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Community research

ASGARD

Advanced Fuels for Gen IV Reactors: Reprocessing and Dissolution

Contract Number: 295825

DELIVERABLE D 1.2.1 - INITIAL TRAINING PROGRAMME

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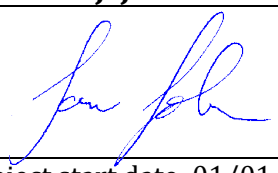		

Project start date: 01/01/12 Project duration: 48 months

Dissemination level			
PU	Public	**X**	
RE	Restricted for specific group		
CO	Condifential (only for ASGARD partners)		

EURATOM

Version control table

Version number	Date of issue	Author(s)	Brief description of changes made

Relevant domain(s) and workpackage(s)

Tick **ALL** ☐ or select in the following table:

DM	WP
DM 1 ☒	WP 1.1 ☐ WP 1.2 ☒ WP 1.3 ☐
DM 2 ☐	WP 2.1 ☐ WP 2.2 ☐ WP 2.3 ☐
DM 3 ☐	WP 3.1 ☐ WP 3.2 ☐ WP 3.3 ☐
DM 4 ☐	WP 4.1 ☐ WP 4.2 ☐ WP 4.3 ☐

Project information

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CONTENT

EXECUTIVE SUMMARY

The ASGARD training and education programme has been designed to complement the main R&D programme. It aims to share the acquired knowledge among communities and generations, and thus contribute to maintaining the nuclear expertise at the fore-front of Europe.

This deliverable stems from ASGARD WP1.2, the main objective of which is to stimulate exchange of knowledge and practical experience among the community and future researchers. For drafting this Initial training programme, supply and demand analysis of the training needs within ASGARD community has been performed. The demand emerging from Domains 3 and 4 revealed the need of training in dissolution chemistry and reprocessing. The identified components of the training programme have been categorised as follows:

- Summer Schools
- Open seminars
- Courses
- Full courses
- Short courses
- Lectures and trainings
- E-learning module and courses

It could be concluded that the offer of the training components from the ASGARD Partners suffices to run an effective training system. When combining the results of supply and demand analysis with the consortium commitments outlined in the ASGARD Description of Work and drafting the schedule of the programme an important criterion has been the effectiveness of both the training and the use of the resources. Therefore, most of the training activities have been attached to the project meetings. To achieve effective dissemination of the information on the project and its outcomes, the International Workshops have been attached to two different important international conferences in the field.

1 INTRODUCTION

The ASGARD training and education programme has been designed to complement the main R&D programme. It aims to share the acquired knowledge among communities and generations, and thus contribute to maintaining the nuclear expertise at the fore-front of Europe. The training and educational work package of ASGARD will work in close collaboration or will follow up other training programmes (like e.g. CINCH, ENEN and IAEA) for maximum gain and efficiency in the knowledge dissemination and strengthening the European human capital in this area.

This deliverable stems from ASGARD WP1.2, the main objective of which is to stimulate exchange of knowledge and practical experience among the community and future researchers. Students (MSc and PhDs) represent the primary target group, but also teachers and other members of the community will benefit from ASGARD activities and measures in area of education/training and mobility. Dedicated courses based on the outputs of the domains and previous experience have been planned to be developed with special emphasis put on safety aspects related to dissolution, conversion, reprocessing and fuel fabrication under normal and accident conditions.

For drafting this Initial training programme, supply and demand analysis of the training needs within ASGARD community has been performed. When combining the results of this analysis with the consortium commitments outlined in the ASGARD Description of Work and drafting the schedule of the programme an important criterion has been the effectiveness of both the training and the use of the resources. Therefore, most of the training activities have been attached to the project meetings. To achieve effective dissemination of the information on the project and its outcomes, the International Workshops have been attached to two different important international conferences in the field.

2 SUPPLY AND DEMAND ANALYSIS OF THE TRAINING, COURSES AND LECTURES

As the first step in designing the ASGARD Training Programme, the Supply and Demand analysis was performed. On the Demand side, the Domain leaders were asked to define the identified training needs for their domains. On the Supply side, all ASGARD Partners, including the Industrial Users group, were approached with a request to define their proposals for ASGARD-relevant training courses they could run for the benefit of the consortium. The response to these appeals has been summarised in Table 1.

As can be seen from this table, the demand emerging from Domains 3 and 4 relates to training in dissolution chemistry and reprocessing. A preference was expressed to have some practical laboratory component as a part of the training. In principle, both these topics could be covered in one course even though it might be difficult to cover this entire field together with a practical component in a reasonably-long course.

The range of offers of training courses obtained is rather broad and spans from short several-hours long courses to full courses with expected duration of one to two weeks. In principle, the offers may be categorised as follows:

- Full courses
- Short courses
- Lectures and/or trainings that can be used as contributions to Summer schools or to the training component of ASGARD coordination meetings.
- E-learning component

A more detailed description of these offers is given in the next chapter, a mix and a proposed schedule of the training activities is shown in Chapter 4.

	Topic	Target group / Comment
Demand		
Domain 2		
Domain 3	Course on dissolution chemistry	
Domain 4	"Reprocessing" course	
Supply		
Chalmers University of Technology	Sol gel technique (to complement the KTH Fuel fabrication course)	
Forschungszentrum Jülich GmbH		
Instytut Chemii i Techniki Jadrowej		
National Nuclear Laboratory Limited	Prepared to consider putting together a reprocessing course (if funded from DM1)	
Paul Scherrer Institut		
Nuclear Research and Consultancy Group		
Karlsruher Institut für Technologie	no offer	
Commissariat a l'énergie atomique et aux énergies alternatives	Ready to contribute to summer school or any other T&E initiative (topic not specified)	
Ceske Vysoke Uceni Technicke v Praze	Hands-on Training in Nuclear Chemistry	CINCH guaranteed course
Kungliga Tekniska Hoegskolan	Fuel fabrication course	PhD students and young researchers
Evalion s.r.o.		
Westinghouse Electric Sweden	Industrial fuel manufacturing	
Institul National de Cercetare-Dezvoltare Pentru Tehnologii Izotopice si Moleculare	Isotopic separation	About 5 hours, in 2014, M31-36
University of Leeds		
University of Manchester		
University of Cambridge		

Table 1 Training, education and courses Supply and demand analysis

3 COMPONENTS OF THE TRAINING PROGRAMME

3.1 SUMMER SCHOOLS

There will be two Summer Schools organized within the ASGARD project. The first school will be organized as mostly internal (for students coming from Beneficiaries' organizations), the second one will be more open for external parties. It has been decided that the Schools will be attached to other planned events.

The first school will be attached to the 3rd Project meeting, both the School and the Meeting have been planned to be hooked to FAIRFUELS project second workshop and hosted by NRG. The preliminary dates are in the week of 28 January, with a tentative agenda: Monday FAIRFUELS project progress meeting, Tuesday + Wednesday ASGARD / FAIRFUELS 'Winter school', Thursday + Friday ASGARD progress meeting. Amsterdam is planned to be the venue location. The scientific programme of the school will be discussed during the ASGARD Project Meeting taking place in Radium Palace Hotel, Jáchymov, Czech Republic, on June 11–14, 2012.

The second Summer Schools will be more open for external parties. Its main aim will be to disseminate the results achieved within the ASGARD project to the broader scientific community and thus contribute to the common transfer of knowledge and know-how and to preserving the knowledge gained in ASGARD. Similarly to the first one, the second Summer school will be mainly focused on young researchers and PhD students.

3.2. OPEN SEMINARS

An open joint seminar with the ACSEPT project is under negotiation. The seminar should address the safety aspects of reprocessing and contribute to the transfer of knowledge and know-how regarding reprocessing from the FP7 ACSEPT project into ASGARD community and to ensure the synergy and general transfer of knowledge between the two projects. It should take place during the FP7 ACSEPT meeting planned in relation with ATALANTE conference in September 2012.

3.3 COURSES

In principle, the courses planned for the duration of ASGARD project either address training of the ASGARD community to achieve higher competence in ASGARD-relevant research or dissemination of the results achieved within the ASGARD project to the broader scientific community. However, the courses run in the later phases of the project may contribute to both these aims.

The courses offered can be divided into two groups:

- Full courses
- Short courses

3.3.1 FULL COURSES

Three full – a week or more long courses – were proposed by the ASGARD community.

- The first of them, which has the character of the "dissemination" course, should be "Fuel fabrication course", proposed by KTH. This course will be developed on the basis of the outputs of the ASGARD technical domains and previous experience. The target audience of the course should be the PhD students and young researchers – both those involved in the project and those coming from outside the ASGARD community.
- The idea of the second course emerged as a response to the demand to develop a "Reprocessing course". NNL declared their preparedness to assemble such a course, including a practical laboratory component, if appropriate funding is available.
- The third of the courses, proposed by CTU, regards "Hands-on Training in Nuclear Chemistry". This is a course developed by the FP7 CINCH project consortium to train master or PhD level chemists in the basics of nuclear chemistry. It is aimed at researchers who will need to work with open ionising radiation sources in radiochemical laboratories in the course of ASGARD project.

3.3.2 SHORT COURSES

Two short courses were proposed to be developed and delivered by ASGARD Partners. They include:

- Isotopic separation course proposed by INCDTIM – an about 5 hours course that should be ready for delivery in 2014
- Industrial fuel manufacturing course proposed by WESTINGHOUSE.

3.4 LECTURES AND TRAININGS

In addition to the full or short courses specified in the preceding chapters, additional lectures or trainings may be developed on-demand and/or as needed for the optimization of the programme of the summer schools or the full courses. Most ASGARD Partners are prepared for such activities, explicit offers were formulated by

- Chalmers who proposed lecture/training on Sol gel technique aimed to complement the KTH Fuel fabrication course
- CEA who expressed their readiness and willingness to contribute their expertise to optimization of the programme of the summer schools or any other T&E initiative.

Further, at least three lectures on commercial nuclear fuel will be prepared and delivered by the specialists selected from the Industrial Users Group during the First and the Second International Workshops. Additional three lectures concerning the production of each type of fuel described in the project, with respect to the safety concerns, will be given by specialists in the respective DM. The lectures will be held during project meeting(s) in the second half of the project.

3.5 E-LEARNING MODULE AND COURSES

Scientific outputs from one of the DM2, DM3 or DM4 will be used for development of an e-learning module for an already existing e-learning platform. This action is seen as a complement to previous and parallel efforts of other EURATOM projects and will act as a dissemination measure of one of the projects outcomes. The e-learning module developed may be also used as one of the components of the Second ASGARD Summer School.

4 SCHEDULE OF THE TRAINING ACTIVITIES

Table 2 Schedule of the training activities

Year	Month	Activity	Year	Month	Activity
Year 1 (2012)	1		Year 3 (2014)	25	
	2			26	
	3			27	
	4			28	1st ASGARD International Workshop - 2 lectures on commercial nuclear fuel (IUG) (4)
	5			29	
	6			30	
	7			31	
	8			32	
	9	Open seminar with FP7 ACSEPT (1)		33	
	10			34	
	11			35	Isotopic separation course (INCDTIM) (3)
	12			36	
Year 2 (2013)	13	1st ASGARD Summer School - Industrial fuel manufacturing course (WESTINGHOUSE) (2)	Year 4 (2015)	37	
	14			38	
	15			39	
	16			40	E-learning module
	17			41	2nd ASGARD Summer School - Fuel Fabrication course (KTH) - Sol gel technique training (Chalmers) (3)
	18			42	
	19	3 lectures on the production of O, N, and C fuels (DMs specialists) / Reprocessing course (NNL) (3)		43	
	20			44	
	21			45	2nd ASGARD International Workshop - 1 lecture on commercial nuclear fuel (IUG) (5)
	22			46	
	23			47	
	24			48	

(1) Attached to ATALANTE 2012 conference
(2) Attached to ASGARD and FAIRFUELS projects meeting
(3) Attached to ASGARD project meeting
(4) Attached to the 17th Radiochemical conference
(5) Attached to the ENS TopFuel 2015 conference

The initial training programme schedule developed is summarized in Table 2. The main principle, which has been followed during drafting this schedule, has been the

effectiveness of both the training and the use of the resources. Therefore, most of the training activities have been attached to the project meetings. To achieve effective dissemination of the information on the project and its outcomes, the International Workshops have been attached to two different important international conferences in the field.

5 CONCLUSIONS

The ASGARD training and education programme has been designed to complement the main R&D programme. It aims to share the acquired knowledge among communities and generations, and thus contribute to maintaining the nuclear expertise at the fore-front of Europe.

This deliverable stems from ASGARD WP1.2, the main objective of which is to stimulate exchange of knowledge and practical experience among the community and future researchers. For drafting this Initial training programme, supply and demand analysis of the training needs within ASGARD community has been performed. The demand emerging from Domains 3 and 4 revealed the need of training in dissolution chemistry and reprocessing. The identified components of the training programme have been categorised as follows:

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