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CINCH

CINCH

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PU	Public	**X**
RE	Restricted to a group specified by the partners of the CINCH project	
CO	Confidential, only for partners of the CINCH project	

EXECUTIVE SUMMARY

Main results of CINCH project fully correspond to the planned objectives. The consortium consisted of 9 partners from 7 European countries, including Russia and Norway. Partners from both academia and industry participated on the project. Training needs of major stakeholders in "nuclear" field were identified and evaluated, and information about various university curricula in nuclear chemistry was gathered. Consequently, optimum curricula for nuclear chemistry education at both MSc. and PhD. levels were proposed.
In close cooperation among all partners involved, three hands on training courses were developed. First demonstrating runs of these courses were also used for a feedback and future improvement. These courses may form core basis for future cooperation of a consortium. Moreover, electronic tools for teaching/learning activities were developed and used, including a "nuclear wiki" NukWik. Strategic studies identified European Master in Nuclear- and Radiochemistry quality label awarded by ECTN Association as an optimum means for mutual qualification recognition. An in-depth analysis of the various identified sources of sustainable financing, the programme "Erasmus for All" seems to be of high interest. Networking with the other European networks and organizations and presenting the CINCH activities at various conferences in nuclear or generally energy field helped to have inter-sectoral and international views together to enable concentration more on the further exploitation.

This deliverable contributes to the following Work-Packages and Tasks:

WP 1	
☐ Task 1.1	☐ Task 1.2 ☐ Task 1.3 ☐ Task 1.4 ☐ Task 1.5 ☐ Task 1.6
WP 2	
☐ Task 2.1	☐ Task 2.2 ☐ Task 2.3
WP 3	
☐ Task 3.1	☐ Task 3.2 ☐ Task 3.3 ☐ Task 3.4
WP 4	
☐ Task 4.1	☐ Task 4.2 ☐ Task 4.3 ☐ Task 4.4 ☐ Task 4.5 ☐ Task 4.6 ☐ Task 4.7
WP 5	
☐ Task 5.1	☐ Task 5.2 ☐ Task 5.3
WP 6	
☐ Task 6.1	☐ Task 6.2 ☐ Task 6.3 ☐ Task 6.4 ☐ Task 6.5 ☒ Task 6.6

OUTLINE

1 FINAL PUBLISHABLE SUMMARY REPORT

1.1 Objectives of CINCH project

Maintenance of skills in nuclear chemistry is of strategic, as well as immediate, importance for the European nuclear operations. The demand for the skills in this field would not decrease even if Europe decides to phase out its nuclear energy because these skills are even more indispensable for decommissioning the nuclear installations than for their operation. Because the current situation in nuclear chemistry education and training in Europe is quite diverse, the project aimed at its coordination. The system developed should provide a common basis to the fragmented activities in this field and thus move the education and training in nuclear chemistry to a qualitatively new level.

The main target groups were not only the doctoral students and research workers but also the students at the master level. Including these students into the system should increase attractiveness of the studies of nuclear chemistry and thus enlarge the source of highly qualified professionals for the future employers.

1.1.1 University curricula evaluation

The objective was to collect information on nuclear and radiochemistry education in the European universities, evaluate and compare curricula of various universities. This work formed the basis for all following undertakings in the education field.

The information was collected through internet, reports, personal contacts and by visits. Earlier surveys performed by DNRC, IAEA or within other EC 6th FP projects like EURAC and ENEN-II, were also taken into account. Not only EU countries were involved but the whole Europe, including Russia, was covered. The universities were categorized into various groups depending on whether they give courses on bachelor, master or graduate levels. Another classification was based on general area, on which the university focused its education (general nuclear and radiochemistry, nuclear technology, radioecology, radiopharmaceutical chemistry etc).

1.1.2 University curricula development

The objective was to define a set of curricula leading to different levels of radiochemical education that would be applicable at any university. To achieve this objective, the most important target specializations of nuclear and radiochemistry education, such as actinide chemistry, nuclear fuel cycle chemistry, radioecology, radiopharmaceutical chemistry etc., were identified. A system of minimum requirements for the extent (number of ECTS) and contents of the fundamental nuclear chemistry courses was proposed and developed that should guarantee a uniform level of the university graduates bearing the title of MSc. in Nuclear Chemistry or (MSc. in Chemistry specialized in Nuclear Chemistry).

1.1.3 Identification and evaluation of the training needs

Current nuclear industry park is facing a challenge in finding and training a whole new generation of employees, as result of the strategies adopted after 1986, when some countries opted for phasing out their nuclear power plants. As a contribution to coping with this challenge, identification and evaluation of current training needs was performed. Main objective was to collect information on nuclear industry park (as the largest employee of the graduates) and the potential developments in the next five to ten years. Additional goal was an updating of the teaching curricula for meeting the needs specified above.

1.1.4 Joint courses and Strategies development

The primary objective was to develop several "sample" compact modular courses and design a system for students and teachers exchange (including internships). This was realized by choosing several courses from the university curricula developed in 1.2 and training courses developed in 1.3 and developing detailed plans of such compact (1-2 weeks) modular courses combining lectures and practical laboratory exercises.

The main expected results here were

- Set of several "sample" compact modular courses in different branches of modern nuclear chemistry.
- A sustainable system for students and teachers exchange that will make long-term running of the developed courses possible.
- Verification of the functionality of two of the general purpose education/training courses and one dedicated training course by running them once for about 10 students each at one of the participating universities.

1.1.5 E-learning Platform

The aim of this work package was to develop and launch an e-learning platform for providing courses in nuclear chemistry in the European Union, Russia and Norway. Such e-learning tools, when combined in a sensible way may be useful and effective addition to traditional teaching. The main tasks in this regard were:

a) Identification of the topics that would be deliverable on-line.

b) Development of a database for sharing and distribution of e-learning tools and materials.

The pilot topics developed in the CINCH project concerned the chemistry of the nuclear fuel cycle.

1.1.6 Management and Dissemination

The primary aim was to manage and coordinate the project activities and project partners. It was ensured that the project complied with FP7 rules, met the set objectives and produced the agreed deliverables. In addition, overall project finances were managed. Finally, the exploitation plan was developed.

The secondary aim was to guarantee dissemination of the information about the project and its results among the nuclear community with the stress on the potential end users of the results. The main expected result of this activity was keeping the interested public informed about the results achieved in this project.

1.2 Partners involved

The CINCH consortium included both academia and 'future employers', representatives of all the key players in the field have been included. The EU experience was faced with the Russian expertise; "Think-tank" activities were organized for gathering the views as broad as possible. The experience gained by former EU 6th FP projects like EURAC, ENEN II, ENETRAP etc and ENEN association during the coordination of nuclear engineering education was directly applied, among others to design the common qualification criteria, test running of relevant training and MSc course

modules and in the development of a sustainable system of long-term financing of the scheme.

1.3 Main Results

The main results of the project with the broadest impact to students, teachers, industries, and research community are a set of compact joint modular courses in different branches of modern nuclear chemistry, an electronic tool in the form of a virtual educational platform available for both education and training, and a long term sustainable strategy for the nuclear chemistry education including a roadmap for its implementation.

1.3.1 University curricula evaluation

The main obtained result is a comprehensive report of European university education in the field of nuclear chemistry.

During the evaluation, the essential content of each course was surveyed and compared. The credit points of courses were listed. Both lecture courses and practical laboratory courses were included in the survey. Curricula in various universities were compared based on various factors, such as stage of nuclear energy in the country in question. To keep the evaluation as objective as possible and to gather the main relevant points, the evaluation was done by means of a list of criteria defined. In designing these criteria, full use was made of the existing knowledge and expertise, especially that gathered by ENEN association, and of the suggestions of the Advisory Board with end-users.

Special attention was paid to the practical laboratory exercises in nuclear chemistry. A detailed database of the laboratory exercises available / in use at the universities in Europe was compiled. This database became a basic source of information for implementation of new or update of existing practical laboratory courses. It could also serve as the basic resource for drafting a future textbook of practical laboratory exercises in nuclear chemistry.

Also, a comprehensive list of available textbooks, university textbooks and other teaching aids that adequately cover all the topics within nuclear chemistry at different levels was compiled.

1.3.2 University curricula development

Optimum routes leading to various levels (Ph.D., master) of qualification in these fields were defined. The curricula were proposed for each of the various routes and levels of education identified in the form of “Minimum requirements”. The plan deals with essential knowledge (courses/modules/exercises) required at various levels. The curricula developed for the Master level of education should become a basis for the future “European Master in Nuclear Chemistry”. Entry points for trainees with different background and education levels were defined.

The main result was a set of curricula leading to different levels of nuclear chemical education including a ground for the future “European Master in Nuclear Chemistry”.

1.3.3 Identification and evaluation of the training needs

Compiling, reviewing and evaluating a list of training aids used by the industries in the field of nuclear chemistry and radiochemistry was performed. In this light, elements of optimum curricula for different target groups and different levels of radiochemical training were proposed. A plan was made of basic nuclear and radiochemistry training programme that should provide the professionals educated in non-nuclear disciplines of chemistry with the skills necessary for enrolling the topical modular courses developed in 3.2.

The result is a comprehensive report on nuclear industry park needs and their development in the next five to ten years together with their current training aids, concluded with proposed curricula for different target groups and different levels of radiochemical training to meet their needs.

1.3.4 Joint courses and Strategies development

Two types of such courses were developed

1. General purpose education/training courses in different branches of modern nuclear chemistry for the students and/or trainees with sufficient nuclear chemical background.
2. Dedicated training course designed namely for delivering the basics of nuclear chemistry to non-nuclear chemists, including the "senior" ones – e.g. employees of the end users requiring re qualification.

Three test courses were brought up to the level of verifying their functionality by running them once for approximately 10 students each at three of the participating universities.

One of the general-purpose sample courses was on the Chemistry of nuclear fuel cycle; the hosting institution was ENSCP.

Another sample general-purpose course was focused on Radioecology, the hosting institution was UMB. The course provided the insight of the relevance of applied radiochemistry, linking nuclear/radiological sources, ecosystem transport, biological effects and risk evaluation.

Dedicated training course on nuclear chemistry was held at CTU.

Another task done was to investigate the available sources of sustainable financing of the joint courses. The ENEN experience served here as the basis for the search.

The secondary objectives were

- To develop a long term strategy for the nuclear chemistry education.
- To gather all the inter-sectoral and international views together.

To meet the first of these aims, two Think-tank activities were organized to identify the major challenges the nuclear chemistry education faces now and in the future. The main actors in the field were brought together involving several the non-Consortium institutions.

Networking with the other European networks and organizations (ENEN, ENFTP, SNETP, etc.) and presenting the CINCH activities at various conferences in nuclear or generally energy field (such as e.g. FISA, GLOBAL, European Nuclear Conference, NRC-8 - the 8th international conference on Nuclear- and Radiochemistry, etc.) helped to have inter-sectoral and international views together to enable concentration more on the further exploitation (further development of the programme, or use in other areas).

1.3.5 An interactive database of teaching material and the CINCH e-learning platform

The interactive database developed and launched should provide teachers anywhere access to high quality teaching material and aids. An open structure was proposed and implemented as a "Wiki" (NukWik - https://wiki.uio.no/mn/safe/nukwik), which has a structure that encourages active participation in developing and updating the material. It is important to understand that such a database is a dynamic construction, where the users not only download material but also contribute by uploading their own material. In this way everybody will benefit in the long run by having a large selection of material and aids. In theory, such a wiki-database can be developed to provide a complete set of course material, including course book(s), exercises and laboratory instructions. The

CINCH project, however, only provided the platform and illustrated how the platform can be utilized. It is up to the end users to decide to what extent they want to base their courses and teaching on the Wiki, and how it should be structured.

An important part of WP5 was to identify optimum freely available e-learning management platform among the platforms already implemented at Universities and to develop and implement examples of how courses can be put together using such tools. Information originating from other WPs, in particular WP4, was used in putting together e-learning modules for selected courses.

The main expected results of this WP are an interactive wiki-database NukWik with some start up learning material and aids for nuclear chemistry and the CINCH Moodle e-learning management platform (http://193.51.253.155/cinch/). Furthermore, examples and recommendations for how open source and in-house E learning platforms can use the material in the wiki to build anything from small, compact courses to much more complex projects incorporating many courses and large groups of students were provided. The work in this WP covered the Phases 1 to 4 following the SAT approach (Systematic Approach to Training).

1.3.6 Dissemination

The main means of information dissemination were

- Project web page at http://www.cinch-project.eu/.
- A session dedicated to nuclear chemical education with a specific stress on the results achieved within this project that was organized during the NRC 8 conference (the 8th International conference on Nuclear- and Radiochemistry), which took place in September 2012 in Italy.
- Final public workshop presenting the results of the project both the general nuclear community and the general publics. The workshop was organized before the end of the project in Netherlands, within the frame of a joint winter school of FAIRFUELS, ASGARD and CINCH projects.
- Presentations of the CINCH project, both by lectures or poster presentations) at many international nuclear conferences and topical/project meetings, such as e.g. ACSEPT project meeting in Bologna (2009), APSORC09 conference in Napa, USA (2009), AtomiCarriers in Brussels (2009), 1st ACSEPT International Workshop in Lisbon (2010), RadChem 2010 conference in Marianske Lazne, 3rd and 4th EuCheMS Chemistry Congress in Nuerenberg or Prague, respectively (2010 and 2012), IAEA education meeting in Uppsala (2010), NESTet 2011 conference in Prague, GLOBAL 2011 in Japan, IEMPT 2012 meeting in Prague, Atalante 2012 conference in Montpellier and others.
- Distribution of CINCH-project handouts at the conferences listed above and at other occasions.

2 PLAN FOR USE AND DISSEMINATION OF FOREGROUND

All obtained results of the CINCH project will be used and exploited during and after the end of the project. The continuing application and potential expansion of the use of nuclear power requires maintaining the competence in education and training in nuclear chemistry and an increase of the numbers of the respective specialists, among others also nuclear chemists. The system under development will enable formation of a long-term Euratom Fission Training Scheme (EFTS) providing a common basis to the fragmented activities in this field and thus move the education and training in nuclear chemistry to a qualitatively new level.

The main target group are not only the doctoral students and research workers but also the students at the master level, including these students into the system should increase attractiveness of the studies of nuclear chemistry and thus enlarge the source of highly qualified professionals for the future employers.

2.1 Use and dissemination of CINCH foreground

CINCH project was from its nature strongly dependent on narrow cooperation between partners and intensive exchange of information in all its workpackages. Moreover, it was also based on finding new (associated) partners and accumulating knowledge outside of partner consortium. Obtained knowledge, contacts and prepared materials (e.g. courses, databases) will be exploited in future works.

2.1.1 Data about universities

One of the important CINCH results are a survey on universities giving education in nuclear and radiochemistry and a comprehensive report on European university education in the field of nuclear chemistry. The objective was to collect information on nuclear and radiochemistry education in the European universities, evaluate and compare curricula of various universities. The work done on this topic forms the basis for other CINCH achievements.

University institutes giving education in nuclear and radiochemistry in Europe were listed, involving not only EU countries but the whole Europe, including Russia. The universities are categorized into various groups depending on whether they give courses on bachelor, master or graduate levels. Another classification is be based on general area on which the university focus its education (general nuclear and radiochemistry, nuclear technology, radioecology, radiopharmaceutical chemistry etc). The List contains contact information, home page addresses, number of staff, number of students at various levels, specific areas etc. List was delivered to all listed institutes and posted on the project web site.

Another important and easily exploitable result is surveying, comparing and evaluating university curricula in nuclear and radiochemistry. Curricula of the listed universities were collected in nuclear and radiochemistry. All courses dealing with general nuclear and radiochemistry and applied nuclear and radiochemistry were included: principles on nuclear and radiochemistry, radiation safety (only if given in connection with nuclear and radiochemistry courses), detection and measurement of radiation (only if given in connection with nuclear and radiochemistry education programme), analytical radiochemisty, chemistry of the nuclear fuel cycle, radiopharmaceutical chemistry, radioecology, actinide chemistry, transactinide chemistry, etc. The essential contents of each course were surveyed and compared. The credit points of courses were listed. Both lecture courses and practical laboratory courses were included in the survey.

This enabled comparison of curricula in various universities based on various factors, such as stage

of nuclear energy in the country in question. Many nuclear and radiochemistry professors (or other responsible persons) were personally interviewed.

There are several universities in Russia giving education in nuclear and radiochemistry. The universities and the courses have been classified according to the general area on which they are focused: basic knowledge in nuclear and radiochemistry, radiochemical technology, radiopharmaceutical chemistry and some more specific topics, e.g. environmental radiochemistry, geochemistry, dosimetry, etc.

Methodology for the comparison and evaluation of the curricula was defined; the evaluation of the curricula is a key point for having an overview of the nuclear education in Europe. This evaluation has to be as objective as possible and must gather the main relevant points. For this purpose, the evaluation was done with the use of the existing knowledge and expertise, especially that gathered by ENEN association and former EU 6th FP projects like EURAC and ENEN-II.

The main exploit of the CINCH project is the preparation of ground for a future "European Master in Nuclear Chemistry". Presently, ENSCP have the experience of the implementation of an international Master of Nuclear Energy (http://www.master-nuclear-energy.fr/), and UMB has the experience in implementation and running of the European Master in Radioecology (http://www.umb.no/study-options/article/european-master-of-science-in-radioecology). These Masters are used as samples for building a European consortium for the future European Master in Nuclear Chemistry. The information collected in CINCH, namely the “Minimum requirements for a master’s degree in nuclear and radiochemistry“ will be precious for preparing the technical contents of the future “European Master in Nuclear Chemistry”.

2.1.2 Databases

The above mentioned list of universities giving education in nuclear chemistry and the collection of curricula of nuclear and radiochemistry courses has been complemented with several other databases. One of them is the database of existing practical exercises in nuclear and radiochemistry that has been compiled within the CINCH. Making use of the survey of the curricula of university practical laboratory courses, a detailed database of the laboratory exercises available / in use at the universities in Europe has been compiled. All the providers of practical laboratory courses have been invited to contribute detailed descriptions of work for the respective exercises into a common database. This database will thus become a basic source of information for implementation of new or update of existing practical laboratory courses. As a main exploit, it may also serve as the basic resource for drafting a future textbook of practical laboratory exercises in nuclear chemistry.

Similarly, a comprehensive list of textbooks, university textbooks and other teaching aids that adequately cover all the topics within nuclear chemistry at different levels has been compiled. This survey is not limited to the European textbooks but it covers all the textbooks that have been published in English or any European languages. The titles have been grouped based on their scope – e.g. general textbooks, nuclear fuel cycle chemistry textbooks, radioanalytical textbooks, etc. Suitable textbooks have been recommended for the identified routes and levels of nuclear chemical education. One of the exploits of this evaluation is the identification of the potential gaps in the coverage of the field by available textbooks and suggestion of the correction measures. The most important example of this effort is the identified lack of comprehensive textbook of practical laboratory exercises in nuclear chemistry

2.1.3 Training needs and courses

Identification of the needs of the current nuclear industry park as the largest employee of the graduates is one of the most important and potentially most exploited outcomes. Current nuclear industry park is facing a challenge in finding and training a whole new generation of employees.

One of the CINCH objectives has been to collect information on nuclear industry park (as the largest employee of the graduates) and the potential developments in the next five to ten years. In addition, an attempt was done to compile, review and evaluate a list of training aids used by the industries in the field of nuclear chemistry and radiochemistry.

Several "sample" joint compact modular courses and strategies have been developed for future use by consortium, partners and any interested end users. Three of these courses were brought up to the demonstration level and are ready to be re-run whenever a need arises. They are:

- General-purpose sample course focused on the chemistry of nuclear fuel cycle. The leader in the course development was ENSCP, France. It is focused on technological aspects of fuel preparation.
- General-purpose sample course focused on radioecology. The leader in the course development was UMB, Norway. The course provides the insight of the relevance of applied radiochemistry, linking nuclear/radiological sources, ecosystem transport, biological effects and risk evaluation.
- Dedicated training course focused on nuclear chemistry. The leader in the course development was CTU, Czech Republic. It is focused on the fundamentals of nuclear chemistry and basic hands-on laboratory training in radiochemistry and aims at providing a bridge for non-nuclear chemists to enter the field of nuclear chemistry.

In addition, curricula of a series of additional courses were proposed and developed. They are usually based on the courses existing at CINCH partners and they can be easily brought up to the demonstration level as joint modular courses.

2.1.4 Strategic studies

Very important outcomes of the project that have been designed as major exploits of obtained results and that will be extensively used in further work are the strategic studies that are also relevant for other groups working in similar direction. These include:

- Examination and comparison of alternative routes leading to a European Master in Nuclear Chemistry
- Evaluation of the options for a sustainable system for students and teachers exchange (including internships).

The extensive amount of information on various curricula in NRC was collected and analysed. Completed list was submitted to all of the participated institutes and universities for a feedback. Based on the received comments the contents of the report was updated and modified and the latest version of the report was uploaded onto the public CINCH project web site. Findings of the overall survey were also presented in the EuCheMS International conference on Nuclear and Radiochemistry at the Lake Como, Italy and in the Final public workshop of CINCH in Petten, Netherlands.

Among the various identified sources of financing, the programme "Erasmus for All" seems to be of high interest. In particular, the possibility of creation of "knowledge alliances" and "sector skills alliances" is highly attractive and could be a relevant way to strengthen the partnerships between higher education institutions and industrial end-users. In the same spirit, the creation of "chairs" supported by industrial end-users should be cautiously considered with a reasonable probability of success considering both the needs of recruitments and the quality of the consortium of universities involved in the NRC EuroMaster project. For the end-users, the contribution to such a chair would allow them to exchange with all the universities participating to the consortium in one step and to detect easily talents throughout Europe.

The networking associated with the NRC EuroMaster quality label awarded by ECTN Association could be developed in partnership with ENEN. As ENEN activities are not strongly orientated towards nuclear- and radiochemistry, the NRC EuroMaster project is not in competition which should favour a fruitful collaboration.

Other sources of financing include creation of continuing programmes based on modules available in the NRC EuroMaster, enrolment of non-EU students for which the tuitions fees can be high and of course a myriad of bilateral or national programmes.

2.1.5 CINCH wiki and CINCH Moodle

An important exploit of the CINCH project, that should be sustainable by its nature, is an open NukWik site at https://wiki.uio.no/mn/safe/nukwik/index.php/NukWik, containing learning aids for nuclear chemistry. This result will be widely utilized for education and training as the source of teaching materials and other useful information. Already now, some "seed material" has been placed there and is available for the general public in the field for downloading, further development, and extension.

A user-friendly e-learning platform CINCH Moodle was developed under the Learning Management System Moodle (http://193.51.253.155/cinch/). It aims at master/PhD students and other trainees. This interactive platform is available for e-learning modules or whole joint courses in nuclear- and radiochemistry. It should allow teachers and students to get information needed in the respective course in fast, interactive and sufficient form. This virtual education platform should facilitate the access of the educators as well as the students to Nuclear- and Radiochemistry courses without unnecessary mobility of personnel. These are key properties needed when running international courses. A sample original e-learning course entitled "Chemistry of the circuits of the nuclear power plants", presenting the state-of-the-art of the chemistry used in nuclear power plants, along with the prospective works under study to improve the efficiency and the life time of current and future nuclear power plants, was developed and implemented of this platform. The responses obtained in the test run were positive.

3 WIDER SOCIETAL IMPLICATIONS OF THE PROJECT

The CINCH consortium included both academia and 'future employers', representatives of the majority of the key players/countries in the field have been included. The EU experience was merged with the Russian expertise; "Think-tank" activities were organized for gathering the views as broad as possible. The experience gained by former EU 6th FP projects like EURAC, ENEN-II, ENETRAP etc and ENEN association during the coordination of nuclear engineering education was and will be directly applied, among others to design the common qualification criteria, the mutual recognition system, test running of relevant training and MSc course modules and in the development of a sustainable system of long-term financing of the scheme.

The results of the project are expected to have a broad impact to students, teachers, industries, and research community. This regards particularly the compact joint modular courses in different branches of modern nuclear chemistry, the electronic tool in the form of a virtual educational platform – CINCH Moodle – available for both education and training (both conceived as applicable at the Ph.D., life-long learning, and MSc. levels), and a long term sustainable strategy for the nuclear chemistry education including a roadmap for its implementation. Moreover, nuclear wiki "NukWik" has been developed as a source of information and a tool for teachers and students worldwide.

3.1 Advisory board

Established Advisory Board (AB) has been exploited to large degree in the course of the project, however it will continue to be an important point of reference even in the future. The contacts between CINCH partners and AB members were firmly established and those will be useful in future. Also, contacts established with the Young Generation network (YGN) initiatives aiming at fostering academia – industry collaboration may prove useful.

3.2 Networking

Networking with the other European networks, project consorita, and organizations (ENEN, ACSEPT, ACTINET I3, STAR, SKIN, IAEA, SNETP, etc.) and presenting the CINCH past, present and future activities at various conferences in nuclear or generally energy field (such as e.g. APSORC'09, ACSEPT International Workshop, RadChem 2010 – 16th Radiochemical Conference, IAEA "Technical Meeting on Training and Educational Systems for Nuclear Industry", STAR Stakeholder Workshop Helsinki, 26eme Journées de l'Innovation et de la Recherche pour l'Enseignement de la Chimie (JIREC), 3rd EuCheMS Chemistry Congress - Chemistry - the Creative Force, NESTet 2011 – Education and Training, Nuclear engineering science and technology, 5th International Symposium "Chemistry and Chemical Education" Vladivostok, ISEC 2011, GLOBAL 2011, etc.) helped to have inter-sectoral and international views together to enable concentration more on the further exploitation (further development of the programme, or use in other areas).

Networking provided for informing the whole community, all related sectors and industries. Links to other European networks and organizations listed above have been established to provide for information exchange and timely feed-back on the impact of CINCH activities. Presentations were and will continue to be delivered or small workshops held at bigger events and conferences in nuclear or generally energy field (in addition to those listed above such as e.g. FISA, 4th EuCheMS Chemistry Congress - Chemistry for Life, ATALANTE 2012, NRC8 – 8th International conference on Nuclear- and Radiochemistry, NEA Information Exchange Meeting in Partitioning &

Transmutation, etc.) to inform people about the project and its results and enable face-to-face discussions with anybody who is interested. If possible, similar information will be provided at the conferences outside Europe. Other means of contact are the videomeetings. The project uses well established videoconferencing platform and CINCH consortium members may also contribute to other online and face-to-face forums organized by other projects and associations. The scope is to have inter-sectoral and international views together to enable concentration more on the further exploitation (further development of the programme, or use in other areas).