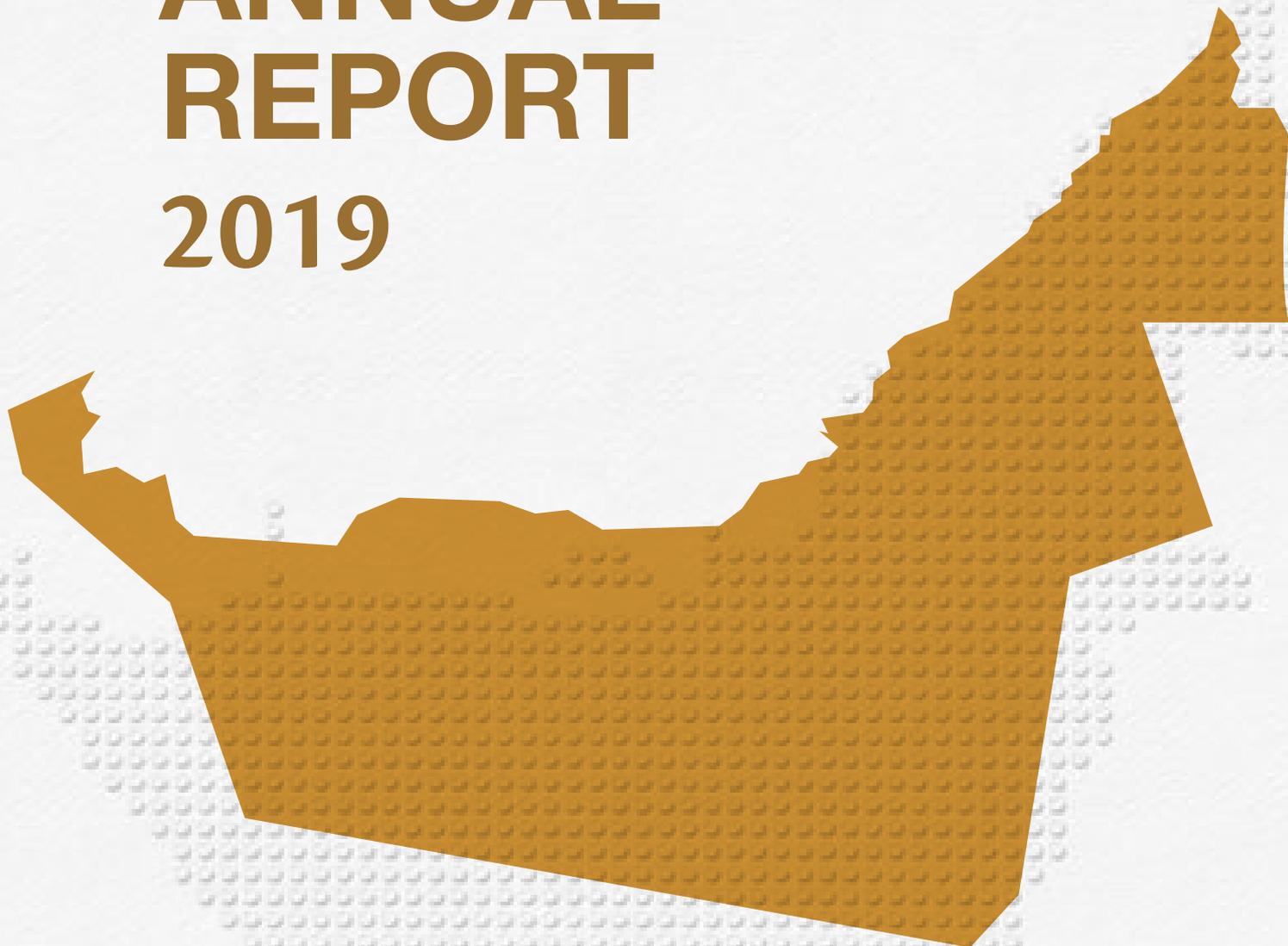


ANNUAL REPORT 2019





H.H. SHEIKH KHALIFA BIN ZAYED AL NAHYAN

President of the United Arab Emirates
and Ruler of Abu Dhabi



H.H. SHEIKH MOHAMMED BIN RASHID AL MAKTOUM

Vice President of the United Arab Emirates,
Prime Minister and Ruler of Dubai



H.H. SHEIKH MOHAMMED BIN ZAYED AL NAHYAN

Abu Dhabi Crown Prince and
Deputy Supreme
Commander of the UAE Armed Forces

PAVING A PATHWAY OF EXCELLENCE

In 2009 FANR embarked on a journey destined to contribute to the future growth and prosperity of the UAE and its people through the highest standards of nuclear safety, security and safeguards. The year 2019 marked the 10th anniversary since the Federal Authority for Nuclear Regulation (FANR) was established with the mandate to ensure the safe, secure and peaceful use of nuclear energy and radiation sources in the UAE.

This Annual Report is an account of the activities of the Federal Authority for Nuclear Regulation (FANR), which must be submitted once a year to the Minister of Presidential Affairs pursuant to Article (11) of the Federal Law by Decree No (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy. It covers the period from 1 January 2019 to 31 December 2019.

ISBN (978-9948-34-289-2)



CONTENTS

01

2019 OVERVIEW

- MESSAGE FROM OUR CHAIRMAN
- MESSAGE FROM OUR DIRECTOR GENERAL
- FANR'S 10th ANNIVERSARY
- MILESTONES ACHIEVED IN OUR 2019 JOURNEY
 - Barakah Nuclear Power Plant
 - Inspections
 - Licences
 - Secondary Standards Dosing Laboratory
 - UAE Environmental Report
- ABOUT FANR
 - Our Corporate Philosophy
 - Our Board of Management
 - Our Organisational Structure
- BARAKAH NUCLEAR POWER PLANT
 - Licences and Assessments
 - Inspections
 - Transition to Operations
- NUCLEAR SAFETY
 - Construction and Operating Experience Feedback
- NUCLEAR SECURITY
- NUCLEAR NON-PROLIFERATION
 - Nuclear Export Control Inspections
 - Nuclear Export Control Training and International Cooperation
- RADIATION SAFETY
 - Licences
 - Radiation Safety Inspections
 - Radioactive Waste in the UAE
 - Environmental Protection
 - Radiation Source Register
 - National Dose Register
 - Regulations and Regulatory Guides
- EMERGENCY PREPAREDNESS
 - Emergency Operations Centre
 - Emergency Training, Drills and Exercises
 - Competent Authority
 - Secondary Standards Dosing Laboratory

02

FUNDAMENTALS FOR EXCELLENCE

- NATIONAL & INTERNATIONAL COLLABORATION
 - National Collaboration
 - International Collaboration
 - International Events & Conferences
- RESEARCH AND DEVELOPMENT
 - ATLAS-2
 - Halden Reactor Programme
 - MORAD Project

03

CORPORATE GOVERNANCE

- INTEGRATED MANAGEMENT SYSTEM
 - ISO 9001:2015
 - Performance Monitoring Framework
- BOARD AUDIT AND RISK COMMITTEE
- INTERNAL AUDIT
- RADIATION PROTECTION COMMITTEE
 - Orphan Sources Recovery Working Group
 - National Strategy for Education, Training and Qualification in Radiation Protection Working Group
 - National Environmental Radiological Measurements Working Group

FINANCIAL STATEMENTS

- FANR Total Expenditure in 2019

04

BUILDING CAPACITY

- EMIRATISATION
- WOMEN AT FANR
- TRAINING AND DEVELOPMENT
 - Leadership and Management Development Programme
 - Scholarship Programme
 - Internship Programme
 - Competency Development Framework
 - Developpee Programme
 - Internal Training Programmes
 - Inspector Qualification Programme
 - International Collaboration Supporting Education and Training
- KNOWLEDGE MANAGEMENT
 - Knowledge Loss Risk Assessment
 - Knowledge Resource Matrix
 - Preserving History
- POSITIVE CULTURE
 - Cultural Diversity at FANR
 - Acknowledging Excellence
 - Employee Happiness & Well-being
- INNOVATION STRATEGY

CONTINUED EXCELLENCE IN THE FUTURE

01

MESSAGE FROM



THE CHAIRMAN

The year 2019 has been marked with significant progress towards FANR's Mission of ensuring the peaceful, safe and secure use of nuclear energy and radiation sources in the UAE while developing the sustainability of the UAE's regulatory infrastructure according to its 2017-2021 Corporate Strategy.

It is my pleasure to present the Annual Report highlighting FANR's main achievements for the year 2019. The Barakah Nuclear Power Plant has remained our top priority as it will contribute to the UAE's energy grid and meet our beloved country's ambitions to diversify its energy sources. It remains our mission to ensure that the UAE's nuclear sector is safe, secure and peaceful.

During the year, the UAE hosted the Emergency Preparedness Review (EPREV) follow-up mission led by the International Atomic Energy Agency, which reviewed the progress made in the UAE based on EPREV's 2015 mission recommendations in preparing the necessary response arrangements to be applied in the unlikely event of a nuclear emergency at the Barakah Nuclear Power Plant. The follow-up mission praised the significant improvements made by the UAE in developing and strengthening its nuclear emergency preparedness and response arrangements for the Barakah Nuclear Power Plant.

In 2019 we celebrated with our key stakeholders, the 10th anniversary of FANR by showcasing key milestones achieved on our journey while simultaneously building a strong regulatory system. Over these 10 years since our establishment, FANR has proved its commitment to fulfilling its mission locally and globally making the government agenda a reality and ensuring the safe, secure and peaceful use of nuclear and radioactive activities in the UAE.

Regulating the nuclear industry is a complex responsibility requiring high-level and knowledge-intensive expertise. This is why we are proud to have qualified, Emirati nuclear staff members working alongside our expatriate staff in nuclear safety, nuclear security and nuclear non-proliferation.

We encourage research and development through the course of our work, and will continue to work with national and international partners to build a stringent regulatory framework to further prepare our Emirati staff to lead the UAE's nuclear regulator.

H.E. Abdulla Nasser Al Suwaidi
Chairman

MESSAGE FROM



THE DIRECTOR GENERAL

FANR has continued to realise its vision of being a globally recognised nuclear regulator through the provision of thorough oversight of the nuclear sector in the UAE. In the 10 years' since its establishment, FANR has put in place a robust, five-year regulatory framework with associated processes and procedures to ensure we carry out our mission to protect the public and environment from nuclear and radiation hazards.

In early-2019 we launched FANR's Innovation Strategy, which aims to develop innovative solutions that contribute to FANR's Vision of being globally recognised as a leading nuclear regulator. Regulatory oversight of the Barakah Nuclear Power Plant remains our core focus for which we completed the review of the operation licence application for Unit 1. FANR staff conducted more than 50 inspections in 2019 related to the Barakah Nuclear Power Plant. These inspections included verification of the licensee's operator training and certification programme as well as the licensee's organisational readiness for Unit 1 operations, cyber security, nuclear fuel storage and other requirements. FANR certified 53 senior reactor operators employed by the Nawah Energy Company to operate and manage the Main Control Room of Unit 1 of the Barakah Nuclear Power Plant. FANR also deployed two female inspectors for a two-year term on-site at the Barakah Nuclear Power Plant.

In 2019 staff continued to develop or revise a number of regulations and regulatory guides in accordance with FANR's five-year regulatory framework. Some of these regulatory documents address the disposal of spent fuel and radioactive waste while the regulations focus on the physical protection plan for the nuclear power plant and export control.

We have been gearing-up our efforts to protect the public and the environment by conducting high-quality regulatory programmes for areas where radiation applications are used outside the nuclear programme such as for medical and industrial purposes. In 2019 FANR issued a total of 1,088 licences to conduct activities using regulated material in different fields. The majority of the licences issued were for medical purposes whilst the remainder were for non-medical purposes. FANR issued 49 licences related to the use, handling and possession of nuclear material as well as its import and export. FANR's online system, the NuTech Portal, was launched in March 2019. The system is fully integrated with Abu Dhabi General Administration of Customs and enables licensees to receive approval on their shipments within minutes. The paperless NuTech Portal has reduced the approval time for clearing shipments from Abu Dhabi customs by 80% and achieved a customer happiness rating of 100%.

Research and development will eventually contribute to the sustainability of nuclear applications in the UAE. In 2019 FANR joined Khalifa University, and Emirates Nuclear Energy Corporation to open the Emirates Nuclear Technology Centre at Khalifa University in Abu Dhabi, UAE. The primary purpose of the centre is to support the long-term sustainability of the UAE Peaceful Nuclear Energy Programme by creating a dedicated innovation hub for peaceful nuclear technologies. The centre's initial research projects will focus on three areas: nuclear safety and systems; nuclear material science and chemistry; and radiation safety in the environment.

FANR's Secondary Standards Dosimetry Laboratory provided over 500 calibration services during the year for customers in the UAE and abroad. The Secondary Standards Dosimetry Laboratory's radiation metrology and calibration services ensure that accurately known doses are delivered to patients during diagnosis and therapy, and that radiation measurement instruments used throughout the UAE including those used in the nuclear programme provide the expected degree of accuracy to support radiation protection. The Emirates Authority for Standardisation and Metrology has named FANR's Secondary Standards Dosimetry Laboratory as a 'Designated Institute' thereby making it the UAE's reference laboratory in radiation metrology.

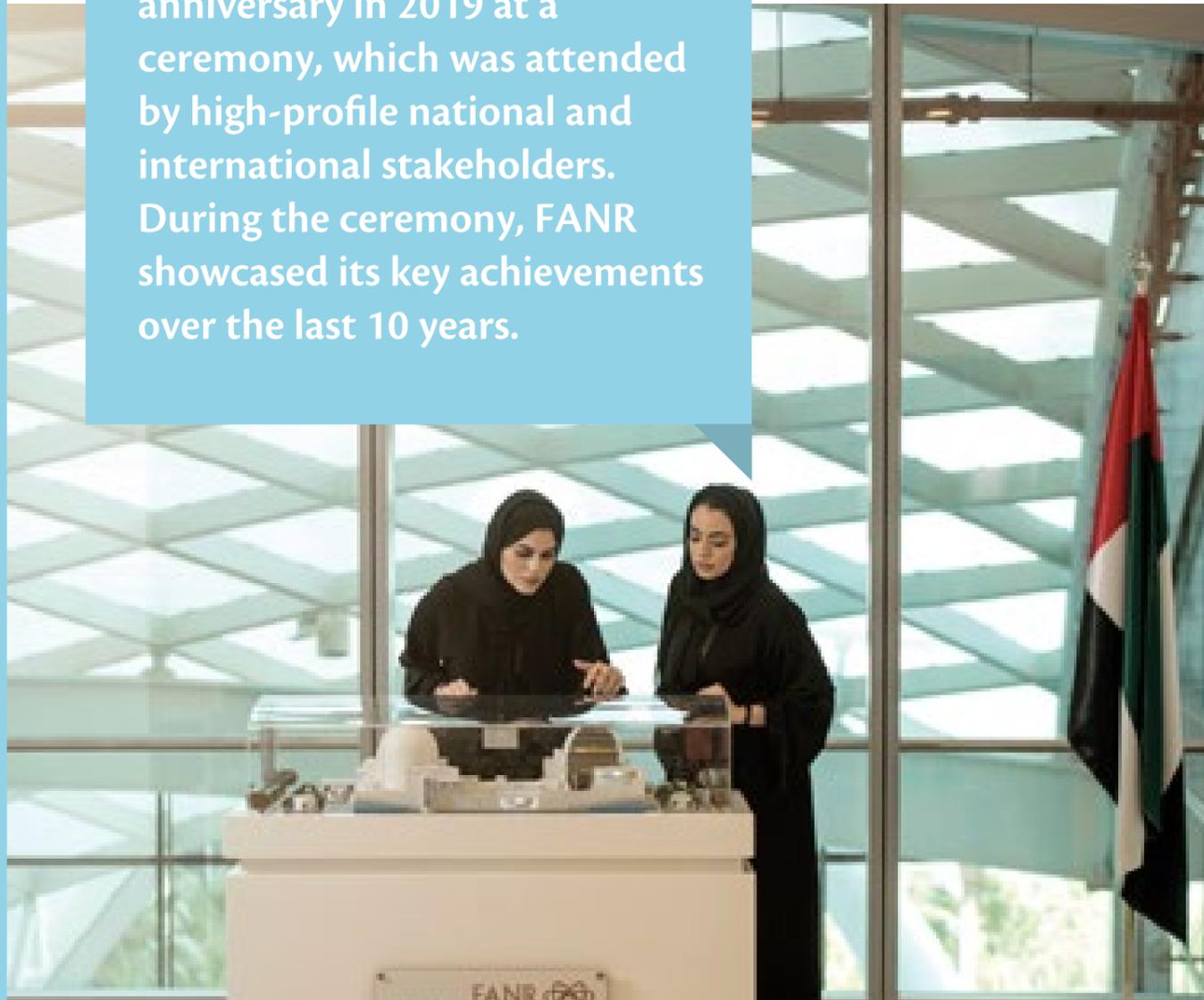
FANR's Emergency Operations Centre, which will play a key role in ensuring FANR's emergency preparedness and readiness to respond to any nuclear or radiological emergency in the UAE, was officially inaugurated in 2019. The centre embodies FANR's Mission to protect the public and the environment from radiation risks. In 2019 FANR led and participated alongside national and international stakeholders in more than 20 drills and exercises to test the centre's capability.

FANR remains dedicated to developing the capabilities of Emiratis at the nuclear regulatory level. In 2019 FANR pioneered the UAE Legal Developpee Programme to prepare Emiratis, who have studied nuclear law, for employment in FANR's Legal Affairs Department. This programme supports FANR's strategy to ensure long-term sustainability by developing Emirati talent in the nuclear sector and related fields. Long-term career opportunities for Emiratis at FANR are achieved through focused recruitment and training and development programmes. In 2019 the total workforce at FANR was 244, 67% of whom was Emirati.

Christer Viktorsson
FANR Director General

FANR'S 10th ANNIVERSARY

FANR celebrated its 10th anniversary in 2019 at a ceremony, which was attended by high-profile national and international stakeholders. During the ceremony, FANR showcased its key achievements over the last 10 years.



Over the past 10 years, FANR has developed a strong, regulatory framework to protect the public, workers and the environment from radiation and nuclear hazards, and ensure the peaceful use of all nuclear activities in the country. FANR has issued regulations, conducted safety assessments, carried out inspections and issued licences. These efforts are critical for building a nuclear and radiation safety infrastructure that will allow industry to flourish.

Capacity building for Emiratis in the nuclear sector has been a FANR priority from the outset. FANR has 244 staff of whom 67% is Emirati. Almost 45% of our Emirati colleagues hold leadership roles in the technical departments in FANR's Operations Division, and women constitute over 40% of the organisation. FANR also employs expatriate experts with the competence required for the nuclear sector.

During our 10th anniversary celebration, FANR launched the first-ever UAE Nuclear Forum with the aim of creating a unique platform for nuclear professionals to engage in and exchange knowledge.

244

FANR staff

67%

Emirati

45%

Emiratis with leadership roles

40%

of female employees

MILESTONES ACHIEVED IN FANR 2019 JOURNEY

BARAKAH NUCLEAR POWER PLANT

A key milestone was achieved in 2019 when FANR completed the review and assessment of the licence application from the Nawah Energy Company (NAWAH) to operate Unit 1 of the Barakah Nuclear Power Plant.

Organisational readiness

FANR's programme of inspection to verify the readiness of the organisational aspects needed to ensure the safe and secure operation of Unit 1 of the Barakah Nuclear Power Plant was completed. This included reviews of NAWAH's technical training programmes and the procedures used to implement NAWAH's integrated management system, and inspections to assess NAWAH's Integrated Demonstration of Organisational Readiness (IDOR). The IDOR inspections focused on verifying the readiness of plant personnel as well as the cross-cutting tools and systems used to manage and execute plant work activities.

The results of the regulatory activities conducted to verify NAWAH's organisational readiness for operation are documented in a 'Ready-to-Operate' report, which will be used to allow FANR to make an informed licensing decision on Unit 1 of the Barakah Nuclear Power Plant.

INSPECTIONS

FANR's vigorous inspection programme continued throughout the year. By December 2019 FANR inspectors had carried out 742 inspections including announced, unannounced and reactive inspections.

This number included 404 radiation safety inspections to assess the safe use of radiation sources so as to protect workers, the general public and the environment.

A total of 163 inspections were conducted on companies around the UAE to ascertain their compliance with the obligations of the UAE Safeguards Agreement, the Additional Protocol, and requirements of the international nuclear import and export control regime. Around 40% of these inspections were carried out to ensure compliance with the provisions of FANR Regulation on the Export and Import Control of Nuclear Material, Nuclear Related Items and Nuclear Related Dual-Use Items (FANR-REG-09). The remainder of the inspections were carried out to ensure compliance with the provisions of the FANR Regulation for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10).

Maintaining its resolve to ensure the security of radioactive sources within its territories, FANR continued deploying an ambitious inspection programme. A total of 74 regulatory inspections of licensees' facilities were conducted during the year.

As part of a strategic initiative to target radioactive material in transit, FANR conducted 101 regulatory transport inspections on licensees that transport radioactive sources.

742

INSPECTIONS CONDUCTED

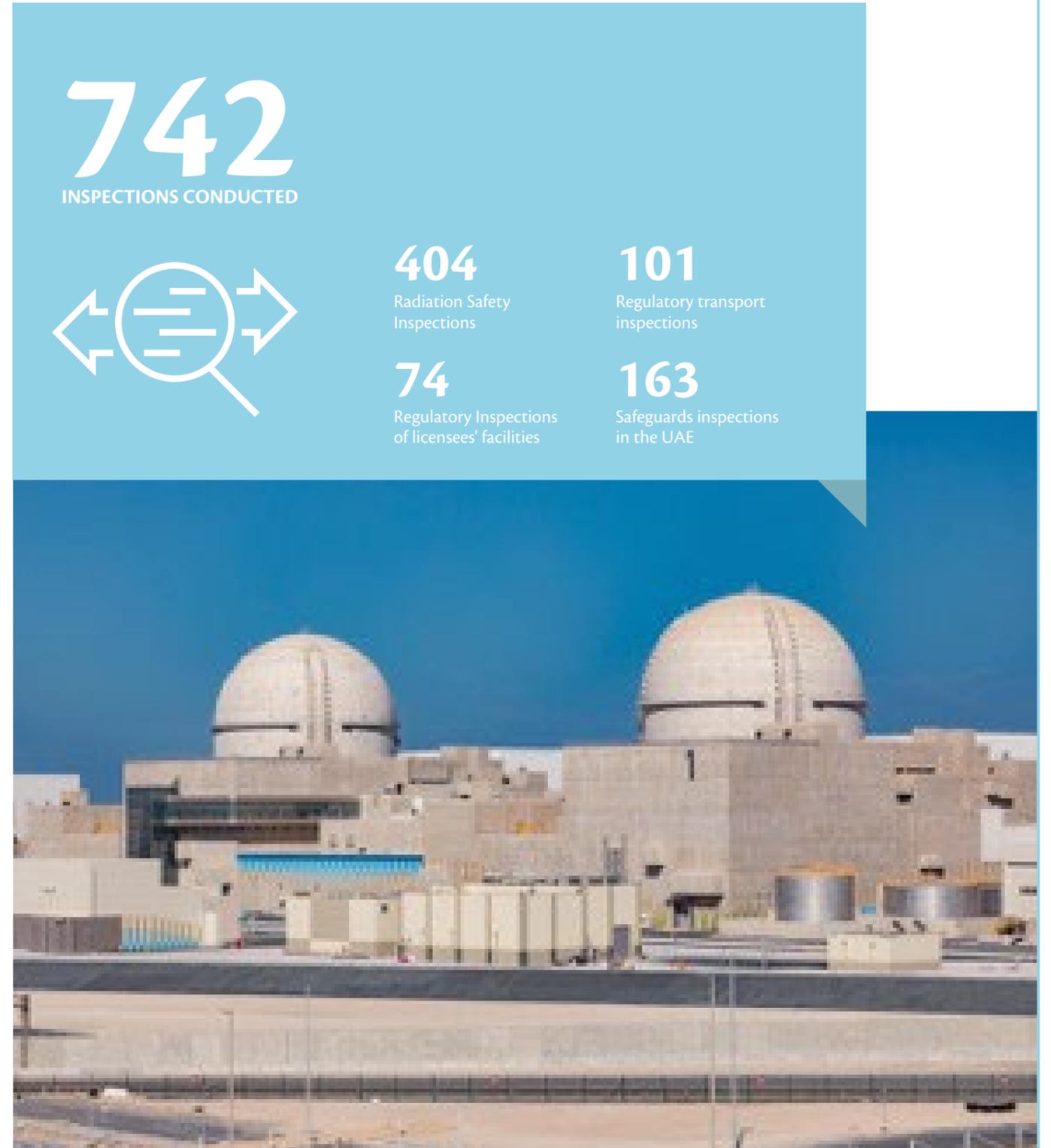


404
Radiation Safety
Inspections

101
Regulatory transport
inspections

74
Regulatory Inspections
of licensees' facilities

163
Safeguards inspections
in the UAE



1,088

Licences issued for the conduct of activities using radiation sources in medical and non-medical fields

483 new . **459** renewals . **146** amendments

49

Licences issued relating to the use, handling and possession of nuclear material and import/ export of nuclear material and regulated items

23 new . **11** renewals . **15** amendments

+500

Calibrations in FANR's Secondary Standards Dosimetry Laboratory's inaugural year

+100

Samples of water, soil, sediment, fish, air and vegetation collected from across the UAE

LICENCES

As of December 2019 FANR had issued a total of 1,088 licences to conduct activities using radiation sources in medical and non-medical fields. This figure included 483 new licences, 459 renewals and 146 amendments.

FANR also issued 49 licences related to the use, handling and possession of nuclear material and import/ export of nuclear material and regulated items. Of these 23 were new licences, 11 renewals and 15 amendments.

SECONDARY STANDARDS DOSIMETRY LABORATORY

In 2019, the first year of its operation, FANR's Secondary Standards Dosimetry Laboratory delivered more than 500 calibration services to customers in the UAE and abroad.

The Secondary Standards Dosimetry Laboratory also passed two proficiency tests organised by the International Atomic Energy Agency in relation to X-ray calibrations, which have supported the extension of the laboratory's ISO 17025 accreditation to include X-ray calibration services. FANR's Secondary Standards Dosimetry Laboratory also participated in an adequacy test as a 'reference laboratory' with the support of the Abu Dhabi Quality and Conformity Council.

The Emirates Authority for Standardization and Metrology has named FANR's Secondary Standards Dosimetry Laboratory a 'Designated Institute' thereby making it the UAE's reference laboratory in radiation metrology.

UAE ENVIRONMENTAL REPORT

FANR continuously monitors radioactivity levels in the UAE environment using its environmental laboratory at Zayed University in Abu Dhabi. We collect samples and use 17 radioactivity monitoring stations at various locations across the UAE for this purpose. More than 100 samples of water, soil, sediment, fish, air, and vegetation were collected from areas throughout the UAE in 2019 alone.

FANR's sampling efforts sometimes require the cooperation of other governmental agencies such as the Environment Authority - Abu Dhabi, or foodstuff companies such as Al Foah.

FANR's laboratory also analyses materials transported across the UAE's borders, and regularly teams-up with other federal government agencies to ensure that the radioactivity in products entering the UAE do not pose risks to the health and safety of the public.



OUR VISION

To be globally recognised as a leading nuclear regulator

OUR MISSION

To protect the public and the environment from the harmful effects of ionising radiation and to ensure the exclusively peaceful use of nuclear energy in an integrated manner with the concerned authorities and according to international best practices as well as capacity building of Emiratis in the nuclear field and various technical fields.

ABOUT FANR

OUR CORPORATE PHILOSOPHY

Since its establishment in September 2009 as the regulator for the nuclear sector in the UAE pursuant to the Federal Law by Decree No (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy, FANR has continued to fulfil its mandate to protect the country's public, workers and environment in accordance with best international practice.

OUR CORE VALUES



Safety Culture



Transparency



Collaboration



Independence



Excellence

OUR BOARD OF MANAGEMENT

The FANR Board of Management acts as the key decision-making body and is appointed pursuant to a resolution of the UAE Cabinet. The Board of Management sanctions and implements vital decisions, which impact the overall performance of FANR. Its membership includes:

OUR ORGANISATIONAL STRUCTURE

The organisational structure at FANR is designed to enable the organisation to deliver on its mandate to ensure the highest standards of nuclear and radiological safety, security and non-proliferation in the UAE.

There are two divisions at FANR: Administration and Operations. The Legal Affairs Department and Corporate Development Department fall under FANR's Director General Office. Internal Audit, which is an independent function established to evaluate the adequacy and effectiveness of FANR's controls, systems, policies and procedures, comes under the auspices of the board Audit and Risk Committee.



H.E. Abdulla Nasser Al Suwaidi
Chairman



H.E. Ambassador Hamad Ali Al Kaabi
Deputy Chairman



H.E. Mr Ali Khalfan Al Dhaheer
Board Member



H.E. Mrs Razan Khalifa Al Mubarak
Board Member



H.E. Dr Abdul Qader Ebrahim Alkhayat
Board Member



H.E. Dr Ali Mohamed Shaheen Ahmed
Board Member



H.E. Engineer Fahad Al Hammadi
Board Member

BARAKAH NUCLEAR POWER PLANT



Licences and Assessments

By December 2019 FANR had completed the review and assessment of Nawah Energy Company's (NAWAH) licence application to operate Unit 1 of the Barakah Nuclear Power Plant. The process included the completion of a comprehensive programme of inspections to support the findings that Unit 1 of the Barakah Nuclear Power Plant has been constructed in accordance with FANR requirements, and that NAWAH is organisationally ready to operate Unit 1.

FANR also completed the review and assessment of NAWAH's licence application to handle and store unirradiated nuclear fuel at Unit 2 of the Barakah Nuclear Power Plant. This included an inspection of the fuel handling and storage area at Unit 2 of the Barakah Nuclear Power Plant to support the findings that NAWAH is ready to receive unirradiated nuclear fuel.

FANR reviewed and assessed Chapter 20 of the Final Safety Analysis Report in 2019. This report is a summary of the Physical Protection Plan and complementary documents (Cyber Security Programme Manual, Security Qualification and Training, Target Sets Assessment, Contingency Plan and Vulnerability Assessment) for the operation licence of Unit 1 of the Barakah Nuclear Power Plant.

In order to support the assessment of the effectiveness of the physical protection of Unit 1 of the Barakah Nuclear Power Plant against the design basis threat, a successful security exercise was carried out by NAWAH in November 2019 in accordance with Article (29) of FANR Regulation for the Physical Protection for Nuclear Materials and Nuclear Facilities (FANR-REG-08).

Inspections

Throughout 2019 FANR staff continued to monitor and evaluate the licensed activities at the Barakah Nuclear Power Plant to verify compliance with FANR regulations. These inspections included certain activities of five resident inspectors with permanent offices at the Barakah Nuclear Power Plant, whose scope of work included monitoring the day-to-day construction and commissioning activities at the nuclear power plant to confirm adherence with FANR's regulatory requirements. FANR inspectors also had oversight responsibility for witnessing and reviewing the results of the commissioning tests both in the field and from the Main Control Room of Unit 1 of the Barakah Nuclear Power Plant.

During the 2019 review period, FANR conducted 28 nuclear safety inspections, 6 nuclear security inspections, and 5 radiation safety inspections to ensure that the facilities, equipment, and work performance meet all necessary requirements, and that they comply with the applicable law and regulations, and any conditions set out in the licence conditions.

A total of 16 safeguards inspections were conducted at the Barakah Nuclear Power Plant. Nine of these inspections were conducted by IAEA safeguards inspectors in cooperation with FANR safeguards inspectors to verify the UAE's compliance with its safeguards and Additional Protocol obligations. Three inspections were conducted by FANR safeguards inspectors to ensure compliance with the provisions of the FANR Regulation for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10),

and a further four inspections evaluated compliance with the provisions of the FANR Regulation on the Export and Import Control of Nuclear Material, Nuclear Related Items and Nuclear Related Dual-Use Items.

Three security inspections were carried out by FANR to ensure that the nuclear power plant is constructed in accordance with requirements. Two of the inspections assessed the implementation of ENEC's Cyber Security Plan and the implementation of physical protection systems. A further three inspections were conducted to ensure the plant's readiness for operation. The inspections' scope covered the 'security organisation', the management of safety/ security interface, and ensuring that the transfer of responsibility from ENEC's Security to Nawah's Security would not alter the conclusion of the Security Evaluation Report of the operation licence for Unit 1 of the Barakah Nuclear Power Plant.

Transition to Operation

A seamless symbiosis of operations and research.

FANR's processes, procedures, organisational alignment and staffing were developed in 2009 to prepare for the initial stages of the construction licence review and regulatory oversight of the construction of the Barakah Nuclear Power Plant. However, as Unit 1 of the Barakah Nuclear Power Plant approaches the operations phase, a new regulatory oversight model for operations is required with associated procedures, work instructions, organisational alignment, and staffing. In 2016 FANR initiated a project entitled 'Transition to Operation' in order to carefully identify activities and resource issues affected by the transition, and subsequently provide a comprehensive plan outlining the required steps to facilitate an effective transition and ensure that FANR continues to discharge its responsibilities.

At FANR's request, the project underwent an expert peer-review mission by the International Atomic Energy Agency (IAEA) in 2017. The IAEA team found that FANR had developed a structured approach to prepare itself for the oversight of operating reactors. A number of suggestions were raised by the IAEA for FANR's consideration.

By December 2019, the main objectives of the four-year 'Transition to Operation' project had been fulfilled successfully.

These objectives were to do the following:

- Deliver regulatory guides, internal procedures, and work instructions necessary for the regulatory oversight of operations with the support of technical support organisations.
- Develop the required technical skills and knowledge of FANR staff through a defined competency framework, technical table-top exercises, in-house integrated training, a two-month rotation at the Barakah Nuclear Power Plant, and emergency drills and exercises.
- Change FANR's organisational alignment to accommodate the requirements of human resources and Emiratisation to satisfy the competency framework.
- Develop suitable IT capabilities to manage and assess the licensee's performance during operations.
- Implement a communication strategy that ensures the values of safety culture, transparency, collaboration, and excellence are instilled in every aspect of the project.

NUCLEAR SAFETY



FANR rigorously strives to achieve the highest levels of nuclear safety in all its operations.

FANR is the nuclear regulatory body responsible for regulating the design, siting, construction, operation and decommissioning of all nuclear facilities in the UAE such as nuclear power plants. This role is clearly differentiated from that of the operator, who is in charge of running and operating the facility or nuclear power plant. The final responsibility for safety rests with the operator of the facility. FANR maintains oversight of nuclear safety, security and safeguards, in accordance with the requirements of national and international legislation through the issuance of regulations and regulatory guides to implement UAE law. FANR oversees the operator's compliance with requirements through a programme of assessment, authorisation, inspection and enforcement.

In 2019, FANR completed an in-depth review and assessment of the application for an operation licence for Unit 1 of the Barakah Nuclear Power Plant. FANR will grant a licence only when it is satisfied that the applicant's proposals and commitments comply with FANR's stringent safety requirements. FANR's senior management is currently preparing a licensing recommendation to the FANR Board of Management regarding the issuance of the licence for the operation of Unit 1 of the Barakah Nuclear Power Plant.

During the review period, FANR continued to inspect the construction of all four reactors at the Barakah site. For this inspection programme, FANR has a permanent resident inspector's office at the nuclear power plant with five inspectors monitoring construction and commissioning activities on a full-time basis.

In the course of 2019, FANR completed 28 regulatory inspections of the site construction and the operational readiness of the future operator, NAWAH, including its vendors.

Construction and Operating Experience Feedback

FANR maintained its programme of reviewing construction and operating experience feedback (COEF) information in 2019. The aim of such COEF programme is to review events that have occurred both internationally and in the UAE in order to learn lessons and implement corrective actions to avoid similar events recurring. At FANR, [the COEF programme is a core process within FANR's integrated management system, and provides the following benefits:](#)

- Analysis of trends to identify patterns in events and conditions by providing actionable intelligence and prevent the reoccurrence of undesirable events or conditions.
- Learning and gaining knowledge through experience in order to prevent or minimise the risk of future events by learning from the lessons of such events that have already occurred in the UAE or elsewhere in the areas of nuclear and radiological safety, security, and safeguards.

During the year, FANR conducted nine COEF screening meetings that collectively reviewed 20 NAWAH reports and 73 international reports in order to assess and then distribute them internally for review or action as appropriate. Eight newsletters were distributed to FANR staff to provide them with updates on NAWAH's activities and international events.

NUCLEAR SECURITY

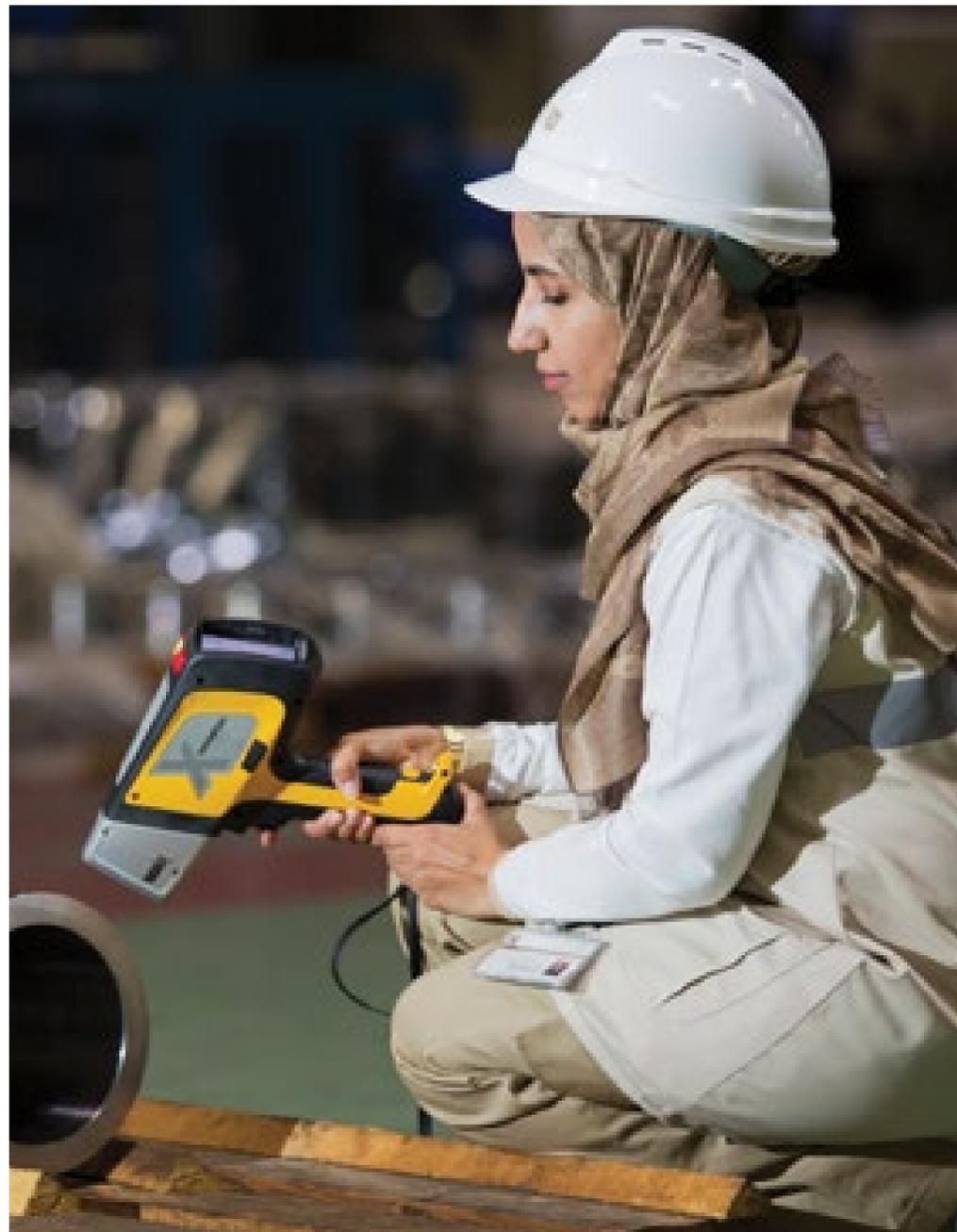


Our capability and capacity to implement and maintain international nuclear security standards, so as to keep the UAE and its people safe, was attested through FANR's certification to key standards in 2019 such as the following:

- FANR's commitment to excellence and quality was demonstrated through the repeat attainment of the **ISO 27001:2013 Certificate**. This is a globally recognised standard for Information Security Management, which provides accreditation on FANR's security practices to licensees and stakeholders, and ensures that FANR is aligned with the best practices for protecting business sensitive information.

- The **Abu Dhabi Monitoring and Control Centre certified** FANR's surveillance and control devices. This certification demonstrates that FANR has complied with the requirements of Abu Dhabi Law No. (5) for 2011 pursuant to which the Abu Dhabi Monitoring and Control Centre was established to manage and regulate the use of monitoring and control systems. This certificate will advance FANR's security measures, which will ensure, in turn, the security and safety of FANR's personnel and premises.

NUCLEAR NON- PROLIFERATION



Robust, comprehensive and transparent safeguards remain the cornerstone of the peaceful application of nuclear energy and prevention of the proliferation of nuclear weapons and their associated technologies.

As part of FANR's commitment to excellence, and in line with the government's directive of a 'Smart Vision', FANR continued to develop a nuclear export control system known as the NuTech Portal to further streamline the release of non-controlled items. The NuTech Portal is fully integrated with Abu Dhabi Customs' 'DHABI' system, and is a key step towards achieving the Digital Government 2021 vision.

With regard to safeguards' implementation, the nuclear material balance period was closed in March 2019 after physical inventory verification by the International Atomic Energy Agency. The physical inventory takings at the UAE 'locations outside facilities' confirmed that all nuclear material was accounted for correctly and completely, and that there had been no diversion of nuclear material from peaceful activities. Consequently, the physical inventory takings confirmed the solid performance of the UAE State System of Accounting for and Control of Nuclear Material (otherwise known as the 'SSAC'), which is maintained by FANR.

The International Atomic Energy Agency's (IAEA) safeguards verification and technical activities in 2019 at the Barakah Nuclear Power Plant also included design information verification at all reactor units, and physical inventory takings at Units 1 and 2 of the Barakah Nuclear Power Plant. The IAEA successfully completed the installation of containment and surveillance measures at Unit 3 of the Barakah Nuclear Power Plant. These measures, which include remote monitoring and providing information directly to the IAEA's Headquarters in Austria followed the successful installation of an identical operational system at Units 1 and 2 of the Barakah Nuclear Power Plant in 2017 and 2018.

FANR continues to develop the UAE State System of Accounting for and Control of Nuclear Material and has established a four-step plan for information management involving nuclear material accountancy, inspections and licensing. In line with FANR's commitment to achieve a fully integrated 3S regulatory approach (i.e. on safeguards, safety and security), the current phase of implementation involves the integration of safeguards and export control licensing into the existing FANR e-licensing service.

Nuclear Export Control Inspections

A total of 163 safeguards inspections were conducted around the UAE in 2019, and covered a wide scope of verification activities.

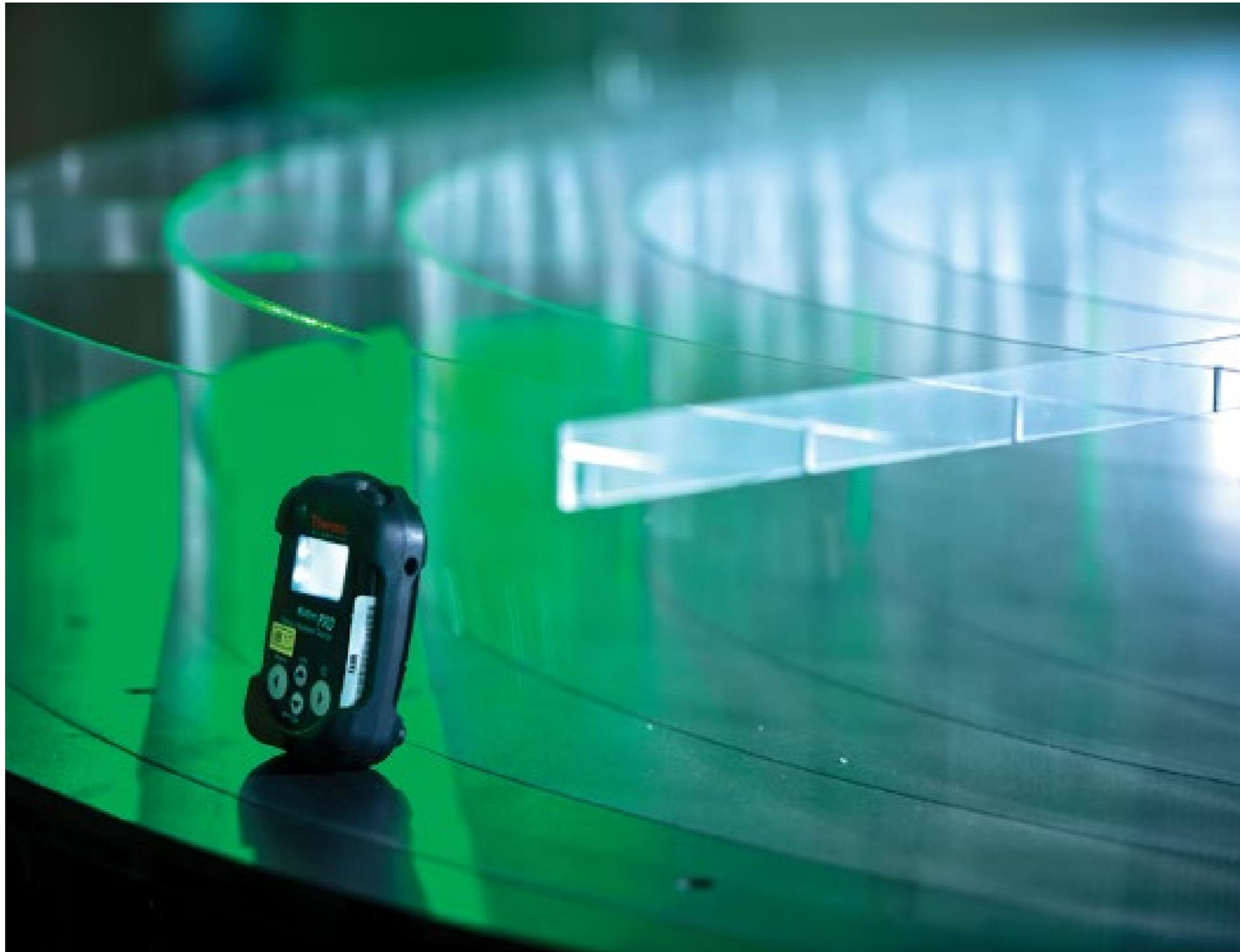
Around 40% of these inspections were to ensure compliance with the provisions of the FANR Regulation on the Export and Import Control of Nuclear Material, Nuclear Related Items and Nuclear Related Dual-Use Items (FANR-REG-09). The UAE received positive feedback from all IAEA verification activities, which confirms FANR's continued, full compliance with the obligations of the UAE's Safeguards Agreement.

Nuclear Export Control Training and International Cooperation

As a further enhancement to the mutual benefits of cooperation and collaboration between the United Arab Emirates and the Republic of Korea, joint studies were launched between FANR, the Nuclear Safety and Security Commission, and the Korea Institute of Nuclear Non-proliferation and Control. The first joint study was approved in 2019 and will be implemented in 2020; it relates to the implementation of nuclear safeguards.

In 2019, FANR employees benefited from two comprehensive nuclear export control training sessions provided by the United States' Department of Energy. The training sessions provided advanced training on nuclear related dual-use commodity identification, and catch-all control provisions.

RADIATION SAFETY



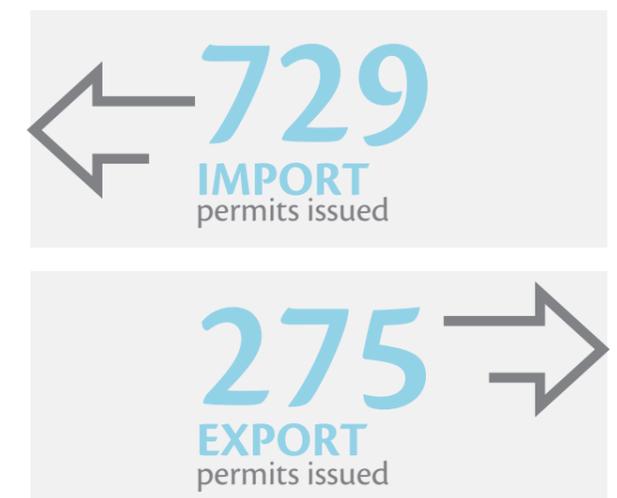
FANR ensures the highest standards of radiation protection in medicine, industry and nuclear facilities through its continuous regulatory oversight.

Licences

By the end of 2019 FANR had issued a total of 1,088 licences to conduct activities using sources of radiation in different fields, of which 615 were new licences. The majority of the licences issued were for medical purposes such as dental X-ray, medical diagnostics, nuclear medicine, and radiotherapy. The remainder were for non-medical purposes such as industrial radiography, well-logging and security screening.

Licensing the use, handling and possession of nuclear material also continued in 2019. This included the renewal of over 329 licences that were first issued or renewed after three years of the previous issued date in 2016.

FANR issued approximately 729 import permits and 275 export permits in 2019 for the purpose of controlling the movement of radiation sources and supporting the maintenance of the National Source Register. This register is consistent with the International Atomic Energy Agency's (IAEA) Code of Conduct's recommendations.



Radiation Safety Inspections

In 2019 FANR continued its radiation safety inspection programme. By the end of December 2019, FANR's radiation safety inspectors had carried out 404 inspections across the UAE, which involved announced, unannounced and reactive inspections.

During the year, FANR's inspectors noticed a better understanding from its licensees with regard to radiation safety and protection as well a greater awareness of FANR's roles, responsibilities and the importance of a strong safety culture.

Radioactive Waste in the UAE

The objectives of FANR's radiological monitoring work include surveying the radiological conditions in the UAE prior to the operation of nuclear facilities, documenting the baseline level of radiation present in the UAE's environment, and determining the source of man-made radionuclides.

In 2019 FANR issued a regulation on "Disposal of Spent Fuel and Radioactive Waste" and regulatory guide "Near-Surface Disposal of radioactive Waste" related to the disposal of spent fuel and radioactive waste as well as the related regulatory guidance for the disposal of low-level radioactive waste in a near-surface radioactive waste disposal facility. FANR staff actively participated in the cost estimation methodologies for spent fuel management at the International Atomic Energy Agency's (IAEA) Headquarters in November 2019.

FANR staff also concluded the review of the operation licence application for the treatment and disposal facilities for naturally occurring radioactive material (otherwise known as NORM). A Safety Evaluation Report and an operational readiness inspection report were prepared to support the issuance of operation licences for NORM treatment disposal facilities. FANR's Board of Management subsequently issued operation licences to the NORM treatment and disposal facilities in March 2019.

The NORM treatment and disposal facilities have yet to receive NORM waste from the diverse interim storage locations before commencing operation.

Environmental Protection

In 2019 FANR continuously monitored the radioactivity levels in the UAE environment using its environmental laboratory in Abu Dhabi and various monitoring stations across the UAE. More than 100 samples were collected during the year from different media such as water, soil, sediment, fish, air, and vegetation. In addition to the laboratory analyses, more than 800,000 individual measurements of gamma dose rates were collected from a network of 17 gamma monitoring stations throughout the UAE.

FANR's Radiological Environmental Laboratory participated in the International Atomic Energy Agency's (IAEA) 2019 inter-laboratory proficiency testing programme known as ALMERA, the Analytical Laboratories for the Measurement of Environmental Radioactivity. ALMERA has a network of more than 160 laboratories in 87 countries from around the world, and tests the ability of radiochemistry laboratories to analyse radioactive samples and accurately report the results. FANR's Radiological Environmental Laboratory succeeded in the international inter-comparison by meeting the acceptance criteria.

Radiation Sources Register

The Federal Law by Decree No (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy mandates that a National Source Register be established to maintain detailed information of all radiation sources and regulated items in the UAE. The register includes all information necessary to uniquely identify inventory items, their status and condition in their working environments, their physical locations and the organisations responsible for them.

National Dose Register

The UAE National Dose Register is an e-licensing system. It provides an online business platform for all FANR undertakings associated with regulated activities involving nuclear and regulated materials to register and maintain radiation dose records for occupationally exposed workers in the UAE. Further enhancements will be incorporated in the system in future to address regulatory requirements.



800,000
INDIVIDUAL
measurements of gamma dose rates
collected from a network of

17
GAMMA
monitoring stations
throughout the UAE

Secondary Standards Dosimetry Laboratory (SSDL)

FANR's Secondary Standards Dosimetry Laboratory located on the campus of Khalifa University officially began providing calibration services in 2019 and reached several major milestones.

As a member of the International Atomic Energy Agency/ World Health Organisation SSDL international network, FANR's Secondary Standards Dosimetry Laboratory successfully passed two IAEA Proficiency Tests related to X-ray calibrations in 2019. After a thorough assessment, the Emirates National Accreditation System extended FANR's Secondary Standards Dosimetry Laboratory ISO/IEC 17025:2017 accreditation to include X-ray calibration services.

The Emirates National Accreditation System has named FANR's Secondary Standards Dosimetry Laboratory a 'Designated Institute' thereby making it the UAE's reference laboratory in radiation metrology.

These achievements confirm the capacity of FANR's Secondary Standards Dosimetry Laboratory to supply radiation calibration services to end-users of radiation measurement devices in the medical, nuclear and industrial sectors. They also confirm that the laboratory is recognised at national and international levels for its competence and high quality results.

Regulations and Regulatory Guides

FANR's regulations and regulatory guides take into account the International Atomic Energy Agency's (IAEA) safety standards as well as other nuclear regulatory best practices.

In 2019 FANR began developing and reviewing several regulations and regulatory guides in accordance with its regulatory Plan endorsed by FANR Board of Management.

All FANR regulations and regulatory guides are subject to review and update every five years (as necessary).

In line with its five-year plan commitment, FANR issued the following regulations and regulatory guides in 2019:

- FANR-REG-27: Disposal of Radioactive Waste
- FANR-RG-027: Near-Surface Disposal of Radioactive Waste

EMERGENCY PREPAREDNESS



FANR coordinated both an International Atomic Energy Agency (IAEA) review mission on the Emergency Preparedness Review (EPREV) in 2019 and activities in preparation of the IAEA's ConvEx-3 exercise in 2021. Training and awareness sessions were implemented for staff from FANR and other UAE entities.

Emergency Operations Centre

FANR's Emergency Operations Centre was formally inaugurated in 2019. The centre was kept fully operational and updated in 2019, and also hosted a number of awareness sessions, training and qualification activities.

FANR's Emergency Response Organisation (FERO) continues to be ready to respond to a nuclear or radiological emergency. In line with both its internal procedures and FANR's role, the FERO responded promptly to an event at one of its licensees and deployed its FERO on-call team to closely monitor the situation until the minimal radiological hazard was under control.

Emergency Training, Drills and Exercises

FANR conducted and participated in 21 drills and exercises, which covered national exercises, International Atomic Energy Agency (IAEA) exercises, table-top exercises, radiological exercises, and drills at NAWAH. There were also 21 training sessions, workshops and awareness sessions conducted on a variety of topics related to nuclear and radiological emergencies. All internal training activities were driven by the qualification needs of FANR's Emergency Response Organisation.

With regard to awareness sessions for other UAE entities, FANR implemented three sessions on first response to radiation emergencies for entities from Dubai, Sharjah and Abu Dhabi. These sessions included practical sessions using FANR's equipment for simulating high radiation levels and asking participants to respond based on the concepts delivered.

21 Training, workshops & awareness sessions on nuclear and radiological emergencies

Emergency drills and exercises **21**

Competent Authority

FANR in cooperation with strategic stakeholders successfully hosted the Emergency Preparedness Review (EPREV) follow-up mission led by the International Atomic Energy Agency (IAEA) in September 2019.

The UAE's efforts during the EPREV follow-up mission included:

- Interactions with and contributions from 18 national UAE entities involved in offsite nuclear emergency preparedness
- a number of meetings and information sharing amongst those entities and experts from the EPREV team (300 hours in deliberation meetings and 50 supporting documents shared to verify the readiness of all the organisations involved)
- entrance and exit meetings with the experts

FANR was also actively involved in the UAE's nomination to host the largest and most complex IAEA exercise under international emergency conventions, ConvEx-3. This nomination led to the UAE being selected to host the exercise in October 2021. In preparation for this upcoming event, FANR organised the first UAE coordination meeting in October 2019 and the first international coordination group meeting in November 2019.

02



NATIONAL & INTERNATIONAL COLLABORATION

National Collaboration

As part of ongoing efforts to raise public awareness of FANR and the nuclear industry in the UAE, FANR conducted several community outreach activities in 2019 to inform the public of FANR's roles and responsibilities.

The FANR Public Outreach Campaign aims to engage with different segments of the community and raise awareness about FANR as the UAE's nuclear regulator and increase understanding of FANR's role in ensuring a safe, secure and peaceful nuclear energy programme. The campaign has been launched across the country, and is aimed at students in schools and universities, members of the public, government entities and FANR licensees who are authorised to use regulated items.

In 2019 FANR held seven student outreach sessions, and reached over 500 students in schools and universities in Al Ain, Dubai and Abu Dhabi. Each session featured a presentation on the basic facts about radiation in everyday life and the nuclear sector in the UAE. FANR also conducted various public outreach sessions in the community, visited community centres and presented an open forum for the public on FANR's role.

+500

Students at schools and **universities** reached in outreach sessions

'Meet Your Regulator' events are hosted by FANR on an annual basis for FANR licensees in both the medical and non-medical sectors. Such events reflect FANR's commitment to transparency as it openly shares its regulatory experience with its licensees. During the 'Meet Your Regulator' events, FANR discusses documents that its licensees should use as guidance to comply with FANR requirements. Updates are also provided to licensees on any changes in FANR's regulatory requirements.

At this year's event, FANR also discussed the new FANR e-licensing system, which was launched in July 2019. The new system provides enhancements on the old system.

FANR used the 2019 'Meet Your Regulator' event to seek first-hand feedback through open discussion in a bid to further strengthen the safety and security culture. Almost 900 participants attended the event in 2019.

900

Participants at 'Meet Your Regulator' event

FANR is committed to ensuring national cooperation with local stakeholders, and meeting global standards and best practices through cooperation with international agencies.



International Cooperation

Our international engagement strategy is driven by the ambition to achieve the highest standards of performance in the nuclear sector including safeguards and non-proliferation, as clearly laid out in the UAE Nuclear Policy.

FANR has taken an active role in international cooperation, and in doing so contributes effectively to the global safety regime. International engagement is driven by the ambition to achieve the highest standards of performance in the nuclear sector including safeguards and non-proliferation as clearly laid out in the UAE Nuclear Policy.

FANR continues to cooperate with nuclear regulatory bodies in countries such as China, France, Finland, Republic of Korea, Spain, the United Kingdom, and the United States of America.

- In 2019 there were 24 international agreements and memoranda of understanding for cooperation relevant to nuclear safety, security, safeguards and capacity building. A new agreement was concluded between FANR and the Belgian Nuclear Research Centre in 2019, and the agreement covers training and research activities.

- FANR extended its cooperation with key expert organisations in France including cooperation with the Institute for Radiological Protection and Nuclear Safety, and with the Nuclear Safety Authority to continue the exchange of information in the area of nuclear safety and radiation protection.

- A cooperation mechanism is in place with Korean regulators to exchange information on operational safety aspects of the APR1400 and other technical information related to security and safeguards. This includes cooperation with the Institute of Nuclear Safety, the Korea Institute for Nuclear Non-Proliferation and Control, the Korea Nuclear Safety and Security Commission and the Korea Atomic Energy Research Institute.

FANR actively interacts with the IAEA through a technical cooperation programme and an Integrated Work Plan

Participation At International Events & Conferences

A FANR delegation successfully participated in the International Atomic Energy Agency's (IAEA) Effective Nuclear and Radiation Regulatory Systems conference, which aims to share regulatory experiences from IAEA Member States to improve the effectiveness of nuclear and radiation regulatory systems.

Their participation included:

- A keynote speech by FANR's Director General on developing a regulatory body of high international standards in the UAE to highlight efforts put in place to build the infrastructure for nuclear facilities as well as for the use of radioactive sources in the UAE.
- A presentation from the FANR Education & Training Department Director on FANR's approach on capacity building.
- A number of posters presented by FANR on the regulation of radiation sources and medical facilities, and on strengthening international cooperation.

- FANR continued to present its key regulatory activities at key international conferences including the 63rd IAEA General Conference and the 31st Regulatory Information Conference hosted by the US Nuclear Regulatory Commission.

In cooperation with international entities, FANR has successfully hosted key technical workshops such as the following:

- Sanctions Implementation and Enforcement Workshop in cooperation with the US Department of State and Sandia National Laboratories
- Emergency Preparedness Review follow-up mission in cooperation with the IAEA
- Halden Programme Group Meeting in cooperation with the Institute for Energy Technology
- Student competition on Nuclear Science for Development in cooperation with the UAE Permanent Mission to the IAEA, and UAE entities
- Spent Fuel Management Workshop in cooperation with the Nuclear Threat Initiative

RESEARCH & DEVELOPMENT

The Federal Law by Decree No. (6) of 2009, Concerning the Peaceful Uses of Nuclear Energy empowers FANR to carry out and support research and development relevant to FANR's scope of work.

ATLAS-2

In 2019 work was carried out on three strategic research and development projects. One female Emirati, who is a FANR nuclear safety assessment engineer, was selected to participate in the ATLAS-2 Project alongside the technical project lead. Under the senior specialist's guidance and mentorship, the Emirati is learning to use the thermal hydraulic safety analysis code, RELAP 5, whilst conducting experiments and tests developed by the Korean Atomic Energy Research Institute. She participated in every test and experiment over the last two years and put FANR on the global stage regarding thermal hydraulic safety analysis by presenting two of her research findings at ATLAS Project Review Meetings. On each occasion, the Emirati demonstrated vast improvements in her skills and knowledge, and in her ability to convey technical analysis to a highly-skilled and knowledgeable audience.

In May 2019 the FANR engineer delivered a paper on RELAP 5 simulation of intermediate break loss of coolant accident at the International Congress on Advances in Nuclear Power (ICAPP) in France.

Halden Reactor Programme (HRP)

In 2019 FANR used its membership for capacity building initiatives. In 2019 the UAE served as the chairing member of the Halden Programme Group and hosted the 161st Halden Programme Group Meeting in October in Abu Dhabi. The meeting assembled nearly 50 Halden Programme Group members representing over 15 countries in the technical areas of fuel and material, and human and organisational factors.

MORAD Project

One of the most significant milestones achieved in this project in 2019 was the signing in February of a sponsorship agreement between FANR and Khalifa University to commission research activities. The MORAD project is led by FANR staff who are working with Khalifa University and the French Institute of Radiation Protection and Nuclear Safety (IRSN) to complete the activities detailed in the research project proposal.



Overall 2019 was an important milestone year for FANR's research and development projects.

Emiratis participated in the Halden Programme Group; one of whom is a new member who is now part of the first Data Legacy Project.

One Emirati presented her research at the International Congress on Advances in Nuclear Power Plants 2019 conference; and two Emirati actively participated in the literature review for the first radionuclide dispersion modelling project in the UAE.

03





INTEGRATED MANAGEMENT SYSTEM (IMS)

FANR operates an integrated management system, which was established according to IAEA standards. The integrated management system enables FANR to implement its functions and responsibilities in a safe, effective and efficient way that is accordance with the general policies set out by the FANR Board of Management.

The IMS procedure on the development and revision of IMS documents was revised in 2019 to ensure stricter governance and ease of IMS document development.

The IMS procedure on FANR management system audits and non-conformance management covers the methodology to conduct internal management system audits, the different channels of receiving non-conformances, and corrective action follow-up.

The Risk Management Process (MP.9) is based on ISO 31000 Risk Management standards and reflects the internal roles in the organisation. The process factors into account other procedures such as the Risk Assessment and Corrective Action Procedure; Occupational Health and Safety Hazard Identification and Risk Assessment Procedure; Knowledge Loss Risk Assessment Procedure; FANR Management Systems Audits and Non-conformance Management procedure; and the Business Continuity Procedure.

CORPORATE GOVERNANCE

ISO 9001:2015

The ISO 9001:2015 is an international standard that sets out the quality management principles endorsed by the International Organization for Standardization (ISO).

FANR received ISO 9001:2015 Quality Management System certification in February 2019 from the British Standards Institution for the 'regulation and management of services related to the nuclear sector in the United Arab Emirates including licensing, compliance monitoring for safety, security, safeguards and radiation protection, and the provision of services related to the radiation protection infrastructure'.

Two quality internal audits were conducted in May and October 2019 to assess system effectiveness and opportunities for improvement.

The British Standards Institution conducted a quality external audit in November 2019 and no non-conformances were raised.

PERFORMANCE MONITORING FRAMEWORK

FANR uses a performance monitoring framework to monitor progress against the organisation's five-year strategic plan as shown below.



FANR VISION

To be globally recognised as a leading Nuclear Regulator



FANR STRATEGIC OBJECTIVES

- 1 Ensure the peaceful, safe and secure use of nuclear energy and radiation sources
- 2 Develop sustainability of the UAE regulatory infrastructure
- 3 Ensure the provision of all administrative services in accordance with the quality, efficiency and transparency standards
- 4 Enhance innovation culture within the organisational work environment

In 2019 this framework ensured improvements in FANR's performance through monitoring the performance of 75 activities on 14 operational plans.

BOARD AUDIT & RISK COMMITTEE

The Audit and Risk Committee provides extensive support to FANR's Board of Management through advice on matters relating to the organisation's governance.

The committee is made up of four members and convened four times in 2019. The committee members provided recommendations, and took decisions on various concerns raised by FANR's senior management. During the review period, the Audit and Risk Committee made four recommendations to the Board of Management, took four decisions regarding the Internal Audit Department at FANR and assigned 15 actions to the Internal Audit Department and FANR's management to implement so as to enhance and improve various facets of the organisation.

Several initiatives were implemented during the year to improve governance at FANR. These included:

- Reviewing progress on the Finance and Accounting Manual and proposing suggestions to expedite development of the same.
- Providing significant guidance in matters dealing with Abu Dhabi and federal courts.
- Recommending enhancements to the inspections process by establishing integrated inspections and integrated licensing across the Operations Division.
- Reviewing the Internal Audit Department's proposal for establishing an Anti-Fraud Framework and encouraging its implementation in the forthcoming years.
- Reviewing FANR management's progress in implementing corrective actions in response to the findings of the State Audit Institution such as improvements in governance and strengthening controls in areas of contracting, compensation, recruitment and so on.
- Reviewing and providing valuable input on FANR management's initiatives around the effective implementation of the Cabinet Resolution No. 27 of 2015 Concerning Administrative Penalties for Violating the Conditions of the licenses issued by FANR.

In 2019, the Audit and Risk Committee supported the FANR Internal Audit Department by reviewing the 2019 entity-wide FANR 'Risk Refresh' results and approving the 2019 Risk-Based Internal Audit Plan.

As the primary point of contact for liaison with the State Audit Institution, the Audit and Risk Committee reviewed the State Audit Institution's report on FANR for 2018 and responded to the observations identified within the report.

The Audit and Risk Committee also provided guidance, oversight and direction to FANR's management and its external auditors in support of the closure and issuance of formal financial statements for the year ending 31 December 2018. In addition, the Audit and Risk Committee also evaluated the performance of its external auditors as well as the Internal Audit Department and provided constructive feedback.

INTERNAL AUDIT

Internal Audit is a department at FANR that was established to improve FANR's operating governance through a systematic, disciplined approach to the organisation's risk management, control and governance processes.



The following activities were carried out by the Internal Audit Department inline with 2019 Audit approved plan:

- Conducted external quality assurance and improvement programme and received the top rating of 'Generally Conforms' to the Institute of Internal Auditors international standards for the professional practice of internal auditing; this indicates that the internal audit function is judged to be in conformance with the standards in all material aspects. According to the conclusion of the quality assessment undertaken by the UAE Internal Auditors Association, FANR became the UAE's first federal authority to be rated 'Generally Conforms' for its internal audit function.
- Conducted an entity-wide 'risk refresh' exercise, which included the development of a consolidated enterprise risk register, which is linked to FANR's Operational Plan initiatives and the IMS process and procedures, and the development of a three-year risk-based internal audit plan to ensure coverage of the identified high risks through audits over a three-year period.
- Completed and reported the results of eight activities including an entity-wide annual 'risk refresh' exercise, internal audits, follow-up audits, special assignments, the Audit and Risk Committee's ad hoc requests in 2019 based on the approved annual risk-based internal audit plan.
- Conducted an annual follow-up review on agreed management action plans to enhance internal controls across FANR.
- Conducted awareness sessions on internal audit throughout the year to improve employees' understanding of risks, risk management, risk assessments, internal audits and follow-up audits (some of which were performed in collaboration with external stakeholders).
- Collaborated with international nuclear regulators to exchange best practice for internal audit in the nuclear sector.

The Radiation Protection Committee engaged in several significant discussions and decisions in 2009. These related to:

- A memorandum of understanding agreed between FANR and the UAE Armed Forces to establish orphan storage arrangements and transfer sources to the storage facility.
- Unjustified exposure reported to the Radiation Protection Committee as a matter of concern particularly with respect to new security screening technologies potentially operated without justification and physician requests for radiological examination of patients only as evidence of treatment.
- Progress reports presented to the Radiation Protection Committee on the implementation of the Radon Monitoring Project and a survey plan for radon indoor concentration measurement at Al Ain city. The Radiation Protection Committee subsequently endorsed the National Environmental Radiological Measurements Work Group for the UAE National Indoor Radon Survey for Dwellings of High Public Occupancy, a long-term project involving several national entities and competent authorities.
- Consideration of requirements for a national internal dosimetry infrastructure.
- Approving a project to establish an integrated approach between occupational health and safety, and radiological health surveillance.
- Establishing a taskforce to study the national requirement for techniques such as cytogenetic bio-dosimetry and internal dosimetry.



RADIATION PROTECTION COMMITTEE

The main activities and achievements of the Radiation Protection Committee's Workgroups during 2019 are summarised below:

Orphan Sources Recovery Working Group

The Orphan Sources Recovery Working Group was established in 2019 to identify the national status on radioactive sources out of regulatory control otherwise known as 'orphan sources'. The working group has already identified national stakeholders involved with the control of radioactive sources and focused on strengthening mutual cooperation.

The main activities undertaken by the Orphan Sources Recovery Working Group in 2019 involved the following:

- Considerable progress in establishing national end-of-life management capabilities for radioactive sources with notable support from the UAE Armed Forces.
- Establishing a programme to raise awareness amongst operators and the public of potential events involving orphan sources. Educating and informing border monitoring staff and scrap metal dealers has been a high priority. A brochure for scrap metal dealers has been prepared for publication and larger scrap metal dealers are being encouraged to install radiation detection equipment.
- Implementing guidelines for border monitoring (detection capabilities at the border, training on orphan source documentation, establishing communication channels, etc).
- Working on a financing scheme to manage radioactive material.
- Organising a meeting on mechanisms for dealing with radioactive and nuclear materials at ports of entry. Various actions have subsequently been implemented.
- Developing an educational plan to train customs officers on detecting radioactive material, and applying guidelines and codes of conduct for import and export in cooperation with the International Atomic Energy Agency.

National Strategy for Education, Training & Qualification in Radiation Protection Working Group

The focus of the working group on the National Strategy for Education, Training and Qualification in Radiation Protection was on three projects in 2019 namely the submission of the draft national strategy for education and training in radiation protection to the Radiation Protection Committee; defining and implementing temporary criteria for qualified experts (the full qualification framework is not yet in place); and developing a comprehensive framework of national qualifications for radiation protection professionals.

The Working Group began work in May 2017 and in July 2019 the Radiation Protection Committee approved the final draft of the national strategy. The temporary criteria were also approved in 2019, and implementation of the criteria commenced at end-2019 marked by the creation of a temporary list and an open call for candidatures as potential UAE qualified experts.

National Environmental Radiological Measurements Working Group

During 2019, the Working Group's attention was focused on three projects:

- UAE Indoor Radon Survey for Dwellings of High Public Occupancy. The working group is working on a strategy to identify if there are radon exposures in the UAE above FANR reference levels, and take action, if needed.
- Enhance National Capability in Radionuclide Measurement in Food and Drinking Water: food and drinking water may contain radionuclides of both natural and artificial origin. FANR Regulation for Existing Exposure Situations (FANR-REG-19) sets legal requirements on the establishment of controls over unplanned events involving radiation exposure.
- Enhance National Capabilities in the Area of Quality Assurance in Analytical Measurement: this project identifies gaps and required resources such as training, unified instructions, development of analytical techniques, validation of measurement methodologies, proficiency tests, comparative measurements, fellowships, scientific visits, expert missions and assessments, accreditation of laboratories, and so forth.

The National Environmental Radiological Measurements Working Group supports the national Joint Emergency Radiological Monitoring and Assessment Team (JERMAT) through the harmonisation of analytical and measurement methodologies, quality management of measurement, training, comparison exercises, proficiency tests and accreditation.



TOTAL EXPENDITURE IN 2019
282.28 MILLION

FANR EXPENDITURE IN 2019

Department	2019 Expenditure
Director General	5,776,692.06
Corporate Development Department	9,609,254.21
Internal Audit Department	2,751,668.97
Human Resource Department	27,998,450.37
Education & Training Department	19,259,824.41
Supply Chain & General Services Department	32,197,327.60
Information & Communications Technology Department	24,882,868.95
Finance & Control Department	8,899,578.06
Government Communication Department	11,571,326.49
Nuclear Safety Department	50,391,017.89
Radiation Safety Department	39,055,069.60
Nuclear Security Department	18,102,740.59
Safeguards Department	20,275,825.67
Legal Affairs Department	6,046,854.08
Deputy Director General for Operations	3,808,675.27
Deputy Director General for Administrations	1,657,536.31
Grand Total	282,284,710.53

04



BUILDING CAPACITY



In order to accomplish its vision of being recognised as a global leader in nuclear regulation, FANR implements and conducts extensive programmes to foster and nurture the organisation's resources, skills and processes.

EMIRATISATION

FANR is dedicated to optimising the skills, processes and resources needed to excel and realise its vision of being globally recognised as a leading nuclear regulator.

FANR's capacity-building efforts include steadfast support of the government's Emiratisation initiative. The main goal of FANR's education and training activities is to ensure Emiratis are trained and developed to acquire the required knowledge, skills and attitudes to contribute effectively to FANR's core functions.

Long-term career opportunities for Emirati employees at FANR are encouraged through focused recruitment, training and development programmes. In 2019, FANR's total workforce was 244 employees; 67% of whom are Emirati. FANR continues to attract talented Emiratis to meet its business requirements and five additional Emirati were recruited in 2019.

WOMEN AT FANR

Women play a fundamental role in carrying out FANR's mandate of regulating the UAE's nuclear sector and ensuring the protection of the public, workers and the environment. Women make up over 40% of FANR's overall workforce. They hold leadership positions and play key roles at FANR in nuclear safety, nuclear security, safeguards, radiation safety, and education and training. There are also female employees at FANR who have completed their postgraduate studies in nuclear science.

This year, FANR deployed its first two female resident inspectors to the Barakah Nuclear Power Plant. These resident inspectors will stay at the site for a 2-year term to conduct regulatory oversight over construction, commissioning, operational readiness and overall operations. Earlier in 2019, FANR launched the first Legal Developpee Programme in the UAE with all-female participation. This programme aims to train Emiratis in nuclear law and prepare them for employment at FANR's Legal Affairs Department.

TRAINING & DEVELOPMENT

Through its educational and vocational programmes, FANR conducted various training and development initiatives in 2019.

Leadership & Management Development Programme

This programme establishes a platform for FANR employees to become better leaders and contributors within FANR as well as valuable contributors to FANR's broader regulatory and transparency goals. In 2019, FANR designed the leadership competency that will serve as the base line for all future leadership programmes. FANR also celebrated the successful completion of two FANR employees from the Prime Minister's Office Future Leaders Programme.

Scholarship Programme

In order to develop its qualification portfolio, FANR awards scholarships to Emirati employees to complete tertiary education at leading institutions, such as Zayed University, Manchester University, the Korea Institute of Nuclear Safety and the Korea Advanced Institute of Science and Technology where one FANR employee completed the Master's programme in 2019.

Internship Programme

The FANR Internship Programme offers Emirati interns the platform to discover life as a future FANR employee. In 2019 eleven students successfully completed internships in both the Administration and Operations divisions. The interns' extensive six-week job rotation provided insight into the main responsibilities and functions of the respective division's departments.

Competency Development Framework

FANR's competency development framework is the foundation to continuously ensuring a highly competent workforce for the organisation. Technical and behavioural competency assessments for both divisions were completed in 2019 in an effort to highlight focused training and development needs.

Young Developpee Programme

This programme is designed to provide fresh, Emirati science and engineering graduates with the fundamental knowledge required to understand technical concepts applicable to nuclear engineering, radiation protection and regulation. In 2019, the third year of the programme, 17 newly graduated engineers completed the development programme and were permanently placed as engineers in one of the four technical departments in the Operations Division. We also launched a Legal Developpee Programme during the review period. This first-of-a-kind programme in the UAE is designed to provide fresh law graduates with the fundamental knowledge required to understand concepts related to the laws, legislation and agreements related to FANR and the UAE's peaceful nuclear programme in addition to other concepts related to nuclear law.

17 Engineering graduates completed Young Developpee Programme and permanently appointed

Internal Training Programme

A total of 1,807 internal and external training events were conducted in 2019 for more than 80% of FANR employees. This included technical and non-technical training delivered by employees. The internal training sessions used a variety of different training methodologies including classroom training, self-study, table-top exercises, laboratory work and simulations.

1,807

Internal and external training events for more than

80% of employees

Inspector Qualification Programme

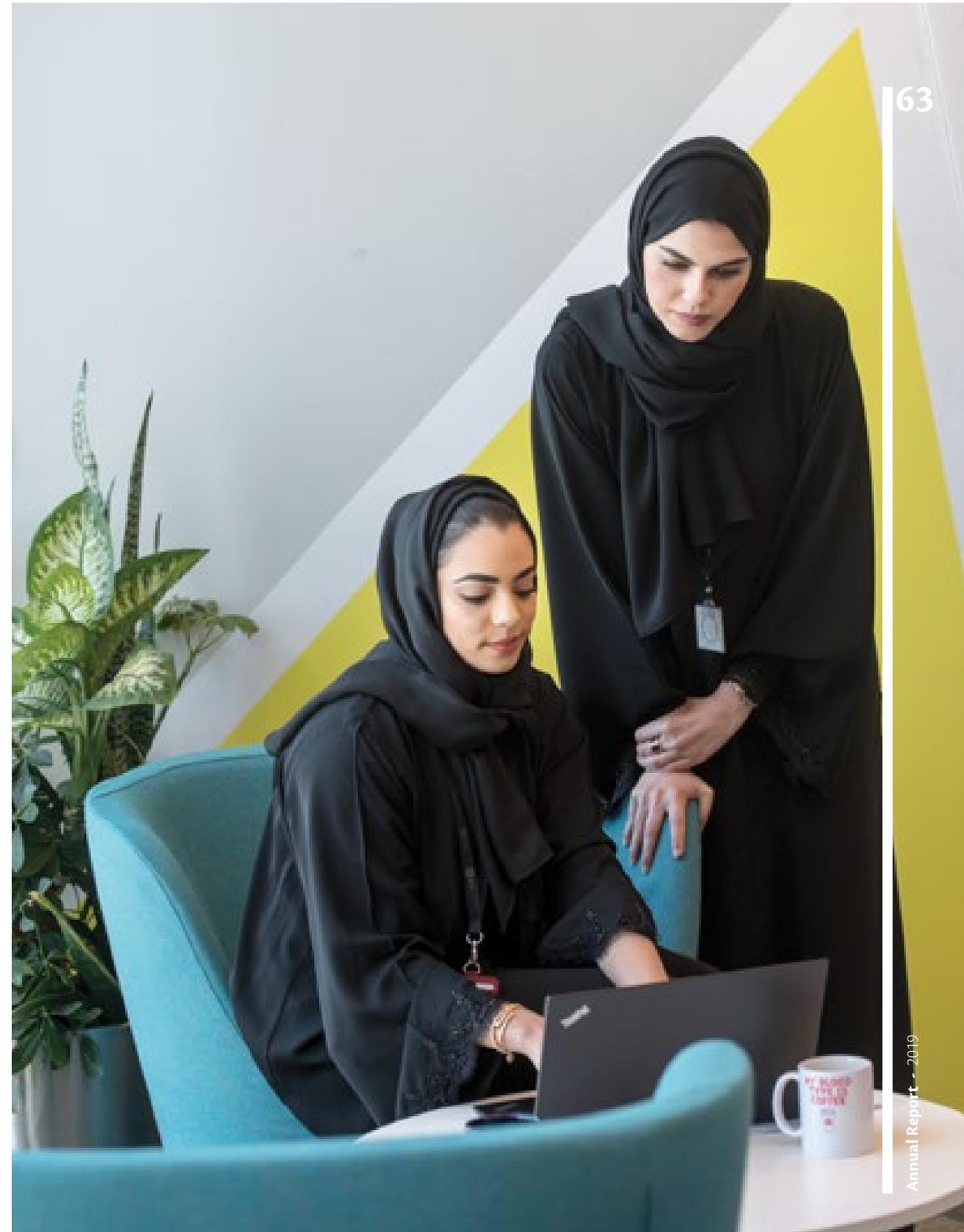
In 2019 FANR recorded 83 inspectors who are qualified to carry out inspections at nuclear and industrial facilities in the UAE of whom 49 are Emirati. FANR's Inspector Qualification Programme follows a rigid curriculum including initial training topics; an inspector job-shadowing programme; and Ministry of Justice training in order to be authorised as a judicial officer. Each inspector is required to participate in re-qualification training every three years to renew their inspector card.

83 People qualified as inspectors
49 Emirati



International Collaboration Supporting Education & Training

In accordance with the framework agreement with the French Institute for Radiation Protection and Nuclear Safety, FANR collaborated on research and development in the field of aquatic dispersion modelling, and with the French National Institute for Nuclear Science and Technology on education and training. In 2019 FANR's collaboration with the French National Institute for Nuclear Science and Technology resulted in ten FANR employees being trained on nuclear energy and radiation safety fundamentals, and 14 FANR employees attending Systematic Approach to Training (SAT)-based 'Train-the-Trainer' training.





Acknowledging the value of preserving and applying critical knowledge as a national asset, FANR implemented a Knowledge Management Programme to enhance its intellectual capital and for business sustainability purposes. The programme is designed to support FANR's knowledge-based decisions for the safe and efficient regulation of nuclear activities in the UAE.

As part of the programme, FANR staff conducted knowledge awareness sessions in 2019.

The Knowledge Management Programme aims to support FANR's management by minimising the impact of employee mobility (e.g. transfer of personnel within or outside the organisation, retirement, and so on) and associated knowledge loss. Additionally, the programme will aid the transfer of nuclear knowledge from one employee to the next.

In order to achieve these objectives, a number of actions were developed in 2019.

KNOWLEDGE MANAGEMENT

Knowledge Loss Risk Assessment

This is one of the most important tools used to identify organisational critical knowledge and critical knowledge owners. A Knowledge Loss Risk Assessment took place in 2019, which resulted in a number of lessons being learnt about the methods of conducting the assessment. These lessons have been translated into plans for enhancing the formats and steps for conducting such an important knowledge management activity.

Knowledge Resource Matrix

The Knowledge Resource Matrix developed at FANR is designed to capture all processes related to knowledge. In practice, the Knowledge Resource Matrix documents process competencies, information about references and standards as well as details about the entities and individuals required for any given process to function. The Knowledge Resource Matrix takes into consideration the four competency quadrants recommended by the International Atomic Energy Agency: legal, technical, function-related knowledge and behaviour. The Knowledge Management team have agreed with the Quality Management team to make the Knowledge Resource Matrix mandatory for each process, and FANR management supported this decision. This reflects FANR's culture of developing knowledge and FANR's maturity in this regard.

Knowledge Transfer Plan

FANR's Knowledge Transfer Plan uses the Knowledge Resource Matrix and Knowledge Loss Risk Assessment results (i.e. captured information, references, knowledge networks and knowledge topics) to develop 'know-how' documents. The Knowledge Transfer Plan then serves to facilitate transferring critical subject matter expert's knowledge to the targeted employee or employees in a structured manner so as to minimise the impact of potentially losing critical knowledge.

When based on the Knowledge Resource Matrix, a Knowledge Transfer Plan transfers knowledge of a process owner. However, when a Knowledge Transfer Plan is based on Knowledge Loss Risk Assessment results, it transfers knowledge of a subject matter expert who does not hold the responsibility of a process owner. Each Knowledge Transfer Plan is unique in terms of development and interactions between the stakeholders of the Knowledge Transfer Plan, but the methodologies used are largely the same. FANR learnt much about the Knowledge Transfer Plan in 2019, and enhancement is ongoing to support Emiratisation plans.

POSITIVE CULTURE

FANR spares no effort in developing and fostering a positive culture through several initiatives and practices.

Acknowledging Excellence

The FANR Annual Award is a scheme designed to show recognition for the achievements of individual employees and working groups.

Two employees were awarded Prime Minister's Medals in the 5th cycle of the Mohamed bin Rashid Government Excellence Awards. FANR also launched an electronic awards system known as FARAS to encourage a culture of appreciation amongst employees as well as to increase productivity and positivity at work.

The newly-introduced system attracted huge interest from employees and achieved high levels of satisfaction (91%).

Cultural Diversity at FANR

FANR's values and organisational culture are built on teamwork and excellence. Both FANR's Emirati and expatriate staff work together under defined objectives, and follow structured integrated management procedures to ensure quality and strong governance. Many initiatives are conducted internally to ensure staff harmonisation, social connection and togetherness with the aim of creating a strong working environment that promotes transparency, excellence and safety culture.

Employee Happiness & Well-being

Employee happiness and well-being constitute an important pillar at FANR. Thus, FANR's continues its Employee Happiness and Well-being program which aims to creating a positive and encouraging work environment to meet staff needs and cater for their happiness mentally and physically.

FANR's Happiness and Well-being Strategy is aligned with the UAE's National Happiness and Well-being Programme.

INNOVATION STRATEGY

With innovation at the forefront of technological advancement, FANR recognises the value in achieving long-term goals along with present strategic objectives.

Several steps and initiatives were undertaken in 2019 to promote and encourage innovation at FANR, all of which corresponded with UAE Vision 2021 and aimed to position the UAE among the best countries in the world. Aligned with government directives, we have formulated our own innovation vision at FANR, namely "To develop and discover innovative solutions to become a leading Nuclear Regulator".

FANR Innovation Management Office was responsible for building and implementing the FANR Innovation Strategy that was launched during 2019. The team focused on managing the innovation processes at FANR, ensuring optimal utilisation of innovation resources, optimising the innovation project portfolio and securing the portfolio's effective realisation.

They also worked on the main initiatives and activities designed to entrench an innovation culture within the organisational work environment, such as:

- Increasing awareness among employees regarding FANR's innovation vision, strategy, process and results; as well as the innovation competencies defined for FANR employees.
- Improving innovation process and accountability measures to increase the value-add of our innovation activities.
- Increasing collaboration and synergies with partner organisations and other external stakeholders, such as customers.
- Developing innovation platforms and internal competition to adopt best practices and leading business models on innovation.
- Establishing FANR's intellectual property (IP) and patent policy, with associated processes.

CONTINUED EXCELLENCE IN THE FUTURE

FANR is focused on attaining the mission mandated to it by the UAE government by continuously achieving excellence both now and in the future. In 2019 FANR excelled in its core functions of ensuring safety, security and safeguards as well as in education and training. The focus for the future will be on its principal goal to ensure the peaceful, safe and secure use of nuclear and radiation sources. FANR's journey to excellence is ongoing as it works towards ensuring a safe, secure and peaceful nuclear energy programme that promises a brighter future for the UAE and its people.

