1. Basic Information

1.1. CRIS Number: 2007/19343.06.04
1.2. Title: Radiological Safety in Uranium Mining and Milling Facilities
1.3. Sector: Nuclear safety
1.4. Location: Bucharest, Romania
1.5. Duration: 17 months

2. Objectives

2.1. Overall Objective:

- to improve the nuclear regulatory authority (CNCAN) capabilities with regard to radiological safety in uranium mining and milling facilities

2.2. Project purpose:

- to improve the CNCAN staff expertise with regard to the radiological safety assessment of uranium mining and milling related activities (Component 1)
- to enhance the CNCAN staff skills and capabilities in the field of uranium mining and milling related activities (Component 2)

2.3. Justification:

Starting from the particularity of the nuclear safety sector, the project addresses the issue always actually, referring to the European Union position on a “high level of nuclear safety”. Several documents, starting with the Treaty establishing the European Atomic Energy Community (EURATOM) and dedicated reports (i.e. European Union Report on nuclear safety in the context of enlargement - CONF-RO 28/01), underline the necessity to have adequate systems in place complying with the basic safety standards and an effective nuclear regulatory regime in place, capable to answer to all challenges in the field.

The uranium mining industry have drawn the attention of the European representatives from the beginning of the negotiation process (i.e. the Draft Common Position – CONF-RO 5/02 for chapter 22 “Environmental Protection” asked on clarification for specifying the measures to be taken with regard to the strategy to reduce radioactive dose of workers involved in practices such as uranium mining). This is due to the fact that, this sector was a sensitive one taking into consideration the health protection of workers involved in the related activities, particularly the individual occupational exposure, aspect also addressed by the 2004 Regular Report on Romania’s progress towards accession, Chapter 22 Environmental protection: “The corresponding administrative capacities need to be strengthened. Implementation needs to be ensured with regard to the acquis concerning the health protection of workers”. In parallel, several programmatic documents required to have in place nuclear regulatory authorities adequate empowered and independent ready to implement the EURATOM provisions, such as:

- 2005 Regular Report on Romania’s progress towards accession, chapter 14 –Energy, recognized that the nuclear regulatory authority CNCAN as administrative structure is in place and
should pay attention to ensure compliance with the Euratom Treaty requirements and procedures and further strengthening its capacity;

- **2003/397/EC Council Decision on the principles, priorities, intermediate objectives and conditions contained in the Accession Partnership with Romania**, identifying as medium term objective: *to ensure compliance with Euratom requirements and procedures and to focus on strengthening the independence, resources and capabilities of the national regulatory authority for nuclear safety.*

Taking into consideration the previous kind of projects whose beneficiary CNCAN was (all projects were a type of *technical assistance*), it appears as a consequence that this project to be also a technical assistance.

This request is launched under the **Transition Facility provisions**, by taking into account the fact that nuclear regulatory related activities are not eligible under the **Structural Funds Regulations 2007-2013**, being not included in any prioritary axis.

3. Description

3.1. Background and justification:

The radioactive waste generated in mining and milling activities, especially that involving uranium ores differs from that one generated in nuclear power plants and most other industrial activities and medical facilities. Waste arisen from mining and milling activities contains only low concentrations of radioactive material, being generated in large volumes in comparison with the waste from other facilities. Radioactive waste arises from all stages of mining and milling processes and includes mill tailings, waste rock, mineralized waste rock and process water, including leaching solutions. The hazards to humans or to the environment posed by mining and milling waste arise not only from its radioactivity but also from the presence of toxic chemicals and other materials in the waste.

Achieving a consistent regulatory approach to protect against these different hazards is a challenge for national regulators in nuclear field. Regulators need to manage radiological hazards associated with the waste, but there is also a particular need to take into account the non-radiological hazards. The different waste streams produced by mining and milling operations, tailings represent the greatest challenge, particularly in terms of long term management, because of the large volumes produced and their content of very long lived radionuclides and heavy metals. The preferred management option for achieving the protection goals depends on specific conditions on the site, the characteristic of the ore body, the specificity of the mining and milling processes and the characteristics of the tailings. To observe the principles for managing radioactive waste, the access to and dispersion in the environment of the hazardous constituents of the tailings should be restricted for long periods into the future.

As it concerns Romania, the national competent authority dealing with the aspects related to this proposal is the National Commission for Nuclear Activities Control (CNCAN) which carries out its activities in accordance with the provisions of the Law no. 111/1996 on safe deployment, regulation, authorization and control of nuclear activities, republished.

As the radiation protection aspects shall be observed in all practices, CNCAN permanently developed specific activities in order to comply with the related requirements for public health and environmental protection by paying attention to improve its capabilities in accordance with the Western practices. As the law is stipulating, CNCAN is empowered to issue regulations in order to detail the general requirements on nuclear safety, radiation protection, management of radioactive waste, having also responsibilities of licensing and control of nuclear activities, including the activities related to the uranium ore mining and milling. Among CNCAN attributions are included activities controlling the implementation of the provisions of international agreements in force in the field of radiation protection and nuclear safety of nuclear and radiological facilities.
In this context, CNCAN issued a number of specific radiological safety norms and guides on radiation protection in mining and milling activities (see Annex no. 5), being very useful and important for CNCAN staff to benefit of EU experts experience related to the assessment of related legislation, from the point of view of their compliance with the requirements of the EU legislation.

This project request is also a result of the previous assistance received by CNCAN in the framework of Phare Project RO.01.10.01, "Nuclear Safety Regulatory Regime Consolidation", Task no. 6 "Revision of the Norms on Raw Material Mining and Milling" which Final Report stated: "According to the objectives of Task 6 the Council Directive 99/31 on landfills and the draft of a Directive on management of waste from the extractive industry should be taken into consideration. ... Furthermore, the EU experts proposed to take some German recommendations and guidelines into account which are directed towards the decommissioning and remediation of legacies from former uranium mining and milling." These are the German "conception and methodology of a safety assessment report for uranium mill tailings ponds" and the guideline for "measurement of alpha activity surface contamination on scrap by means of beta-counting".

The related guidelines and norms subjected to the review process were elaborated by the CNCAN staff themselves based on the provisions identified within the international legislation, in order to complete the regulatory framework dedicated for this activity area. Following this activity, it appears the necessity to have an independent review (performed by the Western experts) of these guidelines/norms content, in order to get their opinion on the compliance manner with the international provisions and practices. As regards, the methodology to be issued, it is obviously a major benefit for the regulatory staff to have the appropriate input (both in terms of human capabilities and technical aspects).

Having in mind the CNCAN lack of experience related to the assessment of radiological risk in uranium and thorium mining and milling activities, including tailing ponds, it is mandatory to have a general evaluation of the existing guideline on the assessment report on radiological safety of uranium tailing ponds, of the guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting, as well as on the reports on radiological safety for the technical closure projects of mining and milling facilities. A general assessment of the existing norms and guidelines for the uranium and thorium mining and milling activities and the development of a methodology for inspection and assessment of long term stability of closed tailing ponds and dumps would be of real benefit for CNCAN activity, leading to the enhancement of the regulatory staff capabilities in this area.

As concerns the personnel skills, there is a lack of experience in the activities involving measurements of radon concentration and radon short live daughters (including continuous measurements), measurements of alpha-global activity of scrap metals, as well as in related inspection and control procedures, in order to get a consistent regulatory approach on protection of public/environment against different hazards posed by mining and milling waste.

3.2. Linked Activities

- Project RO 01.10.01 "Nuclear Safety Regulatory Regime Consolidation", task no. 6 "Revision of the norms on raw material mining and milling" (approved under the 2001 Financing Memorandum for Programme for Community support in the field of Nuclear safety for Romania). Within this task, the assistance was related to the reviewing of the regulatory framework in the field of raw material mining and milling. Although the Western experts pointed out the compliance with the IAEA recommendations and the Directive 96/29 Euratom, some recommendations have been made to enhance their capabilities and to improve the regulatory framework. The aim of this task was to assist CNCAN in the process of finalising the regulatory framework the field of raw material mining and milling taking into account European requirements and practice. EU experts gave a general advice to CNCAN staff on the way of elaboration of norms for near surface disposal, assisted CNCAN staff in the process of reviewing some selected norms, taking into account the national situation and strategy.

\[3\]
The general consideration on the whole Romanian normative framework related to the mining and milling issues included in the Final Task Report stipulates: "... it appears that all the relevant topics arising from internationally general accepted principles and techniques (IAEA Safety guide No. WS-G-1.2, Council Directive 96/29/Euratom, Draft of guidelines on the use of waste mineral mining and milling industries, Draft document on the management of waste from the extractive industry are covered. It could be useful, though, to have them covered in only one or two documents followed by a couple of guidelines containing more technical recommendations. These guidelines are to be considered as a valid support to guide the applicant in the preparation of an application for obtaining an authorization. ... In order to overcome the difficulties arisen from the actual structure of the norms and make easier the submission of an application, it was suggested to hand out to the applicant a scheme based on the translated German document on the preparation of the safety assessment report for mill tailings ponds."

- **Project RO 2005/017-519.03.01** "Development of CNCAN capabilities regarding the regulatory aspects of Naturally Occurring Radioactive Materials (NORM) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) related activities" (approved under the 2005 Financing Memorandum for Programme for Community support in the field of Nuclear Safety for Romania). The main objective of this project is covering the establishment and development of the regulatory framework and the related technical capabilities of CNCAN staff in the area of NORM and TENORM related activities.

As one of the main results of the project is to draw-up the specific regulations on authorization the Naturally Occurring Radioactive Materials (NORM) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) related activities, it should be noted that it will be taken into account the aspects related to the non-uranium mining and milling activities as they are included in the related norms/guidelines subjected of the actual request.

### 3.3. Results

The results envisaged to be obtained within the project are oriented as follows in accordance with the components identified below:

**Results under component 1:**

1.1 revised version of the guideline for drawing-up the assessment report on radiological safety of uranium tailing ponds from uranium milling, including the recommendations and comments of the Western experts by taking also into account the national situation;
1.2 revised version of the guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting including the recommendations and comments of the Western experts by taking also into account the national situation;
1.3 revised versions of the CNCAN existing norms and guidelines for the uranium and thorium mining and milling activities, from the point of view of their compliance with the requirements of the EU legislation in the field (these reviewed versions shall include the recommendations issued by the Western experts by taking into consideration the national situation);
1.4 review document, from regulatory point of view, of the related assessment reports on radiological safety for the technical closure projects of mining and milling facilities (as submitted by the licensee);
1.5 final version of the methodology for inspection and assessment of long term stability of closed tailing ponds and dumps (documentation necessary for development of regulatory activities);

**Results under component 2:**
2.1 trained regulatory staff for performing measurements of radon concentration and radon short live daughters (including continuous measurements);
2.2 trained regulatory staff for performing measurements of alpha-global activity of scrap metals;
2.3 trained regulatory staff on related inspection and control procedures, in order to get a consistent regulatory approach on protection of public/environment against different hazards posed by mining and milling waste.

3.4. Activities

The activities envisaged to be carried out under this project for achieving the project purposes are structured to be developed in two components, such as:

Component no. 1: Transfer of know-how for the Romanian nuclear regulatory staff on radiological safety assessment in the area of uranium and thorium mining and milling related activities

In order to achieve the project objective, technical assistance is required for enhancing the technical capability of CNCAN staff with the view of analyzing the specific regulatory documentation as issued related to the radiological safety issues in uranium mining and milling activities. The specific activities to be performed in the framework of this component are oriented for the enhancement of Romanian nuclear regulatory staff expertise, the Western experts being requested to provide (in the framework of the "on-the-job" training sessions), an in-depth transfer of know-how of their experience in this area, by identifying all technical issues needed to be addressed in carrying out the regulatory review.

At the end of this component activities, it is assumed that the related revised versions of the documentations to be reviewed, respectively the final version of the document needed in the regulatory process (methodology for inspection and assessment of long term stability of closed tailing ponds and dumps) will be obtained.

Within this component, the technical assistance will address the reviewing/elaboration of the following documents:

1.1 specific guideline for drawing-up the assessment report on radiological safety of uranium tailing ponds from uranium milling;
1.2 related assessment reports on radiological safety based on which are to be elaborated the technical closure projects of mining and milling facilities. The assessment shall be performed during a joint and interactive work between the Western and Romanian experts;
1.3 specific guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting;
1.4 CNCAN existing norms and guidelines for the uranium and thorium mining and milling activities, from the point of view of their compliance with the requirements of the EU legislation in the field;
1.5 methodology for inspection and assessment of long term stability of closed tailing ponds and dumps) – to be drawn-up (or providing) within the project, as required document necessary for the suitable development of regulatory activities;

Component no. 2: Training of the Romanian nuclear regulatory staff on mining and milling related aspects

As part of the activities to be followed in order to comply with the project purposes, is a specific and dedicated training session (some of the activities to be carried-out being in terms of "on-the-job" training) both for the regulatory staff and of those of other organizations/institutions involved in the mining and milling related activities.

In the framework of this project, the following training activities are envisaged to be carried-out for improving the regulatory staff skills and capabilities:
2.1 national training course on assessment techniques for measurements of effective doses received from the radon short lived daughters, including the radioactive powders (also continuous measurements). This training course is envisaged to be held on-site at the Crucea mine (about 550 km from Bucharest). By the specificity of the training curriculum (the assessment techniques for doses, the necessity to evaluate the monitoring programme in the area – see also the Annex no. 8), this activity cannot be performed at CNCAN headquarters – in Bucharest – being more efficient to develop this measurements directly nearby the mine area.

2.2 training on measurement techniques for alpha-global activity;

2.3 study tour on related regulatory mining and milling issues

The Annex no. 8 attached to this document presents, for each of the training items requested, the minimum information for a better understanding of this request, such as: content of the training, topics, number of participants, duration, number of trainers and their profiles.

The quantification of all inputs for this project is summarised in the Annex no. 9 (budgetary estimation of CNCAN project under TF) attached to this file.

3.5. Lessons learned:

See Annex 7.

4. Institutional Framework

In Romania, the nuclear regulatory authority is the National Commission for Nuclear Activities Control (CNCAN). The legal framework for developing the CNCAN activities is set-up by the Law no. 111/1996 on safe deployment, regulation, authorization and control of nuclear activities, republished.

As national competent authority with specific responsibilities in this area, CNCAN is empowered to issue norms, regulations for the specification in detail of the general requirements for nuclear safety, for protection against ionizing radiation, for controlling the non-proliferation of nuclear weapons, for physical protection and emergency plans for intervention in case of nuclear accident, including authorization and control procedures. Also, CNCAN issues operation licences for the nuclear objectives and installations, having the power to suspend or withdraw the licences or the practice permits in the case of failure to observe the legal provisions. CNCAN applies sanctions under the provisions of the law.

The key partners involved in the implementation of this projects are:

- Division of Special Materials, mainly the Office for Authorization and Surveillance of Radioactive Mining Activities within CNCAN which is empowered to analyze and review/assess the radiological safety documentation related to the geological research, mining and milling of ores, disposal of radioactive waste originated from geological and technological research, mining and processing of nuclear ores, licensing of transport means including packages. Also, the staff is involved in performing the inspections and periodical controls with the view of their usual activities;

- Project Implementation Unit within CNCAN which is responsible for overall coordination of all EU projects, including monitoring and the implementation.
5. Detailed Budget

<table>
<thead>
<tr>
<th>MEuro</th>
<th>Transition Facility Support</th>
<th>Co-financing</th>
<th>Total cost (TF plus cofinancing)</th>
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<td>Investment Support</td>
<td>Institution Building</td>
<td>Total Transition Facility (=I+IB)</td>
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<td><strong>Total</strong></td>
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<td>0.800</td>
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</tbody>
</table>

VAT is not an eligible expenditure under both the Transition Facility and national cofinancing funds indicated in the above budget table. Where contracts are subject to VAT due to provisions of national legislation, these funds have to be provided from national resource outside and in addition to the amounts indicated in the budget table.

6. Implementation Arrangements

6.1 Implementing Agency

The project will be implemented in accordance with the national rules governing the public acquisition.

The Central Financing and Contracting Unit (CFCU) within the Ministry of Finance will be the Agency responsible for implementing the projects.

Contact person within CFCU:
Mrs. Carmen Rosu, Director
Address: 44 Mircea Voda Bvd, Entrance B
Sector 3, Bucharest
Phone: +4021 326 55 55
Fax: +4021 326 87 09
E-mail: carmen.rosu@mfinante.ro

6.1.1. Implementing Authority:

The Implementing Authority (IA) is the National Commission for Nuclear Activities Control (CNCAN). The IA is fully responsible for the technical issues of above project implementation, including any related policy support, monitoring and execution.

Contact person within CNCAN
Mrs. Daniela Casaru, Director for International Affairs, SPO
Address: Libertatii 14 Blvd, sector 5, Bucharest
Phone: +4021 317 38 07
Fax: +4021 317 38 87
E-mail: daniela.casaru@cncan.ro.
CNCAN, acting also as Beneficiary, is involved in: the preparation of: the tendering dossier, including the evaluation criteria, the evaluation of offers, takes part in the implementation of the specific projects.

6.2. Twinning

N/A.

6.3. Non-standard aspects

The national procurement rules on public acquisition shall be strictly followed.

6.4. Contracts

One service contract is foreseen to be concluded with the value indicated under point 5. The professional experience of the trainers and of the related experts to be involved in the project is detailed within the Annex no. 8.

7. Implementation Schedule

7.1. Start of tendering/call for proposals
October 2007

7.2. Start of project activity
April 2008

7.3. Project completion
August 2009

8. Sustainability

The assessment reports will be used by the regulatory authority staff as instruments for performing the institutional control during the post-closure phase of disposal facilities for radioactive waste arisen from mining and milling activities.

CNCAN staff will be supported in reviewing the guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting and, together with the practical lessons learnt under this project related to the measurements performance, will better develop its regulatory activities in this field. The evaluation reports issued by the EU experts will contribute to the safety closure and decommissioning of mining and milling facilities, with a view to the restoration and rehabilitation of the affected environment. Improvement of the regulatory authority capability with regard to the radiological safety assessment of uranium mining and milling related activities will contribute to the achievement of a consistent regulatory approach to protect humans and the environment against hazards posed by mining and milling waste.

9. Conditionality and sequencing

The proposed project is relying on the results obtained in the previous project, as completed, namely the Phare project RO 01.10.01 “Nuclear Safety Regulatory Regime Consolidation”. Within this project, some of the CNCAN norms have been assessed and following this issue, the final report stipulated as recommendations, that new regulatory norms to be issued. Consequently, within the Component 1 of this project, the reviewing of some norms issued further to project RO 01.10.01 is envisaged.

No sequencing in carrying-out the project activities is provided.

\[\text{Page } 8\]
Annexes to project Fiche
1. Logframe in standard format
2. Detailed implementation chart
3. Contracting and disbursement schedule, by quarter, for full duration of project (including disbursement period)
4. For all projects: reference list of feasibility/pre-feasibility studies, in-depth ex ante evaluations or other forms of preparatory work. For all investment projects, the executive summaries of economic and financial appraisals, environmental impact assessments, etc, should be attached: N/A
5. Reference list of relevant laws and regulations
6. Reference list of relevant strategic plans and studies (may include institution sector strategies, development plans, business development plans, etc): N/A
7. Lessons learnt from previous years
8. Detailed training map
9. Quantification of the project inputs
## Log frame

**Transition Facility programme for Romania**

<table>
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<tr>
<th>LOGFRAME PLANNING MATRIX FOR Project Fiche</th>
<th>Programme name and number 2007/19343.06.04</th>
<th>Disbursement period expires: 15 12 2010</th>
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<td>Radiological Safety in Uranium Mining and Milling Facilities</td>
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<td><strong>Overall objective</strong></td>
<td><strong>List of other projects with same objective</strong></td>
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<td>• to improve the nuclear regulatory authority (CNCAN) capabilities with regard to radiological safety in uranium mining and milling facilities</td>
<td>Project RO 01.10.01 “Nuclear Safety Regulatory Regime Consolidation”, task no. 6 “Revision of the norms on raw material mining and milling”</td>
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<td>Relates to Copenhagen criterion and acquis chapter¹</td>
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¹ Please specify here the recommendation made in Comprehensive Monitoring Report or other relevant documents (SIGMA (financial control, procurement, Peer Reviews, Evaluation reports, Final reports of TW projects)

| | | |
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<table>
<thead>
<tr>
<th>Project purpose</th>
<th>Objectively verifiable indicators</th>
<th>Sources of Verification</th>
<th>Assumptions</th>
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</thead>
</table>
| - to improve the CNCAN staff expertise with regard to the radiological safety assessment of uranium mining and milling related activities | - improved regulatory expertise  
- assessment reports  
- enhanced CNCAN staff skills and capabilities  
- no of trained staff (at least 15 persons)  
- training report  
- task reports | - evaluation and approval of radiological risk assessment related documents | - legislative changes involving modification in the related regulatory framework  
- staff availability |
| Results | Objective indicators | Sources of Verification | Assumptions |
| Results Component 1 | - At least of 10 regulatory staff participating in the evaluation activities for the related documents  
- number of documents revised (guidelines/norms)  
- number of documents as issued | - Revised guidelines / norms  
- Methodology for inspection and assessment of long-term stability of closed tailing ponds and dumps, as issued during the project  
- final task report | - staff availability |
of view of their compliance with the requirements of the EU legislation in the field (these reviewed versions shall include the recommendations of the Western experts by taking also into account the national situation)

- review document, from regulatory point of view, of the related assessment reports on radiological safety for the technical closure projects of mining and milling facilities (as submitted by the licensee)

- Final version of the methodology for inspection and assessment of long term stability of closed tailing ponds and dumps (documentation as necessary for development of regulatory activities)

**Results Component 2**

- trained staff for performing measurements of radon concentration and radon short live daughters (including continuous measurements);

- trained regulatory staff for performing measurements of alpha-global activity of scrap metals

- trained regulatory staff on related inspection and control procedures, in order to get a consistent regulatory approach on protection public/environment against different hazards posed by mining and milling waste

<p>| - At least of 30 number of trained staff (from which about 10 of the regulatory authority) | - training materials |
| - training reports |
| - training materials |
| - training reports |
| - training materials |
| - training reports |
| - final task report |</p>
<table>
<thead>
<tr>
<th>Activities</th>
<th>Means</th>
<th>Assumptions</th>
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| **Activities Component 1**  
- technical assistance in the evaluation/reviewing of the specific guideline for drawing-up the assessment report on radiological safety of uranium tailing ponds from uranium milling  
- technical assistance in the evaluation/reviewing of the specific guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting;  
- technical assistance in the evaluation/reviewing of the CNCAN existing norms and guidelines for the uranium and thorium mining and milling activities, from the point of view of their compliance with the requirements of the EU legislation in the field;  
- technical assistance in the evaluation/reviewing of the related assessment reports on radiological safety based on which are to be elaborated the technical closure projects of mining and milling facilities;  
- technical assistance for drawing-up (or providing) of the specific documentation necessary for the suitable development of regulatory activities (methodology for inspection and assessment of long term stability of closed tailing ponds and dumps) | - TA | - staff availability |
Activities Task 2
- National training course on assessment techniques for measurements of effective doses received from the radon short lived daughters, including the radioactive powders (also continuous measurements);
- Training on measurement techniques for alpha-global activity
- Study tour on related regulatory mining and milling issues
### Annex 2 - Detailed time implementation chart-

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<th>Calendar months</th>
<th>2006</th>
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<td>Technical assistance Contract</td>
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- D = Design
- C = Contracting
- I = Implementation
## Annex 3a - Cumulative contracting schedule

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NB: 1. All contracting should normally be completed within 6-12 months and must be completed within 24 months of signature of the FA.

## Annex 3b - Cumulative disbursement schedule

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NB: All disbursements must be completed within 36 months of signature of the FA.
Reference list of relevant laws and regulations

1. Law no. 111/1996 Law no. 111/1996 on safe deployment, regulation, authorization and control of nuclear activities, republished

2. Radiological Safety Norms on Operational Radiation Protection of Workers in Uranium and Thorium Mining and Milling Facilities, approved by Order no. 127/2002 of the CNCAN President


4. Radiological Safety Norms on Decommissioning of the Uranium and Thorium Mining and Milling Facilities, approved by Order no. 184/2006 of the CNCAN President (revised in 2006)

5. Radiological Safety Norms on the Uranium and Thorium Mining and Milling - Authorization Procedures, approved by Order No. 171/2004 of the CNCAN President through


7. Guideline on Criteria of Release from CNCAN Regulatory Body in order to Use, in Other Purposes, the Buildings, Materials, Facilities, Dumps, and Area Contaminated following the Activities of Uranium and/or Thorium Ores Mining and/or Milling, approved by Order No. 184/2006 of the CNCAN President

8. Guideline on the Recommended Parameters for the Estimation of the Effective Doses on all Ways of Exposure, Relevant for Other Purposes Usage of the Uranium and/or Thorium Mining and/or Milling Waste Heaps and Contaminated Sites, approved by Order No. 184/2006 of the CNCAN President
Annex no. 7

Lessons learnt from previous years

Following the recommendations issued by the EU experts included in the final Report of the Phare Project RO 01.10.01 "Nuclear Safety Regulatory Regime Consolidation", Task No. 6, "Revision of the norms on raw material mining and milling", CNCAN has taken a few steps towards their fulfilment:

- Radiological Safety Norms on Decommissioning of the Uranium and Thorium Mining and Milling Facilities (revised);

- Guideline on Technical Requirements for Design, Siting, Construction, Operation, Closing and Decommissioning of the Uranium and Thorium Mining and Milling Ores and Waste Disposal Areas (issuing);

- Guideline on Criteria of Release from CNCAN Regulatory Body in order to Use, in Other Purposes, the Buildings, Materials, Facilities, Dumps, and Area Contaminated following the Activities of Uranium and/or Thorium Ores Mining and/or Milling (issuing);

- Guideline on the Recommended Parameters for the Estimation of the Effective Doses on all Ways of Exposure, Relevant for Other Purposes Usage of the Uranium and/or Thorium Mining and/or Milling Waste Heaps and Contaminated Sites (issuing).
Detailed training map

For Component no. 2: Training of the Romanian nuclear regulatory staff on mining and milling related aspects

Activity no. 1: National Training Course on assessment techniques for measurements of effective doses received from the radon short lived daughters, including the radioactive powders (also continuous measurements);

Module no. 1: Protection against Occupational Exposure in the Mining and Processing of Raw Materials

a) Part 1: International Standards in Radiation Protection

- IAEA Safety Standards
  - Safety Fundamentals – Principles
  - Safety Requirements – “Shall” statements
  - Safety Guides – “Should” statements

- Other safety-related publications
  - Safety Reports
  - Technical Reports
  - TECDOCs

- IAEA Safety Fundamentals – the 10 Principles
  1. Operator is responsible for safety
  2. Legal & governmental infrastructure, independent regulatory body
  3. Justification, limitation of risk
  4. ALARA
  5. Protect all populations, incl. distant populations, future generations includes waste minimization and reuse / recycling
  6. Graded regulatory approach commensurate with risk
  7. Regular safety assessment, apply lessons learned
  8. Accident prevention
  9. Emergency preparedness and response
  10. Intervention must produce net benefit

- Natural Sources of Radiation

- Safety Requirements containing specific references to natural sources

- The International Basic Safety Standards (BSS)

- Safety Guide RS-G-1.1 Occupational Protection

- Safety Guide RS-G-1.6 Occupational exposure: mining & minerals processing

- Safety Guide RS-G-1.7 Exclusion, exemption, clearance

- Safety Guide WS-G-1.2 Radioactive waste management: mining & minerals processing

- Safety Reports on radon and NORM – providing for application of the Standards

b) Part 2: Occupational Radiation Protection Methodologies

- History of Occupational Exposure to Radiation

- Effects of Radiation

- International Bodies and the Basic Units
  - International Commission on Radiological Protection (ICRP)
  - International Atomic Energy Agency (IAEA)
  - ICRU, UNSCEAR, UIR, WHO

- Critical Units
- Bq (old unit Ci) the basic measure of radioactivity 1 Bq is one disintegration in one second (1 Ci = 3.7E10 Bq)
- Sv (more commonly the mSv or μSv) the basic unit of dose. Allows comparison of exposure from all kinds of radiation. Directly relates to the risk associated with radiation
  - Specialised Units
    - nJ/m³ (WL and WLM) specialised unit for radon decay product concentration in air
    - Gy a unit of absorbed dose generally used for gamma exposure. Energy dependent relationship with the Sv and often assumed to be equivalent (conservative assumption)

- Basic Principles; Justification; Limitation; Optimisation; ALARA;
- Main Occupational Exposure Pathways; Reducing Doses; Basic Dose Calculation;
- Management and Regulatory Infrastructure; Record Keeping, Databases and Privacy;
- Gamma Introduction; Units of Measurement; Simple Dose Calculations;
- Detection of Gamma Radiation; Selection of Gamma Measuring Instruments;
  Sources of Background Gamma Radiation; Gamma Emitters of the U/Th Decay Chains; Sources of External Gamma Radiation in Mining and Milling; Process Factors Influencing Gamma Dosrates; Nuclide Mixtures and Gamma Intensity
- Occupational Exposure Scenarios; Reducing Gamma Exposures;
- Gamma Survey Strategies: Basic Measurements and Survey Locations; Types of Gamma Surveys; Survey Strategies;
- Documentation/Records;
- Quality Assurance (QA);
- Dust: Why is Dust of Radiological Importance?
  - Measurement of Dust Inhalation Exposure; Common Methods of Measuring Dust in Air;
- Problems with Dust Monitoring; Particle Sizing and Chemical Form;
- Gross Alpha Counting;
- Dose conversion factors; Use of Dose Conversion Factors (DCF); Dose Calculation;
- Radon Introduction: What are Radon Decay Products?; Units of Measurement; Dose Calculations; Detection of Radon and Radon Decay Products; Methods;
  Selection of Radon Decay Product Measuring Instruments; Properties of Radon and its Decay Products; Radon and Background Radiation
  - Sources of Background Radiation
  - Sources of Radon and its Decay Products in Mining and Milling;
  - Process Factors Influencing Concentrations;
  - Occupational Exposure Scenarios; Reducing Exposures;
  - Survey Strategies: Basic Measurements and Locations; Types of Surveys;
    Survey Strategies-Surface and Underground Operations;
  - Factors Influencing Dose;
  - Documentation/Records;
  - Quality Assurance (QA)

Module no. II: Management of mining and milling waste
a) Part 1: Verification of compliance with limits on effective dose

- The main types of exposure
  - External gamma radiation
  - Inhalation of radon progeny
  - Inhalation of radionuclides in dust

- Steps in the compliance verification process
  - Identify all significant intakes and exposures
  - Quantify:
    - Personal dose equivalent (penetrating radiation)
    - Exposures (radon progeny)
    - Intakes (dust)
  - Depending on the verification method:
    - Convert exposures and intakes to effective dose, or
    - Derive limits on exposure and intake
  - Compare with annual limits on effective dose, exposure or intake

- Exposure pathways and measurement units
- Inhalation of dust
- Ore dust inhalation dose coefficients
- Uranium and thorium concentrate
- Chemically separated U and Th concentrates: inhalation dose coefficients
- Compliance verification methods
- Conversion to effective dose
- Specific publications references (IAEA Publications, IAEA Safety Guides, ICRP Publications)

b) Part 2: Management of Uranium Mining and Milling Waste

- Design objectives and considerations
  - Meet national regulatory criteria and objectives
  - Protect human health and environment
  - Minimize contaminant releases using ALARA
  - Take into account non-radiological contaminant
  - Minimize the reliance on active maintenance for the post-closure period

- Mining and milling waste
  - Exploration waste
  - Mining waste
  - Milling and Operation waste
  - In Situ Leach waste
  - Miscellaneous waste
  - Decommissioning waste

- Management of Exploration Waste
  - Trench Rock
    - Excavated Material should be segregated according to activity
    - Trenches should be backfilled
  - Drilling Sludge


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- Water and sludge should be contained
- Maximize recycling of water and mud
- Drill holes backfilled/capped

- 
  **Dry cuttings and dust**
  - Safe disposal when site is abandoned
  - Return to drill hole may be best
  - Drill holes backfilled/capped

- 
  **Core samples**
  - Should be properly stored during and after operation
  - Safe disposal of fragments and dust

- 
  **General waste**
  - Safe disposal in accordance with local laws and best practice

• Management of Mining waste
  - **Solid waste**
    - Waste rock and low grade ore
    - Scrap material and equipment
  - **Liquid waste**
    - Mine water
    - Surface water drainage
    - Other liquids (fuel, oil etc)

• Solid Mining waste: Scrap material and equipment
• Liquid Mining Waste: Mine drainage water
• Liquid Mining Waste: Surface water drainage
• Management of Mining waste – In Situ Leach –

• Management of Milling wastes
  - **Liquid waste**
    - Barren and decant solution
    - Seepage from tailings
    - Plant washings, laboratory waste, laundry water
  - **Solid waste**
    - Tailings
    - Heap leach piles
    - Waste concentrates
    - Scrap material and equipment

• Airborne emissions

• Liquid Milling waste: Barren and decant solutions
• Liquid Milling Waste: tailings seepage
• Other liquid waste
• Solid Milling Waste: Waste concentrates
• Solid Milling Waste: Scrap material and equipment
• Airborne Milling Wastes

c) Part 3: Management of Mining and Milling Waste - Tailings

• Tailings Disposal Methods
• Uranium tailings - Hazards
• Surface tailings impoundments
• Surface Impoundments: Valley dam impoundments
• Surface Impoundments: Ring dyke impoundments
• Below Grade Disposal: Mine Pit Impoundments
• Disposal in underground mine voids

Module no. IV: Radiation Protection against exposure to natural sources

a) Part IA: General considerations

• Exposure of workers and members of the public to:
  - Radon in workplaces and dwellings
  - Materials containing elevated concentrations of radionuclides of natural origin
    - Work involving such materials, including transport, management of residues
    - Building materials incorporating such materials
    - Residues from past practices
    - Cosmic rays above ground level

• Material designated in national law or by a regulatory body as being subject to regulatory control because of its radioactivity

• NORM and the nuclear fuel cycle
  - the overlap

• Application of the Standards to Radon
  - Normally considered as chronic exposure subject to intervention
  - Optimization of protection – optimized action level for intervention through remedial action
  - Guideline action levels: 1000 Bq/m³ for workplaces
    200–600 Bq/m³ for dwellings
  - No action required below action level
  - In workplaces, if remedial action cannot reasonably achieve reduction to below action level, apply requirements for practices (usually an issue only in underground workplaces)

• Application of the standards to NORM
  - As with radon – optimization of protection
  - Usually unnecessary to regulate material below:
    1 Bq/g (U, Th series radionuclides)
    10 Bq/g (K-40)
  - Irrespective of quantity, or whether natural or processed
  - Can also be used as clearance levels
  - Building materials below these levels may require consideration – guidance being developed (DS400)
- Transport regulations apply, but only above certain specified activity or activity concentration levels, unless material is used for its radionuclide content

b) **Part 1B: Assessing the need for radiation protection measures in work involving mineral and raw materials**

- Objective
- Scope
- Uranium and thorium decay series
- Excluded exposures
- Applicability of requirements
  - Practice or intervention
  - Material containing radionuclides of natural origin
  - Radon
- Graded approach to regulation
  - Exemption
  - Notification
  - Authorization
- Industrial activities most likely to require regulatory consideration
  - Extraction of rare earth elements
  - Production and use of thorium and its compounds
  - Production of niobium and ferro-niobium
  - Mining of ores other than uranium ore
  - Production of oil and gas
  - Manufacture of titanium dioxide pigments
  - The phosphate industry
  - The zircon and zirconia industry
  - Production of tin, cooper, aluminum, iron and steel, zinc, and lead
  - Combustion of coal
  - Water treatment
  - Characterization of industrial process
- Activity concentration as an indicator of dose from exposure to gamma radiation and to dust
- Exposure to radon
- The industrial operations based on current occupational exposure data
- Practical techniques for determining radionuclide activity concentrations
  - Sampling of material
  - Measurement accuracy and quality
  - Analytical techniques
- Example of an assessment procedure
  - Identification of industry sectors
  - First level of assessment
  - Underground mines and other workplaces with similar characteristics
  - Second level of assessment
  - Other work situations
c) **Part 1C: Management of NORM waste, Monitoring and Surveillance during operations**

- The Requirement for a Monitoring Programme
- General Steps in the Development of a Monitoring Programme
- Consideration of Radiological and Non-radiological Parameters
- Choice of Parameters to Monitor
- Determination of Sampling Methodology
- Important Considerations in Sampling Methodology
- Common Sampling Techniques
- Analysis Techniques
- Selection of Analysis Technique
- Optimisation of Resource Requirements vs Monitoring Requirements
- Interpretation of the Results
- Separation of Operational Impacts From Natural Background
- Techniques for Removal of Background Contribution
- Documentation of Results
- Reporting of Results
- Periodic Revision to Ensure Relevance
- Revision Timing

**Activity no. 2:**  *Training on measurement techniques for alpha-global activity*

Main topics envisaged to be emphasized during this training shall cover the following:

**Title: Measurement principle for in-situ indication of total alpha activity (TAA) on scrap surface**

Application of β-radiation to define the TAA is developed as a procedure, especially appropriate for clearance measurements for scrap from uranium mining and milling. This procedure is based on a problem-related contact calibration associating β-activity and α-activity of the U$^{238}$ nuclides with each other. At this end, it was proven that the application of β-radiation is a viable procedure for in-situ measurements.

The training is intended to cover the following items:

- surface contamination; fixed surface contamination;
- measurement principle; direct and indirect measurements of surface contamination;
- total alpha activity;
- contact calibration;
- quality assurance;
- nuclide vector;
- redistribution of β-particles;
- measurement precision and evidence limits for definition of scrap surfaces;
- systematic and statistical error;
- detection limit and evidence limit.
Activity no. 3: Study tour on mining and milling related regulatory issues

The topics envisaged by these study tours are as follows:

ST no. 1: assurance of the radiological safety in the uranium mining and milling activities; monitoring, surveillance and assessment of dose records

ST no. 2: management of radioactive waste originated from uranium mining and milling; regulatory aspects for closure of mines and processing installations; environment restoration.

Profiles (professional experience) of the experts to be involved in the project, as well as of the trainers

Qualifications and skills

- university degree or equivalent in physics, nuclear power or mechanical engineering
- good communication skills
- fluency in both spoken and written English

Professional experience

- knowledge and experience of nuclear regulatory issues focused on mining and milling aspects (at least 10 years)
- Knowledge and experience in assessment of radiological safety documentation for the related uranium/thorium mining and milling activities;
- knowledge of relevant international documents with a view to uranium / thorium mining and milling
- knowledge and experience on the regulatory aspects for closure of mines and processing installations and environment restoration
- adequate knowledge and experience for evaluation of the licensing support documentation for the uranium/thorium mining and milling related activities;
- relevant experience in organizing and conducting training activities;
- knowledge and experience in elaboration specific regulations.
Quantification of the project inputs

This annex shall present the both the quantification of inputs and the related budget for each project component.

As it was stated, for achieving of the project purposes and the overall objective, the following two components were identified:

**Component no. 1:** Transfer of know-how for the Romanian nuclear regulatory staff on radiological safety assessment in the area of uranium and thorium mining and milling related activities

**Component no. 2:** Training of the Romanian nuclear regulatory staff on mining and milling related aspects

**Component no. 1:** Transfer of know-how for the Romanian nuclear regulatory staff on radiological safety assessment in the area of uranium and thorium mining and milling related activities

a1) **evaluation of the specific guideline for drawing-up the assessment report on radiological safety of uranium tailing ponds from uranium milling**

- no. of experts involved in the evaluation: 2
- translation into English of the guideline 50 pages (50 x 20 Euro/pag=1000 Euro)
- electronically submission of the guideline to the Western experts
- evaluation of guideline (in expert’s country) = 20 x 2 = 40 days
- electronically submission of the guideline to CNCAN for getting their comments
- elaboration of the final version of the guideline
- final WS in Romania to discuss the final version of the guideline: 5 days
- man x days = 45 (from which 5 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- Incidental 0
- no. of travel in Romania: 1 x 2 = 2

a2) **evaluation of the related assessment reports on radiological safety based on which are to be elaborated the technical closure projects of mining and milling activities**

- no. of reports to be evaluated 2
- no. of experts involved: 2
- assessment of the reports in Romania, due to their specificity
- man x days = 50 (from which 20 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental 0
- no. of travel in Romania: 1 x 2 = 2

a3) evaluation of the specific guideline on measurement of alpha activity surface contamination on scrap by means of beta-counting:
- no. of reports to be evaluated = 1
- translation into English of the guideline: 20 pages (20 x 20 Euro/pag. = 400 Euro)
- no. of experts involved: = 2
- electronically submission of the guideline to the Western experts
- evaluation of guideline (in expert’s country) = 30 days
- electronically submission of the guideline to CNCAN for getting their comments
- elaboration of the final version of the guideline
- final WS in Romania to discuss the final version of the guideline: = 5 days
- man x days = 35 (from which 5 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental 0
- no of travels in Romania: 1 x 2 = 2

a4) evaluation of CNCAN existing norms and guidelines for the uranium and thorium mining and milling activities, from the point of view of their compliance with the requirements of the EU legislation in the field;
- no. of norms/guidelines to be evaluated = 5
- technical meeting in Romania in order to identify the requirements (presentation of the norms/guidelines, establishing the best approach to be followed in order to get the result)
- man –days = 5 days
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental 0
- no of travels in Romania: 1 x 5 = 5

a4.1)
a) Radiological Safety Norms on Decommissioning of the Uranium and Thorium Mining and Milling Facilities, as revised in 2006 and approved by CNCAN President through Order No. 184/2006
b) Guideline on Criteria of Release from CNCAN Regulatory Body in order to Use, in Other Purposes, the Buildings, Materials, Facilities, Dumps, and Area Contaminated following the Activities of Uranium and/or Thorium Ores Mining and/or Milling

c) Guideline on the Recommended Parameters for the Estimation of the Effective Doses on all Ways of Exposure, Relevant for Other Purposes Usage of the Uranium and/or Thorium Mining and/or Milling Waste Heaps and Contaminated Sites

- no. of experts involved: 2
- evaluation of the above mentioned norm+guidelines (in expert’s country) = 46 days
- electronically submission to CNCAN of the recommendations
- CNCAN shall comment on the modifications proposed
- elaboration of the final version of the above mentioned norm+guidelines by the Western experts = 20 days
- final WS in Romania to discuss the final version of the above-mentioned norm+guidelines: 5 days
- man x days = 82 (from which 5 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental: 0
- no of travels in Romania: 1 x 2 = 2

a4.2)

Guideline on Technical Requirements for Design, Sitting, Construction, Operation, Closing and Decommissioning of the Uranium and Thorium Mining and Milling Ores and Waste Disposal Areas, approved by CNCAN President through Order No. 213/2006

- no. of experts involved: = 2
- translation into English 50 pages (50 x 20 Euro/pages = 1000 Euro)
- evaluation of the guideline (in expert’s country) = 20 x 2 = 40 days
- electronically submission to CNCAN of the recommendations
- CNCAN shall comment on the modifications proposed and electronically submit them to the Western experts
- elaboration of the norm final version = 10 days
- final WS in Romania to discuss the final version of the guideline: 5 days
- man x days = 45 days (from which 5 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental 0

LB
- no of travels in Romania: 1 x 2 = 2

4.3

Radiological Safety Norms on the Uranium and Thorium Mining and Milling - Authorization Procedures, approved by CNCAN President through Order No. 171/2004

- no. of experts involved: 2
- evaluation of the guideline (in expert’s country) = 20 x 2 = 40 days
- electronically submission to CNCAN of the recommendations
- CNCAN shall comment on the modifications proposed and electronically submit them to the Western experts
- elaboration of the norm final version = 10 days
- final WS in Romania to discuss the final version of the guideline: 5 days
- man x days = 55 days (from which 5 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- incidental 0
- no of travels in Romania: 1 x 2 = 2

5) drawing-up (or providing) of the specific documentation necessary for the suitable development of regulatory activities (methodology for inspection and assessment of long term stability of closed tailing ponds and dumps).

- no. of experts involved: 2
- WS in Romania for 5 days
- elaboration by the Western experts of the draft methodology: 25 days x 2 = 50 days
- electronically submission to CNCAN of the draft version of methodology for potential comments
- elaboration of the final version of the methodology based on the CNCAN’s comments
- final WS in Romania to discuss the methodology as applicable in Romania= 5 days
- man x days = 60 (from which 10 days in Romania)
- fee rate = 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- no of travels in Romania: 2 x 2 = 4
- incidental 0
Component no. 2: Training of the Romanian nuclear regulatory staff on mining and milling related aspects

b 2.1) National training course on radiological safety in uranium mining and milling facilities

This training course is aimed to enhance both the theoretical and practical skills of the regulatory staff, as well as of those people involved in the mining and milling area. Having in mind the complexity and the technical aspects envisaged, the training is divided into several modules, which shall be jointed together, as it was presented in the related Annex.

The CNCAN staff participating in this training course is belonging to the technical divisions developing regulatory activities linked to mining and milling activities (ex. Division for Special Materials, Division for Radiation Protection and Radioactive Waste, Division on Quality Control, Radiological Emergencies Department).

Module no. 1 is envisaged to be held outside Bucharest, at Vatra Dornei (a locality near to Crucea mine).
- duration of training course = 5 days
- no. of participants = 35 persons (10 from CNCAN and 25 from the related establishments)
- no. of lecturers = 2 persons
- total number of participants (including the lecturers) = 37 persons – 40 persons

- preparation of the training course = 20 days x 2 lecturers = 40 man-days
- travel = 1 x 2 = 2
- fee rate: 850-950 Euro/day
- per-diems in Romania= 150 – 200 Euro
- no. of man-days = 45 (from which 5 in Romania)

Module no. 2 and 3 shall be held together in Bucharest
- duration of training course = 5 + 5 days = 10 days
- no. of participants = 35 persons (10 from CNCAN and 25 from the related establishments)
- no. of lecturers = 2 persons
- total number of participants (including the lecturers) = 37 persons ~ 40 persons

- preparation of the training course = 20 days x 2 lecturers = 40 man-days
- travel = 1 x 2 = 2
- fee rate: 850-950 Euro/day
- per-diems in Romania= 150 – 200 Euro
- no. of man-days = 50 (from which 10 in Romania)

Module no. 4 shall be held in Bucharest.
- duration of training course = 5 days = 5 days
- no. of participants = 35 persons (10 from CNCAN and 25 from the related establishments)
- **no. of lecturers** = 1 persons
- total number of participants (including the lecturers) = 36 persons
- preparation of the training course = 20 days x 1 lecturer = **20 man-days**
- travel = 1 x 1 = 1
- fee rate: 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- no. of man-days = 25 (from which 5 in Romania)

### 2.2) Training on measurement techniques for alpha-global activity

- duration of the training = 5 days
- **no. of participants** = 35 persons (10 from CNCAN and 25 from the related establishments)
- **no. of trainers** = 1 persons
- total number of participants (including the lecturers) = 36 persons
- preparation of the training = **20 days**
- travel = 1
- fee rate: 850-950 Euro/day
- per-diem in Romania = 150 – 200 Euro
- no. of working days = 25 days (from which 5 in Romania)

### 2.3) Study tours on related regulatory mining and milling issues

- **no. of CNCAN participants** = 2 + 2
- duration of the study tour = 5 days
- no. of involved experts from the host institutions = 2
- per-diem for CNCAN staff = max. 250 Euro/day
- travel costs for CNCAN staff = max. 850-950 Euro/day
- preparation of the technical aspects = 10 days x 2 = **20 man-days**

#### Organisation of the administrative meetings:

**Inception Meeting:**

- no of experts = 4
- total no participants = about 10 persons
- duration = 5 days
- preparation of the meeting = 5 days x 4 = **20 man-days**
- fee-rate = 850-950 Euro/day
- per-diem in Romania = 200 Euro
- number of man-days: = 25 (from which 5 in Romania)

**Coordination meetings**

- **number of coordination meetings** = 2
- no of experts = 2
- duration = 2 days
- preparation of the meeting = 5 days x 2 = **10 man-days**
- fee-rate = 850-950 Euro/day
- per-diem in Romania = 200 Euro
- number of man-days: 12 (from which 2 in Romania)
Total: 12 x 2 = 24 man-days (from which 4 in Romania)

Final meeting:
- no of experts 4
- total no participants = about 10 persons
- duration 3 days
- preparation of the meeting 10 days x 4 = 40 man-days
- fee-rate 850-950 Euro/day
- per-diem in Romania = 200 Euro
- number of man-days: 40 (from which 3 in Romania)

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<td>- Senior experts</td>
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<td>- Junior experts</td>
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PROVISION FOR INCIDENTAL EXPENDITURE: 5 3,000

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</table>
1 All fee rates must cover:
- the remuneration actually paid to the experts concerned per working day
- administrative costs of employing the relevant experts, such as relocation and repatriation expenses, accommodation, expatriation allowances, leave, medical insurance and other employment benefits accorded to the experts by the Consultant
- the margin, covering the Consultant's overheads, profit and backstopping facilities
2 Experts working for more than 6 consecutive months on the contract
3 Experts working for less than 6 consecutive months on the contract
4 The annual leave entitlement of experts must not exceed 60 calendar days
Note that the input of experts must be given in full working days

5 Provision for incidental expenditure:
- all incidental expenditure incurred in the course of the contract as required by the Terms of Reference is to be invoiced at actual cost.
- any cost related to the payment of an incidental expenditure is included, such as bank charges.
- supporting documentation need not be submitted at the time interim invoices are presented for payment but must be retained for seven years after the final payment is made by the Contracting Authority.
- the provision for incidental expenditure does not cover travel to/from the beneficiary country for experts (other than for missions identified in the Terms of Reference)
- any long distance air travel must be by economy class while long distance train travel may be by 1st class
- the subsistence paid to experts on missions requiring an overnight stay away from the base of operations in the beneficiary country must be a maximum of the per diem rate published on the Procedures page of the Web site http://europa.eu.int/comm/europeaid/index_en.htm for each night away

The financial evaluation of tenders only considers the total fees, since the provision for incidental expenses must be the amount stated in Clause 6.5 of the Terms of reference. Please refer to Section 6 of the Terms of reference to identify what is to be included in fees and what may be covered by the provision for incidental expenditure in this contract. An audit certificate provided by a suitably qualified auditor will be required before the final payment is made.

6 Provision for expenditure verification
- must cover expenditures incurred in the course of the contract for expenditure verifications undertaken by external auditors cannot be decreased in the course of the contract.