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INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

EXTENDED FOLLOW-UP MISSION

TO

UNITED ARAB EMIRATES

ABU DHABI

31 January to 8 February 2015

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY

Integrated
Regulatory
Review Service
IAEA | IRRS

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)
FOLLOW-UP REPORT TO
THE UNITED ARAB EMIRATES

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Mission date:	*31 January to 8 February 2015*
Regulatory body:	*Federal Authority for Nuclear Regulation (FANR)*
Location:	*FANR Headquarters, Abu Dhabi, United Arab Emirates*
Regulated facilities and activities:	*Barakah Nuclear Power Plants, Emirates Nuclear Energy Corporation (ENEC), use of radiation sources and transport of radioactive material*
Organized by:	*International Atomic Energy Agency (IAEA)*

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The number of recommendations, suggestions and good practices is in no way a measure of the status of the regulatory body. Comparisons of such numbers between IRRS reports from different countries should not be attempted.

CONTENTS

EXECUTIVE SUMMARY

At the request of the Government of the United Arab Emirates (UAE), an international team of senior safety experts met representatives of the Federal Authority for Nuclear Regulation (FANR) and other organizations contributing to nuclear and radiation safety from 31 January to 8 February 2015 to conduct the IRRS follow-up mission to the UAE. The follow-up mission took place at the headquarters of FANR in Abu Dhabi. The purpose of the follow-up mission was to review the measures undertaken following the recommendations and suggestions from the initial IRRS mission conducted in 2011. In addition, the follow-up mission was extended to include a review of the transport of radioactive material.

The follow-up mission compared the UAE regulatory framework for nuclear and radiation safety against IAEA safety standards as the international benchmark for safety. The follow-up mission was also used to exchange information and experience between the IRRS follow-up Team members and the UAE counterparts in the areas covered by the IRRS.

The IRRS follow-up Team (the Team) consisted of six senior regulatory experts from six IAEA Member States and four IAEA staff members.

The Team carried out a review of the measures undertaken following the recommendations and suggestions of the 2011 IRRS mission in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body related to regulation of nuclear power plants and use of radiation sources, including authorization, review and assessment, inspection, enforcement, and the development and content of regulations and guides. The additional area of the transport of radioactive material referred to above was also reviewed.

The follow-up mission included a review of reference material and interviews and discussions with management and staff from FANR and other organizations.

Throughout the mission, the Team was extended full cooperation in discussing regulatory and technical issues by all parties; in particular, the staff of FANR provided the fullest practicable assistance and demonstrated extensive openness and transparency.

The Team concluded that the recommendations and suggestions from the 2011 IRRS mission have been taken into account systematically by a comprehensive action plan. Significant progress had been made in many areas and many improvements were carried out following the implementation of the action plan.

The initial IRRS mission in 2011 made 57 findings; 18 recommendations and 39 suggestions. As agreed between FANR and the IAEA during the IRRS follow-up preparatory meeting in September 2014, the findings related to Module 10, “Emergency Preparedness and Response”, i.e. 4 recommendations and 5 suggestions, are to be addressed during the upcoming IAEA EPREV mission in March 2015. During this follow-up mission, the Team determined that 13 out of 14 recommendations reviewed and 30 of 34 suggestions reviewed had been effectively addressed and therefore could be considered closed. FANR should be commended for this accomplishment.

The Team concluded that FANR has further strengthened its regulatory oversight and made significant progress in addressing the findings of the 2011 IRRS mission and have

demonstrated commitment for an effective implementation of the IRRS programme, by inviting an IRRS follow-up mission.

The Team identified certain issues warranting attention or in need of improvement. This report includes 3 new recommendations and 2 new suggestions. Key areas for improvement, including the findings from the extended part of the mission, i.e. transport, include:

- The Government of the UAE should develop a National Policy and Strategy for the management and disposal of spent nuclear fuel and radioactive waste;

- FANR should consider strengthening its capacity to implement its regulations on the safe transport of radioactive material;

- FANR should consider developing a procedure, in the integrated management system, to periodically review its regulations and guides to maintain consistency across the different regulated facilities and activities;

- The Government of the UAE should issue the Resolution concerning the administrative penalties and fines, that is required to provide FANR with the necessary authority to apply them;

- FANR and the relevant Health Authorities should develop and publish Diagnostic Reference Levels for the UAE.

The findings from the 2011 IRRS mission that remain open can be found in Appendix IV.

The new findings of the IRRS follow-up Team are summarized in Appendix V.

An IAEA press release was issued at the end of the mission.

I. INTRODUCTION

In December 2011, at the request of the Government of the United Arab Emirates (UAE), an international team of thirteen senior safety experts met representatives of the Federal Authority for Nuclear Regulation (FANR) and other organizations contributing to nuclear and radiation safety, to conduct an Integrated Regulatory Review Service (IRRS) Mission to review the effectiveness of the UAE regulatory framework for nuclear and radiation safety.

At the request of the Government of the UAE, an international team of senior safety experts met representatives of the FANR and other organizations contributing to nuclear and radiation safety from 31 January to 8 February 2015 to conduct the IRRS follow-up mission to the UAE. The follow-up mission took place at the headquarters of FANR in Abu Dhabi. The purpose of the follow-up mission was to review the measures undertaken following the recommendations and suggestions of the 2011 IRRS mission. In addition, the follow-up mission was extended to include the transport of radioactive material.

A preparatory meeting for the follow-up mission was conducted 29 to 30 September 2014 at FANR headquarters in Abu Dhabi to discuss the purpose, objectives, scope and detailed preparations for the follow-up mission in conjunction with the results of the 2011 IRRS mission and the inclusion of the additional area covering the transport of radioactive material.

The Team consisted of six senior regulatory experts from six IAEA Member States and four IAEA staff members.

The Team carried out a review of the measures undertaken following the recommendations and suggestions of the 2011 IRRS mission in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body related to regulation of nuclear power plants and use of radiation sources, including authorization, review and assessment, inspection, enforcement, and the development and content of regulations and guides. The additional area of the transport of radioactive material referred to above was also reviewed.

FANR conducted a self-assessment in preparation for the follow-up mission. The results of the self-assessment and supporting documentation were provided to the Team as advance reference material (ARM). During the follow-up mission the Team performed a systematic review of all topics by reviewing the ARM, conducting interviews and discussions with management and staff from FANR. Meetings with the Ministry of Health and the Dubai Health Authorities were also organized. All through the follow-up mission the Team received excellent support and cooperation from FANR and other organizations.

II. OBJECTIVE AND SCOPE

The purpose of the follow-up mission was to review the national regulatory framework for nuclear and radiation safety in the UAE, including the measures undertaken following the recommendations and suggestions of the 2011 IRRS mission. In addition, the scope of the follow-up mission included a review of an additional area of the transport of radioactive material. The scope of the IRRS follow-up mission addressed facilities and activities regulated by the FANR, including nuclear power plants and radiation sources, as well as transport of radioactive material. The review was carried out by comparison of existing arrangements against the IAEA safety standards.

It is expected that the IRRS follow-up mission will facilitate regulatory improvements in the UAE and other Member States from the knowledge gained and experiences shared by the FANR and IRRS reviewers and through the evaluation of the effectiveness of the UAE regulatory framework for nuclear and radiation safety.

III. BASIS FOR REVIEW

A) Preparatory work and IAEA Review Team

At the request of the Government of the UAE, a preparatory meeting for the IRRS follow-up mission was conducted from 29 to 30 September 2014. The preparatory meeting was carried out by the appointed Team Leader, Mr Carl-Magnus Larsson, Chief Executive Officer, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the IAEA representatives, Team Coordinator Mr Ahmad Al Khatibeh and Deputy Team Coordinator Mr Geoffrey Jones.

The IRRS follow-up mission preparatory team had discussions regarding the progress made by FANR in addressing measures undertaken following the recommendations and suggestions of the 2011 IRRS mission, the self-assessment work conducted since 2011 and the relevant regulatory programme for the additional area of transport of radioactive material that was not addressed in 2011. The FANR team was led by senior management, represented by Mr John Loy, Deputy Director General Operations Division, FANR and included other senior management and staff. The discussions resulted in agreement that the following areas of its regulatory programme were to be included in the IRRS follow-up mission:

- Follow up of IRRS findings from the 2011 mission;
- The findings related to emergency preparedness and response will be addressed during the IAEA EPREV mission in March 2015;
- Additional review area covering transport of radioactive material.

FANR representatives made a presentation on the major regulatory changes in nuclear and radiation safety since 2011, as well as progress made in implementing recommendations and suggestions of the 2011 IRRS mission and the preliminary results of the self-assessment for the additional review area of the transport of radioactive material.

IAEA staff presented the IRRS principles, process and methodology. This was followed by a discussion on the tentative work plan for the implementation of the IRRS follow-up mission in the UAE in February 2015.

The proposed IRRS follow-up Team composition (senior regulators from Member States to be involved in the review) was discussed and the size of the Team was tentatively confirmed. Logistics including meeting and work space, counterparts and identification of the Liaison Officer, proposed site visits, lodging and transportation arrangements were also addressed.

The Liaison Officer for the preparatory meeting and for the IRRS follow-up mission was Mr Daniele Giuffrida, Director of Radiation Safety Department, FANR.

FANR provided the IAEA (and the Team) with the advance reference material (ARM) for the review during December 2014, including the self-assessment results. In preparation for the follow-up mission, the IRRS follow-up Team members conducted a review of the ARM and provided their initial review comments to the IAEA Team Coordinator prior to the commencement of the IRRS follow-up mission.

B) Reference for the review

The most relevant IAEA safety standards and the Code of Conduct on the Safety and Security of Radioactive Sources were used as review criteria. A more complete list of IAEA publications is given in Appendix VII.

C) Conduct of the review

An initial Team meeting was conducted on Saturday, 31 January 2015, in Abu Dhabi. The Team Leader and the IAEA Team Coordinators gave an overview and informed the Team of the focus areas and specific issues of the mission, clarified the basis for the review and the background, context and objectives of the follow-up mission and to agree on the methodology for the review and the evaluation among all reviewers. They also presented the agenda for the mission.

The Liaison Officer was present at the initial Team meeting and presented logistical arrangements planned for the mission.

The reviewers also reported their first impressions of the ARM.

The entrance meeting was held on Sunday, 1 February 2015, with the participation of FANR senior management and staff, and officials from the National Emergency Crisis & Disaster Management Authority (NCEMA), Environmental Agency Abu Dhabi (EAD), General Authority for the Protection and Security for Ports, Borders and Free Zones (GAPBFZ), Emirates Nuclear Energy Corporation (ENEC), UAE Armed Forces, Ministry of Health, Dubai Health Authority (DHA), Health Authority of Abu Dhabi (HAAD), Khalifa University and Federal Customs Authority (FCA). Opening remarks were made by Dr William Travers, Director General, FANR and the IRRS follow-up Team Leader, Mr Carl-Magnus Larsson. Mr Ian Grant, Director of Nuclear Safety Department, FANR, and Mr Daniele Giuffrida, Director of Radiation Safety Department, FANR, gave an overview of the progress made regarding previous IRRS findings since 2011.

During the follow-up mission, a review was conducted for all the review areas with the objective of evaluating how the UAE and FANR had addressed the recommendations and suggestions after the IRRS mission in 2011 and also providing additional recommendations and suggestions. The review was conducted through meetings, interviews and discussions.

The Team performed its activities based on the mission programme given in Appendix III.

The IRRS follow-up exit meeting was held on Sunday 8 February 2015. The opening remarks at the exit meeting were presented by Dr William Travers, Director General, FANR, and were followed by the presentation of the results of the mission by the IRRS Team Leader, Mr Carl-Magnus Larsson. Closing remarks were made by Mr Ahmad Al-Khatibeh, IAEA Team Coordinator, on behalf of the Mr Denis Flory, IAEA Deputy Director General, Head of the Department for Nuclear Safety and Security.

An IAEA press release was issued at the end of the follow-up mission.

1. RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT

1.1. NATIONAL POLICY AND STRATEGY FOR SAFETY

There were no findings in this area in the initial IRRS missions.

1.2. ESTABLISHMENT OF A FRAMEWORK FOR SAFETY

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S1	**Suggestion:** The Government of the UAE and FANR should consider developing or clarifying, as appropriate, mechanisms by which appeals by a licensee or a stakeholder against a decision by the FANR Board of Management can be reviewed by a body independent of FANR.
S2	**Suggestion:** FANR should consider merging the two existing regulations that cover radiation protection requirements in nuclear power and non-nuclear power sectors respectively.

Changes since the initial IRRS missions

Suggestion 1: The 2011 Team noted that a decision to issue a licence, decline a licence application, or suspend or revoke a licence is taken by the FANR Board of Management. While a licence applicant has the right to appeal to FANR Board of Management against a negative decision, the Team could not verify any opportunity to appeal to a court or other entity, nor provisions for other concerned parties to appeal against a decision.

In response to this, FANR has drafted a procedure called 'Independent Review of Licensee's Administrative Appeals'. It is undergoing review by the FANR Integrated Management System Committee (IMS-C).

A "Cabinet Resolution Concerning Administrative Penalties and Fines on Violating the Terms of the Licences issued by the Federal Authority for Nuclear Regulation" is in the process of being issued by the Cabinet. The draft resolution states that before FANR suspends or revokes a licence or any part thereof, if it deems appropriate, it may notify the licensee in writing of its intention to suspend or revoke the licence or any part thereof and grant the licensee an appropriate period, as determined by FANR, to rectify the cause of the administrative violation. The licensee must respond in writing to FANR's notification to explain the reason for the administrative violation and the corrective action to be taken to rectify the administrative violation. If FANR decides to suspend or revoke the licence or any part thereof, its decision in this regard shall be final.

The licensee would always have the right to appeal or challenge a final decision of FANR to the UAE courts in accordance with Article 25. of the UAE Federal Law n. 11 of 1992 Concerning Civil Procedures.

The Team has reviewed the draft procedure for "Independent Review of Licensee's Administrative Appeals" and finds it provides reasonable assurances for independence of the second opinion about the disputed matter. The Team also understands the wider legal arrangements in the UAE, which gives right to the licensees to appeal to the court.

The procedures do not explicitly cover the right of third parties, such as a party affected by the licensing decision, but not the subject of it. The Team understands there are other avenues, e.g. through courts, to seek to overturn a decision.

Suggestion 2: FANR has considered and decided not to take up this Suggestion. They have explained to the Team that while the suggestion represents reasonable concerns, the disadvantages of merging these regulations would appear to significantly outweigh the advantages. In particular, while about two thirds of the content of these regulations overlap, about one third of each addresses topics outside the scope of the other. FANR-REG-11 contains radioactive waste management and environmental monitoring requirements that would be inappropriate for nearly all regulated materials licensees. Likewise, FANR-REG-24 contains medical practice requirements that would not apply to nuclear facilities. Further, FANR-REG-24 contains requirements concerning management, quality assurance, and emergency planning that are not addressed in FANR-REG-11 but in other nuclear facilities regulations. A merged regulation would therefore need to consist of at least three sections, one section that applied to both, nuclear facilities and regulated materials, one that applied to nuclear facilities only, and one that applied to regulated materials only. The net effect would appear to be to perform a substantial amount of work to arrive at a situation that would not be substantively different from what now exists. Therefore FANR has decided to address the recommendations and suggestions that apply to each regulation, and be vigilant to maintain and improve their consistency, but not pursue their merger.

Status of the findings in the initial missions

Suggestion 1 is closed on the basis of progress made and confidence in effective completion noting that the draft internal procedure for independent review of licensee's administrative appeals - which is appropriate and fit for purpose – will soon be approved.

Suggestion 2 is closed as FANR has considered the suggestion and has provided reasonable explanation why it was not followed.

1.3. ESTABLISHMENT OF A REGULATORY BODY

There were no findings in this area in the initial IRRS missions.

1.4. INDEPENDENCE OF THE REGULATORY BODY

There were no findings in this area in the initial IRRS missions.

1.5. PRIME RESPONSIBILITY FOR SAFETY

There were no findings in this area in the initial IRRS missions.

1.6. COMPLIANCE AND RESPONSIBILITY FOR SAFETY

There were no findings in this area in the initial IRRS missions.

1.7. COORDINATION OF AUTHORITIES HAVING RESPONSIBILITIES FOR SAFETY WITHIN THE REGULATORY FRAMEWORK

2011 Mission RECOMMENDATIONS, SUGGESTIONS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S3	**Suggestion:** The Government of the UAE should encourage and facilitate the establishment of Memoranda of Understanding (MoU) between FANR and other governmental bodies, to avoid duplication of efforts and conflicting advice. FANR should conclude the current negotiations for MoUs as soon as practicable.
S4	**Suggestion:** The Radiation Protection Committee should develop and implement an action plan to address outstanding issues such as reference levels (or intervention levels) for existing exposure situations and emergencies, administration of orphan sources and derivation of diagnostic reference levels for different diagnostic procedures.

Suggestion 3: The Team was provided with evidence about a number of MoUs between FANR and governmental bodies such as the National Emergency, Crisis and Disasters Management Authority (NCEMA), the National Transport Authority (NTA), Khalifa University of Science, Technology and Research, the Telecommunications Regulatory Authority (TRA), the Environment Agency - Abu Dhabi (EAD), the Department of Civil of Aviation – Sharjah Emirates (DCA), the Abu Dhabi National Oil Company (ADNOC). This represents a very good basis for further coordination of related activities in the country.

Suggestion 4: The 2011 Team considered the Radiation Protection Committee (RPC) to have a very important function of great benefit for radiation protection and coordination between various national bodies and the UAE should be commended for its establishment. The 2011 Team also considered it important that adequate priority and resources were provided to carry out activities under the RPC umbrella and that it formulates an action plan with clearly defined targets and timeframes.

The Team notes that since the 2011 Mission, the RPC was continued by the Board of Management of FANR for a further three year period in July 2014. The issue of reference levels for existing exposure situations will be considered further in the context of the forthcoming FANR Regulation 19 on existing exposure situations; after discussion in the RPC, FANR is completing a regulatory guide on reference levels for emergency exposure situations; the offer of a storage location for orphan sources by the UAE Armed Forces followed discussion of the matter in the RPC. The issue of Diagnostic Reference Levels (DRLs) has been discussed and a specific Technical Cooperation project has been developed by Ministry of Health, with the intention of developing national DRLs.

The Team has sampled evidence provided by FANR for review. The Team is, on the basis of this review, reassured that, whilst a formal action plan has not been developed, significant progress is being made against this suggestion and that RPC fulfils an important role as a forum for promoting safety and uniformity in radiation protection. The suggestion can therefore be closed. The specific issues (e.g. orphan sources, reference levels and diagnostic reference levels) are dealt with specifically under relevant modules in this report.

Status of the findings in the initial missions

Suggestion 3 is closed as Memoranda of Understanding with other organizations are in place.

Suggestion 4 is closed based on evidence of the active role the Radiation Protection Committee is taking.

1.8. EMERGENCY PREPAREDNESS AND RESPONSE

There were no findings in this area in the initial IRRS missions.

1.9. SYSTEM FOR PROTECTIVE ACTIONS TO REDUCE EXISTING OR UNREGULATED RADIATION RISKS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R1	**Recommendation**: The Government of the UAE should encourage collaboration amongst relevant bodies to make an inventory of sites with elevated levels of radiation, whether this be from natural exposure or legacies from past practices, and to determine reference levels for remedial or other actions.
R2	**Recommendation:** The Government of the UAE should establish an interim organization for the safe recovery and storage of orphan sources until ultimate transfer of responsibility can be achieved to the new "Waste Entity" to be established pursuant to the Nuclear Law.

Changes since the initial IRRS missions

Recommendation 1: There were three national workshops organized related to the subject matter titled "National Workshop on Baseline Radiation Mapping" in July 2013, February 2014 and September 2014. One of the purposes was also to "define sampling and field measurement methodology for natural and man-made radionuclides in the environment".

Outcomes of these workshops have helped FANR to draft the Regulation on existing exposure Situations (FANR-REG-19). Its requirements shall apply to exposures arising from past activities that were not subject to Regulatory Control or from nuclear or radiation emergencies, from radon in workplaces, dwellings and other buildings and also from commodities. The draft regulation is also setting the reference levels for remedial or other actions. It is well aligned with international guidance. This regulation is in its final stages of adoption.

The Team concludes that FANR has initiated significant activities to address Recommendation 1. This is a significant task and the area is complex and multifaceted. The Team concludes that FANR's direction of work is relevant and the ambition is satisfactory. The Team has recognized these achievements as a good progress. While this is acknowledged, the Team also concludes that significant work remains. The inventory of sites with elevated levels of radiation has not been established yet.

Recommendation 2: The Team has observed that FANR has established an Orphan Source Procedure to govern its activities when an orphan source is reported. A national strategy document has been approved by the FANR Board of Management in 2014. An agreement has been entered with the UAE Armed Forces for storage of orphan sources, and procedures and instructions have been drafted. The action plan foresees that the storage facility will become operational in June 2015. However, it still has to be established which entity will be licensed to operate the facility and what the nature of the licence will be.

Status of the findings in the initial missions

Recommendation 1 is closed on the basis of progress made and confidence in effective completion as significant work has been initiated.

Recommendation 2 is closed on the basis of progress made and confidence in effective completion as major steps towards the establishment of the interim solution for storage of sources were completed and the store could be in use already in 2015.

1.10. PROVISION FOR THE DECOMMISSIONING OF FACILITIES AND THE MANAGEMENT OF RADIOACTIVE WASTE AND SPENT FUEL

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R3	**Recommendation:** The Government of the UAE should ensure the development of a National Policy and Strategy for Radioactive Waste Management is brought to conclusion in the shortest timeframe. This would facilitate inter alia, the development of the necessary regulations and regulatory guidance documents.

Changes since the initial IRRS missions

Recommendation 3: FANR has committed to the development of the necessary framework of regulations and regulatory guidance for decommissioning of facilities and management of radioactive waste and spent fuel. In addition to the FANR regulations on predisposal management (FANR-REG-11 and FANR-REG-26) and supporting regulatory guide (FANR-RG-18), FANR is drafting regulations on: decommissioning; disposal of radioactive waste; and drafting of a regulatory guide on near-surface disposal facilities. It is also progressing the necessary cabinet resolution and regulations to create the Decommissioning Trust Fund.

A project has commenced (September 2014) to develop a regulation which provides the "necessary legal direction and requirements to applicant licensees for the disposal of radioactive waste in a manner that protects people and the environment from the harmful effects of ionizing radiation". Importantly, this regulation will cover disposal of very low level radioactive waste (VLLW) in landfill facilities, near surface disposal for low level radioactive waste (LLW), disposal of intermediate level radioactive waste (ILW), geological disposal of high level radioactive waste (HLW) including spent fuel if treated as waste, and borehole disposal for e.g. disused sealed sources. It will also cover safety prior to operations, during operations and post-closure.

The directions of the policy and strategy are clear enough to allow work to start on the Decommissioning Trust Fund (DTF) for, inter alia, the funding of radioactive waste management and on a regulation/ guides for waste disposal (especially siting of facilities). The latter is needed to support the proposed Waste Management Organisation in establishing possible sites in the UAE. Other matters that need to be resolved include decay storage on site where ENEC has suggested 100 years decay storage on site as part of the waste management strategy, which would extend the operational life-time of the Barakah site to two centuries and possibly beyond, i.e. into the 2200s. It appears to the Team that another option would be for the radioactive waste management plan to allow for considerably shorter decay storage. Regardless of outcomes, it is evident that major policy-related decisions are still pending in this area.

The Team has recognized efforts described above as a good progress. However the National Policy and Strategy for Radioactive Waste Management does still not exist. This is required by Article 41 of the Nuclear Law, which states that "The Cabinet shall issue policy regarding the long term management and disposal of the spent nuclear fuel, the radioactive waste and identify the entity in charge of implementing such policy".

Status of the findings in the initial missions

Recommendation 3 is open because the National Policy and Strategy for management and disposal of spent nuclear fuel and radioactive waste, which is mandated in the Nuclear Law, is still not in place in UAE.

1.11. COMPETENCE FOR SAFETY

There were no findings in this area in the initial IRRS missions.

1.12. PROVISION OF TECHNICAL SERVICES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S5	**Suggestion:** The Government should continue to develop and implement provisions to establish the nationwide radiological monitoring system for early warning purposes as well as for the long-term assessment of radiological contamination of the territory of the country.
R4	**Recommendation:** FANR should develop authorization criteria to be fulfilled by dosimetry services providers for the individual monitoring of workers subject to occupational exposure.

Changes since the initial IRRS missions

Suggestion 5: The Team was shown the web screen showing on-line data from 10 gamma dose rate monitors at different locations around UAE. It was explained that in the near future they will expand that network to 14 locations. Data are updated every several hours, however, in the case of an elevated dose rate the frequency of data collection would be increased. The web page is not public.

The Team considers this to be a satisfactory fulfillment of the suggestion.

Recommendation 4: FANR has developed draft authorization criteria to be fulfilled by dosimetry services providers and plans to issue them as a regulation in 2015. This issue will also be addressed by the planned IAEA Occupational Radiation Protection Appraisals (ORPAS) mission later in 2015.

Status of the findings in the initial missions

Suggestion 5 is closed because the radiological monitoring system for early warning purposes is in place.

Recommendation 4 is closed on the basis of progress made and confidence in effective completion as sufficient assurances are in place for successful completion in the near future.

2. GLOBAL NUCLEAR SAFETY REGIME

2.1. INTERNATIONAL OBLIGATIONS AND ARRANGEMENTS FOR COOPERATION

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S6	**Suggestion:** The Government of the UAE should officially notify the IAEA as soon as practicable that it endeavours to follow the provisions of the Code of Conduct on the Safety and Security of Radioactive Sources.

Changes since the initial IRRS missions

Suggestion 6: By letter, dated 27 August 2013, to the IAEA Director General, the UAE stated that it is working towards following the guidance contained in the IAEA Code of Conduct on the Safety and Security of Radioactive Sources and that it intends to act in accordance with the Guidance on the Import and Export of Radioactive Sources on a harmonized basis.
The UAE also hosted, through FANR, the International Conference on the Safety and Security of Radioactive Sources in Abu Dhabi in October 2013.

Status of the findings in the initial missions

Suggestion 6 is closed because the suggested action was fully implemented.

2.2. SHARING OF OPERATING EXPERIENCE AND REGULATORY EXPERIENCE

There were no findings in this area in the initial IRRS missions.

3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

3.1. ORGANIZATIONAL STRUCTURE OF THE REGULATORY BODY AND ALLOCATION OF RESOURCES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S7	**Suggestion:** FANR should consider organizing the regulatory body so that activities related to radioactive waste and decommissioning are integrated.

Changes since the initial IRRS missions

Suggestion 7: FANR has reviewed and decided to maintain the current organizational arrangements with regard to radioactive waste and decommissioning. The organizational focus remains the Nuclear Facilities section (NF) of the Radiation Safety Department (RSD). That department also covers the other practices and activities. In due time, when the workload warrants it, FANR may establish a separate radioactive waste and decommissioning section.
FANR has justified its position as follows: "Dividing the regulatory work on radioactive waste management (RWM) between the NF section and the Radioactive Materials (RM) section allows a holistic approach that integrates RWM with other regulatory issues for Barakah Nuclear Power Plant (Barakah NPP) on the one hand and the radioactive source users on the other. It is the role of the Director RSD (and DDG-O) to ensure that a consistent safety framework in RWM is applied. It would not be sensible to allocate the RWM for the Barakah NPP to the RM section; nor vice-versa.

The other alternative of creating a RWM section, separate both from the NF and RM sections, creates problems of coordination with other aspects of the regulatory tasks of these sections, with little return from the specialization gained, at least at this stage of the UAE program's development. It may be that as issues of RWM loom much larger, this organizational change could be re-considered."

The Team takes note of that decision and its justification. Such organizational change might indeed be needed only after the start of operation of nuclear power plants when the amount of the radioactive waste in the country will increase.

Status of the findings in the initial missions

Suggestion 7 is closed as sufficient explanations were provided why FANR did not decide for proposed organizational change.

3.2. EFFECTIVE INDEPENDENCE DURING CONDUCT OF REGULATORY ACTIVITIES

There were no findings in this area in the initial IRRS missions.

3.3. STAFFING AND COMPETENCE OF THE REGULATORY BODY

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S8	**Suggestion:** FANR and the relevant stakeholder organizations should consider targets for developing Emirati staff having the necessary competences and

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
	experience to assure regulation and safety of facilities and activities in all potential circumstances on an appropriate timescale.

Changes since the initial IRRS missions

Suggestion 8: FANR is continuing its capacity building and workforce activities aiming at increasing the participation of Emirati staff in FANR core activities. The Team has noted that the Emiratization & Capacity Building Committee has been created (revived) in November 2014 with membership from the technical and HR units of FANR. Targets for establishing a strong and sustainable Emirati workforce within FANR have been established but the long-term goals are yet to be finalized. There are education and training programmes in place to attract young people into the organization and retain them for a longer period. It will, however, take time before their careers will develop so far they will be able to take over leading positions, particularly in the operations side. The Team was not under the impression that these Emiratization ambitions in any way jeopardize or take priority over safety.

Major challenges continue to be: competition for skilled and educated workforce from e.g. the oil and gas industry; retaining skilled workforce; and, managing the expectations for very rapid career progression among young and skilled new recruitments. The expatriates are going to remain a significant component of the FANR workforce for foreseeable time.

Status of the findings in the initial missions

Suggestion 8 is closed on the basis of progress made and confidence in effective completion of the current ambitions and activities to support a healthy balance between Emirati and expatriate staff.

New observations from the additional transport module

At present time, FANR has not dedicated staff with the responsibilities for transport of radioactive material. FANR currently does not have the sufficient capability to perform its functions regarding the safe transport of radioactive material.

Important basic functions to be covered include

- Performing technical assessment to support approvals required by the transport regulations, including independent technical review (see also Chapter 6.3). This experience is also of great value for input into decisions connected to the transport of radioactive material, e.g. dry storage of spent fuel.
- Cooperating with other national authorities (Federal Transport Authority, Federal Civil Aviation Authority, local authorities) including aspects of coordination with the international modal organizations International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO),
- Performing transport package design approval and other types of approvals required by the transport regulations (see also Chapter 5.3).
- Representing the UAE in IAEA Transport Safety Standards Committee TRANSSC (see also Chapter 9.7),
- Ensuring that the UAE follow the review and revision of the IAEA's regulation on the safe transport of radioactive material and update UAE Regulations accordingly,

- Participating in IAEA meetings and international conferences on the safe transport of radioactive material, e.g. the International Symposium on the Packaging and Transportation of Radioactive Materials (PATRAM), including the transport aspects of spent fuel management.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation:	FANR does not have sufficient capability to perform all its functions regarding the safe transport of radioactive material.
(1)	**BASIS: GSR Part 1 Requirement 18 para. 4.11 states that** *"The regulatory body has to have appropriately qualified and competent staff. A human resource plan shall be developed that states the number of staff necessary and the essential knowledge, skills and abilities for them to perform all the necessary regulatory functions."*
(2)	**BASIS: TS-G-1.5 para. 2.10 states that** *"The competent authority should be able to independently assess and verify the technical and test data submitted by an applicant…."*
RF1	**Recommendation:** FANR should update their human resource plan to include appropriate competent staff in the area of transport of radioactive material.

3.4. LIAISON WITH ADVISORY BODIES AND SUPPORT ORGANIZATIONS

There were no findings in this area in the initial IRRS missions.

3.5. LIAISON BETWEEN THE REGULATORY BODY AND AUTHORIZED PARTIES

There were no findings in this area in the initial IRRS missions.

3.6. COMMUNICATION AND CONSULTATION WITH INTERESTED PARTIES

There were no findings in this area in the initial IRRS missions.

4. MANAGEMENT SYSTEM OF THE REGULATORY BODY

4.1. THE MANAGEMENT SYSTEM OF THE REGULATORY BODY

There were no findings in this area in the initial IRRS missions.

4.2. GENERAL REQUIREMENTS OF GS-R-3

There were no findings in this area in the initial IRRS missions.

4.3. SAFETY CULTURE

There were no findings in this area in the initial IRRS missions.

4.4. GRADING THE APPLICATION OF MANAGEMENT SYSTEM REQUIREMENTS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S9	**Suggestion**: FANR should consider further improving descriptions of the graded approach to be used in different areas of its activities such as: • Licensing of radiation practices; • Safety assessment and inspection for nuclear facilities and activities consistent with the magnitude of the possible radiation risks; • Reviewing or developing the radiation protection regulations for non-nuclear facilities and activities; • Further developing documentation of the Integrated Management System.

Changes since the initial IRRS missions

Suggestion 9: The Integrated Management System (IMS) manual gives an overarching description of the application of the graded approach in the organization. The Generic Inspection Guidance (NSD-GDL-00001-2011 rev.3) gives further guidance of the graded approach in the section 4.3.7 Method for Selection of Inspection Samples.

The procedure Review of a Nuclear Facility License Application provides general guidance on the roles and responsibilities, the methods to be followed, and the outputs required in implementing the licensing process for nuclear facilities. In section 7 of the procedure it is explained how the graded approach is applied in the review process. The document Construction Inspection Programme Overview for BRAKA NPP explains the establishment of a baseline inspection programme based on risk-informed approach.

The CP2 process for Radioactive Materials and Radiation Generator Licensing include notification, exemption and licencing condition according to FANR-REG-24 v1. Licensing instructions for different purposes are used in daily work according to FANR regulatory requirements taking in to account a graded approach.

The inspection instructions for Regulated Materials (FANR-RSD-PI-00002 rev 2 (Fixed Gauges), FANR-RSD-PI-000009 (Dental X-Ray) rev 2, FANR-RSD-PI-00006 rev 2 (Radiotherapy), establishes the inspection frequency basis for each purpose, related to the relative risk associated to each type of radiation practice or sources within a practice.

Status of the findings in the initial missions

Suggestion 9 is closed because there is evidence that the concept of a graded approach is applied at all levels in the regulatory structure.

4.5. DOCUMENTATION OF THE MANAGEMENT SYSTEM

There were no findings in this area in the initial IRRS missions.

4.6. MANAGEMENT COMMITMENT

There were no findings in this area in the initial IRRS missions.

4.7. SATISFACTION OF INTERESTED PARTIES

There were no findings in this area in the initial IRRS missions.

4.8. ORGANIZATIONAL POLICIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S10	**Suggestion:** FANR should consider having all policies of FANR (approved by the Board of Management) integrated in the IMS and available to all staff via the Local Area Network and that clarifying text is inserted in the IMS Manual.

Changes since the initial IRRS missions

Suggestion 10: Policies approved by the Board of Management: HR Policy; Procurement Policies and Tender Committee terms of reference; Corporate Information Security Policy; and the Social Media Acceptable Use Policy; are included in the Enterprise Document Management System (EDMS) and FANR portal and thus available to staff. This is clarified in the manual of the IMS under section 2.6 Documentation Structure of the IMS.

Status of the findings in the initial missions

Suggestion 10 is closed because polices approved by the board are integrated in the management system and available for all staff on FANR's portal.

4.9. PLANNING

There were no findings in this area in the initial IRRS missions.

4.10. RESPONSIBILITY AND AUTHORITY FOR THE MANAGEMENT SYSTEM

There were no findings in this area in the initial IRRS missions.

4.11. PROVISION OF RESOURCES

There were no findings in this area in the initial IRRS missions.

4.12. HUMAN RESOURCES

There were no findings in this area in the initial IRRS missions.

4.13. INFRASTRUCTURE AND WORKING ENVIRONMENT

There were no findings in this area in the initial IRRS missions.

4.14. DEVELOPING PROCESSES

There were no findings in this area in the initial IRRS missions.

4.15. PROCESS MANAGEMENT

There were no findings in this area in the initial IRRS missions.

4.16. CONTROL OF DOCUMENTS, PRODUCTS AND RECORDS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R5	**Recommendation:** FANR should prioritise development of the EDMS to ensure those products i.e. documents (reports, licences etc.) addressing the same subject matter can be compiled in one dossier having a unique identification number and that record-keeping follows the same structure. FANR should furthermore, consider resolving the implementation issues with EDMS and EPM, particularly clarifying the relationships between the two systems, to ensure equal application of the advantages of each system for all areas of FANR's activities.
R6	**Recommendation:** FANR should take steps to specify retention times for various records and associated materials.

Changes since the initial IRRS missions

Recommendation 5: The Document Management Procedure (IMS-SP6-003) is being implemented with all incoming and outgoing documents being processed and stored in the Electronic Document Management Systems (EDMS). EDMS is the main repository for storing and retrieving all documents at FANR. It's well-structured and matters are given unique identification numbers and stored in appropriate dossier. The Enterprise Project Management (EPM) system is the project management tool and may be used to exchange documents related to running projects but will never be used as a repository. All documents uploaded to EPM will be migrated to EDMS once related projects are completed and closed. Documents related to Barakah licensing that are included in the EPM system, but not EDMS, are being transferred to EDMS, with completion expected in 2015. FANR has updated the Document Management process (SP.6) based on its experience.

Recommendation 6: The Document Disposition Procedure issued 26 June 2014, clarifies the purpose including defining the requirements for the retention and disposition of FANR documents. The procedure provides the retention times and other guidelines related to the disposition of FANR regulatory and administrative documents and records. However, no document disposition has yet been made.

Status of the findings in the initial missions

Recommendation 5 is closed on the basis of progress made and confidence in effective completion because the updated procedure clarifies that Electronic Document Management System (EDMS) is the repository for incoming and outgoing documents and that documents included in the Enterprise Project Management (EPM) system will be transferred to EDMS within 2015.

Recommendation 6 is closed because requirements for the retention and disposition of FANR documents are clarified in the document disposition procedure.

4.17. PURCHASING

There were no findings in this area in the initial IRRS missions.

4.18. COMMUNICATION

There were no findings in this area in the initial IRRS missions.

4.19. MANAGING ORGANIZATIONAL CHANGES

There were no findings in this area in the initial IRRS missions.

4.20. MONITORING AND MEASUREMENT

There were no findings in this area in the initial IRRS missions.

4.21. SELF-ASSESSMENT

There were no findings in this area in the initial IRRS missions.

4.22. INDEPENDENT ASSESSMENT

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S11	**Suggestion:** FANR should consider preparing and implementing a plan (programme) for internal audits as a management tool for independent assessment.

Changes since the initial IRRS missions

Suggestion 11: The IMS Manual includes an Audit and Risk Committee comprising three members of the Board of Management. The goal/objectives of internal audits are addressed in the IMS Manual. A Manager, Internal Audit position reporting to the Board of Management has been created. MP.6 (Evaluate and Improve Performance) Rev. 2 was approved in March 2013. The Internal Audit Procedure (Rev. 0), approved in June 2010, requires the development and approval of an annual internal audit plan. The procedure does reflect current practices, roles and responsibilities however FANR has not yet recruited the internal audit manager. Until the audit manager is in place, the Management System Coordinator is given significant responsibilities for planning and coordinating internal audits. The procedure is planned for update when an Internal Audit Manager is recruited. FANR performed four internal audits during 2012, using the KPMG risk assessment methodology as input. According to the internal audit plan 5 internal audits have been conducted during 2013-2014.

Status of the findings in the initial missions

Suggestion 11 is closed because there is a plan and there is evidence that FANR is implementing it. Additionally FANR has improved the organization providing a specific function for conducting internal reviews.

4.23. MANAGEMENT SYSTEM REVIEW

There were no findings in this area in the initial IRRS missions.

4.24. NON-CONFORMANCIES AND CORRECTIVE AND PREVENTIVE ACTIONS

There were no findings in this area in the initial IRRS missions.

4.25. IMPROVEMENT

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S12	**Suggestion:** FANR should consider taking a systematic approach to monitoring the completion of improvements, including actions taken regarding non-conformances, and how to check for the effectiveness of the improvements.

Changes since the initial IRRS missions

Suggestion 12: The system for continuous improvement has been restructured. The new Terms of Reference (responsibilities, members etc.) and guidelines can be found in EDMS under the IMS folder. The process (MP.6, Evaluate and Improve Performance) and related non-conformance and corrective procedures have been revised to provide a more systematic approach to monitoring the completion of improvements and checking their effectiveness. A Non-conformance Coordinator (NC-C) has been identified with responsibility for coordinating activities and supporting the implementation of both procedures. The procedures also provide for a Non-conformance Screening Committee, whose responsibilities include establishing due dates for corrective actions.

Evidence of a systematic approach to continuous improvement included: clear responsibilities; committees on different organizational levels discuss non-conformances reports and corrective plans, check effectiveness of improvements; a system on the FANR portal for reporting non-conformances. FANR has also done a staff survey on the effectiveness and satisfaction on the system on non-conformances. The result of the survey led to improvement and a training program. Managers at all levels demonstrated leadership and commitment to the process.

Status of the findings in the initial missions

Suggestion 12 is closed because FANR has taken a number of measures towards a systematic approach to continuous improvement.

5. AUTHORIZATION

5.1. AUTHORIZATION OF NUCLEAR POWER PLANTS

There were no findings in this area in the initial IRRS missions.

5.2. AUTHORIZATION OF REGULATED MATERIAL

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S13	**Suggestion:** FANR should consider authorizing the various steps in the development of a non-nuclear power facility e.g. notification, design, construction, operation, shut down and decommissioning, with a view to confirming that the design intent has been delivered e.g. for shielding high end medical radiation activities such as oncology.

Changes since the initial IRRS missions

Suggestion 13: In response to this suggestion FANR has recently issued the revision of FANR-REG-24 which included the insertion of the following Article (4)(3):

"A Person seeking to undertake Covered Activities in a Facility (other than a Nuclear Facility) shall provide the Authority, before constructing the Facility, with technical information and data to enable the Authority to acquire an understanding of the Design of the Facility. Similarly, a Person already operating a Facility shall notify the Authority before shutting down or Decommissioning the Facility". In accordance with Article (1) of the Law, Facilities include "...places where Radioactive Material is produced, processed, used, handled, stored, or disposed of, or where radiation generators are installed, on such a scale that consideration of protection and Safety is required."

FANR staff informed the Team that this provision enables application of a step-wise authorization process to Facilities other than Nuclear Facilities, such as radiotherapy, nuclear medicine, industrial irradiation, and predisposal radioactive waste management. FANR has a right to identify additional such places by notice published in the Gazette.

The Team was concerned that the revision of the regulation FANR-REG-24 is not completely fulfilling Suggestions 13 from the initial IRRS mission, as the new Article (4)(3) relates solely to the obligation of the applicants regarding the notification of FANR, but do not define the possibility of licensing in several steps. However, in practice this revision of regulation is allowing FANR staff to develop regulatory guides as support to regulation and a comprehensive set of procedures and instructions defining licensing process for various types of practices, taking into consideration complexity and safety significance of the regulated practice.

The Team was informed that the new process has been already followed for FANR's consideration of a proposed NORM treatment facility planned to be operated by Abu Dhabi National Oil Corporation (ADNOC). Moreover, in licensing new complex Medical and Industrial facilities, the process has been divided in subsequent steps, including an inspection of construction premises before granting the no-objection to proceed to the following steps.

As a new significant improvement for authorization process FANR has started E-Licensing system project with the purpose to develop web based interface with applicants that will allow FANR to improve licensing and inspection processes, along with providing for establishment of national dose register and inventory of regulated materials.

Status of the findings in the initial missions

Suggestion 13 is closed on the basis of progress made and confidence in effective completion as FANR has issued new revised regulation and regulatory guidelines and prepared or is preparing detailed instructions and procedures for regulatory review and assessment.

5.3. AUTHORIZATION OF TRANSPORT

Since the IAEA regulations have been adopted for national transport of radioactive material as FANR-REG-13, all requirements for authorization by the competent authority are in place.

Currently, transport of radioactive material in the UAE is based on packages of foreign origin which, with one exception, do not require approval of package design by the UAE. Therefore currently only one package design has been approved in the UAE (multilateral approval of a package design for fissile material of Korean origin), and there is only limited expertise in this field. Even less experience is available for the other types of approval required by the IAEA regulations for the safe transport of radioactive material.

The need for approvals by the UAE will soon rise when fissile material will be shipped to and from the NPP. Packages for such shipments, even if designed and approved abroad, will require multilateral approval. It is therefore suggested to improve competence in package design approval and other types of approvals. See recommendation RF1 in Chapter 3.2.

In the UAE, radioactive material may only be transported by licensed organizations. Licensing is done by FANR, based on licensing of the vehicle by local authorities and an application including information on radiation protection program, safety procedures, training and emergency plans.

6. REVIEW AND ASSESSMENT

6.1. REVIEW AND ASSESSMENT OF NUCLEAR POWER PLANTS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R7	**Recommendation:** FANR should develop an internal procedure on the transfer of lessons-learned taking into account the benefit of utilizing experience, notably from the vendor country of origin and international community.

Changes since the initial IRRS missions

Recommendation 7: FANR has progressed with developing and implementing its Construction and Operating Experience Feedback (COEF) programme that incorporates national and international experience. The COEF procedure supporting IMS process CP.7 was approved by the IMS Committee in October 2014, and the process has been implemented. An interim COEF data base for NPP operating experience has been developed and implemented with access available to all FANR Operations staff. FANR is participating in international reporting systems and forums including IRS and INES and is represented at the IRS coordinators meeting and the NEA Working Group on Operating Experience, and is engaged with the activities related to Counterfeit, Fraudulent, and Suspect Items (CFSI). FANR has also requested greater access to the Korean Institute of Nuclear Safety (KINS) internal COEF data base for operating experience from the vendor country.

Status of the findings in the initial missions

Recommendation 7 is closed. FANR has developed and implemented a procedure on the transfer of lessons-learned, and is engaged with the vendor country of origin and the international community.

6.2. REVIEW AND ASSESSMENT OF REGULATED MATERIAL

There were no findings in this area in the initial IRRS missions.

6.3. REVIEW AND ASSESSMENT OF TRANSPORT

Since the IAEA regulations have been adopted for national transport of radioactive material as FANR-REG-13 all requirements for the review and assessment by the competent authority are in place.

As already mentioned in Chapter 5.3, currently only one package design has been approved by the UAE (multilateral approval of a package design for fissile material of Korean origin). In the assessment of compliance of this package design with the regulations, significant credit from the assessment of the Korean competent authority has been taken (multilateral approval). The expertise for such an independent assessment taking into account transport specific requirements is not fully developed in the UAE. The same is true for assessment to support other types of approval required by the IAEA regulations for the transport of radioactive material. Such approvals require technical assessment in the fields of mechanical and thermal performance of the package, containment, shielding and criticality safety. It is suggested to increase expertise in FANR in technical assessments required for approvals related to transport of radioactive material. See recommendation RF1 in Chapter 3.2.

7. INSPECTION

7.1. INSPECTION OF FACILITIES AND ACTIVITIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S14	**Suggestion:** FANR should examine Article 36(3) of the Law No.6 with a view to ensuring that prosecutions are possible for situations where FANR has to intervene to restore radiological safety.
S15	**Suggestion:** FANR should consider improving the process to assess the competence and qualifications of consultants from technical support organisations assisting FANR during inspections.
R8	**Recommendation:** The Government of the UAE should clearly assign responsibilities for overseeing industrial safety aspects during construction of facilities.

Changes since the initial IRRS missions

Suggestion 14: As noted for Suggestion 1, a "*Cabinet Resolution Concerning Administrative Penalties and Fines on Violating the Terms of the Licenses issued by the Federal Authority for Nuclear Regulation*" is in the process of being issued by the UAE Government. Once that resolution has been issued by the UAE Government, FANR will coordinate with the relevant judicial authorities and/or other authorities to implement this resolution. In the meantime FANR has developed an IMS procedure on enforcement (CP3-04-003, revision 2), which specifically addresses violations, administrative penalties and enforcement action.

Suggestion 15: FANR's procurement process (IMS SP.5) calls for prequalification of vendors providing services to FANR, including a technical assessment of the vendor capabilities.

FANR's selection process for the inspection Technical Support Organizations (TSOs) required the bidders to provide information regarding their experience and past performance on similar contracts, capabilities with respect to personnel, equipment and facilities, and years of experience in the business as well as other general indicators. Bidders were also required to demonstrate their technical capability including the following points.

- Relevant and current credentials for services provided to other Regulatory Authorities by the Company to ensure public health, safety and security
- Optimum skill set of resources with relevant qualification and technical experience
- Leading practices in key disciplines within the skill set
- Accreditations for key safety sensitive positions within the skill set
- Key tools and data needed to achieve the desired outcomes
- Technical quality and safety standards of the key tools and data

A team of FANR inspectors evaluated each bid against the technical criteria outlined above. Only those bids that satisfied the technical criteria were considered for further evaluation of the commercial proposals. Those bids that did not satisfy the technical proposal were excluded from further consideration. By this process, FANR ensured that the TSOs it engaged possess the necessary technical competences.

Recommendation 8: Industrial safety in the Emirate of Abu Dhabi is overseen by the Abu Dhabi Environment, Health and Safety Centre (ADHSEC), which has assumed the responsibility for regulation of industrial safety on the Barakah site. The FANR Director General wrote to the ADHSEC in 2013, proposing discussions leading to a possible Memorandum of Understanding (MOU). A subsequent meeting held with ADEHSC in July 2013 resulted in a declaration by ADEHSC that they have full responsibility for regulation of EHS in the Nuclear Sector of UAE. The MOU is being developed.

Status of the findings in the initial missions

Suggestion 14 is open. The Cabinet Resolution is required to provide the legal basis to fully implement this Suggestion.

Suggestion 15 is closed. FANR's implementation of the procurement process has shown that it provides an adequate basis for assessing the competence and qualifications of TSO staff.

Recommendation 8 is closed on the basis of progress made and confidence in effective completion. The interaction between FANR and Abu Dhabi Environment, Health and Safety Centre (ADEHSC) has provided the clarity on responsibilities for overseeing industrial safety. An MOU providing final documentation and clarity is, however, still under development.

7.2. TYPES OF INSPECTION OF FACILITIES AND ACTIVITIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S16	**Suggestion:** FANR should consider developing generic criteria for event reporting by all licensees in order to effectively perform reactive inspections.

Changes since the initial IRRS missions

Suggestion 16: With regard to the nuclear power plant facilities, FANR has included in the Construction Licenses issued to ENEC for Barakah License Condition LC6 entitled "Reporting of unplanned events". LC6 requires the licensee to report promptly to FANR a violation of the license or any accident or event, including the occurrence of defects or deficiencies, having the potential to affect quality, safety, radiation protection, nuclear safety, nuclear security or safeguards. The licensee has submitted several reports pursuant to LC6.

IMS CP.7 procedure includes in Appendix 4 criteria for determining any needed prompt action in response to reported events, which may include a decision to conduct a reactive inspection. Guidance on the conduct of reactive inspections is included in the FANR CP3 generic inspection guidance procedure.

FANR is currently drafting a Regulatory Guide on "Reporting of Events" (FANR-RG-008) expected to be issued in April 2015.

For facilities and activities other than the nuclear power plant, FANR REG – 24, Article 17 requires the licensee to conduct formal investigations of abnormal circumstances arising in the operation of the facility or the conduct of activity. Specific reporting times for these events are specified in the regulation.

Additionally, FANR has included in the license conditions "The requirement for incident reporting" where the licensee shall notify the Authority within 4 hours in case of loss of

radioactive sources, theft of categories 1, 2 or 3 radioactive sources, etc. and then within 24 hours for other less sever incidents and finally within 7 days for the least significant incidents. The license conditions also specify the criteria of the reports to be submitted to the Authority.

Status of the findings in the initial missions

Suggestion 16 is closed. FANR has implemented specific event reporting requirements for all licensees.

7.3. GRADED APPROACH TO INSPECTION OF FACILITIES AND ACTIVITIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S17	**Suggestion:** FANR should develop a procedure for coordinating inspection activities with review and assessment activities.

Changes since the initial IRRS missions

Suggestion 17: In the Nuclear Safety Department, a dedicated group of inspection specialists work separately from the staff engaged in the review and assessment process. In the other Operations Departments (RSD, SCD and SGD), the same staff conduct both review and assessment and inspections. However, the CP.3 Generic Inspection Guidance provides for Subject Matter Experts (SMEs) to participate in and support inspections. This coordination is being realized through the participation of relevant SMEs in vendor and site inspections.

NSD has also developed a work instruction to guide the coordination between NSD Inspection Group activities and the Safety Assessment Group, for instance to determine whether inspection findings from construction of the facility comply with the technical requirements detailed or referenced in the Preliminary Safety Analysis Report (PSAR).

Status of the findings in the initial missions

Suggestion 17 is closed. FANR has developed CP.3 which addresses coordination of inspection activities with review and assessment activities.

7.4. INSPECTION OF TRANSPORT

Licensees for activities involving radioactive material, including transport, are regularly inspected. The frequency of the inspections depends on the hazard connected to the facility or activity, as set in the inspection instructions for regulated material. Inspection of transport licensees is generally carried out once a year. If transport of radioactive material is authorized by the licence, inspections are conducted, which include inspection of the preparation of packages for transport and the transport itself. Inspections for transport are conducted together with inspection of other activities if applicable for the licensee. There are no special issues related specially to inspection of transport different from those analyzed in the original mission.

8. ENFORCEMENT

8.1. ESTABLISHMENT OF AN ENFORCEMENT POLICY

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S18	**Suggestion:** FANR should consider establishing and implementing a policy for the use of enforcement measures by inspectors including seizure of evidence and statement gathering procedures, particularly in cases where immediate intervention for protection of persons is needed in the field.

Changes since the initial IRRS missions

Suggestion 18: The FANR Integrated Management System Committee (IMS-C) has approved the new FANR Enforcement Procedure, which is now fully applied in the domain of radioactive sources as well as in Nuclear Facilities. The Procedure will be further developed pursuant to the issuance of the "*Cabinet Resolution Concerning Administrative Penalties and Fines on Violating the Terms of the Licences issued by the Federal Authority for Nuclear Regulation*" referred to in Suggestions 1 and 14 above.

Once the Cabinet Resolution has been issued, FANR will be coordinating with the relevant judicial authorities to develop a procedure to implement a process of gathering statements and seizing evidence (and the relevant judicial entity with the power of seizure).

Status of the findings in the initial missions

Suggestion 18 is closed. FANR has developed an IMS procedure that specifically addresses violations, administrative penalties and enforcement action.

8.2. REQUIRING OF CORRECTIVE ACTION BY AUTHORIZED PARTIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S19	**Suggestion:** FANR should implement its internal action plan (FANR Action Plan) which proposes to: • complete regulation on administrative penalties and fines by the end of 2012; • complete protocol on referrals to prosecution authorizes by end 2012; • fully implement enforcement procedures for regulated material users by early 2012; and • complete protocol on referrals to prosecution authorizes by end 2012.

Changes since the initial IRRS missions

Suggestion 19: As noted for Suggestions 1, 14, and 18, a "*Cabinet Resolution Concerning Administrative Penalties and Fines on Violating the Terms of the Licenses issued by the Federal Authority for Nuclear Regulation*" is in the process of being issued by the UAE Government.

The FANR Integrated Management System Committee (IMS-C) has approved the new Enforcement Procedure, which will be further developed pursuant to the issuance of the "Cabinet Resolution Concerning Administrative Penalties and Fines on Violating the Terms of the Licenses issued by the Federal Authority for Nuclear Regulation".

Once the Cabinet Resolution has been issued, FANR will be coordinating with the relevant judicial authorities and/or other authorities to develop a process of referrals to the prosecution authorities.

Status of the findings in the initial missions

Suggestion 19 is open. While FANR's final actions are contingent on action by the Cabinet, they have not developed the protocols and procedures to implement all of the elements of this suggestion.

8.3. ENFORCEMENT FOR TRANSPORT

Enforcement for transport is based on the same laws as enforcement for other licensed activities (UAE Nuclear Law, FANR-REG-24). There are no special issues related specially to enforcement for transport different from those analyzed in the IRRS 2011 mission.

9. REGULATIONS AND GUIDES

9.1. GENERAL

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S20	**Suggestion:** FANR should consider detailing its internal procedures for elaboration of the establishment, revision and revoking of regulations. Amendments should include criteria for identifying the need for new or revised regulations, should specify the periodicity of the review of the current regulations and guides and should also address the formal review by legal staff in the process for issuing regulations.

Changes since the initial IRRS missions

Suggestion 20: A procedure detailing the steps for regulations development and maintenance has been developed and implemented under IMS process CP1. The procedure includes provision for legal review in the process of development and for the periodicity of reviewing and updating current regulations.

Status of the findings in the initial missions

Suggestion 20 is closed. FANR has developed Core Process 1 which addresses the developing, revising, and revoking regulations, including appropriate legal review.

New observations from the follow-up mission

The Team has accepted the FANR explanation why it has decided for the time being not to merge two regulations FANR-REG-11 and FANR-REG-24 which to some extent cover the same areas but for different users (See chapter 1.2 above related to the Suggestion no. 2 of the IRRS mission 2011). On a long run, however, it is advisable to put in place mechanism that would periodically check the consistency of regulations and prevent any ambiguities or inconsistencies.

The Team reiterates its position from the original mission; that every effort should be made to avoid the unintentional establishment of 'double standards' with regard to nuclear and non-nuclear activities. The Team is satisfied that FANR is aware of, and able to deal with, this issue, as work progresses.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation: FANR has currently some regulations setting same or similar requirements for different users. While for the time being there were no problems detected, it would be wise to prevent any development into wrong direction in the future.	
(1)	**BASIS: GSR Part 1, Requirement 22 states that** *"The regulatory body shall ensure that regulatory control is stable and consistent".*
SF1	**Suggestion:** FANR should consider establishing procedures in its Integrated Management System to periodically review its regulations and guides with the goal to ensure consistency between updated regulations and guides and prevent unnecessary duplication of requirements or inconsistent requirements for different types of users or activities.

9.2. NUCLEAR POWER PLANTS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S21	**Suggestion:** FANR should make provisions to ensure staff is trained in the technical background and significance of those regulatory documents issued in other jurisdictions and referenced / used in FANR's guidelines. FANR should also take measures to regularly monitor changes in those referenced documents and evaluate potential implications for their own guidelines.
S22	**Suggestion:** FANR should continue the process for completing the regulatory framework, in such a manner that all regulations and guides needed to support regulatory review, inspection and decision-making are in place before the related licensing stages of the nuclear power plant project.

Changes since the initial IRRS missions

Suggestion 21: A training curriculum which includes background to IAEA and US NRC documents has been developed and implemented through the Competency Management System frameworks. These frameworks address the technical background and significance of those regulatory documents issued in other jurisdictions and referenced and used in FANR's guidelines.

The monitoring and evaluation of changes is part of the detailed procedure under CP1 as above for suggestion 20, and periodic inspector requalification ensures updates to key regulations and guides is addressed.

Suggestion 22: The Team concluded that FANR has published all the regulations needed for the current phase of development of the nuclear power programme and the development of further regulations is continuing.

Status of the findings in the initial missions

Suggestion 21 is closed. FANR has implemented training for its technical staff that addresses its procedures, regulations, guides, and the underlying documents, e.g., IAEA standards and USNRC documents.

Suggestion 22 is closed. FANR has promulgated all regulations necessary to support the review, inspection, and decision-making regarding the nuclear power plant project. Actions are planned to support longer term needs such as decommissioning.

9.3. NON-NUCLEAR POWER ACTIVITIES

There were no findings in this area in the initial IRRS missions.

9.4. FURTHER CONSIDERATIONS ON REGULATED ACTIVITIES

There were no findings in this area in the initial IRRS missions.

9.5. DECOMMISSIONING

There were no findings in this area in the initial IRRS missions.

9.6. EXISTING EXPOSURE SITUATIONS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S23	**Suggestion:** FANR should consider developing a safety guide to assist users in complying with safety requirements on control of discharges for facilities with regulated materials.
R9	**Recommendation:** FANR should review the existing regulatory framework for safety and define according to the IAEA Safety Standards, the concepts of exemption, clearance and radioactive waste for all practices and activities.
S24	**Suggestion:** FANR should develop a regulation establishing the main safety requirements for all phases of decommissioning of all types of regulated facilities. This should include requirements for the period after permanent shutdown of a facility at the end of its operational lifetime.
R10	**Recommendation:** FANR should develop regulations covering the main requirements for the regulation and control of existing exposure situations established in the IAEA Safety Standards GSR Part 3.
R11	**Recommendation:** FANR should develop a set of regulations for safety assessment for all regulated facilities and activities taking into account a graded approach.

Changes since the initial IRRS missions

Suggestion 23: Since the initial IRRS mission FANR has issued regulatory guidance FANR-RG-007 (RG-007) based on the requirements from regulation FANR-REG-24 version 0 "Basic Safety Standards for Facilities and Activities using Ionizing Radiation other than Nuclear Facilities". Article (32) of RG-007 addressed "Releases of Radioactive Material to Sewers". RG-007 is based on the concept of exemption and referred to IAEA Safety Guide WS-G-2.3 "Regulatory Control of Radioactive Discharges to the Environment". Moreover, FANR has drafted a new Regulatory Guide 18 (RG-18), which supports the application of regulation FANR-REG-26 "Regulation for Pre-disposal Management of Radioactive Waste". Article (3) of RG-18 provides fuller guidance on discharge authorization. RG-18 explicitly refers to WS-G-2.3 for detailed guidance to applicants on applying for discharge permits. RG-18 is based on the concept of clearance according to its accepted international definition.

Recommendation 9: Since the initial IRRS mission FANR has revised regulation, FANR-REG-24 "Basic Safety Standards for Facilities and Activities Using Ionizing Radiation other than Nuclear Facilities" which is now version 1. The regulation is now clearly using the concept of exemption. In the coming period, FANR plans to modify RG-007 accompanying the modified regulation FANR-REG-24, where misunderstanding between the concepts of exemption and clearance will be fully clarified.

FANR has drafted regulation FANR-REG-26 "Regulation for Pre-disposal Management of Radioactive Waste", which introduces the concept of clearance according to its accepted international definition. Then, as support to the application of the regulation, FANR drafted a new Regulatory Guide 18 (RG-18), which is also based on the concept of clearance. As a final step, in order to review the existing regulatory framework for safety and to define the concepts of exemption, clearance and radioactive waste for all practices and activities, according to the IAEA Safety Standards, FANR is committed to revise regulation FANR-REG-11 "Radiation Protection and Predisposal Radioactive Waste Management in Nuclear Facilities" and to make it fully consistent with regulation FANR-REG-26. This activity is already planned.

Suggestion 24: FANR drafted regulation FANR-REG-21 "Regulation on Decommissioning of Facilities", which is undergoing internal review. The objective of this regulation is to establish the safety requirements for all aspects of decommissioning from the siting and design of a facility to the termination of the licence. However, this regulation does not apply to facilities for Naturally Occurring Radioactive Material (NORM) or for waste from oil and gas processing. However, requirements for the decommissioning of supporting buildings and services of such facilities are established in this draft regulation. Taking into consideration the importance of the oil industry in UAE, the issue regarding NORM will be addressed through specific NORM regulations.

Recommendation 10: In response to this recommendation a draft regulation FANR-REG-19 "Regulation on Existing Exposure Situations", based on GSR Part 3, has been prepared and in accordance with FANR CP1, has been sent to Stakeholders for their review and comments. Requirements from this regulation apply to exposures due to: (a) Contamination of areas by residual radioactive material arising from Past activities that were not subject to Regulatory Control or that were subject to Regulatory Control but not in accordance with the Authority's requirements and from a nuclear or radiation emergency, after exposure due to an emergency situation has been declared ended. (b) Radon in workplaces, in dwellings and in other buildings with high occupancy factors for members of the public. (c) Commodities, including food, feed and drinking water, that incorporate radionuclides of natural origin.

Recommendation 11: Since the initial IRRS mission FANR has developed a set of regulations and regulatory guides for safety assessment for all regulated facilities and activities. Requirements for safety assessment of nuclear facilities are established in FANR-REGs 02, 03, 05 and 16. Requirements for radioactive waste management facilities are established in FANR-REG-11. Requirements for safety assessment of other facilities and activities is now included in a revised version of FANR-REG-24. In addition, FANR has developed regulatory guides dealing with specific practices.
There is CP2 procedure on licensing radioactive materials and radiation generators and list of related Licensing instructions for different purposes under development according to FANR regulatory requirements to apply protection and safety measures commensurate with the nature and extent of the radiation risks associated with the regulated activity, safety assessments part is included in these check lists.

Status of the findings in the initial missions

Suggestion 23 is closed on the basis of progress made and confidence in effective completion of drafting and implementing the outstanding regulatory guidelines on control of discharges in line with relevant standards.

Recommendation 9 is closed on the basis of progress made and confidence in effective completion of the revision of FANR-REG-11 to include the definition of the concepts of exemption, clearance according to the IAEA Safety Standards.

Suggestion 24 is closed on the basis of progress made and confidence in effective completion of the draft FANR regulation, FANR-REG-21, covering the main safety requirements for all phases of decommissioning.

Recommendation 10 is closed on the basis of progress made and confidence in effective completion of the draft FANR regulation, FANR-REG-19, covering the main requirements for the regulation and control of existing exposure situations.

Recommendation 11 is closed on the basis of progress made and confidence in effective completion of the draft set of regulations for safety assessment for all regulated facilities and activities, which will take into account a graded approach.

9.7. TRANSPORT

FANR is responsible for issuing regulations for the transport of radioactive material by road, rail and sea in the UAE. The IAEA regulations TS-R-1 (2009 Edition) have been adopted for national transport of radioactive material by road, rail and sea in the UAE as FANR-REG-13. Regulation of the transport of radioactive material by air is under the responsibility of the Federal Civil Aviation Authority which applies the International Civil Aviation Organization (ICAO) regulations for air transport.

The UAE are members of the international organizations for sea and air transport IMO and ICAO, respectively. International shipments of radioactive material are currently carried out by air only; therefore the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air apply to these international shipments. In the future international shipments of nuclear fuel are expected, which probably will be carried out by sea.

The international regulations for the transport of dangerous goods which are applicable to the UAE via the international agreements (namely the International Maritime Code for Dangerous Goods (IMDG Code) and the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air) have been revised recently and are scheduled to be revised every two years. The regulation and organization of the transport of radioactive material can be significantly improved by keeping the national regulations for transport of radioactive material by all modes of transport in line with these international agreements.

FANR should therefore revise FANR-REG-13 to reflect the latest IAEA regulations SSR-6 which have become the basis for the international dangerous goods transport regulations in January 2015. FANR should further schedule reviewing and amending, if necessary, the national regulations for the transport of radioactive material according to the regular Revisions of the IMDG Code and the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, leading to a two year review cycle.

Reporting criteria for incidents/accidents are set up in FANR-REG-24 (Article 19). Templates for reporting are provided.

Guidance for consignors, carriers and consignees is published by FANR as FANR-RG-006. It may be useful to provide additional guidance to applicants for approvals from FANR

regarding documents to be provided with the application. Regarding guidance on the expected contents and structure of document showing compliance of a package design with the IAEA regulations for safe transport of radioactive material, the European Technical Guide on Package Design Safety Reports for the Transport of Radioactive Material (PDSR Guide) currently under consideration by IAEA could be taken into account.

FANR would benefit significantly from intensifying international co-operation regarding transport of radioactive material, thus increasing competence in this area. Representatives of FANR should actively participate in the Transport Safety Standards Committee (TRANSSC) and other IAEA meetings. See recommendation RF1 in Chapter 3.2.

Training of workers involved in the transport of radioactive material in the UAE is required by FANR-REG-13, which adopts the IAEA regulations for the safe transport of radioactive materials. Training records are inspected during licensing and inspection of licensees providing or including transport of radioactive material. On the other hand, training which is currently available is focused on radiation protection topics only and is less specific for ensuring knowledge and understanding of the transport regulations and requirements specific for the workplace according to the IAEA regulations for the safe transport of radioactive materials. For defining requirements for training for transport of radioactive material coordination with the other authorities regulating transport of dangerous goods could be sought. The Team was informed that FANR is considering the training requirements of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) as a model for defining national training requirements.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation:	The national regulations for transport of radioactive material by road, rail and sea in the UAE are based on outdated international safety standards and agreements.
(1)	**Basis: GSR Part 1 Requirement 33 states that** *"Regulations and guides shall be reviewed and revised as necessary to keep them up to date, with due consideration taken of relevant international safety standards and technical standards and of relevant experience gained…."*
(2)	**Basis: TS-G-1.5 para. 3.7 states that** *"In the preparation of national regulations and guides for the transport of radioactive material, all relevant international agreements, regulations and recommendations should be taken into account…"*
RF2	**Recommendation:** FANR should review and, if necessary, amend the national regulations for the transport of radioactive material for road, rail and sea transport according to the two year revision cycle of the international regulations of the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation	Training of workers including specific lectures on transport of radioactive material is not available.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: TS-G-1.5 para. 4.104 states that** *"In addition to providing for the training of its own personnel, the competent authority should, as appropriate, specify and participate in the training of other persons involved in the transport of radioactive material. Furthermore, the competent authority should ensure through its compliance assurance programme and its monitoring of management systems that all the training needs of the organizations involved in transport are recognized and implemented."*
SF2	**Suggestion:** FANR should consider defining requirements for training for transport of radioactive material and introducing specific training requirements into the licence conditions.

10. EMERGENCY PREPAREDNESS AND RESPONSE

It was decided that this IRRS follow-up mission would not address module 10 findings, which would be reviewed as a standard part of the Emergency Preparedness Review (EPREV) mission conducted in the UAE from 21 to 31 March 2015. This section summarizes the review of the IRRS 2011 findings by the EPREV team.

10.1. BASIC RESPONSABILITIES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S25	**Suggestion:** FANR and NCEMA should as soon as possible finalize and implement the Memorandum of Understanding (MoU). The MoU should consider the issues of public communication and of cooperation between the Emergency Operation Centres of NCEMA and FANR.
R12	**Recommendation:** The Government should make sure that the roles, responsibilities and organizational relationships and interfaces between all the response organizations should be clarified, agreed and formalized as soon as possible**.**
S26	**Suggestion:** The Government of the UAE should consider inviting an Emergency Preparedness Review (EPREV) mission upon the completion of the national and local off-site radiation emergency plans.

Changes since the initial IRRS missions

Suggestion 25: The MoU between FANR and NCEMA has been signed 15 July 2012. It clarifies the respective roles of the two entities in terms of cooperation on nuclear emergency response. Please also refer to section 2.1 of the EPREV report.

Recommendation 12: The National Emergency Framework provides a clear standardized basis for the assignment of roles and responsibilities in all types of emergencies. The offsite plan builds on this framework and further defines the roles of the major entities involved in nuclear emergency preparedness and response (EPR) for Barakah NPP. This framework is equally applicable to radiological emergencies, provided it is so documented.

Status of the findings in the initial missions

Suggestion 25 is closed.

Recommendation 12 is closed.

Suggestion 26 is closed.

10.2. ASSESSMENT OF THREATS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R13	**Recommendation:** Organizations, involved in emergency planning, should finalize the assessment of hazards at the national level properly taking into

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
	account radiological hazards in accordance with GS-R-2.

Changes since the initial IRRS missions

Recommendation 13: The hazard assessment is completed by ENEC and is included in the Preliminary Safety Analysis Report (PSAR). It includes very low probability events. However, as discussed in section 2.3 of the EPREV report, a summary of this hazard assessment, demonstrating a good understanding of the need for the offsite protection strategy, should be documented in the offsite plan.

Status of the findings in the initial missions

Recommendation 13 is closed.

10.3. EMERGENCY MANAGEMENT AND OPERATIONS

There were no findings in this area in the initial IRRS missions.

10.4. IDENTIFIYNG, NOTIFYING AND ACTIVATING

There were no findings in this area in the initial IRRS missions.

10.5. TAKING MITIGATORY ACTION

There were no findings in this area in the initial IRRS missions.

10.6. TAKING URGENT PROTECTIVE ACTION

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S27	**Suggestion:** FANR, with other relevant stakeholders and through the coordination of the Radiation Protection Committee, should continue to work towards the establishment of national intervention levels for application in emergency situation, in compliance with the international standards.
S28	**Suggestion:** The Government of the UAE should consider establishing an exclusion zone around the NPP site to prevent the developments which would unnecessary increase the population density and complicate emergency planning**.**

Changes since the initial IRRS missions

Suggestion 27: FANR-RG-024, about to be promulgated, contains criteria that are consistent with IAEA safety standards.

Suggestion 28: According to Statistical Center Abu Dhabi (SCAD) data, the only population within the Urgency Protective Action Zone (UPZ), but outside the Precautionary Action Zone (PAZ), is the (non-permanent) residents of the beach villas located on either side of the Barakah NPP site between Highway E11 and the coastline. In addition, there will be workers for the Etihad Rail project who would reside at camps at various locations inside the UPZ

until the project is completed. There are no other public population centres until the greater Al Ruwais and Al Sila'a areas are reached, which are outside the UPZ.

Status of the findings in the initial missions

Suggestion 27 is closed.

Suggestion 28 is closed.

10.7. PROTECTING EMERGENCY WORKERS

There were no findings in this area in the initial IRRS missions.

10.8. ASSESSING THE INITIAL PHASE

There were no findings in this area in the initial IRRS missions.

10.9. MANAGING THE MEDICAL RESPONSE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R14	**Recommendation:** The Government of the UAE should establish a minimum medical capability at the national level to face medical emergencies, at the hospital level and by medical first responders. Consideration should be given to educating and training medical professionals to recognize the symptoms of radiation injuries.

Changes since the initial IRRS missions

Recommendation 14: The ADNOC hospital in Al Ruwais has an interim capability to treat contaminated patients and is implementing a permanent facility for the processing and treatment of contaminated and overexposed patients. UAE has formalized agreements with Japan and Korea for the advanced medical care of severely exposed patients.

Status of the findings in the initial missions

Recommendation 14 is closed.

10.10. KEEPING THE PUBLIC INFORMED

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S29	**Suggestion:** FANR should consider developing a communication plan taking into account the psychological consequences of radiation emergencies.

Changes since the initial IRRS missions

Suggestion 29: The national strategy for public communication with regard to EPR is not under FANR jurisdiction but under the Ministry of Interior (MOI) and NCEMA. The national public information strategy is clearly defined, as discussed in section 3.8 of the EPREV report. However, as discussed in this same section, NCEMA should consider ensuring that all plans and all stakeholders provide consistent information about the national communication

strategy and the role of the public information centres during a nuclear emergency. Psychological aspects are also addressed in section 3.11 of the EPREV report.

Status of the findings in the initial missions

Suggestion 29 is closed.

10.11. TAKING LONG-TERM PROTECTIVE ACTION

There were no findings in this area in the initial IRRS missions.

10.12. ORGANIZATION

There were no findings in this area in the initial IRRS missions.

10.13. PLANS AND PROCEDURES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R15	**Recommendation:** The Government of the UAE should ensure that the plans and procedures for coordinating national response, based on a comprehensive assessment of hazards and coordinated with other relevant and existing plans, are established and completed by the indicated deadlines. Each response organization should prepare its own plan for coordinating and performing their assigned functions.

Changes since the initial IRRS missions

Recommendation 15: MOI is the lead agency for nuclear emergencies and is in the process of finalizing the offsite plan, in cooperation with all involved entities and with NCEMA. The planning process for the development of this plan is well documented. The requirement for all entities to develop their own plans is in the National Emergency Framework.

Status of the findings in the initial missions

Recommendation 15 is closed.

10.14. LOGISTICAL SUPPORT AND FACILITIES

There were no findings in this area in the initial IRRS missions.

10.15. TRAINING, DRILLS AND EXERCISES

There were no findings in this area in the initial IRRS missions.

11. THEMATIC AREAS

11A. CONTROL OF MEDICAL EXPOSURE

11A.1. RESPONSIBILITIES OF THE GOVERNMENT SPECIFIC TO MEDICAL EXPOSURE

There were no findings in this area in the initial IRRS missions.

11A.2. RESPONSIBILITIES OF THE REGULATORY BODY SPECIFIC TO MEDICAL EXPOSURE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R16	**Recommendation:** The Government of the UAE should ensure, with respect to the specific requirements of IAEA BSS 2011 GSR Part 3 interim: • establish a set of diagnostic reference levels; • ensure that, as a result of consultation between the health authority, relevant professional bodies and the regulatory body, the following are established: a) Dose constraints to be fulfilled for exposures of carers and comforters, and volunteers participating in a programme of biomedical research; b) Criteria and guidelines for the release of patients who have undergone therapeutic procedures using unsealed sources or patients who still retain implanted sealed sources.
S30	**Suggestion:** FANR should consider developing a standardized reporting format for radiation incidents/accidents.
S31	**Suggestion:** FANR should consider developing a set of compliance requirements for the typical suite of medical imaging equipment and other radiation sources as part of efforts to assist medical practices to ensure patient dose optimization.

Changes since the initial IRRS missions

Recommendation 16: The 2011 mission considered FANR's role in radiation protection of patients and carers, and for protection in biomedical research, and issued recommendation 16 considering that "given FANR's role, it is considered that FANR should be increasing its efforts to engage the medical sector including other health regulatory authorities…." to promote radiation protection in medicine. In response to this recommendation FANR proposed to the Radiation Protection Committee, which among its members has representatives of Health Authorities in the UAE, to consider establishment of Diagnostic Reference Levels (DRLs) at a national level.

While FANR has exclusive regulatory control to authorize radiation activities, licencing in medical practices and promotion of radiation protection of the patient are also responsibilities of the respective Health Authorities. Since the initial IRRS mission, the Dubai Health Authority partially established local DRLs, where particular attention was devoted to the establishment of DRLs for pediatric computed tomography, as well as for mammography. The DRLs were based on surveys as well as on European data. The standard conventional modalities in radiology have not been taken into consideration, primarily because of the very

rapid growth of the market and the number of new X-ray devices, but also because of the transition from old film technology to new digital techniques. Dubai Health Authority also took an important step towards the establishment of DRLs in nuclear medicine, where data on doses are currently being analyzed. The next step will be to officially publish the data for use as local DRLs.

The Federal Ministry of Health and the Abu Dhabi Health Authority are looking to cooperate with FANR to start the new project on establishing DRLs through possible cooperation with the IAEA Technical Cooperation (TC) programme. FANR took an initiative and prepared a draft guideline on Quality Assurance as a basis for the DRL project, this guideline is under review by health authorities and relevant professionals. The Ministry of Health has drafted an IAEA TC project, for which it is the National Counterpart, for the development of DRLs during the 2016-17 IAEA TC cycle.

As regards dose constraints for exposures of carers and comforters, and for volunteers participating in a programme of biomedical research, FANR has published regulatory guide FANR-RG-007. Dose constraints for persons who receive medical exposures as part of a biomedical research programme have not been established under this Regulatory Guide, because these dose constraints will be specific to a particular research programme; they should be proposed by health care or research professionals and approved by an ethics committee or a similar institutional body.

FANR also prepared a draft guideline for the release of patients who have undergone therapeutic procedures using unsealed sources or patients who retain implanted sealed sources. It is expected that based on the outcome of the discussion, the Radiation Protection Committee will decide on the next step, i.e. whether it should be published as it is or whether it should become part of a revised regulatory guide, taking into consideration that the existing FANR-RG-007 will be revised.

Suggestion 30: Since the initial IRRS mission, progress has been made by FANR to prepare a standard reporting form for incidents/accidents. This form, the "Regulated Materials Licensee Incident Report" is in line with the reporting form developed by the IAEA. The form also includes details of reporting instructions for users, including medical licensees. The form is available on the FANR website. The FANR counterparts informed the Team that the reporting form has been examined in the international emergency preparedness and response exercise ConvEX-2A and addressed in the FANR CP 6 Emergency Communications Procedure.

Suggestion 31: Revision 1 of FANR-REG-24 will allow FANR to identify compliance requirements through reference to international standards and to certifying bodies through a regulatory guide or through the FANR website, but so far there has been little progress on this issue. However, during discussions with representatives of the Federal Health Ministry, the Team was informed that detailed requirements for all medical devices are already available through the licensing process of all medical institutions by the relevant Health Authorities. Moreover, the entire system undergoes one more test by competent experts during the process of accreditation for medical institutions, which is binding for all of them. In fact, all equipment must meet the defined criteria and be in accordance with relevant international standards.

The Health Authorities have also established a system applicable to new equipment, for which there was no previous experience in the country. In the case that some medical equipment does not meet the specified requirements, authorities have established a system of information

dissemination to other institutions to prevent the possibility of installation of not adequate equipment.

In view of explanation described above the Team believes FANR should continue to work collaboratively with other authorities to promote the nation-wide safe implementation of imaging techniques.

Status of the findings in the initial missions

Recommendation 16 is closed as such, as it does not any longer capture the issues in a relevant manner. The elements of the recommendation that relate to dose constraints for carers, comforters and volunteers have been appropriately addressed by FANR, as have the criteria for release of patients. As regards Diagnostic Reference Levels the follow-up mission notes progress. To highlight the need for continued efforts in this area, a new Recommendation is issued below.

Suggestion 30 is closed as FANR has developed the necessary web-based reporting procedures.

Suggestion 31 is closed based on FANR's initiatives and cooperation with the licensing Health Authorities.

New observations from the follow-up mission

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
Observation	Information obtained indicates limited progress in establishing Diagnostic Reference Levels (DRLs) at the national level.
(1)	**BASIS: IAEA BSS 2011 GSR Part 3 Req. 34:** *"The government shall ensure that relevant parties are authorized to assume their roles and responsibilities and that diagnostic reference levels, dose constraints, and criteria and guidelines for the release of patients are established."*
RF3	**Recommendation:** FANR and the relevant Health Authorities should develop and publish Diagnostic Reference Levels for the UAE.

11A.3. RESPONSIBILITIES OF REGISTRANTS AND LICENSEES SPECIFIC TO MEDICAL EXPOSURE

There were no findings in this area in the initial IRRS missions.

11A.4. JUSTIFICATION OF MEDICAL EXPOSURE

There were no findings in this area in the initial IRRS missions.

11A.5. OPTIMIZATION OF PROTECTION AND SAFETY

There were no findings in this area in the initial IRRS missions.

11A.6. PREGNANT WOMEN AND BREAST-FEEDING WOMEN

There were no findings in this area in the initial IRRS missions.

11A.7. RELEASE OF PATIENTS AFTER RADIONUCLIDE THERAPY

There were no findings in this area in the initial IRRS missions.

11A.8. UNINTENDED AND ACCIDENTAL MEDICAL EXPOSURES

There were no findings in this area in the initial IRRS missions.

11A.9. REVIEWS AND RECORDS

There were no findings in this area in the initial IRRS missions.

11B. OCCUPATIONAL RADIATION PROTECTION

11B.1. RESPONSIBILITIES OF THE REGULATORY BODY SPECIFIC TO OCCUPATIONAL EXPOSURE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S32	**Suggestion:** FANR should consider within two years an IAEA Occupational Radiation Protection Appraisal Service (ORPAS) mission in order, among other goals, to define an action plan for further development of the infrastructure for the monitoring of occupationally exposed workers.

Changes since the initial IRRS missions

Suggestion 32: The 2011 Team noted that the responsibilities of licensees are established with regard to the enforcement of the regulations and, in particular, concerning the optimization of radiation protection, dose limits for the workers, and the need for FANR to receive and assess the documents provided by the applicants. Considering the level of maturity, the Team suggested that an IAEA Occupational Radiation Protection Appraisal Service (ORPAS) could provide valuable further input to the development of this area.

The follow-up mission was informed that an ORPAS pre-mission took place in September 2014, and a full ORPAS mission is scheduled for October 2015.

Status of the findings in the initial missions

Suggestion 32 is closed on the basis that an ORPAS mission has been requested and a pre-mission took place last year.

11B.2. REQUIREMENTS FOR MONITORING AND RECORDING OF OCCUPATIONAL EXPOSURE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S33	**Suggestion**: FANR should consider strengthening its efforts to develop a national dose register for occupationally exposed workers.

Changes since the initial IRRS missions

Suggestion 33: The 2011 Team observed that a study of the set-up of a central dose register had been undertaken but no action had, at that time, been initiated for its implementation. The Team therefore suggested strengthening of the efforts to develop a national dose register for occupationally exposed workers.

A draft procedure has been prepared for developing a national dose register of occupationally exposure workers. This draft procedure is currently undergoing internal discussion. Furthermore, FANR has decided to implement a complete e-licensing system. This system consists of four parts: Authorization, Inspection, Inventory of sources and a National Dose Register.

FANR has already set the requirement for this system and communicated them to the designer and programmer. This constitutes a significant step forward in the development of the national dose register. FANR is expecting significant functionality already within six months.

The Team notes that the establishment of a national dose register is on FANR's agenda but is also mindful of the significant difficulties associated with the establishment of such registers. The Team acknowledges FANR's efforts and the fact that it is given priority but concludes that despite the excellent progress this suggestion should be kept open to acknowledge the huge efforts required.

Status of the findings in the initial missions

Suggestion 33 is open. While the ambition, approach and ongoing activities are commendable, significant work still remains in this area, which justifies leaving the suggestion open.

11B.3. RESPONSIBILITIES OF EMPLOYERS AND LICENSEES FOR THE PROTECTION OF WORKERS

There were no findings in this area in the initial IRRS missions.

11B.4. COMPLIANCE BY WORKERS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R17	**Recommendation:** FANR should make provision for requirements stating clearly the responsibilities and duties of the workers for the implementation of the protection and the safety measures for themselves as well as for the other workers**.**

Changes since the initial IRRS missions

Recommendation 17: The 2011 Team recommended that FANR regulations are completed by additional requirements complying with the requirement 22 in GSR-Part 3 which requires that "Workers shall fulfil their obligations and carry out their duties for protection and safety". FANR-REG-24 Rev. 1 has been issued, which states that the licensee should make sure that workers fulfil their obligation for the implementation of the protection and the safety measures to protect themselves as well as for the protection of others in Article 20 (3)(l). This falls short of explicitly stating clearly the responsibilities and duties of the workers. Instead they were included under the responsibility of the licensee. FANR is committed to correct this in FANR-REG-24 Rev. 1.

Status of the findings in the initial missions

Recommendation 17 is closed on the basis of progress made and confidence in effective completion noting that FANR will correct article 20 of FANR REG-24 Rev. 1. to clarify the responsibilities and duties of the workers.

11B.5. COOPERATION BETWEEN EMPLOYERS AND REGISTRANTS AND LICENSEES

2011 Mission RECOMMENDATIONS, SUGGESTIONS

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S34	**Suggestion:** FANR should consider the establishment of administrative rules concerning the implementation of a radiation protection and safety programme, in particular for those workers who performed their activities in different facilities where radioactive sources are present or where activities involving regulated materials have to be done.

Changes since the initial IRRS missions

Suggestion 34: When occupationally exposed workers are performing their activities in different workplaces, for different employers, arrangements will have to be made in order to ensure that all requirements regarding their protection and safety are complied with. The follow-up mission notes that Rev 1 of FANR-REG-24 includes the provisions of GSR Part 3 Requirement 23 which forms the basis of this Suggestion (Article 20).

Status of the findings in the initial missions

Suggestion 34 is closed on the basis that relevant provisions are now incorporated in the regulations.

11B.6. ARRANGEMENT UNDER THE RADIATION PROTECTION PROGRAMME

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S35	**Suggestion**: FANR should mandate all licensees that currently do not have a radiation protection programme to provide such a programme within a defined period of time.

Changes since the initial IRRS missions

Suggestion 35: The 2011 Team concluded that guidance for radiation protection programmes have been issued by FANR. Applicants were requested to provide information on the radiation protection programme to be implemented and the inspections procedures contains provisions for checking the implementation of such programme. However, at the time, it appeared from inspection reports that there continued to be a lack of licensee compliance with this requirement.

FANR is pursuing this Suggestion through its inspection programme and the license renewal process, which commenced in 2013. The obligation of Licensees to prepare a specific Radiation Protection Programme was the subject of presentations at the license forum in November 2012, and FANR published advices on protection and safety programmes for different practices on its website. These measures have proven to be very successful and now most if not all practices have a radiation protection programme.

Status of the findings in the initial missions

Suggestion 35 is closed on the basis of results obtained from the licence renewal programme and other activities.

11B.7. ASSESSMENT OF OCCUPATIONAL EXPOSURE AND WORKERS' HEALTH SURVEILLANCE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S36	**Suggestion:** FANR should consider providing guidance for the assessment of occupational exposure to ionizing radiations to be performed for all exposure pathways and guidance on how to assess the total effective dose.

Changes since the initial IRRS missions

Suggestion 36: The Team was informed that action to resolve the suggestion was ongoing and will be completed in the frame of the ORPAS mission, scheduled for Q4 2015.

Status of the findings in the initial missions

Suggestion 36 is open based on insufficient progress, awaiting the completion of an ORPAS mission in 2015.

11B.8. RESPONSIBILITIES OF THE REGULATORY BODY SPECIFIC TO OCCUPATIONAL EXPOSURE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S37	**Suggestion:** FANR should consider providing information to licensees on existing training material or on training service providers for workers subject to occupational exposure.

Changes since the initial IRRS missions

Suggestion 37: FANR has committed to providing information on requirements for training for different practices and also on the training providers currently available in the UAE. This information is available on FANR website (see for example: http://www.fanr.gov.ae/En/RulesRegulations/Pages/Training-in-Radiation-Protection-and-the-Safe-Use-of-Radiation-Sources.aspx). Furthermore there is a growing interest in FANR to set training requirements for different workgroup categories and accredit or approve training providers.

FANR already approached the IAEA and had preliminary contacts for an Education and Training Appraisal (EduTA) mission to assess and evaluate education and training in UAE. This mission is expected to take place in 2016.

Status of the findings in the initial missions

Suggestion 37 is closed based on review of evidence.

11B.9. CONDITIONS OF SERVICE

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
R18	**Recommendation:** FANR should review and complete the existing requirement addressing the conditions of service as described in the GSR Part 3, 3.111 and

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
	3.112.

Changes since the initial IRRS missions

Recommendation 18: The condition of services has been addressed fully in FANR-REG-24 (Rev1) Art. 28: the Licensee shall not offer benefits as a substitute for protection and safety measures required by this regulation. In particular:

- workers' conditions of service shall be independent of whether they are or could be subject to occupational exposure, and
- licensees shall make all reasonable efforts to provide workers with suitable alternative employment when the workers, for health reasons, may no longer continue in employment in which they are or could be subject to occupational exposure.

The rest of the article addresses the female workers, pregnant and breast feeding workers and trainee under the age of 18.

Status of the findings in the initial missions

Recommendation 18 is closed on the basis of relevant provisions being included in the regulations.

11B.10. SPECIAL ARRANGEMENTS

There were no findings in this area in the initial IRRS missions.

11C. SAFETY AND SECURITY OF RADIOACTIVE SOURCES

11C.1. THE IMPORT AND EXPORT OF RADIOACTIVE SOURCES

2011 Mission RECOMMENDATIONS, SUGGESTIONS	
S38	**Suggestion**: FANR should inform IAEA about the proposed developments of RAIS so that other Member States may similarly benefit from useful improvement.
S39	**Suggestion**: The Government of the UAE should ensure that orphan sources are deemed to be evidence unless or until FANR makes the decision not to prosecute the legal owner of the regulated material.

Changes since the initial IRRS missions

Suggestion 38: The national register of radioactive sources has been established by FANR using the Regulatory Authority Information System (RAIS) developed by the IAEA. While using a RAIS, FANR's staff identified possible improvements to RAIS in expanding the range of information stored and the level of detail in analyses available. As a response to this suggestion, the Team has seen evidence how FANR has communicated to the IAEA some ideas for possible improvements of the RAIS software package.

Suggestion 39: Since the initial IRRS mission FANR has prepared and the Board of Management has approved an Orphan Source Strategy to ensure Radiation Protection from Orphan Sources. The scope of the Orphan Sources Strategy is to cover all the actions required to assure radiation protection from orphan sources through the period from 2015 to 2020, specifying responsibilities granted to various National Authorities in fostering coordination and liaison between them. The implementation of the Orphan Source Strategy is based on existing legal requirements coming from the Federal Law and comprehensive second level legal framework related to Radiation Protection in planned exposure situations, including Nuclear Security and Safeguards requirements. Implementation steps of the Strategy are planned through an Action Plan which is developed as an integral part of the strategy itself.

FANR, in cooperation with other interested parties (mainly represented in the Radiation Protection Committee) will define priorities in the implementation of the strategy's actions, taking into consideration the level of immediate and potential radiological hazard and the availability of resources to implement the actions. To establish end-of-life management of radioactive sources two very important actions are defined: to assure long term availability of a safe and secure storage facility and to establish a financing scheme appropriate for assuring availability of adequate resources necessary for management of radioactive sources.

Taking into consideration the complexity of the already mentioned activities and the participation of a large number of interested parties (customs, border police, civil protection, etc.) as well as the planned time frame for implementation of strategy (end of 2016), the Team concluded that in order to implement the strategy all relevant interested parties must be fully committed, must be well prepared and all activities must be coordinated.

A second important activity, as a response to this suggestion, was the approval of the new FANR Enforcement Procedure by the FANR Integrated Management System Committee. The Enforcement Procedure, which forms part of the general enforcement policy, applies to radiation sources.

Status of the findings in the initial missions

Suggestion 38 is closed as FANR has informed IAEA about the proposed developments of RAIS.

Suggestion 39 is closed on the basis of progress made and confidence in effective completion and implementation of the Orphan Sources Strategy as the only remaining step for full compliance.

11D. TRANSPORT OF RADIOACTIVE MATERIAL

Regulations in compliance with the IAEA regulations for the safe transport of radioactive material have been adopted in the UAE. The review process of regulations adopted by FANR is not in line with the two year review cycle for the international transport community for the regulations on the safe transport of radioactive materials (see Chapter 9.7).

FANR currently does not have the sufficient capability to perform its functions regarding the safe transport of radioactive material including authorization (see Chapter 5.3), review and assessment (see Chapter 6.3) and international cooperation (see Chapter 9.7). The human resource plan in FANR currently does not include appropriate competent staff in the area of transport of radioactive material (see Chapter 3.2).

Licensees for activities involving radioactive material, including transport, are regularly inspected. Inspections of transport of radioactive material include inspection of the preparation of packages for transport and the transport itself (See Chapter 7.4).

Enforcement for transport is based on the same laws as enforcement for other licensed activities (See Chapter 8.3).

Training of workers involved in the transport of radioactive material which is currently available in the UAE is focused on radiation protection topics only and is less specific for ensuring knowledge and understanding of the transport regulations and requirements specific for the workplace according to the IAEA regulations for the safe transport of radioactive material.

FANR has neither defined requirements for training for transport of radioactive material nor introduced specific training requirements into the licence conditions (see Chapter 9.7).

APPENDIX I - LIST OF PARTICIPANTS

INTERNATIONAL EXPERTS			
1	**LARSSON** Carl-Magnus	Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	carl-magnus.larsson@arpansa.gov.au
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4	**FRANZÉN** Anna	Swedish Radiation Safety Authority (SSM)	anna.franzen@ssm.se
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6	**REICHE** Ingo	Bundesamt für Strahlenschutz (BfS)	ireiche@bfs.de
IAEA STAFF MEMBERS			
1	**Al KHATIBEH** Ahmad	Division of Radiation, Transport And Waste Safety	A.Al-Khatibeh@iaea.org
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LIAISON OFFICER			
1	**GIUFFRIDA** Daniele	Liaison Officer	Daniele.Giuffrida@fanr.gov.ae

APPENDIX II – LIST OF COUNTERPARTS

IRRS EXPERTS	Counterpart
RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT	
Carl-Magnus Larsson Andrej Stritar	Ian Grant, John Loy, Daniele Giuffrida, Aayda El Shehhi, Monira Al Kuttab, Rashid Al Falahi, Buthaina Al Ameri, Michael Nichols, Emmanuel Bosc, Ameena Al Abdouli, Maha Aziz, Hussain Al Katheeri, Eyad Mahadeen, Walid El Mowafi, Ahmed El Shemeili, Dejan Trifunovic
GLOBAL SAFETY REGIME	
Carl-Magnus Larsson Andrej Stritar	Ian Grant, John Loy, Daniele Giuffrida, Saif Al Kaabi
RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	
Carl-Magnus Larsson Andrej Stritar	Ian Grant, John Loy, Daniele Giuffrida, Mohammed Sultan El Zaabi, Mariam Al Mahmoud, Sultan Al Dhaheri
MANAGEMENT SYSTEM OF THE REGULATORY BODY	
Anna Franzén	Ian Grant, Daniele Giuffrida, John Loy, Fatema Al Junaibi, Mohamed Al Suwaidi, Ahmed Abd Elnaby, Dejan Trifunovic, Aayda El Shehhi
AUTHORIZATION	
Jovica Bošnjak Mohammad Hassan Kharita	Ian Grant, Daniele Giuffrida, Aayda Al Shehhi, Pablo Abate, John Loy, Dejan Trifunovic, Buthaina Al Ameri, Ali Al Remeithi
REVIEW AND ASSESSMENT	
Michael Mayfield	Ian Grant, Daniele Giuffrida, Aayda Al Shehhi, Michael Cash, Maha Aziz, John Loy
INSPECTION	
Michael Mayfield Mohammad Hassan Kharita Ingo Reiche Anna Franzén	Ian Grant, Daniele Giuffrida, Aayda Al Shehhi, Mustafa Majali, Eyad Mahadeen, John Loy, Buthaina Al Ameri, Ali Al Remeithi
ENFORCEMENT	
Michael Mayfield Mohammad Hassan Kharita Jovica Bošnjak	Ian Grant, Daniele Giuffrida, Michael Cash, Eyad Mahadeen, John Loy
REGULATIONS AND GUIDES	

IRRS EXPERTS	Counterpart
Michael Mayfield Mohammad Hassan Kharita Jovica Bošnjak Anna Franzén	Ian Grant, Daniele Giuffrida, John Loy, Nicolas Tricot
CONTROL OF MEDICAL EXPOSURE	
Carl-Magnus Larsson	Daniele Giuffrida, John Loy, Aayda Al Shehhi, Mustafa Majali
OCCUPATIONAL RADIATION PROTECTION	
Mohammad Hassan Kharita	Daniele Giuffrida, John Loy, Aayda Al Shehhi, Ali Al Remeithi, Hussain Al Katheeri
SAFETY AND SECURITY OF RADIOACTIVE SOURCES	
Jovica Bošnjak	Daniele Giuffrida, John Loy, Saif Al Kaabi
TRANSPORT OF RADIOACTIVE MATERIALS	
Ingo Reiche	Daniele Giuffrida, John Loy, Aayda Al Shehhi

APPENDIX III - MISSION PROGRAMME

IRRS FOLLOW-UP MISSION TO UAE

Time	Contents	Notes
Saturday 31 January		
14:00-17:30	IRRS Team Briefing	**Location:** Hotel meeting room ***Participation:*** - IRRS Team - FANR LO
Sunday 1 February		
10:00	Entrance Meeting: - Opening remarks from UAE - Opening remarks from IRRS Team Leader - Introductions (IRRS Team; FANR management team, liaison officer & counterparts, observers)	***Participation:*** - FANR senior management & team - Officials from other Ministries/Organizations (NCEMA, EAD, GAPBFZ, ENEC, DHA, HAAD, Khalifa University, FCA, the UAE Armed Forces) - IRRS Team Leader, Deputy Team Leader, IAEA Coordinators, IRRS experts & support staff
11:00	FANR Presentation (Overview of current situation, highlighting what has changed since 2011 mission)	FANR
12:00	Lunch	
13:00-17:00	Interviews	FANR
17:00-18:00	IRRS Team Meeting	**Location**: FANR IRRS Team & FANR Liaison Officer
Monday 2 February		
12:00	Lunch	
17:00-19:00	IRRS Team Meeting	**Location:** FANR IRRS Team & FANR Liaison Officer
Tuesday 3 February		
9:00-17:00	Interviews Report Writing	FANR
12:00	Lunch	
17:00-19:00	IRRS Team Meeting & report writing	**Location:** Hotel meeting room IRRS Team & FANR Liaison

Time	Contents	Notes
		Officer
Wednesday 4 February		
9:00-17:00	Interviews: Report Writing	FANR
12:00	Lunch	
17:00-19:00	IRRS Team Meeting & report preparation	**Location:** Hotel meeting room IRRS Team & FANR Liaison Officer
Thursday 5 February		
9:00-17:00	Report Writing/Finalization	IRRS Team, at FANR
12:00	Lunch	
17:30-19:30	Cross Reading	IRRS Team
Friday 6 February		
09:00-10:30	Report Finalization by IRRS Team	Location: Hotel
10:30	Draft zero of report provided to FANR by email for initial feedback	Mission Coordinators
Saturday 7 February		
9:00-16:00	FANR review the Draft Report Technical tour/visit	
16:00-	Meeting with FANR to address comments	FANR
Sunday 8 February		
10:00-12:00	Exit Meeting: - Official handover of final draft report - Closing remarks: FANR, IRRS Team Leader, IAEA Team Coordinator on behalf of DDG, Department of Nuclear Safety and Security	Location Intercontinental Hotel

APPENDIX IV - RECOMMENDATIONS (R) AND SUGGESTIONS (S) FROM THE 2011 IRRS MISSION THAT REMAIN OPEN

Section	Module	R/S	Recommendations/Suggestions
1.10	PROVISION FOR THE DECOMMISSIONING OF FACILITIES AND THE MANAGEMENT OF RADIOACTIVE WASTE AND SPENT FUEL	R3	The Government of the UAE should ensure the development of a National Policy and Strategy for Radioactive Waste Management is brought to conclusion in the shortest timeframe. This would facilitate inter alia, the development of the necessary regulations and regulatory guidance documents.
7.1	INSPECTION OF FACILITIES AND ACTIVITIES	S14	FANR should examine Article 36(3) of the Law No.6 with a view to ensuring that prosecutions are possible for situations where FANR has to intervene to restore radiological safety.
8.2	REQUIRING OF CORRECTIVE ACTION BY AUTHORIZED PARTIES	S19	FANR should implement its internal action plan (FANR Action Plan) which proposes to: • complete regulation on administrative penalties and fines by the end of 2012; • complete protocol on referrals to prosecution authorizes by end 2012; • fully implement enforcement procedures for regulated material users by early 2012; and • complete protocol on referrals to prosecution authorizes by end 2012.
11B.2.	REQUIREMENTS FOR MONITORING AND RECORDING OF OCCUPATIONAL EXPOSURE	S33	FANR should consider strengthening its efforts to develop a national dose register for occupationally exposed workers.
11B.7.	ASSESSMENT OF OCCUPATIONAL EXPOSURE AND WORKERS' HEALTH SURVEILLANCE	S36	FANR should consider providing guidance for the assessment of occupational exposure to ionizing radiations to be performed for all exposure pathways and guidance on how to assess the total effective dose.

APPENDIX V - RECOMMENDATIONS (RF), SUGGESTIONS (SF) AND GOOD PRACTICES (GPF) FROM THE 2015 IRRS FOLLOW-UP MISSION

Section	Module	RF/SF/GPF	Recommendations, Suggestions or Good Practices
3.3	STAFFING AND COMPETENCE OF THE REGULATORY BODY	RF1	FANR should update their human resource plan to include appropriate competent staff in the area of transport of radioactive material.
9.1	REGULATIONS AND GUIDES - GENERAL	SF1	FANR should consider establishing procedures in its Integrated Management System to periodically review its regulations and guides with the goal to ensure consistency between updated regulations and guides and prevent unnecessary duplication of requirements or inconsistent requirements for different types of users or activities.
9.7	REGULATIONS AND GUIDES - TRANSPORT	RF2	FANR should review and, if necessary, amend the national regulations for the transport of radioactive material for road, rail and sea transport according to the two year revision cycle of the international regulations of the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO).
9.7	REGULATIONS AND GUIDES - TRANSPORT	SF2	FANR should consider defining requirements for training for transport of radioactive material and introducing specific training requirements into the licence conditions.
11A.2.	RESPONSIBILITIES OF THE REGULATORY BODY SPECIFIC TO MEDICAL EXPOSURE	RF3	FANR and the relevant Health Authorities should develop and publish Diagnostic Reference Levels for the UAE.

APPENDIX VI - REFERENCE MATERIAL PROVIDED BY FANR

- REG-26-English PRF1
- REG-26-English
- Waste RG018 draft
- REG-19-English public
- FANR-RG-019_Radiation_Safety_in_Industrial_Radiography
- REG-24- Certified-English (2)001
- FANR-REG-15-ENGLISH
- Medical Preparedness and Response Training - 2013
- Stakeholders' Report on national or hosted meeting
- Guidance for Release of Patients After Radionuclide Therapy - for review
- RG_007
- S4. Project Proposal. DRL
- REG-24- Certified-English (2)001
- REG-24- Certified-English (2)001
- Review of Appeals Procedure - INITIAL DRAFT
- REG DEVELOPMENT PROPOSAL 7-9-12 - LOY
- FANR NTA MOU Arabic - English signed on March 2012
- FANR-ADNOC MoU_signed on 25 Sept 2012
- FANR-CNIA MoU - Signed Arabic
- FANR-CNIA MoU-Signed English
- FANR-KU MoU_Arabic_signed on 7 Dec 2011
- FANR-KU MoU_English_signed on 7 Dec 2011
- FANR-NCEMA MoU_Arabic_signed_15 July 12
- MOU btwn FANR and DCA Sharjah
- MOU btwn-TRA and FANR 2013 12 18
- MOU FANR EAD
- AF-FANR-DGO-COR-6189_Temporary Storage for Orphan Radioactive Sources ready_18 06 14 (2)
- cin_000072153
- Draft MOM of the 7th meeting - English
- REGULATORY GUIDE 24 - Rework by SF after Walid - 24 November 2014
- RPC Minutes of the Meeting 07-01-13 English
- RPC Minutes of the Meeting 24-04-12 English
- DTF Board of Management December 2014- REVISED MARK UP
- FANR-RSD-MEM-00058 2014_Development of Reg 27_03.09.14
- Memo for REG 21
- REG 21 draft Version C revised resolution internal comments(3) +LB +FE edit1+ma
- REG 27 draft Version A for IAEA expert review
- REG-26-English PRF1
- Waste RG018 draft after internal review July 2013 Clean
- Requirements to Approve Dosimetry Service - rev.1.2
- cin_000020025
- Memo Style
- Screenshot from EDMS
- cin_000069870
- CP2 Licensing Management Procedure Rev 2

- IMS-CP 7-COEF Procedure-Rev 0
- FANR-DGO-ADEHSMS-COR-661
- JL ADEHSC 140713
- REG-19-English public
- REG-24- Certified-English (2)001
- INSP INST RADIOTHERAPY REV 2 - 15 MAR 2012
- Screenshot from IMS
- cin_000019963
- cin_000019964
- cin_000022150
- cin_000072251
- IMS-MP.6-Corrective Action procedure-Rev.3
- IMS-MP.6-Non Conformance Procedure-Rev.0
- REG-24- Certified-English (2)001
- cin_000020091
- MEMORANDUM, Technical Evaluation of TSOs Proposals
- CON 03 Vendor Inspection - Reactive Rev 0
- Construction Licence for Barakah Units 1 and 2 - Amendment 001 Rev 1
- CP 7 Construction and Operating Experience Feedback (COEF)
- FANR_RG_008 COEF Version A
- Generic Inspection Guidance Rev 3 a
- Memo Approval for Production of Regulatory Guide RG-008
- CP3-00-013 Inspection Review and Assessment Coordination-Rev 0 - Copy
- Inspection Review and Assessment Coordination-Rev 0
- cin_000020091
- cin_000020091
- CP1 - Regulation Development and Maintenance Procedure - Copy
- Procedure Regulation Development and Maintenance
- cin_000023259
- cin_000023811
- cin_000023814
- cin_000023862
- FANR-REG-14-ENGLISH
- FANR's Plan for future development of the Regulatory Framework JL Clean July 2014 (2)
- RG_007
- RG-18-English
- RPC MOM 20 May 2013 - English
- S4 and S2 .7- Criteria for use in Nuclear and Radiological emergency
- S4. Project Proposal DRL
- Final Report third_ UAE_ National_Workshop_Baseline_Env_Monitoring
- MOM-Third UAE national workshop on Baseline Environmental Radiation Mapping-29 SEP 2014
- UAE 7003- PPAR_January-June 2014- TCC reviewed
- Letter - Amano
- cin_000072251
- REG DEVELOPMENT PROPOSAL 7-9-12 - LOY
- Capacity building and emiratization committee charter

- cin_000021134
- ECB Committee MOM 17nov
- ET strategy Plan (Eng and Arabic)
- Memo Style
- CP2-GradApp_RevProcess_19_11_2014
- FANR Construction Inspection Overview Whitepaper Outline 21 Nov 2011
- IMS-CP 7-COEF Procedure-Rev 0
- INSP INST DENTAL X-RAY REV 0 - 20 MAR 2012
- INSP INST INDUSTRIAL RADIOGRAPHY REV 2 - 19 MAR 2012
- National Dose Register - Rev 0 modified 4 July 2014_final (2)
- REG-24- Certified-English (2)001
- Application-for-renewal
- Training courses website
- Orphan Sources Procedure
- Statement on Orphan Sources Strategy - ENGLISH Final
- Respondent Audits of management system - rev.1
- Respondent Design Assessment - rev.1
- Respondent Emergency planning and exercises - rev.1
- Respondent Enforcement actions and investigations of incidents - rev.1
- Respondent Examination of maintenance and servicing arrangements - rev.1
- Respondent International Interdepartmental - rev.1
- Respondent Issuing of approvals - rev.1
- Respondent Monitoring and inspections of transport operations - rev.1
- Respondent Regulatory effective legal framework - rev.1
- Respondent Training and distribution of information - rev.1
- Respondent Witnessing manufacture - rev.1
- Respondent Witnessing testing - rev.1
- Respondent Audits of management system - rev.1
- Respondent Design Assessment - rev.1
- Respondent Emergency planning and exercises - rev.1
- Respondent Enforcement actions and investigations of incidents - rev.1
- Respondent Examination of maintenance and servicing arrangements - rev.1
- Respondent International - rev.1
- Respondent Issuing of approvals - rev.1
- Respondent Monitoring and inspections of transport operations - rev.1
- Respondent Regulatory review and maintenance of effective legal framework - rev.1
- Respondent Training and distribution of information - rev.1
- Respondent Witnessing manufacture - rev.1
- Respondent Witnessing testing - rev.1
- REG 21 draft Version C revised resolution internal comments(3) +LB +FE edit1+ma
- FANR-NCEMA MoU_Arabic_signed_15 July 12
- FANR-NCEMA MoU_English_signed_15 July 12
- FANR-REG-15-ENGLISH
- EPREV
- Letter Cost estimate EPREV mission 2015
- REGULATORY GUIDE 24 - Rework by SF after Walid - 24 November 2014
- Criteria for use in Nuclear and Radiological emergency
- ERI-06 Emergency Liaisons - Revision 0 - 07 October 2014

- ERI-07 Emergency Communications Team - Revision D - 03 Sep 2014
- ERP-03 Emergency Communications - Revision 1 - RSD Internal Review 20 Nov 11
- FANR_Regulated_Materials_Licensee_Incident_Report_Eng
- REG-24- Certified-English (2)001
- Pre-orpas mission report UAE

APPENDIX VII - IAEA REFERENCE MATERIAL USED FOR THE REVIEW

1.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Fundamental Safety Principles, No SF-1, IAEA, Vienna (2006)
2.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, No. GSR Part 1, IAEA, Vienna (2010).
3.	**INTERNATIONAL ATOMIC ENERGY AGENCY** – The Management System for Facilities and Activities. Safety Requirement Series No. GS-R-3, IAEA, Vienna (2006).
4.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Preparedness and Response for Nuclear and Radiological Emergencies, Safety Requirement Series No. GS-R-2, IAEA, Vienna (2002).
5.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3, No. GSR Part 3, IAEA, Vienna (2014).
6.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety assessment for facilities and activities, General Safety Requirements Part 4, No. GSR Part 4, IAEA, Vienna (2009)
7.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Predisposal Management of Radioactive Waste, General Safety Requirement Part 5, No. GSR Part 5, IAEA, Vienna (2009).
8.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Decommissioning of Facilities, Safety Requirement Series No. GSR Part 6, IAEA, Vienna (2014).
9.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety of Nuclear Power Plants: Design, Specific Safety Requirements No. SSR-2/1, IAEA, Vienna (2012).
10.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety of Nuclear Power Plants: Commissioning and Operation, Specific Safety Requirements Series No. SSR-2/2, IAEA, Vienna (2011).
11.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Site Evaluation for Nuclear Installations, Safety Requirement Series No. NS-R-3, IAEA, Vienna (2003).
12.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety of Research Reactors, Safety Requirement Series No. NS-R-4, IAEA, Vienna (2005).
13.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Nuclear Fuel Cycle Facilities, Safety Requirement Series No. NS-R-5, IAEA, Vienna (2014)
14.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Disposal of Radioactive Waste, Specific Safety Requirements No. SSR-5, IAEA, Vienna (2011)
15.	**INTERNATIONAL ATOMIC ENERGY AGENCY** – Regulations for the Safe Transport of Radioactive Material, Specific Safety Requirements No. SSR-6, IAEA, Vienna (2012)

16.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Organization and Staffing of the Regulatory Body for Nuclear Facilities, Safety Guide Series No. GS-G-1.1, IAEA, Vienna (2002).
17.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Review and Assessment of Nuclear Facilities by the Regulatory Body, Safety Guide Series No. GS-G-1.2, IAEA, Vienna (2002).
18.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Regulatory Inspection of Nuclear Facilities and Enforcement by the Regulatory Body, Safety Guide Series No. GS-G-1.3, IAEA, Vienna (2002).
19.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Documentation Used in Regulating Nuclear Facilities, Safety Guide Series No. GS-G-1.4, IAEA, Vienna (2002).
20.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Guide Series No. GS-G-2.1, IAEA, Vienna (2007)
21.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Criteria for use in Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Guide Series No. GSG-2, IAEA, Vienna 2011)
22.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Commissioning for Nuclear Power Plants, Safety Guide Series No. SSG-28, IAEA, Vienna (2014)
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30.	**INTERNATIONAL ATOMIC ENERGY AGENCY -** Safety of Radiation Generators and Sealed Radioactive Sources, Safety Guide Series No. RS-G-1.10, IAEA, Vienna (2006)
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35.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Safety of Uranium Fuel Fabrication Facilities Specific Safety Guide Series No. SSG-6, IAEA, Vienna (2010)
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38.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Geological Disposal Facilities for Radioactive Waste Specific Safety Guide Series No. SSG-14, IAEA, Vienna (2011)
39.	**INTERNATIONAL ATOMIC ENERGY AGENCY** - Storage of Spent Nuclear Fuel Specific Safety Guide Series No. SSG-15, IAEA, Vienna (2012)
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