

Project Fiche No. 3

Registry of nuclear materials, radioactive sources, waste and exposures

1. Basic information

- 1.1 CRIS Number:** 2010/022-503
1.2 Title: **Registry of nuclear materials, radioactive sources, waste and exposures**
1.3 ELARG Statistical code: 03.64 - Nuclear safety
1.4 Location: Vinča/Belgrade, Serbia

Implementing arrangements:

1.5 Contracting Authority:

The European Union represented by the European Commission 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

PC Nuclear Facilities of Serbia (NFS)

Vinča, Belgrade, Serbia

Radojica Pešić, Director General

and

The Agency for Ionizing Radiation Protection and Nuclear Safety of Serbia (AIRPNSS)

Vlajkovicева 3

Belgrade, Serbia

Financing:

1.8 Overall cost (VAT excluded)¹: EUR 880 000

1.9 EU contribution: EUR 800 000

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: 1 year following the end date for execution of contracts

¹ The total cost of the project should be net of VAT and/or other taxes. Should this not be the case, the amount of VAT and the reasons why it should be considered eligible should be clearly indicated

2. Overall Objective and Project purpose

2.1 Overall Objective:

To provide PC NFS and AIRPNSS with registries of all nuclear materials, radioactive sources, all stored waste and exposures.

2.2 Project purpose:

To contribute to the implementation of the VIND Programme (Vinča Institute Nuclear Decommissioning – in accordance with the Law on radiation protection and nuclear safety managed by Public Company Nuclear Facilities of Serbia) that is coordinated and partly supported by the IAEA, and to provide state authorities with liable inventories of radioactive sources, waste and exposures.

This project and each of the included activities responding to the recommendations arising from the gap analysis for Serbia performed in the assessment of the regulatory infrastructure performed under IPA 2007².

2.3 Link with AP/NPAA/EP/SAA

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

As short term priority for Serbia mentioned in Annex 2 of European Partnership with Serbia, continuation of dismantling of the Vinca research reactor is stated.

The Serbia 2009 progress report mentions that “Serbia has made good progress in the areas of **nuclear safety and radiation protection**. The Law on Ionising Radiation Protection and Nuclear Safety Waste was adopted in May 2009. The provisions of the Law stipulate the next establishment of a nuclear regulatory agency. This agency is expected to be fully operational during the first half of 2010. Decommissioning of the Vinča RA research reactor, preparation for the repatriation of spent nuclear fuel to the Russian Federation, and management of radioactive waste on-site are progressing well. All the decommissioning activities at Vinča are now being performed under a new Public Company for Nuclear Facilities of Serbia.

Serbia has not ratified the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Nevertheless significant progress has been achieved.

However, considerable efforts still need to be made in order to align nuclear safety and radiation protection with the *acquis* and best EU practices”.

2.4 Link with MIPD

The IPA Multi-beneficiary Multi-annual indicative Planning Document (MIPD) 2009-2011³, *section 2.3.3.11 - Nuclear Safety and Radiation Protection*, mentions that “in Serbia [...], the operation, refurbishment and dismantling of nuclear research reactors constitute additional sources of radiation risks that would require investment, in particular for the management of spent nuclear fuel and radioactive waste”.

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)

² B. Tomic et al.; Assessment of the Regulatory Infrastructure in the Field of Nuclear safety and Radiation Protection in Western Balkans, Final Report, ENCO FR-(09)-56 March 2010

³ C(2009)4518, 16.06.2009

- Serbian Law on ionising radiation protection and on nuclear safety (2009)
- 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

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 (see hereafter).

- Phase 1: Removal, characterisation and repackaging of spent nuclear fuel in store at the Vinča Institute (IAEA and other donors funding; IPA funding);
- Phase 2: Preparations for and transport of Russian-origin spent nuclear fuel from the Vinča Institute to the Russian Federation (IPA funding);
- Phase 3: Reprocessing and disposal of the Russian-origin spent nuclear fuel in the Russian Federation (IAEA and other donors funding);
- 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 (IAEA and other donors funding);
- Phase 5: Provisions of equipment for a waste processing facility at the Vinča Institute (IPA funding);
- Phase 6: Conditioning, packaging and storage of disused sealed radioactive sources (IAEA and other donors funding, IPA funding);
- Phase 7: Conditioning and processing of improperly stored and unconditioned radioactive waste (IAEA and other donors funding, IPA funding);
- Phase 8: Decommissioning of the old storage facilities for sources and radioactive waste (IAEA and other donors funding, IPA funding);
- Phase 9: Dismantling of the old piping system and tanks containing radioactive liquid waste (IPA funding);
- Phase 10: Radioactivity survey of the Vinča site (IPA funding);
- Phase 11: Implementation of recommendations and priorities from Phase 10, site-wide radiation survey (IPA funding);
- Phase 12: Stabilization of spent nuclear fuel storage pool and decontamination of storage spent fuel room;
- Phase 13: Registry of radioactive sources, waste and exposures;
- Phase 14: Phase 2 of conditioning, packaging and storage of disused sealed radioactive sources;
- Phase 15: Decontamination and decommissioning of the RA research reactor hot cells;
- Phase 16: Other incremental decommissioning projects.

3.2 Justification

Serbia has accumulated radioactive waste and disused sealed radioactive sources from the former Yugoslavia for more than fifty years. It has two research reactors, one operational and one in decommissioning, both of which have spent nuclear fuel; multiple uranium mines; multiple waste generators in research facilities, hospitals, and universities; a new waste processing facility under construction; source storage bunkers; degraded and new waste storage facilities; contaminated facilities, some of which are abandoned; and numerous nuclear assets in terms of equipment and facilities. Control of these assets and liabilities is spread across numerous public and private institutions and multiple government organisations.

Based on the recognition that all nuclear materials and assets belong solely to the government by international agreement, and based on recognition that all nuclear liabilities are the responsibility of the government, identification and consolidated management of all such materials, assets and liabilities is essential to ensure effective control, minimise costs, ensure safety and security, establish a process of continuous reduction of liabilities, and maximise use of assets.

The new nuclear law promulgated by the Serbian Parliament establishes a Nuclear Regulatory Authority which can be authorised to control and manage all such liabilities and assets. However, the learning curve for such an agency demonstrates a need for external expert assistance to expedite control and implement effective management of all nuclear liabilities and assets.

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

The project should contribute to significantly decrease the radiological risks that exist in Serbia for both the personnel of nuclear facilities and the members of the public.

It has a catalytic effect in the sense that it may reveal sources of ionising radiation that are not properly controlled by the safety authorities and thereby induce remediation actions. It may also have a cross-border impact since radioactive contamination of the environment may occur following an accident with uncontrolled radiation sources.

The sustainability can be ensured by the recent governmental decision to establish a Public Company for Nuclear Facilities in Serbia (PCNFS) that will be in charge of managing all radiological issues at Vinča. This company disposes of approximately 120 persons and received annual allocations from the national budget.

3.4 Results and measurable indicators:

The end result will be that all nuclear materials, radioactive sources, radioactive waste and occupational radiation exposures are identified and registered in proper national databases which are placed under the control of the AIRPNSS:

- a) All nuclear materials, radioactive sources and radioactive waste stored in the territory of Serbia are located, identified and quantified.
- b) A national database gathering all information on nuclear materials, radioactive sources and radioactive waste is established and operating under the control of the AIRPNSS.
- c) All occupational radiation exposures are identified and quantified.
- d) A database gathering all information on occupational radiation exposures is established and operating under the control of the AIRPNSS.

- e) Radiation passport system for occupational radiation workers established and operating under the control of the AIRPNSS.
- f) A national strategy for reducing radiological risks during the next decade in Serbia is established, including management of radioactive waste, radioactive sources and radiation exposures.

3.5 Activities:

1. Assistance in identification of, and collection of data for, all nuclear materials, radioactive sources and radioactive waste throughout Serbia, including safeguards materials, and the current facilities (locations) and responsible management organisations.
2. Assistance in identification of, and collection of data for, all occupational radiation exposures throughout Serbia, and the responsible management organisations.
3. Assistance to design and operate the appropriate national databases and software applications operated by the AIRPNSS for collecting and processing all information related to all nuclear materials, radioactive sources, all radioactive waste and occupational radiation exposures; this shall include identification of all required data points to be captured.
4. Assistance in drawing up a national strategy for reducing all radiological risks, including the management of nuclear materials and radioactive waste, for the Serbian population during the next decade.

3.6 Conditionality and sequencing:

Fully operational Agency for Ionizing Radiation Protection and Nuclear Safety (AIRPNSS), able to license activity, is in place.

3.7 Linked activities:

The implementation of the VIND programme.

3.8 Lessons learned

In Serbia, management of radioactive waste has become an important political issue and this explains the support given by the government to finance the remediation activities at the Vinča Nuclear Institute within the framework of the VIND programme. The past and current activities resulting, in particular, from the 2007 IPA-funded regional project on the assessment of the regulatory infrastructure in Serbia, showed that the presence of nuclear materials and radioactive waste on the territory of Serbia exceeds by far the limit of the Vinča site and therefore needs to be registered in a proper way by the recently established Serbian nuclear regulatory agency.

Lessons from the past in most of the Central Europe and Eastern Countries show the need to have a comprehensive inventory of radioactive materials and waste that is under control by the national nuclear regulatory body.

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4. Indicative Budget (amounts in EUR)

			SOURCES OF FUNDING									
			TOTAL EXP. RE	IPA EU CONTRIBUTION			NATIONAL CONTRIBUTION				PRIVATE CONTRIBUTION	
ACTIVITIES	IB (1)	INV (1)	EUR (a)=(b)+(c)+(d)	EUR (b)	%(2)	Total EUR ©=(x)+(y)+(z)	%(2)	Central EUR (x)	Regional/Local EUR (y)	IFIs EUR (z)	EUR (d)	%(2)
Activity 1	x		880 000	800 000	91	80 000	9					-
Contribution Agreement with IAEA	x		880 000	800 000	91	80 000	9					-
TOTAL IB			880 000	800 000	91	80 000	9					
TOTAL INV												
TOTAL PROJECT			880 000	800 000	91	80 000	9					

Amounts net of VAT

- (1) In the Activity row use "X" to identify whether IB or INV
(2) Expressed in % of the **Total** Expenditure (column (a))

Additional Funding from Government, IAEA and Other Contributors

As discussed in preceding paragraphs, this project is intended to support the Vinča Institute Nuclear Decommissioning (VIND) programme, which is Serbia's priority nuclear safety and radiation protection support programme. For more than 50 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 waste are found in rooms and degraded storage facilities located all over Vinča. 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 waste 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 28 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 19 million in contributions through 2009 from sources other than the EU; this includes nearly EUR 14 million in support from the Serbian Ministry of Science and Technological

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Development. An additional EUR 24 million is currently approved for 2010-13, including EUR 5 million from the Serbian Ministry of Science and Technological Development.

The EU is currently funding the repatriation of spent nuclear fuel to the Russian Federation (EUR 4.5 Million already contracted plus EUR 3.3 Million to be contracted soon under the 2009 IPA programme), radioactive waste management activities at Vinča (EUR 5.5 Million to be contracted under the 2008 and 2009 IPA programmes).

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 declines sharply in 2009-2011, as the government, IAEA, and other contributors are shifting their financial resources towards spent fuel repatriation. However, it is still anticipated that the Ministry of Science and Technological Development will contribute more than EUR 1 million annually to waste management and decommissioning activities, mostly in terms of security and local labour resources.

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Existing VIND Funding Approvals

Spent Fuel Repatriation Project (EUR)/ Phases 1 to 4 of the programme			
	2004-09 Funding	2010-11 Funding	Total
European Commission	4 100 000	3 630 000	7 730 000⁴
IAEA	7 15000	2 682 411	3 367 411
Nuclear Threat Initiative (NGO)	360 000	76 074	436 074
USA	894 815	5 185 185	6 080 000
Czech Republic	-	732 593	732 593
Russia	-	2 222 222	2 222 222
Serbia	-	8 148 148	8 148 148
Total	6 069 815	22 676 633	28 716 448

Sealed Sources and Waste Management (including Nuclear Security) (EUR)/ Phases 5 to 7 of the programme			
	2004-09 Funding	2010-13 Funding	Total
European Commission	1 197 833	5 502630	6 700 462⁵
IAEA	1 247 205	32 148	1 279 354
Nuclear Threat Initiative (NGO)	438 471	32 127	470 597
USA	890 007	-	890 007
UK	101 481	-	101 481
Slovenia	75 333	44 444	119 778
Total	3 950 330	5 611 349	9 561 679

Decommissioning (EUR)/ Phases 8 to 11 of the programme		
	2004-09 Funding	Total⁶
European Commission	-	-
Nuclear Threat Initiative (NGO)	135 079	135 079
IAEA	225 544	225 544
USA	18 519	18 519
Total	379 142	379 142

Serbia Funding from Ministry of Science and Technological Development (EUR)	
	2004-10 Funding
2004	500 000
2005	800 000
2006	1 100 000
2007	2 500 000
2008	4 000 000
2009	5 200 000
2010	5 200 000
Total	19 300 000

⁴ Under the IPA2007-09 horizontal programmes on nuclear safety and radiation protection

⁵ Idem

⁶ Beginning in 2010, decommissioning projects were combined with waste projects in IAEA programmes

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

Contracts	Start of Tendering	Signature of contract	Project Completion
Contribution Agreement with IAEA	N/A	Q3 2011	Q4 2013

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 Vinča 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

- I- Log frame in Standard Format
- II- Amounts (in EUR) contracted and disbursed per quarter over the full duration of the project (EU funded)
- III- Description of Institutional Framework
- IV- Related laws, regulations and strategic documents
- V- Details per EU funded contracts.

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ANNEX I: Logical framework matrix in standard format

LOGFRAME PLANNING MATRIX FOR Project Fiche	Programme name and number – 2010 IPA horizontal programme on nuclear safety and radiation protection – 2010/022-503	
Registry of nuclear materials, radioactive sources, waste and exposures	Contracting period expires – 2 years following the date of the conclusion of the financing agreement.	Disbursement period expires – 1 year following the end date for execution of contracts
	Total budget: EUR 880 000	IPA budget: EUR 800 000

Overall objective	Objectively verifiable indicators	Sources of Verification	
To provide PC NFS and AIRPNSS with registries of all nuclear materials, radioactive sources, all stored waste and exposures.			
Project purpose	Objectively verifiable indicators	Sources of Verification	Assumptions
To contribute to the implementation of the VIND Programme (Vinča Institute Nuclear Decommissioning – in accordance with the Law on radiation protection and nuclear safety managed by Public Company Nuclear Facilities of Serbia) that is coordinated and partly supported by the IAEA, and to provide state authorities with liable inventories of radioactive sources, waste and exposures. This project and each of the included activities respond to the recommendations arising from the gap analysis for Serbia performed in the assessment of the regulatory infrastructure performed under IPA2007.		Progress reports	The Serbian nuclear regulatory body should be fully operational

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Results	Objectively verifiable indicators	Sources of Verification	Assumptions
<p>The end result will be that all nuclear materials, radioactive sources, radioactive waste and occupational radiation exposures are identified and registered in proper national databases which are placed under the control of the AIRPNSS</p>	<p>a) All nuclear materials, radioactive sources and radioactive waste stored in the territory of Serbia are located, identified and quantified. b) A national database gathering all information on nuclear materials, radioactive sources and radioactive waste is established and operating under the control of the AIRPNSS. c) All occupational radiation exposures are identified and quantified. d) A database gathering all information on occupational radiation exposures is established and operating under the control of the AIRPNSS. e) Radiation passport system for occupational radiation workers established and operating under the control of the AIRPNSS. f) A national strategy for reducing radiological risks during the next decade in Serbia is established, including management of radioactive waste, radioactive sources and radiation exposures.</p>	<p>Operational databases available at the nuclear regulatory body. On-site visits of representatives of AIRPNSS and PCNFS.</p>	<p>Sufficient labour resources available to be trained and operate the database and software applications. Access to database of doses to exposed workers.</p>
Activities	Means	Costs	Assumptions
<p>All the following activities should be contracted through a Contribution Agreement with the IAEA.</p>	<p>CA with IAEA</p>	<p>EUR 800 000</p>	
<ol style="list-style-type: none"> 1. Assistance in identification of, and collection of data for, all nuclear materials, radioactive sources and radioactive waste throughout Serbia, including safeguards materials, and the current facilities (locations) and responsible management organisations. 2. Assistance in identification of, and collection of data for, all occupational radiation exposures throughout Serbia, and the responsible management organisations. 3. Assistance to design and operate the appropriate national databases and software applications operated by the AIRPNSS for collecting and processing all information related to all nuclear materials, radioactive sources, all radioactive waste and occupational radiation exposures; this shall include identification of all required data points to be captured. 4. Assistance in drawing up a national strategy for reducing all radiological risks, including the management of nuclear materials and radioactive waste, for the Serbian population during the next decade. 	<p>Contracted support</p>		

ANNEX II: Amounts (EUR) contracted and disbursed per quarter over the full duration of the project (EU funded)

Contracted	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012	Q1 2013	Q2 2013
Contribution Agreement	800 000							
Cumulated	800 000							
Disbursed								
Contribution Agreement	200 000		200 000		200 000			200 000
Cumulated	200 000	200 000	400 000	400 000	600 000	600 000	600 000	800 000

ANNEX III: Description of Institutional Framework

The responsibility for the fields related to the peaceful use of nuclear energy in the following sectors; (i.e. sector of health, of environment, of science and technology, of nuclear safety and radiation protection, of agriculture and transport, etc) rests with the Ministry of Science and Technological Development, the Ministry of Environment and Spatial Planning, and an independent regulatory body which is the Agency for Ionizing Radiation Protection and Nuclear Safety of Serbia.

The Ministry of Science and Technological Development (MSTD) is responsible for R&D in the nuclear sector, as well as for the inspection in the field of nuclear safety. The Ministry of Environment and Spatial Planning is responsible for the inspection in the field of radiation protection. Licensing of the radiation or nuclear activities lies with the new independent Agency.

In force is the Law on Ionizing Radiation Protection and on Nuclear Safety which was enacted in 2009 (36/09). It establishes measures for the protection against ionising radiation, as well as nuclear safety measures, liability for nuclear damages, supervision and authorization and penalties. Based on the former Law on Protection against Ionizing Radiation (46/96), there are 11 regulations related to protection against ionizing radiation and for the safety of radiation sources and 5 regulations related to nuclear safety and security. All the regulations are still applicable.

An Independent regulatory body, the Agency for Ionizing Radiation Protection and Nuclear Safety of Serbia, was established in accordance with the Law on Ionizing Radiation Protection and on Nuclear Safety. It is expected that it will be fully operational in mid of 2010.

ANNEX IV: 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)
- Law on ionising radiation protection and on nuclear safety (2009)
- Article 110 of the draft SAA
- Nuclear Safety and Radiation Protection action of the Multi-beneficiary MIPD 2009-2011

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 Comprehensive Safeguards Agreements with the IAEA for the Application of Safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons. It should be also noted that Serbia has signed but has not yet ratified the Additional Protocol to the Treaty.

ANNEX V: Details per EU funded contract

This project together with the projects:

- Project No 4: "Part 2 of project for conditioning and secure storage of disused sealed radioactive sources and any other radioactive waste and nuclear materials located in Serbia".
- Project No 5: "Stabilisation of spent nuclear fuel storage pool at the Vinča site in Serbia".

which are all part of the VIND programme, will be supported through a Contribution agreement with the IAEA to be concluded in the third quarter of 2011.

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