

WORK PROGRAMME 2008

***EURATOM for Nuclear Research and
Training Activities¹***

(European Commission C(2007)5750 of 29 November 2007)

¹ In accordance with the Treaty establishing the European Atomic Energy Community and in particular Articles 7 and 10 as contextualised in the following decisions :
Council Decision 2006/970/Euratom of 18 December 2006 concerning the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011) and Council Decision 2006/976/Euratom of 19 December 2006 concerning the Specific Programme Euratom for nuclear research and training activities (2007-2011)

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GENERALITIES

Following the adoption of the 7th Euratom Framework Programme (FP7) and the corresponding Specific Programme for “Nuclear Research and Training Activities”² and “Rules for Participation”³, the Commission adopts work programmes with the assistance of the programme committees for fission and fusion. This work programme (WP) constitutes a financing decision for 2008. It defines the technical scope of actions and provides information on the implementation arrangements, in particular the provisions for the call for proposals to be issued at the end of 2007 for Fission research.

OBJECTIVES

Research and development activities in this work programme comprise two themes: Fusion Energy, and Nuclear Fission and Radiation Protection. In the priority theme of Fusion Energy, the overall objective is to develop the knowledge base for, and to realise ITER as the major step towards the creation of prototype reactors for nuclear fusion based power stations that are safe, sustainable, environmentally responsible and economically viable.

In the priority theme of Nuclear Fission and Radiation Protection, the overall objective is to establish a sound scientific and technical basis in order to accelerate practical developments for the safe management of long-lived radioactive waste, to enhance the safety performance, resource efficiency and cost-effectiveness of nuclear energy and to ensure a robust and socially acceptable system of protection of man and the environment against the effects of ionising radiation.

² Decision 2006/976/Euratom of the Council of 19 December 2006 (Euratom Specific Programme),

³ Regulation Number 1908/2006/Euratom of 19 December 2006

I. CONTEXT

I.1 Approach

Nuclear power is the principal carbon-free source of base load electricity in the EU, totalling some 135GWe of installed capacity and accounting for one-third of current electricity generation. It therefore plays a key role in limiting the EU's emissions of greenhouse gases, and makes an important contribution to improving the Union's independence, security and diversity of energy supply.

Energy policy is a growing concern at the EU level, as demonstrated by the set of energy-related Communications adopted by the Commission in early 2007, the so-called the Energy Package. Following a process of extensive consultation and analysis, the Commission intends to adopt before the end of 2007 a Strategic Energy Technology (SET-) Plan. This plan is intended to accelerate the development of the technologies that may help achieve the objectives set out in the EU Energy Policy Package. Nuclear energy technologies are among the options having the greatest potential for substantial contributions in reaching the energy and climate objectives. The SET-Plan is likely to propose changes in the way the energy research and innovation system operates in Europe and progress in the construction of an European Energy Research Area. It is also envisaged that the SET-Plan will propose the launch of specific European initiatives. Euratom Work Programmes will take due consideration of the proposals made in the SET-Plan.

Nonetheless, research on issues such as safety, waste and radiation protection will continue to figure prominently in the Euratom Work Programmes, in addition to R&D on the potential of future systems in line with Community policy to investigate a broad portfolio of future energy sources and carriers.

In the longer term, nuclear fusion offers the prospect of an almost limitless supply of clean energy, with ITER being the crucial next step in the progress towards this ultimate goal. The realisation of the ITER project therefore lies at the heart of the present EU strategy, though it must be accompanied by a strong and focused European R&D programme to prepare for the exploitation of ITER and to develop the technologies and knowledge base that will be needed during its operation and beyond.

The annual programme is established using a wide range of inputs to ensure that the activities supported maintain direct relevance to the evolving research needs of industry and EU policies in the nuclear field. Consultations with the two Consultative Committees for the Euratom programme, the Euratom Scientific and Technical Committee, the Advisory Group on Energy, the concerned stakeholders involved in the frame of the SET-Plan, as well as exchanges during projects meetings, Conferences, and the implementation of previous Work Programmes (especially the coverage following calls for proposals and evaluations), provide important input in areas of interest and elements of future topics. Specific forums, such as the European Strategy Forum on Research Infrastructures (ESFRI), may also provide the Commission with timely specific advice on opportunities and priorities with relevance to the Euratom research sector. Finally, for the Fission part, the Technology Platforms in the field of geological disposal and "Sustainable Nuclear Energy", and the resulting Strategic Research Agendas and Deployment Strategies will provide, in the future, important input for the Euratom Work Programmes in these areas.

In the theme of Fusion Energy the priority of the programme is the success of the ITER project which has been successfully negotiated in FP6. With the decision to site ITER at Cadarache in Southern France, the EU has taken the main responsibility for the project contributing up to 50% of its cost. In order to discharge the European obligations to the ITER project, a Joint Undertaking has been set up in Barcelona, Spain. This Joint Undertaking will also be responsible for providing the contribution of Euratom to Broader Approach activities with Japan for the rapid realisation of fusion energy and for the implementation of a programme of preparatory activities for the construction of a demonstration fusion reactor (DEMO) and related facilities including the International Fusion Materials Irradiation Facility (IFMIF). The Broader Approach activities include contributing to the Engineering Validation, Engineering Design Activities (EVEDA) of IFMIF, to the upgrade of the tokamak JT60 in Naka (Japan), and to the International Fusion Energy Research Centre (IFERC) in Rokkasho (Japan), which will cover design and R&D activities for a demonstration fusion reactor, fusion computer simulation and ITER remote experimentation. To prepare for the prompt implementation of the ITER experimental programme, the Euratom Associated laboratories will have a more focused research programme that will provide input to the preparation of ITER and the longer term activities. An important cornerstone of this research programme is the use, under the European Fusion Development Agreement (EFDA), of the JET facilities where important enhancements are being made that will provide data for the ITER programme. EFDA, in its new form adapted to this new phase of the programme, will also coordinate the activities of the Euratom associated laboratories by way of topical groups, task forces and implementing arrangements. Another aspect of the Fusion programme is the investigations into alternative concepts notably with the construction of the W7-X stellarator in Greifswald, Germany.

A review of all the facilities in the fusion programme, examining the possibility of phasing out facilities, and considering the need for new devices in parallel with ITER exploitation, has been initiated and will be completed in 2008. The review will be used as a basis for the possible support of existing/new or upgraded devices in order to ensure that the programme maintains a set of fusion facilities necessary to fulfil the overall objectives of the programme.

It is also necessary to maintain the expertise that has placed the EU fusion programme at the forefront of international research on fusion energy. This will also be provided through a programme of human resources, development, training, education and mobility.

Finally, calls for proposals may be organised to improve the "keep in touch" scientific outreach activities bringing together organisations and bodies involved in fusion energy-related matters e.g. to ensure cooperation with universities, or related scientific communities such as those in the materials and technology areas (see also §II.1.8).

In the theme Nuclear Fission and Radiation Protection, actions will be undertaken in five principal activity areas: management of radioactive waste, reactor systems, radiation protection, infrastructures and human resources. However, important cross-cutting links exist throughout the Euratom programme and, to some extent, with other EC programmes. This is considered in more detail in §I.4. To implement actions selected on the basis of calls for proposals, the following funding schemes are to be used:

- collaborative projects;
- networks of excellence;

- coordination and support actions;
- possible combinations of the above.

Collaborative Projects are subdivided into (i) large-scale integrating and (ii) small or medium-scale focused projects. The distinction is made on the basis of Euratom financial contribution, which for (i) is > EUR 3 million and for (ii) is <= EUR 3 million. This fixed threshold of EUR 3 million is an eligibility criterion. In addition, the requested Euratom financial contribution for a large-scale integrating Collaborative Project and a Network of Excellence shall not exceed EUR 6 million. For Coordination and Support Actions, the maximum Euratom contribution shall not exceed EUR 1 million. For combinations of a Collaborative Project and a Coordination Action (see below), the maximum Euratom contribution shall not exceed EUR 3 million. These maxima are also eligibility criteria. Other limits may be indicated in the Work Programme and call fiche for specific topics, in which case they would override the generic limits indicated above. Proposals that do not conform to the threshold and maximum limits will be rejected at the eligibility stage and not be further evaluated.

Training and mobility actions are embedded into the funding schemes. Refer to II.2.5 for more details.

Support in the field of infrastructures (existing or new research infrastructures of importance at European level) will be provided through either collaborative projects or coordination and support actions, or a combination of a Collaborative Project and a Coordination Action to combine integration, networking, access to infrastructures and joint research. This combination is used in the EC FP7 Capacities programme and is similar to the Integrated Infrastructures Initiative (I3) used in EC & Euratom FP6.

For both themes (Fusion⁴ and Fission), the forms of the grants to be used are indicated in Annex 3.

I.2 Scope of Work

This Work Programme contributes to the implementation of the Euratom Specific Programme. The calls for proposals planned within this work programme are those scheduled to be financed from the 2008 budget.

I.3 International Cooperation

The international and global dimension in European research activities is important in the interest of obtaining mutual benefit. FP7 is open to the participation of countries having concluded the necessary agreements to this effect, and is also open, at the project level and on the basis of mutual benefit and subject to acceptance by the consortia concerned, to the participation of entities from third countries and of international organisations for scientific cooperation.

⁴ In addition, see Euratom Rules for Participation, Chapter IV.

International cooperation is an important feature of the fusion research and training programme. The collaboration of third countries in the integrated European programme is through an extensive network of cooperation, including the ITER Agreement and general bilateral agreements and multilateral specific agreements and implementing programmes, the latter generally in the framework under the auspices of the International Energy Agency (IEA) or the International Atomic Energy Agency (IAEA).

In fission research and training, bilateral and multilateral scientific and technological cooperation agreements where Euratom is party constitute a good base for cooperation. This includes the Generation IV International Forum. Cooperation is nevertheless also possible even if such an agreement is not in place.

Entities from third countries may participate in projects in addition to the requisite minimum number of participants from Member States or Associated Countries. The guiding principle for international cooperation is mutual benefit, which leads to sharing the cost of the cooperation.

Therefore, in the case of a participating international organisation, or a legal entity established in a third country, a Community financial contribution may be granted only if at least one of the following conditions is satisfied:

- provision is made to that effect in the Specific Programme or this Work Programme;
- the participation is essential for carrying out the action;
- such funding is provided for in a bilateral scientific and technological agreement or any other arrangement between the Community and the country in which the legal entity is established.

To foster international cooperation, a structured dialogue may be established with third countries to define areas and topics of mutual interest.

International cooperation activities could also include the invitation on an ad hoc basis of third country representatives to some projects meetings or training actions. In these cases, limited funds for participation of representatives from ICPCs (Annex 1) should be earmarked in the project budgets.

Cooperation between Euratom and the OECD/NEA and IAEA in nuclear fission research and training should build on their established competences and historical records tracking nuclear development and associated acquired knowledge. IAEA might also play a support role in fostering cooperation between Euratom and countries not yet having a fully developed nuclear infrastructure.

In the area of nuclear fission and radiation protection, enhanced international cooperation will also be fostered via the proposed trans-national networking of Euratom NCPs and contacts from third countries. A topic for supporting this action is presented in §II.2.6.

I.4 Cross-Cutting Issues and Proposals

Particular attention has to be paid to those technical actions cutting across Euratom Fusion and Fission parts of the Programme, as well as Euratom and EC Specific Programmes. Interactions between the different actions should be adequately accommodated. Examples include:

- the horizontal aspects of training and research infrastructures, which are critical elements in the maintaining of knowledge and competences;
- the common development of risk analysis tools and means (including computational platforms);
- research on advanced materials and production technologies;
- the human factor and man-machine/technology-organisation interface dimension;
- developments in advanced Instrumentation and Control for industrial processes;
- the approach to standards and regulations;
- the complementarity between different types of reactors and other nuclear systems for the burning (transmutation) of high-level radioactive waste;
- links with other energy areas (including synfuel and hydrogen production using high temperature reactors);
- cellular and molecular biology, systems biology and epidemiology more generally;
- emergency response and management;
- the uses of ionising radiation in medicine and industry;
- communication on and societal acceptance of technologies.

The following broader issues are of particular importance, and specific arrangements for a coordinated approach between the Euratom and EC Framework Programmes might be foreseen:

- *Cooperation Specific Programme:* In the area of advanced materials, new production technologies and integration of technology for industrial application for high performance surfaces and materials, computational modelling, information technologies, etc.
- *Capacities Specific Programme:* (i) In the area of *research infrastructures* there needs to be close collaboration to ensure support for key nuclear research infrastructures with more general research applications; (ii) The *Science in Society* activity also has parallels in activities in the nuclear sector, and there is a clear potential for mutually beneficial cross-fertilisation in areas such as

governance and stakeholder issues, especially those associated with the local acceptance of controversial facilities or technologies.

- *Security Research Programme:* Adequate consideration regarding the mitigation of impacts from the malevolent use of radioactive material.
- *Link with Community policies:* Arrangements for effective coordination within the Commission services will be put in place, in particular to ensure that activities continue to respond to developments in EU policies. For this purpose, the multi-annual programming may draw on the help of user groups from different Commission services associated with the policies concerned.

I.5 Submitting a Proposal

There are significant differences between the management and funding of the two themes. In the theme Fusion Energy the main funding schemes are through Contracts of Association between Euratom and national research organisations or bodies and multilateral agreements. Within these contracts and agreements an annual work programme is agreed and implemented. For this part of the fusion energy research programme there are generally no calls for proposals. For some actions, such as coordination and support actions or human resources, education and training, calls may be made. The content of the programme is described in §II.1 and details of any calls are provided in §III.1. For the theme Nuclear Fission and Radiation Protection the details of the activities, areas and topics are presented in §II.2. § III.2 provides the information on the corresponding call(s) for proposals.

Proposals should be submitted under the terms of a call for proposals set out in §III. In order to submit a proposal, a proposer should consult the following:

- this work programme;
- the relevant call for proposals as published in the *Official Journal of the European Communities*;
- the relevant Guide for Applicants.

These and a number of other useful texts, including the rules for participation, are available on the CORDIS Website <http://cordis.europa.eu>. The latter should be consulted to ensure that the documents being used are the most recent. Some will be revised during the programme lifetime and even the duration of a particular call for proposals.

I.6 Evaluation Criteria and Related Issues

The “Guidelines on Proposal Evaluation and Project Selection Procedures” describe the basic procedures to be followed by all programmes under FP7. The set of criteria and thresholds applicable to this work programme are given in Annex 2. Any complementary criteria or thresholds, if applicable, are clearly stated in the relevant part of this Work Programme, at the topic level.

Furthermore, the work programme, and consequently its call(s) for proposals, may specify and restrict the participation of legal entities to take into account specific objectives of the Framework Programme.

When evaluating proposals received in response to a call, the Commission may opt to send the proposals to external experts or make proposals available by electronic means, so that experts can carry out their examination at home or their place of work.

For the fission call of this work programme, §III.2 provides indicative budgets for activities, areas or combinations of areas defined in the Specific Programme. The purpose is to ensure a balance of the programme commensurate with strategic needs, while also facilitating the ranking of proposals following the evaluations. At the end of the evaluation process, proposals will be ranked within their indicative budget groups and funded according to the indicative budgets shown in §III.2. Hence there will be competition between topics in the same indicative budget group, and some topics may end up not being supported if proposals fail to reach a high enough standard (even though proposals in other groups with lower overall scores will be funded) or if this Work Programme limits the maximum number of proposals that may be funded under one single topic. Proposals scoring above all evaluation thresholds, but for which sufficient funding is not available, will be put on a common reserve list for the whole call, from which proposals will be considered for funding if additional funds become available from any part of the call. In the ranked lists per group and the reserve list, all funding schemes have the same weight, the priority order being determined by total score. To separate tied proposals, the score for criterion 1 will be given priority, followed by that for criterion 3. Proposals on the reserve list are not carried over for funding from next year's budget. Depending on the strategic nature of the topic in question, the Commission may, in such cases, decide to reinsert the topic in next year's Work Programme.

I.7 Ethical aspects

All research carried out under this work programme must respect fundamental ethical principles, and the requirements set out in the text of the Euratom Specific Programme and Rules for Participation. More information on the procedures for the review, where appropriate, of ethical aspects of submitted proposals is given in the "Guidelines on Proposal Evaluation and Project Selection Procedures".

II. CONTENT OF PROGRAMME AND CALL(S) IN 2008

II.1 Fusion Energy

The content of the Fusion Energy programme has several facets covering the full range of funding schemes. These are:

- **International agreements** including those covering the construction and exploitation of ITER and the implementation of Broader Approach Activities;
- **European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy')** to discharge the responsibilities of the European Union towards the ITER Agreement and the Broader Approach activities;
- **Contracts of Association** which are bilateral contracts between research organisations or bodies in all the Member States and Euratom Associated States (Switzerland) and the Community. Some Contracts of Association will include activities of research institutes in more than one Member State (transnational research Units);
- **European Fusion Development Agreement** between all the Associates (signatories of a contract of association) to fully exploit the JET Facilities and possibly other fusion devices and coordinate the research activities, including training, carried out under the Contract of Association;
- **Other multi-lateral agreements**, such as the Mobility Agreement, that promote the collaboration and mobility of researchers between the different research organisation and facilities;
- **Human resources, education and training** which are supported through training and career development fellowships via EFDA through the Contracts of Association.
- **Coordination and Support Actions** aimed at strengthening the interfaces of the fusion community with related scientific communities.

II.1.1 Activity: ITER International Organisation

The ITER Agreement was signed by the Parties in Paris on 21 November 2006, together with the agreement on its provisional application. It is expected that the ITER Agreement will enter into force before the end of 2007 after each of the Parties has informed the Depository (IAEA) that all the constitutional requirements for ratification, acceptance or approval have been met. The resources for the construction phase will be provided predominantly by contributions in kind. The procurement of the components to be provided in kind will be under the responsibility of the Member of the Organisation providing that component, acting through its Domestic Agency (see §II.1.3). The ITER Organisation will also receive contributions in cash from its Members.

The ITER Agreement contains specific provisions for the Host Party EURATOM to make available or cause to be made available to the ITER Organisation the site in defined initial

conditions and the support required for the implementation of the ITER Project. The site preparation activities, launched in 2007 will continue in 2008 with the platform levelling and excavation work as the main activity.

II.1.2 Activity: Broader Approach activities

The Agreement between the European Atomic Energy Community and the Government of Japan for the Joint Implementation of the Broader Approach Activities in the Field of Fusion Energy Research ("the Agreement") was signed on 5 February 2007 in Tokyo.

The Agreement entered into force on 1st of June 2007. It comprises three large research projects to be jointly implemented, aiming at supporting the ITER project and at an early realisation of fusion energy as a clean and sustainable source of energy for peaceful purposes, and will be open to participation of other ITER Parties.

The three projects are 1) the Engineering Validation and Engineering Design Activities for the International Fusion Materials Irradiation Facility (IFMIF/EVEDA), 2) the International Fusion Energy Research Centre (IFERC), and 3) the Satellite Tokamak Programme. The first two projects will be carried out at Rokkasho; the third project will be carried out at Naka. The Euratom contribution to the Broader Approach activities consist mainly of in-kind procurements provided voluntarily by Member States (presently France, Italy, Spain, Germany) and also by Switzerland and transferred through the Joint Undertaking. These contributions are made in the form of in-kind equipment, and staff for project teams in Japan. A small part of the total comes from Community funds.

The activities launched in 2007 will continue and expand in 2008 with the organisation of teams in Europe and the implementation of design and procurement activities for the three projects.

II.1.3 Activity: The European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy')

The Euratom contributions to the ITER Organisation, the Broader Approach activities as well as the implementation of activities in preparation for DEMO and IFMIF will be provided by the European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy'). The Community contribution will be based on the Council decision No 2007/198/Euratom of 27 March 2007 and on the Joint Undertaking activities as detailed in its project plan and resources estimate plan. The Community will also contribute to the administration expenses of the 'Fusion for Energy'.

The Euratom participation in ITER will include contributions to the construction of equipment and installations, which are within the perimeter of the ITER site and necessary for its exploitation, as well as to the costs associated with the staffing and management of, and the support to be given to, the project during construction. The participation will also include contribution to the costs to be borne by Europe as a Host Party. The Euratom contributions to the Broader Approach activities will include coordination of voluntary contributions of Member States and Associated States including design and procurement activities for IFMIF and JT60, launching of urgent procurements for the Satellite Tokamak Programme and

activities related to IFERC. The Joint Undertaking will also support other activities related to preparing for DEMO.

II.1.4 Activity: Programmes of the Associations

Through the Contracts of Association⁵, the Commission and the Associates (Member States through their fusion research laboratories and institutes or these entities as entrusted by Member States) carry out jointly activities within the thematic area "fusion energy research" within the 7th Community (Euratom) Framework Programme. Such activities are detailed in the Annual Work Programme of the Association, following a multi-annual Work Plan annexed to each Contract. The co-ordinated activities under EFDA which are part of the Annual Work Programme of the Association shall be defined in accordance with the EFDA Work Programme and the corresponding work shall be executed in accordance with the relevant provisions of the EFDA and its Implementing Agreements. As regards the additional support foreseen in the provisions (Article 8.2 and Article II.4a of the General Conditions) of the Contracts of Association and under EFDA, with the revised EFDA agreement the scientific programme of the Associations will become more coordinated. The contribution of the Associations to EFDA will include the joint scientific exploitation of the JET facility in order to contribute to ITER physics as well as on ITER-relevant work notified under EFDA. Activities identified as priority actions in the EFDA Work Programme will be supported by priority support. Facility upgrades will be eligible for priority support when they contribute to such activities and after recommendation through EFDA. The training and career development of scientific and technical personnel, the dissemination of results and the diffusion of information to the public will be an integral part of the activities of the Associations. This will include exchange of information through conferences, seminars, workshops, scientific and technical meetings, publications and other actions to promote technology transfer.

The Associations' activities will be programmed annually and the content of activities and facilities eligible for funding will be adapted after the comprehensive review of facilities to be carried out during 2008. The funding of some facilities may be phased out.

II.1.5 Activity: Association Programme within the European Fusion Development Agreement

The EFDA is a multilateral framework partnership agreement, intended to coordinate at European level the research activities carried out under the bilateral Contracts of Association. Following the conclusion by the Community of the ITER agreement, signed on 21 November 2006, and the establishment of the European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy'), the scope and procedures of the EFDA have been adapted to the new international and European framework of the thematic area "Fusion energy research", as stated, in particular, in point 2 of the Annex to the Euratom Specific Programme. The EFDA under FP7 shall cover the following interrelated activities, which will complement those carried out by the 'Fusion for Energy':

- I. Co-ordinated activities in physics and emerging technology;

⁵ See Articles 51 and 52 of Chapter IV of the Euratom Rules for Participation

- II. The collective use of the JET facilities *through the JET Operation contract and the JET orders and notifications*;
- III. Training and career development of researchers, promoting links to universities and carrying out support actions for the benefit of the thematic area of research "fusion energy";
- IV. the European contributions to international collaborations that are outside of the scope of the 'Fusion for Energy'.

These activities are further described in a multi annual Work Plan. It should be noted that the collective use of the JET facilities is the only activity that remains unmodified from the previous agreement. Activities I to III are mirrored, as regards their implementation, in specific provisions of the bilateral Contracts of Association.

In the case of training actions in 2008, the EFDA Work Programme will identify priority areas to train jointly up to 40 engineers and researchers for a period of up to 3 years per researcher. This training will receive up to 40% Community contribution via the Contracts of Association.

To provide encouragement for excellence and career development, up to 10 exceptional candidates and research topics per year will be identified via the appropriate EFDA procedures. These candidates will be eligible for Community support as defined in §III.1 via the Contracts of Association for a period of 2 years per researcher.

The activities supported under EFDA during 2008 are further defined in the EFDA Work Programme.

II.1.6 Activity: Mobility of Researchers

The Mobility Agreement sets the framework for supporting the mobility of the researchers and trainees from the organisations participating in the programme, in order to promote enhanced collaboration and integration of the programme, and to foster international co-operation. Synergy and complementarity with other themes will be highlighted. It will apply to:

- cooperative work of the Associations;
- participation to ITER and the Broader Approach;
- cooperative work under EFDA and participation in meetings in support of the EFDA international corporations such as International Tokamak Physics Agreement (ITPA);
- participation in keep in touch activities, training, career development and support actions.

II.1.7 Activity: Training, career development fellowships and support actions

The activities should ensure adequate human resources and a high level of cooperation within the programme, both for the immediate and medium term needs of ITER, and for the further development of fusion. They will include high-level training for engineers and researchers at post-graduate and post-doctoral level, including the use of facilities in the programme as training platforms and dedicated seminars and workshops. These activities will be included in the Associations work programme as activities to be carried out under the EFDA (§ II.1.5 above).

II.1.8 Activity: Coordination and Support Actions

These activities will aim at strengthening the interfaces of the fusion community with related scientific communities.

No calls are foreseen during 2008:

II.1.9 Activity: Integrated Infrastructures Supporting Cross-cutting Activities

There are no calls foreseen during 2008.

II.1.10 Activity: Cost Sharing Actions

Cost sharing actions to promote and contribute to fusion energy research with bodies in the Member States or Associated Countries that are not associated with the Seventh Framework Programme. No calls are foreseen in 2008.

II.2 Nuclear Fission and Radiation Protection

The activities and associated objectives include:

Management of radioactive waste

To support the implementation oriented research and development activities on all remaining key aspects of deep geological disposal of spent fuel and long-lived radioactive waste and, as appropriate, demonstration of the technologies and safety, and to underpin the development of a common European view on the main issues related to the management and disposal of waste. Research on partitioning and transmutation and/or other concepts aimed at reducing the amount and/or hazard of the waste for disposal.

Reactor systems

To support research to underpin the continued safe operation of all relevant types of existing reactor systems (including fuel cycle facilities), taking into account new challenges such as lifetime extension and development of new advanced safety assessment methodologies (both the technical and human element), including as regards severe accidents, and to assess the potential and safety and waste management aspects of future reactor systems in the short and medium term, thereby maintaining the high safety standards already achieved within the EU and considerably improving the long-term management of radioactive waste.

Radiation protection

To support research, in particular on the risks from low doses, on medical uses and on the management of accidents, to provide the scientific basis for a robust, equitable and socially acceptable system of protection that will not unduly limit the beneficial and widespread uses of radiation in medicine and industry. Research to minimize the impact of nuclear and radiological terrorism and diversion of nuclear material will be managed in close cooperation with the Theme Security under the EC Cooperation Research Programme.

Infrastructures

To support the availability of, and cooperation between, research infrastructures such as material test facilities, underground research laboratories and radiobiology facilities and tissue banks, necessary to maintain high standards of technical achievement, innovation and safety in the European nuclear fission energy and radiation protection sector.

Human resources, mobility and training

To support the retention and further development of scientific competence and human capacity (for instance through joint training activities) in order to guarantee the availability of suitably qualified researchers, engineers and employees in the nuclear sector over the longer term.

A significant part of the support for human resources, mobility and training will be implemented by encouraging the embedding of this support within the Networks of Excellence, Collaborative Projects and, where appropriate, other actions. It is considered that 5% of the total project budget should be dedicated to these activities. Projects in all

areas are therefore encouraged to develop a comprehensive "training and (trans-national) mobility" package. In addition to these embedded training and mobility actions, some Coordination Actions may be specifically dedicated to the development and implementation of *Euratom Fission Training Schemes*. These will mainly target domains where there is a recognised and well-defined need to maintain, expand or build competence in a given field. More can be found on the training actions under II.2.5.1.

An important aim of the work programme is to cater adequately for those topics that cut across more than one of the above activities (see §I.4). Where necessary, such topics are presented under a separate activity of the work programme.

Depending on the strategic nature of the research, the *expected impact* may be defined either at the level of the Activity / Area or at the specific topic level. Usually a maximum of one project will be considered for funding per topic. Where more than one project per topic may be considered for funding, the *funding scheme* for that topic is indicated in the plural. In some specific cases, a larger maximum number of projects to be retained for funding under one topic may also be mentioned. Introductory text under "Activity" and "Area" is taken from the corresponding Specific Programme. However, topics proposed in this work programme cover only a part of possible actions falling within the scope of the Specific Programme.

To the extent possible, synergy and complementarity with other themes will be taken into consideration during the evaluation and negotiation phases.

II.2.1 Activity: Management of Radioactive Waste

Through implementation-oriented research and technological development (RTD), the activities aim to establish a sound scientific and technical basis for demonstrating the technologies and safety of disposal of spent fuel and long-lived radioactive wastes in geological formations, to underpin the development of a common European view on the main issues related to the management and disposal of waste, and to investigate ways of reducing the amount and/or hazard of the waste by partitioning and transmutation or other techniques.

II.2.1.1 Area: Geological disposal

RTD in the field of geological disposal of high-level and/or long-lived radioactive waste involving engineering studies and demonstration of repository designs, in-situ characterisation of repository host rocks (in both generic and site-specific underground research laboratories), understanding of the repository environment, studies on relevant processes in the near field (waste form and engineered barriers) and far-field (bedrock and pathways to the biosphere), development of robust methodologies for performance and safety assessment and investigation of governance and societal issues related to public acceptance.

Expected Impact: Advances in the treatment and understanding of key issues crucial for safety, either in the operational phase or over the longer term, of geological repositories. In particular, this should lead to demonstrable improvements in robustness of associated performance and safety analyses and ultimately increased confidence in the safety case as it relates to specific scientific/technical fields or physical components of a repository system.

Topic: Fission-2008-1.1.1: Gas generation and transport in support of performance assessment

The scope of the action could include work on the mechanisms and processes governing gas production and migration from waste emplacement to the backfill and host rock. It could focus on the establishment of the boundary conditions for gas migration including the physical understanding of the phenomena (geochemical interactions between radionuclides, gas, water, rock and EBS), the kinetics and balance in time of the gas production and consumption processes, modelling of laboratory data and in situ experiments for extrapolation in time and at large scale, and assessment of potential impacts with respect to development of scenarios and optimisation of systems designs. A proposal integrating the key research stakeholders (waste management organisations, regulatory authorities and research institutions) is expected to establish a common European view on these issues. The proposal should take into consideration previous work in this field and the emerging results from related on-going FP6 projects. A multi-disciplinary approach with effective integration of experimentalists, modellers and designers is essential in addressing these issues. **Funding scheme:** Maximum one large-scale Collaborative Project

Topic: Fission-2008-1.1.2: Strategies and technologies for repository monitoring

The work should include: (i) the definition of methods and approaches for and development of monitoring strategies for the operational and staged closure phases of a geological repository (what, why, how, when and for how long) as a contribution to the objective of demonstrating the safety of the disposal system; (ii) establishing decision-making procedures in phased disposal processes that address public concerns; (iii) development of monitoring technologies and methods for selected time frames and steps of the phased disposal process for implementation and use in national monitoring strategies; (iv) testing of the monitoring technologies in one-to-one scale demonstrators and/or pilots in repository situations. For this action, the involvement of leading radioactive waste management organisations is essential. Close co-ordination and involvement of regulatory authorities is strongly recommended. Ways and means to involve and seek input from local stakeholders and the public concerned by repository projects should be investigated. Extensive communication with and dissemination towards the public and all stakeholders is expected. **Funding scheme:** Maximum one small or medium-scale Collaborative Project.

Topic: Fission-2008-1.1.3: Long-term performance of Engineered Barrier Systems (EBS)

Focus of the work will be on evaluating the sealing and barrier performance of EBS with time through extrapolation of the short-term effects of various key processes on the long term, including evolution of their relative impacts. The work plan should include laboratory and field experiments targeted at studying in particular the behaviour of the interfaces within and between EBS components as well as with the host rock, in normal and altered evolution scenarios. Numerical simulation will include the development of modelling tools for simulation over long periods of time and at scales that cannot be represented through experimentation. The final report of the project should include an analysis of the impact of the findings in terms of performance and safety assessment as well as guidance for repository design and construction. For this action, a multi-disciplinary and integrated approach is expected. Involvement of leading radioactive waste management organisations, regulatory authorities, research organisations and universities is essential. **Funding scheme:** Maximum one small or medium-scale Collaborative Project

Topic: Fission-2008-1.1.4: Consensus views on scientific/technical knowledge for the safety case of geological repositories

For a given scientific/technical field or physical component of a repository system (e.g. waste forms and degradation, actinide sciences, near-field and far-field processes and other pertinent aspects of a repository safety case), the objective is to develop a comprehensive scientific/technical consensus and/or state-of-the-art assessment based on current knowledge of and confidence in the long-term repository safety and to identify key remaining issues deserving further support at European level following completion of current FP6 research projects and other on-going research. Leading radioactive waste management organisations together with regulators and key research organisations are essential for this action. These consensus views and state-of-the-art assessments would provide essential input to the establishing of the strategic research agenda of an eventual European Technology Platform in the field of geological disposal and could also be used as vehicles for communication with wider audiences and stakeholders. A dissemination event should be organised to present and discuss the recommendations with the wider research community and stakeholders. **Funding scheme:** Coordination and Support Actions (supporting).

II.2.1.2 Area: Partitioning and transmutation

RTD in all technical areas of partitioning and transmutation (P&T) which could be the basis for the development of pilot facilities and demonstration systems for the most advanced partitioning processes and transmutation systems, involving sub-critical and critical systems, with a view to reducing the volumes and hazard of high-level long-lived radioactive waste issuing from treatment of spent nuclear fuel. Research will also explore the potential of concepts that produce less waste in nuclear energy generation, including the more efficient use of fissile material in existing reactors

Expected impact: Demonstrable contribution to the progress towards the development of sustainable nuclear technologies in line with the initial roadmaps outlined in the September 2007 Vision Report of the Sustainable Nuclear Energy Technology Platform. Proposals need in particular to contribute to the selection, design and development of future reactors and systems, and/or to the possibility of closure of the nuclear fuel cycle. Actions are also expected to contribute to the competitiveness of European industry in this field.

Topic: Fission-2008-1.2.1: Establishment of a Central Design Team (CDT) for a fast-spectrum transmutation device

The scope of activities of the CDT could include: (i) development of the Engineering Design of a first-step experimental device that may serve both as a test-bed for transmutation and as a fast spectrum irradiation facility, operating as a sub-critical (accelerator driven) system, and/or as a critical reactor; (ii) definition of new R&D activities, if any, in the aid of design and construction of such a facility; (iii) detailed analysis of the site specifications and regulatory requirements to host such a facility; (iv) monitoring of the progress of R&D activities underway for the construction of a next-step European Transmutation Demonstration facility with minor-actinide fuel. This action needs to be conducted in synergy with teams that may be engaged in the feasibility study of an associated pilot-scale chemical separation facility and an advanced fuel-production unit in Europe. The multi-disciplinary team should be drawn from European nuclear industry and research establishments across EU including a significant participation of the host institution in terms of support and assistance.

The activities of the design team should be conducted in accordance with the road-mapping exercise undertaken in the FP6. **Funding scheme:** Maximum one small or medium-scale Collaborative Project

Topic: Fission-2008-1.2.2: Transmutation fuels and targets and their reprocessing

The scope could include: (i) development of fabrication technology and assessment of transmutation performance of inert matrix fuels and targets containing, among others, Curium, with a view to optimising the choice between homogeneous or heterogeneous reprocessing; (ii) reprocessing of irradiated actinide targets to provide optimised reprocessing routes for CERCER- and CERMET-based targets and provide a ranking between various types of inert-matrix targets with respect to “reprocessibility”; (iii) Post Irradiation Examination (PIE) of Accelerator Driven Systems and fast reactor fuels and targets currently underway in European programmes with a view to providing in-depth information on the irradiation behaviour of oxide/nitride inert matrix fuels and targets; (iv) modelling aspects of inert matrix fuel behaviour under irradiation in support of the above PIE. The action needs to be conducted in synergy with teams that are engaged in other fuel and actinide partitioning projects world-wide, while maintaining close links with Generation IV, wherever appropriate. The research activities should be conducted in accordance with the road-mapping exercise undertaken in the FP6. **Funding scheme:** Maximum one Collaborative Project, either small or medium-scale or large-scale.

II.2.2 Activity: Reactor Systems

The aim is to ensure the continued safe operation of existing installations and, as a contribution to enhancing diversity and security of supply and combating global warming, to explore the potential of more advanced technology to deliver an even safer, more resource-efficient and more competitive exploitation of nuclear energy.

Throughout this activity, it is particularly important for the success of the envisaged actions that as broad a range of stakeholders as possible participate, e.g. research organisations, systems suppliers and architect engineers, utilities and associated services, regulatory bodies and associated technical safety organisations (TSOs), and education and training institutions. In addition, certain actions could also benefit from enhanced cooperation with third countries, and appropriate links are to be encouraged where practicable and mutually beneficial.

II.2.2.1 Area: Nuclear installation safety

RTD in operational safety of current and future nuclear installations, especially plant life assessment and management, safety culture (minimising the risk of human and organisational error), advanced safety assessment methodologies, numerical simulation tools, instrumentation and control, and prevention and mitigation of severe accidents, with associated activities to optimise knowledge management and maintain competence.

Expected impact: Demonstrable contribution to the progress towards the development of sustainable nuclear technologies in line with the initial roadmaps outlined in the September 2007 Vision Report of the Sustainable Nuclear Energy Technology Platform. Actions must enable the EU to take a leading position in the field of advanced numerical simulation in support of the continued safe operation of nuclear reactors, and contribute to improvements in

residual lifetime prediction in order to assist decision making in this area regarding both existing and future reactors. Ultimately, this could lead to the development of common strategies and practices for plant safety and lifetime management at EU level.

Topic: Fission-2008-2.1.1: Sustainable integration of European research on severe accident phenomenology and management

The project should establish a self-sustaining organisation in the field of severe accident research through activities in networking, integration, knowledge management, exchange of information, dissemination of results and training in order to keep the competence in severe accident management alive in Europe. The project must include a contractual obligation to create an appropriate legal entity by the end of the project. It is envisaged that there could be up to a maximum of approximately 10 members of the network core group. Regarding the benchmarking activities of the ASTEC model, this should be continued with a view to its qualification for all types of existing water-cooled reactors in Europe. The interpretation circles working on the results of experimental programmes, in particular Phebus FP, International Source Term Programme and ISTC projects should be further integrated into the European severe accident research community. The active participation of the research community and users (industry and regulators) within the project is required to meet the objectives of the project. In addition, as part of the joint programme of activities (JPA), research programmes may be proposed, developed and implemented to resolve one or two of the remaining priority issues in severe accidents identified in current research: e.g. in-vessel degraded core coolability and/or ex-vessel corium coolability and interaction with concrete. These will include experimental work and validation of models for the ASTEC simulation tool. If such research programmes form part of the proposal, funding should be greater than that dedicated to the rest of the JPA. **Funding Scheme:** Maximum one Network of Excellence.

Topic: Fission-2008-2.1.2: Numerical coupling of safety-relevant phenomena

This topic builds on the results of on-going research in Europe and will contribute to the development of the next generation of experimentally validated "best estimate" tools for modelling and numerical simulation of two-phase thermal-hydraulics and core physics for present PWRs and BWRs, as well as for future reactors, using a common and well-proven informatics platform. The aim is to create a European pole of excellence in reactor safety computations. The project should mainly address: (i) coupling of core physics and thermal hydraulics models for reactor safety; (ii) addition of models related to fuel behaviour; (iii) sensitivity and uncertainty analysis using deterministic and statistical methods, where appropriate; (iv) experimental validation, using industrial plant data and results of existing or new experiments, as necessary, in order to qualify the models, in addition to other means of validation such as benchmarking with other qualified calculation codes when available. A users' group should test the new tools in a number of benchmark exercises with a view to their qualification. A strong interaction with the NEA and/or IAEA databanks is to be proposed to avoid duplication of efforts. **Funding Scheme:** Maximum one large-scale Collaborative Project.

Topic: Fission-2008-2.1.3: Prediction of irradiation effects on reactor pressure vessel, internals and/or claddings using multi-scale simulation tools

The research activities build on previous actions, which focused on initial multi-scale modelling of irradiation effects on reactor pressure vessels and internals using a qualified

software integration platform, contributing to the creation of a European pole of excellence in numerical simulation for residual lifetime prediction. The present project should include: (i) the production of an advanced Fracture Toughness Module modelling the irradiation degradation on reactor pressure vessels of PWRs and BWRs for a duration of up to 60 years; (ii) coupling of corrosion and irradiation effects on reactor internals and/or fuel claddings in PWRs and BWRs; (iii) experimental validation and model qualification using industrial plant data and results of existing or new experiments (including non-EU sources) as necessary, in addition to other means of validation such as benchmarking with other qualified calculation codes when available. A users' group should test the newly developed informatics tools in a number of benchmark exercises with a view to their qualification. Close links will be established with the NEA and/or IAEA databanks. **Funding Scheme:** Maximum one large-scale Collaborative Project.

Topic: Fission-2008-2.1.4: Structural integrity assessment for safety and lifetime management of the Reactor Coolant System piping and components (other than the Pressure Vessel)

The research should identify and qualify realistic failure modes relevant to the ageing and lifetime management of reactor coolant systems in order to develop, improve, unify and qualify methods of structural integrity assessment, based on relevant experience feedback and case studies from a utilities users' group. This should be done with the support of an effective knowledge management database system. A set of tools needs to be developed to validate and test (pilot case) the identified failure modes. In close collaboration with the users' group, unified best practice procedures for the ageing and lifetime management for the reactor coolant system (piping and components) are to be developed, validated and tested (pilot exercise). These activities should cover issues such as weld repairs, dissimilar metal welds, leak-before-break concept, and ageing phenomena, including environmental effects. **Funding Scheme:** Maximum one small or medium-scale Collaborative Project.

Topic: Fission-2008-2.1.5: Risk-informed methodologies for Plant Life Management

There is no common approach for existing plants on how to evaluate (residual) safety margins in terms of the level of the safety function, both at the level of individual components and that of the plant as a whole, in order to handle plant-life management decisions. Decisions based on residual safety margins have to be made when new experience from operations and research is evaluated, as well as in handling maintenance planning and up-rating issues. This action should lead to progress towards the development of common best practices on the use of risk-informed decision making for maintenance (including Non Destructive Examination), upgrading and up-rating in nuclear power plants in Europe. Possible activities include: (i) the review, on the basis of information from the utilities and regulators, the state-of-the-art regarding decision making for large maintenance activities, upgrading and up-rating in the EU, based on the associated safety impacts; (ii) providing perspectives on methodologies and criteria used for in-depth analyses based on deterministic and risk-based approaches to safety assessments of existing power reactors in the EU; (iii) developing a basis for a possible common ground at EU level for risk-informed plant life management (from design to decommissioning), with a roadmap for further research actions. **Funding Scheme:** Maximum one Coordination and Support Action (supporting).

II.2.2.2 Area: Advanced nuclear systems

RTD to improve the efficiency of present systems and fuels and, in collaboration with the international efforts in this field such as the Generation IV International Forum, to investigate aspects of selected advanced reactor systems in order to assess their potential, proliferation resistance and their effects on long-term sustainability, including upstream research activities (especially material science) and the study of the fuel cycle and innovative fuels and waste management aspects.

Expected impact: Demonstrable contribution to the progress towards the development of sustainable nuclear technologies in line with the initial roadmaps outlined in the September 2007 Vision Report of the Sustainable Nuclear Energy Technology Platform. Proposals need in particular to contribute to the selection, design and development of future reactors and systems, and/or to the possibility of closure of the nuclear fuel cycle. Actions are also expected to contribute to the competitiveness of European industry in this field.

Topic: Fission-2008-2.2.1: Innovative reactor systems

Europe must combine its RTD efforts in the performance phase (conceptual design) for selected Generation IV systems. This requires firm conclusions on the technical feasibility of all six Generation IV systems and fuel cycles in accordance with the GIF strategy, thereby bringing the viability phases (pre-conceptual designs) to an end. This should be in line with both the GIF roadmap regarding the viability/performance phases and the EU strategy set up in the SNE-TP Vision Report, and include an analysis of the national RTD programmes (including available manpower, research facilities and funding sources) thereby enabling consensus regarding a preliminary down-selection to be reached. The project proposal(s) need(s) first to draw conclusions on the pre-conceptual design of the Generation IV system, thereby defining the fuel cycles and the nuclear systems that comply best with the GIF technology goals. The focus should be on key aspects of the conceptual design of the selected system(s), sufficient for procurement specifications for construction of a prototype or demonstration plant (including cogeneration of heat and power, and closure of the fuel cycle, wherever possible). A project could include: (i) a cross-cutting forum, involving high-level stakeholders, to analyse the national strategies in the EU with respect to Generation IV and to come up with a consensus regarding priorities; (ii) further core and fuel design studies (including reactor physics, thermal hydraulics, structural mechanics) with application of innovative materials and advanced fuel technologies; (iii) safety analysis and licensing issues, with emphasis on the qualification of relevant numerical simulation tools and new assessment techniques for defence-in-depth; (iv) plant-life management: e.g. operation and monitoring, instrumentation and control, radiological protection, waste management, etc; (v) application, wherever possible, of the cross-cutting methodology reports produced by GIF (e.g. risk and safety, economic modelling, physical protection and proliferation resistance) and of relevant documents by IAEA/INPRO (e.g. sustainability); (vi) feedback from both regulatory and industrial experts, through the establishment of a higher level advisory board, to come to firm conclusions; (vii) clear definition of the contribution to the Euratom R&D package in the GIF agreement. The findings should be disseminated to stakeholders, in particular, industry (system suppliers and energy providers), regulatory bodies and political decision makers. Close collaboration will need to continue with countries participating in GIF and with research teams not directly involved in fission (in particular, innovative materials in fusion energy and industrial applications of high temperature process heat). **Funding scheme:** Maximum of two Collaborative Projects, either small or medium-scale or large-scale.

II.2.3 Activity: Radiation Protection

The safe use of radiation in medicine and industry relies on a sound radiation protection policy and its effective implementation, and remains a priority in the programme. Research plays a key role in maintaining and improving standards of protection, and this is a common objective of all activities in the programme. Research also has the important objectives of underpinning Community policies and their effective implementation and responding rapidly and effectively to emerging needs. A key objective of this research will be to help resolve the controversy over the risk from exposures to radiation at low and protracted doses. Resolution of this scientific and regulatory issue has potentially important cost and/or health implications for the use of radiation in both medicine and industry.

II.2.3.1 Area: Quantification of risks for low and protracted exposures⁶

Better quantification of the risk to health for low and protracted exposures, including individual variability, through epidemiological studies and an improved understanding of the mechanisms from cellular and molecular biology research.

Topic: Fission-2008-3.1.1: Databases and tissue banks

The project(s) could cover the design, refurbishment, construction, operation and/or provision of access to key databases or tissue banks for use in radiation protection research, limited to research topics covered by this Framework Programme. Successful proposal(s) will need to pay particular attention to ensuring accessibility to and sustainability of any tissue bank(s) or database(s) developed/improved, etc. Establishing critical mass and cost efficiency by integrating (either in practice or virtually) tissues/data from various sources will also be an important consideration. For tissue banks, preference will be given to those where the probability of causation of disease by radiation is significant, where the exposure of the tissue is known or can be reasonably estimated, and where the collection, storage and documentation of tissues are state of the art. **Funding scheme:** Coordination and Support Actions (supporting).

Expected impact: Availability of sustainable and accessible databases and tissue banks essential for state of the art research in the radiological sciences, in particular permitting better understanding of the mechanisms and quantifying the risks of low and protracted doses of radiation.

II.2.3.2 Area: Medical uses of radiation

Enhance the safety and efficacy of medical uses of radiation in diagnosis and therapy (including nuclear medicine) through new technological developments and achieving a proper balance between the benefits and the risks of such uses.

⁶ This is to be interpreted as exposures typically encountered in the workplace, the environment and in the use of radiation in medicine for diagnostic purposes

Topic: Fission-2008-3.2.1: The risk of early and late health effects from the use of radiation therapy

The work should cover: (i) assessment (by calculation and/or measurement) of the distribution of doses in normal/healthy tissues⁷ resulting from existing and emerging therapy approaches (e.g. photons, IMRT, protons, ion beams) and of the risks of early and late health effects resulting from the exposure of normal/healthy tissues; (ii) a robust assessment of the uncertainties in these risk estimates (i.e. taking account of dosimetric, radiobiological, and all other significant contributors to uncertainty); (iii) assessment of the potential (either by changes in equipment and/or protocols) for reducing doses to normal/healthy tissues (and related risks) for existing and emerging therapeutic approaches; (iv) development of a broadly applicable method for assessing the doses and related risks of early and late health effects in normal/healthy tissues irradiated as a result of existing and emerging therapy approaches and dissemination to the medical physics community. In this action, effects on the foetus, infants, children and adults should be considered. Any successful proposal is likely to be multi-disciplinary and effectively exploit synergies between state-of-the-art expertise in the radiation sciences (in particular dosimetry and radiobiology) and also establish effective links with clinicians and manufacturers. No animal experiments should be proposed and the assessment should, ideally, be completed within at most 2 years. **Funding scheme:** Maximum one small or medium-scale Collaborative Project

Expected impact: Quantification of early and late health risks to normal/healthy tissues from the use of existing and emerging techniques for radiation therapy as input to sound judgements on their application and optimisation. Identification of future research needs for those techniques where the risks cannot be assessed with sufficient certainty for sound clinical decision making.

II.2.3.3 Area: Emergency management and rehabilitation

Improve the coherence and integration of emergency management (including the characterisation of contamination and the rehabilitation of accidentally contaminated territories) in Europe through the development of common tools and strategies and demonstrate their efficacy in operational environments.

Topic: Fission-2008-3.3.1: Optimal approaches for monitoring

The project should result in the development of a methodology for optimising the design of monitoring systems for timely and effective decision making in an emergency. Use should be made of state-of-the-art decision support system/s (ie, comprehensive computer based systems developed post-Chernobyl) to evaluate and better understand how monitoring information of different types, obtained at different times and with differing spatial resolution, can **improve the quality of decision making in, and of response to,** an emergency and in its aftermath. Based on this evaluation, a broadly applicable methodological approach should be developed for optimising the design of a monitoring system at national or regional levels for use in conjunction with state-of-the-art decision support systems. **Funding scheme:** Maximum one small or medium-scale Collaborative Project. Euratom contribution limited to a maximum of EUR 500 000 (specific eligibility criterion).

⁷ In general, the assessment should cover the whole body (excluding the tumour) unless exposures of parts can be shown to make a negligible contribution to the overall risk

Expected impact: A tool for making more efficient use of monitoring resources and improving the bases for decision making in emergencies, in particular in the context of the need to upgrade/replace during the next decade many of the monitoring systems installed in Europe post-Chernobyl.

II.2.4 Activity: Infrastructures

Research infrastructures are an essential part of RTD in nuclear science and technology and radiological sciences, ranging in size from very large and expensive plant and laboratory networks to much smaller facilities such as databases, numerical simulation tools and tissue banks. The objectives of the programme are to provide support for key infrastructures where there is clear EU added value, especially in order to establish critical mass and for the replacement of ageing facilities such as e.g. research reactors. This will consolidate the success of previous Community programmes, which have facilitated trans-national access to, as well as cooperation between, such infrastructures, and contribute to maintaining the high standards of technical achievement, innovation and safety in the European nuclear sector. Infrastructures also make an important contribution to the training of scientists and engineers.

II.2.4.1 Area: Supporting infrastructures

Support for the design, refurbishment, construction and/or operation of key research infrastructures required in any of the above activities; for example: underground laboratories for research on geological disposal of radioactive waste, pilot/test facilities for partitioning and transmutation devices, reactor components and sub-systems, hot cells, facilities for severe accident testing and thermal hydraulic testing, material testing reactors, numerical simulation tools and radiobiology facilities, databases and tissue banks for use in radiation protection research.

Topic: Fission-2008-4.1.1: Support to research infrastructures in the actinide sciences

The action aims to optimise the use and development of existing research infrastructures in the field of actinide sciences and to ensure the access of research teams from across the EU and beyond. The action shall provide a wider and more efficient access to and use of, the research infrastructures existing in the different Member States, Associated States and third countries when appropriate. This will ensure that European researchers have access to the high performing research infrastructures they require to conduct their research, irrespective of the location of the infrastructures. The aim is also to structure better and integrate, on a European scale, the way these research infrastructures operate and to foster their joint development in terms of capacity and performance. A consortium of key stakeholders in the actinide sciences needs to be mobilised, including a number of research infrastructures providing access. In this way, infrastructure operators will develop synergies and complementary capabilities thereby offering an improved access to researchers. Likewise, infrastructure operators and users will be in a better position to tackle new developments in their field with a more coordinated approach. The closer interaction between a large number of scientists active in and around a number of infrastructures will also facilitate cross-disciplinary fertilisations and a wider sharing of knowledge and technologies. The action shall combine, in a closely coordinated manner and following the FP6 Integrated Infrastructures Initiative (I3) model: (i) *networking activities*, (ii) *trans-national access and/or service activities* and (iii) *joint research activities*. All three categories of activities are mandatory as

synergistic effects are expected from these different components. Further details about the I3 model is provided in the accompanying Guide for Applicants. **Funding scheme:** Maximum one project as a combination of Collaborative Project and Coordination Action.

Expected impact: The main impacts should be demonstrably positive at the level of the European Research Area in the field of actinide science, especially on the way research infrastructures in this field operate, evolve and interact with the rest of the fission research activities and with their users. This should optimise the functioning and development of research infrastructures in the actinide sciences, on a European scale, and improve the services provided to researchers.

II.2.4.2 Area: Access to infrastructures

Facilitate transnational access to existing and future infrastructures by individual research workers and research teams.

Topic: Fission-2008-4.2.1: Transnational access to large infrastructures

Community support will be provided to cover costs of access for researchers from Member States and Associated States, other than the state where the infrastructure is established, in order to promote access for researchers to infrastructures that provide essential and unique services to the European research community. The active participation of major infrastructure operators and potential users will be required to achieve the objectives. **Funding Scheme:** Coordination and Support Actions (supporting).

Expected impact: The action will maximise the use of existing nuclear research infrastructures in Europe in all activities of the programme and facilitate access to and use of these infrastructures by research workers throughout Europe.

II.2.5 Activity: Human Resources, Mobility and Training

Owing to the concern in all sectors of nuclear fission and radiation protection over maintaining the required high level of expertise and human resources, and the implications this may have especially on the ability to retain current high levels of nuclear safety, the objectives of the programme will be to support, through a variety of measures, the spreading of scientific competence and know-how throughout the sector. These measures aim to guarantee the earliest possible availability of suitably qualified researchers, engineers and technicians, for instance through joint training activities and improved coordination between EU educational institutions in order to ensure qualifications are equivalent across all Member States, or by facilitating the training and mobility of students and scientists. Only a truly European approach can ensure the required incentives and harmonised levels of higher education and training, thus facilitating the mobility of a new generation of scientists and catering for the career-long training needs of engineers and experts faced with tomorrow's scientific and technological challenges in an increasingly integrated nuclear sector.

II.2.5.1 Area: Training & mobility of research workers

Coordination of national programmes and provision for general training needs in nuclear science and technology, as part of general support to human resources in all thematic domains. Includes measures to make the sector more attractive to young scientists and to facilitate the career development of research workers across the EU, be it in the private or in the public sector.

A significant part of the support for human resources, mobility and training will be implemented by encouraging the embedding of this support within the Networks of Excellence, Collaborative Projects and, where appropriate, other actions. It is considered that 5% of the total project budget should be dedicated to these activities. Projects in all areas are therefore encouraged to develop a comprehensive "training and (trans-national) mobility" package. Proposals for large Collaborative Projects and Networks of Excellence will in particular foresee a dedicated budget for:

- (i). The development and delivery of training courses in the subject matter of the project. These training courses will be widely announced (preferably posted on the ENEN website) and will be open also to non-participating organisations, including, where appropriate, from third countries as an element of international cooperation. A fee may be requested for the attendance. A limited budget, however, should be foreseen to support the attendance costs (fee and travel) for participants from ICPCs (see list in Annex 1);
- (ii). The exchange of research workers aiming at improving synergies between private and public research organisations at international level. A part of the research undertaken in the project will be executed by researchers preparing a doctoral thesis or employed at a post-doctoral position. The number of such researchers will be monitored by the Commission services.

In addition to these embedded training and mobility actions, Coordination Actions will be specifically dedicated to *Euratom Fission Training Schemes* (EFTS) in specific areas where a shortage of skilled professionals has been identified.

The EFTS is a significant development from a pure training and mobility programme to one dedicated rather to structuring research training and researchers' career development across the EU. Special measures to encourage early-stage researchers and support early stages of scientific career will be introduced. Efforts will also be made to address life-long learning and career development of experienced researchers in the public and private sectors. These actions will seek to maximise transfer of higher level knowledge and technology with emphasis on multi-disciplinarity and/or trans-national and inter-sectoral mobility (e.g. industry – academia partnerships). These actions will target research workers at least at post-graduate or equivalent level, i.e. from doctoral students to senior visiting scientists.

Proposals will be submitted by networks of (host) organisations aimed at structuring the existing research training capacity around a selected number of themes, in both private and public sectors. A strong participation by industry is considered an important added value (in particular, systems suppliers and energy providers). Synergies (including co-funding) will be also sought with governmental actions at regional, national and international level, including actions under other Community policies (e.g. education, energy, cohesion, employment and neighbourhood). In each EFTS, a high-level Board of Advisors should be established in order

to advise about the best balance between supply and needs of training, thereby ensuring a stable feedback mechanism. The result will be a series of higher level training schemes and/or doctoral schools that could become international scientific references in the long term, making best use of private-public partnerships.

The ENEN approach used successfully until now for education (e.g. the certificate of *European Master of Science in Nuclear Engineering*) should be expanded to the EFTS actions (e.g. a *European passport for Continuous Professional Development* could be developed). It relies on the principles of modularity of courses and common qualification criteria, a common mutual recognition system, and the facilitation of teacher, student and worker mobility across the EU.

For each selected theme, the Euratom funding will be provided principally for the coordination and networking aspects of the EFTS, i.e. scientific secretariat, implementation of joint training programmes, organisation of training events (for example, on the occasion of international conferences), mobility of teachers and students, exchange of scientific staff and/or training facilities, etc. Other funding sources should be used to pay the grants for individual fellowships. The courses can be organised traditionally (e.g. one-week Eurocourses or summer courses) and/or electronically (e.g. using teleconferencing or e-learning).

For each theme selected, the EFTS will conduct an evaluation with the help of the above mentioned Advisory Board, and possibly draft best practice guidelines on how to define the steps in their systematic approach to higher level training (e.g. analysis, design, development, implementation and evaluation) and how to strengthen synergies between suppliers and end-users in a sustainable manner.

Expected Impact: Maximise the transfer of higher-level knowledge and technology, addressing young as well as experienced research workers, in a number of well-identified areas of nuclear fission and radiation protection where a coordinated action at EU level will bring added value. Nuclear research careers need to be made more attractive across the EU, and links need to be strengthened with other Community policies and with training networks in nuclear fission and radiation protection outside Europe. The visibility and the influence of the scientific nuclear fission community should be enhanced in the public debate at large.

Topic: Fission-2008-5.1.1: Euratom Fission Training Schemes (EFTS) in all areas of Nuclear Fission and Radiation Protection

The proposed topic puts into practice the main conclusions of earlier strategy studies, in particular those conducted at national or international level, taking into account the experience gained during the FP6 co-ordination actions in management of radioactive waste (CETRAD), in reactor systems (NEPTUNO and ENEN II) and in radiation protection (EURAC and ENETRAP). EFTS should help cope with the main concern of maintaining/creating skills to ensure the long-term viability of the EU nuclear sector. Training of trainees is a major issue in specific areas where the international sharing of experience is particularly important for public health and safety reasons. Possible actions are the structuring, implementation and evaluation of higher-level training schemes or doctoral schools that could become international references in their field, making best use of private-public partnerships. Themes could cover applied sciences as well as basic sciences in any field within the scope of Euratom FP7 (fission and radiation protection). The evaluation of the proposed EFTS should follow ENEN approach or use SWOT analysis, and the new schemes should strengthen the synergy between universities, research centres, training organisations and industries, thereby

ensuring the training better respond to industry and/or regulatory needs while enhancing mutual recognition of professional qualifications across the EU. In addition, "think tank" activities could be organised aimed at supporting policies for an internal market of research workers in nuclear fission and radiation protection. **Funding Scheme:** Maximum of three Coordination and Support Actions (coordinating).

II.2.6 Activity: Cross-Cutting Actions

II.2.6.1 Area: Cross-cutting actions

Topic: Fission-2008-6.0.1: Secretariat of the Sustainable Nuclear Energy Technology Platform

The Sustainable Nuclear Energy Technology Platform (SNE-TP) was launched on 21 September 2007. The Platform stakeholders have now to work together to develop their Strategic Research Agenda and the corresponding Deployment Strategy. A secretariat will be established to organise this work and act as a centralised information and communication centre for the Platform. In particular, a dedicated and effective public Website and a Platform Intranet will be set up. This action provides support for the operation of the secretariat for two years. The proposer should share a part of the cost of the effort. **Funding scheme:** Maximum one Coordination and Support Action (supporting).

Expected impact: The smooth running of the organisational and logistical aspects of SNE-TP operation over a two-year period, resulting in the effective work of the Platform, demonstrated by the drafting of the Strategic Research Agenda and the Deployment Strategy.

Topic: Fission-2008-6.0.2: Database of competences and facilities

In close collaboration with the OECD/NEA and IAEA and by integrating the results of previous Euratom programmes, a user-friendly and open access database of nuclear competences and infrastructure facilities in the EU should be created, thereby facilitating the transnational access and mobility of researchers. The database should also include, as a pilot exercise, links with other databases containing historical and detailed technical information in a given subject. This action should be strongly connected to the work undertaken within SNE-TP. The action should cover: (i) the cataloguing of current competences, RTD programmes and facilities available at European level, both in the public and private sectors, in the fields of reactor design and safety, waste management, P&T, innovative reactor systems and fuel cycles and nuclear education and training; (ii) the creation of a user-friendly interactive Web-based database containing the above information that is freely and readily available to the nuclear research community; (iii) the maintaining and updating on at least an annual basis and the development of self-sustainable mechanisms and procedures for the updating on a similar frequency after the end of this project. As a pilot case, the information on competences and facilities in the database should be linked with summary reports of scientific research results and publications in a chosen technical area. Close contacts need to be established with the Euratom FP projects in the selected technical area. **Funding Scheme:** Maximum one Coordination and Support Action (supporting).

Expected impact: This work will enable a better structuring of the nuclear fission research community in Europe and provide an all-important definitive overview of European nuclear competences, tools and facilities.

Topic: Fission-2008-6.0.3: Actions supporting programme implementation and other activities

Actions could cover: (i) promoting and facilitating the communication on, the dissemination, transfer, exploitation, assessment and broad take-up of past and present programme results (over and above the standard diffusion and exploitation activities of individual projects); (ii) contributing to achievement of strategic objectives, notably regarding the European Research Area (e.g. pilot initiatives on benchmarking, mapping, networking, etc.); (iii) preparation of possible future Community actions (e.g. via prospective studies, exploratory measures, pilot actions, etc.). Events such as annual workshops and conferences are not covered if they would take place anyway without Commission support and the action does not demonstrably serve the Community programme's strategic objectives (in the sense of the European Research Area, improved coordination, public awareness, preparation of Community initiatives, etc.). **Funding Scheme:** Coordination and Support Actions (supporting).

Expected impact: Such bottom-up actions should serve an important role in any of the activities under the programme by providing support in line with strategic objectives (dissemination, ERA, future actions).

Topic: Fission-2008-6.0.4: Trans-national cooperation among NCPs and third country contacts

The action should reinforce the networking of FP7 National Contact Points (NCP) and third country contacts, under the theme of nuclear fission and radiation protection, by promoting trans-national cooperation. The activities should be adapted to the specific needs in the area of nuclear fission and radiation protection and to the requirements identified by the NCPs and contact points concerned. General activities could include: (i) the identifying and sharing of good practice (e.g. joint workshops, training, twinning schemes); (ii) practical initiatives to benefit cross-border audiences (e.g. trans-national brokerage events); (iii) specific efforts to help less experienced NCPs, especially from the New Member States, benefit from the experience accumulated in other countries. Proposals should include NCPs officially appointed by the relevant national authorities and any third country contact points similarly endorsed at the national level. NCPs and contact points should preferably be unique to the area of Euratom / fission and radiation protection. Other EU participants are not eligible. Not all NCPs need to be included in a proposal. Subject to the applicable rules, eligible costs of third country partners may be reimbursed under the programme. **Funding Scheme:** Maximum one Coordination and Support Action (coordinating); Euratom Contribution limited to a max. of EUR 350 000 (specific eligibility criterion); the project will last until end 2011.

Expected impact: Improved NCP services across Europe in the area of nuclear fission and radiation protection thereby facilitating simplified access to FP7 calls in this field and improved quality of submitted proposals. A more consistent level of NCP support services across Europe. More effective participation of organisations from third countries alongside those from the EU Member States and associated countries.

II.2.7 Non-Competitive Actions

II.2.7.1 Area: Non-competitive actions

Topic: Fission-2008-7.0.1: Report on Engineered Barrier Systems

The Commission intends to support the preparation of a synthesis report on Engineered Barrier Systems (EBS) and the safety of deep geological repositories for high-level radioactive waste. The objective of the report will be to bring together the main conclusion from a series of key thematic international workshops organised by the OECD/NEA on the Engineered Barrier Systems (EBS). The last workshop in the series took place in September 2006. Using the proceedings of the workshops as a starting point, a report should be drawn up developing common views on the role that EBS play in the disposal system through reinforcing the performance of the natural barrier and on how integration is necessary to achieve successful design, construction, testing, modelling and performance assessment.

Legal entity: Terra-Salus Ltd, Orchard House, Church lane, Bisbrooke, Oakham, Rutland LE15 9EL (UK), who was responsible for drafting the individual workshop proceedings. The Euratom contribution will EUR 25 000. The rate of financing is maximum 100% (in accordance with Article 32 of the Rules for Participation⁸ for Coordination and Support Actions). The evaluation, selection and award criteria for Support Actions (Annex 2) will be followed.

Topic: Fission-2008-7.0.2: Secretariat for the Generation IV International Forum GIF

USA, UK, France, Brazil, Japan, Korea, South Africa, Argentina and Canada signed the Generation IV International Forum (GIF) Charter in July 2001, with the purpose of developing concepts for one or more nuclear energy systems that can be operated in a manner that will provide a competitive and reliable supply of energy, while satisfactorily addressing nuclear safety, waste, proliferation and public perception concerns. Switzerland signed the GIF charter in February 2002. Euratom signed the Charter on 30 July 2003 by a decision of the Commission pursuant to Article 101(3) of the Euratom Treaty. The Russian Federation and the People's Republic of China signed in November 2006. A Framework Agreement (FA) for collaboration on R&D of Generation IV systems, setting the framework conditions for subsequent system and project arrangements, has also been concluded and the majority of Charter signatories have acceded to it. The FA depository is the OECD / NEA. The EU Council approved the accession of the Euratom to the FA in its Decision no. 14121/05, Brussels, 8 November 2005, and Euratom formally acceded in May 2006. Accession brings with it certain obligations, including the co-funding of the NEA's GIF technical secretariat activities. The level of this funding from each signatory was established by the GIF Policy Group at its meeting in Ottawa in March 2007. The present action is to fulfil the Euratom's obligations in this respect, and covers arrears for the period from 2005 to the present and funding up until the end of 2008.

Legal Entity: Organisation for Economic Co-operation and Development (Nuclear Energy Agency) - (Le Seine – Saint Germain / 12 boulevard des Iles / F – 92130 Issy-les-Moulineaux / France). Euratom contribution is EUR 330 000 for operation of the Secretariat up until end 2008. The rate of financing is maximum 100% (in accordance with Article 32 of the Rules for

⁸ OJ L 54/4, 22.2.2007, p.32

Participation⁹ for Coordination and Support Actions). The Evaluation, Selection and Award Criteria for Support Action (Annex 2) will be followed.

Topic: Fission-2008-7.0.3: Secretariat of a High Level Expert Group on low dose risk research

A High Level Expert Group (HLEG) comprising representatives of funding/regulatory bodies in Member States and selected experts will be established to develop a strategic research agenda and roadmap for low dose risk research in Europe. This will provide a framework for the better structuring and integration of future Member States' and Euratom research in this important area and the more effective use of limited resources. The Commission will provide support for a Secretariat. The main tasks of the secretariat, acting on behalf of the HLEG, will comprise: (i) drafting the strategic research agenda and road map for low dose risk research in Europe; (ii) developing a sustainable operational framework for implementation of the research agenda by the Commission and Member States; (iii) providing support for key members of the HLG not nominated/financed by Member States

Legal Entity: Bundesamt für Strahlenschutz established in Willy-Brandt-Strasse 5, Salzgitter, 10149, 38226 Germany. Euratom contribution is EUR 75000 for one-year operation of the Secretariat. The rate of financing is 100% (In accordance with Article 32 of the Rules for Participation¹⁰ for Coordination and Support Actions). The Evaluation, Selection and Award Criteria for Support Action (Annex 2) will be followed.

⁹ OJ L 54/4, 22.2.2007, p.32

¹⁰ OJ L 54/4, 22.2.2007, p.32

II.3 Indicative EURATOM BUDGET 2008

		Year 2007	Year 2008¹¹
Calls	<i>Call FP7 Fission</i>	48 650 000	48 410 000
	<i>Call FP7 Fusion</i>	5 000 000	
Experts evaluators	<i>Evaluation and monitoring</i>	350 000	350 000
Other	<i>European JU for ITER</i>	96 800 000	164 800 000
	<i>COA("baseline support, and additional support under EFDA outside JET")</i>	75 271 000	68 040 000 ¹²
	<i>EFDA("JOC and JET orders")</i>	75 610 000	86 400 000
	<i>Mobility and other agreement</i>		<i>pm</i> ¹³
	<i>FP6 Ex post evaluation</i>	200 000	
RSFF		0	0
Cordis		0	0
COST		0	0
Eureka		0	0
ERA nets		0	0
Estimated Total Budget Allocation		301 881 000	368 000 000

¹¹ Under the condition that the preliminary draft budget for 2008 is adopted without modification by the budgetary authority

¹² The funding includes up to EUR 7.5 million for coordinated activities, up to EUR 5 million for training actions and career development fellowships

¹³ The duration of the Mobility agreement has been extended until the 31st of Dec 2008 with the corresponding funds committed under FP6.

III. IMPLEMENTATION OF PROGRAMME AND CALL(S) IN 2008

III.1 Fusion

Activities under the thematic area 'Fusion energy research' will be implemented on the basis of procedures and rules for dissemination and use set out in the following funding schemes with the indicative budget shown in Table §II.3:

International agreements

International agreements relating to cooperation with third countries, or any legal entity which may be established by such an agreement, in particular the ITER Agreement;

All contributions to the ITER project and to the Broader Approach will be carried out by 'Fusion for Energy'.

The European Joint Undertaking for ITER and the Development of Fusion Energy 'Fusion for Energy'

The Euratom contributions to the ITER Organisation, the Broader Approach activities as well as the implementation of activities in preparation for DEMO and IFMIF will be provided by the European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy') established under Articles 45 – 51 Euratom Treaty.

The overall Community contribution foreseen to the 2008 budget of the Joint Undertaking Work Programme is shown in Table §II.3

Contracts of Association

The Contracts of Association renewed under FP7 between the Community and Member States or Associated Third Countries or legal entities within Member States or Associated Third Countries will have an indicative budget that comprises financing of baseline support, with additional support for priority projects, training, career development fellowships and support actions; the total amount for these activities is shown in Table §II.3.

For career development fellowships (with a duration of 2 years), the maximum Community contribution will be up to EUR 52 000 per year and per researcher as a living allowance, up to EUR 6000 per year and per researcher for expenses related to the participation to research and training activities (meeting and conference attendance, participation in training actions, research costs, etc), with an additional 3% of the direct costs for management activities and 10% of direct costs as contributions to overheads, excluding costs for subcontracting . The use of the mobility agreement to support mobility of the participants for their training actions, etc will ensure the pan-European nature of the joint training actions.

European Fusion Development Agreement

The European Fusion Development Agreement (EFDA) renewed under FP7 and concluded between the Community and organisations in, or acting for, Member States and Associated Countries. The Community support will cover research co-ordination activities, training, career development, support actions, JET S/T orders implemented under the Contracts of Association, the JET Implementing Agreement (JIA), the JET Operation Contract and the EFDA Host support, secondment and assignment of staff.

The global indicative budget for EFDA, (including Host support, JET Operational Contract and JET activities) is shown in Table §II.3.

Mobility agreement and other multilateral agreement

The indicative expenditure for the mobility agreement and any other multilateral agreement concluded between the Community and associated organisations is shown in Table §II.3.

Training and Career Development fellowships

Career development fellowships and training actions will be supported through the Contract of Association (see §II.6) and coordinated through EFDA.

Coordination and Support Actions

There are no Coordination and Support actions foreseen in 2008.

III.2 Nuclear Fission and Radiation Protection

Call Identifier: FP7-Fission-2008

Date of Publication: 30 November 2007¹⁴

Deadline: 15 April 2008, at 17:00:00, Brussels local time¹⁵

Indicative Budget: EUR 48 410 000 from 2008 budget

The budget for this call is indicative. The final budget awarded to this call, following the evaluation of projects, may however vary by up to 10% of the total value of the call.

Topics called:

Usually a maximum of one project will be considered for funding per topic (indicated by a singular under *funding scheme*). Where more than one project per topic could be considered for funding, this is clearly indicated (by a plural) under *funding scheme*. In some specific cases, a larger maximum number of projects to be retained for funding under one topic is also mentioned.

Activity/Area	Topic	Funding Schemes
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¹⁴ The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.

¹⁵ At the time of the publication of the call, the Director-General responsible may delay this deadline by up to two months

Management of Radioactive Waste:	Fission-1	
<i>Geological disposal:</i>	<i>Fission-1.1</i>	
	Fission-2008-1.1.1: Gas generation and transport in support of performance assessment	Large-scale Collaborative Project
	Fission-2008-1.1.2: Strategies and technologies for repository monitoring	Small or medium-scale Collaborative Project
	Fission-2008-1.1.3: Long-term performance of Engineered Barrier Systems (EBS)	Small or medium-scale Collaborative Project
	Fission-2008-1.1.4: Consensus views on scientific/technical knowledge for the safety case of geological repositories	Coordination and Support Action(s) (supporting)
<i>Partitioning and transmutation:</i>	<i>Fission-1.2</i>	
	Fission-2008-1.2.1: Establishment of a Central Design team (CDT) for a fast-spectrum transmutation device	Small or medium-scale Collaborative Project
	Fission-2008-1.2.2: Transmutation fuels and targets and their reprocessing	Collaborative Project, either small or medium-scale or large-scale
Reactor Systems:	Fission-2	
<i>Nuclear installation safety:</i>	<i>Fission-2.1</i>	
	Fission-2008-2.1.1: Sustainable integration of European research on severe accident phenomenology and management	Network of Excellence
	Fission-2008-2.1.2: Numerical coupling of safety-relevant phenomena	Large-scale Collaborative Project
	Fission-2008-2.1.3: Prediction of irradiation effects on reactor pressure vessel, internals and/or claddings using multi-scale simulation tools	Large-scale Collaborative Project
	Fission-2008-2.1.4: Structural integrity assessment for safety and lifetime management of the Reactor Coolant System piping and components (other than the Pressure Vessel)	Small or medium-scale Collaborative Project
	Fission-2008-2.1.5: Risk-informed methodologies for Plant Life Management	Coordination and Support Action (supporting)
<i>Advanced nuclear systems:</i>	<i>Fission-2.2</i>	
	Fission-2008-2.2.1: Innovative reactor systems	Max. of 2 Collaborative Project(s), either small or medium-scale or large-scale
Radiation Protection:	Fission-3	
<i>Quantification of risks for low and protracted exposures:</i>	<i>Fission-3.1</i>	

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	Fission-2008-3.1.1: Databases and tissue banks	Coordination and Support Action(s) (supporting)
<i>Medical uses of radiation:</i>	<i>Fission-3.2</i>	
	Fission-2008-3.2.1: The risk of early and late health effects from the use of radiation therapy	Small or medium-scale Collaborative Project
<i>Emergency management and rehabilitation:</i>	<i>Fission-3.3</i>	
	Fission-2008-3.3.1: Optimal approaches for monitoring	Small or medium-scale Collaborative Project (Euratom contribution limited to max. EUR 500 000)
Infrastructures:	Fission-4	
<i>Supporting infrastructures:</i>	<i>Fission-4.1</i>	
	Fission-2008-4.1.1: Support to research infrastructures in the actinide sciences	Combined Collaborative Project and Coordination Action (Integrated Infrastructure Initiative)
<i>Access to infrastructures:</i>	<i>Fission-4.2</i>	
	Fission-2008-4.2.1: Transnational access to large infrastructures	Coordination and Support Action(s) (supporting)
Human Resources, Mobility and Training:	Fission-5	
<i>Training & mobility of research workers:</i>	<i>Fission-5.1</i>	
	Fission-2008-5.1.1: Euratom Fission Training Schemes (EFTS) in all areas of Nuclear Energy and Radiation Protection	Max. of 3 Coordination and Support Action(s) (coordinating)
Cross-cutting Actions:	Fission-6	
<i>Cross-cutting actions:</i>	<i>Fission-6.0</i>	
	Fission-2008-6.0.1: Secretariat of the Sustainable Nuclear Energy Technology Platform	Coordination and Support Action (supporting)
	Fission-2008-6.0.2: Database of competences and facilities	Coordination and Support Action (supporting)
	Fission-2008-6.0.3: Actions supporting programme implementation and other activities	Coordination and Support Action(s) (supporting)
	Fission-2008-6.0.4: Trans-national cooperation among NCPs and third country contacts	Coordination and Support Action (coordinating) (Euratom contribution limited to max. EUR 350 000)

Eligibility Criteria:

Collaborative Projects are subdivided into (i) large-scale integrating and (ii) small or medium-scale focused projects. The distinction is made on the basis of Euratom

financial contribution, which for (i) is > EUR 3 million and for (ii) is <= EUR 3 million. This fixed threshold of EUR 3 million is an eligibility criterion. In addition, the requested Euratom financial contribution for a large-scale integrating Collaborative Project and a Network of Excellence shall not exceed EUR 6 million. For Coordination and Support Actions, the maximum Euratom contribution shall not exceed EUR 1 million. For combinations of a Collaborative Project and a Coordination Action (see below), the maximum Euratom contribution shall not exceed EUR 3 million. These maxima are also eligibility criteria. Other limits may be indicated in the Work Programme for specific topics, in which case they would override the generic limits indicated above. This is the case for topics Fission-2008-3.3.1 and Fission-2008-6.0.4 and the non-competitive actions. Proposals that do not conform to the threshold and maximum limits above will be rejected at the eligibility stage and not be further evaluated.

Evaluation Procedure:

- The evaluation criteria (including weights and thresholds) and sub-criteria together with the eligibility, selection and award criteria for the different funding schemes are set out in annex 2 to this work programme.
- The evaluation will follow a single stage procedure.
- Proposals will not be evaluated anonymously.
- Proposals may be evaluated remotely.

The table below provides indicative 2008 budgets for activities, areas or combinations of activities/areas defined in the Specific Programme. The purpose is to ensure a balance of the programme commensurate with strategic needs, while also facilitating the ranking of proposals following the evaluations. At the end of the evaluation process, proposals will be ranked within their indicative budget groups and funded according to the indicative budgets shown in the table. Hence there will be competition between topics in the same indicative budget group, and some topics may end up not being supported if proposals fail to reach a high enough standard (even though proposals in other groups with lower overall scores will be funded) or if this Work Programme limits the maximum number of proposals that may be funded under one single topic. Proposals scoring above all evaluation thresholds, but for which insufficient funding is not available, will be put on a common reserve list for the whole call, from which proposals will be considered for funding if additional funds become available from any part of the call. In the ranked lists per group and the reserve list, all funding schemes have the same weight, the priority order being determined by total score. To separate tied proposals, the score for criterion 1 will be given priority, followed by that for criterion 3. Proposals on the reserve list are not carried over for funding from next year's budget. Depending on the strategic nature of the topic in question, the Commission may, in such cases, decide to reinsert the topic in next year's Work Programme.

Group	Activities or Areas	Indicative budget (EUR million)
1	<i>Fission-1.1</i>	8
2	<i>Fission-1.2 & -2.2</i>	10.98
3	<i>Fission-2.1</i>	17
4	<i>Fission-3</i>	4
5	<i>Fission-4, -5 & -6</i>	8 <i>(of which EUR 350 000 is reserved for Fission-2008-6.0.4)</i>
6	<i>Fission-7 (non-competitive actions)</i>	0.43
	<i>Total</i>	48.41

With reference to the above table: All budgetary figures given in this call are indicative. The repartition of sub-budgets awarded within this call, following the evaluation of projects, may vary by up to 10% of the total value of the call.

Indicative evaluation and contractual timetable: Evaluation: spring 2008; contract negotiation and signature: autumn 2008.

Consortia Agreements: Required for all projects where there is more than one partner

Particular requirements for participation, evaluation and implementation: None beyond the standard rules and guidelines.

The forms of grant and maximum reimbursement rates which will be offered are specified in Annex 3 to the Euratom work programme.

Minimum number of participants¹⁶ as set out in the Rules for Participation

Funding scheme	Minimum conditions
Collaborative project (also applicable for a combination of a CP with another funding scheme) and Network of Excellence	At least 3 independent legal entities, each of which is established in a MS or AC, and no two of which are established in the same MS or AC.
Coordination and support action (coordinating)	At least 3 independent legal entities, each of which is established in a MS or AC, and no two of which are established in the same MS or AC.
Coordination and support action (supporting)	At least 1 independent legal entity

¹⁶ MS = Member States of European Atomic Energy Community; AC = Associated country. Where the minimum conditions for an indirect action are satisfied by a number of legal entities, which together form one legal entity, the latter may be the sole participant, provided that it is established in a Member State or Associated country

IV. INDICATIVE PRIORITIES FOR FUTURE WPs AND CALLS

This section provides an indication of the definition of possible future actions to be included in the Euratom Work Programme for 2009 or later. No guarantee can be given at this time of inclusion in a future programme.

IV.1 Fusion

The objective of the Fusion programme in the near term is the successful realisation of the ITER project and preparations for the earliest possible start of the experimental activities. The Euratom work programme for the thematic priority Fusion Energy in 2009 will continue to concentrate on the following activities:

- providing support for the ITER project through the activities of the 'Fusion for Energy';
- coordination of the work programmes in the Contract of Association through the activities of EFDA;
- support for enhanced collaborations through the mobility agreement;
- support for specific support actions and actions in favour of training and career development of researchers.

IV.2 Nuclear Fission and Radiation Protection

In future, the setting of priorities will take into account, inter alia, the Strategic Energy Technology Plan to be prepared by the Commission at the end of 2007 and the research agendas established by the Sustainable Nuclear Energy Technology Platform, the proposed platform on geological disposal and the High Level Expert Group on Low Dose Risk. Other specific initiatives will be considered in the context of fostering enhanced cooperation with third countries, in particular Russia and China.

ANNEXES:

- 1) International Cooperation Partner Countries (ICPC)
- 2) Eligibility and Evaluation Criteria for proposals
- 3) Table for Forms of Grants and Maximum Reimbursement Rates for Projects Funded Through the Euratom Work Programme

ANNEX 1: List of International Co-operation Partner Countries (ICPC)¹

ACP *

- AFRICAN

- Angola
- Benin
- Botswana
- Burkina-Faso
- Burundi
- Cameroon
- Cape Verde
- Central African Republic
- Chad
- Comoros
- Congo (Republic)
- Congo (Democratic Rep. of)
- Côte d'Ivoire
- Djibouti
- Equatorial Guinea
- Eritrea
- Ethiopia
- Gabon
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Kenya
- Lesotho
- Liberia
- Madagascar
- Malawi
- Mali
- Mauritania
- Mauritius
- Mozambique
- Namibia
- Niger
- Nigeria
- Rwanda
- Sao Tome and Principe
- Senegal
- Seychelles
- Sierra Leone
- Somalia
- South Africa³
- Sudan
- Swaziland
- Tanzania
- Togo
- Uganda
- Zambia
- Zimbabwe

- CARIBBEAN

- Barbados
- Belize
- Cuba
- Dominica
- Dominican Rep.
- Grenada
- Guyana
- Haiti
- Jamaica
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and Grenadines
- Suriname
- Trinidad and Tobago

- PACIFIC

- Cook Islands
- Timor Leste
- Fiji
- Kiribati
- Marshall Islands
- Micronesia, Federal States of
- Nauru
- Niue
- Palau
- Papua New Guinea
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu
- Samoa

ASIA

- Afghanistan
- Bangladesh
- Bhutan
- Burma/Myanmar
- Cambodia
- China^{2**}
- India^{2**}
- Indonesia
- Iran
- Iraq
- Lao People's Democratic Republic
- Malaysia
- Maldives
- Mongolia
- Nepal
- Oman
- Pakistan
- Philippines
- Sri Lanka

- Thailand
- Vietnam
- Yemen

EASTERN EUROPE AND CENTRAL ASIA (EECA)

- Armenia³
- Azerbaijan³
- Belarus³
- Georgia³
- Kazakhstan
- Kyrgyz Republic
- Moldova³
- Russia^{2**}
- Tajikistan
- Turkmenistan
- Ukraine^{2,3}
- Uzbekistan

LATIN AMERICA

- Argentina²
- Bolivia
- Brazil^{2**}
- Chile²
- Colombia
- Costa Rica
- Ecuador
- El Salvador
- Guatemala
- Honduras
- Mexico²
- Nicaragua
- Panama
- Paraguay
- Peru
- Uruguay
- Venezuela

MEDITERRANEAN PARTNER COUNTRIES (MPC)

- Algeria³
- Egypt^{2,3}
- Jordan³
- Lebanon³
- Libya³
- Morocco^{2,3}
- Palestinian-administered areas³
- Syrian Arab Rep.³
- Tunisia^{2,3}

WESTERN BALKAN COUNTRIES (WBC)

- Albania⁴
- Bosnia-Herzegovina⁴
- Kosovo⁵
- Montenegro⁴

*In the 'Specific international cooperation actions', Africa can also be considered as a region on its own, while the Caribbean countries can also participate with Latin American and the Pacific countries with Asia.

**For participation in the 'Specific international cooperation actions' each of Brazil, China, India and Russia may be considered individually as a region on its own. Thus, the required two or more partners can be located in these countries. However, in this case, at least two different partners from different provinces, oblasts, republics or states within Brazil, China, India or Russia are necessary.

¹ Up-to-date information on status of countries available at : http://cordis.europa.eu/fp7/who_en.html#countries

³ Signed an agreement with the EC covering Science & Technology

³ These countries are also part of the European Neighbourhood Policy (ENP)

⁴ Until country becomes Associated to FP7.

⁵ As defined by UNSC resolution 1244 of 10 June 1999.

Annex 2: FP7 Evaluation Criteria

Eligibility and Evaluation Criteria for Proposals

Eligibility criteria

A proposal will only be considered eligible if it meets all of the following conditions:

- It is received by the Commission before the deadline given in the call text.
- It involves at least the minimum number of participants given in the call text.
- It is complete (i.e. both the requested administrative forms and the proposal description are present)
- The content of the proposal relates to the topic(s) and funding scheme(s), including any special conditions, set out in those parts of the relevant work programme
- Collaborative projects are subdivided into (i) large-scale integrating projects and (ii) small or medium-scale focused research projects. **The fixed threshold (in terms of the EU financial contribution) between the two types of collaborative projects is EUR 3 million. This is an eligibility criterion. In the case of large-scale integrating Collaborative Projects, the EC contribution is limited to a maximum of EUR 6 million. This is an eligibility criterion.**
- **The EC contribution to Networks of Excellence is limited to a maximum of EUR 6 million. This is an eligibility criterion.**
- **The EC contribution to combinations of Collaborative Project and Coordination Action (Integrated Infrastructure Initiative or I3 scheme) is limited to a maximum of EUR 3 million. This is an eligibility criterion.**
- **The EC contribution to Coordination and Support Actions is limited to a maximum of EUR 1 million. This is an eligibility criterion.**

Other eligibility criteria may be given in the call text. See the maximum limits for Euratom contribution for topics Fission-2008-3.3.1 and Fission-2008-6.0.4 and the non-competitive actions.

Evaluation criteria

The evaluation criteria against which proposals will be judged are set out in articles 14 and 15 of the Rules for Participation. For the 'Euratom' specific programme these are:

- scientific and/or technological excellence;
- relevance to the objectives of these specific programmes¹⁷;

¹⁷ **Relevance:** A proposal may be **partially relevant** if it addresses only marginally the topic(s) of the call, or if only part of the proposal addresses them. Such conditions will be reflected in the evaluation of the first criterion ('S/T excellence'). The degree to which a proposal is relevant to the objectives of a call will be reflected in the

- the potential impact through the development, dissemination and use of project results;
- the quality and efficiency of the implementation and management.

Within this framework, the work programmes will specify the evaluation and selection criteria and may add additional requirements, weightings and thresholds, or set out further details on the application of the criteria.

The purpose of this annex is to set out such specifications. Unless otherwise indicated in the relevant parts of this work programme, the criteria, weightings and thresholds given here will apply to all calls for proposals.

Proposals will be evaluated in line with the Commission "Rules on Submission of Proposals and the Related Evaluation, Selection and Award Procedures".

A proposal which contravenes fundamental ethical principles, fails to comply with the relevant security procedures, or which does not fulfil any other of the conditions set out in the specific programme, the work programme or in the call for proposals shall not be selected. Such a proposal may be excluded from the evaluation, selection and award procedures at any time. Details of the procedure to be followed are given in the Commission rules mentioned above.

The arrangements for a particular call will be set out in the relevant Guide for Applicants.

evaluation of the third criterion ("impact"). Proposals that are clearly not relevant to a call ("out of scope"), will be rejected on eligibility grounds before the evaluation.

		1. Scientific and/or technological excellence (relevant to the topics addressed by the call) (award)	2. Quality and efficiency of the implementation and the management (selection)	3. The potential impact through the development, dissemination and use of project results (award)
All funding schemes		<ul style="list-style-type: none"> • <i>Soundness of concept, and quality of objectives</i> 	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures • <u>Quality and relevant experience of the individual participants</u> 	<ul style="list-style-type: none"> • <i>Contribution, at the European [and/or international level], to the expected impacts listed in the work programme under relevant topic/activity</i>
Collaborative projects		<ul style="list-style-type: none"> • <i>Progress beyond the state-of-the-art</i> • Quality and effectiveness of the S/T methodology and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including complementarity, balance)</u> • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property.
Networks of Excellence		<ul style="list-style-type: none"> • <i>Contribution to long-term integration of high quality S/T research</i> • Quality and effectiveness of the joint programme of activities and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including ability to tackle fragmentation of the research field, and commitment towards a deep and durable integration)</u> • Adequacy of resources for successfully carrying out the joint programme of activities 	<ul style="list-style-type: none"> • Appropriateness of measures for spreading excellence, exploiting results, and disseminating knowledge, through engagement with stakeholders and the public at large.
Co-ordination & support actions	CA	<ul style="list-style-type: none"> • Contribution to the co-ordination of high quality research • Quality and effectiveness of the co-ordination mechanisms, and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including complementarity, balance) [for SA: only if relevant]</u> • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Appropriateness of measures for spreading excellence, exploiting results, and dissemination knowledge, through engagement with stakeholders, and the public at large.
	SA	<ul style="list-style-type: none"> • Quality and effectiveness of the support action mechanisms, and associated work plan 		

Notes:

1. Evaluation scores will be awarded for each of the three criteria, and not for the sub-criteria. Each criterion will be scored out of 5. No weightings will apply. The threshold for individual criteria will be 3. The overall threshold, applying to the sum of the three individual scores, will be 10.

2. The second column corresponds to the **selection criteria** in the meaning of the financial regulation¹⁸ (article 115) and its implementing rules¹⁹ (article 176 and 177). They also will be the basis for assessing the "operational capacity" of participants. The other two criteria correspond to the **award criteria**.
3. For the evaluation of first-stage proposals under a two-stage submission procedure, only the sub-criteria in italics apply.

¹⁸ OJ L248 16.9.2002, p1.

¹⁹ OJ L357 31.12.2002, p1

For the Topic Fission-2008-4.1.1 for which the funding scheme is a **combination of a Collaborative Project and a Coordination Action** to cover integration, networking, transnational access and joint research, along the lines of the FP6 I3 (Integrated Infrastructures Initiatives), the evaluation criteria, taken from the EC FP7 Capacities Programme, are:

Evaluation criteria applicable to Integrated Infrastructure Initiative project proposals (I3)		
1. S/T QUALITY “Scientific and/or technological excellence (relevant to the topics addressed by the call)”	2. IMPLEMENTATION “Quality and efficiency of the implementation and the management”	3. IMPACT “Potential impact through the development, dissemination and use of project results”
<ul style="list-style-type: none"> • Clarity of the objectives and quality of the concept. • Contribution of the overall project to the provision of integrated services and to the co-ordination of high quality research. • Quality and effectiveness of the Transnational Access and Services, and associated work plan: The extent to which the activities will offer high quality services, access to state-of-the-art infrastructures, and will enable users to conduct high quality research. • Quality and effectiveness of the Joint Research Activities and associated work plan: The extent to which the activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures. • Quality and effectiveness of the co-ordination mechanisms and associated work plan: The extent to which the Networking Activities will foster a culture of co-operation between the participants, and enhance the services to the users. 	<ul style="list-style-type: none"> • Appropriateness of the management structure, the management procedures, and the implementation plan to achieve the objectives of the project. Quality and relevant experience of the individual participants and quality of the consortium as a whole (including complementarity, balance, critical mass). • Appropriate allocation and justification of the resources to be committed (budget, staff, equipment), by task and participant. 	<ul style="list-style-type: none"> • Contribution at the European level of the access and service activities towards an improved access to - and use of - the pool of research infrastructures and new opportunities of access and use for researchers from across the EU. • Contribution at the European level of the Joint Research Activities towards an optimum development of research infrastructures. • Contribution at the European level of the collaborative arrangements put into place and the perspectives for their long-term sustainability, towards a structuring impact on the pool of research infrastructures in Europe. • Appropriateness of measures envisaged for the management of intellectual property and for the dissemination and/or exploitation of project results among operators/users of research infrastructures.

Annex 3: Table for Forms of Grant and Maximum Reimbursement Rates for Projects Funded Through the Euratom Work Programme

Forms of Grant

The FP7 'Rules for Participation' propose three potential forms of grant for the Community financial contribution: reimbursement of eligible costs, flat rate financing including scale of unit costs, and lump sum financing. In this work programme, for all funding schemes, the reimbursement of eligible costs (including the different options for flat rates on indirect costs as established in Article 32 of the Rules for Participation) will be the only form of grant used²⁰.

Maximum Reimbursement Rates

The upper limits foreseen in the Rules for Participation (Article 32) for the Community financial contribution are summarised in the following table.

	Secondary and higher education establishments and SMEs ²¹	All other organisations
Research and technological development activities	75%	50%
Demonstration activities	50%	50%
Coordination and support actions and actions for the training and career development of researchers	100%	100%
Management, audit certificates and other activities ²²	100%	100%

²⁰ This annex does not apply to the funding schemes listed under section III.1 (fusion energy), except where the activities are implemented through calls for proposals.

²¹ For the purposes of this call, and in order to maximise the potential of the limited funds of the Euratom Programme in Fission, the upper limit of 75% for RTD activities applies only for educational establishments and SMEs. For other entities mentioned specifically in the Rules for Participation, an upper limit of 50% will be applied.

²² Including, inter alia training in actions that do not fall under the funding schemes for training and career development of researchers, coordination, networking and dissemination (as set out in Article 32(4) of the Rules for Participation).