

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

1. Basic information

1.1 CRIS Number: 2007/019-038

1.2 Title: Equipment for the radioactive waste processing facility at the Vinča Institute (project No 2)

1.3 Sector: 06.64 - Nuclear Safety

1.4 Location: Belgrade, Serbia

Implementing arrangements:

1.5 Contracting Authority:

The European Community represented by the Commission of the European Communities for and on behalf of the Republic of Serbia in joint management with the IAEA.

1.6 Implementing Agency:

The International Atomic Energy Agency (IAEA), Technical Cooperation Department

1.7 Beneficiary: The Republic of Serbia

1.8 Overall cost: €1,030,000

1.9 EU contribution: €1,030,000

1.10 Final date for contracting: Two years following the date of conclusion of the Financing Agreement

1.11 Final date for execution of contracts: Two years following the end date for contracting

1.12 Final date for disbursements: Three 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 project (VIND) that is coordinated and partly supported by the IAEA through the supply of equipment for the operation of the radioactive waste processing facility.

2.3 Link with SAA:

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

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)
- 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)

3. Description of project

3.1 Background and justification:

At present the spent nuclear fuel and radioactive waste storage situation at the Vinča Institute in Serbia represents a nuclear security, proliferation, environmental and human health hazard. The facility contains substantial quantities of high and low enriched uranium fuel elements refined yellow cake of uranium, more than 1200 sealed radioactive sources, unprocessed radioactive liquid waste tanks, and thousands of unconditioned radioactive waste containers.

There are two existing waste hangers at the Vinča Institute that support all waste storage and conditioning activities. Older hanger – hanger 1 – is in bad condition. The original building is a metal corrugated structure that is rusting. Inside, there is a haphazard array of a variety of radioactive materials, all in different need of segregation, characterization and compacting. But, there is no room in this facility for any of these activities. Likewise, there is a second hanger – hanger 2 – that is nearly completely full of sealed radioactive sources. Although it was constructed only twenty years ago, it too is in need of repair and refurbishment, and radioactive waste inside needs to be sorted, segregated, and characterized in a more efficient manner. Finally high-activity sealed radioactive sources need to be stored in a more secure manner.

The implementation of the VIND programme will generate additional radioactive waste that needs to be processed and stored according to best EU practices. Of particular importance is the spent fuel cooling ponds water that will have to be processed after spent nuclear fuel removal and repackaging. This processing should be done at the earliest possible future since more than half of the nuclear fuel elements that have been stored in the pond are currently leaking fission products. Any crack in pond wall could contribute to leaking of contaminated water into the environment. Air is continuously exchanged between the interior of the building and the outdoors meaning that radioactive contaminants of the pond could leak outside the building into the environment.

The international Community is well aware of the radiological risks that are posed by the presence of highly and low enriched uranium in spent nuclear fuel currently in store in Serbia as well as by the poor management of radioactive waste in this country. Therefore under the coordination of the International Atomic Energy Agency (IAEA), several donor countries organisations and notably the USA are providing funding in order to contribute to solving these issues. In this context the Vinča Institute Nuclear Decommissioning (VIND) programme has been established in 2002 based on a decision by the Serbian government to decommission the Vinča RA research reactor and ancillary

facilities, including processing and storage of radioactive waste as well as repatriation of all new and spent nuclear fuel to the Russian Federation.

At present the VIND programme comprises five main phases:

- Phase 1: Removal, characterisation and repackaging of spent nuclear fuel in store at the Vinča Institute
- Phase 2: Preparations for and transport of Russian-origin spent nuclear fuel from the Vinča Institute to the Russian Federation
- Phase 3: Reprocessing and disposal of the Russian-origin spent nuclear fuel in the Russian Federation
- Phase 4: Design and construction of a waste processing and storage facility at the Vinča Institute for all types of radioactive waste to be generated during decommissioning operations of the RA nuclear research reactor
- Phase 5: Provisions of equipment for the waste processing facility at the Vinča Institute

Concerning phase 4, Serbia has provided funding for three new radioactive waste storage and processing facilities (traditionally called "hangars") to be constructed. Two hangars for radioactive waste storage have been fully designed and are in process of receiving a license for construction. The third building – the radioactive waste processing facility – will be constructed in 2008. Whereas the purpose for the first two buildings is to increase storage capacity for radioactive waste onsite, the purpose for the radioactive waste processing facility is to reduce and segregate waste to maximize the amount of waste that can be stored. Thus, in this facility equipment will be present that can compact waste, containerize waste, evaporate liquids, and encase waste in concrete drums. As auxiliary equipment, and since much of the waste is moderately radioactive, equipment is needed to analyze the waste to determine what is present, to what level of contamination, and to determine what contaminants are present.

The total cost of the five phases of this programme would amount to €28,000,000. Donor organisations and countries (mainly the USA and Serbia) have already committed approximately €23,000,000 to support the VIND programme. In other words, funding is already provided or committed for phases 1, 3 and 4. Conversely phases 2 and 5 are not yet funded

Therefore the aim of this project is to contribute to the VIND programme via the support to phase 5: "Provisions of equipment for a radioactive waste processing facility at the Vinča Institute".

The equipment that is listed hereafter makes up the bulk of what will be needed to operate the radioactive waste processing facility. Additional equipment may be acquired through in-kind donations from a variety of countries.

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

The project will reduce the risks of radioactive pollution of the environment since all waste types currently in store at the Vinča Institute will be processed and stored according to best EU practices. It has a catalytic effect in the sense that providing funding to phase 5 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:

Procurement documents are received indicating placement of orders and delivery of equipment to Vinca. Onsite audits at Vinča can verify the actual installation and usage of the equipment.

4. Activities:

Procurement of the following pieces of equipment:

- i. Security equipment (CCTV, alarm, plus installation and connection to CAS);
- ii. Installation and training for all equipment;
- iii. Half-Height ISO Containers (HHISO) (must meet ISO standard), 40 each, 19.5 m³ external volume with 15.5 m³ internal capacity; flowable grouting channels;
- iv. Encapsulation shield boxes for sealed sources and high activity large components; 50 each; 5 m³ external volume, 2.5 m³ internal capacity;
- v. Waste storage container with cooling and ventilation system for long term storage of high-activity resins/sorbents from spent fuel pond water cleaning: capacity 200 kg of sorbent;
- vi. Overpack metal waste drums, standard 320 l, for overpacking 200 l drums and backfill with grout; 100 each;
- vii. Bulk waste collection, accumulation and sorting boxes; metal; liftable by forklift; for hazardous and radioactive materials; approximately 1.5 m³ (typical external dimensions 1300 mm H x 1200 mm W x 1850 mm L), with removable top and gasket for top, lockable, empty weight <0.4 Mt, payload 5 Mt minimum; final protective finish yellow in colour; 35 each;
- viii. Forklift for handling HHISOs and heavy waste containers; minimum capacity 35 metric tons; safety margin (specified live load) capacity 40 metric tons;
- ix. Drum dryer, evaporator, for radioactively contaminated liquid concentrates, decontamination solutions, and wet solid wastes;
- x. Area radiation monitors;
- xi. Radiation monitoring equipment (contamination area monitoring equipment, portable survey instrumentation);
- xii. Personnel Contamination Monitors;
- xiii. Disposable protective clothing (coveralls, hoods, booties, gloves);
- xiv. Radioactive Waste Compactor;
- xv. 200 l Barrel Forklift with front stacking forks.

3.5. Conditionality:

The implementation of this project is subject to the following prerequisites:

- that a Foreign Trade Agreement is concluded between the Serbian government and the Russian Federation, allowing the implementation of phase 3 of the VIND programme;
- that Serbia or other donors are committed to cover all expenses for phase 3 of the VIND programme;
- that a successful contract is negotiated for the construction of the waste processing and storage facility at the Vinča Institute for all types of radioactive waste to be generated during decommissioning operations of the RA nuclear research reactor, and is covered by funds made available from other donors.

3.6. Linked activities

The project entitled "Preparation for and transportation of spent nuclear fuel from the Vinča Institute to the Russian Federation (project No 1)" that is covering phase 2 is closely related to this project.

3.7. Lessons learned

Concerning supply of equipment for radioactive waste treatment, conditioning, packaging and storage, it must be underlined that in the past the Phare nuclear safety programme supported similar activities in several countries and notably in Bulgaria and Romania. The equipment supplied is of

conventional nature and as for all supply contracts the technical specifications of the equipment to be purchased must be well described and the associated cost should be estimated with accuracy.

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	1,000,000	1,000,000	100		1,000,000							
Contingencies (3%)	30,000	1,030,000			30,000							
TOTAL	1,030,000	1,030,000			1,030,000							

* expressed in % of the Total Cost

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

Contracts	Start of Tendering	Signature of Contribution agreement	Project Completion
Contract 1.1	N/A	September 15, 2007	November 30, 2010

6. Cross cutting issues (where applicable)

6.1 Environment:

All waste types already in store at the Vinča Institute or to be generated during the implementation of the VIND programme will be managed according to best EU practices and thereby will minimise risks of radioactive pollution of the environment.

ANNEXES

- 1- Log frame in Standard Format
- 2- Amounts Contracted and Disbursed per Quarter over the full duration of Programme
- 3 - Reference to laws, regulations and strategic documents
- 4- Details per EU funded contract

ANNEX 1: Logical framework matrix in standard format

LOGFRAME PLANNING MATRIX FOR Project Fiche	Programme name and number Part I of the horizontal programme on nuclear safety and radiation protection - 2007/019-038	
Equipment for the radioactive waste processing facility at the Vinča Institute	Contracting period expires Two years following the date of conclusion of the Financing Agreement	Period of execution expires Two years following the end date for contracting
	Total budget € 1,030,000 including 3 % contingencies	IPA budget:

Overall objective	Objectively verifiable indicators	Sources of Verification	
Improvement of radioactive waste management at the Vinča institute	Operating facilities generating radioactive waste products	Procurement documents; inspection reports, visits of the waste processing facility (WPF)	
Project purpose Supply of equipment for waste processing, conditioning, packaging and storage at the Vinča institute	Objectively verifiable indicators Receipt of equipment on-site, installation and operation	Sources of Verification Compliance with technical specifications, inspection of waste processing methods and procedures, visit of the WPF facility.	Assumptions Regulatory approval received for operation; equipment installed and operable
Results Generation of radioactive waste products that are complying with Serbian regulations	Objectively verifiable indicators Records indicate waste is being processed in a more optimum way	Sources of Verification Compliance with technical specifications, inspection of waste processing methods and procedures, visit of the WPF facility.	Assumptions Regulatory approval received for operation; equipment installed and operable
Activities	Means	Costs	Assumptions
Purchase of the necessary equipment	Supply contracts to be established by the IAEA within the framework of the Contribution Agreement with the European community Equipment to be delivered listed in section 4.	€ 1,030,000 including 3% contingencies	All equipment can be procured using standard procurement methods.

ANNEX II: Amounts (in €) Contracted and disbursed by quarter for the project

Contracted	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009
Contract 1.1	€ 1,030,000 Including 3% contingencies									
Cumulated	€ 1,030,000 Including 3% contingencies									
Disbursed	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q4 2010	Q4 2009
Contract 1.1	€800,000				€ 200,0 00		€ 30,000			
Cumulated	€800,000	€800,000	€800,000	€800,000	€1,000,000	€1,000,000	€1,030,000	€1,030,000	€1,030,000	

Annex III: Reference to laws, regulations and strategic 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

Annexe IV: Details per EU funded contract

This project as well as project entitled "Preparation for and transportation of spent nuclear fuel from the Vinča institute to the Russian Federation (project No 1)" that are corresponding to phases 2 and 5 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.

The equipment listed under section 4 will be included in specific contribution agreement concluded with the IAEA.