**Concept Number:** IRA2018004

**Title:** Strengthening regulatory competence and capability of radioactive waste management for improved national nuclear and radiation safety

**Original Language Title:** English

**Project Number:** ?????

**Project Type:** National

**Project For:** Iran, Islamic Republic of

**Submitted By:** Member State and/or Observers With Rights

**Priority:** 1

**Project duration (Total number of years):** 4

**Project duration (Start date):** 2020-01-01

**Field of Activity:** 11 - Governmental and regulatory infrastructure for nuclear installations safety

**FOA Distribution:**
FoA Code: 11 = 40%
FoA Code: 19 = 40%
FoA Code: 12 = 20%

**Sustainable Development Goal:**
07 - Ensure access to affordable, reliable, sustainable and modern energy for all

**Link to RB Programme:** 3.3 Radiation and Transport Safety - 3.3.2 Regulatory Infrastructure and Transport Safety

**Project Description/Abstract:** The objective of this project is to enhance the capabilities of the Iran Nuclear Regulatory Authority as the Nuclear Regulatory Body in Iran in carrying out their regulatory functions in line with the updated IAEA safety standards. The main targets for INRA are: Establishment of Nuclear Safety Centre (NSC) as INRA’s technical support organization; Regulatory Safety assessment and supervision over safety of Busher Nuclear Power Plant2 and other Nuclear Fuel Cycle Facilities (NFCFs); Upgrade of the integrated quality management system at INRA; and Compliance assurance in the safe transport of Radioactive Material. Iran Radioactive Waste Management Company (IRWA) is the designated company in charge of implementing the national program on radioactive waste management. IRWA is currently developing radioactive waste management infrastructure at Anarak. This includes facilities to characterize, treat, store and dispose of the waste. The site will accept waste from the Bushehr NPP (both conditioned and solid), and various other smaller waste producers such as medical, NORM and other industrial uses. This TC project will therefore aim at strengthening IRWA’s capacity in operating its waste management facilities including developing waste characterization methods, evaluating the borehole option for Disposal of Disused Sealed Radioactive Sources (DSRS) and producing a feasibility study report for the proposal of methodology and strategy of radioactive waste and spent fuel management.

**Problem to be addressed:**

Iran Nuclear Regulatory Authority (INRA), as the only national nuclear regulatory body for regulating all nuclear and radiation facilities and activities in Iran is facing challenges in the required capacity and competency to carry out its regulatory functions effectively. As part of its strategic plan, a Nuclear Safety Centre (NSC) will be established to act as INRA technical support organization for independent safety review and assessment. Part of the human resource will be from current staff of INRA. However, additional capacity building, development of procedures and upgrading of integrated management system is required for effective delivery of services for effective and efficient implementation of the assigned role. There are also emerging issues that becoming priority to be addressed by INRA on programme for regulating and monitoring of NORM. Hence, INRA wishes to receive a continuation of the IAEA assistance in the period 2020-2023 to further strengthen its capabilities and competencies in performing regulatory functions and discharge its responsibilities.

IRWA will start operating its repository at the Anarak site in the coming years. Proposing spent fuel management options and remediation activities are also an area of which IRWA has been given the responsibility as well. IAEA technical advice and assistance regarding above mentioned activities and the availability of equipment for the characterization of waste or to perform radiation monitoring are therefore needed to strengthen IRWA’s capabilities to perform its role. GACHIN mining and milling facility was closed down and therefore, there is a need to initiate the decommissioning plan and the site remediation program.. In addition, the operation of Bushehr NPP and emerging new phases of BNPP unit 2 and 3 are expected to increase the amount of spent fuels. Therefore, it’s the management of spent fuel should be defined in advance and IRWA is expected to proposed several feasible options to the government for its final decision.

**Stakeholder:** There will be two main counterparts for this project, Iran regulatory authority (INRA) and Iran Radioactive Waste Management Company (IRWA). INRA is mainly responsible for meeting the targets for outputs 1, 2 and 3 of the project while IRWA is mainly responsible for output numbers 4, 5 and 6. Other nuclear installations such as the Operating Organizations and Utilities including NPPs, RRs and FCFs, Licensees (or license holders), Technical Support Organizations (TSOs) are the main stakeholders in the project. Also, general public and nuclear science and development and research institutes and universities are the beneficiaries of the project.

**Partnerships:** INRA may be collaborating with an international organization for a project to support the physical establishment of the Nuclear Safety Centre and therefore this IAEA TC project will focus on the capability building of the human resources for the Nuclear Safety Centre.

**Overall Objective:** To strengthen and enhance national capabilities for safe, reliable and sustainable application of nuclear technology for peaceful uses for socio-economic development

**Role of nuclear technology and IAEA:** The project objective is to strengthen national capabilities for regulating all radiation and nuclear activities throughout the country and safely managing the radioactive waste. It is expected that the IAEA will contribute by enhancing the capability of human resource and provide the necessary technical assistance/support and facilitate in procurement of technical equipment.

**Participating Member State(s):**
Iran, Islamic Republic of

**Physical infrastructure and human resources:** The INRA’s experts accompanied with the NSC experts (as the main internal TSO of INRA) will be the main manpower in the project. Also, INRA will benefit the experiences of other sectors whenever it recognized their knowledge and experience are useful and has a complementary role in conducting the projects. The physical location of meetings, WSs and expert missions will be INRA or NSC premises. All INRA and NSC equipment including laboratories, computer center and documentation center will be available. IRWA staffs as well as some other supporting companies' staff and professors from universities are the main human resource of this project dealing with safe management of radioactive waste. Anarak disposal facility as a central disposal has some unique and brilliant parameters that may meet all requirements of deep geological repository and the treatment saloon in this repository can receive the decommissioning waste as well. Saghand Uranium mine can be converted to the repository and GACHIN mining and milling facility is ready for the decommissioning and remediation process.

**Sustainability:** In the short term, the outputs are expected to improve the effectiveness of INRA’s system and IRWA's radioactive waste management activities. The project also utilizes a structured approach and activities to develop indigenous resources and in house competence and trained manpower with an aim to produce sustainable improvements in regulating radiation and nuclear activities in the country including safe management of radioactive waste.

**Safety regulatory infrastructure:** Safety infrastructure and associated standards and procedures at the national level are adequate to ensure that the project will be implemented in a safe manner.

**Other considerations, e.g. environment, gender:** The projects are defined based on the INRA’s and IRWA's prophecy i.e. protection of workers, public, future generations and environment against harmful effect of radiation. It is firmly believed that the defined projects have positive impact in this direction.

**Implementation strategy:** This project will focus on further strengthening of Iran’s safety, waste management, decommissioning and regulatory capabilities through technical cooperation based on safety standards, other IAEA publications and proven practices. Where possible, a train-the-trainers approach shall be adopted to maximize the multiplier effect of the support provided to the country. Knowledge management process will be strengthened in order to retain and utilize provided IAEA and international knowledge, competence and expertise. The project management approach relies on the strong ownership of the counterparts, effective national level coordination and the commitment of the project core team. This will help to anticipate and address (through close monitoring, regular reviews and timely adjustments) the need for intervention and/or additional measures in order to mitigate potential negative impact on project implementation.

**Monitoring and progress reporting:** The project foresees an annual review/coordination meeting for follow-up and assessment of the project progress. A detailed annual action plan will be prepared for the execution of the project and regularly updated. PPARs will be shared with the Agency to monitor the progress of the project.

**Risk management:** The main risks in implementation of this project are to recruit key international experts, placement of fellows for training and impediment for procurement of equipment. These risks will be reviewed in regular meetings and actions will be identified to mitigate these risks.

|  |
| --- |
| **CORE FINANCING** |
| **Year** | **Human Resource Components** (Euros) | **Procurement Components** (Euros) | **Total** (Euros) |
| Experts | Meetings/ Workshop | Fellow-ships | Scientific Visits | Training Courses | **Sub-Total** | Equipment | Sub-Contracts | **Sub-Total** |
| 2020 | 40 950 | 42 000 | 11 340 | 21 420 | 0 | **115 710** | 0 | 0 | **0** | **115 710** |
| 2021 | 15 750 | 94 500 | 17 010 | 9 450 | 0 | **136 710** | 35 000 | 0 | **35 000** | **171 710** |
| 2022 | 42 000 | 15 750 | 0 | 6 300 | 11 025 | **75 075** | 0 | 0 | **0** | **75 075** |
| 2023 | 15 750 | 0 | 0 | 0 | 0 | **15 750** | 0 | 0 | **0** | **15 750** |
| **First Year Approved : 2020** |
| **FOOTNOTE-a/ FINANCING** |
| **Human Resource Components (Euros)** | **Procurement Components (Euros)** | **Total (Euros)** |
| Experts | Meetings/ Workshop | Fellow-ships | Scientific Visits | Training Courses | **Sub-Total** | Equipment | Sub-Contracts | **Sub-Total** |
| 0 | 10 500 | 0 | 0 | 0 | **10 500** | 50 000 | 0 | **50 000** | **60 500** |
| 5 250 | 21 000 | 0 | 6 300 | 0 | **32 550** | 0 | 0 | **0** | **32 550** |
| 10 500 | 0 | 0 | 0 | 0 | **10 500** | 10 000 | 0 | **10 000** | **20 500** |
| 5 250 | 0 | 0 | 0 | 0 | **5 250** | 0 | 0 | **0** | **5 250** |
| **First Year Approved : 2020** |

|  |
| --- |
| **Non-Agency FINANCING** |
| **Year** | **Human Resource Components (Euros)** | **Procurement Components (Euros)** | **Total (Euros)** |
| Experts | Meetings/ Workshop | Fellow-ships | Scientific Visits | Training Courses | **Sub-Total** | Equipment | Sub-Contracts | **Sub-Total** |
| 2020 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 65 000 | **65 000** | **65 000** |
| 2021 | 4 200 | 0 | 0 | 0 | 0 | **4 200** | 0 | 38 000 | **38 000** | **42 200** |
| 2022 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 11 000 | **11 000** | **11 000** |
| 2023 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 31 000 | **31 000** | **31 000** |
| **First Year Approved : 2020** |

 **Logical Framework Matrix (LFM)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Design Element** | **Indicator** | **Baseline and Target** | **Means of Verification** | **Assumptions** |
| **Outcome** | Improved radiation and nuclear safety through effective oversight and improved capability in the safe management of radioactive waste  | Enhancement of INRA’s ability to oversight of the Licensees in compliance to IAEA safety standardsby end of project. National strategy on radioactive waste management finalized by end of project | Results of the first self-assessment. | The Annual Performance Reports of INRA & IRWA; IRRS mission report |  Continued support and coordination of Atomic Energy Organization of Iran |
| **Output** | 1 Nuclear Safety Center established and fully operational to support INRA | Number of documents prepared and specialist trained | No technical support provided | Safety assessment and inspection reports | National & International support for establishment and operation of NSC. |
| 2 Upgraded INRA integrated management system for its core functions and training programme | Regulatory function performed in compliance with the integrated management system by end of project.New training programme implemented by end of project | INRA management system. Target, to update current management system in line with latest IAEA standard and best practices of other regulatory bodies | EPPAR. Document and procedures of the management system | Continuous strong support of the top level management of INRA. |
| 3 Policy, strategy and programme for regulating and monitoring of NORM including its waste approved. | Enforcement of regulatory supervision of NORM in the country by end of project. | Status report of ministry of health on supervision of NORM. | INRA’s annual performance report. | Government support. |
| 4 Environmental Remediation program established for Gachin Mining & Milling Facility | Report of environmental monitoring and action plan for decommissioning activities for Gachin Mining and Milling Facility completed by end of project | Gachin Mining and Milling Facility had closed down and ready for decommisioning | The document for environmental monitoring and the action plan for decommisioning | Technical support of IAEA, financial and technical support of national government and Atomic Energy Organization of Iran, stockholders engagement |
|  |  |  |  |  |
| 5 Capability for waste characterization activities improved | Finalized option on how to carry out waste characterization by end of 2021 IRWA able to carry out waste characterization activities by end of 2023 | Waste takeover procedures prepared, waste operator and generator could get useful information for managing their waste in a proper manner | The generated waste passports and location of the waste in its final destination | Technical support of IAEA, waste characterization laboratories equipped |
| 7 Strategies, methodologies and program for management of radioactive waste and Spent Fuel proposedTSA4 | Feasibility study documents completed by end of 2023 | Target: Proposal on the options, strategy and methods for managing the spent fuel, solid and NORM waste presented to the government | Feasibility study documeGovernment decision | Technical support of IAEA providing other progressed countries in these fields |
| **Activity** | 1.1 Developing regulations, guidance and procedures for nuclear installations |  |  | N/AN/AN/AN/AN/AN/AN/A |  |
| 1.2 Training on safety assessment for nuclear safety and radiation protection |  |  | N/AN/AN/A |  |
| 1.3 Improving knowledge on safe transport of radioactive Material |  |  | N/AN/A |  |
| 1.4 Improving knowledge on inspection and enforcement activities |  |  | N/AN/AN/AN/A |  |
| 2.1 Determining regulatory body core functions based on IAEA Safety standards |  |  | N/A |  |
| 2.2 Revising the existing QMS |  |  | N/AN/AN/AN/A |  |
| 2.3 Drafting competency management programme for INRA |  |  | N/A |  |
| 2.4 Safety assessment and supervision over safety of BNPP-2 |  |  | N/AN/AN/AN/AN/AN/AN/AN/AN/AN/A |  |
| 2.5 Safety assessment and supervision over safety of NFCFs, |  |  | N/AN/A |  |
| 2.6 Implementation of integrated quality management system at INRA and improving safety culture in nuclear and Radiation facilities and Activities; |  |  | N/AN/A |  |
| 3.1 policy strategy and programme for regulating and monitoring of NORM |  |  | N/AN/AN/AN/AN/A |  |
| 4.1 Remediation program management and considerations for Gachin mining and milling facility |  |  |  |  |
| 4.2 Environmental and source monitoring of Gachin mine and surrounding area |  |  |  |  |
| 4.3 Waste management options |  |  |  |  |
|  |  |  |  |  |
| 6.1 Investigation on methods of waste characterization |  |  |  |  |
| 6.2 Purchase of waste characterization instruments |  |  |  |  |
| 7.1 Investigation on NORM wastes and residues in national industries |  |  |  |  |
| 7.2 Design of radiomonitoring program |  |  |  |  |
| 7.3 The safety standards and their application to NORM management |  |  |  |  |
| 7.4 Options for the management of NORM waste |  |  |  |  |
| 7.5 Spent fuel storage and disposal methodologies |  |  |  |  |
| 7.6 Spent fuel handling methodologies |  |  |  |  |
| 7.7 Spent fuel deep geological studies |  |  |  |  |
| 7.8 Development of feasibility study |  |  |  |  |
| 7.9 Strengthening of solid radioactive waste treatment |  |  |  |  |
| **Input** | 1.1.1 EM on decommissioning of nuclear facilities regulations including specifying the role of the regulatory authority |  |  |  |  |
| 1.1.2 Workshop on developing storage/disposal of spent fuel regulations |  |  |  |  |
| 1.1.3 EM on developing regulatory guidance on characterization methods and technology to meet waste acceptance criteria |  |  |  |  |
| 1.1.4 EM on developing regulatory guidance on approaches and concepts for effective disposal of radioactive waste |  |  |  |  |
| 1.1.5 Expert advice on determination of standard (limit) level of trace elements for nuclear facilities |  |  |  |  |
| 1.1.6 Workshop on establishment of regulatory guidance for radiation protection in High Level and Existing Exposure |  |  |  |  |
| 1.1.7 EMs on developing regulations and regulatory guides for FCFs |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 1.2.1 Workshop on estimation of age of component in nuclear installations |  |  |  |  |
| 1.2.2 Workshop on periodic safety review of NFCFs | Fnote a – can be combined with 1.1.7 too |  |  |  |
| 1.2.3 WS on Nuclear Safety School |  |  |  |  |
| 1.3.1 Workshop on compliance assurance in safe transport of radioactive material |  |  |  |  |
| 1.3.2 Workshop on package, design and safety performance | Footnote/a  |  |  |  |
| 1.4.1 Technical meeting on developing inspection procedure for management of radioactive waste of research reactors |  |  |  |  |
| 1.4.2 Workshop on risk informed inspection including inspection of FCF and dry and wet tail dam storage |  |  |  |  |
| 1 |  |  |  |  |
|  |  |  |  |  |
| 2.1.1 Workshop on roles and responsibilities of regulatory body in qualification of NDT in inspection for NPP |  |  |  |  |
| 2.2.1 Expert mission on management system audit report, QAP and integrated management system |  |  |  |  |
| 2.2.2 Workshop on preparation of ARM (Advanced Ref Material) Documents for preparation of IRRS mission |  |  |  |  |
| 2.2.3 Preparatory mission for IRRS Mission (2020) |  |  |  |  |
| 2.2.4 Conducting IRRS Mission |  |  |  |  |
| 2.3.1 Expert mission on establishment of competence management programme for regulatory body |  |  |  |  |
| 2.4.1 Expert mission on review and assessment of chapter 3 and 4of BNPP-2 |  |  |  |  |
|  | Combined with 2.4.1 |  |  |  |
| 2.4.3 Expert mission on review and assessment of chapter 15 of BNPP-2 |  |  |  |  |
| 2.4.4 Expert mission on review and assessment of chapter 19 of BNPP-2 |  |  |  |  |
| 2.4.5 WS on developing national standard review plan for review and assessment of BNPP’s SAR |  |  |  |  |
| 2.4.6 EM to review standard review plan for review and assessment of BNPP’s SAR | Footnote a |  |  |  |
| 2.4.7 EM to review BNPP-2 PSA level 1 |  |  |  |  |
| 2.4.8 EM to review BNPP-2 PSA level 2 | Footnote a |  |  |  |
| 2.4.9 EM to review BNPP-2 Fire PSA | Footnote a |  |  |  |
| 2.4.10 Fellowships on neutronic and thermal hydraulic computer codes |  |  |  |  |
|  | Similar to 2.4.10 |  |  |  |
|  | Similar to 2.4.10 |  |  |  |
|  | Similar to 2.4.10 |  |  |  |
| 2.5.1 EMs on review and assessment of specific chapters of NFCFs | Unclear – Footnote a |  |  |  |
| 2.5.2 Scientific Visits of FCFs including UCF, FMP, FEP, etc., |  |  |  |  |
|  | Similar with 2.5.2 |  |  |  |
|  | Similar to 2.5.1 |  |  |  |
| 2 | Combined with 2.2.1 |  |  |  |
| 2.6.2 EM on review of INRA’s regulation of integrated quality management system; |  |  |  |  |
| 3.1.1 Workshop on comprehensive approach of radon survey in dwellings. | Support provided via RAS9064 and there are already national expert on this topic – Footnote/a |  |  |  |
| 3.1.2 Workshop on Development Radiological Plan on High Level Natural Radiation Areas (HLNRAs). |  |  |  |  |
| 3.1.3 Expert mission on monitoring, assessing and regulating for NORM in: Oil and gas industry,Mines other than uranium and thorium mines and Building materials | Combined with operator and IRWA |  |  |  |
| 3.1.4 EM on Strategies and Management of radioactive waste from NORM activities | Combined with operator and IRWA |  |  |  |
| 3.1.5 EM on Occupational exposure control for NORM activities3.1.# Determination of radioactive waste category and inventory – (combining 6.1.2 and 7.4.13.1.# SV on treatment and disposal routes for NORM waste for IRWA (1 person/ 1 week) | Combined with operator and IRWA – Footnote a (not high priority– support already provided via regional TC project and there should be national experts on this topic* Should combine with 7.4.1 Identification of practical radiation protection measures

Combined with IRWA |  |  |  |
| 4.1.1 Scientific visit for development of remediation options, technology selection and waste management options for contaminated sites (2 person/ 1 week) |  |  |  |  |
| 4.1.2 Planning for remediation, site characterization, establishing the remediation criteria & strategy, suggestion for implementing remediation actions, suggestion for conducting post-remediation activities, remediation safety assessment | Local cost |  |  |  |
| 4.1.3 Investigation on remediation of areas of extensive surface contamination, localized contamination and radioactively contaminated sites from extraction and processing of ores | Local cost |  |  |  |
| 4.1.4 Expert mission on remediation strategies, options, methodologies and environmental remediation program |  |  |  |  |
| 4.1.5 ME on remediation safety assessment |  |  |  |  |
| 4.2.1 Purchasing of Handheld Radiation Detector for Gamma  | Footnote a |  |  |  |
| 44.2.2 Participation to Annual meeting of the International Working Forum for Regulatory Supervision of Legacy Sites (RSLS)RSLS demonstration events 4.2.# Participation to the RSLS working group activities  | Combined with 4.1.4for INRA and IRWAfor INRA and IRWA |  |  |  |
| 4.2.3 Developing of environmental and source radiomonitoring plan and remediation technologies and technology selection |  |  |  |  |
| 4.3.1 Developing of the decommissioning plan and waste management alternatives |  |  |  |  |
|  | Implemented under IRA9023 (4.1.7)  |  |  |  |
|  | Can be supported via RAS9089 |  |  |  |
|  | Can be supported via RAS9089 |  |  |  |
| 6.1.1 SV on radioactive waste characterization method and radioactive waste solidification and tests of cemented waste (2 person/ 1 week) |  |  |  |  |
|  | Part of Output 3 -moved to 3.1.#– combined with 7.9.1 |  |  |  |
| 6.1.3 Developing of the destructive and non-destructive tests of waste packages |  |  |  |  |
| 6.1.4 Sampling methods and List of instruments for waste assay and analysis |  |  |  |  |
| 6.1.5 Development of Cemented waste characterization document |  |  |  |  |
| 6.1.6 Specification of instruments used for Cementation of radioactive wastes |  |  |  |  |
| 6.1.7 FE for radiation lab analysis device (2 person/ 1 month) |  |  |  |  |
| 6.1.8 Participate in IAEA proficiency tests |  |  |  |  |
| 6.1.9 FE on scaling factor driving (1 person/1 month) |  |  |  |  |
|  | Support are provided under IRA9023 – facing challenges |  |  |  |
| 6.2.2 Specifications of Gas generation measurement equipment |  |  |  |  |
| 6.2.3 Specifications of destructive test equipment(Core sampling system) |  |  |  |  |
| 6.2.4 Purchase of Laboratory materials (resins, traces and reference material for characterization laboratory) | Footnote a |  |  |  |
| 6.2.5 Purchase of Destructive test equipment (Core sampling system) |  |  |  |  |
| 6.2.6 Purchase of Gas generation measurement equipment |  |  |  |  |
| 6.2.7 Characterization of Stored drums and wastes |  |  |  |  |
| 7.1.1 Origin and radiological characteristics of NORM |  |  |  |  |
| 7.1.2 Main forms of appearance of NORM |  |  |  |  |
| 7.1.3 SV on treatment and disposal routes for NORM waste (1 person/ 1 week) | Move to 3 |  |  |  |
| 7.2.1 Planning of active and passive measurements in candidate sites |  |  |  |  |
| 7.2.2 Development of strategy for management of NORM wastes and residues |  |  |  |  |
|  | Similar with Output 3 – redundant – combined with 3.1.4 |  |  |  |
| 7.3.2 ME on safety assessment of NORM waste disposal options |  |  |  |  |
| 7.4.1 Identification of practical radiation protection measures |  |  |  |  |
| 7.4.2 Managing of wastes from decontamination of plant and equipment |  |  |  |  |
| 7.5.1 Literature review for SF management |  |  |  |  |
| 7.5.2 SV of SF storage options (wet and dry) and deep geological repository (2 person/ 1 week) |  |  |  |  |
| 7.6.1 Literature review for SF handling | Local Cost |  |  |  |
| 7.6.2 SV of cask (dual purpose cask construction workshop) (2 person/ 1 week) | F/a  |  |  |  |
| 7.7.1 Literature review for SF deep geological | Local Cost |  |  |  |
| 7.8.1 Providing final SF management feasibility study |  |  |  |  |
| 7.9.1 Developing inventory and category of radioactive solid wastes | Part of Output 3 |  |  |  |
| 7.9.2 Developing sorting and cutting methods |  |  |  |  |
| 7.9.3 Developing available disposal option for each category of solid wastes |  |  |  |  |
| 7.9.4 Developing combustible Solid waste management methods |  |  |  |  |
| 7.9.5 Developing non-combustible solid waste management methods |  |  |  |  |
| 7.9.6 Developing final solid waste management strategy |  |  |  |  |
| 7.9.7 SV of solid radioactive waste treatment and decontamination (2 person/ 1 week) |  |  |  |  |
| 7.9.8 ME on preparing specification of solid waste management device | Local cost |  |  |  |
|  | On-going project IRA9023 |  |  |  |

Waste Projects

|  |  |  |  |
| --- | --- | --- | --- |
| Code  | Title | Year | Achievement |
| IRA4028 | Treatment of Low- and Intermediate-Level Radioactive Wastes | 1999-2001 | The Agency's assistance focused on the provision of expert advice and training on waste technology and safety and on the procurement of some equipment for radioactive waste treatment, including gamma spectrometers and installation & calibration of a radioactive waste treatment facility. Experts assisted in the preparation of the national waste management strategy; evaluated the status of incinerator facility in Esfahan; analyzed information on raw waste, waste form and waste packages control; prepared structure of SAR and QA for radioactive waste management centre; and supervised hydraulic tests of liquid waste treatment facilities Aqua Express, including hands-on training of two AquaExpress operators. Additionally, 5 fellows were trained on radioactive waste management technologies. As a result of this project a central waste management facility was created and human capabilities were built for the processing and interim storage of radioactive waste. This central waste management facility provides useful knowledge for developing a strategy for managing radioactive waste from planned nuclear power plants, which will contribute to ensuring proper and sound waste management and improvements in radiation protection for personnel, the general public and the environment. |
| IRA4033 | Development of National Waste Management Strategy | 2001-2002 | The Government of Iran embarked on a nuclear power plant (NPP) project to meet the energy demand of the country. In addition, various applications with radionuclides, operation of research reactors, nuclear research centres, uranium mining and milling, oil mining and other research and technological activities had also been generating radioactive waste in Iran. Effective and safe management of this waste required a comprehensive programme that included the development of human and technological infrastructure for the processing, storage and disposal of the waste. All these activities needed to be coordinated under a well defined and approved National Radioactive Waste Management Strategy on the basis of the present condition and planned disposal of the radioactive waste. The Waste Management Department of the Atomic Energy Organization of Iran was responsible for developing the national radioactive waste management strategy for the country. As a result, this project was approved in 2001 in response to a request for assistance by the Government of Iran in developing a management strategy commensurate with the requirements of the national programme for the use of nuclear power and applications with radioisotopes. In meeting the above objective, the IAEA fielded 7 expert missions with 17 experts. The IAEA awarded 2 fellowships and 6 scientific visits to the counterpart and to the staff of the counterpart institutes. Generally, expert missions were carried out to assist in the drafting and review of the radioactive waste management strategy as well as to deliver lectures at national seminars on this topic. This included assisting the local staff in developing the Safety Analysis Report for the Centralized Waste Processing Facility in Iran and lecturing at the Seminar on the National Waste Management Strategy. One expert mission was fielded to assist the counterpart in planning and commissioning of the radiochemical laboratories at the new premises of the Radioactive Waste Department, including providing training in the use of radiometric equipment. One expert assisted in the finalization of the radioactive waste management strategy and supported the counterpart during the presentation and preliminary discussion of the strategy with the regulatory body. Fellows were trained in the management of laboratories. This training covered: working in an analytical laboratory; waste sampling; registration; record keeping; quality assurance/quality control; waste processing and storage; control of waste processing treatment; safety analysis methodology; safety analysis codes and collection of inputs for safety analysis methodology. Scientific visitors acquired knowledge in the system for waste management at an NPP; including waste minimization and the strategy on radioactive waste management at the NPP, and collection, handling, treatment and disposal of radioactive waste. Scientific visitors acquired knowledge in the development of a national waste management strategy, including in the structure and preparation of this strategy. By way of the training courses and lectures mentioned, the staff of counterpart institute gained knowledge in the management of radioactive waste, options for the disposal of radioactive waste, selection of a disposal site and safety analysis for facilities for the disposal of radioactive waste. This training proved useful in the formulation of a national radioactive waste management strategy for Iran. As a result, technical capabilities of the local staff in dealing with waste treatment and disposal, spent fuel storage and management was also enhanced. |
|  IRA4034 | Characterization of Candidate Sites for Low- and Intermediate-level Radioactive Waste Repository | 2003-2004 | Research and industrial organizations in the Islamic Republic of Iran carry out their work using a wide range of nuclear technology applications, which produce significant amounts of low and intermediate level waste (LILW), including disused radioactive sources. In addition, the operation and decommissioning of planned nuclear power plants is expected to generate about 100 000 square metres of LILW. The Waste Management Department of the Atomic Energy Organization of Iran (AEOI) is in the process of completing and updating the inventory of all LILW that is currently stored at a number of temporary sites in the country. Under these circumstances, there is an urgent need for the Islamic Republic of Iran to plan and develop a near surface facility for the long term safe disposal of LILW. In addition, a borehole type repository is being developed for disused radioactive sources. The AEOI has been entrusted with the task of selecting a suitable site for the establishment of such a repository in the near future. The Waste Management Department has done some preliminary work in this area and requested technical assistance from the International Atomic Energy Agency (IAEA) to help ensure that the selection and design of the repository meet the recommended safety policies on the management of radioactive waste being generated in the country. In parallel, the regulatory infrastructure for licensing and control of nuclear facilities was under development. As a part of this effort, regulatory guidelines for the management and disposal of radioactive waste were also established. An effort was made for close coordination and interaction between the Waste Management Department and the Regulatory Body for the successful completion of the tasks involved in site characterization, safety assessment and licensing of the proposed radioactive repository. OUTPUTS In meeting the objective of the project, a series of seven expert missions related to the planned near surface disposal facility and some activities in the area of developing a borehole disposal facility for sealed sources were fielded to assist and advise the AEOI project team with field characterization activities and assessment of investigation findings. These missions assisted the counterpart in the area of remote sensing technologies to further define and delineate an identified site with regard to its suitability for a disposal facility in the context of geological setting. The missions also assisted in the area of the management of radioactive sources, specifically disposal relevant issues such as borehole repository which could be co-located with the planned near surface disposal facility for waste arising from Bushehr nuclear power plant and from nuclear applications. Missions assessed the geological and other data that had been collated by the counterpart and recommended additional work needed to characterize and select preferred sites for detailed investigations. Other mission tasks focused on site selection and characterization, providing advice to the counterpart on issues relating to potential designs for near surface and borehole disposal facilities, to advise the national regulatory body on the requirements for assessing suitability of the site for construction and operation of LILW disposal facility relevant to the Iranian conditions and to advise on quality management. It was planned that site selection, generic design and generic safety assessment of the facility be subjected to the international peer review at the end of the project duration in 2006 to close the preparatory phase of repository development and assist the counterpart in planning its implementation phase. However, the peer review (or an evaluation of the siting project and related activities) was postponed due to the prevailing situation in Iran. Since the Waste Management Department of AEOI had completed the technical activities required to develop documentation supporting the request for the siting licence, the content of those activities needed to be assessed by the external experts because of missing domestic capacities. One of the anticipated outcomes of the peer review mission was advice on the complexity of performed activities and proposals for the completion of the documentation being developed as a support for the request for the siting licence. The project also provided the counterpart institute with AMBER code for safety assessment. Installation and basic training for the code was also provided to staff of the counterpart institute. Extensive training in the field of radioactive waste management technologies were provided through four fellowships and one scientific visitor. Fellows were trained on interpretation of remote sensing geological data, including analysis of geological data for siting a repository. Training also covered conditioning and packaging of LILW for disposal, development of waste acceptance criteria and methodologies for record keeping, including development of a safety assessment report for a disposal facility. OUTCOMES This project enhanced the capability of the counterpart institute to formulate and apply site selection criteria, and to collect and analyse relevant data for the safety assessment of potential site(s), including site selection and the development of a conceptual design for the repository. This capacity is expected to contribute positively to the construction of a repository for the LILW in Iran. The project has also provided the necessary training and equipment to the counterpart institute in order to carry out the required site characterization activities. Project staff has acquired a good understanding of the principles of safety assessment and are equipped with necessary tools to undertake supporting calculations and assessment. As a result, site investigation was performed at two locations and a conceptual design and safety assessment was completed, which has yet to be reviewed by a peer review mission. In continuing this effort, a technical cooperation project on ‘Development of a Low and Intermediate Level Waste Disposal Facility, IRA3006, was approved for the 2007–2008 cycle. |
| IRA3006 | Development of a Low and Intermediate Level Waste Disposal Facility | 2007 - 2008 | In 2006, the Waste Management Department at the Iran Nuclear Waste Management Company completed the siting process and the development of a generic design for a Low and Intermediate Level Waste (LILW) repository. The next stage in its implementation was the elaboration and completion of documentation required by the national authorities for issuing the siting licence for the facility. Documents on conceptual design of the facility and its infrastructure; safety report including performance and safety assessment; preliminary Environmental Impact Assessment (EIA) and Quality Management (QM) plan were submitted to the Regulatory Authority. Due to the limited national capacity, the Agency’s assistance was needed in the preparation of such documents. OUTPUTS:The Final Site Characterization (FSC) report; the preliminary Safety Assessment Report (SAR), and the preliminary Environmental Impact Assessment (EIA) report were developed. A draft waste inventory meant for disposal was also established. OUTCOME: The project significantly contributed to national capacity in the development and preparation of relevant documents which were needed in order to apply for the construction license. |
| IRA9019 | Strengthening Owner’s Capability for Construction, Commissioning and Licensing Activities of Low and Intermediate Level Waste Disposal Facility | 2009-2011 | The need for the development of a Low and Intermediate Level Waste (LILW) facility derives from the national programme’s declared target share of nuclear energy in the total electricity generation capacity in Iran which has been set to 20 000 MW for the coming three decades. Waste management issues constitute an integral part in this programme and as such, initial screening of the various potential sites that can be used for the waste disposal facility has already been performed. The development of a reference design for a near surface repository in the selected site as well as site characterization and conceptual safety assessment were in progress. The project aimed at the timely identification and rectification of any gaps in the national expertise that was needed for the successful management of all technical issues pertaining to the licensing and safe operation of new waste disposal facility. OUTPUTS: 1. The Facility’s detailed design document has been developed except for the design of the trenches which is being addressed under the TC project IRA/9/021. 2. The required documents, such as Radiation Protection Programme (RPP), Safety Assessment Report (SAR), Quality assurance (QA) and the Emergency Preparedness Programme (EPP), to apply for a licence to transport the waste packages from Bushehr nuclear power plant to the site were developed and submitted to Regulatory Authority and the transport permit was granted. 3. The Environmental Impact Assessment (EIA) was revised. Supporting documents on ecology, regional historic, archaeological, architectural, scenic, cultural, and natural landmarks; socioeconomics; short-term environmental effects, long-term environmental effects, environmental measurements and monitoring programmes, prevention, mitigation and control methods for each of environmental negative consequences were prepared. OUTCOME: The project has significantly contributed to the development of the national capacity in the design, construction, licensing, and future safe operation of a radioactive waste disposal facility through the development of the relevant documents. |
| IRA9021 | Ensuring the Safe Construction of the TALMESI Radioactive Waste Disposal Facility | 2012-2015 | Ensuring the safety of environment is one of the main target of radioactive waste disposal. According to geological and site selection studies, erosion is one of the main issues in TALMESI disposal site. Surface development processes and local features of sediments such as sheet erosion and gully erosion are real hazard for TALMESI repository. IRA9021 is focusing on determination of erosion rate of soils in TALMESI to measure and monitor water erosion rate in disposal site. The following activities have been defined within the project scope: (i) Determination of long term erosion rate of TALMESI (by Optically stimulated luminescent (OSL) measurement); (ii) Rainfall simulation Experiments; (iii) Gully erosion monitoring; and (iv) Runoff Plots (for measurement of sheet erosion rate in disposal site). Through IRA9021, IAEA had provided assistance in (i) training in OSL sampling, site selection for OSL samples and OSL measurement; (ii) guidance in selection for Runoff plot installation and Gully monitoring; (iii) guidance for Site Selection for rainfall simulation tests; (iv) guidance in design of runoff plots; (v) guidance in manufacturing and sending of rainfall simulator; (vi) Training on rainfall simulation experiments and gully erosion monitoring; and (vii) guidance in interpretation of results . Through the activities implemented in the project, As a result, the project team were able to identify the erosion rate in particular in the gully area, the amount of sediment loss and the calculate the sheet erosion rate. Based on these information, the Preliminary Post-Closure Safety case for radioactive waste disposed at the TALMESI site were completed and It provided a technical assessment of TALMESI ability to safely store and dispose all low and medium level radioactive waste generated in Iran. |

Regulatory Project

|  |  |  |  |
| --- | --- | --- | --- |
| Code  | Title | Year | Achievement |
| IRA9015 | Regulatory Infrastructure for Licensing of Bushehr NPP | 1997-2000 | This project was approved in 1997 in response to a request from the Government of the Islamic Republic of Iran (IRA) in establishing a regulatory body with a capability for the licensing and regulatory control of the Bushehr nuclear power plant (BNPP) and other nuclear facilities in the country, in accordance with internationally recognized codes, standards, and practices. The project was subsequently extended for the next two TC cycles till 2002. The BNPP was completed as a result of a government agreement between IRA and the Russian Federation. The construction of the BNPP was implemented through a contract between the Atomic Energy Organization of Iran (AEOI) and Zarubezhatomenergostroi, Russia. The quality standards in respect of nuclear and radiological safety in BNPP were agreed between the principals and had to be conformed to the requirements and intents of standards such as the IAEA nuclear safety standards and other IAEA safety standards as well as other known national and international standards. The design concept of the BNPP was changed from the originally planned pressurized water reactor-type to the WWER (water cooled, water moderated power reactor)-1000 type reactor. In meeting the above objectives, 52 expert missions were fielded that were conducted by 102 experts. In addition, one fellow was trained and two workshops, a national training course and a meeting were held in the framework of this project. The first workshop was a National Training Workshop on Emergency Preparedness and Response; the second was a Workshop on Management of the Utility Regulatory Body. The Agency’s latest guidance, technical manuals and tools on emergency preparedness and response were utilized at the National Training Workshop. The training course and meeting were on the methodology of the review of the safety analysis report for NPPs and comparative analysis of codes and standards. The Government of Iran provided some US $120 000 in cost sharing funds for implementing some of the above activities. The first expert mission was fielded to assess the status of the regulatory body in Iran and establish an overall programme for the implementation of the project. Several expert missions on specific technical aspects were fielded to advise, assist and train staff of the counterpart institute in the following areas: (i) legislation and regulation, (ii) safety standards and guides, including methodology on safety review, (iii) organization of the regulatory body and structure, iii) regulatory inspection management and inspection procedures, (iv) licensing, (v) emergency preparedness in an event of nuclear accident, (vi) radiation protection policy, regulation and systems, and (vii) radioactive waste management policy and systems, including spent fuel. A fellow was trained on the use of computer codes for safety analysis of nuclear power plants and research reactors, in particular the reactor core behaviour. In general, the experts assisted in the development of national legislation with particular emphasis on the nuclear safety and radiation protection aspects, and corresponding regulations. The roles and structure of a nuclear safety and regulatory body for Iran were defined and the body would be responsible for providing advice on nuclear safety regulatory aspects, support for licensing activities and for carrying out all other tasks as assigned to it by national law. This included assistance in developing the policy for licensing and enforcement of regulations, as well as liaison with other national regulatory bodies. Experts also assisted in upgrading national codes and standards to international levels, training regulatory staff, formulating procedures for issuing of licenses, evaluating submitted regulatory documents and establishing a national regulatory inspectorate to carry out inspection of the activities during design, construction, commissioning and operation of BNPP. As a result of this project, the following legislative act and regulatory documents were prepared: (i) Act on Safe and Peaceful Utilization of Nuclear Energy’, (ii) regulatory documents on ‘Quality Assurance Criteria for Nuclear Facilities’, ‘Supervisory Procedures for Nuclear Power Plants in Iran’, and ‘Licensing Procedure for Nuclear Facilities in Iran’. Through the above activities that were carried out in the framework of this project, the Nuclear Safety Department of the AEOI was supplied with the necessary legal measures, resources and expertise to function as a competent national regulatory body. |
| IRA9017 | Regulatory Infrastructure for Licensing and Control of Nuclear Facilities | 2003-2004 | The Iranian Nuclear Regulatory Authority (INRA) was entrusted with the responsibility of exercising regulatory control over all national nuclear facilities and activities related to the peaceful use of nuclear energy. Through the ongoing national and relevant regional technical cooperation projects, INRA Departments of Nuclear Safety and Radiation Protection have assisted with the upgrade of their capabilities in the respective areas of competence. Taking into account the progress of the Bushehr Nuclear Power Plant (BNPP-1), the main areas for assistance to INRA focused on the review, from a regulatory perspective, of the seismic qualification of the plant systems, structures and components as well as the programmes, plans and procedures for plant commissioning. Furthermore, INRA was expected to carry out the regulator's review of the Final Safety Analysis Report (FSAR) for BNPP-1, a task that required substantial technical capacity on INRA’s part and, thus, further support from the International Atomic Energy Agency (IAEA). INRA was also expected to discharge its other regulatory functions in connection with the design, construction, commissioning and licensing of BNPP-Unit 1. In addition, INRA planned to initiate actions for preparing itself as an independent body for undertaking its national responsibilities towards facilities other than the nuclear power plant. This included review of national safety standards and guidelines, regulatory inspections, safety assessments, and regulatory control for radioactive waste management programmes. OUTPUTS The IAEA provided project assistance in the form of a series of meetings on emergency preparedness, a series of expert missions and workshops on specific topics, including two midterm and two end of year review meetings. Towards this end, a total of 17 expert missions were fielded that were conducted by 44 experts, and 4 missions were carried out by IAEA staff to counterpart institutes. In addition, the project also supported 9 national expert missions that were carried out by 25 national experts. Those missions were carried out to review and finalize the project work plan for the years 2003–2007, to identify, review and implement technical tasks including the review of the final draft of the Iranian Atomic Law and review the current level of implementation of the INRA quality management system. Missions were also implemented in order discuss and share experiences and good practices in the field of nuclear safety culture. The first expert mission was fielded to conduct a workshop on the treatment of severe accidents in the Preliminary Safety Analysis Report (PSAR). Subsequent expert missions were carried out on specific technical aspects to advise, assist and train INRA staff of in the following areas: (i) PSAR review, (ii) accident management for BNPP-1, (iii) role of the IAEA and other standards in Iranian Nuclear Regulation, (iv) review of the beyond design basic accident list, (v) seismic qualification of BNPP-1, (vi) review of the commissioning programme and procedures for BNPP-1 three expert missions comprised of nine experts were carried out in this area, (vii) operational safety issues of BNPP-1, (viii) review on quality management system, (ix) follow-up on implementation of quality management system, (x) seminar of regulatory review service, (xi) preparation of training programme for INRA, (xii) regulations regarding the radiation programme for BNPP-1, two expert missions comprised of three experts were carried out in this area, and (xiii) regulatory review of on-site emergency preparedness and procedures for BNPP-1. One of the core missions was to review the top level commissioning documentation and the process of its preparation and regulatory review, three expert missions were carried out in that area. The experts reviewed the top level documentation prepared for the commissioning of BNPP-1, reviewed the status of preparation of commissioning programme and related commissioning procedures and discussed with the counterpart and provided the recommendations for the regulatory authority of Iran regarding the methods to review the commissioning documentation. Eighteen experts were also recruited to lecture at six meetings and workshops that were organized in the framework of the project. Meetings and workshops were organized in the following areas: (i) emergency planning for BNPP-1, (ii) establishment of a quality management system for Iranian regulatory body, (iii) analysis of human and organizational factors affecting the safety of Iranian nuclear facilities, (iv) assessment of safety culture in nuclear facilities, (v) safety culture and (vi) emergency planning. Through those workshops, participants from the regulatory organization of Iran and the BNNP-1 were trained on the regulatory requirements in the area of emergency preparedness, including how to develop and implement emergency planning as well as how to prepare the emergency plan manual. One of the workshops provided an avenue for the participants to exchange practical lessons learned about the implementation of a quality management system for regulatory authorities. The meeting on safety culture helped to explain to the participants, the complex relationship between safety culture, safety management and improved operational safety. It also provided a forum for interactive dialogue on the role of the regulatory authority within the process of enhancing the safety culture in Iran. OUTCOMES As a result of this project and other related technical cooperation projects, the capabilities of the Iranian counterparts were enhanced in the areas relating to the development and implementation of a plant specific accident management programme for BNPP-1. The use of IAEA safety standards for regulating the BNPP-1 and other nuclear facilities, licensing and operational documentation of BNPP-1 and seismic safety review services (SSRS) were also enhanced. The commissioning programme and procedures for BNPP-1 were improved, as well as the PSAR review of BNNP-1, the operational safety issues of BNNP-1, the quality management system, regulatory tasks of assessment, inspection and drafting regulations related to BNPPs and the radiation protection programme of BNPP. As a result of this project, INRA is now capable of defining and establishing a regulatory quality management system complying with the requirements of the IAEA Safety Standards Series number GS-R-3, regarding the management system for facilities and activities. Apart from enhancing INRA capability to perform its national regulatory functions, the project also assisted counterpart institutes in their efforts to complete BNPP-1’s FSAR including its environmental and seismic qualification of BNPP-1 plant systems, structures, and components, and commissioning documentation which included the plan, programmes and procedures for the commissioning of BNPP-1. |
| IRA9018 | Regulatory Infrastructure for Licensing and Control of Nuclear and Radiation Facilities in Iran | 2007-2008 | The Iranian Nuclear Regulatory Authority (INRA) is the competent authority in the country responsible for licensing, supervision, and control of radiation sources and nuclear facilities. In addition to licensing and supervision of BNPP-1, INRA performs regulatory control of radiation sources. The main priorities addressed under this project were: (1) regulatory control and licensing of nuclear and radiological facilities; (2) dose assessment; (3) radiation monitoring in nuclear facilities; (4) development, completion and validation of radiation emergency plans at national and institutional levels for local emergencies and trans-boundary accidents; and (5) development of national regulations and standards. Outputs:(1) INRA personnel gained theoretical knowledge in regulatory oversight, including review of safety documents and inspection of nuclear power plants, research reactors and waste management. (2) INRA progressed as a nuclear regulatory authority as demonstrated by its regulatory function performed on the construction and preparation for start-up of the BNPP-1. Personnel competency and self-confidence for inspection of BNPP during the commissioning phase have been enhanced in preparing inspection plans and programmes, check-lists, and findings’ reports. (3) The effective Quality Management System (QMS) focusing on safety have been adopted, based on the IAEA Safety Standards and in accordance with INRA’s regulatory infrastructure. The Integrated Regulatory Review Service (IRRS) mission concluded that INRA was effectively regulating safety of BNPP-1 with well trained personnel. Outcomes: The project significantly contributed to the enhancement of regulatory control and licensing of nuclear and radiation facilities according to the international practices and standards through good management techniques. |
| IRA9020 | Enhancing the Regulation of Nuclear Facilities and Radiation Activities | 2012-2015 | **Achievements****Output – 01 – Enhanced INRA Competency** A workshop took place on the implementation of licensing process of nuclear installations. Experts presented national examples of various aspects of licensing, resulting in a better understanding of IAEA safety standards in nuclear installations. Four fellows were trained on inspection activities during operation of WWER for one month. This included inspection methods, developing inspection programmes, evaluation of findings and construction of inspection reports and monitoring. Another fellowship was carried out, during which the fellow received training in operational safety aspects of research reactors. This enhanced the ability of operating in a safe manner the TRR research reactor.A workshop took place on classification of safety systems, structures and components for NPPS. In this occasion, experiences were shared concerning SSG 30 and the IAEA safety guide DS 367 was presented. Furthermore, two workshops were implemented on NPP inspection, in which the Iranian Regulatory Body received guidance and recommendations on the controls of the fuel during the normal operation of NPP, resulting in a more knowledgeable regulatory body regarding developing and implementing NPP inspection programmes. Furthermore, another workshop took place to assist INRA, resulting in an improved understanding on how to conduct review and make assessment of SAR for RRs.An expert mission was carried out, resulting in the revision of INRA’s training needs as a consequence of the gaps analysis following completion of the first cycle of Norwegian EB project training. Subsequently, a fellow was trained on the practical use of reactor analyses software for VVER reactors, enhancing the knowledge of the project team.A workshop took place and provided practical and technical information on establishment of effective ageing management programme of the I&C system of the TRR-1. Another workshop was carried out, increasing INRA’s capabilities to review and assess submissions provided by the licensee. Lastly, an expert mission was implemented, in which the expert discussed with INRA’s counterparts the activities that are planned to take place during the remaining of the year. **Output – 02 – Updated regulations and regulatory guides.**A workshop took place on developing regulations and regulatory guides, which enhanced the ability of INRA to develop regulations and guides incorporating IAEA Safety Standards. An expert mission was carried out, during which the experts reviewed the licensing regulations and guidance documents for new NPP. Furthermore, another expert mission took place, in which two IAEA experts reviewed INRA’s seismic regulations. Additionally, a staff travel mission took place in which the Programme Management Officer reviewed the implementation of the TC Programme and discussed further actions. **Output – 03 – Safety case of radioactive waste disposal facility reviewed and approved**A workshop was implemented on review and assessment of safety cases for waste disposal facilities. This improved the understanding of participants about hoe to review documents related to the licensing of near-surface disposal facility. Another training workshop took place on Safety Assessment Software for Waste Storage and Disposal Facilities. This enhanced the counterpart’s capacity in this topic, using ECOLEGO software tool. Additionally, a third workshop was carried out on this topic, achieving an action plan for improvement of regulatory capabilities.  **Output – 04 – Safety related documents of NPPs, RRs and waste disposal facilities assessed and reviewed.**An expert mission was implemented on the regulatory oversight of emergency operating procedures and accident management guidelines and prepared a workshop on the topic. This achieved the improved capability of INRA staff to provide regulatory oversight of extreme accident related topics. Another expert mission took place on strengthening the role of the regulatory authority in light of the Fukushima accident.**Output – 05 - Improved regulatory control procedures for discharges and radiation monitoring.**Two review meetings were carried out, in which the implementation of activities in the workplan were revised and adjusted. Moreover, an expert mission took place. In this occasion, advice and guidance was provided to the INRA on the establishment of a national radon survey. **Output – 06 – IAEA safety standards for management system implemented**A workshop on modelling dispersion and dose assessment for the marine environment radiation exposure pathways was implemented. Models and assistance was provided, as well as the agreement of future activities related to radiological environmental assessments. In addition, an expert mission took place, during which the experts reviewed the National Nuclear Safety Department’s assessment of near surface radioactive waste disposal facility licence application documents. Subsequently, another expert mission was carried out, where a workshop was supported on regulatory assessment and oversight of accident and transient analyses, improving INRA’s technical capability in that manner. Afterwards, two experts reviewed the draft regulations of the INRA on Emergency Preparedness and Response in the context of IAEA safety standards. **Output – 07 – Regulatory review follow-up mission (IRRS) implemented.**An expert mission took place, on SARIS, Regulatory Self-Assessment Seminar. Technical presentations and discussions on the SARIS methodology were provided. **Output – 08 – INRA regulations and related documents on emergency preparedness and responses reviewed and updated**A workshop on EPR fundamentals and development of a response plan for nuclear emergencies was implemented, in which, presentations were delivered on the EPR requirements, as well as, provided guidance in this topic. Another workshop took place regarding Severe Accident Management and Emergency Preparedness, where INRA was provided with expertise concerning the requirements and OSART mission highlights. Lastly, an expert mission was carried out to review INRA’s Regulatory Assessment of the Safety Analysis report of the TRR. This improved the counterpart’s understanding of the IAEA safety standards. **Outcome**This project improved the ability of the INRA in licensing and control of nuclear facilities, enhancing their capabilities in safety regulations, as well as, emergency preparedness and response.  |