

**Project Fiche – 2008 IPA Horizontal Programme
on Nuclear Safety and Radiation Protection**

1. Basic information

- 1.1 CRIS Number:** 2008/020-350
- 1.2 Title:** Decommissioning of Degraded Waste Storage Hangar No 1
- 1.3 ELARG Statistical code:** 03.64 - Nuclear safety
- 1.4 Location:** Vinča Institute in Serbia

Implementing arrangements:

1.5 Contracting Authority:

The European Community represented by the Commission of the European Communities for and on behalf of Serbia in joint management with the International Atomic Energy Agency (IAEA).

1.6 Implementing Agency:

The International Atomic Energy Agency (IAEA), Technical Co-operation Department.

1.7 Beneficiary:

The Republic of Serbia
Institute of Nuclear Sciences
11001, Belgrade, P.O Box 522
Dr. Jovan Nedeljkovic, Director General

Financing:

- 1.8 Overall cost (VAT excluded):** EUR1 476 000 which includes extensive reliance on EU technical expertise and companies to assist in the planned activities.
- 1.9 EU contribution:** EUR 1 200 000
- 1.10 Final date for contracting:** 2 years following the date of conclusion of the Financing Agreement.
- 1.11 Final date for execution of contracts:** 2 years following the end date for contracting.
- 1.12 Final date for disbursements:** 3 years following the end date for contracting.

2. Overall Objective and Project Purpose

2.1 Overall Objective:

To improve radioactive waste management at the Vinča Institute in line with best EU practices.

2.2 Project purpose:

To contribute to the implementation of the Vinča Nuclear Institute Decommissioning programme (VIND) that is coordinated and partly supported by the IAEA through the complete removal, processing and secure storage of all radioactive wastes, sources and safeguards materials, and the complete dismantlement of the degraded Hangar No 1.

2.3 Link with AP/NPAA/EP/SAA

Article 110 of the draft SAA with the Republic of Serbia explicitly mentions nuclear safety as one of the cooperation topics.

The Serbia 2007 progress report mentions that "little progress has been made in the area of nuclear safety and radiation protection. The dismantling operations and removal of spent fuel from the Vinča research reactor are in progress, but faces numerous difficulties. However Serbia has not yet acceded to the Convention on Nuclear Safety and to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management".

2.4 Link with MIPD

The MIPD action entitled "Nuclear Safety and Radiation Protection" mentions that there are "specific problems posed by the management of radioactive waste and spent nuclear fuel in Serbia". In this context, the MIPD intends to support "further alignment of the management practices of radioactive materials with EU best practices".

2.5 Link with National/Sectoral Investment Plan

- Decision of the Serbian government to decommission the RA research reactor located at the Vinča Institute and approval of the VIND programme (2002 and 2004)
- Activity framework in the field of nuclear safety and radiation protection for the period 2008-2010 decided by the government of Serbia.

3. Description of project

3.1 Background and justification:

Operation of the RA nuclear research reactor at Vinča until 1983 has generated spent nuclear fuel and many types of radioactive waste that need to be properly managed. This is the main aim of the VIND programme that was established in 2002 based on a decision of the Serbian government to decommission the Vinča RA research reactor. The VIND programme comprises a number of successive phases of implementation that are covering the period 2006-2013.

Management of spent nuclear fuel is considered as the most urgent problem to be solved and therefore the three first phases addressed the characterisation, repackaging, transport to the Russian Federation and reprocessing operations. It is important to note that phase 2 (transport of spent nuclear fuel to the Russian Federation) will be funded by the 2007 IPA horizontal programme on nuclear safety and radiation protection.

Management of radioactive waste to be generated during the decommissioning and dismantling of the RA research reactor constitutes also an important radiological issue and phases 4 and 5 of the VIND programme are devoted to the transformation of an old building into a waste treatment and conditioning facility. Funding of the equipment to be installed into this facility is also part of the 2007 IPA horizontal programme on nuclear safety and radiation protection.

However proper management of radioactive waste stored at the Vinča Institute requires additional phases to be implemented over the period 2009-2011, i.e.

- Phase 6: Conditioning, packaging and storage of disused sealed radioactive sources;
- Phase 7: Conditioning and processing of improperly stored and unconditioned radioactive waste;
- Phase 8: Decommissioning of the old storage facilities for sources and radioactive waste;
- Phase 9: Dismantling of the old piping system and tanks containing radioactive liquid waste, and
- Phase 10: Radioactivity survey of the Vinča site.

Several donor countries (e.g. the USA, Norway) have already expressed their intention to contribute to the funding of these activities as well as the IAEA. However the funds that are expected to be collected are still far from the needs already identified.

Therefore the aim of this project is to contribute to the VIND programme via the support to Phase 8: "Decommissioning of the old storage facilities for sources and radioactive waste".

In this context, the first incremental decommissioning project will be the decommissioning and complete removal of old storage waste Hangar No 1, which contains roughly half of all historical radioactive waste from the former Yugoslavia. The Hangar is nearly 45 years old and in very poor condition; has radiation dose rates of up to 6 mSv/h; stores yellowcake, metallic uranium and other safeguards materials; stores several hundred drums of unconditioned and uncharacterised waste; has hundreds of high dose rate disused radiation sources; has some very low levels of contamination on the surrounding land and scrap materials; and is a home for some small animals.

The project is supported by technical and safety expertise of IAEA under its Technical Cooperation programme. Being part of VIND programme, the project is also supported by Ministry of Science of Government of Republic of Serbia providing continuity of funding.

3.2 Assessment of project impact, catalytic effect, sustainability and cross border impact

The project will reduce the radiological risks related to the unsafe and unsecured storage of radioactive waste in particular for the personnel of the Vinča Institute.

It has a catalytic effect in the sense that providing funding to phase 8 of the VIND programme will enable the whole sequence of operations leading to a safer and more secure Vinča nuclear site to become effective.

3.3 Results and measurable indicators:

The final result of the project is that all radioactive materials, waste and sources are removed and safely, securely stored; Hangar No 1 is dismantled; the concrete pad is removed; and the surrounding area is remediated. This shall include the following individual performance indicators:

1. A conceptual project approach and implementation plan is completed and documented; a radiological characterisation report for H1 is completed; a radiological characterisation report for the environs surrounding H1 is completed; a sample and analysis plan is completed; a shielding plan and a personnel protection plan are completed; and all of these plans and

reports are incorporated into the revised Safety Analysis Report for the decommissioning license;

2. The revised Safety Analysis Report is completed and approved by the regulatory body, and a license is issued for decommissioning. Subsequent decommissioning activities, such as the decommissioning of the underground liquid transuranic waste tanks, will become revisions to this license;
3. All radioactive samples are analysed and documented for inclusion in the final decommissioning report, with appropriate quantification and qualification of results;
4. All clean waste inside H1 and in the surrounding area is removed from site and disposed in municipal landfills or in accordance with instructions from the regulatory body;
5. All radioactive sealed sources are removed for conditioning and/or for secure storage; the inventory of removed sealed sources has been captured in the Source Conditioning Facility database, regardless of whether stored or conditioned;
6. All radioactive waste is removed for conditioning and/or for secure storage; the inventory of removed waste has been captured on the Common Waste Information Database (CWID);
7. H1 and the attached shed C1 are dismantled and properly dispositioned (e.g., processed, stored), including the removal of the concrete slab and all adjacent radioactive materials;
8. The surrounding environs have been remediated for industrial use and are under the positive control of the responsible Agency or organisation;
9. A final site characterisation has been performed and is accepted by the regulatory body as having achieved the radiological objectives for industrial areas within Vinca;
10. A final decommissioning report is submitted to the various stakeholders, including the EU.

3.4 Activities:

Activities which are identified below as “Tender offers” may be grouped into larger offers, although it is anticipated that several such offers and contracts will be issued.

- Assistance in developing a detailed conceptual design and implementation plan to achieve project objectives; this will become an integral part of the revised Safety Analysis Report for the decommissioning license;
- Assistance in developing a detailed plan for personnel protection from radiological, occupational, biological and industrial hazards; this will include a shield plan to be implemented early in the process to minimize radiation exposures and facilitate the early removal of radioactive sources; this will become an integral part of the revised Safety Analysis Report for the decommissioning license;
- Assistance in performing a comprehensive radiological characterisation of the facility for decommissioning, which shall be incorporated into the decommissioning plan; this shall include but is not limited to: loose surface contamination on walls, floor and support structures in all areas; inventory of suspected clean waste by type and container; inventory of radioactive sealed sources by type, activity, dose rate (some of which exceed 6 mSv/hr on contact with exterior of source shield); inventory of radioactive waste by general description and container; identification and tagging of all safeguards materials; identification of all potential and known biological issues (e.g., live and dead small animals, snakes, poisonous insects, etc.); and identification of other occupational and industrial hazards; this will become an integral part of the revised Safety Analysis Report for the decommissioning license;

- Assistance in performing a comprehensive radiological characterisation of the adjacent environs for decommissioning, which shall be incorporated into the decommissioning plan; this shall include but is not limited to: contamination of vegetation out to 50 m (or to the fenced security boundary, whichever is less); ground contamination to 50 m horizontal and to a depth of the aquifer or bedrock or 10 m, whichever is less; identification, inventory, and radiological characterization of all scrap metal and other excess materials stored within 50 m of H1; this will become an integral part of the revised Safety Analysis Report for the decommissioning license;
- Assistance in completing, submitting and obtaining approval of revised Safety Analysis Report for the decommissioning license for Hangar No 1;
- Assistance in preparation of sample analysis plan, including analytical specifications and sample management, to support the radiological characterisation plans in activities 3 and 4;
- Tender offer and contract for implementation of sample and analysis plan identified in activity 6;
- Tender offer and contract for implementation of personnel protection and shielding plan identified in activity 2;
- Tender offer for and implementation of inventory and removal of all sealed sources either to the Source Conditioning Facility temporary storage area or to the Secure Storage Facility; this will allow greater access to H1 while dramatically reducing the source term; the inventory will be consistent with the source inventory requirements established for the Source Conditioning Facility and incorporated into their database;
- Tender offer for and implementation of segregation, monitoring and removal of all potentially clean waste and clean biological hazards, including disposition in accordance with municipal waste standards or as directed by the regulatory body; this shall also include the removal and characterisation of all clean scrap materials in the surrounding area (out to approximately 50 m from existing Hangar 1 structure); including disposition of clean materials and conditioning and storage of Low Level Waste (LLW).
- Tender offer for and implementation of physical, chemical and radiological characterisation of all radioactive waste other than sealed sources; this will include appropriate sampling and analysis, inventory of every waste container, external inspection of every waste container, internal inspection of every waste container with respect given to potential internal hazards and airborne hazards or dispersion, segregation by intended processing method, and priority for processing; inventory will include marking every container with a unique container identification according to the site procedure and Common Waste Information Database (CWID) requirements; data entry of all characterization data and other related data into CWID; development of a movement plan for each container to ensure positive tracking and control; implementation of the movement plan and subsequent updating in CWID; this shall also include the removal and characterization of all contaminated scrap materials in the surrounding area (out to approximately 50 m from existing Hangar No 1 structure);
- Tender offer for and implementation of decontamination of Hangar No 1 accessible surfaces and concrete floor; areas of fixed contamination will be clearly marked for possible later segmentation and removal as contaminated waste;
- Tender offer for and implementation of dismantlement and disposition of Hangar No 1 walls and roof, including disposition of clean/exempt waste and conditioning and storage of LLW; this will also include the dismantlement and disposition of the attached metal shed identified as facility C1;

- Tender offer for and implementation of dismantlement and disposition of Hangar No 1 concrete floor, including disposition of clean concrete and conditioning and storage of LLW;
- Tender offer for and implementation of remediation of the adjacent areas (out to approximately 50 m from existing Hangar No 1 structure), including disposition of clean/exempt materials and conditioning and storage of LLW;
- Tender offer for and implementation of final area radiological characterization and preparation for long term environmental stabilization and control for continued industrial use;
- Assistance in developing final decommissioning and area remediation report for submission to the Ministry of Science, Ministry of Environment, Vinca Institute, EU and other stakeholders;
- Provide additional experts as needed for progress assessment, on site assistance, problem resolution, verification of achievement of performance indicators.

All these activities will be supported through a European Community Contribution Agreement with the IAEA (see Annex V).

3.5 Conditionality and sequencing:

The implementation of this project requires a functioning regulatory body in charge of nuclear issues in Serbia since part of the project will consist of drafting a decommissioning plan to be reviewed and approved by this body.

3.6 Linked activities:

All the other phases of the VIND programme.

3.7 Lessons learned

Since 2004 the implementation of the VIND programme under the coordination of the IAEA is proceeding according to the time schedule. However, the latest developments of this programme showed that supplementary technical expertise would be required for the monitoring taking into account the increasing number of projects being implemented and their high technical complexity.

4. Indicative Budget (amounts in €)

| Activities | TOTAL COST | SOURCES OF FUNDING | | | | | | | | | | | |
|--------------------------|------------------|--------------------|-----------|----|------------------|------------------------------|-----------|---------|----------|------|---------|----------|----------|
| | | EU CONTRIBUTION | | | | NATIONAL PUBLIC CONTRIBUTION | | | | | PRIVATE | | |
| | | Total | % * | IB | INV | Total | % * | Central | Regional | IFIs | Total | % * | |
| Activity 1 | | | | | | | | | | | | | |
| contract 1 | 1 430 000 | 1 154 000 | 81 | | 1 154 000 | 276 000 | 19 | | | | | 0 | 0 |
| Contingencies (about 4%) | 46 000 | 46 000 | 100 | | 46 000 | 0 | 0 | | | | | 0 | 0 |
| TOTAL | 1 476 000 | 1 200 000 | 81 | | 1 200 000 | 276 000 | 19 | | | | | 0 | 0 |

Amounts net of VAT

* expressed in % of the Total Cost

Additional Funding from Government, IAEA and Other Contributors

As discussed in preceding paragraphs, this project is intended to support the Vinca Institute Nuclear Decommissioning (VIND) programme, which is Serbia's priority nuclear safety and radiation protection support programme. For more than 40 years, Serbia was the central collection centre for all disused sealed sources and radioactive waste from the former Yugoslavia, including countries which are now EU Member States. These sealed sources and wastes are found in rooms and degraded storage facilities located all over Vinca. Only a few of the thousands of disused sealed sources and the thousands of waste containers have ever been conditioned, and the conditioning methods for those few items does not meet current international standards. Construction of proper waste processing facilities, secure storage facilities, and source conditioning facility, as well as conditioning and storage of the resultant wastes and sources, is estimated to cost more than EUR 8 million.

VIND is also intended to repatriate more than 8000 highly enriched and low enriched spent fuel elements to Russia from the RA Research Reactor. The total cost of the repackaging, transport, spent fuel reprocessing, and disposition of the resultant waste will exceed EUR 25 million.

Finally, decommissioning of the RA Research Reactor and degraded support facilities, including site-wide radiological characterization, remediation or resolution of identified sources of radiation and contamination, and upgrading the capabilities of the radiation protection programme, is estimated to cost an additional EUR 25 million or more.

The VIND programme has been in progress since 2004 and has received more than EUR 16 million in contributions through 2008 from sources other than the EC; this includes nearly EUR 9 million in support from the Serbian Ministry of Science. An additional EUR 14 million is currently approved for 2009-11, including EUR 10 million from the Serbian Ministry of Science. The EC has committed to a EUR 5.46 million through a 2007 Contribution Agreement.

A summary of the VIND funding approvals is included in the following table. It should be noted that funding for decommissioning activities, sealed sources, and waste management decline sharply in 2009-11, as the government, IAEA, and other contributors are shifting their financial resources toward spent fuel repatriation. However, it is still anticipated that the Ministry of Science will contribute more than EUR 1 million annually to waste management and decommissioning activities, mostly in terms of local labour resources.

Existing VIND Funding Approvals

| Spent Fuel Repatriation Project (€) Phases 1, 2 and 3 of the programme | | | |
|---|--------------------|--------------------|------------------------------|
| | 2004-08 Funding | 2009-11 Funding | Total |
| European Commission | 885 000 | 3 545 000 | 4 430 000¹ |
| IAEA | 1 910 152 | 526 667 | 2 436 819 |
| Nuclear Threat Initiative (NGO) | 2 578 820 | - | 2 578 820 |
| USA * | 550 000 | 2 666 667 | 3 216 667 |
| Russia * | - | - | - |
| Total | 5 923 972 | 6 738 333 | 12 662 305 |

* IAEA is negotiating with USA and Russia additional funding of more than €6M each.

| Sealed Sources and Waste Management (including Nuclear Security) (€)/ Phases 4 to 7 of the programme | | | |
|---|--------------------|--------------------|------------------------------|
| | 2004-08 Funding | 2009-11 Funding | Total |
| European Commission | 715 000 | 315 000 | 1 030 000² |
| IAEA | 1 065 724 | 200 000 | 1 265 724 |
| Nuclear Threat Initiative (NGO) | 334 333 | - | 334 333 |
| USA | 566 667 | 300 000 | 866 667 |
| UK | 40 000 | 40 000 | 80 000 |
| Slovenia | 30 000 | 40 000 | 70 000 |
| Total | 2 751 724 | 895 000 | 3 646 724 |

| Decommissioning (€)/ Phases 8 to 10 of the programme | | | |
|---|--------------------|--------------------|----------------|
| | 2004-08 Funding | 2009-11 Funding | Total |
| European Commission | - | - | - |
| Nuclear Threat Initiative (NGO) | 125 671 | - | 125 671 |
| IAEA | 314 618 | - | 314 618 |
| USA | 6 833 | - | 6 833 |
| Total | 447 122 | - | 447 122 |

| Serbia Funding from Ministry of Science (€) | |
|--|--------------------|
| | 2004-08 Funding |
| 2004 | 500 000 |
| 2005 | 800 000 |
| 2006 | 1 100 000 |
| 2007 | 2 500 000 |
| 2008 | 4 000 000 |
| 2009-2011* | 10 200 000 |
| Total | 19 100 000 |

* 2.5M/year + estimated 2.7M for fuel repatriation contract

| Total Known Funding to VIND, excluding EC Funding (€) | | | |
|--|--------------------|--------------------|--------------|
| | 2004-08 Funding | 2009-11 Funding | Total |
| | | | |

¹ Under the 2007 IPA horizontal programme on nuclear safety and radiation protection

² Idem

| | | | |
|--------------|-------------------|-------------------|-------------------|
| Total | 16 422 818 | 13 973 333 | 30 396 151 |
|--------------|-------------------|-------------------|-------------------|

5. Indicative Implementation Schedule (periods broken down per quarter)

| Contracts | Start of Tendering | Signature of contract | Project Completion |
|------------|--------------------|-----------------------|--------------------|
| Contract 1 | N/A | 1Q 2009 | 4Q 2011 |

6. Cross cutting issues

6.1 Equal Opportunity:

The project will benefit both women and men through improvements in environmental protection and safety. On all activities, both men and women will have equal opportunities to compete for contracts and to work on any related activities.

6.2 Environment:

This project will improve radiological conditions within the Vinca site and the surrounding environments by reducing the potential for release of radioactivity via groundwater, airborne activity, or malicious intent. All radioactive materials, sources, etc. will be removed from areas of little control and placed in proper storage, including extensive radiological characterization and conditioning; this will ensure graded levels of security and radiological controls so as to reduce the impact on the environment, workers and the general public.

6.3 Minorities:

On all activities, minorities will have equal opportunities to compete for contracts and to work on any related activities.

ANNEXES

- 1- Log frame in Standard Format
- 2- Amounts contracted and Disbursed per Quarter over the full duration of Programme
- 3- Description of Institutional Framework
- 4 - Related laws, regulations and strategic documents:
- 5- Details per EU funded contract

ANNEX 1: Logical framework matrix in standard format

| | | |
|--|---|--|
| LOGFRAME PLANNING MATRIX FOR Project Fiche | Programme name and number – 2008 IPA Horizontal Programme on Nuclear Safety and Radiation Protection | 2008/020-350 |
| Decommissioning of Degraded Waste Storage Hangar No 1 at Vinča Institute of Nuclear Sciences | Contracting period expires – 2 years following the date of the conclusion of the Financing Agreement. | Disbursement period expires – 3 years following the end date for contracting |
| | Total budget including 5% contingencies: EUR 1 476 000 | IPA budget: EUR 1 200 000 |

| Overall objective | Objectively verifiable indicators | Sources of Verification | |
|--|--|---|---|
| Old waste storage hangar H1 and associated shed C1 have been dismantled, all waste and sealed sources safely and securely stored in the new Serbian National Waste Storage Facility (WSF), and the area around H1 has been remediated for subsequent industrial use. | Hangar H1 dismantled; all waste and sources removed and securely stored; adjacent area remediated for subsequent industrial use, license for radioactive material storage in H1/C1 terminated. | License terminated; decommissioning report accepted by regulatory body. | |
| Project purpose | Objectively verifiable indicators | Sources of Verification | Assumptions |
| To contribute to the implementation of the Vinča Nuclear Institute Decommissioning project (VIND) that is coordinated and partly supported by the IAEA through the complete removal, processing and secure storage of all radioactive wastes, sources and safeguards materials, and the complete dismantlement of the degraded Hangar No 1. | Hangar 1 decommissioned and dismantled; surrounding area remediated. | Final report; removal of license for H1 by regulatory commission | Construction of waste storage facility completed and licensed to receive and store waste. (Completion scheduled in 2008.) |
| Results | Objectively verifiable indicators | Sources of Verification | Assumptions |
| 2.1 - A detailed conceptual design, implementation plan, personnel health and safety plan, radiological characterization, and safety analysis report incorporated into a comprehensive decommissioning plan has been submitted to the regulatory authority for a decommissioning license; a license for decommissioning of H1 has been approved by the regulatory authority. | 2.1 – Decommissioning plan complete | 2.1 – Decommissioning plan accepted by regulator | 2.1 – None |
| 2.2 - Contracts awarded and implementation completed for radiological sample analysis plan, personnel protection plan, and integrated shielding plan. | 2.2 – Contracts issued | 2.2 – Contracts in place. | 2.2 – None |
| 2.3 - All radioactive sealed sources and all waste characterized, removed from H1 and C1, and safely, securely processed and/or stored. | 2.3 –H1/C1 dismantled. | 2.3 – Waste inventory record/database; source inventory database | 2.3 – Waste processing, storage facilities commissioned; source conditioning facility in service. |
| 2.4 - H1 and C1 dismantled; all radioactive decommissioning and dismantling waste packaged and removed to Waste Storage Facility; all clean waste properly disposed (including all wastes within 50m radius of H1 or to adjacent security fence, whichever is closer). | 2.4 – H1/C1 dismantled. | 2.4 – Final decommissioning report | 2.4 – None |
| 2.5 - Site remediated for industrial use, final site radiological characterization performed, license for H1 withdrawn and site approved for industrial use by regulatory authority; final decommissioning report completed and issued to stakeholders. | 2.5 – H1/C1 area and adjacent areas remediated and released for industrial use. | 2.5 – Acceptance letter by regulatory body. | 2.5 – None |

| Activities | Means | Costs | Assumptions |
|--|--|------------------------|--|
| All the following activities should be contracted through a Contribution Agreement with the International Atomic Energy Agency. At this stage, the number of contracts or sub-contracts identified so far for each beneficiary country is only indicative. | | | |
| 2.1.1 - Assist in developing a detailed conceptual design and implementation plan to achieve project objectives; this will become an integral part of the revised Safety Analysis Report for the decommissioning license. | 2.1.1- Contract for conceptual design; implementation plan. | 2.1.1. = EUR 10 000 | 2.1.1. – None |
| 2.1.2 - Assist in preparation of sample analysis plan, including analytical specifications and sample management, to support the radiological characterisation plans in activities 2.1.4 and 2.1.5. | 2.1.2- Contract to develop sample analysis plan. | 2.1.2. = EUR 2 000 | 2.1.2. – None |
| 2.1.3 - Assist in developing a detailed plan for personnel protection from radiological, occupational, biological and industrial hazards; this will include a shield plan to be implemented early in the process to minimize radiation exposures and facilitate the early removal of radioactive sources; this will become an integral part of the revised Safety Analysis Report for the decommissioning license. | 2.1.3 - Contract to develop personnel protection plan. | 2.1.3 = EUR 7 000 | 2.1.3. – None |
| 2.1.4 - Assist in performing a comprehensive radiological characterisation of the facility for decommissioning, which shall be incorporated into the decommissioning plan; this shall include but is not limited to: loose surface contamination on walls, floor and support structures in all areas; inventory of suspected clean waste by type and container; inventory of radioactive sealed sources by type, activity, dose rate (some of which exceed 6 mSv/hr on contact with exterior of source shield); inventory of radioactive waste by general description and container; identification and tagging of all safeguards materials; identification of all potential and known biological issues (e.g., live and dead small animals, snakes, poisonous insects, etc.); and identification of other occupational and industrial hazards; this will become an integral part of the revised Safety Analysis Report for the decommissioning license. | 2.1.4- Contract for radiological characterisation for H1. | 2.1.4 =EUR 136 000 | 2.1.4. – None |
| 2.1.5 - Assist in performing a comprehensive radiological characterisation of the adjacent environs for decommissioning, which shall be incorporated into the decommissioning plan; this shall include but is not limited to: contamination of vegetation out to 50 m (or to the fenced security boundary, whichever is less); ground contamination to 50 m horizontal and to a depth of the aquifer or bedrock or 10 m, whichever is less; identification, inventory, and radiological characterization of all scrap metal and other excess materials stored within 50 m of H1; this will become an integral part of the revised Safety Analysis Report for the decommissioning license. | 2.1.5- Contract for rad characterisation for H1 adjacent environs. | 2.1.5. = EUR 34 000 | 2.1.5 – Environs at exterior of fence line determined to have no significant radiological concern. |
| 2.1.6 - Assist in completing, submitting and obtaining approval of revised Safety Analysis Report for the decommissioning license for Hangar No 1. | 2.1.6- Contract for SAR development and submittal. (PSAR submitted 2nd Qtr; FSAR 3rd Qtr.) | 2.1.6. = EUR 34 000 | 2.1.6. – None |
| 2.1.7 - SAR and decommissioning plan approved by the regulatory authority; license issued for decommissioning of H1. | 2.1.7- Three experts X 1 week to review SAR & decom plan. | 2.1.7. - Funded by MoS | 2.1.7 - Approval by regulatory authority required. |
| | 2.1.7- Regulatory body resources for H1 | 2.1.7. = EUR 14 000 | 2.1.7. – None |
| 2.2.1 - Tender offer, contract for, and implementation of sample and analysis plan identified in activity 2.1.2. | 2.2.1- Contract to implement sample analysis plan. | 2.2.1. = EUR 51 000 | 2.2.1. – None |

| | | | |
|--|--|-----------------------|---------------|
| 2.2.2 - Tender offer, contract for, and implementation of personnel protection and shielding plan identified in activity 2.1.3 above. | 2.2.2 - Contract to implement personnel protection plan. | 2.2.2. = EUR 35 000 | 2.2.2. – None |
| 2.3.1 - Tender offer for and implementation of inventory and removal of all sealed sources either to the Source Conditioning Facility temporary storage area or to the Secure Storage Facility so as to allow greater access to H1 while reducing the source term; the inventory will be consistent with the source inventory requirements established for the National Source Conditioning Facility and incorporated into their database. | 2.3.1- Contract for source & waste removal. | 2.3.1. = EUR 68 000 | 2.3.1. – None |
| 2.3.2 - Equipment for removal of all sources and wastes. | 2.3.2- Support equipment, waste containers and storage shields, lifting devices, pallet trucks, fork lifts, security systems, and other source handling and processing equipment provided in 2008 through donors, IAEA or Vinca. | 2.3.2 - Funded by MoS | 2.3.2. – None |
| 2.3.3 - Tender offer for and implementation of segregation, monitoring and removal of all potentially clean waste and clean biological hazards, including disposition in accordance with municipal waste standards or as directed by the regulatory body; this shall also include the removal and characterisation of all clean scrap materials in the surrounding area (out to approximately 50 m from existing Hangar 1 structure); including disposition of clean materials and conditioning and storage of Low Level Waste (LLW). | 2.3.3- Contract to remove all clean and bio waste. | 2.3.3. = EUR 102 000 | 2.3.3. – None |
| 2.3.4 - Tender offer for and implementation of physical, chemical and radiological characterisation of all radioactive waste other than sealed sources; this will include appropriate sampling and analysis, inventory of every waste container, external inspection of every waste container, internal inspection of every waste container with respect given to potential internal hazards and airborne hazards or dispersion, segregation by intended processing method, and priority for processing; inventory will include marking every container with a unique container identification according to the site procedure and Common Waste Information Database (CWID) requirements; data entry of all characterization data and other related data into CWID; development of a movement plan for each container to ensure positive tracking and control; implementation of the movement plan and subsequent updating in CWID; this shall also include the removal and characterization of all contaminated scrap materials in the surrounding area (out to approximately 50 m from existing H1 structure). | 2.3.4- Contract to remove all chemical & radwaste & sources. | 2.3.4. = EUR 87 000 | 2.3.4. – None |
| 2.3.5 - Fellowships and training in support of source waste segregation, packaging, relocation, storage, security. | 2.3.5- Source & waste management; 1x24 mos. | 2.3.5. = EUR 10 000 | 2.3.5. – None |
| 2.4.1 - Tender offer for and implementation of decontamination of Hangar No 1 accessible surfaces and concrete floor; areas of fixed contamination will be clearly marked for possible later segmentation and removal as contaminated waste. | 2.4.1- Contract for decontamination of H1 including providing EQ & supplies. | 2.4.1 = EUR 85 000 | 2.4.1. – None |

| | | | |
|---|---|------------------------|--|
| 2.4.2 - Tender offer for and implementation of dismantlement and disposition of Hangar No 1 walls and roof, including disposition of clean/exempt waste and conditioning and storage of LLW; this will also include the dismantlement and disposition of the attached metal shed identified as facility C1. | 2.4.2- Contract to dismantle & dispose of H1/C1 walls & roof. | 2.4.2 = EUR 102 000 | 2.4.2. – None |
| 2.4.3 - Tender offer for and implementation of dismantlement and disposition of Hangar No 1 concrete floor, including disposition of clean concrete and conditioning and storage of LLW. | 2.4.3- Contract to dismantle & dispose of H1/C1 floors. | 2.4.3. = EUR 87 000 | 2.4.3. – None |
| 2.4.4 - Fellowships and training in support of decommissioning activities for H1 and sample analyses. | 2.4.4- Facility decommissioning; 1x24 mos. | 2.4.4. = EUR 10 000 | 2.4.4. – None |
| 2.5.1 - Tender offer for and implementation of remediation of the adjacent areas (out to approximately 50 m from existing Hangar No 1 structure), including disposition of clean/exempt materials and conditioning and storage of LLW. | 2.5.1- Contract for remediation of areas adjacent to H1. | 2.5.1. – EUR 102 000 | 2.5.1. – None |
| 2.5.2 - Tender offer for and implementation of final area radiological characterization and preparation for long term environmental stabilization and control for continued industrial use. | 2.5.2- Contract for final radiological characterization of H1 area. | 2.5.2 = EUR 68 000 | 2.5.2. – None |
| 2.5.3 - Assistance in developing final decommissioning and area remediation report for submission to the Ministry of Science, Ministry of Environment, Vinca Institute, EU and other stakeholders. | 2.5.3- Contract for final decommissioning report for H1. | 2.5.3 = EUR 34 000 | 2.5.3. – None |
| 2.5.4 - License for radioactive material storage in H1/C1 terminated. | 2.5.4- License for H1/C1 terminated. | 2.5.4. – Funded by MoS | 2.5.4. – Acceptance of final status by regulator |
| 2.5.5 - Other expert and staff travel for progress assessment, on site assistance, problem resolution, verification of achievement of performance indicators. (Applies to all activities.) | 2.5.5- Expert or staff assistance | 2.5.5 = EUR 27 000 | 2.5.5. – None |

ANNEX 2: amounts (in €) Contracted and disbursed by quarter for the project

| Contracted | Q1 2009 | Q2 2009 | Q3 2009 | Q4 2009 | Q1 2010 | Q2 2010 | Q3 2010 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 |
|-------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Contract 1.1 | 1 200 000 Including about 4 % contingencies | | | | | | | | | | | |
| Cumulated | 1 200 000 Including about 4 % contingencies | | | | | | | | | | | |
| Disbursed | Q1 2009 | Q2 2009 | Q3 2009 | Q4 2009 | Q1 2010 | Q2 2010 | Q3 2010 | Q4 2010 | Q1 2011 | Q2 2011 | Q3 2011 | Q4 2011 |
| Contract 1.1 | 75 000 | 243 000 | 241 000 | 119000 | 175000 | 187 000 | 142 000 | 18 000 | | | | |
| Cumulated | 75 000 | 318 000 | 559 000 | 678 000 | 853 000 | 1 040 000 | 1 182 000 | 1 200 000 | | | | |

ANNEX 3: Description of Institutional Framework

The responsibilities for the fields related to the peaceful use of nuclear energy (health, the environment, science and technology, nuclear safety and radiation protection, agriculture, transport, etc) rest with several ministries.

The Ministry of Science (MS) is responsible for R&D in the nuclear sector, for nuclear safety, nuclear materials and radioactive waste management in the country. Under the Ministry's competence and financing are the R&D, including the Vinča Institute of Nuclear Sciences, the Institute of Technology of Nuclear and Other Mineral Raw Materials (ITNMS), the Institute of Geology, the Institute of Nuclear Energy Application in Agriculture (INEP) and others. The Ministry ensures that the law on the nuclear safety and the related regulations are carried out and provides the financial resources for the activities. The MS is responsible for bilateral and multilateral international scientific-technical co-operation of Serbia, including the cooperation with the IAEA.

The Ministry for Environmental Protection (MEP) is responsible and leading in radiation protection and monitoring of the environment, emergency planning etc.

In force is the Law on Protection against Ionizing Radiation that was enacted in 1996 (46/96). It establishes measures for the protection against ionising radiation, as well as nuclear safety measures, liability for nuclear damages, supervision and authorization, penalties. Based on the Law on Protection against Ionizing Radiation, there are 11 regulations related to protection against ionizing radiation and for the safety of radiation sources and 5 regulation related on nuclear safety and security.

Currently, there is no effectively independent Serbian regulatory body for radiation and nuclear safety. Law 46/96 does not make provision for the establishment of a regulatory body, although it makes reference to the 'competent Ministry'. Currently, in accordance with the *Law on Ministries*, the Ministry of Science and Ministry of Environmental Protection are identified as the competent Ministries.

A temporary regulatory body called the 'Regulatory Commission on Radiation and Nuclear Safety' has been established by the Ministry of Science to administer the decommissioning of the research reactor at the Vinca Institute, the shipment of spent nuclear fuel to the original Russian supplier, and the treatment of radioactive waste.

The Vinca Institute of Nuclear Sciences was founded in 1948. It is the main institute involved in research and applications in nuclear science (since 1968 multidisciplinary, not only nuclear) and covers a wide range of scientific and engineering fields; 800 employees, out of which 400 is research staff, organized in 16 laboratories (actually departments) from Nuclear Physics, Theoretical Physics and Physics of Condensed Matter, Radiation and Environmental Protection, Nuclear Engineering to Multidisciplinary Research and Engineering which are, to a large extent, independent.

The Radiation and Environmental Protection Laboratory covers: environmental radioactivity control, ionization radiation dosimetry, metrology analyses, radiation protection, radioactive waste arrangement and decontamination, reactor dosimetry, instrumentation servicing and operative dosimetry. The Nuclear Engineering Laboratory covers: reactor physics, safety and control of nuclear reactors, nuclear engineering and radiation protection. Together with the

Reactor Department, it is responsible for two research reactors: RA (shut down for decommissioning) and RB (zero power, requiring upgrading).

The RA research reactor went into operation in 1959 and has been shut down since 1984 due to fuel corrosion problems and for the refurbishment of the reactor control and safety system. Since the date, it stays with a partially loaded core containing 480 fuel slugs with 80% enriched uranium. In addition, 6656 spent fuel slugs with 2% enriched uranium and 884 slugs with 80% enrichment are located in a spent fuel storage pool containing about 200 tons of stagnant water of poor quality to minimize the corrosion process.

ANNEX 4: Related Laws, Regulations and Strategic Documents

Project-Specific Documents

- Decision of the Serbian government to decommission the RA research reactor located at the Vinča Institute and approval of the VIND programme (2002 and 2004)
- Draft of the Serbian new Law on ionising radiation protection and on nuclear safety (2006) and existing Serbian Law on Protection against Ionising Radiation (1996)
- Article 110 of the draft SAA
- Nuclear Safety and Radiation Protection action of the multi-country MIPD programme

International Conventions and Treaties

Serbia is a party to the following instruments under the IAEA's auspices

- Agreement on the Privileges and Immunities of the IAEA
- Vienna Convention on Civil Liability for Nuclear Damage
- Convention on Physical Protection of Nuclear Material
- Convention on Early Notification of a Nuclear Accident
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

Serbia has signed but has not yet ratified the Optional Protocol Concerning the Compulsory Settlement of Disputes to the Vienna Convention on Civil Liability for Nuclear Damage.

As a party to the Treaty on the Non-Proliferation of Nuclear Weapons, Serbia has a Comprehensive Safeguards Agreements with the IAEA for the Application of Safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons.

ANNEX 5: Details per EU funded contract

This project together with the projects:

- Conditioning and secure storage of disused sealed radioactive sources;
- Characterisation and conditioning of radioactive waste;
- Radioactivity survey;
- Strengthening radiation safety capabilities and infrastructure;
- Project Management Unit for EU supported projects;

which are all part of the VIND programme, will be supported through a European Community Contribution Agreement with the IAEA.

Specific contribution agreement will be concluded in accordance with the terms of the Financial and Administrative Framework Agreement (FAFA) between the European Community and the United Nations, signed on 29 April 2003, to which the IAEA has adhered on 17 September 2004.