LATEST IAEA ACTIVITIES RELATED TO RESEARCH REACTOR CONVERSION AND FUEL RETURN PROGRAMMES

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ABSTRACT

The IAEA has been involved for more than twenty years in supporting international nuclear non-proliferation efforts associated with reducing the amount of highly enriched uranium (HEU) in international commerce. IAEA projects and activities have directly supported the Reduced Enrichment for Research and Test Reactors (RERTR) programme, as well as directly associated efforts to return research reactor fuel to the country of origin where it was originally enriched. IAEA efforts have included the development and maintenance of several data bases with information related to research reactors (RRs) and research reactor spent fuel inventories that have been essential in planning and managing both RERTR and spent fuel return programmes. Other IAEA regular budget and Technical Cooperation activities have supported research reactor conversion and spent fuel return programmes.
After the announcement of the Global Threat Reduction Initiative (GTRI) by United States Secretary of Energy Spencer Abraham on May 2004 at the IAEA headquarters in Vienna and following recommendations of the 2004 RERTR meeting, held in Vienna in November 2004, IAEA support of RERTR and the programmes of repatriation of research reactor fuel to the country of origin are being strengthened. A comprehensive number of new activities have been initiated and some others are being prepared for 2006.
The paper fully describes objectives, structure and implementation of IAEA new activities in support of RERTR and fuel return programmes. Special emphasis is put in explaining IAEA mechanisms used for implementation and specific contribution and value added through Agency's involvement. Future activities under preparation are introduced and described.

1. Introduction

For over 50 years RRs have been one of the cornerstones of nuclear science and technology, with a good record of safe operation. They have played and continue to play a key role in the development of the peaceful uses of nuclear energy. Their contribution to the education and training of scientists and engineers for the whole nuclear community is well documented. In addition, RRs are used for a variety of purposes such as the production of isotopes for medicine and industry, non-destructive testing, analytical studies, the modification of

materials, research in physics, biology and materials science, and support of nuclear power programmes.

As important as the continuous delivering of research, education, services and products is the requirement that the RRs community addresses the increasing international concern regarding security and non-proliferation. This concern is associated with the continued operation of many RRs with highly enriched uranium (HEU) and the existence of large inventories of HEU RR spent fuel in different countries.

Agency's competence in the area of RRs has been continuously built since its foundation. At present, RRs aspects at the Agency are articulated in two different subprogrammes, one dealing with utilization, modernization, fuel cycle issues (including conversion and spent fuel return) and decommissioning and the other with safety and physical security.

The IAEA has been involved for more than twenty years in supporting international nuclear non-proliferation efforts associated with reducing the amount of highly enriched uranium (HEU) in international commerce. IAEA projects and activities have directly supported the Reduced Enrichment for Research and Test Reactors (RERTR) programme, as well as directly associated efforts to return research reactor fuel to the country of origin where it was originally enriched. IAEA efforts have included the development and maintenance of several data bases with information related to research reactors and research reactor spent fuel inventories that have been essential in planning and managing both RERTR and spent fuel return programmes. Other IAEA Regular Budget and Technical Cooperation activities have supported research reactor conversion and spent fuel return programmes.

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In the following sections the structure and implementation of IAEA new activities in support of RERTR and spent fuel return programmes are fully described. Special emphasis is put in explaining IAEA mechanisms used for implementation and specific contribution and value added through Agency's involvement. Future activities under preparation are introduced and described.

2. New IAEA Activities in Support of RR Conversion and Fuel Return Programmes

Activities at the IAEA in support of GTRI are articulated either through the Regular Agency Programme or the Technical Cooperation (TC) Programme [1]. Even though organizational and administrative mechanisms are different in both programmes a strong interaction between them exists and a solid "one house approach" is used to implement the projects.

2.1 Regular Programme

In the following paragraphs descriptions of the most significant activities carried out under the Regular Programme in 2005 are presented. IAEA involvement in ^{99}Mo production using LEU is reported in other presentation to this meeting [2]

2.1.1 Preparation of Guidelines for Research Reactor Fuel Qualification

Several national and international efforts are underway to develop, qualify, and license Low Enriched Uranium (LEU) research reactor nuclear fuel (RRNF). On the one hand, different types of Russian designed LEU RRNF are being developed in order to allow for the conversion of an important number of Russian designed research reactors (RR) both in the Russian Federation and in former Soviet Union customers. On the other hand, a coordinated international effort seeks to qualify high density fuel based on γ-phase U-Mo alloy, either dispersed in aluminium or monolithic, for application in plate-type reactors of Western design, tube-type reactors of Russian design, and pin-type reactors of Canadian design. This development work has been undertaken to provide fuels with the higher densities needed to extend the use of low-enriched uranium (LEU) to those reactors requiring higher densities than currently available in silicide dispersions and to provide a fuel that can be more easily reprocessed than the silicide.

Consistent with increasingly critical non-proliferation concerns brought about by the use of Highly Enriched Uranium (HEU) in RRNF, conversions of RRs from HEU to LEU are acquiring strong momentum worldwide. The latter implies that an important number of commercial operations involving LEU RRNF are foreseeable in the near future. For upcoming RRNF supply arrangements a clear appreciation is crucial of the requirements that the procured RRNF should meet. One of the main requisites is that RRNF supplied for RR core conversion should be qualified. Therefore, a common understanding of what "qualified fuel" means is necessary. In recent international RR meetings, participants expressed their interest in having the IAEA prepare a comprehensive publication on the above-mentioned subject.

The IAEA has recognized that, even though a great deal of information on RRNF qualification is available in the open literature (including regulatory documents prepared for the qualification of LEU silicide fuel), so far no comprehensive document addressing the rationale of qualification of RRNF has been published. The IAEA also understands that such a guideline document will serve to indicate definitions, processes and requirements to be used in RRNF supply negotiation as well as helping in the orientation of fuel development activities.

A Consultancy Meeting on the subject was held on 7-9 March 2005. Two consultants each from Argentina, France, and the United States and one each from Canada, the Republic of Korea, and the Russian Federation, plus two observers from the U.S. participated in the meeting, in addition to Agency staff from NEFW, Nuclear Fuel Cycle and Materials Section, NSNI, Research Reactor Safety Section, and NAPC, Physics Section.

The purposes of the meeting were: i)to discuss basic definitions, approaches and processes relevant to the qualification of research reactor nuclear fuel; ii) to determine the scope and table of contents of a future IAEA guideline publication on qualification of research reactor nuclear fuel; iii) to draft the outline of the future document and prepare extended synopsis of the different sections of the guideline; iv) to define a time schedule for the preparation of the document; and v) to consent and assign responsibilities for the elaboration of the different chapters of the guideline document.

The consultants readily agreed that guidelines for research reactor fuel qualification are needed and would be useful for fuel developers, fuel manufacturers, and all parties involved in research reactor fuel conversion projects. The consultants prepared a draft outline/table of contents for the guidelines document and short summaries were written for each of the chapters and for some of the sub-sections. The guidelines will have separate chapters discussing fuel qualification, and separately, fuel manufacturer/fabricator qualification.

The document, at present under preparation, will also include case studies on the "Western," Canadian, and Russian approaches for qualifying RR fuel.

2.1.2 Conversion of Slowpoke and Miniature Neutron Source Reactors

The Canadian-designed and built Slowpoke-2 reactors (five still operating) and the Chinese-built Miniature Neutron Source (MNSR, 27 kw) reactors (four in China, five abroad) are reactors of similar design. They have common operational, utilization, and spent fuel management issues. It is considered that an exchange of information on these matters would be of value to the reactor operators.

Thus, these reactors represent an ideal basis to initiate an international effort to form a research reactor operators users group, suitable to allow participant operators to address common issues, problems, and opportunities and to exchange information.

In addition, most of these reactors have cores consisting of less than 1 kilogram of HEU (90% or greater) and some of them are considering converting to the use of LEU fuel.

Two Slowpoke-2 reactors in Canada operate using LEU fuel. One started up on LEU fuel and the other was converted to LEU fuel. In addition, the China Institute of Atomic Energy (CIAE) has also been studying conversion of the MNSR cores to LEU. However, cost is likely to be an important factor to be considered by operators seeking to convert to LEU or to replace a spent core of such reactors.

In view of the foregoing, discussions among Slowpoke-2 and MNSR operators with the objective of forming a users group to address operational and utilization issues, including conversion of Slowpoke-2 and MNSR reactors, as part of international efforts to reduce and eventually eliminate the civil use of HEU, may prove to be useful.

A technical meeting regarding the conversion of SLOWPOKE and Miniature Neutron Source Reactors (MNSR) was held on 23-25 May 2005. Participants from Canada, China, France, Ghana, Jamaica, Nigeria, Pakistan, Syria and the U.S., participated in the meeting, in addition to Agency staff from NEFW, Nuclear Fuel Cycle and Materials Section, and NAPC, Physics Section and NSNI, Research Reactor Safety Section. The purposes of the meeting were: i) to discuss the operating, utilization, and fuel performance experiences of Slowpoke and MNSR research reactors; ii) to exchange information on ongoing programmes and future plans; iii) to review the experience of Slowpoke reactors which operate on LEU; iv) to examine whether there are technical solutions, including a qualified fuel, available for conversion of the HEU-fuelled reactors; v) to exchange information on spent fuel management plans of the different operators; and vi) to discuss the opportunity of an international effort for the conversion of the reactors that may include a mutual procurement of LEU fuel.

The participants of the Technical Meeting agreed that conversion to LEU has been clearly demonstrated for the SLOWPOKE, and based on initial analysis, appears to be feasible for the MNSRs. However, it was agreed that additional analysis, including various calculations, would have to be made in order to confirm that the MNSRs can be converted. All the MNSRs represented at the meeting stated their interest in conversion, as long as external funds are available to pay for the cost of the conversion.

The six major recommendations contained in the Technical Meeting report are: i) the IAEA is to establish an international working group or another form of cooperation for SLOWPOKEs and MNSRs; ii) the IAEA is to consider preparation of a TECDOC on a generic design relevant to SLOWPOKE and MNSR core conversion to be discussed at a future meeting; iii) Member States to request participation in, or creation of IAEA TC projects that address conversion of SLOWPOKE and MNSR reactors; iv) donors to provide extra-budgetary resources to IAEA TC project(s) that address conversion of SLOWPOKE and MNSR reactors; v) the IAEA is to assist in the clarification of issues related to repatriation or other

secure disposition of MNSR spent fuel; and vi) U.S. DOE RERTR programme to expand to include MNSRs.
Based on the results of the meeting, a new meeting of this group will be held in early 2006. The main objective of this meeting, in addition to further sharing of information on operating and utilization experience, will be to agree on the preparation of the TECDOC called for in the recommendations to this meeting, and to finalize the draft outline, including with chapter synopses, and to make drafting assignments as well as a schedule. The meeting should also consider the initiation of a CRP in 2006, possibly with extra budgetary funds, on preparations for MNSR conversion and repatriation of spent fuel.

2.1.3 Use of LEU in Accelerator Driven Subcritical Assemblies

An Accelerator Driven Sub-critical Assembly system (ADS) is composed of a sub-critical assembly and an accelerator. In such a system, the accelerator provides a charged particle beam for generating a neutron source to drive the sub-critical assembly.
The sub-critical assembly consists of an array of nuclear fuel elements without the possibility of sustaining a chain reaction. The ADS operates in a sub-critical mode and stays subcritical, regardless of the accelerator being on or off.
In such sub-critical assemblies the neutrons are produced by the interaction of the charged particles with the target materials and multiplied in the fuel materials. The nuclear reactions of the sub-critical assembly can be stopped by turning off the charged particle beam. This is different from conventional fission reactors, which utilize control rods to absorb neutrons for terminating the chain reaction.
The sub-critical assembly of the ADS includes nuclear fuel, coolant and reflector. In principle, HEU or LEU can be used for the sub-critical assembly fuel.
At present, there are more than twenty IAEA Member States with ADS activities and in some of them several institutes and universities are performing ADS activities. Some Member States are operating or have plans for building ADS systems and it is imperative that these facilities only utilize suitable LEU fuel for the sub-critical assembly.
A Technical Meeting was held in Vienna from 10-12 October 2005, which was attended by 15 experts from 13 Member States.
The main purpose of the meeting was to address non-proliferation concerns related to the use of HEU in Accelerator Driven Sub-critical (ADS) systems, by exploring the technical feasibility of using LEU as an alternative fuel material. In addition, participants presented reports describing the status and the current plans for ADS projects, including objectives, functions, main characteristics and design details with respect to the sub-critical assemblies. The meeting discussed the use of LEU instead of HEU for the sub-critical assemblies; optimization studies for using LEU in future ADS projects; conversion of existing ADS with HEU to LEU; and future ADS plans.
Papers presented at the meeting will be compiled as “Working Material” and will be accessible on the Internet.
The meeting recommended that a CRP be organized covering the following topics: i) analytical analyses of YALINA (Belarus) Booster configuration and comparison with experimental results including: original configuration, original configuration with 90% uranium enrichment fuel rods changed to 36%, original configuration with 90% and 36% uranium enrichment fuel rods changed to 21%, Monte Carlo and Discrete methods are included, results include subcriticality evaluation, neutron spectra, neutron flux spatial distributions, comparison with experimental results, analytical and experimental error analyses; ii) uncertainty analyses (data, methods, and experimental) using MUSE analytical and experimental results to enhance the understanding of obtained results and reduce the

errors; iii) performance analyses of LEU and HEU subcritical assemblies with respect to neutron multiplication, fuel requirements, neutron flux level, experimental capabilities, and utilization; iv) determination and studies of experimental ADS systems safety issues including the subcriticality level; v) neutron yield benchmark, neutron spatial distribution, neutron spectrum, and spatial energy deposition calculations from electron, proton, and deuteron targets with particle energy less than 200 MeV. Start from existing data sets and previous benchmark to reflect model and code improvements; and vi) benchmark calculation of SAD (Russian Federation) subcritical assembly.

2.1.4 IAEA-Research Reactor and Spent Fuel Data Bases

The IAEA has developed and maintains two research reactor-related databases. The Research Reactor Data Base (RRDB) contains data on 673 research reactors, based upon responses to questionnaires sent out annually by the IAEA to owners and operators of research reactors. The Research Reactor Spent Fuel Data Base (RRSFDB) contains data provided to the Agency on spent fuel inventories at 210 research reactors. These data bases enable the Agency to analyse trends in research reactors worldwide, to plan the IAEA's regular programme activities, as well as technical cooperation projects, and to support RERTR and spent fuel take back programmes. The IAEA completed during 2005 an effort to merge the two data bases and is in the process of distributing the questionnaires to the RR operators. The latter is indispensable to update and improve quality of records in the database. Considering the increasing importance of this database in supporting and planning GTRI activities, the IAEA strongly encourages RR operators and operating organizations to promptly and accurately respond to the questionnaires. The authors are ready to help in clarifying database aspects and respond to questions from RR operators with respect to the questionnaire and the process of gathering information.

2.2 Technical Cooperation Programme

The IAEA Technical Cooperation programme manages projects in member states that provide assistance in areas related to research reactor utilization, fuel conversion, spent fuel management and repatriation of fresh and spent HEU fuel and safety.

2.2.1 Support of the Russian Research Reactor Fuel Return (RRRFR)

These activities are carried out under TC Project RER/4/028, "Repatriation, Management and Disposition of Fresh and/or Spent Nuclear Fuel from Research Reactors". The objectives of RER/4/028 are: i) to assist Member States with research reactors to repatriate, manage or dispose of their fuel, fresh or irradiated; ii) to support the Russian Research Reactor Fuel Return (RRRFR) programme; and iii) to support the Global Threat Reduction Initiative (GTRI) by facilitating the return of fresh or irradiated HEU (including the possibility of contracting the manufacture of transport casks) or LEU spent fuel to the country of origin.
The Agency offers its management and technical experience in terms of technical advice, training, contract drafting and negotiations, Safeguards inspections, and application of safety standards to ensure that efficient and secure preparatory steps are taken in the country and the transfer is managed safely and securely. In addition, the Agency provides expert advice, organize training or technical workshops in areas relevant to safety, security or transportation, where needed.

For future spent fuel shipments under this programme, the IAEA would also help with pre-transport activities such as environmental impact assessment, contracting the supply of transport casks, assessment of transport routes, and by providing advice in respect of handling deteriorated research reactor fuel.

Since end of 2004 to present, the following main activities have been performed:

a) On 22 December 2004, the IAEA helped Czech authorities and the US National Nuclear Security Administration (NNSA) remove HEU from the Czech Republic. Six kilograms of fresh HEU were safely returned to the Russian Federation. The nuclear fuel was originally supplied to the Czech Republic by the Soviet Union for use in the Soviet-designed 10 megawatt LVR-15 multi-purpose research reactor, located in Rez near the Czech capital, Prague. The IAEA carried out all the procurement and contract activities and safeguards inspectors were present in Rez to monitor the process of loading the fuel.
b) On 25 May 2005, about three kilograms of fresh HEU were safely airlifted from Latvia back to Russia. The mission was a joint effort between Latvia, the Russian Federation, the United States, and the IAEA. The IAEA facilitated the contracts for the shipment to take place and IAEA safeguards inspectors were present to monitor the mission.
c) On 26-27 September 2005, fourteen kilograms of fresh HEU have been safely returned to the Russian Federation from the Czech Republic. The mission was a joint effort between the IAEA, the United States, the Czech Republic and Russia. IAEA safeguards inspectors monitored and verified the packing of the HEU for from a research reactor at the Czech Technical University, Prague. The shipment contract was arranged by the IAEA, as part of its technical cooperation activities. The nuclear fuel was originally supplied to the Czech Republic by the former Soviet Union for use in a Russian designed multi-purpose research reactor operated at the Czech Technical University for education and training of physics and engineering students.
d) By request of the RRRFR Programme, the IAEA initiated on July 25, 2005 a bidding process for the 'Supply of a Research Reactor Spent Fuel Transport and Storage Cask System to be used for the Repatriation of Research Reactor Spent Nuclear Fuel to the Russian Federation'. The Agency prepared the Scope of Work for this procurement, in consultation with the RRRFR Programme. The deadline for offers was October 21, 2005. An evaluation group consisting of five (5) international expert consultants was convened October 24-28, 2005 at IAEA Headquarters, Vienna, for the purpose of review and technical evaluation of the bids submitted in response to this IAEA procurement. To perform the technical evaluation of cask systems proposals from six (6) international cask vendors, the group developed a matrix of evaluation criteria. A final evaluation report was presented to IAEA. The financial evaluation is being completed by a separate, independent group. The target is to finalize the contract and deliver the purchase order, before end of 2005.

2.2.2 Support of RERTR

The IAEA has been involved with and has fully supported RERTR since its inception. Over the last years, the number of requests of IAEA assistance for RR conversion increased considerably.

At present the IAEA is managing the following active TC projects, related to RR conversion:

- KAZ/9/00, Support to Convert WWR-K Reactor to Low-enriched Uranium Fuel.
- LIB/4/009 Enhancement of the Safety System of Tajoura Research Reactor and Critical Facility

- POR/4/016 Core Conversion of the Portuguese Research Reactor to Low-enriched Uranium Fuel
- BUL/4/014 Refurbishment of Research Reactor
- UKR/9/024 Modernization and Safety Improvement of Research Reactor
- UZB/9/004 Improving Operational Safety of the Research Reactor at the Institute of Nuclear Physics
- ROM/4/024 Full Conversion of TRIGA 14-MW Core from HEU to LEU Fuel
- CHI/4/021 Production and Irradiation Qualification of Fuel Elements for Research Reactors

New project proposals are being analyzed for different Member States like Jamaica and Poland, among others.
In the following paragraphs a description of the most relevant activities carried out in 2005, in relation with RR conversion is presented (conversion of the Romanian TRIGA reactor and the Chilean qualification of LEU fuel are reported in other presentations to this meeting [3], [4].

a) The MARIA reactor, operated by the Polish Institute of Atomic Energy (IAE), is a Russian-designed research reactor that operates with Russian-supplied HEU fuel. The reactor initially operated with 80% enriched HEU and converted to 36% HEU in 1999. The present objective is to convert the current core to LEU fuel.
Recently, IAE have been studying the possibility of using fully qualified LEU silicide fuel to convert the MARIA reactor. The proposed silicide fuel (U3Si2) with a density of 4.8 g/cm^3 has been qualified to very high burnups and there is extensive experience with its use in many research reactors worldwide. The assembly design proposed for use in MARIA would be unique, however, and would need to be qualified for the MARIA operating conditions by irradiating two lead test assemblies in the MARIA reactor. Poland has applied for a Footnote/a project (see explanation below) to the IAEA to support the conversion to LEU fuel. A first trilateral meeting between IAE, the IAEA, and DOE/NNSA to discuss the options for converting the MARIA reactor was held in the Świerk-Centre, Poland, 30 to 31 August 2005. The objectives of the meeting were to discuss: i) potential fuel manufacturers; ii) fuel qualification requirements; iii) fuel procurement process under the IAEA; iv) project financing through the Footnote/a process; v) conversion analysis necessary and required support; vi) regulatory process; and vii) identification of major tasks and tentative schedule for conversion.
The participants developed a schedule with milestones and deadlines that will allow the conversion of the MARIA reactor to LEU fuel without the necessity of procuring additional HEU fuel. A tentative schedule and milestones for conversion activities was developed at the meeting based on the IAEA approach, the technical aspects for qualification of the lead test assemblies, and procurement of the remaining LEU assemblies.
Considering the very tight schedule for this project, the main recommendations were to timely carry out the following action items for which the IAEA is responsible: i) organize and expert mission to Poland to assist in developing design specifications and drawings necessary for the procurement of the LEU fuel; ii) organize an expert consultation for evaluation of tenders for LEU fuel supply; and iii) organize QA auditing inspection missions to the supplier's factory to assess quality of assemblies fabrication.

b) Conversion of the Portuguese reactor is being carried out under TC project: POR/4/016 "Core Conversion of the Portuguese Research Reactor to Low-enriched Uranium Fuel" The objectives of the project are: to convert the present HEU fuel core of the Portuguese Research Reactor (RPI) to LEU fuel and return the HEU spent fuel to the USA within the framework of

an agreement signed by Portugal and the US Department of Energy (DOE) under the Foreign Research Reactor Spent Nuclear Fuel Policy.
Representatives from Portugal (ITN), the IAEA and DOE/NNSA met September 1-2, 2005 at the IAEA in Vienna to discuss conversion of the RPI research reactor at ITN to low enriched uranium (LEU) fuel. At the meeting a planned overall schedule for fuel procurement and conversion of the reactor was developed. The IAEA will be responsible for the following actions: i) conduct an expert mission to Portugal on Safety Analysis Report documentation; ii) prepare call for tenders with specific instruction regarding validity & scope of offer; iii) conduct an expert mission to Portugal to assist in implementing previous recommendations regarding revision and/or upgrading of safety documentation; iv) issue the call for tenders for LEU fuel; v) convene a consultancy meeting to evaluate offers and select the preferred tender; vi) arrange fuel supply contract; and vii) Organize quality control missions to LEU fuel manufacturer, in order to carry out: verification of fabricator qualification, fuel quality plates inspection and final assembly quality inspection.
A more complete description of this project is reported in other presentation to this meeting [5].

c) Conversion of the research reactor cores (10 MW and Critical Facility) at Tajoura, Libyan Arab Jamahiriya is being performed under a direct government to government agreement and not as an specific IAEA TC conversion project. Nevertheless, the government of the Libyan Arab Jamahiriya has requested assistance from the IAEA for: i) assessment of the quality of the proposed LEU IRT-4M replacement fuel, and ii) implementation of pool side inspection capabilities at Tajoura.
The Agency appointed an appropriate independent fuel expert to help the Libyan counterpart in evaluating quality assurance and quality control aspects of LEU fuel at the fabrication plant. The IAEA also assisted in selecting and purchasing especial pool side inspection equipment to be used to closely control LEU fuel behaviour during irradiation. The latter includes, an underwater visual inspection device, a sipping test facility and a specifically designed endoscope system that allows visual inspection of the fuel surface within the narrow gaps between the fuel tubes. IAEA will appoint a group of experts to help in installing and starting up these new devices and in training the Libyan operating staff on the site.

3. How is IAEA Technical Assistance Delivered?

IAEA's assistance is delivered through two main mechanisms that are summarized in the following paragraphs.

3.1 Regular Programme

The main mechanism is through co-ordinated research activities. These co-ordinated research activities are normally implemented through Co-ordinated Research Projects (CRPs) that bring together research institutes in both developing and developed Member States to collaborate on the research topic of interest. The Agency may also respond to proposals from institutes for participation in the research activities by awarding individual contracts not related to a CRP. A small portion of available funds is used to finance individual projects, which deal with topics covered by the Agency's scientific programme. The Agency designates a Project Officer for the CRP, usually from its technical staff, who will liaise with the persons nominated as Chief Scientific Investigators for the participating institutes. Between them, they manage and liaise on the research programme, which has a duration

normally of between 3 to 5 years. The Agency's Research Contracts Administration Section (NACA) of the Department of Nuclear Sciences and Applications is responsible for co-ordinating and administering the CRP financial and contractual arrangements.
Contact Information:
Research Contracts Administration Section: E-mail: crp.research@iaea.org

Other useful mechanisms are participation in IAEA's Technical Meetings and Workshops and getting in touch with IAEA staff members to discuss and provide suggestions and ideas on new activities or required assistance.

3.2 Technical Cooperation Programme

From January 2005, as indicated before, a new TC regional project, RER/4/028, is being used to handle all projects on fuel repatriation. To facilitate the conversion of research reactors to LEU fuel, for the 2005-2006 cycle, the IAEA has a number of national Regular Core and Footnote a/ TC projects based on requests from Member States. The Regular Core TC projects are those projects which are funded by the IAEA out of their regular TC budget. The second type of project, the Footnote a/ project, is funded directly by a donor country.
All mechanisms of IAEA TC are applied to GTRI related TC projects: i) training (fellowships and scientific visits); ii) expert missions; iii) organization of technical meetings or workshops; and iv) procurement of equipment, fuel and services.
When dealing with relevant purchases (like LEU fuel for conversion or fuel repatriation services), the IAEA offers mechanisms for international bidding, thus ensuring transparency and fairness and the best value for the money. The evaluation of tenders is carried out by international, independent and neutral experts and the contract is finally awarded to the best technical and financial offer.
Application for TC projects is carried out by interested Member States, by sending their project proposals to the TC Department of the IAEA.

4. Conclusions

To continue contributing to international non-proliferation efforts, support of RERTR and the programmes of return of research reactor fuel to the country of origin, the IAEA initiated in 2005 a robust and comprehensive set of new activities. These efforts will be maintained, strengthened and expanded in the following years.
To assist Member States and the international initiatives in their efforts to reduce and eventually eliminate the use of HEU and return spent fuel to the country of origin, the Agency offers the all mechanisms available through its Regular Agency Programme and Technical Cooperation Programme.
The IAEA encourages Member States to contact pertinent departments at the Agency to seek assistance and make suggestions for new activities in relation with RR and target conversion and fuel return issues.

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