following:

Station 1 (1)
Do we need an accreditation system?

Usefulness and importance of an accreditation scheme/system
-in general?
-to you?

- Considered more useful (80%) than important (70%)



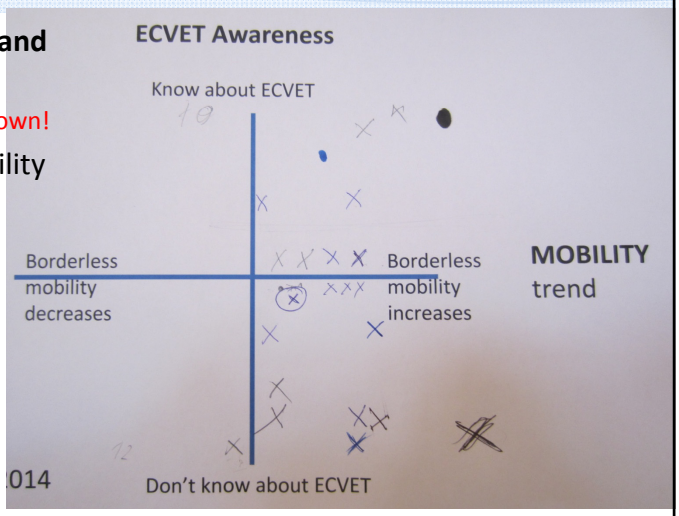
Station 1 (2)

What would motivate you to apply such a system?

- *Motivations*
  - *of a company to get staff to learn (+)*
  - *is it worth it? cost vs. benefit*
- *Credibility*
  - *favorable to public acceptance*
  - *regulator acceptance*
- *Mobility*
  - *favorable for early career professionals*
  - *+/- it is already happening*
- *View that it is very implementation dependant – the time/effort needed could be the constraint*

Station 2 (1)

- **Do you understand what ECVET is?**
- Mostly not well known!
- Borderless mobility increases



Views about Human Mobility and Life Long Learning

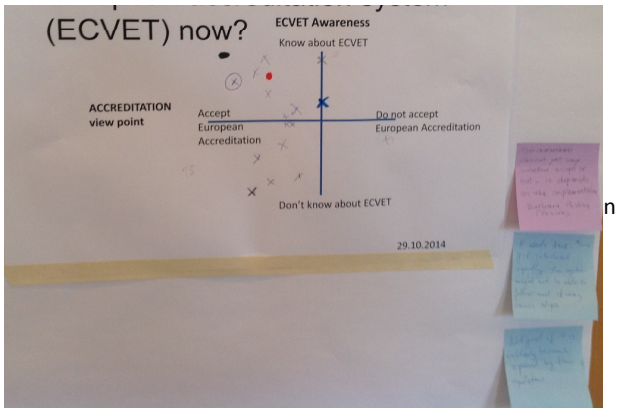
- *12 positive notes*
  - *"good concept"*
  - *Enables maintenance of critical mass and knowledge*
  - *Both in a perspective of individual and organization*
- *3 doubtful*
  - *Does it really work*
  - *How country specific items concerned*
- *2 concerned*
  - *How it effects individual workers*
  - *Brings stress, (unhealthy) competition, problems to personal life*

Station 2 (3)

Would you be willing to accept a European accreditation system (based on ECVET) now? 16 positive, 1 neutral, 1 negative

ACCREDITATION view point in the sticker notes: does it work, needs time to be introduced to the practice.
Problems if adopted too fast by the regulators

ECVET Awareness



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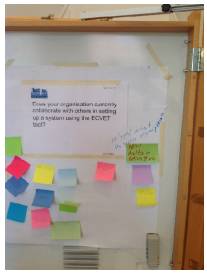
Station 2 (4)

Those aware of the ECVET system to respond on:

What are your views about the proposed EU instrument ECVET (European Credit System for Vocational Education and Training)?

- *Those who are aware about ECVET willing to accept an European accreditation system?*
- *Also most of those who do not know about ECVET willing to accept it. " a good concept"*



Does your organisation currently collaborate with others in setting up a system using the ECVET tool?

- **Posiva and Petrus III-consortium**
- **Not adopted by organizations: 12 "No" responses**

Station 3 (1)

What is the current competence maintenance approach used in your organisation? Do you have one?

- *YES n=19; NO n= 2 ; Unsure n = 1*
- *Two groups identified: A: current professionals in the organisation and B: new entrants to the organisation*
- *Several approaches (> 25) – major approaches are*

A –current professionals	B – new entrants
Internal courses (N =7)	Choose students (PhD) (N = 8)
Seminars related to the dev. of competence (N = 2)	Training/supports to achieving educational goals (N = 7)
Chartership with professional bodies/ professional progression (N = 2) PhD (sponsoring, sabbaticals)	University degrees in science (N = 5) TSO training education (experts to starters) (N =2)

Station 3 (2)

To what extent would you/your organisation apply a competence assessment (accreditation) system, if a widely accepted scheme was available?

Number in favor: N = 12; NO N = 4, Do not know: N = 6

Where in the job hierarchy of your organisation does accreditation fit? *(identify the 2-3 most frequent levels here)*

- *levels: Experts a top level*

Would you prefer/require/push your staff to be accredited? Would you require accreditation from new staff on entry, if accreditation was available?

How many would require accreditation? N = 16

How many would make it voluntary for the staff? N = 7

How many would require as an entry requirement? N = 7

Station 3 (3)

Would you be willing to integrate or do you see benefits in integrating your current system into a European accreditation system?

How many would integrate? (N = 12)

Benefits identified:

- *none identified*

Station 4 (1)

What are the appropriate approaches to find out/to measure/ to distinguish (objectively?) if someone has achieved a required standard of mastering certain KSC (Knowledge, Skills and/or Competence)?

- **CV (12)**
- **Interview (12)**
- **Work Portfolio (7)**
- **References (publications, recommendation letters, ...) (7)**
- **Discussion on practical examples (case solving, ...) (6)**
- **Education (3)**
- **Probation period (3)**
- **Independent expert body (Accreditation, professional institutions) (3)**
- **Continuous appraisal (on the job) (1)**
- **Public presentation of previous works (1)**

Station 4 (2)

In which areas is the definition of learning outcomes most urgently needed, and why?	N= for each learning outcome
Safety Case Knowledge	7
Environmental areas / issues	5
Safety areas	3
Independent learning ability	3
Applied sciences	2
Interdisciplinary thinking	2
Modelling / numerical competences	2
Material sciences / design	2
Safety case understanding	1

Station 5 (1)

What is your interest in having a voluntary accreditation for the geological disposal community?

POSITIVE

- *Ease exchange and mobility of experts in Europe*
- *Allow to learn about different methods, education styles, regulations and standards*
- *Preserve, maintain and train newly hired people.*
- *Promotes confidence building.*

Station 5 (2)

What is your interest in having a voluntary accreditation for the geological disposal community?

LIMITED:

- *What is the added value with regards to existing education systems and mobility tools (e.g. training courses in the framework EC funded research programs (matter of cost and dedicated subjects) ? -strongest comment-*
- *Preference for academic profiles*
- *Preference for mobility promoted by financial benefits*
- *Might restrict availability of experts*
- *Intercultural difficulties*
- *Language barriers*
- *Acquired skills are only fit for their specific program (country).*

What constraints do you see for such an accreditation system? What type of risks do you see related to an accreditation system, if such a system existed?

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Station 5 (3)

What constraints do you see for such an accreditation system? What type of risks do you see related to an accreditation system, if such a system existed?

CONSTRAINTS

- *Should be a complement to existing accreditation systems in some countries*
- *Requires times and resources to implement and maintain.*
- *Might be difficult to apply because the geological disposal program is a very specific and narrow field.*
- *Should take into account the national regulations.*

Station 5 (4)

Would you see the implementation of such a European system as a risk of decreasing the flexibility of your existing (staff qualification) system? (E.g. administrative burden?)

No impact N = 7 ,

What suggestions do you have to overcome the constraints and/or the risks (including resource constraints)?

to be addressed later

Station 6 (1)

I II III IV V VI

RAD. WASTE TYPES	CARRY OUT GENERIC STUDIES AND	SELECT HOST ROCK AND	DEVELOP TECHNOLOGY AND		PRODUCE IN INDUSTRIAL SCALE AND
	DEVELOP CONCEPT	SELECT SITE	DESIGN REPOSITORY	CONSTRUCT REPOSITORY	OPERATE REPOSITORY

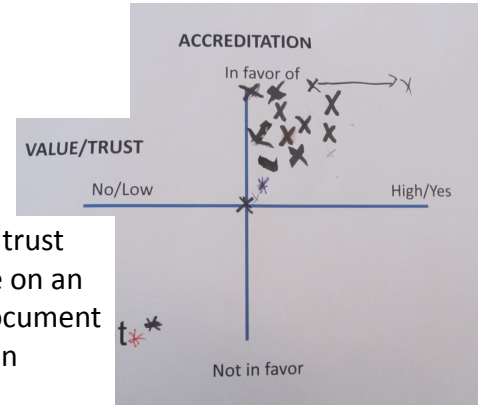
Stage (I-VI)	Specific action area	Replies N=

Several comments on having too little time to reflect on this

Many topics picked from the Deployment plan especially under Key Topics 3 and 7

Station 7 (1)
Are you in favour of accreditation?

Favor N =17
Not in favor N = 3
Not sure N = 1



What value and trust would you place on an accreditation document issued by such an accred. body?

- Fear of the process becoming bureaucratic.

Station 7 (2)

Trust and value of an accreditation document?

- *depends strongly on the type of accreditation system implemented and who accredits (e.g. in IAEA high trust)*
- *difficult to answer due to the difficulties to measure learning outcomes*

Who should make up the accreditation body [so that you would trust their decisions]?

- *Expert groups, end-users; IAEA, an independent agency*
- *combination of universities (incl. ENEN, IAEA) and end-users; universities*
- *WMOs*

Station 7 (3)

What type of credentials should the members possess, who make up such a body?

- *interdisciplinary scientific competences, with expertise in waste management (like professors coming from university) and related*
- *experts for the IGD-TP or WMOs*
- *higher education institutions*
- *lot of replies saying don't know, need to think about it*

Where should this body reside in order to be trusted by your organisation?

- *an international and independent organisation*
- *IGD-TP organisation*
- *IAEA*
- *EU*
- *In a nuclear country*
  - » *No idea*

Station 7 (4)

What type of organisational form should the body have?

- *independent – most important, recognised by all relevant institutions*
- *an informal network*
- *part of EU (Energy division)*
- *Public and transparent*

Station 8 (1)

How should an accreditation scheme/system be financed?

- *European level funding (EU) i.e. our taxes N = 10*
- *ENEN special account*
- *By cost sharing – WMOs, industry, individuals (N = 5-10)*
- *Public private scheme*

And by whom?

- *WMOs; Government; Member states;, Nuclear fund…*
- *individuals themselves (N = 7)*

- Risks:
  - *should be affordable to the participants*
  - *time consuming*
- Constrain:
  - *keep at national level*

Station 8 (2)

What would be your willingness to invest into getting an accreditation?

For you N=	For your staff/organisation member N =	For a training programme N =	For something else:
9	5		1

Station 9

Other thoughts and views related to the voluntary accreditation scheme and competence maintenance in geological disposal from the participants:

- *Timing / timetable of such a scheme*
- *Lower level of EQF (attention to specific areas like RP, social sciences...)*
- *Lead organisations to get the other WMOs on board*
- *Advertise this*
- *Pilot and lessons learned*
- *Equally available for everyone*
- *Risks: Lack of flexibility, lack of heterogeneity (like in training); danger of narrow specialisation*

Quick conclusions

- to be determined at a later stage, not totally against – more cautious due to lack of information and awareness
- for several participants a new topic
- hopeful the awareness has increased now

Where you able to provide all your input?

The station questions will remain open until 6 November 2014 at the link

https://www.webropolsurveys.com/S/30FAA4B6C4285645.par

The link is also accessible from the JA 14 page on http://www.idgtp.eu.

More inputs are most welcome.

The way forward after today

- Your detailed views will be now recorded, then
- Analysed and the final results handled at CMET no 4 on 26 Nov. in Paris (registration by 19 November 2014)
- Further discussions will take place in CMET no 5 in April 2015 in Lisbon back-to-back with Petrus III (either week starting 13 April or 20 April 2015);
- The report on the feasibility study on the voluntary accreditation schem will ready by end of 2015 with recommendations
- After that the decision will be much depending on you – the IGD-TP how to proceed.

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