

**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:** Strengthening Radiation Protection and Nuclear Safety in Montenegro through Capability Upgrading of Technical Support Institution
- 1.3 ELARG Statistical code:** 03.64 – Nuclear Safety
- 1.4 Location:** Podgorica (Montenegro)

**Implementing arrangements:**

**1.5 Contracting Authority (EC):**

The European Community represented by the Commission of the European Communities for and on behalf of Montenegro

**1.6 Implementing Agency:**

Not applicable.

**1.7 Beneficiary:**

Beneficiary institution:

P.I .Centre for Ecotoxicological Research of Montenegro (CETI)

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**Financing:**

**1.8 Overall cost (VAT excluded):** EUR 395 000

**1.9 EU contribution:** EUR 300 000

**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 radiation protection and nuclear safety in Montenegro by upgrading capabilities of CETI, country's official and leading institution in the field.

### **2.2 Project purpose:**

To upgrade CETI's performance capabilities in the following five major areas of radiation protection:

- monitoring of the **radioactivity in the environment**, including response to radiological/nuclear **emergency situations**
- management of low and medium radioactivity **radioactive waste storage and transportation** of radioactive materials
- professional, patient and public **exposure control**

In addition (and in parallel), the project should support:

- CETI's servicing as principal **technical support** organization (TSO) to EPA in the field of radiation protection and nuclear safety as a future **regulatory authority** (RA) in Montenegro and
- Broadening **certification/accreditation** of CETI activities, so as to cover complete radiation protection and nuclear safety area which is of relevance in Montenegro.

The above will be done in order to have the country complying with international (IAEA and EU) norms in the respective fields. It will be achieved by providing:

- adequate pieces of equipment, currently missing,
- staff education & training and
- expert assistance.

### **2.3 Link with AP/NPAA / EP/ SAA:**

AP addresses environmental protection as one of priority areas (para. 2.3, "Sectoral Policies")

### **2.4 Link with MIPD:**

The MIPD action entitled "Nuclear Safety and Radiation Protection" mentions that "All IPA eligible beneficiaries are facing radiological issues that are connected with the use of radionuclides for industrial and medical applications. In most Beneficiaries in the Western Balkans management of sealed radioactive sources, for example, dismantling of radioactive lightning rods and operation of centralised storage facilities remains a key issue. Moreover management of radioactive waste in hospitals may require investments and training of the personnel". Therefore this project proposal which deals with several important radiological issues resulting from the use and management of radionuclides in Montenegro is fully in line with the MIPD activities.

### **2.5 Link with National Sustainable Development Plan:**

Not applicable.

### **2.6 Link with national/sectoral investment plans:**

Not applicable.

### 3. Description of project

#### 3.1 Background and justification:

**3.1.1 Background.** Montenegro is a small ‘non-nuclear’ country (no nuclear power plants or nuclear fuel cycle), the use of radiation sources being limited to simple medical and industrial applications. The **Public Institution Centre for Ecotoxicological Research of Montenegro (CETI)** in Podgorica was founded by Government of Montenegro in 1997 as a support institution for environmental monitoring including radiation protection. CETI's Department for Radiation Protection and Monitoring (DRPM) performs most of the measurements, monitoring and expertise services in this field in the country. More information about CETI-DRPM (foundation, aims, current state of activities, future plans) is given in **Annex III**.

**3.1.2. Justification.** When judging the existing radiation protection (RP) infrastructure and services in Montenegro, it is easy to realise that CETI-DRPM is the principal stakeholder - having most of necessary equipment, well qualified staff and efficient organisational structure. However, when comparing the existing capabilities (Annex III) with the desired level – so as to cover all relevant RP issues – one will note that approximately 70-80% is in place. The remaining 20-30%, i.e. **completion of RP capabilities of CETI**, is the subject of this project proposal. For the above mentioned priority areas (2.2) it goes about following.

**3.1.2.1 Monitoring of radioactivity in the environment and preparedness/ response to radiological/nuclear emergency situations.** CETI is pretty well equipped and staffed for environmental monitoring, having 10 years experience in effectuating monitoring programmes for the government (Annex III). However, few segments are still missing in its scope of activities in this subject.

- There is no distance radioactivity monitoring network in place in Montenegro. Such network is necessary for both regular continuous monitoring of radioactivity in the air and for early warning in case of radiological/nuclear emergency situations. Provision of 5-6 **distance radioactivity monitoring modules** and their connection into a CETI-controlled network would settle this problem. The network could further be interconnected into regional monitoring grid. Suggested locations include 2-3 border points (north, west, east), 1 coastal point (south), 1 near Steelworks (Niksic) and 1 in capital (Podgorica).
- Also, there is currently no possibility in the country for alpha/beta measurement, (existing instrument is out of work), although there is recently acquired **instrumentation for total beta counting** and for alpha spectrometry. Namely, these techniques require a relatively complicated sample preparation. Provision of a **basic radiochemistry unit** (fume hood, columns, dishes, mixer, evaporator, heaters, oven, balances, chemicals, standards) would be necessary to cover this area. Besides waste characterisation and radiological accident/emergency situations involving alpha/beta sources, an example of the potential use is recently well known case of Po-210 (or other alpha emitter) poisoning.
- Training of 1-2 staff members in radiochemistry and alpha/beta measurements should be done in parallel.

**3.1.2.2 Radioactive waste management and transportation of radioactive materials.** By contractual arrangement with the Ministry of Tourism and Environmental Protection, CETI is in charge of radioactive waste management in Montenegro, including recently constructed low and medium activity waste storage (RAOS) in Podgorica, which is located within CETI premises at town outskirts. There is a national Technical Cooperation project ongoing with IAEA on this subject, through which the storage will be equipped and four CETI staff members trained for one month for operating the storage (code: MNE/3/002, duration: 2007-2008). Storage licensing and

accreditation are envisaged once it is completed. Hence, a few items should be still covered in this respect:

- A specialized ADR vehicle for transportation of radioactive substances, since no such one exists in Montenegro up to now. The vehicle will be used not only for transportation of disused sources and radioactive waste, but also for medical sources (e.g. radiopharmaceuticals), industrial sources (i.e. gamma-radiography), calibration sources, etc. – in accordance with existing regulations.
- Portable gamma-spectrometry device (preferably with high resolution HPGe semiconductor detector) for in-situ characterisation of radioactive waste prior to its transportation to storage site.
- Further specialisation of the staff in waste management and in transport of radioactive materials (note: training provided by the IAEA within ongoing national TC project on waste management is only of “introductory & fundamentals” nature).
- Support to storage licensing and accreditation (this will likely take place after IAEA MNE/3/002 project is terminated)

**3.1.2.3 Professional, patient and public exposure control.** This is an important segment of radiation protection practice and of CETI activities as TSO to the EPA as a Regulatory Authority of Montenegro. CETI is authorised for these activities by the Ministry of Health and Ministry of Environmental Protection. Personal thermo luminescent (TLD) dosimetry service was established in 2006 and is so far the only one in Montenegro. There is a Harshaw 4500 TLD Reader and a set of 900 TLD cards (badges). From the 2006 CETI was contracted services of the TLD control for all medical and other institutions in Montenegro. Until 2006 TLD control was organised from Belgrade- Serbia. This service should be strengthened, namely:

- It is common practice to have a back-up instrument in TLD services, in case the first one goes out of order (for a short or long term).
- It is also practice to have 2.5 badges per each person monitored (accounting for badge exchange and for its loss/ damage). Having in mind some 800 professionally exposed persons to be monitored in Montenegro, additional 1000 badges will be needed.

In 2007 CETI also started with QC/QA of medical radiation sources. For this purpose one staff member was trained in Italy, obtaining master degree in this specialisation (the only specialist of the kind in Montenegro). One RTI “Barracuda” instrument currently serves for X-ray machine control, but in order to complete the scope of medical applications (e.g. mammography, nuclear medicine, radiotherapy, and brachytherapy), additional instrumentation and training will be needed, including:

- Back-up RTI Barracuda instrument with sets of detectors and filters
- “Star Pattern” instrument for X-ray tube focus testing
- “Huettner test” objects, for film resolution testing
- Set of dosimeters for various dose ranges and origins
- Sets of ionisation chambers and of electrometers (e.g. “Farmer” chambers)
- High performance oscilloscope
- Sensitometer and densitometer for film parameter characterization

- Set of phantoms for various exposition sources (e.g radiography, mammography, nuclear medicine, radiotherapy and various radiation field characterisations)
- Set of calibration sources (X and gamma)

The above instrumentation can also be used for QC/QA of industrial sources – a regulatory requirement which is not practiced at all in Montenegro up to now.

From 2004 CETI possess certificates for ISO 9001:2000 and ISO/IEC 17025:2000 and 2006 for dosimetry control.

**CETI's service as technical support organisation (TSO) to EPA as a Radiation protection and nuclear safety regulatory authority (RA).** From its establishment in 1997, CETI effectively covers technical support activities within regulatory control of radiation sources in Montenegro (whatever rudimentary and/or inadequate form RA had/has). This included environmental radioactivity monitoring, control of radioactivity in food and in consumables, construction materials, etc. Until now radiation protection and nuclear safety was within the competence of the Ministry of tourism and environmental protection as a RA of Montenegro until constitution of the EPA of Montenegro. TSO services to RA will continue in future, when RA will be placed within Environmental Protection Agency of Montenegro (EPAM). However, the scope of EPAM regulatory activities will be much broader than it is now the case, and so will be supported by CETI.

- In this sense, staff would be properly trained, especially in nuclear law aspects. This is a very broad and important area which was much neglected in radiation protection in Montenegro up to now.
- Nuclear law library and data base should also be upgraded.

**3.1.2.4 Certification/accreditation.** Final step in upgrading CETI's performance in radiation protection and nuclear safety should be broadening certification and accreditation of all methods/activities in place.

**3.2 Assessment of project impact,** catalytic effect, sustainability and cross border impact (where applicable).

This project will be strong maintenance for the future RA and for better medical exposure control for the citizens in Montenegro. Proper radioactive waste management and proper early warning control will be established. Proper QA/QC of medical radiation and industrial sources will be established in accordance with EU standards.

### **3.3 Results and measurable indicators:**

- It is CETI obligation and practice to issuing **periodical reports** on its activities, environmental monitoring in particular for the Ministry of tourism and environmental protection.
- Removal of radioactive waste, including orphan sources, from its locations (industry, environment, medical facilities, ...)
- Data bases of (1) radiation sources and (2) individual/collective exposures
- Compliance with international (IAEA and EU) safety standards in the field of radiation protection and nuclear safety

### 3.4 Activities:

The activities are grouped so as to **correspond with** five main radiation protection areas listed in 2.2 (**Project Purpose**) and 3.1.2 (**Justification**).

For all equipment provision items, **CETI will contribute 25%** from its own resources or will manage to find it from Government or from other local sources (e.g. relevant ministries).

**Education and training** will presumably be provided by the IAEA, within IAEA-EU coordination in this project.

#### 3.4.1 **Monitoring of the radioactivity in the environment and preparedness/ response to radiological/nuclear emergency situations.**

3.4.1.1 Provision of 5-6 distance radioactivity monitoring modules, cca. **EUR 40 000**

3.4.1.2 Putting into operation distance monitoring network, cca. **EUR 10 000**

3.4.1.3 Provision of radiochemistry unit (fume hood, columns, dishes, mixer, evaporator, heaters, oven, balances, chemicals, standards), cca. **EUR 80 000**

#### 3.4.2 **Radioactive waste storage and transportation of radioactive materials.**

3.4.2.1 Provision of one specialised vehicle (together with accessories) for the transportation of radioactive materials, including waste, cca **EUR 40 000**

3.4.2.2 Training of 4-5 persons in waste management and transportation of radioactive materials.

3.4.2.3 Costs of storage licensing (not provided by the IAEA), cca **EUR 6 000**

#### 3.4.3 **Professional, patient and public exposure control.**

3.4.3.1 Provision of TLD reader (back-up to the existing one), cca **EUR 40 000**

3.4.3.2 Provision of additional 1000 TLD cards (badges), cca. **EUR 20 000**

3.4.3.3 Provision of equipment for QC/QA of medical, industrial and other sources of ionizing radiation (cca **EUR 135 000**, training included), in particular:

- RTI “Barracuda” with sets of detectors and filters
- “star pattern” instrument for x-ray tube focus testing
- “Huettner test” objects, for film resolution testing
- Set of dosimeters for various dose ranges and origins
- Sets of ionization chambers and of electrometers (e.g. “Farmer” chambers)
- High performance oscilloscope(s)
- Sensitometer and densitometer for film parameter characterization
- Set of calibration sources (X and gamma)
- Set of phantoms for various exposition sources (e.g radiography, mammography, nuclear medicine, radiotherapy and various radiation field characterization)

### 3.4.4 CETI's service as technical support organization (TSO) to radiation protection and nuclear safety regulatory authority (RA).

3.4.4.1 Education and training of 2-3 staff members in legal ("nuclear law") issues.

3.4.4.2 Library and data base upgrading, cca. **EUR 4 000**

**3.4.5 Certification/accreditation.** Certification and accreditation of CETI's methods/ activities in radiation protection and nuclear safety, cca **EUR 20 000.**

### 3.5 Conditionality and sequencing:

- CETI provides 25% costs on equipment items (from its own or other domestic sources)
- Equipment delivery and staff education/training should go in parallel
- Education and training is provided by the IAEA
- ADR vehicle procurement should precede the activities in waste management
- There is endorsement by the Ministry of Tourism and Environmental Protection

### 3.6 Linked activities:

Not applicable.

### 3.7 Lessons learned:

Not applicable.

## 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 3.4.1.1	40 000	40 000	100		40,000	0	,0				0	0
Activity 3.4.1.2	10 000		0		0	10 000	100				0	0
Activity 3.4.1.3	85 000		0		0	85 000	100				0	0
Activity 3.4.2.1	40 000	40 000	100		40 000	0	0				0	0
Activity 3.4.2.3	6 000	6 000	100		6 000	0	0				0	0
Activity 3.4.3.1	40 000	40 000	100		40 000	0	0				0	0
Activity 3.4.3.2	20 000	20 000	100		20 000	0	0				0	0
Activity 3.4.3.3	130 000	130 000	100		130 000	0	0				0	0
Activity 3.4.4.2	4 000	4 000	100		4 000	0	0				0	0
Activity 3.4.5	20 000	20 000	100		20 000	0	0				0	0
<b>TOTAL</b>	<b>395 000</b>	<b>300 000</b>	<b>76</b>		<b>300 000</b>	<b>95 000</b>	<b>24</b>				<b>0</b>	<b>0</b>

\* expressed in % of the Total Cost

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

Contracts	Start of Tendering	Signature of contract	Project Completion
Contract 1	Q2 2009	Q4 2009	Q4 2010

## **6. Cross cutting issues**

### **6.1 Equal Opportunity:**

The project offers equal opportunities to all.

### **6.2 Environment:**

There are substantial environmental gains to the beneficiary country (Montenegro) by accomplishment of this project, since a better monitoring of the radioactivity will improve the quality of the environment and further contributes to sustainable economical development.

### **6.3 Minorities:**

The project offers equal opportunities to all.

## **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 - Reference to laws, regulations and strategic documents:
  - Reference to AP /NPAA / EP / SAA
  - Reference to MIPD
  - Reference to National Development Plan
  - Reference to national / sectoral investment plans
- 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
<b>Strengthening Radiation Protection and Nuclear Safety in Montenegro through Capability Upgrading of Technical Support Institution</b>		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 : <b>EUR 395 000</b>	IPA budget: <b>EUR 300 000</b>
<b>Overall objective</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	
To improve radiation protection and nuclear safety in Montenegro by upgrading capabilities of CETI, country's leading institution in the field.	Periodic reports	CETI, EU-IPA missions, IAEA missions	
<b>Project purpose</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
To upgrade CETI's performance capabilities in the following five major areas of radiation protection: (i) monitoring of the <b>radioactivity in the environment</b> , including prepared-ness and response to radiological/ nuclear <b>emergency situations</b> , (ii) management of low and medium radio-activity <b>waste storage</b> and <b>trans- portation</b> of radioactive materials, (iii) professional, patient and public <b>exposure control</b> , (iv) CETI's service as <b>technical support</b> organization (TSO) to radiation protection and nuclear safety <b>regulatory authority</b> (RA) in Montenegro and (v) <b>certifica- tion/accreditation</b> of CETI's activities in radiation protection and nucl. safety. The above will be done in order to have the country complying with inter-national (IAEA and EU) norms in the respective fields. It will be achieved by providing (i) adequate pieces of <b>equip- ment</b> , (ii) staff <b>education&amp;training</b> and (iii) <b>expert</b> assistance.	Periodic reports	CETI, EU-IPA missions, IAEA missions	There is endorsement by the Ministry of Tourism and Environmental Protection of Montenegro There is necessary oprganizational and personal infrastructure in CETI to accommodate the project
<b>Results</b>	<b>Objectively verifiable indicators</b>	<b>Sources of Verification</b>	<b>Assumptions</b>
Distance radioactivity monitoring network is established and operational Radioactive waste storage is licensed and operational Exposure control of professionals, patients and public is functioning CETI's TSO service to RA is complete and functional CETI's RP practices are certified and accredited	Periodic reports	CETI, EU-IPA missions, IAEA missions	
<b>Activities</b>	<b>Means</b>	<b>Costs EUR</b>	<b>Assumptions</b>
<b>1) Monitoring of the radioactivity in the environment and preparedness/ response to radiological/nuclear emergency situations.</b>  Provision of 5-6 distance radioactivity monitoring modules  Assembling and putting into operation distance monitoring network (provided by the supplier)  Provision of radiochemistry unit (fume hood, columns, dishes, mixer, evaporator, heaters, oven, balances, chemicals, standards)		40.000 10.000  80.000  40.000  6.000	CETI will provide 25% contribution for all equipment purchases
<b>2) Radioactive waste storage and transportation of radioactive materials.</b>  Provision of one specialized vehicle (together with accessories) for the transportation of radioactive materials, including waste  Training of 2-3 persons in the transportation of radioactive materials.		40.000 20.000  135.000	

<p>Costs of storage licensing (not provided by the IAEA)</p> <p><b>3) Professional, patient and public exposure control.</b></p> <p>Provision of TLD reader (back-up to the existing one)</p> <p>Provision of additional 1000 TLD cards (badges)</p> <p>Provision of equipment for QC/QA of medical, industrial and other sources of ionizing radiation training included), in particular: RTI “Barracuda” with sets of detectors and filters; “star pattern” instrument for x-ray tube focus testing; “Huettner test” objects, for film resolution testing; Set of dosimeters for various dose ranges and origins; Sets of ionization chambers and of electrometers (e.g. “Farmer” chambers); High performance oscilloscope(s); Sensitometer and densitometer for film parameter characterization; Set of calibration sources (X and gamma) and Set of phantoms for various exposition sources (e.g radiography, mammography, nuclear medicine, radiotherapy and various radiation field characterization)</p> <p><b>4) CETI’s service as technical support organization (TSO) to radiation protection and nuclear safety regulatory authority (RA).</b></p> <p>Education and training of 2-3 staff members in legal (“nuclear law”) issues.</p> <p>Library and data base upgrading, cca.</p> <p><b>5) Certification and accreditation</b> of CETI’s methods/activities in radiation protection and nuclear safety</p>		<p>4.000</p> <p>20.000</p>	
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**ANNEX 2: Amounts (in €) Contracted and disbursed by quarter for the project**

<b>Contracted</b>	<b>Q1 2009</b>	<b>Q2 2009</b>	<b>Q3 2009</b>	<b>Q4 2009</b>	<b>Q1 2010</b>	<b>Q2 2010</b>	<b>Q3 2010</b>	<b>Q4 2010</b>
Contract 1	300 000							
<b>Cumulated</b>	<b>300 000</b>							
<b>Disbursed</b>								
Contract 1	100 000			100 000			100 000	
<b>Cumulated</b>	<b>100 000</b>	<b>100 000</b>	<b>100 000</b>	<b>200 000</b>	<b>200 000</b>	<b>200 000</b>	<b>300 000</b>	<b>300 000</b>

### **ANNEX 3: Description of Institutional Framework CETI – Background Information**

Montenegro is declared “**ecological state**” by the first article of its Constitution, adopted in 1991 and reconfirmed by the new one (as independent country) in 2007. It means that all major decisions and steps taken in the country should be viewed from environmental preservation standpoint firstly. This has proved being much useful and efficient on several occasions when natural and ambient values were endangered by planning e.g. energetic objects (canyon river dams) or dirty industrial facilities, as well as when enlarging the percentage of the state territory under protection as national parks of nature.

The above idea of environmental protection as a basis for sustainable development is adopted as a political orientation - highlighting environment as the most valuable asset of the country. In supporting this orientation, **Centre for Eco-toxicological Research of Montenegro (CETI)** was established in 1998 by the decision of the Government of Montenegro. CETI is founded as a **public institution**, dealing with environmental monitoring and related activities – measurements, assessments, studies, consultancies, communication with media and public information, etc. Being a small country with limited resources, it was the idea that Montenegro concentrates in CETI most of its capabilities in environmental monitoring laboratories, instrumentation and staff. The task for CETI was to perform all environment monitoring programmes for the Ministry of Environment and to provide relevant professional support to and state institutions.

By unanimous opinion, CETI proved to have fulfilled by far the expectations set at the time. Even beyond – despite the fact it was conceived as a budgetary state institution – CETI gradually became self-sustainable, surviving on tiny local market of environmental monitoring and adjacent intellectual services. The government (still the owner) is among clients, with regular annual programs of environmental pollution monitoring.

Not surprisingly – much due to the official ecological attitudes mentioned – sector of tourism in Montenegro is in huge expansion (one of the fastest growing in the world and representing country’s major revenue). For this reason, environmental protection and tourism are situated within the same ministry. Also in this sense, the director of CETI is being appointed by the Government, upon the proposal of the Minister of tourism and environmental protection.

Upon regaining its independence in 2006, Montenegro committed itself to accessing the EU. Obligations set in AP, NAA, EP, SAA and MIPD were accepted and National Strategy for Sustainable Development adopted. Recognizing these tasks, CETI participates on common basis in developing regulatory infrastructure (laws and regulations) for environmental protection in the country. In the near future, CETI will likely be designated as technical support organization for Environmental protection agency of Montenegro (EPAM), radiation protection services included (establishment of EPAM is decisively supported by the European Agency for Reconstruction and Development, EARD).

Another cornerstone to be emphasized reflects CETI’s support to the Ministry of Agriculture, Forestry and Water Resources. Namely, agriculture is another major direction of the sustainable development in Montenegro - healthy and biological food production being particularly in focus. Following accreditations and

certificates recently obtained, CETI is entrusted by the Ministry with toxicological control of various segments in this complex process, being designated as national reference laboratory for food residues control. It is intended that these activities gradually become more and more important in CETI's practice.

With Ministry of health, labour and social welfare CETI cooperates on developing Strategy of diminishing environmental pollution sources in Montenegro, following the task given by the Government. With the Ministry of interior, cooperation is about combating illicit trafficking of radioactive and nuclear materials and dealing with radiological and nuclear emergency situations. In the future, cooperation with both ministries should extend to other types of technical support services, particularly in analytical field.

**Consequently, CETI can be regarded as one of the essential stakeholders in national strategy towards environmental protection and sustainable economical development based upon.**

Besides professional competence, rational organization, devotion of the staff and hard work, the orders of the day in CETI practice include complying with international norms and commitment to highest quality standards. It is open and transparent in its activities.

### **Current performance capabilities of CETI**

Within its scope of activities, CETI is currently capable of covering measurements, monitoring and assessments of practically all segments of the environment:

- Air
- waters (incl. rivers, lakes, sea, underground, potable and waste waters)
- soil and sediments
- biosphere (bioindicators)
- waste (incl. solid, liquid and gaseous ones)
- living and working environment
- production, import, export and trade of human food and animal forage
- construction materials and various consumables
- accidental and emergency situations related to environmental pollution.

In the above, the following parameters can/are being determined up to a high degree of completeness:

- chemical and physical composition, incl. trace elements
- inorganic and organic pollutants/toxicants
- radioactivity and ionizing radiation.

In doing so, CETI disposes of modern equipment, however amortized to a pretty high degree (most of it was purchased when CETI was founded, in late 90's). Staff, some 70 people, is well qualified (most with university degree, however not many with M.Sc. and Ph.D.).

CETI has ISO 9001:2000 certificate from the certification Body of TUV Management Service GmbH, TUV SUD Gruppe, Munich, Germany and is accredited under ISO/IEC 17025 standard from JUAT accreditation body from Belgrade, Serbia). An IAEA expert mission in 2006 evaluated CETI laboratories with 9.2 (out of 10) for managerial requirements and 9.5 for technical ones.

As to finances, CETI is in a somewhat strange situation. Although 100% owned by the Government, it is fully self sustainable, earning its complete revenues on the market, with no contribution from the state budget. Even the monitoring services performed for the Government (Ministry of the Environment) are subject to market conditions, following an open bidding procedure. Major problems encountered include small and limited market of services in Montenegro, closed markets in the neighbouring countries (difficult to penetrate) and imminent renewing/upgrading of costly equipment.

### **Department of Radiation Protection and Monitoring**

Department of Radiation Protection and Monitoring (DRPM) is in charge of the following:

- monitoring of the radioactivity in the environment (regular monitoring programs of the Government, followed by yearly reports), including gamma-spectrometry, radon, dose-rate and other parameters measurements in air, water, soil, etc. samples at a number of selected locations in the country
- personal and workplace dosimetry
- QC/QA of radiation sources in medicine
- radioactivity control of export/import goods and consumables, including food
- management of radioactive waste storage (low and medium activity)
- national technical support centre in radiological emergency situations

In effectuating these activities, CETI-DRPM disposes of modern equipment, decent laboratory premises and qualified staff. Nuclear spectrometry laboratory is not only by far the most advanced one in Montenegro – it can be regarded as a regional centre of excellence as well. Two low background stationary HPGe gamma-spectrometry systems are in full operation most of the time. There is also a portable HPGe system and a number of in-house and portable NaI detector systems. There is a recently acquired alpha/beta spectrometry system and a multi-sample scintillation counter. Radon measurements are being routinely performed by several standard techniques. There is a modern thermoluminescent dosimetry (TLD) reader system, the only of the kind in the country. A basic radiological emergency kit is also available. CETI disposes of necessary standards and calibration sources for all the above equipment/activities.

In 2000-2002 CETI completed national project of Cape Arza decontamination from depleted uranium (DU). Two UNEP missions late on reported about high professional standards with which this task was done.

In the short and medium term (2008-2011) it is the plan of CETI to further expand and upgrade the above activities, in particular:

- licensing radioactive waste storage and its full operation
- radiation sources in Montenegro database (in RAIS format), including both operational and disused sources
- completion of QC/QA services for medical radiation sources, including both existing and future (planned) medical applications: diagnostic radiology, nuclear medicine, interventional radiology, radiotherapy, brachytherapy,

blood products and medical equipment/consumables gamma-sterilization, etc.

- completion of nuclear spectrometry services, in particular for radioactivity monitoring in the environment, by introducing a radio-chemistry unit
- full coverage of professionally exposed workers in Montenegro by TLD personal dosimetry monitoring
- completion of CETI capabilities as a regulatory body technical support organization (TSO), having in mind both existing regulatory system (competences are within the two ministries: of health and of the environment) and future one (environmental protection agency, EPA)
- enlarging laboratory premises (third floor of the CETI building, currently not used by CETI)
- creating distance radioactivity monitoring system by a network of distance units
- creating conditions for legally/technically proper transportation of radioactive sources in the country (including transit), complying with international norms.
- upgrading the level of 'nuclear law' knowledge of the staff, both for in-house purposes and for advising/services to various stakeholders (government, regulatory authority, users, workers, patients, public)
- certification/accreditation of all methods/activities practiced

## ANNEX 4. Reference to laws, regulations and strategic documents

### International norms:

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. Safety Series 115, IAEA (1996)
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety. Safety Standards Series No. GS-R-1, IAEA (2000)
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY Code of Conduct on the Safety and Security of Radioactive Sources. IAEA/CODEOC/2004
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY Independence In Regulatory Decision Making International Nuclear Safety Advisory Group (INSAG) Report 17, IAEA (2003)
- [5] INTERNATIONAL ATOMIC ENERGY AGENCY Regulatory Control of Radiation Sources GS-G-1.5, 2004
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY Legislation and Establishment of A Regulatory Authority for the Control Of Radiation Sources (draft)
- [7] INTERNATIONAL ATOMIC ENERGY AGENCY Application of the International Radiation Safety Standards in Nuclear Medicine (draft)
- [8] INTERNATIONAL ATOMIC ENERGY AGENCY Application of the International Radiation Safety Standards in Radiotherapy (draft)
- [9] INTERNATIONAL ATOMIC ENERGY AGENCY Application of the International Radiation Safety Standards in Diagnostic Radiology and Interventional Procedures using X-Rays (draft)
- [10] INTERNATIONAL ATOMIC ENERGY AGENCY Application of the International Radiation Safety Standards in Industrial Radiography and Industrial Irradiators (draft)
- [11] INTERNATIONAL ATOMIC ENERGY AGENCY Building Competence in Radiation Protection and the Safe Use of Radiation Sources, RS-G-1.4
- [12] INTERNATIONAL ATOMIC ENERGY AGENCY. Safety Report No 20: Training in Radiation Protection and the Safe Use of Radiation Sources
- [13] INTERNATIONAL ATOMIC ENERGY AGENCY Authorization for the Possession and Use of Radiation Sources (draft)
- [14] INTERNATIONAL ATOMIC ENERGY AGENCY Inspection of Radiation Sources and Enforcement (draft)
- [15] INTERNATIONAL ATOMIC ENERGY AGENCY Guidance on the Import and Export of Radioactive Sources. IAEA/GIERS/2005
- [16] INTERNATIONAL ATOMIC ENERGY AGENCY Quality Assurance within Regulatory Bodies. IAEA-TECDOC-1090 (1999).
- [17] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION Quality Management Systems Fundamentals and Vocabulary. ISO 9000: 2000, Geneva (2000).
- [18] INTERNATIONAL ATOMIC ENERGY AGENCY TECDOC-1344 Categorisation of Radioactive Sources (2003)
- [19] INTERNATIONAL ATOMIC ENERGY AGENCY TECDOC-1355 Security of Radioactive Sources (2003)
- [20] INTERNATIONAL ATOMIC ENERGY AGENCY TECDOC 1344. IAEA, Vienna (2003). Notification and Authorization for the Possession and Use of Radiation Sources. IAEA, Vienna (Draft Safety Report).
- [21] INTERNATIONAL ATOMIC ENERGY AGENCY TECDOC 1388, Strengthening Control over Radioactive Sources in Authorised Use and Regaining Control of Orphan Sources. IAEA, Vienna (2004).
- [22] INTERNATIONAL ATOMIC ENERGY AGENCY, Preparedness and Response for a Nuclear or Radiological Emergency, Safety Series No. GS-R-2, IAEA Vienna (2002).
- [23] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Materials, Safety Series No. TS-R-1, IAEA, Vienna (2000)
- [24] EUROPEAN FOUNDATION FOR QUALITY MANAGEMENT, The EFQM Excellence Model, Brussels (1999).

### Domestic regulation:

1. Law on Protection Against Ionising Radiation, promulgated 4<sup>th</sup> October 1996 (Law 46/96)
2. Law on Organisation of State Bodies of June 2003 (Law 01/332/2).
3. Governmental Decree on the Organisation and Administration of State Bodies of 29<sup>th</sup> July 2004 (Decree 02/5046).
4. Governmental Decree on the Requirements to be met by Legal Entities for Taking Measurements for the Purpose of Appraising the Degree of Exposure to Ionising Radiation of the Persons Working with Radiation Sources, Patients and Population, Official Gazette of the FRY, No. 45/97 (5 September 1997)
5. Rules of Application of the Ionising Radiation Sources in Medicine and Basic Provisions, Official Gazette of the FRY, No. 32/98 (3 July 1998)
6. Rules Setting the Requirements to be Met by Legal Entities for Systematic Testing of the Radionuclide Content in the Environment, Official Gazette of the FRY, No. 32/98 (3 July 1998)
7. Rules Setting the Requirements for the Marketing and Use of Radioactive Materials, X-ray Machines and Other Devices that Generate Ionising Radiation, Official Gazette of the FRY, No. 32/98 (3 July 1998)
8. Rules Concerning the Limits of Exposure to Ionising Radiation, Official Gazette of the FRY, No. 32/98 (3 July 1998)
9. Rules Concerning the Limits of Radioactive Contamination of the Environment and the Modality of Decontamination, Official Gazette of the FRY, Nos. 9/99 and 19/99
10. Rules Concerning the Requirements to be met by Legal Entities for Carrying Out Decontamination, Official Gazette of the FRY, Nos. 9/99 and 19/02/99
11. Rules Concerning the Modality of and Requirements for the Collection, Safekeeping, Recording, Storing, Processing and Dumping Radioactive Materials, Official Gazette of the FRY, Nos. 9/99 and 19/02/89

**Strategic documents:**

1. Council Decision on the Principles, Priorities and Conditions contained in the European Partnership with Montenegro, Council of the European Union, January 2007.
2. European Partnership Action Plan, Government of Montenegro, May 2007
3. Framework Agreement between the Government of Montenegro and the Commission of European Communities on the Rules for Co-operation Concerning ex-financial Assistance to Montenegro in the Framework of the Implementation of the Assistance under the Instrument for pre-accession Assistance (IPA), 2008.
4. Instrument for Pre-accession Assistance (IPA), Multi-Beneficiary, Multi Annual Indicative Planning Document (MIPD), 2008-2010.

**ANNEX V: Details per EU funded contract**

The Contractor is expected to fulfill all the activities listed in section 3.4 with the support of local companies established in Montenegro. CETI will prepare all technical specifications for the subsequent supply contract to be launched.

The project will be tendered, awarded and implemented in accordance with the PRAG.