



# ANNUAL REPORT

## THE FEDERAL AUTHORITY FOR NUCLEAR REGULATION (FANR)

Was established in 2009 with the goal of contributing to the future growth and prosperity of the United Arab Emirates (UAE) and its people by meeting the highest standards of nuclear safety, security, and safeguards. Throughout the 13 years since its inception, FANR has successfully fulfilled its mandate to ensure the safe, secure, and peaceful use of nuclear energy and radiation sources in the UAE.

Each year, a FANR Annual Report is submitted 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. This Annual Report highlights the activities and achievements of FANR during the 12-month period ending on 31 December 2022.



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# 2022 OVERVIEW

## Message from The Chairman of FANR Board of Management

### 2022 was another historic year for the UAE

peaceful nuclear energy programme, marked by FANR issuing the operating licence for Unit 3 of the BNPP. This additional achievement reinforces the UAE government's efforts to diversify its energy mix through nuclear energy, amongst other sources.



**Abdulla Al Suwaidi**  
Chairman of FANR Board of Management

One of the noteworthy milestones is the approval of FANR Strategy 2023-2026, titled **"Our Vision, our Promise"**, by the Board of Management. The strategy outlines FANR's commitment to maintain its regulatory oversight of the nuclear and radiation sectors in the UAE and supports the UAE government's vision **"We the UAE 2031"**. FANR's vision, to be globally recognised as a leading nuclear regulator, will be achieved through the pursuit of two strategic objectives: proactively optimising the regulatory control of facilities and activities, and advancing research and development and capacity building to address potential evolving challenges in the UAE's nuclear and radiation sectors.

FANR Board of Management also held a retreat this year, where the regulatory progress was reviewed, challenges were discussed and solutions were identified to help FANR advance its mission.

FANR continued carrying out its mandate efficiently to ensure the peaceful, safe and secure use of nuclear energy and radiation sources as

well as to develop sustainability of the UAE's regulatory infrastructure.

The initiative of observing a professional day for the nuclear and radiation sector workers in the UAE on 16 February every year was submitted by FANR Legal Affairs Department to FANR's Board of Management and approved in December 2020. The date of 16 February was proposed given that the licence to operate the first ever nuclear reactor in the UAE was granted by FANR to Nawah Energy Company on 16 February 2020.

This initiative aims to annually observe this professional day to highlight the significant achievements and major progress of the UAE in the development of its nuclear and radiation sectors as well as to celebrate and appreciate the continuous work and tireless efforts of the professionals who made the UAE nuclear power programme grow at a commendable and unique pace, making the UAE as a model for many nuclear newcomer countries.

FANR made several consultations in this regard with the relevant stakeholders since 2020,

and submitted the proposal, in 2022, to the UAE Cabinet, who approved it in February in 2023.

This Annual Report details FANR's main achievements in the year 2022. FANR fulfilled its regulatory oversight of the Barakah Nuclear Power Plant when it issued the operating licence for Unit 3 in June 2022, supervising all the testing phases. Unit 1 and Unit 2 of the BNPP are currently up and running, providing the UAE national grid with electricity.

The Barakah Nuclear Power Plant is FANR's utmost priority, and it is FANR's mission to ensure that it is fully safe, secure and peaceful.

Being the UAE's nuclear regulator, our mandate requires and involves knowledge-intensive work and the associated expertise. Hence, we are proud to have qualified Emirati nuclear experts working side by side with our foreign expert staff in nuclear and radiation safety, nuclear security and nuclear non-proliferation. We place emphasis on research and development and work with national and international partners to build a robust regulatory framework, together with Emirati experts who are ready to lead the regulation of the nuclear industry in the UAE in the future.

## Message from FANR Director General

### FANR's efforts in 2022 aimed to

ensure the safe, secure and peaceful use of nuclear material and radiative sources to protect the community and the environment alike. Our robustly built regulatory infrastructure helped us regulate the nuclear and radiation sectors efficiently and effectively.



**Christer Viktorsson**  
FANR Director General

June 2022 was an important milestone, as we issued the operating licence for Unit 3 of the Barakah Nuclear Power Plant. Our oversight and inspection regimes play a critical role in ensuring the safe and secure operation of the nuclear power plant while protecting the community. Our regulatory work in Barakah is ongoing to ensure its continued safety and security and to uphold our commitment to the community.

We also accomplished several achievements in nuclear and radiation safety as well as in nuclear security and nuclear non-proliferation. We carried out inspections and issued licences across the country ensuring ease and smooth flow of business operations while strictly observing all the regulatory requirements.

We continued our active and effective international presence by taking part in the International Atomic Energy Agency's (IAEA) first international conference on Nuclear Law, where FANR representatives and our international partners discussed topical issues related to nuclear law. The chapter authored by H.E. Hamad Al Kaabi, Permanent Representative of the United Arab Emirates to the IAEA, in the IAEA's book titled Nuclear Law: the Global Debate, was presented at the same event. Moreover, FANR received two IAEA missions in 2022 on radiation protection and capacity building. Both missions commended the considerable efforts made by the UAE, FANR and various stakeholders.

Furthermore, we cemented our national and international cooperation since it constitutes a critical contribution to our regulatory mandate. Nationally, we signed agreements to further strengthen cooperation in sectors such as customs, health and economy. Internationally, we inked agreements covering nuclear regulatory matters with partners from different countries. Most importantly, I led FANR's delegations to the Kingdom of Saudi Arabia (KSA) and Republic of Korea (ROK) to explore, expand and strengthen cooperation in various sectors.

We continue to place paramount importance on building Emirati capability in the nuclear regulatory sector, believing this is foundational to ensuring its sustainability. We also maintained our developmental efforts such as our internship and developpee programmes, and invested in our existing and potential leaders to prepare them for the future. I am proud that Emiratis at FANR constitute over 74% of our total workforce with women representing over 44% of FANR employees.



## Achievements In 2022

# FANR is proud of the noteworthy milestones achieved during the year under review:

### ISSUING ANOTHER OPERATING LICENCE

FANR issued the operating licence for Unit 3 of the BNPP, applying a detailed and thorough review of the licence application as well as around-the-clock inspections to ensure strict commitment of the operator to the regulatory requirements.

### CONDUCTING OVER 690 INSPECTIONS

FANR conducted **34 nuclear safety inspections**, covering site construction, commissioning, operational readiness, power ascension testing, vendor inspection activities, and operational activities.

FANR also conducted 68 safeguards-related and 149 export control-related inspections at licensees facilities and the BNPP, including facilitating IAEA safeguards inspections, 76 regulatory inspections for licensee facilities, 110 inspections for radioactive source transport vehicles, 149 medical and 111 non-medical inspections.

### ISSUING REGULATIONS AND REGULATORY GUIDES

**FANR issued two regulations and one regulatory guide**, covering aspects of management for the safety of nuclear facilities, technical services related to radiation safety, and the certification of reactor operators. Such regulations provide a robust regulatory framework for FANR licensees to ensure their full compliance with its regulatory requirements.

### CONTRIBUTING TO THE DEVELOPMENT OF NUCLEAR LAW

The Permanent Representative of the United Arab Emirate to the IAEA, H.E. Hamad Al Kaabi, authored a chapter in the IAEA's first publication to trace the origins, present and future of nuclear law, entitled Nuclear Law: the Global Debate, which highlights the UAE's experience in the development and regulation of its nuclear power programme. In addition to FANR hosting the IAEA Sub-Regional Workshop on Nuclear Law, **the UAE participated in the IAEA's First International Conference on Nuclear Law.**

### RECEIVING THE IAEA EXTENDED OCCUPATIONAL RADIATION PROTECTION APPRAISAL SERVICE (ORPAS)

The follow-up mission to review radiation protection arrangements lauded the UAE's efforts in effectively implementing the national framework for the radiation protection of workers. **The UAE is also the first IAEA member state to request an ORPAS review of its space programme.**

### STRENGTHENING NATIONAL AND INTERNATIONAL COOPERATION

FANR signed eleven **(11) national and international agreements** covering cooperation in capacity building, research and development, nuclear security and nuclear non-proliferation.

### HOSTING A NUCLEAR NON-PROLIFERATION FORUM

This event demonstrated the UAE's commitment to ensuring the **peaceful uses of nuclear energy**, providing a venue for national and international experts to exchange knowledge and experiences and to discuss challenges in matters relating to ensuring the strictly peaceful uses of nuclear material and technology.

### DEVELOPING A REGULATORY OVERSIGHT MANAGEMENT SYSTEM (ROMS)

This system, developed in-house by FANR employees, satisfies diverse user requirements. It caters for the preparation and issuance of inspection reports, safety grading of inspection findings, evaluation of evidence packages and closure of inspection findings, assessment of reportable events and licensee change requests, management and control of international Operating Experience and Feedback, **developing an integrated five-year inspection plan for the BNPP**, and management and control of Reactor Operator/Senior Reactor Operator certification records.

### LAUNCHING REPORT TO PROTECT (R2P)

FANR launched this system to receive whistleblowing concerns, including anonymous reporting of fraud and misconduct concerns, and concerns related to safety, security and safeguards (non-emergencies). R2P allows FANR **to protect the public and the environment from the harmful effects of ionising radiation** and to ensure the exclusively peaceful use of nuclear energy and radiation sources, protect FANR from the consequences of any wrongdoings, such as fraud, misconduct, and instill a workplace ethical culture.

# ABOUT FANR

## Our Strategy

### FANR was established in September 2009 as the regulator of 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 is proud to fulfil its mandate to protect the public, workers and the environment through our vision, mission and core values.



#### 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.



#### OUR CORE VALUES

- Safety culture
- Transparency
- Collaboration
- Independence
- Excellence

In 2022, the Board of Management (BoM) approved FANR's strategy for 2023-2026. The strategy focuses on strengthening FANR's regulatory framework, research and development, capacity building, advanced technology in nuclear and radiological sectors, strategic national and international cooperation, as well as other regulatory matters.

## Board of Management

FANR BoM is our decision-making body, comprising members appointed pursuant to a UAE Cabinet-issued resolution. The BoM sanctions and implements vital decisions that impact the overall performance of FANR.

### FANR Board of Management in 2022



**H.E. Nasser Al Suwaidi**  
Chairman



**H.E. Hamad Ali Al Kaabi**  
Deputy Chairman



**H.E. Razan Khalifa Al Mubarak**  
Member



**H.E. Dr Abdul Qader Ebrahim Alkhayat**  
Member



**H.E. Dr Ali Mohamed Shaheen Ahmed**  
Member



**H.E. Yousif Ahmed Al Ali**  
Member



**H.E. Ahmed Salem Al Shamsi**  
Member



**H.E. Essa Abdul Rahman Al Hashemi**  
Member



**H.E. Dr. Saif Salem Al Hajri**  
Member

### Secretariat of the Board of Management

The Secretariat of the Board of Management provided support for the six meetings of the BoM held in 2022. It also organised the management retreat held on 13 and 14 December 2022 to discuss FANR achievements and identify the current and future challenges and their impact on FANR. During the retreat, the BoM provided guidance and directions to the management to mitigate and overcome identified gaps and challenges effectively, enabling FANR to achieve its objectives for the upcoming 2023-2026 strategic cycle.



# BARAKAH NUCLEAR POWER PLANT (BNPP)

## Licences and Assessments

### During 2022, FANR completed the review and assessment of Nawah Energy Company's (Nawah) licence application

to operate Unit 3 of the BNPP, and the Operating Licence applied for was granted in June 2022.

FANR also completed the review and assessment of Nawah's licence application to handle and store unirradiated nuclear fuel at Unit 4 of the BNPP, and issued the fresh fuel handling and storage license at Unit 4.

## Inspections

FANR monitored and evaluated the licensed activities at the BNPP throughout the year, conducting inspections led by inspectors from FANR headquarters by FANR resident inspectors at the Barakah site. The resident inspectors' scope of work included monitoring the day-to-day construction of the plant as well as commissioning and operations activities to ensure proper and complete fulfilment of FANR regulatory requirements. FANR inspectors also had oversight responsibility for closely monitoring and reviewing the results of the commissioning tests for Unit 4 of the BNPP and the power ascension tests (PATs) on Unit 3.



#### FANR conducted 34 nuclear safety inspections

at the Barakah NPP during the review period, covering the NPP construction, commissioning, operational readiness, power ascension testing, vendor inspection activities, and operational activities.

## Operational Training

To ensure the preparedness of FANR cadre for the operational phase, Emirati employees received further skills enhancement training with respect to the design and operation of the BNPP.

These training activities were open to all FANR nuclear safety technical employees.

Selected Emirati employees were then identified as a second eight-employee batch to participate in the Nawah-delivered Management Senior Reactor Operator (SRO) course, with the objective of enhancing FANR employees' competencies.

The same course is delivered to Nawah employees who have no operator training or technical background, but require more detailed plant knowledge and some operational awareness.

The operational training initiative is part of FANR's internal training programme and it supports our goal of ensuring that Emiratis would acquire the required skills and knowledge to contribute effectively to FANR's core functions.



# NUCLEAR SAFETY



As the national nuclear regulatory body of the UAE, FANR is responsible for regulating the design, siting, construction, operation, and decommissioning of all nuclear facilities in the country, including NPPs. However, the operator in charge of running and operating any nuclear facility holds the overall and final responsibility for safety.

Fulfilling FANR's responsibilities involves oversight of nuclear safety, security, and safeguards in accordance with the requirements of national and international legislations by issuing regulations and regulatory guides. FANR role also involves a programme of assessment, authorisation, inspection, and enforcement to ensure compliance of the operator with requirements.

In 2022, FANR Nuclear Safety Department conducted an in-depth review and assessment of the application for an operating licence for Unit 3 of the BNPP. A licence is only granted when the applicant's proposals and commitments are in full compliance with FANR's safety requirements. In June 2022, FANR BoM approved the Operating Licence for Unit 3 of the BNPP.

**100%**

compliance with FANR's safety requirements



FANR has a permanent resident inspectors' office at the BNPP, with full-time inspectors monitoring the construction and commissioning activities. This ensured continuous inspection of the construction of Unit 4 of the BNPP. FANR inspectors also conducted inspections throughout the initial testing of the reactor at Unit 3 of the BNPP from fuel loading to PAT at 100% power. Unit 2 of the BNPP started commercial operation in April 2022, and Unit 1 successfully completed its first refuelling outage from April to July 2022.

In line with its oversight responsibility of the licensee, FANR employees developed an in-house Regulatory Oversight Management System (ROMS) to deliver a systematic solution that satisfies various user requirements, including:

Preparation and issuance of inspection reports,

Safety grading of inspection findings,

Evaluation of evidence packages and closure of inspection findings,

Assessment of reportable events and licensee change requests,

Management and control of international Operating Experience and Feedback (OPEX),

Developing an integrated five-year inspection plan for the BNPP,

Management and control of Reactor Operator (RO) /Senior Reactor Operator (SRO) certification records.

Importantly, ROMS provides monitoring, feedback and analysis of inspection findings, events and licensee change requests. It also has the capability to generate licensee performance reports as required and standardised inspection reports across operations-related departments.

The licensee (Nawah) submitted eight Licensee Change Requests (LCRs) to FANR for review in 2022, all of which were approved by FANR technical reviewers. In addition, FANR received six event reports from the licensee, three of which were successfully closed and the remaining three are under review.

## Construction and Operating Experience Feedback

FANR's construction and operating experience feedback (COEF) programme is a core process within its Integrated Management System (IMS). The COEF programme was established to review national and global events, learn lessons, and implement corrective actions to avoid similar events recurring. This process provides two fundamental benefits:

1. Trend analysis to identify patterns in events and conditions, and, in turn, provide intelligence to prevent reoccurrence of undesirable events or conditions,
2. Learning and gaining knowledge from past events in nuclear and radiological safety and security, and safeguards to prevent or minimise the risk of future events.

An international system managed jointly by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development, the IRS enables participating countries to exchange operational experience to improve the safety of NPPs. Information obtained from the IRS is shared internally at FANR for review or action, as appropriate.

To enhance the competence of Emirati employees with respect to the design and operation of the BNPP, FANR employees also participated regularly in COEF screening meetings during 2022, benefiting from the preparation of technical presentations on reviewed events.

**15**

COEF SCREENING MEETINGS

**104**

INTERNATIONAL REPORTS

During the year, FANR held 15 COEF screening meetings that collectively reviewed nine Nawah reports, and 104 international reports extracted from the International Reporting System (IRS).

# NUCLEAR SECURITY



## Nuclear Security at the BNPP

As part of its continuous regulatory oversight activities, FANR's Nuclear Security Department (NSD) conducted **four inspections** to assess the BNPP's security aspects, assuring complete and correct security implementation at the Barakah site and Unit 3 readiness for operation.



In each inspection, FANR assessed the security organisation, cyber security implementation, physical protection systems, information protection implementation and security events management. The NSD also follows an inspection plan using inspection procedures and inspection skills, including procedural review, visual observation, interviews and site verification.

For the evaluation of the Operating Licence application of the BNPP's Unit 3, FANR's NSD assessed and reviewed the Physical Protection Plan for the unit and approved its implementation. This process was a key prerequisite for issuing Unit 3 Operating Licence.

As per FANR's security requirements, the BNPP submitted two Transport Security Plans (TSPs) for review. FANR's NSD conducted the required review and approved both plans, authorising the BNPP to transport nuclear fuel for Unit 2 and Unit 4. The transport will deliver initial nuclear fuel for Unit 4 and nuclear fuel reload for Unit 2.

## Observed Security Exercise

### Before issuing an operating licence, FANR conducts activities

to ensure that the BNPP units are ready to operate. For this, FANR's NSD observed a security exercise at Unit 3, contributing to FANR's "ready to operate" evaluation and decision. The exercise involved the BNPP stakeholders (Critical Infrastructure and Coastal Protection Authority (CICPA), security team, operation team, emergency team) and covered several objectives, including cyber security evaluation, Unit 3 internal and external stakeholders coordination, physical protection systems effective functionality and physical security response.

## Licensed by Law

The licensing process is an important activity for FANR as it ensures that a facility is constructed and operated in accordance with the requirements of the law and applicable regulations. To conduct a regulatory activity such as the use, storage, and/or transport of Category **1-3 Radioactive Sources**, a licensee must comply with FANR regulation for Security of Radioactive Sources (FANR-REG-23).

A key element of FANR-REG-23 is the requirement for each licence holder to develop a set of comprehensive security plans and submit them to FANR for assessment and approval. This requirement helps ensure the secure storage, use, and/or transport of Category 1-3 Radioactive Sources by each licence holder.

FANR reviewed and assessed a total of 49 applications in 2022, the majority of which were for non-medical purposes.

FANR's NSD team in charge of radioactive sources security developed and integrated the security licensing requirements in the third phase of the FANR e-Licensing System project, according to which both the applicants and licensees are required to submit security plans and/or transport security plans through the e-licensing system for approval by the NSD's radioactive sources security team.



## Nuclear Security Inspections

To ensure the security of radioactive sources within the UAE territories, FANR continued deploying an ambitious inspection programme throughout the review year, including:

- A total of 76 regulatory inspections of FANR licensees' facilities
- A total of 110 inspections for radioactive source transport vehicles.



## Engagement with National Entities

In 2022, FANR's NSD maintained its national engagement programme through cooperation and coordination with its stakeholders. The department also cooperated with CICPA in several meetings and activities intended to support the physical protection of the BNPP.

Moreover, FANR's NSD coordinated the UAE Ministry of Defence requests related to an Armed Forces' exercise around nuclear facilities with other stakeholders to ensure integration at the national level.

## International Representation

FANR's NSD represented the UAE in all the meetings held by the Nuclear Security Guidance Committee (NSGC) in 2022. Participating in the NSGC meetings provides the UAE with the opportunity of reviewing and approving security-related documents, including guidance, standards and other security publications. In addition, the UAE receives advance knowledge of IAEA security documentations, standards and guidance planned for publication as well as the opportunity to provide input.

Furthermore, FANR's NSD represented the UAE in the Technical Meeting on Computer Security Regulation in Nuclear Security. Apart from the interaction and information exchange during the technical event, the meeting focused on sharing strategies, practices, needs and the lessons learnt from implementing computer security regulations. Several countries participated in that meeting, including the U.S., the UK, Japan, Germany, ROK and China.

### The UAE's participation covered:

The Legislative and Regulatory Framework,

Cyber Security Implementation at the BNPP,

The Assessment and Authorisation Process,

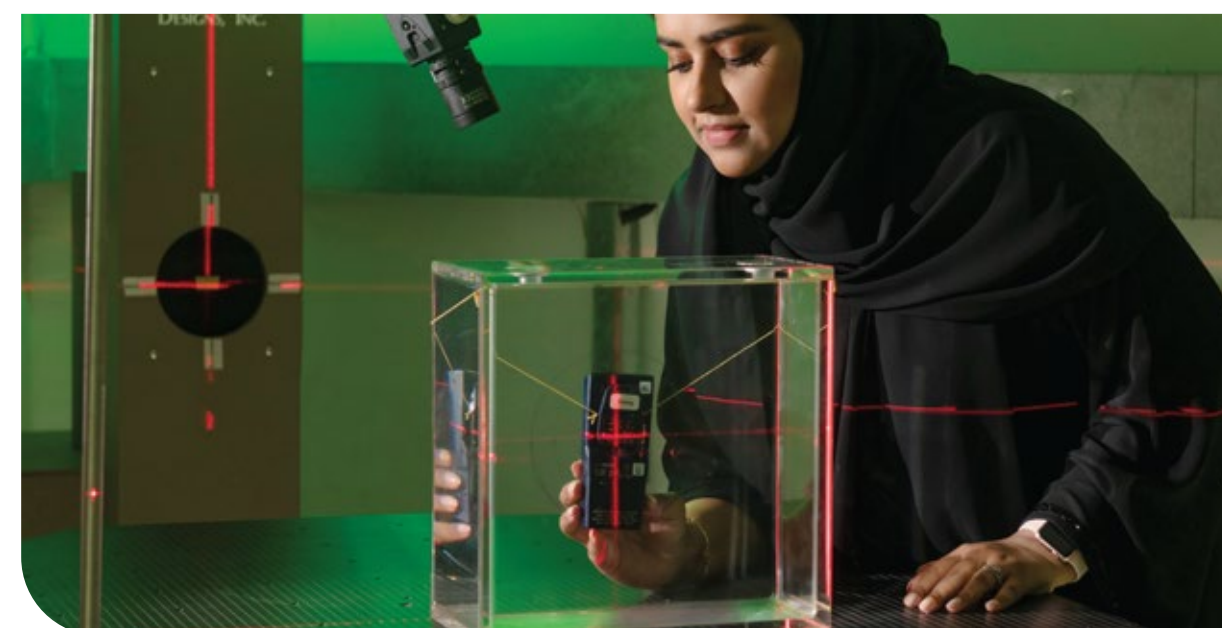
Assurance of Compliance.

## UAE detection architecture

### The illicit trafficking of nuclear and other radioactive materials poses a critical security threat to the international community.

To counter this threat, the international community is developing strategies for detecting nuclear and other radioactive materials out of regulatory control. The development of an effective and sustainable national nuclear detection architecture is therefore critical to the UAE's efforts to deter, detect, and interdict such materials, and, ultimately, to prevent acts of nuclear terrorism.

In a continued effort to help the UAE develop a national nuclear detection architecture, FANR's NSD team in charge of the security of radioactive sources participated in a detection capabilities working group to support the project in Abu Dhabi. During 2022, meetings were conducted with the Federal Authority for Identity, Citizenship, Customs, and Port Security, Abu Dhabi Customs, and other relevant national stakeholders to provide technical guidance in this area. In addition, a Detection and Initial Assessment of Alarms procedure was provided to Abu Dhabi Customs and a joint site visit to Khalifa Port with Abu Dhabi Customs was conducted to assess the current detection capabilities and discuss the possible locations for installing radiation detection portals.





## IAEA Interregional Workshop

In line with its cooperation with the IAEA, FANR hosted an Interregional Workshop on Developing and Implementing Nuclear Security Systems and Measures for Major Public Events. The workshop drew more than **30 experts** from the IAEA member states and the UAE national stakeholders, who exchanged information and expertise in this field.

The outcome of the workshop included established methods and best practices for the development of nuclear security systems and measures to support the overall security of major public events. The IAEA also held a tabletop exercise during the workshop, where Dubai Police and FANR showcased their arrangements during the Dubai EXPO2020 technical visit.

## ISO 27001 Recertification

**FANR obtained the ISO 27001 certificate in 2018 and renewed it successfully in 2022.**

Through the years, FANR has ensured information security integration in all FANR's processes by developing the required controls and supporting documentation.

# NUCLEAR NON- PROLIFERATION

FANR Safeguards is responsible for implementing the UAE's comprehensive safeguards agreement with the IAEA, including the additional protocol to that agreement, and also for operating a nuclear import and export control system. Both of these key nuclear non-proliferation responsibilities are closely related and are only achieved through close cooperation with other UAE competent authorities and international partners. Safeguards and nuclear import/export controls contribute to the peaceful use of nuclear material, equipment and technology – both nationally and globally – and aim to prevent the spread of nuclear weapons. FANR safeguards' non-proliferation efforts include:

- Preparing related regulations and guides that enable the country to meet its international obligations,
- Assessing licence applications for conducting regulated activities and ensuring government-to-government assurances are established,
- Ensuring compliance with regulations through assessments and inspections,
- Initiating enforcement action(s) in cases of non-compliance,
- Making reports and declarations to the IAEA, its member states and other entities in accordance with established agreements.

## Nuclear Non-proliferation Inspections

FANR conducted 68 safeguards-related and 149 export control-related inspections at licensees and the BNPP in 2022, including facilitation of IAEA safeguards inspections.

**68**

**SAFEGUARDS**  
-RELATED INSPECTIONS



**149**

**EXPORT CONTROL**  
-RELATED INSPECTIONS



## Regulations and Guides

A dedicated FANR working group finalised the first draft of the amendment of FANR-REG-10 during the review period. The final draft of FANR-RG-031 regulatory guide related to FANR-REG-09 (V.1) (on nuclear import/export control) was also completed.

## Engagement with the Global Non-proliferation Community

As part of the IAEA COMPASS initiative to support newcomers to the global non-proliferation community, FANR helped Rwanda develop its safeguards training plan this year. In addition, FANR contributed to and made a presentation at an IAEA International Training Course for Embarking Countries on State Systems of Accounting for and Control of Nuclear Material, attended by ten states in August 2022. FANR also presented the UAE's efforts in implementing safeguards at new NPPs in the IAEA Webinar Series attended by several member states in June 2022.

FANR participated in the IAEA Safeguards Symposium in October/November 2022:

- FANR Safeguards presented a joint paper with the ROK on Nuclear Non-Proliferation Partnerships: A Case Study of the United Arab Emirates and the Republic of Korea. The paper highlighted the close and special cooperation between the two countries in the field of nuclear non-proliferation.
- FANR employees were guest speakers in two sessions, namely Millennial Nuclear Caucus and Closing Plenary.
- FANR Export Control team presented two papers. The first was entitled The United Arab Emirates' Responses to Proliferation Risks Associated with Equipment, Material and Technology Listed in the Nuclear Suppliers Group Guidelines. The second was entitled The UAE's Responses to Proliferation Risks Associated with Equipment, Material and Technology Listed in the Nuclear Suppliers Group Guidelines.



The 9th FANR-NSSC/KINAC Technical Meeting was held from 12 to 14 July 2022. FANR has benefitted from 10 years of cooperation with NSSC/KINAC in the fields of safeguards and nuclear export control, primarily through technical/annual meetings and joint studies into nuclear non-proliferation topics of mutual interest.

In October 2022, FANR signed an Administrative Arrangement with the U.S. Department of Energy pursuant to the Agreement for Cooperation between the Government of the U.S. and the Government of the UAE Concerning the Peaceful Uses of Nuclear Energy. A second Administrative Arrangement between the Nuclear Safety and Security Commission of the ROK and FANR, pursuant to the Agreement between the Government of the ROK and the Government of the UAE for Cooperation in the Peaceful Uses of Nuclear Energy, was also finalised in 2022. FANR is cooperating with its U.S. and the ROK counterparts in operationalising the Administrative Arrangements, including the establishment of initial inventories of materials and equipment.



## Accounting for and Control of Nuclear Material

Once again, FANR met the requirements of its comprehensive safeguards agreement by providing the required information to the IAEA, e.g., reports, declarations and notifications, and facilitating inspections and design information verification activities by IAEA inspectors, including the following:

Accounting reports for all five material balance areas (MBAs) in the UAE,

Updated design information for all four BNPP units,

Additional protocol declarations covering the UAE's nuclear-related activities, including nuclear fuel cycle research and plans for development of the nuclear fuel cycle.

During the year under review, FANR facilitated IAEA safeguards verification activities in the UAE, including six locations outside facilities and during three visits to the BNPP. The IAEA verification activities in December 2022 were combined with an IAEA technical visit to finalise arrangements for the installation of a state-of-the-art IAEA containment and surveillance system (C/S) at Unit 4 of the BNPP, which is in the final stages of construction. The C/S system comprises various components, including cameras, electronic seals and remote data transmission equipment. It provides for an effective and more efficient implementation of IAEA safeguards in the UAE. Installing the C/S equipment at Unit 4 of the BNPP complements C/S installations that are already fully operational at the other three BNPP units. The success of the C/S project is the result of close cooperation between the IAEA and FANR embracing the principle of "safeguards by design".



## Nuclear Export Control

FANR completed an Enforcement Tabletop Exercise on 25 and 26 October 2022 in cooperation with the UAE Ministry of Justice and the U.S. Department of Energy (International Non-proliferation Export Control Program, or INECP).

FANR export/import team also participated at a Federal Customs Authority strategic meeting, delivering a presentation on Ensuring Highest Standards of Nuclear Non-Proliferation FANR – Cooperation with Customs Sector.

FANR signed a FAWRI TICK Memorandum of Understanding (MoU) with the Executive Office of Anti-Money Laundering and Counter Terrorism Financing; and supported Maqta Gateway Project, led by Abu Dhabi Department of Economic Development.

The FANR e-Licensing system was updated in 2022 to allow nuclear import and export licences to be integrated with the FANR licensing processes relating to safeguards, safety and security. The launch of the integrated "3S" licensing service creates efficiencies for both licence applicants and FANR.

FANR supported the issuance of the UAE Unified National List of Hazardous Substances (including hazardous substances under FANR control) as per the updated GCC Tariff of 2022. FANR is also cooperating with the U.S. Department of Commerce (Bureau of Industry and Security, or BIS) as part of the implementation of FANR-BIS Memorandum of Intent signed in 2016.

## Nuclear Non-proliferation Forum

FANR held a successful Nuclear Non-proliferation Forum from 28 to 30 March 2022 to promote the highest standards of nuclear non-proliferation and foster international recognition that the UAE is firmly establishing its credentials as a leading nuclear regulator. The forum highlighted the UAE's achievements, developments and commitment in the field of nuclear export/import control and safeguards by sharing best practices, challenges and ideas with national and international experts. The event also allowed FANR to capture and adopt best practices to support effective and efficient processes that support the UAE's national and international obligations in the area of nuclear non-proliferation.

# RADIATION SAFETY

## Inspections

FANR's radiation safety inspection programme, which focuses on high and medium risk facilities and activities, continued throughout 2022, during which FANR inspectors conducted inspection activities across the UAE keeping the health care and safety precautions in line with the recommendations of the health authorities.

260 inspections were conducted by 31 December 2022; 4 of these were re-active inspections, 14 were pre-licensing inspections, 236 were routine inspections, 3 were unannounced inspections and 3 were follow-up inspections, including 149 medical and 111 non-medical activities on monthly basis. They also included 123 inspections on high-risk activities and 137 inspections on medium risk activities.

FANR inspectors conducted inspections at the BNPP to evaluate radiation protection programmes, including the ALARA planning, contamination control, dosimetry, radioactive waste, radiological hazard assessment, radiation monitoring instrumentation, and leak detection.

As part of our regulatory activities, 12 FANR inspectors evaluated Nawah's arrangements to respond to an emergency affecting two units simultaneously (one of the conditions for the exercise). FANR also supported the National Crisis, Emergency, and Management Authority (NCEMA) by assigning five controllers and evaluators to the National Operations Centre, Al Ruwais Emergency Response Centre, and conducting field activities.



# 260

INSPECTIONS  
WERE CONDUCTED

# 149

MEDICAL  
ACTIVITIES

# 111

NON-MEDICAL  
ACTIVITIES

# 123

INSPECTIONS  
ON HIGH-RISK ACTIVITIES

# 137

INSPECTIONS  
ON MEDIUM RISK ACTIVITIES

## Environmental Protection

FANR's independent radiological environmental monitoring programme monitors radiation and radioactive material throughout the UAE to meet the statutory requirements on monitoring radiation and advise government entities on matters related to radiation protection aspects of environmental protection, public health, radioactive waste, water use, consumption of food, and land use.

The programme is implemented largely through FANR Environmental Laboratory in Abu Dhabi and various monitoring stations across the UAE. More than 360 samples were collected during the year from different media, such as airborne particulates and airborne iodine, soil, surface water, date palm fruit, fish and invertebrates, milk and sediment. Moreover, more than 800,000 individual measurements of gamma dose rates were collected throughout the UAE via a network of 18 gamma monitoring stations and Optically Stimulated Luminescent (OSL) dosimeters that determine the ambient gamma radiation. As expected, natural radionuclides were detected in all the samples, but the dose rates in the UAE are incredibly low compared to most of the other countries and represents the natural background of radioactivity.

FANR Environmental Laboratory, which is a member of the IAEA's Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) Network since 2014, participated in 2022 inter-laboratory proficiency testing programme and met the acceptance criteria in the international inter-comparison. The ALMERA programme, which tests the ability of radiochemistry laboratories to analyse radioactive samples and accurately report the results, has a network of more than 195 laboratories representing 90 countries from around the world.



More than

## 360 Samples

were collected



More than

## 800,000 Individual

measurements of gamma  
dose rates were collected



## 18 Gamma

monitoring stations



More than

## 195 Laboratories

representing 90 countries



Secondary Standards Dosimetry Laboratory

FANR’s (SSDL), located in the campus of Khalifa University, Abu Dhabi, officially began providing calibration services in 2019.

The SSDL carried out a total of 563 calibrations in 2022 and achieved a customer satisfaction rate of 97%.

The UAE Cabinet issued Resolution No. (104) of 2021 Concerning the Fees for the Calibration Services Provided by the Secondary Standards Dosimetry Laboratory of the Federal Authority for Nuclear Regulation. Pursuant to this resolution, FANR SSDL started to implement and collect the fees of calibration starting from February 2022.

The SSDL portal achieved fully digital transformation and has been substantially enhanced since launched in 2020 to facilitate use of the SSDL by customers, who can send calibration requests directly through the SSDL portal, follow the status of the request, download the calibration certificates for each device, and provide feedback on the quality of the service received.

In February 2021, FANR’s SSDL became a member of the new GULFMET Technical Committee of Ionising Radiation.

FANR representatives have since been appointed as the committee’s chair and secretary to lead collaboration with other SSDLs in the region. In April 2021, the UAE Ministry of Industry and Advanced Technology (MOIAT) appointed FANR SSDL as the Designated Institute in the area of ionising radiation in the International Bureau of Weights and Measures (BIPM) website, and in August, 2022 the Ministry of Industry and Advanced Technology (MOIAT) declared FANR SSDL a National Measurement Standard in Ionising Radiation in the UAE.

These significant achievements underline the capacity of FANR’s SSDL to supply radiation calibration services to end-users of radiation measurement devices in the medical, nuclear, and industrial sectors even under unforeseen and difficult circumstances.

They also corroborate the national and international recognition of the SSDL’s competence and high-quality results.

Radiation Protection Committee (RPC)

The committee was established in 2011 according to a decision by FANR Board of Management based on Article 67 of Federal Law by Decree No. (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy. The committee is headed by FANR Director General and its membership includes representatives from:

The Ministry of Defence
The Ministry of Interior
The Ministry of Health and Prevention
The Ministry of Climate Change and Environment
The Emirates Nuclear Energy Corporation
The Federal Authority for Identity, Citizenship, Customs and Security
Khalifa University
Department of Health - Abu Dhabi
Dubai Health Authority
The Environment Agency - Abu Dhabi
The National Emergency, Crisis, and Disasters Management Authority
Nawah Energy Company
The Abu Dhabi Centre for Public Health
Abu Dhabi National Oil Company (ADNOC)

The RPC promotes collaboration between various bodies and gives advice and recommendations on how to improve the radiation protection infrastructure in the UAE, how to develop a unified national guide on matters related to radiation protection as well as an emergency plan to respond to radiological disasters, and how to promote awareness of radiation protection.

The committee also provides an environment for inter-agency cooperation on important radiation protection matters to ensure appropriate radiation protection resources and infrastructure in the UAE in the event of planned, emergency, and existing exposure situations. This includes the ability to perform analytical measurements, evaluate measurement results for making coordinated regulatory decisions, implement associated actions to protect people and the environment, and ensure the availability of radiation protection professionals in the UAE.

The RPC implements action plans through working groups and task forces that operate according to specific terms of reference.

The RPC working groups currently include:

- The Medical Applications Working Group
- The Orphan Sources Strategy Working Group
- The National Strategy for Education, Training and Qualification in Radiation Protection Working Group
- The National Environmental Radiation Measurements Working Group

The RPC task forces include:

- Task Force B: Health Surveillance
- Task Force C: Radiation Dosimetry Infrastructure (external, internal, and cytogenetic)

In 2022, the RPC held four meetings, in addition to regular meetings of the working groups, and **recorded several achievements, including:**

29 qualified radiation protection experts were identified, and their names were published in the UAE temporary list as experts who are able to provide authoritative advice to employers on matters relating to compliance with the applicable legal requirements and technical standards in respect of public and occupational exposure to ionising radiation.

Supporting the system of education of the medical physicists in the country due to the increase in the number of medical facilities, especially radiotherapy facilities, which, in turn, require the existence of a robust radiation safety education and training system to assure the safety of patients and workers.

The Joint Emergency Radiation Monitoring and Assessment Team (JERMAT) guidance developed “planning for effective decision making on protective actions based on operational criteria”.

A survey developed to assess the UAE capabilities in the area of radiation environmental monitoring.

A feasibility study on establishing the national referral guidelines in the UAE, and the way forward.

A search and recovery campaign was conducted in an industrial area, where a FANR team visited about 45 scrap dealers in Sharjah. The search was conducted by FANR team and held physical meetings with the management of these facilities to raise awareness about the orphan sources and explain the necessary steps to protect the public and the environment.

FANR team highlighted the importance of having a detector at the entrance of every facility before accepting and processing scrap metal for recycling and also highlighted the need to initially understand the source of scrap metal to be prepared if the sender’s activity involves using radioactive material.

A white paper on “Internal and Cytogenetic Dosimetry” with RPC members.

A white paper on “Establishing a Health Surveillance Programme for Licensees in the UAE”

Participation, in coordination with the health authorities, in collecting data from medical entities for the purpose of revising the national Diagnostic Reference levels (DRLs).

IAEA 11th Competent Authority Meeting

Supporting FANR’s competent authority role under the international conventions related to nuclear and radiological emergencies, FANR participated in the IAEA 11th Competent Authorities Meeting.

FANR employees chaired a session on Information Exchange in an Emergency and presented the UAE FANR Experience on Exercises and Training in Emergency Preparedness and Response, focusing on activities implemented in preparation for the UAE Barakah ConvEx-3 exercise. The UAE competencies and innovative actions during ConvEx-3 were commended by the IAEA, panellists and other meeting participants.

The Joint Convention Meeting

FANR, the Emirates Nuclear Energy Corporation (ENEC), Nawah Energy Company and other leading entities prepared the 4th National Report of the UAE in accordance with the Conventions on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management.

The report was submitted for review at the 6th Review Meeting of the Convention held in June 2022 highlighting the legislative, regulatory and administrative measures and other steps taken by the UAE to fulfil its obligations as a contracting party to the specified conventions.

FANR employees formed part of the UAE delegation that attended the 7th Joint Convention Review Meeting in June 2022. No challenges or suggestions related to the radioactive waste programme in the UAE were identified during the meeting. The UAE is cognisant of measures required to establish the necessary infrastructure for a national radioactive waste management programme.

Attending to Radioactive Waste

FANR is currently conducting a review of an application for the Initial Site Selection Activities for a Near-Surface Low-Level Radioactive Waste Disposal Facility. The site selection licence will be issued once the outstanding review items have been closed.



# EMERGENCY PREPAREDNESS

## Emergency Preparedness Inspections

As part of its regulatory activities, FANR implemented one inspection related to emergency preparedness at Nawah to test the compliance of its emergency preparedness programme with FANR-REG-12 (V.1) and the facilities and equipment related to emergencies.

## Emergency Operations Centre

The FANR Emergency Operations Centre was fully operational throughout 2022 and its arrangements were tested frequently during different drills and exercises.

In coordination with Nawah, arrangements to access data from Nawah were improved. Three Virtual Desktop Infrastructure connections were put in place for FERO employees to access documents and data from Nawah during exercises and drills as well as during the unlikely event of an emergency. A display system was installed to connect Unit 4 of the BNPP. It is fully operational and complements the connection with the three systems installed previously at the other BNPP units.



FERO responded promptly, and as needed, to several notifications related to non-emergency situations involving relevant FANR departments.

This included continuously and closely following the situation in Ukraine and the challenges for different facilities and activities. FERO employees assessed 56 messages from the Ukrainian authorities and 138 IAEA Director General's statements on the situation.



## Emergency Training, Drills and Exercises



According to FANR Emergency Response Organisation Training, Exercises and Drills Annual Plan, FANR Emergency Preparedness Response team implemented 19 drills and training activities related to a nuclear emergency response, including both remote and in-person sessions.

FANR also supported the IAEA in different training activities. A FANR employee lectured at a national training course on drafting regulations for preparedness and response for a nuclear or radiological emergency and in a regional training course on arrangements for the termination of a nuclear or radiological emergency.

# REGULATIONS & REGULATORY GUIDES



FANR regulations and regulatory guides take into account the IAEA safety standards as well as other nuclear regulatory best practices and operational experience. FANR's internal process requires that all regulations are subject to a systematic five-year periodic review.

The preparation of new FANR regulations and review of existing ones in 2022 was done in accordance with FANR's Regulations Master Plan for 2021-2026, which was approved by FANR BoM in March 2021. This master plan provides insights and a roadmap for all FANR regulations until 2026 and subjects for annual amendments, as necessary.

During the review period, FANR developed and revised two regulations and one regulatory guide, all of which were approved and published in FANR website.

FANR is currently updating four regulations, two of which have already been thoroughly reviewed to decide the need for any revision, updating or withdrawal.

### The following criteria were considered and applied, as appropriate:

- Operating experience within the UAE and from other countries,
- IAEA amendments to its standards and/or guidance documents,
- Amendments to other international standards/guidance documents that support FANR's regulatory framework,
- Research and development findings.

### The two FANR regulations published in the UAE Official Gazette in 2022:

- FANR-REG-01 (V.1) "Regulation for Leadership and Management for Safety in Nuclear Facilities."
- FANR-REG-30 "Regulation on the Requirements for the Provision of Radiation Safety Services."

### The FANR regulatory guide approved in 2022:

- FANR-RG-17 V2 "Regulatory Guide for the Certification of Reactor Operators and Senior Reactor Operators at Nuclear Facilities."

# NATIONAL & INTERNATIONAL COLLABORATION



## National Cooperation



During 2022, FANR entered or renewed several key agreements with various organisations to further enhance cooperation and collaboration. The agreements, which took the form of MoUs, were signed with:

- The UAE Space Agency,
- The Federal Authority for Identity, Citizenship, Customs & Port Security (ICP),
- The Abu Dhabi Department of Economic Development,
- The Executive Office for Anti-Money Laundering and Counter Terrorism Financing (AMLCTF),
- Khalifa University.

These MoUs provide a framework for cooperation in various regulatory activities and highlight the importance of information exchange and capacity building between both parties.

FANR participated actively in six national events in 2022, including the World Future Energy Summit, the International Defence Conference, and the World Government Summit. These events resulted in nine high-level meetings and allowed FANR to participate in two government transformational projects.

FANR conducted three government outreach sessions. The outreach sessions, attended by over 200 government representatives, were designed to increase awareness and understanding of FANR's mandate and responsibilities.



FANR also hosted a ceremony to recognise over **60 government partners** from all sectors for their efforts in supporting FANR's vision, mission, and strategic objectives.

The event emphasised the importance of FANR's partnership with the government and demonstrated FANR's commitment to continue its cooperation and collaboration with relevant sectors of the UAE government.

Overall, 2022 was productive and successful, with significant progress made in FANR's partnerships and collaborations with various organisations and government entities.

## International Cooperation

FANR continued to represent the UAE in various ratified international conventions, including:

- The Convention on Nuclear Safety,
- The Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management,
- The Convention on Early Notification of a Nuclear Accident,
- The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

FANR submitted its national report on the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management

and presented it to the 7th review meeting of the Contracting Parties to the Convention, which took place from 27 June to 8 July 2022, where FANR had the opportunity to address notable areas of progress made by the UAE with respect to the safe management of spent fuel and radioactive waste.

FANR's international programme supported its vision to be globally recognised as a leading nuclear regulator through active engagement with international nuclear regulators and leading organisations.

FANR continued to fulfil the UAE's commitments related to nuclear safety,

security and non-proliferation through close cooperation with the IAEA.

During the review period, FANR concluded multiple agreements and MoUs on the exchange of information on nuclear safety and radiation protection issues with its counterparts in many countries, including the U.S., Canada, France, ROK, Belgium and others.

FANR's cooperation with the Korean regulators is the most comprehensive cooperation; it aims to strengthen collaboration between the UAE and ROK on a wide range of areas, including nuclear safety, nuclear security and non-proliferation. Cooperation between the two parties is supervised by the High Level Consultation (HLC)

Committee on nuclear cooperation, which was established in 2018 and led by H.E. Suhail bin Mohammed Faraj Al Mazrouei, the UAE Minister of Energy and Infrastructure, and Choi Jong-moon, the ROK Vice Minister of Foreign Affairs. FANR senior leadership team is in charge of leading the bilateral discussions with the Korean partners on nuclear safety and security regulation.

The UAE and KSA have undertaken to maintain close cooperation, as both countries have nuclear power programmes for peaceful uses. This cooperation focuses on information exchange on many aspects of nuclear safety and radiation protection. FANR and the KSA Nuclear and Radiological Regulatory Commission meet annually to ensure that trans-border matters are well coordinated and regional nuclear safety is well promoted.



## Cooperation with the IAEA

### **FANR continues to strengthen the UAE presence as a Member State by contributing to the IAEA's work aimed to strengthen the global nuclear safety.**

FANR present the UAE in the five Safety Standards Committees of the IAEA on nuclear safety (NUSSC), radiation safety (RASSC), the safe transport of radioactive material (TRANSSC), the safety of radioactive waste (WASSC), and emergency preparedness and response (EPReSC). These committees provide feedback on these areas as well as on areas for improvement to help achieve greater transparency, consensus, quality, coherence and consistency in IAEA safety standards' development.

Upon a request from the IAEA, FANR experts took part in the ORPAS mission to the Philippines, along with other international experts, to assess the occupational radiation protection of the Philippines and provide recommendations.

During 2022, FANR continued to host IAEA capacity building activities with a view to provide hands-on training to Member States in the region, including the Sub-Regional Workshop on Nuclear Law for Asia and the Pacific Region and the Interregional Workshop on Developing and Implementing Nuclear Security Systems and Measures for Major Public Events.

Moreover, FANR continued to utilise the IAEA capacity building programme for its staff by means of hosting technical training sessions and workshops.

One of the key events marking 2022 was the IAEA International Conference on Nuclear Law: The Global Debate (ICNL), the first conference of its kind. FANR extensively contributed to the various activities marking the event, e.g., the article titled "Nuclear Newcomer Countries - The path of the United Arab Emirates" by H.E. Hamad Al Kaabi. FANR's Legal Affairs Department delivered two presentations during the conference and participated in a side event, A Career in Nuclear Law – Opportunities and Challenges.

Towards the end of 2022, FANR hosted the IAEA Sub-Regional Workshop on Nuclear Law for Asia and the Pacific, in Abu Dhabi. Almost 40 lawyers and technical experts from the region attended the workshop to discuss international and national nuclear legal frameworks, share national experiences and identify corresponding IAEA legislative assistance activities to be conducted

In 2022, the UAE has received the ORPAS follow-up mission which looked into the country's occupational radiation protection infrastructure. The mission was extended to cover the secondary standards dosimetry laboratory, naturally occurring radiation material (NORM) treatment and disposal facility, and regulations for the space crew.

An Operational Safety Review Team (OSART) mission, dedicated to assess the operational safety of the BNPP, was requested by FANR, in coordination with ENEC, the licensee.

FANR supported the new IAEA initiative entitled The Nuclear Harmonization and Standardization Initiative (NHSI), kicked off in 2022. The initiative brings together regulators from the world to develop a common regulatory and industry approach to licensing and assessment of new nuclear technologies. FANR is taking part in the NHSI working groups tasked with building an information-sharing framework, developing an international pre-licensing regulatory design review and developing approaches to leverage other regulator's reviews.

## Cooperation with the Nuclear Energy Agency (NEA)

### **FANR is involved in the work of multiple NEA committees and working groups, and contributes, through its expert staff, to the working groups on safety culture, public communication, inspection practices, operating experience and nuclear legislation.**

FANR also benefited from multilateral research and development (R&D) programmes, including ATLAS Phase 3, Halden, CODAP, MDEP. These R&D programmes are intended to enhance safety of NPPs and are conducted under the auspices of the NEA.

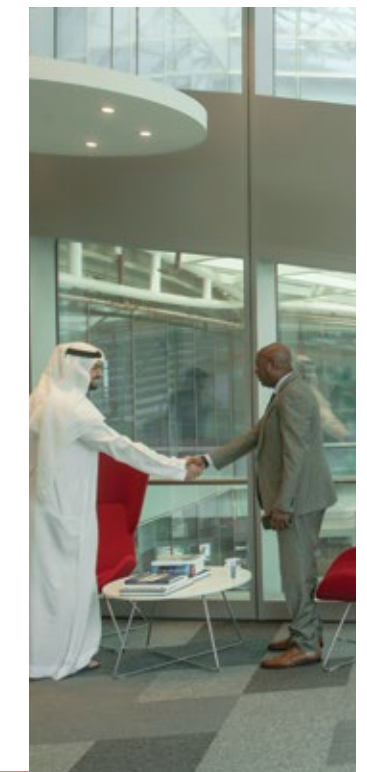
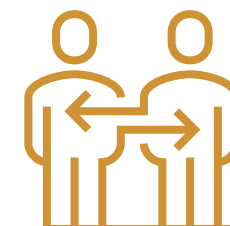
In 2022, FANR chaired the 5th Meeting of the OECD NEA Halden Human Technology Organisation (HTO) Management Board, to discuss, together with other Halden HTO Board Members from different countries, the Halden HTO research programme's proposal for the years 2024–2026, including key research topics related to the safety of the UAE nuclear energy programme.

In line with its efforts to benefit from the NEA mentoring programme intended to reinforce the development of female leaders in science, technology, engineering and mathematics (STEM) and the nuclear energy sector, FANR assigned a highly accomplished female engineer to attend the NAE Mentoring Workshop held in Japan from 23 to 25 July 2022. During the workshop, FANR's female engineer shared with the workshop attendees the experience of her path to nuclear engineering as well as her knowledge and expertise in nuclear safety helping young female students to understand the promising opportunities of the nuclear sector.

## International Workshop on Radiological Protection of Patients in Radiotherapy

FANR co-organised the Radiological Protection of the Patient in Radiation Oncology: Current Challenges and the Future workshop, in cooperation with the International Commission on Radiological Protection (ICRP) and Cleveland Clinic Abu Dhabi. The workshop, which was hosted by Cleveland Clinic Abu Dhabi, aimed to provide a forum for experts from a number of countries to exchange information and discuss challenges relating to the protection of patients undergoing radiotherapy procedures.

During the workshop, FANR presented the UAE's regulatory requirements for the protection of patients, which fall under FANR's mandate to protect the public and environment from the effects of radiation exposure.



# RESEARCH & DEVELOPMENT





The Federal Law by Decree No. (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy empowers FANR to conduct and support research and development studies relevant to FANR's scope of work as well as to initiate and coordinate safety-related research and development work with other authorities.

Accordingly, FANR actively collaborates with organisations in responsible nations to develop research and development capabilities within the UAE's nuclear energy programme, and leverage the operating experience of other countries on major safety issues. As of 2022, FANR was engaged in twelve research collaboration agreements with countries such as the U.S., France, Norway and Belgium.

**ATLAS-3 Project**

Work continued on three strategic research and development projects in 2022. One female Emirati, who is a FANR senior nuclear safety assessment engineer, continued to participate in the ATLAS-3 Project alongside the technical project lead. Under the senior specialist's guidance and mentorship, she has achieved an

advanced level in using the thermal hydraulic safety analysis code, RELAP 5, for analysing experiments and tests developed by the Korean Atomic Energy Research Institute.

She participated in every ATLAS-3 Project Review Meeting and put FANR on the global stage for thermal hydraulic safety analysis by presenting her analysis

findings at the ATLAS Project Review Meetings. She also demonstrated continued improvement in her skills and knowledge as well as her ability to convey technical analysis to a highly-skilled and knowledgeable audience.

FANR remained an active member of the Halden Reactor Project in 2022 with a view to advance capacity building initiatives in human and organisational factors as well as in fuel and materials research.

A group of FANR employees attended Halden Programme Group meetings in May and November 2022, and

supported the Halden Reactor Project to establish the scope of its research programmes for 2021-2023.

In November 2022, FANR hosted a delegation from the Halden Programme Group to discuss the future collaboration between the UAE, its stakeholders and the Halden Human Technology Organisation (HTO) project. Attendees of this meeting

represented the Emirates Nuclear Technology Center (ENTC) stakeholders, namely Khalifa University and ENEC.

It was decided by the meeting that the UAE stakeholders, through ENTC, would complete a ranking sheet to prioritise the UAE's HTO research requirements for 2024-2026.

**MORAD Project**

The Numerical Modelling of Radionuclides Dispersion (MORAD) research programme aims to enhance the capabilities of the UAE to simulate radionuclides dispersion in marine, atmospheric and continental environments, taking regional and local features into account. The MORAD project is led by FANR employees, 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.

Among the significant milestones achieved in the review period, FANR organised a workshop on MORAD project progress in March 2022. Five IRSN scientists took part in the workshop, and Khalifa University and IRSN worked together closely to design,

deploy and run the Wind-Blown Sand Experiment (WISE) field campaign in the UAE. The UAE WISE campaign is the first of its kind to take place in the region and aims to quantify, via direct observation, the resuspension rate of atmospheric dust particles (potentially bearing radionuclides) into the atmosphere. The Laboratoire Interuniversitaire des Systèmes Atmosphériques (LISA) research centre in France is also involved in this work.



# CORPORATE GOVERNANCE

## Integrated Management System

FANR operates an integrated management system (IMS) that was established according to the IAEA standards. FANR's IMS enables the authority to fulfil its responsibilities and roles in a safe, effective, and efficient way in accordance with the general policies set out by the BoM.

### Integrated Management System Governance

The FANR Hub system was established to enhance the governance activities performed by FANR Quality Management by means of:

Planning, conducting and issuing findings from the internal IMS audit,  
Following-up external and internal non-conformance corrective actions,  
Strategic and operational risk analysis,  
Following-up on risk treatment plans.

In 2022, the first internal annual IMS audit was conducted. In the same year, FANR also conducted a follow-up cycle for risk analysis and treatment, and, consequently, 171 operational risks were monitored.

### Integrated Management System Documentation

#### Architecture of Integrated Information Systems (ARIS)

In 2022, FANR launched the automated "Procedure Change Request" workflow in the ARIS system which enables the staff to create change requests, manage the review and approval workflow with multiple stakeholders, and publish the final approved procedures.

In 2022, 107 procedures were approved by FANR.

171

OPERATIONAL RISKS  
WERE MONITORED

107

PROCEDURES

## Integrated Management System

### Performance Monitoring Framework

FANR has adopted the UAE government's Performance Management Framework to monitor progress against the authority's strategic plan.

**The framework and associated systems allow:**

Relevant FANR employees at all functional levels to see the whole picture, understand the connection between organisational processes and the authority's strategic priorities, and ultimately realise the connection between FANR's priorities and those of the government.

FANR to achieve its strategic priorities while focusing on the community's public benefit by linking performance management with the outcomes. Strategic and operational plans ensure the optimal use of resources to achieve the intended results.

The Federal Government Performance Management System also promotes good practices in monitoring strategic and operational performance, to reinforce learning opportunities, support decision-making and governance within the federal entities, and ensure optimal results.

## Audit and Risk Committee

The Audit and Risk Committee (ARC) supports FANR's BoM by providing advice on matters relating to FANR's governance.

**Key activities in 2022 included:**

- Providing oversight on the progress of the Anti-Fraud Framework Project,
- Providing oversight and support towards establishing FANR's Whistleblowing System – Report to Protect (R2P),
- Liaising with the State Audit Institution (SAI) and reviewing SAI's Final Report on FANR for 2021 and Mid-Year Report for 2022, along with FANR management's responses to the observations identified within the report,
- Monitoring the integrity of FANR's financial statements for the year and verifying their compliance with the Federal Government and international accounting standards.
- Verifying independence of the external auditor and ensuring that the external auditors submitted their audited report to FANR BoM,
- Approving the 2023 Risk-Based Internal Audit Plan,
- Evaluating FANR Internal Audit's performance,
- Reviewing the results of all FANR Internal Audit engagements, including assurance and advisory assignment, and data analytics assignment,
- Reviewing FANR management's progress in implementing corrective actions in response to the observations of the SAI Internal Audit and External Audit, such as improvements in governance and strengthening of various internal controls.

## Audit and Risk Committee

### Internal Audit

FANR's Internal Audit adds value to and improves FANR's operations by bringing a systematic and disciplined approach to the authority's risk management, control and governance processes.

**The following key activities were carried out in 2022:**

- Leading the Anti-Fraud Framework Project at FANR,
- Leading the establishment of FANR's R2P Whistleblowing system,
- Conducting an entity-wide risk assessment exercise and developing a short-term (one-year) and long-term (four-year) risk-based internal audit plan to ensure audit coverage of the identified high risks over a four-year period,
- Completing and reporting the results of seven engagements, including advisory assignment on FANR's Succession Planning activity and Customer Invoicing and Receivables Management audit, based on the approved annual plan,
- Applying data analytics techniques to certain risk objectives within the Hire to Retire Cycle, to provide continuous assurance to FANR management,
- Conducting 2021 and 2022 year-end semi-annual follow-up engagements on agreed management action plans for Internal Audit observations, State Audit Observations and External Audit Observations to enhance internal controls across FANR,
- Organising an Internal Audit Knowledge Circle, in collaboration with the UAE Internal Auditors Association, to share FANR's Internal Audit Department's (IAD) best practices with the heads of internal audit at 20 local and federal government entities across the UAE,
- Conducting internal awareness sessions to improve FANR employees' knowledge of the ARC and the IAD roles within the authority.

### Report to Protect

In 2022, FANR launched Report to Protect (R2P) Whistleblowing System– FANR's whistleblowing system that serves as the central hub for receipt of whistleblowing concerns, including

anonymous reporting for:

Fraud and misconduct concerns,  
Concerns related to safety, security and safeguards  
(non-emergencies).

R2P allows FANR to:

Protect the public and the environment from the harmful effects  
of ionising radiation and to ensure the exclusively peaceful uses  
of nuclear energy and radiation sources.  
Protect FANR from the consequences of any wrongdoings such  
as fraud and misconduct, and instill an ethical culture at FANR.

**R2P reporting channels** are accessible to FANR employees and  
its stakeholders, facilitating prompt reporting of any concern in  
a confidential manner, including:

Web reporting portal with feedback facility – [www.R2P.fanr.gov.ae](http://www.R2P.fanr.gov.ae)  
A dedicated email account – [R2P@fanr.gov.ae](mailto:R2P@fanr.gov.ae)  
In-person (direct) communication with the Chief Audit Executive (CAE)  
– Meetings can be scheduled by sending an email to  
[CAE@fanr.gov.ae](mailto:CAE@fanr.gov.ae)

The ARC oversees R2P, sustaining its mandate by receiving  
whistleblowing referrals through the CAE and submitting investigation  
results and recommendations to the BoM. The CAE, with oversight of  
the ARC, manages FANR’s whistleblowing channels. The ARC receives  
quarterly status reports from the CAE on all the whistleblowing concerns  
received through R2P and submits an annual report to the BoM on the  
status of all whistleblowing concerns received through the system during  
a given year.

**R2P is committed to confidentiality and whistleblower protection  
by assuring:**

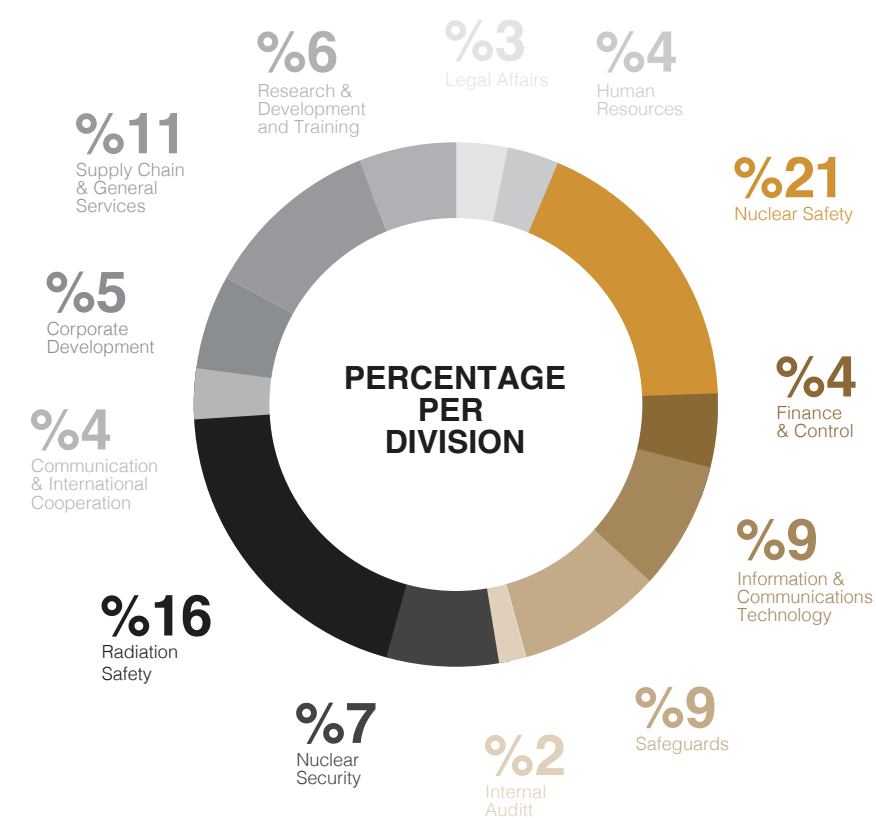
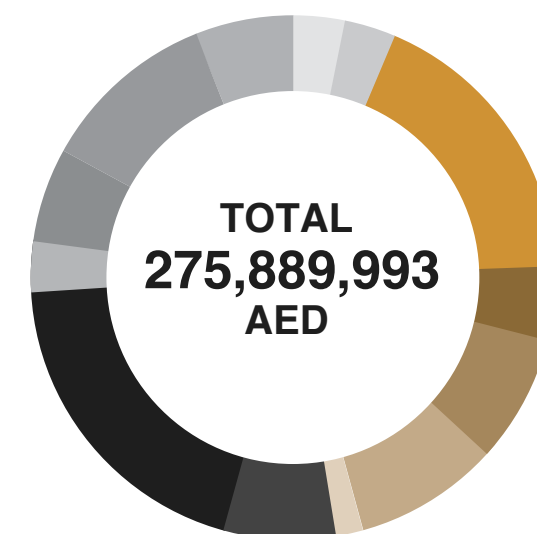
Anonymous reporting of concern(s),  
Acknowledgement of receipt of the reported concern(s),  
The ability to track status of the reported concern(s).

FANR will ensure protection from retaliation to all FANR employees  
who report a suspected concern in good faith, even if the concern  
is not substantiated, and will ensure confidentiality of the  
whistleblower’s identity.



# 2022 BUDGET SPENDING SUMMARY

## FANR Expenditure in 2022



# HUMAN CAPITAL

## Emiratisation

**FANR is dedicated to enhancing the skills, processes, and resources needed to achieve excellence and fulfil its vision.**

FANR's capacity building efforts include strong support for the government's Emiratisation initiative, which aims to increase participation of the UAE nationals in the workforce. FANR activities are designed to ensure that highly skilled and competent Emiratis are selected, trained and developed to contribute effectively to FANR's core functions and to retain its high-calibre employees.

FANR provides long-term career opportunities for Emirati employees by focusing on recruitment, knowledge transfer, and training and development programmes. In 2022, Emiratis represented 74% of FANR's 248 employees. FANR continues to attract talented Emiratis to meet its business needs, recruiting an additional 22 Emiratis during the review period.

FANR believes in leveraging the knowledge and experience of all its employees. The authority is open to hiring individuals with diverse backgrounds and experiences for its core specialised positions. FANR believes that, with proper training and expert guidance, individuals with high enthusiasm and dedication for work will easily develop the necessary skills.

Therefore, FANR hires expert employees to develop and transfer knowledge among young professional Emirati employees, providing them with tools they need to excel in their roles.

In 2022 The FANR appraisal and manpower planning systems have been benchmarked by many entities and found to be excellent. FANR has completed a workload analysis and department mandate project to identify its manpower planning needs for the future. Additionally, FANR developed a new HR Manual to position it as an employer of choice.

Emiratis  
represented  
**74%**  
of FANR's  
**248**  
employees

## Women at FANR

Women make up over

**45%**

of FANR's overall workforce

FANR understands the crucial role that women play in carrying out its mandate. Accordingly, FANR has assigned two Emirati Champions to enable Gender Balance and Equality in line with government direction.

Women make up over 45% of FANR's overall workforce and hold leadership positions in key areas of the organisation, such as the Nuclear Safety, Radiation Safety, Finance, and Education and Training. Females represent 44% of the authority's leadership. It is FANR belief that Emirati women can make a significant contribution to the nuclear industry, as 39% of the authority's technical employees at present are women. Additionally, there are female FANR employees who have completed postgraduate studies in nuclear science.

FANR is committed to creating an inclusive and equitable work environment for all employees and dedicated to providing opportunities for women to advance their careers and make meaningful contributions to the authority and the nuclear industry in the UAE. By fostering a culture of diversity and inclusion, FANR is confident of achieving its goals and fulfilling its mandate as a regulatory body.





## Training and Development

Through its ongoing educational and vocational programmes, FANR conducted several training and development initiatives in 2022.

### Leadership and 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.

FANR's leadership competency framework, designed in 2019, serves as the baseline for all leadership programmes. 83% of FANR's leaders attended the Continuous Leadership Development CLD held in the Baraka site.

### Scholarship Programme

To develop our qualification portfolio, FANR awards scholarships to Emirati employees to complete tertiary qualifications at leading institutions. This year, one employee graduated with an MSc in Strategic and Security Studies from the National Defence Course 2021-2022 at the National Defence College. His Capstone thesis was entitled Emerging Technologies and the Future of CBRN Terrorism.

### Internship Programme

FANR Internship Programme offers interns the platform to discover life as a future FANR employee. It supports Emirati students to complete their graduation requirements and prepares them to real work life experience. 31 interns completed their internship programmes in 2022.

# 31

INTERNS

COMPLETED THEIR INTERNSHIP PROGRAMMES

## Competency Development Framework

FANR's Competency Development Framework is the foundation for continuously ensuring a highly competent workforce. This year, all training and development activities were linked to a gap analysis and assessment conducted for each employee. Training requirements were extensively analysed to ensure a positive improvement in employees' competencies. A career progression model, linked to the competency framework, was developed and implemented.

### Succession Planning

The development and implementation of a new process for Succession Planning was approved during the review period. The project aims to ensure the transfer of knowledge and competencies from critical employees to selected employees at FANR.

### Developee Programme

The FANR Developee Programme is designed to provide fresh Emirati engineering and science graduates with the fundamental knowledge necessary to understand technical concepts applicable to nuclear engineering, radiation protection and regulation.

In 2022, nine developees were placed on a tailored development fast-track programme in FANR Radiation Safety.

### Internal Training Programme

A total of 446 internal and external training events were conducted for 96% of FANR employees during 2022, including technical and non-technical training provided by expatriate employees and Emiratis. The training strategy was adapted during 2022 to focus on more internal training conducted by FANR experts.

# 9

DEVELOPEES



# 96%

OF EMPLOYEES  
ENGAGED IN

# 446

TRAINING EVENTS

## Inspector Qualification Programme

In 2022, the FANR workforce included **86 inspectors** qualified to carry out inspections at nuclear and industrial facilities in the UAE, **59 of whom are Emiratis**.

The qualification follows a rigid programme, including initial training topics, an inspector job-shadowing programme and the Ministry of Justice training to qualify authorised judicial officers. Inspectors are required participate in a re-qualification training every three years to renew their inspector cards.

## Knowledge Management

Knowledge is the nuclear industry's most valuable asset and resource. It is the foundation for the industry's safe and sustainable operations. FANR management acknowledges this by investing in knowledge acquisition and retention.

In 2022, the FANR Knowledge Management Programme continued to develop the Knowledge Management Framework towards its vision to be an internationally recognised leader for other knowledge management programmes. A number of projects were carried to retain the knowledge identified for preservation, taking into account the lessons learnt in knowledge management practices based on FANR's process and procedures; such projects focused on:

- Identifying and capturing critical knowledge,
- Implementing and maintaining knowledge sharing activities,
- Developing Knowledge Transfer Plans,
- Capturing the lessons learnt from benchmarking activities,
- Registering Subject Matter Experts (SME's) in the Knowledge Management database.

These projects contributed to increasing the knowledge flow within the authority, which has reflected positively in maintaining and improving the quality of work that FANR provides to its stakeholders.

## ISO 30401:2018 Knowledge Management Systems

FANR became the first nuclear regulator to achieve the ISO 30401:2018 on Knowledge Management Systems in 2020. The intent of this standard is to set sound knowledge management principles and requirements. In 2022, the FANR Knowledge Management Programme underwent a second external audit, which was concluded without any non-conformances and earned FANR the Compliance Certificate according to the standard.

## FANR Knowledge Management and the IAEA

In 2022, the FANR Knowledge Management Programme went through an expert mission assessment. An Experts Mission team analysed FANR Knowledge Management's activities through various sessions and found that the system has been implemented well, with good work done in this area in terms of national and international practices.

## Reviewing Initiatives

One of most important tasks of FANR Knowledge Management Programme for in the review period this year involved reviewing its knowledge management initiatives. As a result, FANR started to enhance the Knowledge Loss Risk Assessment (KLRA) automated service based on the lessons learnt. The enhancements were about the metadata to improve the data retrieving and analysis. In addition, a number of enhancements were implemented in the KLRA dashboard to reflect more and better data.

## Knowledge Transfer Plans

FANR Knowledge Management initiated a number of Knowledge Transfer Plans (KTPs) in 2022 to mitigate identified knowledge loss risks. This reflects the maturity of FANR Knowledge Management in terms of identifying the knowledge loss risks and putting suitable mitigation actions in place. Most of the targeted KTPs have been finalised.



## Tolerance

In 2022, the FANR Tolerance Working Group promoted workplace tolerance through a variety of initiatives that increased employees' engagement and respect for diversity.

Key achievements included adding new award categories, integrating tolerance into performance management, conducting awareness sessions, creating tolerance competencies, and organising volunteering opportunities and Tolerance Month activities. The group's commitment to inclusivity and respect for diversity has made a significant, positive impact on FANR's work culture.

## Gender Balance

FANR recognises the importance of gender balance and has established a working group dedicated to ensuring fairness and equality wherever possible. In 2022, the FANR Gender Balance Working Group achieved two significant milestones:

Participation in an international gender balance working group.

Working closely with the NEA to study the gender balance and formulate different initiatives to enhance and **increase FANR's gender balance by 2%.**

These accomplishments highlight FANR's commitment to promoting gender equality and fostering a diverse and inclusive work environment. They also reflect FANR's belief that a balanced and diverse workforce leads to better decision-making, increased creativity, and improved productivity.

# ANNUAL STAKEHOLDER SURVEYS



## FANR primary stakeholders include customers, employees, partners, suppliers, and the public.



To measure our communication effectiveness, customer satisfaction levels, awareness of FANR services, public awareness, trust in FANR as a regulatory body, employee happiness and wellbeing, we conducted comprehensive surveys among each stakeholder group. These surveys were in line with the Prime Minister's Office requirements, the Government Excellence Model (GEM 2.0), and the Global Star Rating System for Services. FANR uses the survey results as basis for the annual improvement of its operational plans.

General Stakeholders  
Happiness in 2022

STAKEHOLDERS	PERCENTAGE IN 2022
CUSTOMER	92.4%
EMPLOYEE	74%
PARTNER	81%
SUPPLIER	96%
COMMUNITY	83.2%

The trust was a combination  
of 3 surveys

2022	COMMUNITY	CUSTOMER	PARTNER
% of trust in the regulatory system	91%	93%	96%
% of trust in the emergency preparedness system	90%	94%	94%