

## **Annex III - Civil Nuclear Cooperation**

### **A. General**

1. Iran and E3/EU+3 decided to co-operate, among others, including through IAEA technical cooperation, where appropriate, and without prejudice to the existing bilateral agreements, in different areas of civil nuclear co-operation to be developed within the framework of this JCPOA, as detailed in this Annex. In this context, the Joint Commission will also support assistance to Iran, including through IAEA technical cooperation projects, as appropriate.
2. All civil nuclear cooperation projects under this JCPOA will be mutually determined by the participating states and will be consistent with the JCPOA and the national laws and regulations of the participating parties.
3. The civil nuclear and scientific cooperation projects envisioned between Iran and the E3/EU+3 as part of this JCPOA may be undertaken in a variety of formats, with a variety of potential participants. A given project undertaken by the E3/EU+3 will not necessarily include participation by all E3/EU+3 parties:
  - 3.1. bilateral or multilateral cooperation arrangements with Iran. Such arrangements would be mutually determined by the participating states.
  - 3.2. projects under the auspices of the IAEA, either through IAEA technical co-operation projects including through Project and Supply Agreements.
  - 3.3. through International Science and Technology Centres.

Specifically, E3/EU+3 parties will undertake, to develop nuclear co-operation with Iran, in particular within the following areas:

### **B. Reactors, Fuels and Associated Technologies, Facilities and Processes**

#### **4. Modern light water power and research reactors and associated equipment, technologies and facilities**

E3/EU+3 parties, as appropriate, will facilitate Iran's acquisition of light-water research and power reactors, for research, development and testing, and for the supply of electricity and desalination, with arrangements for the assured supply of nuclear fuel and the removal of spent fuel as provided for in relevant contracts, for each reactor provided. This may include the following areas for co-operation:

- 4.1. Construction as well as effective and safe operation of new light water power reactors and associated equipment, according to Generation III+ requirements, including small and medium sized nuclear reactors, including joint design and manufacturing, as appropriate.
- 4.2. Construction of state of the art light water moderated multipurpose research reactors capable of testing fuel pins, assembly prototypes and structural materials with associated related facilities, including joint design and manufacturing, as appropriate.
- 4.3. Supply of state-of-the-art instrumentation and control systems for the above research and power reactors, including joint design and manufacturing, as appropriate;
- 4.4. Supply of nuclear simulation and calculation codes and software solutions with regard to the above areas, including joint development, as appropriate;
- 4.5. Supply of first and second loop main equipment as well as core of the above research and power reactors, including joint design and manufacturing, as appropriate;
- 4.6. On-the-job training on fuel management scenarios and reshuffling for the above research and power nuclear reactors;
- 4.7. Joint technical review of Iran's current nuclear reactors, upon the request by Iran, in order to upgrade current equipment and systems, including concerning nuclear safety;

## **5. Arak Modernisation Project**

- 5.1. As described in Section B of Annex I, an international partnership composed of E3/EU+3 parties and Iran, which may subsequently be enlarged to include mutually determined third countries will be established, to support and facilitate the redesign and rebuilding of the IR-40 reactor at Arak into a modernised, not exceeding 20MWth, heavy-water moderated and cooled research reactor, based on the agreed conceptual design (as attached to Annex I).
- 5.2. Iran will take the leadership role as the owner and as the project manager, and have responsibility for overall implementation of the Arak modernisation project. A Working Group composed of E3/EU+3 participants will be established to support and facilitate the redesigning and rebuilding of the reactor. An international partnership composed of Iran and the Working Group would implement the Arak modernisation project, with E3/EU+3 participants assuming responsibilities as described in Annex I. The Working Group could be enlarged to include other countries by consensus of the participants of the Working Group and Iran.

E3/EU+3 participants and Iran will conclude an official document expressing their strong commitments to the Arak modernisation project in advance of Implementation Day which would provide an assured path forward to modernise the reactor and would define the responsibilities assumed by the E3/EU+3 participants, especially in the key areas such as redesign, design review and certification, reactor core manufacturing, fuel design, fabrication and supply, safety and security, spent fuel treatment or disposition, as well as concerning the supply of materials, equipment, instrumentation and control systems, and subsequently contracts would be concluded. The participants of the Working Group will provide assistance needed by Iran for redesigning and rebuilding the reactor, consistent with their respective national laws, in such a manner as to enable the safe and timely construction and commissioning of the modernised reactor.

- 5.3. Iran and the Working Group will cooperate to develop the final design of the modernised reactor and the design of the subsidiary laboratories to be carried out by Iran, and review conformity with international safety standards, such that the reactor can be licensed by the relevant Iranian regulatory authority for commissioning and operation.
- 5.4. Iran will continue to assume the primary responsibility for financing the modernisation project. Additional funding arrangements for the project, including for IAEA projects supporting the Arak modernisation project, will be determined based on the official document and contracts to be subsequently concluded.

## **6. Nuclear Fuel**

- 6.1. E3/EU+3 parties, as appropriate, will support assistance to Iran, including through the IAEA, as appropriate, in meeting international qualification standards for nuclear fuel fabricated by Iran.
- 6.2. E3/EU+3 parties will seek to cooperate regarding the supply of modern fuels, including, as appropriate, joint design and fabrication, the relevant licenses and fabrication technologies and equipment and related infrastructure, for current and future nuclear research and power reactors, including technical assistance on purification processes, forming and metallurgical activities for different types of nuclear fuel clads and cladding for the modernised Arak heavy water research reactor.

## **C. Research and Development (R&D) Practices**

7. To implement other aspects of this JCPOA and in support of a broader opening of scientific engagements between the E3/EU+3 and Iran, the E3/EU+3 and Iran will seek cooperation and scientific exchange in the field of nuclear science and technology:

- 7.1. Accelerator-based nuclear physics and nuclear astrophysics research, and stable isotope production in international collaboration at the nuclear, physics, and technology centre at the Fordow facility. Iran will request from the E3/EU+3 and other interested parties specific proposals for cooperative international nuclear, physics, and technology projects and will host an international workshop to review these proposals. The goal is to realise international collaborative projects within a few years. The transitioning to stable isotope production of two cascades will be conducted in a joint partnership between the Russian Federation and Iran on the basis of arrangements to be mutually agreed upon.
- 7.2. Plasma physics and nuclear fusion;
- 7.3. Research reactor applications at the TRR, modernized Arak reactor, or at other future research reactors in Iran, such as:
  - 7.3.1. Training
  - 7.3.2. Radio-isotope production and utilization
  - 7.3.3. Nuclear desalination
  - 7.3.4. Neutron transmutation doping
  - 7.3.5. Neutron activation analysis
  - 7.3.6. Neutron capture therapy
  - 7.3.7. Neutron imaging and materials characterization studies using neutron beams
- 7.4. E3/EU+3 parties and Iran could also explore co-operation in the following additional areas:
  - 7.4.1. Design, manufacture and/or assembly of in-core measuring instrumentation and technologies;
  - 7.4.2. Nuclear instrumentation and control, systems and electronics design, manufacture and/or assembly;
  - 7.4.3. Fusion technology and plasma physics and related infrastructure and facilitating contribution of Iran to the International Thermonuclear Experimental Reactor (ITER) Project and/or similar projects, including relevant IAEA technical cooperation projects;
  - 7.4.4. Neutrino astronomy;
  - 7.4.5. Design and manufacturing, and supply, of different types of accelerators and supply of related equipment including through relevant IAEA technical cooperation projects;
  - 7.4.6. Data acquisition and processing software and interface equipment;

## **D. Nuclear Safety, Safeguards and Security**

### **8. Nuclear safety**

E3/EU+3 parties, and possibly other states, as appropriate, are prepared to cooperate with Iran to establish a Nuclear Safety Centre in Iran, engage in workshops and training events in Iran to support interactions between Iranian

nuclear regulatory authorities and those from the E3/EU+3 and elsewhere to, among other things, share lessons learned on establishing and maintaining regulatory independence and effectiveness, and training on implementing nuclear safety culture and best practices; facilitate exchanges and visits to nuclear regulatory authorities and nuclear power plants outside of Iran focusing on best practices for safe operation; and enhance and strengthen domestic emergency preparedness and severe accident management capability.

Provide support and assistance to enable Iran to join relevant conventions on nuclear safety and security, e.g. through workshops or seminars furthering accession to such commitments. Such workshops or seminars could also take place under the auspices of the IAEA.

E3/EU+3 parties, and possibly other states, as appropriate, will co-operate with Iran in the following areas of nuclear safety, as well as in other areas to be mutually agreed:

- 8.1. Conclusion of bilateral/multilateral agreements with related organisations and research centres;
- 8.2. Supply of valid codes, instruments and equipment related to nuclear safety;
- 8.3. Facilitate exchange of knowledge and experience in the area of nuclear safety;
- 8.4. Enhance and strengthen domestic emergency preparedness and severe accident management capability;
- 8.5. Arrange on-the-job training and apprenticeship courses for reactor and facility operators, regulatory authority personnel and related supportive organizations in the area of nuclear safety inside and outside of Iran;
- 8.6. Establish a Nuclear Safety Centre in Iran, which shall be equipped with necessary tools, techniques and equipment, in order to support and facilitate technical and professional training and exchange of lessons-learned for reactor and facility operators, regulatory authority personnel and related supportive organizations;

## **9. Nuclear Safeguards**

E3/EU+3 parties, and possibly other states, as appropriate, are prepared to cooperate with Iran on the effective and efficient implementation of IAEA safeguards and transparency measures in Iran. Co-operation in the following areas can be envisaged:

- 9.1. Cooperation in the form of on-the-job trainings and workshops to strengthen nuclear material accounting and control process, human resource development, and quality assurance/quality control processes;
- 9.2. E3/EU+3 parties, and other states, as appropriate, are prepared to cooperate with Iran for the effective and efficient implementation of IAEA safeguards and transparency measures in Iran.
- 9.3. This cooperation could take the form of training and workshops to strengthen Iran's safeguards regulatory authority, nuclear material accounting and control processes, human resource development, and quality assurance/quality control processes.

## **10. Nuclear Security**

E3/EU+3 parties, and possibly other states, as appropriate, are prepared to cooperate with Iran on the implementation of nuclear security guidelines and best practices. Co-operation in the following areas can be envisaged:

- 10.1. Co-operation in the form of training courses and workshops to strengthen Iran's ability to prevent, protect and respond to nuclear security threats to nuclear facilities and systems as well as to enable effective and sustainable nuclear security and physical protection systems;
- 10.2. Co-operation through training and workshops to strengthen Iran's ability to protect against, and respond to nuclear security threats, including sabotage, as well as to enable effective and sustainable nuclear security and physical protection systems.

## **E. Nuclear Medicine and Radioisotopes, Associated Technologies, Facilities and Processes**

11. E3/EU+3 parties, as appropriate, are prepared to cooperate with Iran to improve the utilization of nuclear medicine in Iran in order to enhance Iran's expertise in diagnostic imaging and radiotherapy, increase the availability of medical radioisotopes for diagnosis and treatment of Iranian citizens, and facilitate Iran's participation in the broader international scientific and nuclear medicine community. Such cooperation may include:
  - 11.1. Upgrades to the infrastructure associated with existing cyclotron facilities, including for medical radioisotopes production.
  - 11.2. Facilitating Iranian acquisition of a new cyclotron, and associated radio-pharmacy equipment, for medical radioisotopes production.
  - 11.3. Acquisition of state-of-the-art diagnostic imaging and radiotherapy equipment for existing or new nuclear medicine centers, including co-operation between hospitals for the treatment of individual patients.
  - 11.4. Cooperation on occupational and patient dosimetry procedures.
  - 11.5. Improved target utilization to increase radioisotope production.

- 11.6. Acquisition of radioisotope sources for brachytherapy, and radiotherapy instrument calibration, and other medical and industrial applications.
- 11.7. Supply of state-of-the-art radio-medicine center and necessary laboratories.

## **F. Waste Management and Facility Decommissioning**

12. E3/EU+3 parties, as appropriate, are prepared to cooperate with Iran in the safe, effective, and efficient management and disposition of nuclear and radiological wastes derived from Iran's nuclear fuel cycle activities and nuclear medicine, radioisotope production and/or consumption activities.
13. E3/EU+3 parties, as appropriate, are prepared to cooperate with Iran in areas of safe, effective, and environmentally friendly best practices for facility decontamination and decommissioning, including co-operation on long term storage facilities for the repository of low and medium level waste.
14. E3/EU+3 parties, as appropriate, are prepared to facilitate exchanges and visits to relevant sites and locations outside of Iran related to effective waste management and best practices.
15. E3/EU+3 parties, as appropriate, will facilitate the supply of appropriate equipment and systems for waste management and depository facilities in Iran.

## **G. Other projects**

16. Other projects may be implemented between the relevant E3/EU+3 parties and Iran, as mutually determined by the participants in the JCPOA, including in the following areas:
  - 16.1. Construction of nuclear desalination and associated infrastructure in Iran;
  - 16.2. Development of laser technology for medical applications (e.g. for eye surgery);