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**ANNEX I**

to the Commission Implementing Decision on the annual action plan for the European Instrument for International Nuclear Safety Cooperation for 2021

**Action document for nuclear safety cooperation**

**ANNUAL PROGRAMME 2021**

This document constitutes the annual work programme within the meaning of Article 110(2) of Regulation (EU, Euratom) 2018/1046, and action plans within the meaning of Article 7 of Regulation (Euratom) 2021/948.

## 1 SYNOPSIS

### 1.1 Action Summary Table

<b>1. Title OPSYS business reference Basic Act</b>	Action document for nuclear safety cooperation OPSYS/CRIS number: INSC/2021/43-297: Component B (Ukraine) INSC/2021/43-336 : Component D (Iran) INSC/2021/43-294: Components A (Armenia), C (Morocco), E (South Africa) and G (Education)  Financed under Council Regulation (Euratom) 2021/948 of 27 May 2021 establishing a European Instrument for International Nuclear Safety Cooperation complementing the Neighbourhood, Development and International Cooperation Instrument – Global Europe on the basis of the Treaty establishing the European Atomic Energy Community, and repealing Regulation (Euratom) No 237/2014 <sup>1</sup>
<b>2. Team Europe Initiative</b>	No
<b>3. Zone benefiting from the action</b>	The action shall be carried out in Neighbourhood East (Armenia, Ukraine), Neighbourhood South (Morocco), South Africa and Iran  The action shall be carried out at the following location: Yerevan, Kiev, Rabat, Abidjan/Yamoussoukro, Johannesburg and Tehran
<b>4. Programming document</b>	European Instrument for International Nuclear Safety Cooperation Multiannual Indicative Programme (2021-2027) of 03.12.2021 (C(2021) 8687)
<b>5. Link with relevant MIP(s) objectives/expected results</b>	This action is contributing to the “promotion of an effective nuclear safety culture and implementation of the highest nuclear safety and radiation protection standards” in the beneficiary countries.

<sup>1</sup> OJ L 209, 14.6.2021, p. 79.

PRIORITY AREAS AND SECTOR INFORMATION				
<b>6. Priority Area(s), sectors</b>	Nuclear Safety			
<b>7. Sustainable Development Goals (SDGs)</b>	Main SDG: 16 (strong institutions) Other significant: SDG 11 (Disaster Risk Reduction) and SDG 5 (Gender Equality).			
<b>8 a) DAC code(s)</b>	23510			
<b>8 b) Main Delivery Channel @</b>	1000 – Public institutions			
<b>9. Targets</b>	<input type="checkbox"/> Migration <input type="checkbox"/> Climate <input type="checkbox"/> Social inclusion and Human Development <input type="checkbox"/> Gender <input type="checkbox"/> Biodiversity <input type="checkbox"/> Education <input type="checkbox"/> Human Rights, Democracy and Governance			
<b>10. Markers <sup>2</sup> (from DAC form)</b>	<b>General policy objective @</b>	<b>Not targeted</b>	<b>Significant objective</b>	<b>Principal objective</b>
	Participation development/good governance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Aid to environment @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gender equality and women's and girl's empowerment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Trade development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Reproductive, maternal, new-born and child health	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Disaster Risk Reduction @	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Nutrition @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>RIO Convention markers</b>	<b>Not targeted</b>	<b>Significant objective</b>	<b>Principal objective</b>
	Biological diversity @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Combat desertification @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Climate change mitigation @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Climate change adaptation @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>11. Internal markers and Tags</b>	<b>Policy objectives</b>	<b>Not targeted</b>	<b>Significant objective</b>
Digitalisation		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>2</sup> For guidance, see <https://www.oecd.org/development/financing-sustainable-development/development-finance-standards/> (go to “Data collection and resources for reporters”, select Addendum 2, annexes 18 (policy) and 19 (Rio) of the reporting directive).

If an action is marked in the DAC form as contributing to one of the general policy objectives or to RIO principles as a principal objective or a significant objective, then this should be reflected in the logframe matrix (in the results chain and/or indicators).

Migration @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Connectivity @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Migration @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduction of Inequalities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Covid-19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### BUDGET INFORMATION

<b>12. Amounts concerned</b>	<p>Budget line: 14 06 01 00</p> <p>Total estimated cost: EUR 17,660,000</p> <p>Total amount of EU budget contribution EUR 17,100,000</p> <p>This action is co-financed in joint co-financing by:</p> <ul style="list-style-type: none"> <li>• Belgium for an amount of EUR 150,000;</li> <li>• Université Nice Côte d’Azur for an amount of EUR 410,000.</li> </ul>
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### MANAGEMENT AND IMPLEMENTATION

<b>13. Type of financing</b>	<p>Direct management through grant for Component G</p> <p>Direct management through procurement for Components A, B, D and E</p> <p>Indirect management for Component C with the entity(ies) to be selected in accordance with the criteria set out in point 4.3.3</p> <p>and TAIEX-INTPA for the Component F (P.M), not financed under this action</p>
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## 1.2 Summary of the Action

In accordance with the Multiannual Indicative Programme 2021-2027<sup>3</sup>, the overall objective of the Action is the promotion of an effective nuclear safety culture and implementation of the highest nuclear safety and radiation protection standards, and continuous improvement of nuclear safety. This action will be implemented in a COVID-19 context and adapted as necessary for a successful completion.

## 2 RATIONALE

### 2.1. Context

The promotion of radiation protection and nuclear safety is a key priority for the EU since the early days of the European Economic Community and EURATOM. The European Instrument for International Nuclear Safety Cooperation<sup>4</sup> (‘INSC’) is the specific tool of the European Union addressing nuclear safety issues in partner countries, including candidate countries, complementing the Neighbourhood, Development and International Cooperation Instrument – Global Europe and the Instrument for Pre-Accession Assistance (IPA-III).

<sup>3</sup> C(2021)8687.

<sup>4</sup> COM(2018) 462 final 2018/0245 (NLE), Proposal for a Council Regulation establishing a European Instrument for Nuclear Safety complementing the Neighbourhood, Development and International Cooperation Instrument on the basis of the Euratom Treaty, Brussels, 14.6.2018

The international recognition of the added value of the Instrument was acknowledged in 2017 at the 7<sup>th</sup> IAEA Convention on Nuclear Safety review meeting where "*the implementation of the Instrument for Nuclear Safety Cooperation Program for assisting non-EU countries*" was officially recognised world-wide as "good practice". The evaluation under the completed Mid-term review of the External Financing Instruments of the EU<sup>5</sup> recognises the positive contribution of the Instrument, noticing its capability to respond swiftly to new needs. The MTR acknowledged INSC's unique added value due to the institutional framework that allows the Commission to act at a global level; the instrument is supporting complementarities, coordination and synergies and is effective in leveraging financial resources for nuclear safety.

The main target of these actions is to support partner countries in achieving the highest possible level of nuclear safety by aligning their regulatory framework to the "EU acquis" and by transferring best EU practices in the field.

The action in Armenia is in line with of the Comprehensive and Enhanced Partnership Agreement signed by the country and the EU in November 2017. On 1 March 2021, the European Union-Armenia Comprehensive and Enhanced Partnership Agreement (CEPA) entered into force<sup>6</sup>. It has now been ratified by the Republic of Armenia, all EU Member States and the European Parliament. This represents an important milestone for EU-Armenia relations.

The action in Ukraine is in line with Article 342 of the Association Agreement between the EU and Ukraine<sup>7</sup>, signed by the country and the EU in March 2014.

The action in Iran is in line with Annex III<sup>8</sup> on civil nuclear cooperation within the framework of the Joint Comprehensive Plan of Action (JCPoA) which was unanimously adopted on 20 July 2015 by the UN Security Council.

The actions in different countries in Africa are in line with the European Commission joint Communication to the European Parliament and the Council "Towards a comprehensive Strategy with Africa"<sup>9</sup> published in March 2020.

For the purpose of ensuring complementarity, synergy and coordination, the Commission may sign or enter into joint donor coordination declarations or statements and may participate in donor coordination structures, as part of its prerogative of budget implementation and to safeguard the financial interests of the Union. This could be for example the case with the International Atomic Energy Agency (IAEA).

A close working relationship will be maintained between the Commission services and the EEAS and also with the EU Delegations in the beneficiary countries, in order to help ensure a coherent approach, taking the latest relevant developments into account.

## 2.2. Problem Analysis

### **Short problem analysis:**

#### **Component A: Armenia – on site assistance to facilitate safety improvements at ANPP**

Armenia operates<sup>10</sup> one nuclear power plant unit (Metsamor 2) and has another unit (Metsamor 1) in continuous shutdown since 1989, pending decommissioning. The operating unit usually generates up to 40% of the domestic electricity production in Armenia and in 2020 this figure was 27.8%<sup>11</sup>.

<sup>5</sup> [swd-mid-term-review-insc\\_en.pdf \(europa.eu\)](#)

<sup>6</sup> [EU-Armenia CEPA enters into force \(europa.eu\)](#)

<sup>7</sup> [EU-Ukraine Association Agreement \(europa.eu\)](#)

<sup>8</sup> [3. Annex III Civil nuclear cooperation \(europa.eu\)](#)

<sup>9</sup> [communication-eu-africa-strategy-join-2020-4-final\\_en.pdf \(europa.eu\)](#)

<sup>10</sup> ANPP is operated by CJSC HAEK (Closed Joint Stock Company Armenian Atomic Power Plant) company

<sup>11</sup> World Nuclear Performance Report 2020, World Nuclear Association (<https://www.world-nuclear.org/>)

Metsamor 2, the operating unit at the ANPP is a VVER-440/V-270 type reactor; its original design was based on the first generation of Soviet VVER-440/V-230 reactors manufactured in the 1960s. Due to the seismic features of the Metsamor site, the original V-230 design was seismically reinforced and this resulted the V-270 variant. Unit 1 started its commercial operation in 1977 and Unit 2 went into operation in 1980; both units had 407.5 MW<sub>e</sub> gross (376 MW<sub>e</sub> net) electric capacity. Currently only Unit 2 is operated, Unit 1 is in permanent shutdown.

Until now consensus on a definite final closing date and decommissioning of the plant has not been reached. Meanwhile the Republic of Armenia is still considering, but yet to commit, the construction of a new unit. The recently approved “Republic of Armenia Energy Sector Development Strategic Program to 2040” strategy<sup>12</sup> puts emphasis on the implementation of the ANPP Unit 2 upgrade and design lifetime extension until 2026 and on the preparation of studies justifying safe operation of the ANPP after 2026. The strategy also envisages the efficient and safe operation of the ANPP Unit 2 until 2036. The construction of a new nuclear unit (providing replacement capacity on the ANPP site) is planned only before the expiration of the ANPP Unit 2 design lifetime (taking into account its extensions). This phase also includes the preparation of the timetable for the decommissioning activities, as well as the identification of realistic financing sources for the construction of a new unit.

Earlier INSC actions have been carried out to support the ANPP operator and ANRA (the Armenian nuclear regulator) in the implementation of EU stress tests (targeted safety re-assessment) for Metsamor Unit 2, in accordance with the ENSREG/WENRA technical specifications used as the basis for the nuclear stress tests in EU Member States. The Armenian National Report on the stress tests was prepared by the ANRA; its final version was issued in 2015. The National Report went through an ENSREG Peer Review (PR); the findings of the PR were summarized in the “EU Peer Review Report of the Armenia Stress Tests, June 2016” document<sup>13</sup>. The next step in the stress tests process was the preparation of the National Action Plan (NACp) defining the scope and implementation schedule of safety enhancement measures resulting from the ANPP stress tests. The Action Plan is periodically updated by the ANRA and in 2019 it was checked through the usual ENSREG peer review<sup>14</sup>.

The 2019 PR report concluded that a significant amount of work was still to be completed at the ANPP in order to implement the safety improvement measures necessary to address the issues identified in the stress tests. In particular, measures associated with improved seismic resistance, developing the overall concept and technical solution to address the station blackout event and completing the implementation of symptom-based Emergency Operating Procedures (EOPs) and Severe Accident Management Guidelines (SAMGs) were identified as highly important.

Despite numerous safety improvements that have been implemented at the ANPP in the last 25 years, including several projects under international donor funding programmes, the EC maintains the opinion that this reactor type cannot be upgraded to fully meet internationally accepted nuclear safety standards.

Nevertheless, recognising the fact that the service time extension process of ANPP has started and it is now very likely that Unit 2 will be operated until at least 2026, the EC continues to support Armenia in maintaining and enhancing nuclear safety in the priority areas identified during the above mentioned EU Stress Test peer review.

In order to support safety improvements in Armenia in the most effective way, INSC projects under Action Programme 2019 and 2020 are currently in preparation for the Armenian Nuclear Regulatory Authority, ANRA and its Technical Support organisation, NRSC. This new project will complement the ongoing or in preparation ones to support the implementation of Stress Test safety improvements in a timely manner on ANPP.

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<sup>12</sup> [http://www.mtad.am/u\\_files/file/ME/EnergyStrategy\\_angleren.pdf](http://www.mtad.am/u_files/file/ME/EnergyStrategy_angleren.pdf)

<sup>13</sup> [http://ensreg.eu/sites/default/files/attachments/2016-07-20\\_4259241\\_armenia\\_stress\\_tests\\_report-\\_ensreg\\_template\\_final.pdf](http://ensreg.eu/sites/default/files/attachments/2016-07-20_4259241_armenia_stress_tests_report-_ensreg_template_final.pdf)

<sup>14</sup> EU Peer Review Report – Implementation of Armenian Stress Test National Action Plan – November 2019, ENSREG, 17 February 2020 (see <http://www.ensreg.eu/document/armenia-nacp-peer-review-report>)

## **Component B: Ukraine – continued alignment of the Ukrainian regulatory regime with the EU acquis**

Ukraine is a neighboring country of the European Union with 15 VVER nuclear units in operation at four different sites. The total generating capacity of the Ukrainian nuclear fleet was 13.1 GWe in 2020<sup>15</sup>, providing about 54% of the domestic electricity generation. Note that after France (61.4 GWe) and Russia (28.4 GWe) Ukraine has the third largest nuclear electricity generating capacity in Europe.

The Government of Ukraine has established priority to ensuring compliance of Ukrainian regulations with the EU acquis, in line with the commitments laid down in the EU-Ukraine Association Agreement. Harmonisation of Ukrainian legislative and regulatory framework with the relevant EU acquis, IAEA safety standards and WENRA safety reference levels is a key element in the policies of the Ukrainian nuclear regulator for promoting the application of the highest international safety standards and norms in the nuclear and radiation safety practice of Ukraine.

This is a comprehensive and continuous task, which includes strategic planning, analysis of regulations related to nuclear and radiation safety and further elaboration of regulations, as well as their enforcement.

In accordance with these ambitions, SNRIU became a full member of the WENRA in 2015, and from March 2021 it has an “observer” status in the European Nuclear Safety Regulators Group (ENSREG). Ukraine participated in the 1<sup>st</sup> ENSREG Topical Peer Review on Ageing Management and submitted its National Report to ENSREG in 2017.

After the Fukushima-I accident, a targeted safety assessment according to EU/ENSREG methodology (stress tests) of all Ukrainian NPPs was carried out. Following the ENSREG recommendations based on the stress-test results, the Government of Ukraine approved the updated “Comprehensive (Integrated) Safety Improvement Program for Nuclear Power Plants” (C(I)SIP), which includes a series of safety improvement measures aimed at enhancing the resistance of NPP units in severe accident conditions.

The regulatory cooperation project described in the present document can be considered as a continuation of previous activities of a similar type and it will further enhance the safety culture in Ukraine, with focus on the management of severe accidents (including phenomena related to in-vessel melt retention), radioactive waste and spent fuel management, and improving radiation monitoring capabilities in various situations (including emergencies).

It will also further enhance the capabilities of SNRIU and its TSO in connection with selected ageing management issues highlighted in the 1<sup>st</sup> ENSREG Topical Peer Review, and will also provide support during the preparations for the forthcoming 2<sup>nd</sup> ENSREG Topical Peer Review on fire protection.

## **Component C: Morocco - Upgrading the Environmental Monitoring system**

The environmental monitoring capabilities in Morocco are not in line with the present state of the art. This activity will bring Morocco in line with EU best practice and strengthen the existing capabilities and institutions in Morocco.

There is an ongoing INSC project in Morocco (MO3.01-15) which addresses a large number of topics in support to the nuclear regulatory authority of Morocco (AMSSNuR). Outcomes of this project, in particular in the field of EP&R will be used to support the implementation of this new activity.

## **Component D: Iran- Strengthening technical support to the Iranian Nuclear Safety Regulator (INRA), and support to the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP)**

The 2015 agreement on the Joint Comprehensive Plan of Action (JCPOA) provides in its Annex III the detailed description of the future cooperation on civil nuclear matters. Topics listed in Annex III include cooperation to establish a Nuclear Safety Centre in Iran, workshops and trainings to share lessons learned on regulatory independence and effectiveness, training on implementing nuclear safety culture, supply of valid

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<sup>15</sup> World Nuclear Performance Report 2020, World Nuclear Association (<https://www.world-nuclear.org/>)

computer codes, instruments and equipment related to nuclear safety, facilitate exchange of knowledge and experience in the area of nuclear safety and enhance and strengthen domestic emergency preparedness and severe accident management capability.

The present action will continue the on-going activities funded by the EU under the Instrument for Nuclear Safety Cooperation to contribute to the implementation of the JCPoA. This launch of this action will be conditioned to the fulfilment by Iran of its commitment taken at international level in the frame of the JCPOA.

### **Component E: South Africa - Strengthening the capacity of the nuclear regulator NNR**

In 2018, the NNR participated in the 1<sup>st</sup> ENSREG Topical Peer Review (TPR) covering the topic of “ageing management” for nuclear power plants and research reactors. Following the peer review process and its evaluation, the NNR identified the need to perform further reviews of the ageing management programmes corresponding to the Koeberg NPP and the SAFARI-1 research reactor. NNR also plans to participate – on a voluntary basis and pending the invitation from ENSREG– in the 2<sup>nd</sup> ENSREG TPR which will be devoted to the topic of “fire protection in nuclear installations”.

Improving the knowledge of NNR staff and its TSO in using contemporary computer codes for conducting safety analyses for the Koeberg NPP and the SAFARI-1 RR is also an important capability building goal for NNR. Computer code training is required in the following application areas: neutron-physics, reactor physics, thermal-hydraulic calculations, containment modelling, nuclear fuel behaviour calculations and severe accident analysis. NNR also intends to strengthen the current regulatory basis for the reviewing of PSA level 1, 2 and 3 analyses. Within this assistance NNR also requires EU support to develop and apply a novel, risk-informed approach for the regulatory decision-making process.

NNR and CNSS need EU support to develop their technical expertise in the field of licensing of nuclear installations. The support is to be provided in the form of training courses in the following main areas: radiation protection, transport of radioactive materials, and nuclear safeguards and safety analysis. Special training is needed for nuclear inspectors.

Development of regulatory documents is also an area in need of improvements. EU assistance was requested to develop new regulatory documents for the existing SAFARI-1 reactor, which is a research and radio-isotope production reactor, as well as for a new multipurpose nuclear research reactor to replace the SAFARI-1 in the future.

The proposed project will respond to the capacity building needs of the South African nuclear regulator listed above. The envisaged cooperation will ensure further development of the technical capabilities of the South African regulatory body and its TSO in several fields, such as ageing management, safety analyses, licensing and inspection of nuclear facilities, development of new regulatory documents, etc. Provision of extensive training in selected topical areas to NNR and CNSS will also form an important part of the cooperation project.

### **Component F: Capacity building of Nuclear Safety Regulators through TAIEX (Pro Memory, not financed under this action)**

TAIEX<sup>16</sup> is an EU instrument for institutional cooperation between the public administrations of an EU Member State and a beneficiary country. This project type has been applied successfully in many cases already – notably within the EU’s Instrument for Pre-Accession (IPA), being a proven method to transfer public sector expertise from the participating EU MS organization to the partner organization in the respective beneficiary country. More in particular, within the frame of a TAIEX project the administrative capacities of the public administration of a partner country are upgraded by providing training to its staff and supporting the reorganisation or further development of its structure. It also supports the approximation of national laws, specific regulations and quality standards to the *EU acquis*, if needed.

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<sup>16</sup> [TAIEX | European Neighbourhood Policy And Enlargement Negotiations \(europa.eu\)](https://european-council.europa.eu/media/en/press-communications/infographic/taieux-2018-2020)

For several years already, there has been an increase in activities using ionising radiation in many sectors in different non EU countries. Particularly in the medical field or in the industry in different African countries for example.

The current proposal is related to training and tutoring activities aimed to enhance quality and effectiveness of national governance in the field of nuclear and radiation safety in countries which can benefit from TAIEX support. Every specific assignment will be directly requested to the TAIEX secretariat.

## **Component G: Education**

Planning and execution of nuclear decommissioning works, including facility dismantling and management of radioactive waste and spent fuel, are complex operations, involving many actors over a long period. Moreover, these operations are usually subject to many hazards, both in terms of procedural delay uncertainties and of technical and financial<sup>17</sup> issues. Therefore, the timely availability of appropriately trained managers in sufficient numbers to cope with the increasing workload related to nuclear decommissioning projects is a challenge for all key stakeholders in the industry, nuclear operators and their subcontractors. The same challenge also concerns nuclear regulators, and the support organisations they rely on for scientific expertise, in the field operational third-party surveillance, as well as nuclear waste management agencies.

### **Identification of main stakeholders and corresponding institutional and/or organisational issues (mandates, potential roles, and capacities) to be covered by the action:**

#### **Component A: Armenia – on site assistance to facilitate safety improvements at ANPP**

The main beneficiary of the proposed action is the Nuclear Power Plant of Armenia (ANPP).

#### **Component B: Ukraine – continued alignment of the Ukrainian regulatory regime with the EU acquis**

The main beneficiary of the proposed action is the State Nuclear Regulatory Inspectorate of Ukraine (SNRIU).

#### **Component C: Morocco - Upgrading the Environmental Monitoring system**

The main beneficiary of the proposed action is the nuclear regulatory authority of Morocco (AMSSNuR). This action will also benefit to the two main laboratories in Morocco which provide environmental monitoring data to AMSSNuR:

- The Centre National de l'Energie, des Sciences et des Techniques Nucléaires “CNESTEN”;
- The Centre National de Radioprotection “CNRP”.

#### **Component D: Iran - Strengthening technical support to the Iranian Nuclear Safety Regulator (INRA) and Support to the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP)**

The main beneficiaries of the proposed action are the Iranian Nuclear Regulatory Authority (INRA) and the Bushehr Nuclear Power Plant (BNPP).

#### **Component E: South Africa - Strengthening the capacity of the nuclear regulator NNR in South Africa**

The main beneficiaries of the proposed action are the nuclear regulatory authority (National Nuclear Regulator - NNR) and its system of Technical Support Organisations (CNSS) in South Africa.

#### **Component F: Capacity building of Nuclear Safety Regulators through TAIEX (Pro memory, not financed under this action)**

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<sup>17</sup> See COMMISSION DECISION C(2021) 2109 final of 7.4.2021 setting up the group of experts on financial aspects of nuclear decommissioning and spent fuel and radioactive waste management

The main stakeholders are the partners i.e. the Nuclear Regulatory Authorities of the partner country that can benefit from TAIEX and their Technical Support Organisations.

### **Component G: Education**

The main stakeholders are the partners i.e. the Nuclear Regulatory Authorities of the INSC partner country and their Technical Support Organisations (e.g. Armenia, Belarus, Brazil, Egypt, Georgia, Indonesia, Iran, Jordan, Malaysia, Mexico, Morocco, Nigeria, Philippines, South Africa, Thailand, Turkey, Ukraine, Vietnam, etc.) as well as the regional organisations ANNuR (Arab Network of Nuclear Regulators), the Asian Nuclear Safety Network (ANSN) and Atomic cooperation of South-East Asian Nations (ASEANTOM). EU candidate countries (Serbia, Montenegro, Turkey, Albania, North Macedonia) as well as potential EU candidate countries (Bosnia and Herzegovina, Kosovo) are included in the list of potential beneficiaries under the INSC.

## **3 DESCRIPTION OF THE ACTION**

### **3.1. Objectives and Expected Outputs**

#### **Component A: Armenia – on site assistance to facilitate safety improvements at ANPP**

The objectives of the proposed action are the following:

- Provision of further on-site support to the ANPP in the licensing, implementation and follow-up of stress tests related safety enhancement measures and projects;
- Provision of training on selected topics related to nuclear safety;
- Provision of support in decommissioning planning;
- Provision of support in plant decommissioning and radioactive waste and spent fuel management;
- Provision of support in performing and reviewing of various safety analyses required for the implementation of on-site assistance (OSA) projects;

Beyond nuclear safety, provision of support and training in selected topical areas related to nuclear security and safeguards will also be considered within the limits foreseen in the INSC programme.

Activities related to decommissioning planning, plant decommissioning and radioactive waste and spent fuel management will assist the ANPP to solve several important pending issues in these fields, e.g. updating the Decommissioning Strategy and Initial Decommissioning Plan documents, preparation of technical specifications for various radioactive waste management facilities.

As for the implementation of the OSA projects, the expert support to perform its own safety analyses or to review safety analyses submitted by the Contractors will help to accomplish the OSA projects in full conformance to the safety requirements in effect.

The review of the above mentioned safety analyses will be coordinated with the support provided by other INSC projects to the Armenian Nuclear Regulatory Authority (ANRA).

The support to the ANPP Operator is to be realized in the framework of on-site assistance (OSA) project organized according to three main activity areas, as follows:

- General On-Site Assistance means those managerial, administrative and planning activities, which are required to carry out the implementation of the assistance project successfully (these activities cover the “traditional” project management tasks).
- This area includes all planning, project management and administrative tasks that are necessary for the successful implementation of the project. This will allow concentrating the human resources with technical expertise on the important soft- and hard on-site assistance tasks. Hard On-Site Assistance

covers the activities connected to specific, safety-related upgrading projects (these may also include equipment supply).

The Consultant will have to support the Beneficiary in all activities detailed under Task 1 below, including the tendering and implementation phases.

The support is limited to technical areas only.

If the stress tests related safety enhancement measures include equipment purchase financed by the European Commission, then the Consultant will have to provide support to the EC during the related procurement procedures. In particular, adequately qualified experts must be allocated to the tender evaluation tasks, if required.

- Soft On-Site Assistance deals with training and document development issues.

This assistance form is to be carried out during the entire duration of the contract.

Training activities related to the installation of new equipment or systems must be provided and planned in due time. The personnel of the ANPP must be trained and ready for the operation of the new equipment (or system) when the equipment is installed on site and the final acceptance tests were performed successfully.

The soft OSA may also consist of targeted activities for transferring elements of an advanced nuclear safety culture, resulting in significant and continuous improvement of the nuclear safety at the ANPP. This may include e.g. joint development of safety analyses, review reports and plant-specific documents.

### **Component B: Ukraine – continued alignment of the Ukrainian regulatory regime with the EU acquis**

The overall objective of this project is to ensure regulatory contribution to further strengthening of nuclear and radiation protection for personnel, civilian population and the environment in Ukraine. The specific objective is to support the national regulator – State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) – in its efforts to further harmonize methodological approaches and practices in Ukraine with the regulatory approaches and practices in the EU countries.

This includes support to the SNRIU in activities implemented in the framework of the ENSREG Topical Peer Reviews on Ageing Management and Fire Protection; the introduction of graded and integrated approaches in regulating safety of radioactive waste and radioactive material management; provision of methodological unity in radiation monitoring through development of guidance on radiation monitoring in planned, emergency and existing exposure situations; strengthening of SNRIU regulatory capabilities in licensing of "load following modes for NPP units; the implementation of the Strategy on completing regulatory capacity building and resource planning developed under INSC 2018 for harmonizing Ukrainian nuclear and radiation safety regulations and standards with European Union legislation and WENRA reference levels applicable to nuclear operators and nuclear safety regulator and the strengthening regulatory capabilities in review of safety improvement measures for severe accident management.

### **Component C: Morocco - Upgrading the Environmental Monitoring system**

The overall objective of the cooperation is the upgrading of the national environmental monitoring system in Morocco and to bring this in line with the practice in the EU. Morocco will be provided with additional equipment to monitor radioactivity and procedures to detect and respond to any nuclear or radioactive incident, including state-of-the-art decision making tools.

## **Component D: Iran**

### **D1: Strengthening technical support to the Iranian Nuclear Safety Regulator (INRA)**

The Euratom nuclear safety directive<sup>18</sup> stresses that a strong competent regulatory authority with effective independence in regulatory decision-making is a fundamental requirement. In particular, the regulatory authority should have sufficient legal powers, independence, sufficient staffing and sufficient financial resources for the proper discharge of its assigned responsibilities.

This is also stressed in a number of IAEA reference documents such as the IAEA Convention on Nuclear Safety (CNS) Art 8 which states: "a regulatory body (...) provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities." and in the IAEA Safety Standard "Fundamental Safety Principles SF-1".

A project, based on INSC 2018 Decision, will be contracted in 2021-2022 to provide the direct support to the establishment of the Nuclear Safety Centre (NSC) of INRA by providing a first batch of equipment for the NSC. It is already planned to complement this first supply which will mainly cover equipment to be used in the field of Emergency Planning and Response by other projects (under INSC 2019 and 2020) to supply other types of equipment necessary for the NSC according to the feasibility study issued in 2018.

The overall objective of this last project is to support the establishment of an effective and efficient nuclear safety system in Iran by complementing the already ongoing INSC projects in Iran

All these projects together are supporting Iran efforts to become a Contracting Party of the Convention of Nuclear Safety and paving the way of Iran readiness to host again an IAEA IRRS mission in a near future.

### **D2: Support in the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP)**

The main goal of this task is to support Bushehr NPP and its TSO TAVANA in the implementation of safety related measures originating from different safety review activities addressing post Fukushima safety improvement measures, mainly:

- Stress Test Self-Assessment and OSART mission
- Periodical Safety Review

A large number of potential issues for support have already been identified within the framework of project IRN3.01/16 Lot 2 "Support in the Stress Tests Exercise".

## **Component E: South Africa - Strengthening the capacity of the National Nuclear Regulator (NNR)**

The first objective of this action is to build technical expertise capabilities of the nuclear regulatory body in South Africa (NNR) and of its technical support organisation (CNSS) in the field of "aging management", "Fire Hazards" and "risk informed approach" for nuclear installations.

The second objective is to build technical expertise capabilities of the nuclear regulatory body in South Africa (NNR) and of its technical support organisation (CNSS) in the field of licensing of nuclear installations through specific training and development of regulatory documents.

### **Component F: Capacity building of Nuclear Safety Regulators through TAIEX (P.M.)**

In order to support its development and improve its capacity building process nuclear regulatory authorities of different countries could be supported through TAIEX in the following fields:

- improving legislation/regulation,

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<sup>18</sup> COUNCIL DIRECTIVE 2014/87/EURATOM of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations.

- radiation protection,
- management of radioactive sources and waste,
- transport of radioactive material,
- management of NORM (naturally occurring radioactive material),
- emergency preparedness and response.

**Component G: Education and Training for multi-countries**

Based on its successful engagement with Université Nice Côte d’Azur to develop and create the Master “European Leadership for Safety Education (ELSE)” a new project dedicated to nuclear decommissioning is proposed.

3.2. Indicative Activities

**Component A: Armenia – on site assistance to facilitate safety improvements at ANPP**

It is important to note in frame of the ongoing INSC 2016 project support is provided to the Armenian Nuclear Safety Regulator (ANRA) in the field of supervision of the implementation and licensing of Stress Test safety upgrades. This project will run until end of 2021. As a follow-up two other INSC 2019 and 2020 projects are currently under preparation to support ANRA. These projects should run until 2026 in parallel to this newly proposed project for ANPP and should provide the adequate support to ANRA and its TSO NRSC to review and assess the different activities that should be implemented in the frame of this project for ANPP.

It is important to note that in the framework of this component A, the activities planned to be implemented by ANPP shall be in line with the documents approved by the Armenian Regulator (ANRA) responsible for controlling this installation.

**Task 1 – Support in the licensing and implementation of safety enhancement measures**

The main activity of Task 1 is to provide support to the ANPP during the licensing and implementation process of selected safety enhancement measures to be introduced at the plant as a result of the ANPP stress tests. The following table lists those safety issues which must be dealt with as a minimum in the frame of Task 1 (the 3<sup>rd</sup> column provides associated project activities and expected results):

N°	Safety issue	Main activities and planned results
33	Implementation of hydrogen concentration measurements in the containment	- analysis of regulatory requirements, licensing conditions, international standards, guides and requirements - comparative analysis of currently available seismically qualified instrumentation for measuring hydrogen concentration in the containment against specific requirements - development of Technical Specifications and Tender Dossier for the corresponding measurement equipment

N°	Safety issue	Main activities and planned results
34	Installation of after-burners and Passive Autocatalytic hydrogen Recombiners (PARs)	<ul style="list-style-type: none"> <li>- analysis of regulatory requirements, licensing conditions, international standards, guides and requirements</li> <li>- comparative analysis of currently available seismically qualified after-burners and PAR equipment against specific requirements</li> <li>- development of Technical Specifications and Tender Dossier for necessary PARs, H2 igniters, as appropriate.</li> </ul>

Note that the numbering given in column #1 corresponds to the numbering given in Chapter 7 of the ANPP stress tests report.

Safety issues listed in the above table are supplemented by the following item:

- *Development of the Terms of Reference document to carry out a (seismic) PSA on the basis of  $PGA_H^{19} = 0.42g$ .*

The PSA results are to be used to validate the selection of SSCs (Systems, Structures and Components) being part of the extended SSEL (Safe Shutdown Equipment List). PSA results and the outcome of the SSC selection validation are to be summarized in appropriate technical reports. The Contractor has to prepare an appropriate Terms of Reference (ToR) document specifying the tasks to be carried in the associated seismic PSA study. Note that performing the seismic PSA is not part of the current project.

In the frame of Task 1 expert assistance will be provided to the ANPP in all activities listed above. Activities include e.g. analysis of current plant design; analysis of regulatory requirements and licensing conditions, review of relevant international standards, guides and requirements; comparative analysis of equipment against specific requirements; preparation of various analyses (including seismic studies, deterministic calculations and safety analyses, if required); development of recommendations; development of Technical Specifications, Terms of Reference documents and Tender Dossiers.

Task 1 activities are part of the Hard OSA area, the related managerial and administrative tasks (i.e. project management activities) are covered within the General OSA area.

In addition to the activities listed above, Task 1 has to deal with the follow-up of several on-going safety enhancement projects, namely:

- Improvement of confinement tightness;
- Purchasing of autonomous alternative power supply equipment;
- Purchasing of autonomous alternative means for water supply;
- Completion of the program for seismic upgrading of I&C equipment and seismic monitoring system<sup>20</sup>;
- Improvement of room habitability for the Remote Shutdown Panel and for the Post-Accident Monitoring System;

Currently these projects are in various implementation phases, e.g. the work on “Improvement of containment tightness” is contracted and on-going, while others have only their TS or ToR drafted.

In any case, Task 1 has to take care of all activities related to the continuation and follow-up of the above listed safety enhancement measure implementation projects.

<sup>19</sup> PGAH = Peak Ground Acceleration – Horizontal

<sup>20</sup> Technical specifications for the “Seismic-Resistant Reactor Protection System” and “Upgrading of the Seismic Monitoring System” were already drafted in the frame of the current OSA project.

## Task 2 – Provision of support to the ANPP in selected technical areas

Task 2 activities will provide support to the ANPP in all those additional technical areas that were defined in point 4.1 as further key assistance areas. The basic objectives and brief descriptions of the various subtasks are given in the list below:

- *Provision of support and training on selected topics related to nuclear safety, nuclear security and safeguards:*

This activity includes development and delivery of training sessions on selected topics related to nuclear safety and safety culture, as well as exchange of operational experience in relevant areas of interest, including implementation of stress tests measures.

This activity will also include the development of technical specifications and terms of reference documents to provide support during the implementation of the on-line and off-line spent nuclear fuel (SNF) monitoring systems and of a fuel burn-up measurement system.

Beyond nuclear safety, nuclear security and safeguards' aspects will also be considered in the frame of this activity within the scope foreseen in the INSC legal basis.

- *Support in decommissioning planning:*

Support in this area will include updating of the Decommissioning Strategy (DS) and the Initial Decommissioning Plan (IDP) for the decommissioning of ANPP units and facilities. It also provides support to the Beneficiary in the development and review of the DS and IDP licensing submissions for ANPP decommissioning.

- *Support in plant decommissioning and radioactive waste and spent management:*

This activity includes the development of technical specifications for various radioactive waste (RAW) management facilities (e.g. for production of containers, conditioning of RAW, management of solid RAW), as well as for the RAW accounting and control system. Updating the decommissioning database and the review of data inputs are also to be performed here.

- *Support in performing and reviewing various safety analyses required for the implementation of on-site assistance projects:*

Support in this area will include performing safety analyses and calculations required for the development of technical specifications needed for the implementation of the various OSA projects. It will also include the reviews of respective safety analyses and calculations provided by the Contractors in connection with the implementation of various OSA projects.

The detailed technical content and deliverables of the above subtasks will be duly defined in the project inception phase, as a result of discussions with the Beneficiary.

## **Component B: Ukraine – continued alignment of the Ukrainian regulatory regime with the EU acquis**

Several INSC projects have been implemented since years in Ukraine in order to support the alignment of the Ukrainian legislation with the EU acquis in the field of nuclear safety, radioactive waste and spent fuel management and Basic Safety Standards. These projects target as well the development of a regulatory approach in Ukraine which would be comparable to the ones in place in the European Countries. In the frame of these INSC 2015/2018 projects, gaps analysis have been performed with the three main Council Directives in the field and with the WENRA Reference Levels. These INSC projects are also supporting the development of a new strategy for SNRIU to close the identified gaps and to ensure an efficient international support to achieve this target. Other activities are also ongoing to reinforce SNRIU capabilities in the field of radioactive waste management and Emergency Plan and Response.

This new project will build on the results of the previous ones and should allow Ukraine to complete the last necessary steps to align its legislation with the EU acquis, to fully participate and take benefits from the EU Topical Peer Reviews, and makes final necessary progress in the field of Radwaste Management, Emergency Plan and Response and Severe Accident Management according to best EU practices.

### **Task 1 Support to the SNRIU in activities implemented in the framework of the ENSREG Topical Peer Reviews on Ageing Management and Fire Protection**

This task is intended to enhance SNRIU capabilities in the implementation of the expected scope of regulatory activities within the ENSREG Topical Peer Review (TPR) processes. The task includes two parts:

- Implement measures to improve SNRIU ageing management review practices and follow-up following Ukraine's participation in the first EU topical peer review on "ageing management" performed in 2018;
- Support SNRIU in respective activities to be implemented under the second TPR, which will focus on the fire protection of nuclear installations and will take place in 2024.

In the frame of the actions related to the EU topical peer review on "ageing management", the focus will be on the implementation of Ukraine National Action Plan in this field and on the evaluation of the extension of the work in the field of ageing management to nuclear installations other than NPPs.

### **Task 2 Introduction of graded and integrated approaches in regulating safety of radioactive waste and radioactive material management**

Support to the SNRIU in regulation or safe radioactive waste and spent fuel management and harmonization of regulatory requirements on nuclear and radiation safety was provided by the EC in a number of INSC projects. As one of the conclusions of the comprehensive analysis assessing the results of EU support to the Ukrainian nuclear regulatory authority (and prepared for DG DEVCO in 2017), it was mentioned that "Continued regulatory assistance on radioactive waste management is needed as a variety of facilities are constructed and the assessment methodology is only now reaching a state of maturity. Priorities are to set-up a single waste management organization, a waste management strategy and plan with generic guidelines on safety assessments."

This task is intended to support the SNRIU in the implementation of graded and integrated approaches in regulating the safe management of radioactive waste and materials, including the following regulatory areas:

- regulation of safety in integrated management of radioactive waste and spent fuel of various origins using a graded approach;
- regulation of remediation safety with application of a graded approach;
- regulation of safety in clearance of radioactive materials with application of a graded approach.

Depending of the type of support needed, it could be envisaged, as an option, to further include in the scope a joint review with SSTC NRS.

In 2017 and 2018, top-level regulatory documents were introduced in Ukraine to establish general safety provisions for predisposal management and disposal of radioactive waste. These regulations establish the principles for applying the graded and integrated approaches.

Within the framework of previous INSC projects, support to the SNRIU was provided mainly during licensing of specific radioactive waste management facilities. The SNRIU has limited experience in regulation of safe radioactive waste management with application of the abovementioned graded and integrated approaches.

Remediation of facilities with accident-origin and legacy radioactive waste and contaminated sites is performed and planned in Ukraine. Within the framework of previous INSC project support to the SNRIU was provided in the review of the documents with justifications of safe retrieval of radioactive waste and remediation of pilot sites. These activities revealed some gaps in the national regulatory framework in this area. In particular, there is no methodology for the selection of remediation options and the establishment of remediation criteria. The SNRIU made specific regulatory decisions on remediation of the pilot sites upon too generic regulatory requirements.

In the frame of previous INSC projects, SNRIU was systematically supported by INSC contractors in the review of Chernobyl NPP submittals regarding clearance of radioactive materials from regulatory control. The assessment of some pilot documents related to the clearance of radioactive materials generated at the operating NPPs and by other enterprises was carried out but SNRIU has almost no practical experience for what concern clearance of radioactive material from regulatory control. Support should be provided in this field to SNRIU to allow SNRIU to acquire the necessary capabilities.

### **Task 3: Providing methodological harmonisation in radiation monitoring through development of guidance on radiation monitoring in planned, emergency and existing exposure situations**

In accordance with Council Directive 2013/59/EURATOM (Basic Safety Standards, BSS), the regulatory authority and relevant parties shall ensure that programmes for source monitoring and environmental monitoring are in place and that the results from the monitoring are recorded and made available. The regulatory authority is responsible for the review and approval of monitoring programmes used by registrants and licensees.

With respect to the above, the harmonisation of the approaches, methodology and schedule of radiation monitoring is crucial not only because it is technically and economically beneficial, but also because safety can be potentially improved as a result of unambiguous reporting.

To harmonise monitoring programmes, it is planned to develop methodological guidance for licensees on radiation monitoring in planned, emergency and existing exposure situations and for different stages of emergency response, including the period of transition to stabilisation and resumption of normal activities. If necessary new additional guidance documents could be developed as it is already the case in the field of radiation protection in Ukraine.

In terms of the latter type of monitoring (during emergencies), it is important that within the scope of this project attention is paid to levelling the measurement capacities of organisations and authorities involved. Today in Ukraine there are no accredited providers for performing proficiency testing and for the development and operation of proficiency testing schemes according to the requirements of ISO/IEC 17043:2010 (Conformity assessment – General requirements for proficiency testing) in the sphere of radiation monitoring. Some laboratories involved in emergency monitoring participate in the annual recalibration campaigns organized by the IAEA. However, the format proposed under such proficiency testing is not always suitable for the mobile laboratories (or emergency groups using portable equipment). Under such circumstances, the regulator should serve as the main promoter of the inter-laboratory comparison campaigns for mobile laboratories (measurement groups) organized in the near real conditions, where the participants can practice and improve not only their measurement procedures, but also

communication, data transmission and exchange of information, decontamination and personal monitoring capabilities etc.

#### **Task 4: Strengthening of SNRIU regulatory capabilities in licensing of “load following modes” for NPP units**

Ukrainian NPPs are designed for operation in the base-load power mode. However, the operator has started implementing respective measures aimed at introducing the daily power control mode of NPP units for power control per day within a range of 100-75-100% power level. In order to support the licensing process of these activities and ensure safety during these operations it is necessary to enhance the national regulatory framework by means of establishing the procedure for regulatory review and independent technical assessments of the safety justifications for implementing the load following modes at Ukrainian NPPs.

#### **Task 5: Implementation of the Strategy on completing regulatory capacity building and resource planning developed under INSC 2018 project for harmonizing Ukrainian nuclear and radiation safety regulations and standards with European Union legislation and WENRA Reference Levels.**

In 2017, an external Consultant prepared a comprehensive analysis for DG DEVCO, assessing the results of EU support to the Ukrainian nuclear regulatory authority. One of the main conclusions and recommendations of this analysis was that

- SNRIU should receive INSC support to develop an appropriate strategy on completing the regulatory framework, capacity building and resource planning.

The main objective of the recently launched INSC 2018 project (Task H.1) is to provide assistance to the SNRIU in the development of an appropriate strategy to complete the establishment of the Ukrainian regulatory framework, as well as the associated regulatory capacity building process and the planning of necessary resources. The detailed scope of this task will be adjusted once the final reports from the task H1 of the INSC 2018 project will be available in 2022.

The proposed task is intended to support the SNRIU in implementing the strategy provisions with respect to further harmonization of Ukrainian nuclear and radiation safety standards and rules with the legislation of the European Union and WENRA reference levels.

#### **Task 6: Strengthening regulatory capabilities in the field of severe accident management to review the possibility of implementing in-vessel melt retention for Ukrainian NPPs (VVER-440 and VVER-1000)**

After the Fukushima-1 accident, targeted safety assessments (stress tests) of all Ukrainian NPPs was carried out. Following the ENSREG recommendations (Declaration of ENSREG, Annex 1 “EU Stress-Test Specifications”), one of the stress test areas was “Severe Accident Management”.

Based on the stress test results, the Government of Ukraine approved the updated “Comprehensive (Integrated) Safety Improvement Program for Nuclear Power Plants” (C(I)SIP). C(I)SIP includes a series of safety improvement measures aimed at enhancing the resistance of NPP units in severe accident conditions. According to the C(I)SIP implementation schedule, all measures will have been implemented by 2023.

This task aims at ensuring support for reviewing operator’s justifications of the aforementioned safety measures and mitigation of severe accident consequences. It will also support the evaluation of the implementation of the whole modernisation program besides the selected safety improvement measures aimed at enhancing the resistance of NPP units in severe accident conditions at Ukrainian NPPs in operation.

In addition, this task will involve an in-depth study of selected severe accident phenomena for further improvement of reactor and containment models for severe accident analyses available at the SNRIU. Special attention will be given to the investigation of implementation In-Vessel Melt Retention (IVMR) for Ukrainian NPPs (VVER-440 and VVER-1000). Maximum benefits of studies recently performed in Europe in the frame of Horizon 2020 projects or other national projects will be used in this specific field, in order to avoid unnecessary duplications of activities.

Task 6 will include the following subtasks:

- Development of recommendations on assessment of technical and analytical justification of in-vessel melt retention measure for VVER-440;
- Development of recommendations on assessment of technical and analytical justification of in-vessel melt retention measure for VVER-1000;
- Development of recommendations on assessment of impact of in-vessel melt retention measures on another severe accident management measures.

### **Component C: Morocco - Upgrading the Environmental Monitoring System**

In the frame of the INSC project MO3.0/15 work is currently ongoing: to support the development of the regulatory framework and strengthen the capabilities of the Moroccan Regulatory Body AMSSNuR. (Agence Marocaine de Sûreté et de Sécurité Nucléaires et Radiologiques) in different fields (licensing, inspection, validation, verification, identification of safety deficiencies, enforcement actions, development of a national policy and strategy for radioactive waste management, optimisation of medical exposure to ionising radiations etc.).

AMSSNuR is responsible for organising permanent monitoring of radiation protection in the national territory, of which radiological monitoring of the environment is an integral part.

The Institute for Radioelement in Belgium has already worked with the Kingdom of Morocco in the past in the field of environmental radiological monitoring. In particular with the CNESTEN through agreements financed by the Joint Wallonia-Brussels Commission, but also through a project financed by the International Atomic Energy Agency (IAEA). As part of these projects, the IRE had provided three radioactivity monitoring detectors. A new Royal Decree from the Kingdom of Belgium has been published the 24 June 2021, this decree compile the different grants that will be provided by the Belgium State already in 2021 to support nuclear safety improvement in different countries inside and outside of the EU. This decree includes a contribution to support the development of a radiological environmental monitoring programme in the Kingdom of Morocco.

This new INSC project will complement the projects mentioned above and this work should ensure the development of full radiological environmental monitoring programme in the Kingdom of Morocco, in compliance with best international practices.

#### **Task 1 Analysis of the current situation**

The actual status of the environmental monitoring programme in Morocco will be analysed in order to assess its capabilities, operability and compliance with best international practices. This task will be devoted to assess, in particular, the “on-line” and “off-line” monitoring programmes in place, the capabilities of the different laboratories regarding environmental monitoring, etc.

#### **Task 2 Development of an “ON-LINE” monitoring strategy**

This task will support the nuclear regulatory authority of Morocco (AMSSNuR) in the following areas:

- Establishment and implementation of a national strategy for environmental “on-line” radiation monitoring;
- Coordination of the stakeholders involved in the national programme, including (radio)ecological laboratories;
- Qualitative and quantitative assessment of the necessary measurement points to be implemented for the national environmental monitoring programme;
- Methodology for the collection and analysis of the monitoring results;
- Provision of Gamma Dose Rate Detectors and Gamma spectrometers for air and water on-line monitoring;
- Installations of these different detectors, connection to the existing on-line national monitoring system and connection to a new central unit for data collection to this system if necessary.
- Training of AMSSNuR staff in the calibration and maintenance of the different on-line monitoring detectors and on the usage and maintenance of the central unit for data collection.

### **Task 3 Development of an “OFF-LINE” monitoring strategy**

#### **Increase laboratory capacity to analyse environmental samples**

Morocco has two main laboratories (CNESTEN and CNRP) which can provide laboratory analyses of samples taken in the environment. Those laboratories will be supported to achieve independent capacity to perform radiological analysis covering any possible radioactive “waste stream” of the country

This task will support the nuclear regulatory authority of Morocco (AMSSNuR) in the following areas:

- Establishment and implementation of a national strategy for “off-line” environmental radiation monitoring;
- Coordination of the stakeholders involved in the national programme, including (radio)ecological laboratories;
- Evaluation of the existing radiological monitoring programmes deployed by the ionising radiations and radioactive sources users;
- Qualitative and quantitative assessment of the necessary measurement to be implemented for the national environmental monitoring programme;
- Development of a methodology for the collection and analysis of the environmental samples in the different laboratories;
- Development of “state of the art” procedures for environmental samples collections and analysis
- Training of CNESTEN and CNRP staffs for environmental samples collections and analysis
- Inter-comparison of measurement results performed between different Moroccan laboratories and Belgium Laboratories

### **Task 4 Environmental monitoring in emergency situations**

This task will support Morocco’s relevant national regulatory authorities in the preparation for environmental monitoring during emergency situations by the:

- Establishment of a national strategy for environmental radiation monitoring during a nuclear or radiological emergency;
- Development of “state of the art” procedures for environmental radiation monitoring during a nuclear or radiological emergency;
- Training of AMSSNuR, CNESTEN and CNRP staff for environmental radiation monitoring during a nuclear or radiological emergency.

## **Component D: Iran**

Since 2016, the European Commission has been financing 4 INSC projects in Iran (one for the operator of Buser NPP on stress tests and three to assist the nuclear safety regulator INRA).

All these projects which are still ongoing are targeting the enhancement of INRA capabilities in the field of nuclear safety culture and implementation of the highest nuclear safety and radiation protection standards in Iran. There are also supporting the development of INRA Technical Support Organisation, the so-called “Nuclear Safety Centre (NSC)”. On the operator side, the ongoing project support the implementation of the EU Stress Test review of the plant.

These projects are planned to run still for several months and at least until spring 2024 for the most recent one.

A call for tender to supply equipment (computer, screen, Gamma Radiation Detectors, etc.) for INRA Emergency Response Centre, which will be part of the NSC, is in preparation under INSC Action Programme 2018 and two other projects for procurement of equipment to INRA NSC have been already approved in the frame of INSC Action Programmes 2019 and 2020.

These new projects are complementing and, in some cases, should finalise the activities already started since 2016 in the frame of the previous INSC projects mentioned above.

### **D1: Strengthening technical support to the Iranian Nuclear Safety Regulator (INRA)**

The main activities of this project will be devoted to provide the last batch of necessary equipment for the Nuclear Safety Centre (NSC) of the Iranian Nuclear Safety Regulator (INRA). This new project would cover the procurement of different types of computer codes and software (for thermal-hydraulic safety analyses; severe accident analysis; aging management and structural integrity, etc.) and associated extensive training for NSC staff in the use of these tools and in their customisation to support NSC’s safety analyses.

### **D2: Support to the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP)**

A large number of potential issues for support have already been identified within the framework of project IRN3.01/16 Lot 2 “Support in the Stress Tests Exercise”.

The activities would focus on supporting the implementation of recommendations from the Self-Assessment Stress Tests report (SAST), including performing further safety analyses and updating plant procedures. It would cover in particular:

- Elaboration of a strategy for the implementation of specific safety improvement measures
- Performing and/or support and review of additional studies, calculation and safety analyses in areas identified in the SAST report
- Support in modification of respective NPP procedures, instructions, technical specifications, and Safety Analyses Reports to reflect implemented measures
- Independent review and support in validation of symptom based Emergency Operating procedures (EOPs)
- Independent review of Severe Accident Management Guidelines (SAMG) including analytical support and support in verification and validation methodology
- Support in modification of analytical models (including Probabilistic Safety Analysis) to reflect implemented measures

This task would also include, if necessary, the procurement and supply of certain types of equipment such as alternate power sources, mobile diesel pumps, computer software and hardware.

In combination with the Stress Tests, the first Periodic Safety Review (PSR) of BNPP unit 1 will also be an important source of potential safety improvement measures. Since BNPP unit 1 is approaching 10 years of operating lifetime, INRA has requested the 1<sup>st</sup> PSR report from the plant

The following specific services will also be provided by the Contractor:

- Methodological support in PSR execution and follow-up activities
- Assistance in procurement of equipment
- Assistance in procurement of analytical tools (computer codes)
- Training in the use of analytical methods and software (including on-the-job training)
- Assistance in technical visits to EU utilities implementing post Fukushima measures in the frame of their Stress Test National Action Plan or performing Periodic Safety Reviews on their NPPs.

## **Component E: South Africa - Strengthening the capacity of the National Nuclear Regulator (NNR)**

### **Task A.1 Support in improvement of technical expertise capabilities in the field of “ageing management” of nuclear installations**

The NNR has taken a strategic decision to establish the Center for Nuclear Safety and Security (CNSS) in order to strengthen and expand its nuclear safety capabilities.

In 2018, a representative from NNR participated in the 1<sup>st</sup> EU Topical Peer Review which was put in place by the European Nuclear Safety Regulators Group (ENSREG) according to the Council Nuclear Safety Directive 2014. This international peer review covered the topic of “ageing management” for nuclear power plants and research reactors. Following this participation, the need for a further review of Koeberg NPP units and the SAFARI-1 research reactor “ageing management programmes” has been identified by NNR.

This task is aimed at improving the current knowledge of NNR and CNSS for assessing “ageing management programmes” developed by Koeberg NPP and SAFARI-1 RR.

It is expected that this support will allow NNR and CNSS to develop the necessary guidelines, procedures, etc. which should allow a better monitoring the ageing management programmes of Nuclear Installations in South Africa.

### **Task A.2 Support in improvement of technical expertise capabilities in the field of “Fire Hazards” of nuclear installations**

At the 41<sup>st</sup> meeting of the Plenary of the European Nuclear Safety Regulators Group (ENSREG) “fire protection in nuclear installations” was selected as the topic for the second Topical Peer Review (TPR) under the Nuclear Safety Directive.

In accordance with the mentioned European directive, EU Member States must carry out a peer review exercise on a topic that they have to approve themselves every six years. The first exercise was focused on the ageing management of nuclear power plants whereas the second, which will take place between 2023 and 2024, will focus on the aforementioned fire protection. In the next ENSREG meetings, the technical specifications and the specific calendar of actions will be established, in collaboration with the Western European Nuclear Regulators Association, WENRA.

NNR plans to participate in this initiative on a voluntary basis, pending the invitation from ENSREG, in order to benchmark its practices and to share lessons learned with other regulators.

This task will provide NNR with further technical assistance focusing on the topical area of fire-protection systems, including the management of technological obsolescence.

It is expected that this support will allow NNR and CNSS to develop the necessary guidelines, procedures, etc. which should allow for a better monitoring of the fire protection programmes of Nuclear Installations in South Africa.

### **Task A.3 Support in improvement of technical expertise capabilities for deterministic and probabilistic safety analysis**

This task is aimed at improving the current knowledge for conducting safety analyses based on computer codes for NNR, CNSS staff and its organizations and to provide to NNR and its TSO the current basis for the review of PSA level 1, 2 and 3, taking into account international rules and the wide range of experience in PSA of EU nuclear regulatory authorities and TSOs.

Training will be provided to NNR and CNSS specialists on computer codes for bench-marking and verification purposes with existing computer codes in order to gain competence in the use of EU computer codes, simulation tools and models. Such tools will be used to conduct an independent check of the models, used by the licensees to conduct safety analyses, e.g. in the following areas: neutron- and reactor physics calculations, thermo-hydraulic calculations, analyses of severe accidents and physical processes within the containment, and analyses of nuclear fuel behaviour.

Training of NNR and CNSS specialists will be held for each selected computer code (with a maximum of five different computer codes in total), aiming at providing NNR and CNSS specialists within-depth experience and knowledge in computer codes application for the nuclear safety assessment for the Koeberg NPP and/or the SAFARI-1 Research Reactor.

The development of a comprehensive strategy for a risk-informed approach for regulatory decision-making process will also be started with NNR with the support of EU experts.

### **Task A.4 Enhancing in-house training capability of NNR and CNSS for the licensing process of nuclear installations**

This task will identify the necessary training areas, develop training materials, train the trainers and deliver specific training courses for newcomers and for established NNR and CNSS staff members. The NNR is in the process of developing courses in the following areas:

- Training on radiation protection;
- Training on transport of radioactive materials;
- Training on nuclear safeguards;
- Training for inspectors;
- Training for safety analysts.

Currently NNR mostly relies on IAEA training services, but more advanced and specific capacity building is needed and will be provided under this task. Depending of the need at the time of the implementation of the project the trainings could be organised as one training course for a limited number of people of the same level of knowledge, as different trainings for people with different levels of knowledge, as train for the trainers or any combination of these different approaches depending of the way which will be identified as the most efficient. In particular, topics related to the Safety Assessment Report (SAR) and the Preliminary Safety Assessment Report (PSAR) and other submitted documents will be covered, such as:

- systems important to nuclear safety (reactor, primary circuit, secondary circuit, safety systems, I&C systems, power supply systems, etc.);
- radiation protection;
- spent fuel and radioactive waste management
- emergency preparation;
- internal and external hazards;
- deterministic and probabilistic safety analysis.

Furthermore, relevant aspects related to regulatory control, including inspection, during siting, manufacturing, construction, commissioning, operation and decommissioning will be covered, including the assessment of operating instructions and emergency operating guides, including Severe Accident Management Guidelines (SAMGs).

## **Component F: Capacity building of Nuclear Safety Regulators through TAIEX (Pro memory, not financed under this action)**

TAIEX is an EU instrument for institutional cooperation between the public administrations of an EU Member State and a beneficiary country. This project type has been applied successfully in many cases already – notably within the EU’s Instrument for Pre-Accession (IPA) (being a proven method to transfer public sector expertise from the participating EU MS organization to the partner organization in the respective beneficiary country. More in particular, within the frame of a TAIEX project the administrative capacities of the public administration of a partner country are upgraded by providing training to its staff and supporting the reorganisation or further development of its structure. It also supports the approximation of national laws, specific regulations and quality standards to the *EU acquis*, if needed.

## **Component G: Education and Training for multi-countries**

Across the world, a large number of nuclear installations are gradually reaching the end of their operational licensing, and following their final shut down will be decommissioned and dismantled.

Experience shows that the dismantling phase of the decommissioning process is often complex, costly, and requires advanced capabilities not only in terms of suitable technologies and radioactive waste management capacities, but also in terms of human skills for the management of such multi-actor projects, and of their on-site implementation.

While there are many existing opportunities for education and vocational training for specific technical profiles, it is not the case for project managers and decommissioning site managers. Large nuclear operators often have in house sufficient skilled personnel to adapt them to the required profiles for decommissioning operations, but the situation may be much more challenging for smaller operators, and for companies selected to carry out the dismantling works. This kind of challenge is also relevant for regulatory bodies

- Based on its successful engagement with Université Nice Côte d’Azur to develop and create the Master “European Leadership for Safety Education (ELSE)” a new project dedicated to nuclear decommissioning is proposed. This project does not cover only a master degree but the whole 5 years university cursus and should include the following main activities.
- Activity 1 – Development of the diploma content and accreditation of the course;
- Activity 2 – MOOC (Massive Open Online Courses) development and experimentation;
- Activity 3 – Implementation of the Master level course for beginning and middle career managers aiming to qualify as nuclear dismantling project managers;
- Activity 4 – Communication and visibility and international legitimacy;
- Activity 5 – Experimentation of approaches to extend “Management and leadership for safety in nuclear dismantling projects” through a network of “implementing European Universities”.

### 3.3. Mainstreaming

Strengthening nuclear safety in partner countries includes capacity building that is achieved in particular by means of specific training. In all of these activities, the European Commission promotes the participation of women to foster gender equality.

### 3.4. Risks and Lessons Learnt

<b>Risks</b>	<b>Likelihood (High/ Medium/ Low)</b>	<b>Impact (High/ Medium/ Low)</b>	<b>Mitigating measures</b>
Lack of political commitment and administrative support in the beneficiary countries	M	M	Close monitoring of project implementation and establishment of efficient communication channels at appropriate level by the Commission.
No relevant international peer review missions in the relevant time frame	M	M	Reporting requirements at contracting level will include the obligation to provide relevant information for the indicators. If no international peer review mission is available, they will be reviewed by independent experts, e.g. from JRC
Impact on project implementation of covid-19 pandemic crisis or similar type of crisis avoiding or limiting travel possibilities in the targeted beneficiary countries	M	M	Close monitoring of covid-19 or similar type of crisis situation in the beneficiary countries and close monitoring of project implementation and establishment of efficient communication channels to be able to adapt working method and project schedule in due time if needed.
Component A: Armenia Delay in the licensing and implementation of safety enhancement measures on Armenia Nuclear Power Plant due to lack of resources at ANPP or due to too long review process at ANRA level	M	M	Close monitoring of project implementation and establishment of efficient communication channels between this INSC project and the other INSC projects supporting in parallel ANRA
Component B: Ukraine Delay in alignment of the Ukraine regulatory regime with the EU acquis	M	M	Close monitoring of project implementation and establishment of efficient communication channels at appropriate level by the Commission.
Component C: Morocco Delay in supply of necessary equipment to upgrade the environmental monitoring system	L	L	Project effective management. Involvement of different experts, conducting of project implementation assessment.
Component D: Iran Delay on the project implementation due to late implementation of the previous project or due to some problems during implementation of the current project	M	M	Project effective management. Involvement of different experts, conducting of project implementation assessment – close coordination with previous INSC projects still under implementation.
Component D: Iran Difficulties in the acquisitions by	M	M	Close monitoring of project implementation and establishment of

the beneficiary of the necessary computer codes licenses			efficient communication channels at appropriate level between the Commission, the beneficiary and computer codes providers to find adequate solution ensuring project implementation.
Component E: South Africa Delays in project implementation which would in particular hinder NNR participation to the 2 <sup>nd</sup> EU TPR in 2024.	L	L	Project effective management. Involvement of different experts, conducting of project implementation assessment – close coordination with previous ENSREG.
Component G: Education (multi-country) Too limited interest from students for this new Master programme	M	M	Adequate preparation and advertising of this Master degree with the University of Nice - Côte d'Azur

### Lessons Learnt

Extensive and broad experience has been gained in successfully implementing similar activities in other third countries, both in the framework of the TACIS<sup>21</sup> Nuclear Safety Programme and the Instrument for Nuclear Safety Cooperation (INSC). This experience will be used in optimising the design and implementation of this action.

Communication and support from the beneficiary and end-users will remain a key element for successful implementation.

### 3.5. The Intervention Logic

The underlying intervention logic for this action is based on a needs assessment carried out during expert missions, discussions with the relevant stakeholders, and coordination with the main partners and the International Atomic Energy Agency, with which this programme is strongly coordinated. Specific needs were also identified during previous projects in the various countries through well-recorded lessons learnt and exchange between the project teams and beneficiary institutions. These assessments were extensively reviewed by the JRC technical experts. The overall approach is to strengthen the role and capabilities of nuclear regulatory authorities in partner countries to reach the overall objective of promoting nuclear safety, as well as to enhance or develop emergency preparedness and response capabilities. In each country, the envisaged upgrades, modernisations, studies/assessments and regulatory advancements are developed and will be implemented jointly with the local counterparts, in a pre-defined schedule and via well-planned contributions. This will allow a further joint update on the gaps and needs, as well as intensive exchange and learning both at a technical level and at the level of safety culture through addressing priority issues. The actions will be implemented by EU experts and consortia that will transfer know-how to the beneficiary countries.

<sup>21</sup> Technical Assistance to the Commonwealth of Independent States

### 3.6. Logical Framework Matrix

1. Results chain		Indicator	Baseline (value & ref year)	Target (value & ref year)	Source of data	Assumptions
Impact	<p>1. The promotion of an effective nuclear safety culture by strengthening the capacity, training and organisation of Nuclear Safety Regulators</p> <p>This impact contributes to good governance.</p>	Activities directly targeting the strengthening of national nuclear regulators implemented	0% (2020)	100% (2026)	Project documentation	
	<p>2. The promotion of continuous nuclear safety improvement by improving processes, procedures and equipment</p> <p>This impact contributes to disaster risk reduction.</p>	Degree of Implementation of activities which mention this in line with the MIP	0%	100% (2026)	Project reports and evaluations	
	<p>3. Training and Education</p> <p>This impact contributes to gender equality and Women's and Girl's Empowerment</p>	Activities with equal access for women	0	100% (2026)	Project documentation	
Outcomes to Impact 1	<p>1.1 Continued alignment of the Ukraine regulatory regime with the EU acquis</p>	Service partnership project between EU regulatory experts and SNRIU (regulator of Ukraine)	50% (2020)	100% (2025)	Endorsed project documentation	Continued policy of Ukraine to achieve full alignment with EU acquis

	1.2 Strengthening technical support to the Nuclear Safety Regulator (INRA) in Iran	Supply contract of last batch of equipment for the Nuclear Safety Centre	0%(2020)	100% (2025)	Accepted supply	Continued policy of Iran to align with international and EU best practices and successful previous supply projects.
	1.3 Strengthening the regulatory capacity of the regulator NNR in South Africa	First cooperation project with NNR	50% (2020)	100% (2025)	Project documentation	
<b>Outcomes to Impact 2</b>	2.1 On site assistance to facilitate safety improvements on Metzamor Nuclear Power Plant (ANPP) in Armenia	Service project providing expert support to ANPP	50% (2020)	100% (2025)	Endorsed project documentation	Continued operation of ANPP despite advice to decommission
	2.2 Upgrading the Environmental Monitoring System in Morocco	Partnership project between EU and Morocco to improve the Environmental monitoring system	20% (2020)	100% (2025)	Endorsed project documentation	Continued commitment of all involved parties
	2.3 Support to the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP) in Iran	Stress test related issues addressed	0%(2020)	50% (2025)		Continued policy of Iran to align with international and EU best practices in particular the stress test methodology

Outcomes to Impact 3	3.1. Education and Training for multi-countries	Gender related indicators included in all contracts	50% (2020)	80% (2025)	Contracting documentation + Training attendance	All projects have at least some activities where gender equality can be justifiably measured
Outputs to Outcome 1.1	1.1.1 Successful participation of SNRIU in the follow-up of the 1 <sup>st</sup> EU TPR and participation to the 2 <sup>nd</sup> EU TPR	ENSREG reports	Yes (2018)	Yes (2024)	ENSREG website/ contract documentation	Topical review will progress as required. Peer review will progress as required.
	1.1.2 Introduction of graded and integrated approaches in regulating safety of radioactive waste and radioactive material management	Graded approach integrated in SNRIU guidelines / regulations	No	Regulations / guidelines drafted and ready for approval (2025)	Project documentation / SNRIU official publications	Sufficient staff at the regulator to continue implementing this activity
	1.1.3 Providing methodological unity in radiation monitoring through development of guidance on radiation monitoring in planned, emergency and existing exposure situations	Established guidelines on radiation monitoring in line with Council Directive 2013/59/EURATOM	No unity in radiation monitoring for different techniques (2020)	Guideline ensuring unity in radiation monitoring established (2025)	Official SNRIU or SSTC publications	Cooperation with EU bodies on technical issues continues
	1.1.4 Strengthening of SNRIU regulatory capabilities in licensing of “load following modes” for NPP units	Established SNRIU guideline on safety assessment of load following for NPPs	Ad hoc expert judgement (2020)	Established guideline (2025)	Official SNRIU or SSTC publications	Cooperation with EU bodies where such kind of NPP operation is already licensed

	1.1.5 Implementation of the Strategy on completing regulatory capacity building	Strategy implemented	Strategy developed (2020)	Strategy implemented (2025)	Project documentation	SNRIU and SSTC will remain prepared to share the relevant data
	2.1.6 Strengthening regulatory capabilities in the field of severe accident management to review the possibility of implementing in-vessel melt retention for Ukrainian NPPs (VVER-440 and VVER-1000)	Guideline established	Capacity based on individual experts (2020)	Independent capacity available at SNRIU and SSTC (2025)	Project documentation	Strong EU experts will be found to support knowledge transfer
<b>Outputs to Outcome 1.2</b>	1.2.1 Supply of last batch of equipment for INRA Nuclear Safety Centre	NSC fully equipped according to strategy developed in the first cooperation project	25% (2022)	100% (2025)	Project documentation / acceptance test	Previous planned projects will be successful; Iran remains committed to JCPoA
	1.2.2. Thermal hydraulic and Severe Accident computer codes installed and staff trained in INRA Nuclear Safety Centre	Computer codes installed and number of staff trained	0% (2020)	100% (2025)	Training certificated	Iran remains committed to JCPoA
<b>Outputs to Outcome 1.3</b>	1.3.1. improvement of technical expertise capabilities in the field of “ageing management” of nuclear installations following 1 <sup>st</sup> EU TPR	Relevant staff of NNR and CNSS will be able to perform state of the art ageing management review and assessment	25 % (2020)	100% (2025)	Project documentation including self-declaration	Staff will share their assessment
	1.3.2. Support in improvement of technical expertise capabilities in the field of “Fire Hazards” of nuclear installations	Participation in the 2 <sup>nd</sup> EU Topical Peer review	No (2020)	Yes (2024)	ENSREG reports	ENSREG remains open to outside participation

	1.3.3. Support in improvement of technical expertise capabilities for deterministic safety analysis	Competence acquired in use of EU computer codes	Limited (2020)	Yes (2024)	Training certificates	Export restrictions will not prevent sharing this information
	1.3.4. Support in improvement of technical expertise capabilities for probabilistic safety analysis and development of risk-informed regulatory approach	Competence acquired in use of EU risk informed regulatory approach	Limited (2020)	Yes (2024)	Regulatory documents issued + Training certificates	Export restrictions will not prevent sharing this information
	1.3.5 Enhancing in-house training capability of NNR and CNSS for the licensing process of nuclear installations.	Number of available trainings course for in house training	under development (2020)	10 (2025)	Training material developed Training certificates	NNR and CNSS remain committed to share the status of the training
	1.3.6 Supporting NNR capability for development of regulatory documents	Developed Guidance documents in cooperation with EU experts	0(2020)	2(2025)	Official publication by NNR/ project documentation / guidance	NNR remains committed to share the status of the regulatory documents.
<b>Outputs to Outcome</b>						
<b>Outputs to Outcome 2.1</b>	2.1.1. Support in the licensing and implementation of safety enhancement measures on Armenia Nuclear Power Plant	Hydrogen concentration measurements implemented in ANPP	0% (2020)	100% (2025)	Contracts published by ANPP	Supply will be supported through different budget
		Installation of after-burners and passive autocatalytic hydrogen recombiners	0% (2020)	100% (2025)	Acceptance protocols	Supply will be supported through different budget

		Development of Terms of Reference for a seismic PSA	0%(2020)	100% (2024)	Project documentation	PSA developed through different budget
	2.1.2 Provision of support to the ANPP in selected technical areas	Staff trained and number of document prepared or updated in the specific field	0 (2020)	30 (2025)	Project documentation Training certificates	Staff willing to share training completion documents.
Outputs to Outcome 2.2	2.2.1. Upgrading the Environmental Monitoring system in Morocco	Analysis of the current situation	0% (2020)	100% (2022)	Project document – Analysis report	
		Development of an “ON-LINE” monitoring strategy	0% (2020)	100% (2025)	Site acceptance Test (SAT) for equipment delivered Procedures developed Training certificates	Supply will be included in the activities
		Development of an “OFF-LINE” monitoring strategy	0%(2020)	100% (2025)	Project documentation Training certificates Reports of inter-comparison of measurement between laboratories	Continued dedication by regulator AMMSNuR and expert centre CNESTEN/CNRP

		Environmental monitoring in Emergency situations	0%(2020)	100% (2025)	Procedures developed Training certificates	
Outputs to Outcome 2.3	2.3.1 Support to the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP)in Iran	Performing and/or support and review of additional studies, calculation for the implementation of specific safety improvement measures	Partial (2020)	Yes (2025)	Project Documentation	Iran will remain committed to the JCPoA
		Independent review of Symptom Based EOP's performed	No (2020)	Yes (2025)	Project Documentation	Iran will remain committed to the JCPoA
		Independent review of SAMG's performed	No (2020)	Yes (2025)	Project Documentation	Iran will remain committed to the JCPoA
		PSA adapted to implemented stress test measures	No (2020)	Yes (2025)	Project Documentation	Iran will remain committed to the JCPoA
	2.3.2 Periodic safety review carried out	Submission document of PSR to the regulator	No	Yes (2025)	Official documentation	Iran will remain committed to the JCPoA

<b>Outputs to Outcome 3</b>	3.1.1. Gender equality is integrated in the contracting documentation	Gender related indicator in each INSC contract 2021	0 (2021)	80% (2022)	Contracting documentation Training certificates	For all service contracts this can be done, but not for supply
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## 4 IMPLEMENTATION ARRANGEMENTS

### 4.1. Financing Agreement

In order to implement this action, it is envisaged to conclude a financing agreement with Ukraine for component B and Iran for component D.

In order to implement this action, it is not envisaged to conclude a financing agreement with Armenia for component A, Morocco for component C, and for South Africa for component E and for component G.

### 4.2. Indicative Implementation Period

The indicative operational implementation period of this action, during which the activities described in section 3 will be carried out and the corresponding contracts and agreements are implemented, is 76 months from the date of entry into force of the financing agreement for component B and component D, and 76 months from the adoption by the Commission of this Financing Decision for components A, C, E, F and G.

Extensions of the implementation period may be agreed by the Commission's responsible authorising officer by amending this Financing Decision and the relevant contracts and agreements.

### 4.3. Methods of Implementation

The Commission will ensure that appropriate rules and procedures of the EU for providing funding to third parties are respected, including review procedures where appropriate, and compliance of the action with EU restrictive measures<sup>22</sup>.

#### 4.3.1 Direct Management (Grants)

##### (a) Purpose of the grant

The objective of the grant to be awarded under Component G is the continuation of the ambitious academic approach to education on nuclear safety leadership skills that have been started by the European Commission in cooperation with Université Nice Côte d'Azur and which led to the creation of the Master "European Leadership for Safety Education (ELSE)". This new cursus will be developed in order to propose to the nuclear sector a recognized specific university diploma in this field of "nuclear decommissioning works". This project does not cover only a master degree but the whole 5 years university cursus.

##### (b) Justification of a direct grant

Under the responsibility of the authorising officer by delegation, the grant under Component G may be awarded without a call for proposals to Université de Nice - Côte d'Azur. The direct grant is justified because the action has specific characteristics and requires a particular type of body on account of its technical competence and its high degree of specialisation as well as its administrative power, according to Article 195 of Regulation (EU, Euratom) 2018/1046. The Université de Nice - Côte d'Azur is the only European University that is developing a comprehensive education programme in the area of nuclear safety and this activity follows previous European Commission successful engagement for the development and creation of the Master "European Leadership for Safety Education (ELSE)".

#### 4.3.2 Direct Management (Procurement)

The Component A will contribute to facilitate safety improvements at Armenian NPP.

The Component B will contribute continued alignment of the Ukrainian regulatory regime with the EU acquis.

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<sup>22</sup> [www.sanctionsmap.eu](http://www.sanctionsmap.eu). Please note that the sanctions map is an IT tool for identifying the sanctions regimes. The source of the sanctions stems from legal acts published in the Official Journal (OJ). In case of discrepancy between the published legal acts and the updates on the website it is the OJ version that prevails.

The Component D will contribute to strengthen the technical support to the Iranian Nuclear Safety Regulator (INRA) and to support in the implementation of safety improvements at Bushehr Nuclear Power Plant (BNPP).

The Component E will contribute to strengthen the capacity of the National Nuclear Regulator (NNR) in South Africa.

Subject	Indicative type (works, supplies, services)	Indicative trimester to launch the procedure
Component A: Armenia	1 (service)	Q1 2022
Component B: Ukraine	1 (service)	Q1 2022
Component D: Iran	1 service + 2 supply + 2 works	TBD
Component E: South Africa	1 (service)	Q1 2022

#### 4.3.3 Indirect Management with a pillar assessed organisation

Component C of the action may be implemented in indirect management with an entity, which will be selected by the Commission's services using the following criteria: complementary activity planned by the Member State organisation with financial contribution by the Member State.

The implementation by this entity entails the upgrading the Environmental Monitoring System in the Kingdom of Morocco.

In case the envisaged entity would need to be replaced, the Commission's services may select a replacement entity using the same criteria. If the entity is replaced, the decision to replace it needs to be justified .

#### 4.4. Changes from indirect to direct management mode (and vice versa) due to exceptional circumstances

In case of exceptional circumstances preventing the implementation through indirect management, it will be necessary to launch a call for tender.

The geographical eligibility in terms of place of establishment for participating in procurement and grant award procedures and in terms of origin of supplies purchased as established in the basic act and set out in the relevant contractual documents shall apply.

The Commission's authorising officer responsible may extend the geographical eligibility on the basis of urgency or of unavailability of services in the markets of the countries or territories concerned, or in other duly substantiated cases where application of the eligibility rules would make the realisation of this action impossible or exceedingly difficult (Article 28(10) NDICI-Global Europe Regulation).

#### 4.5. Indicative Budget

	<b>EU contribution (amount in EUR)</b>	<b>Indicative third party contribution (amount in EUR)</b>
<b>Procurement</b>		
Component A: Armenia	2,000,000	N.A.
Component B: Ukraine	4,000,000	N.A.
Component C: Morocco Indirect management with a pillar assessed organisation'	1,500,000	Belgium (150,000)
Component D: Iran	5,000,000	N.A.
Component E: South Africa	3,000,000	N.A.
<b>Grant</b>		
Component G: Education (multi-country)	1,600,000	Univ. Nice (410,000)
<b>Total</b>	<b>17,100,000</b>	<b>560,000</b>

#### 4.6. Organisational Set-up and Responsibilities

Components A, B, D, E, will be implemented via direct management through tender procedure.

Component D will be awarded through a call for tender or through a negotiated procedure directly to organisations already implementing technical assistance in Iran, depending on the political context at the time of contracting which excludes an international tendering procedure for this project.

For component C: via indirect management through a Member State organisation according to the criteria put down under 4.3.3.

The implementation of component G will be done by direct management through the Université de Nice - Côte d'Azur (UCA).

As part of its prerogative of budget implementation and to safeguard the financial interests of the Union, the Commission may participate in the above governance structures set up for governing the implementation of the action.

## 5 PERFORMANCE MEASUREMENT

### 5.1. Monitoring and Reporting

The day-to-day technical and financial monitoring of the implementation of this action will be a continuous process, and part of the implementing partner's responsibilities. To this aim, the implementing partner shall establish a permanent internal, technical and financial monitoring system for the action and elaborate regular progress reports (not less than annual) and final reports. Every report shall provide an accurate account of implementation of the action, difficulties encountered, changes introduced, as well as the degree of achievement of its results (outputs and direct outcomes) as measured by corresponding indicators, using as reference the Logframe matrix (for project modality).

Reports shall be laid out in such a way as to allow monitoring of the means envisaged and employed and of the budget details for the action. The final report, narrative and financial, will cover the entire period of the action implementation.

The Commission may undertake additional project monitoring visits both through its own staff and through independent consultants recruited directly by the Commission for independent monitoring reviews (or recruited by the responsible agent contracted by the Commission for implementing such reviews).

## 5.2. Evaluation

Having regard to the nature of the action, a final evaluation will not be carried out for this action or its components.

In case an evaluation is not planned, the Commission may, during implementation, decide to undertake such an evaluation for duly justified reasons, either on its own decision or on the initiative of the partner.

The evaluation reports shall be shared with the partner country and other key stakeholders.

The evaluation reports shall be shared with the partner country and other key stakeholders following the best practice of evaluation dissemination<sup>23</sup>. The implementing partner and the Commission shall analyse the conclusions and recommendations of the evaluations and, where appropriate, in agreement with the partner country, jointly decide on the follow-up actions to be taken and any adjustments necessary, including, if indicated, the reorientation of the project.

The financing of the evaluation shall be covered by another measure constituting a Financing Decision.

## 5.3. Audit and Verifications

Without prejudice to the obligations applicable to contracts concluded for the implementation of this action, the Commission may, on the basis of a risk assessment, contract independent audit or verification assignments for one or several contracts or agreements.

# 6 COMMUNICATION AND VISIBILITY

Communication and visibility is a contractual obligation for all entities implementing EU-funded external actions to advertise the European Union's support for their work to the relevant audiences.

To that end they must comply with the instructions given in the [Communication and Visibility Requirements of 2018](#) (or any successor document), notably with regard to the use of the EU emblem and the elaboration of a dedicated communication and visibility plan, to be completed for every action at the start of implementation.

These obligations apply equally, regardless of whether the actions concerned are implemented by the Commission, the partner country (for instance, concerning the reforms supported through budget support), contractors, grant beneficiaries or entrusted entities. In each case, a reference to the relevant contractual obligations must be included in the respective financing agreement, procurement and grant contracts, and delegation agreements.

Communication and visibility measures may be funded from the amounts allocated to the action. For the purpose of enhancing the visibility of the EU and its contribution to this action, the Commission may sign or enter into joint declarations or statements, as part of its prerogative of budget implementation and to safeguard the financial interests of the Union. Visibility and communication measures should also promote transparency and accountability on the use of funds.

Effectiveness of communication activities on awareness about the action and its objectives as well as on EU funding of the action should be measured.

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<sup>23</sup> See best [practice of evaluation dissemination](#)

Implementing partners shall keep the Commission and concerned EU Delegation/Office fully informed of the planning and implementation of specific visibility and communication activities before work starts. Implementing partners will ensure adequate visibility of EU financing and will report on visibility and communication actions as well as the results of the overall action to the relevant monitoring committees.

For communicating on Team Europe Initiatives, the EU and its Member States can rely on the specific guidance on the Team Europe visual identity:

For the guide: <https://europa.eu/capacity4dev/file/108107/download?token=uw8nJKO5>

For the templates: <https://europa.eu/capacity4dev/file/108106/download?token=fOfXvE-d>

## APPENDIX REPORTING IN OPSYS

An Intervention<sup>24</sup> (also generally called project/programme) is the operational entity associated to a coherent set of activities and results structured in a logical framework aiming at delivering development change or progress. Interventions are the most effective (hence optimal) entities for the operational follow-up by the Commission of its external development operations. As such, Interventions constitute the base unit for managing operational implementations, assessing performance, monitoring, evaluation, internal and external communication, reporting and aggregation.

Primary Interventions are those contracts or groups of contracts bearing reportable results and respecting the following business rule: ‘a given contract can only contribute to one primary intervention and not more than one’. An individual contract that does not produce direct reportable results and cannot be logically grouped with other result reportable contracts is considered a ‘support entity’. The addition of all primary interventions and support entities is equivalent to the full development portfolio of the Institution.

Primary Interventions are identified during the design of each action by the responsible service (Delegation or Headquarters operational Unit).

The level of the Primary Intervention is defined in the related Action Document and it is revisable; it can be a(n) (group of) action(s) or a (group of) contract(s).

Tick in the left side column one of the three possible options for the level of definition of the Primary Intervention(s) identified in this action.

In the case of ‘Group of actions’ level, add references to the present action and other action concerning the same Primary Intervention.

In the case of ‘Contract level’, add the reference to the corresponding budgetary items in point 4.6, Indicative Budget.

N.B. An individual Contract that does not produce direct reportable results and cannot be logically grouped with other result reportable Contracts is considered a ‘support measure’.

<b>Option 1: Action level</b>		
<input checked="" type="checkbox"/>	Single action	Present action: all contracts in the present action
<b>Option 2: Group of actions level</b>		
<input type="checkbox"/>	Group of actions	
<b>Option 3: Contract level</b>		
<input type="checkbox"/>	Single Contract 1	
<input type="checkbox"/>	Single Contract 2	
<input type="checkbox"/>	Single Contract 3	
<input type="checkbox"/>	Group of contracts 1	

<sup>24</sup> For the purpose of consistency between terms in OPSYS, DG INTPA, DG NEAR and FPI have harmonised 5 key terms, including ‘Action’ and ‘Intervention’ where an ‘Action’ is the content (or part of the content) of a Commission Financing Decision and ‘Intervention’ is a coherent set of activities and results which constitutes an effective level for the operational follow-up by the EC of its operations on the ground. See more on the [concept of intervention](#)