IAB

المجلس الاستشاري الدولي

INTERNATIONAL ADVISORY BOARD

NINTH SEMI-ANNUAL REPORT 2014

Brief summary on the International Advisory Board for the UAE nuclear program

The International Advisory Board (IAB) was a concept first developed by the UAE government to augment the transparency of its peaceful nuclear energy program. Indeed, the commitment to form such a body was among the original commitments undertaken by the UAE government in its original white paper describing its intent to evaluate and potentially deploy peaceful nuclear energy within its borders.

More specifically, the IAB represents an unprecedented collection of internationally recognized experts in various disciplines associated with the nuclear energy sector. The board includes world-class expertise in the areas of nuclear safety, security and non-proliferation, as well as regulation, quality assurance, operations, human resource development and waste management associated with the construction, operation and decommissioning of civil nuclear power plants. Led by Dr. Hans Blix, the former Director General of the International Atomic Energy Agency (from 1982-1997), the IAB is charged with conducting semi-annual reviews of the UAE's entire peaceful nuclear energy program and subsequently preparing a semi-annual report summarizing their observations, findings and recommendations. The decision by the UAE government to make these reports available to the public in hard-copy form and over the internet represents yet another example of the latter's commitment to achieving the highest standards of transparency in its peaceful nuclear energy program.

The IAB, while not invested with any legally binding powers, has nevertheless been designed to be an independent advisory body. As stated above, after each of its semi-annual meetings, the Board will issue a report detailing the consensus views of its members with regard to the progress achieved by the program, as well as any areas of concern that merit special attention. The Government will not seek to edit these consensus IAB views and will undertake to publish them free of modification, as intended by the IAB members. Notably, however, the government and the IAB membership have agreed to work together to make those modifications necessary to avoid the dissemination of any sensitive security-related information to which the IAB may have access.

While the IAB's semi-annual reports may address additional topics, they will always be required to specifically address the issues of:

1. Nuclear safety
2. Nuclear security
3. Nuclear non-proliferation
4. Program transparency
5. Program sustainability

The UAE government, and those entities involved in the UAE will use the Board's semi-annual reports to improve performance and, where necessary, allocate additional resources in order to ensure the successful implementation of the over-all program. It is hoped that the UAE populace and the international community will use the reports as an objective source of information via which they may become more informed about and follow the progress of the UAE's nuclear sector.

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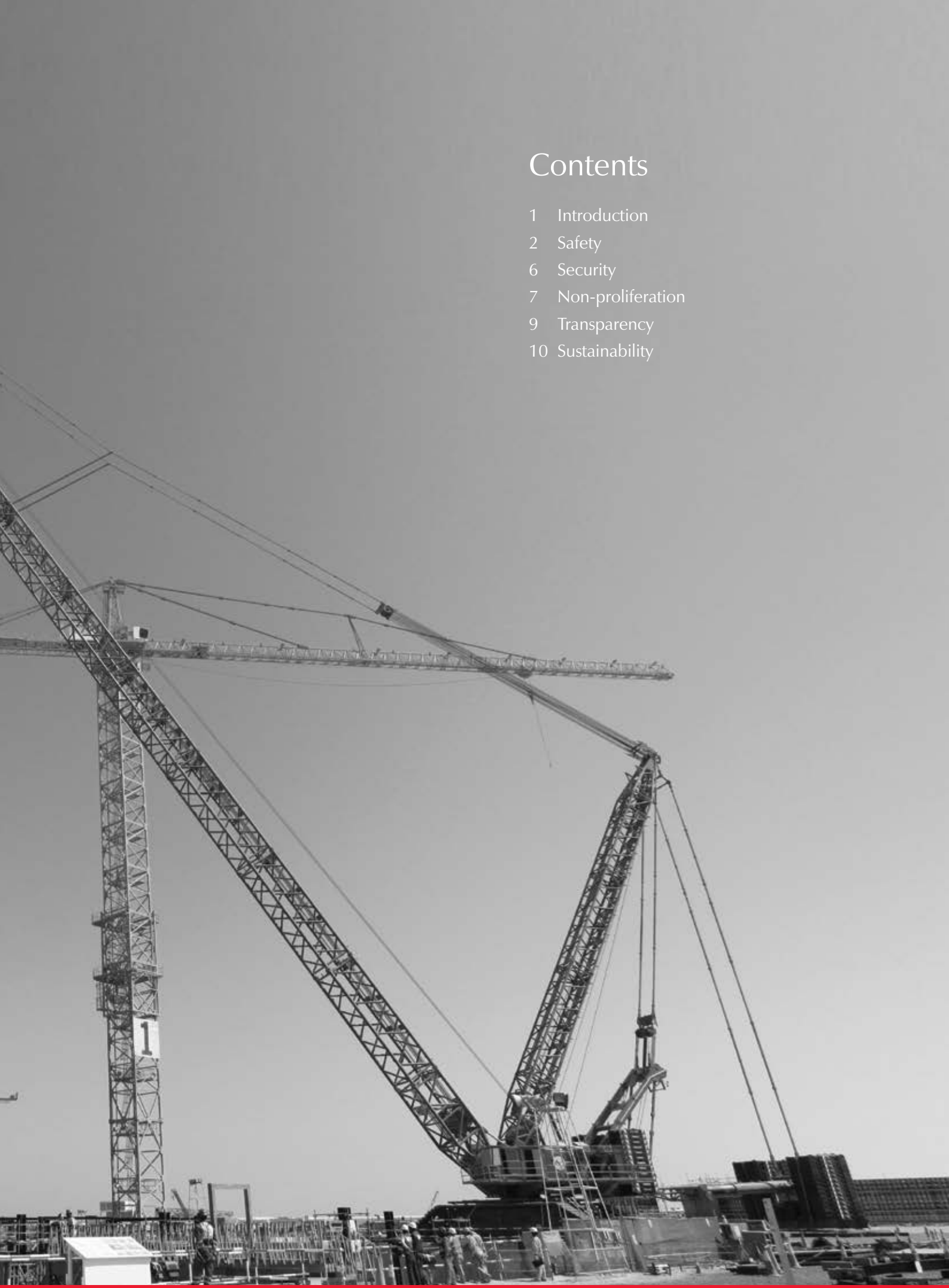


CHAIRMAN'S PREFACE

Dr. Hans Blix
IAB Chairman

On behalf of the International Advisory Board, I am honored to convey to the Government of the United Arab Emirates the ninth report of the Board and place on record the appreciation of the Board for the extensive and valuable insights shared with the Board on the overall progress of the UAE peaceful nuclear energy program.

The Board and I were pleased to see how the UAE peaceful nuclear energy program is reaching a level of young maturity while continuing to remain on time and budget. This report discusses several topics which include the latest status of the construction of the plants, regulatory development around safety, emergency preparedness, and human resource capacities and plans. The Board was also briefed on the latest progress on the Korean supply chain matters.

For the next meeting, the Board has requested several items to be added to the agenda which include, an overview of ENEC's recruitment strategy, further information on the conformity requirements and oversight of Korean manufacturing, and additional information on the nuclear spent fuel and waste management strategy.

The Board congratulates the UAE on the continued success and progress of its nuclear energy program and concludes that the UAE remains fully committed to the principles of safety, security, non-proliferation, transparency and sustainability.

With respect,

Dr. Hans Blix

BOARD MEMBERS

Mr. Jacques Bouchard
Special advisor to the Chairman of CEA (Atomic Energy Commission) - France

Dr. KunMo Chung
Former Minister of Science and Technology – Republic of Korea

Ambassador Thomas Graham
Executive Chairman of Light Bridge Corporation – USA

Mr. Takuya Hattori
President of Japan Atomic Industrial Forum Inc. (JAIF)

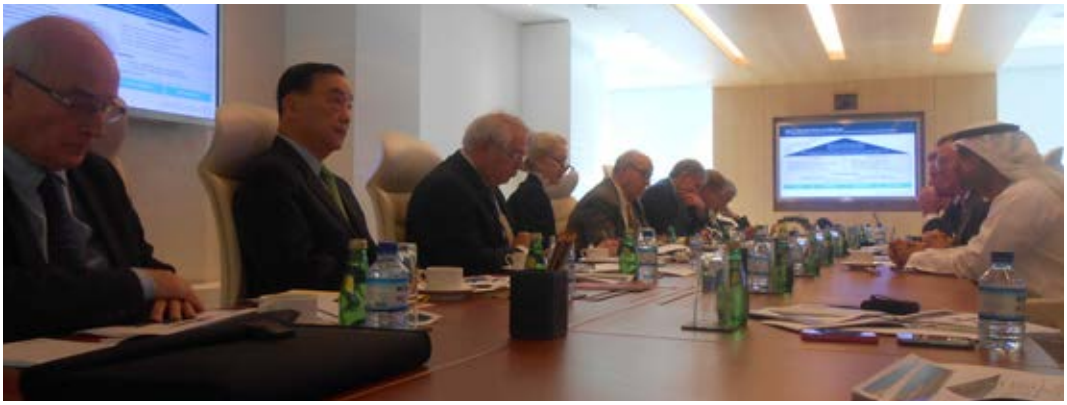
Lady Barbara Thomas Judge
Former Chairman of the United Kingdom Atomic Energy Authority

Dr. Mujid Kazimi
Professor of Nuclear & Mechanical Engineering at Massachusetts Institute of Technology

Mr. Jukka Laaksonen
Former Director General of Radiation and Nuclear Safety Authority – Finland

Sir John Rose
Former Chief Executive of Rolls – Royce plc

INTRODUCTION



The ninth semi-annual meeting of the International Advisory Board (IAB) for the United Arab Emirates (UAE) peaceful nuclear energy program was held in Abu Dhabi on March 10th and 11th, 2014. The Chairman, Dr. Hans Blix, presided and all other members were present. The first two presentations were carried out by the Ministry of Foreign Affairs (MOFA) and the Federal Authority for Nuclear Regulation (FANR). The Emirates Nuclear Energy Corporation (ENEC) presentation took place the following morning. In the afternoon of March 11th the IAB held an internal meeting to discuss the presentations that had been made and IAB requests for information expected for the next meeting.

The UAE peaceful nuclear energy program is based on upholding the highest standards of the five principles of safety, security, non-proliferation, transparency, and sustainability. The IAB is tasked with reviewing the UAE program bi-annually and also reporting the degree to which the UAE program has adhered to these principles. As a result this report is divided into five sections that review each of these principles, based on the presentations of MOFA, FANR, and ENEC. While this structure provides a clear and heavy emphasis on safety, which is appropriate, all five principles are also carefully observed by the UAE program and are comprehensively covered within this report.

The UAE peaceful nuclear energy program is now reaching a level of young maturity. In July 2014, the first reactor will be two years into its construction period and the second reactor one year. In preparation for Units 3 and 4 construction, excavations at the time of the meeting were about 50% complete. The first pouring of concrete to the reactor building of Unit 3 is planned in June 2014, as soon as the Construction License has been received. The fourth reactor is planned to commence construction in mid-2015. The start of power production for the first reactor is scheduled for May, 2017. This report will focus on the major issues of the program.

SAFETY

Safety assessment and recommendations

The discussion on safety began with a presentation by FANR. It was noted that ENEC submitted its Construction License Application (CLA) for Units 3 and 4 of the Barakah Nuclear Power Plant (BNPP) on February 28, 2013. The Limited CL was amended to allow-non-safety related preliminary construction activities to begin for Units 3 and 4 as had been done with Units 1 and 2.

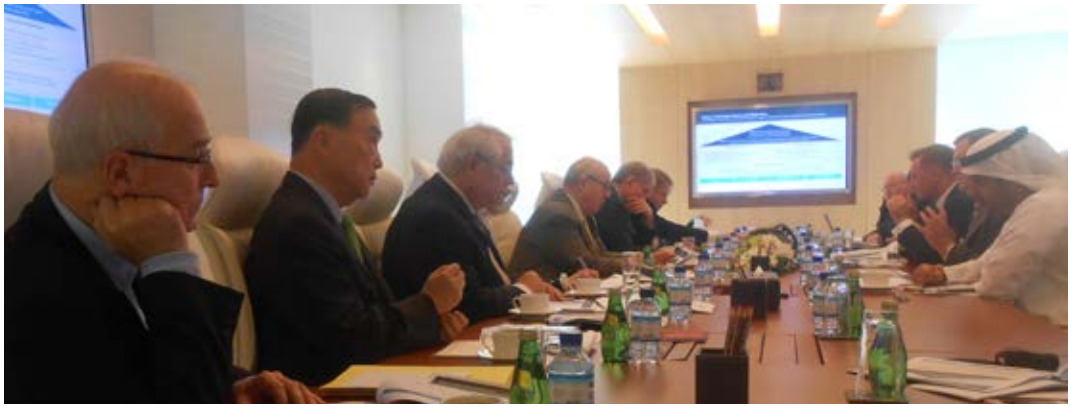
ENEC submitted the Severe Accident Analysis Report (SAAR) Rev. 5 in December 2013. At the time of the meeting, 35 Requests for Additional Information (RAI) had been raised by FANR, addressing molten core concrete interaction, analysis of hydrogen production and containment performance analysis. The open questions related to these three subjects involve several technical issues rather than specific scenarios. The responses to the RAIs are scheduled to be submitted to FANR on May 31, 2014.

A safety issue on which the Board has earlier expressed its interest in is the reliability of the external power transmission grid as a source of electrical power in unusual situations. A reliable grid and strong connections to it from the BNPP are important for reducing the risk of Loss Of Offsite Power (LOOP). LOOP is a precursor to Station Blackout (SBO) – a beyond design basis event that would follow if the onsite emergency diesel generators fail to function after LOOP. A SBO without due contingencies was the direct cause of the Fukushima Daiichi accident. ENEC reported that the BNPP will have two switchyards (one for Units 1 and 2 and one for Units 3 and 4). Each switchyard of the BNPP will be connected with five 400 kV overhead lines (OHL) to offsite switchyards in three different locations. Altogether there are five offsite switchyards in direct connection with the BNPP, with one of them connected with one transmission line to each of the BNPP switchyards, belonging to another transmission system that is separate from the other switchyards and is owned and operated by a different transmission company. This connection will therefore be independent from others and will provide protection against large area grid disturbances. Of the four other offsite switchyards owned by TRANSCO (Abu Dhabi Transmission & Despatch Company) each will have two connecting transmission lines to one of the BNPP switchyards. Each OHL will be capable of transmitting full electrical power of one NPP unit. In conclusion, the Board noted that power line connections from the BNPP switchyards to the external transmission grids have significant redundancy. This provides a reliable offsite power supply to the plant in abnormal situations, as well as a high level of supply security to the consumers who are getting power from the BNPPs.

Another important issue for reliable offsite power supply is ensuring grid stability in the event of sudden plant disturbances. The KEPCO and TRANSCO studies on the grid connection in this respect are complete. The KEPCO studies have confirmed successful and stable connection of the BNPP to the transmission grid, and the TRANSCO studies have confirmed stable behavior of the transmission grid in potential disturbance scenarios arising from BNPP or from elsewhere in the TRANSCO grid. The worst postulated scenario is sudden loss of power supply from one BNPP unit. The stability studies showed no ill effect to the grid or to the operation of the remaining BNPP generators have been submitted to FANR, but are yet to be reviewed and assessed by FANR.

The arrangements for reliable protection against a Station Blackout (SBO), i.e. loss of offsite power and loss of emergency diesel generators, are being finalized by ENEC and FANR. The initial design by KEPCO provides two identical class emergency diesel generators at each Unit and one common diverse diesel generator as an “Alternate AC power source” for the entire plant. Following the Fukushima Daiichi accident, the design of the BNPP was enhanced to allow for connection of mobile diesel generators. In addition to this, ENEC is currently in the process of developing a modification to add a second Alternate AC Diesel Generator (AAC DG), which would provide both redundancy and diversity.

SAFETY



The next issue that FANR brought to the attention of the Board was the question on staffing resources at ENEC. The increasing complexity of the development of the UAE peaceful nuclear energy program requires an increase in staffing levels. FANR found that ENEC is increasing its staff but needs to ensure that new human resources and talent increase in a way commensurate to the expansion of the project.

Several Board members expressed their views about the ENEC situation. A potential solution is that ENEC outsources some of its oversight of manufacturing to qualified external experts. This structure is a common worldwide practice among Licensees that want to assure the quality of the components supplied to their plant without the need for creating large organizations during the construction period that may be made redundant after commissioning. The Board wants to hear more about this issue at the next meeting.

FANR on the other hand has almost enough people to get its mandate done – FANR has done well with recruiting as well as retention of technically qualified people.

FANR briefed the Board on the Korean supply chain issue called CFSI (Counterfeit, Fraudulent and Suspect Items), and on the next day ENEC provided additional information on the topic. A series of CFSI findings for nuclear plants in Korea have resulted in the Korean Government increasing jail and financial penalties for industrialists and public officials within the energy sector. This subject has been an important topic at the previous two Board meetings and will be addressed again at the upcoming meetings.

FANR, with the assistance of expert consultants, has reviewed a report prepared by ENEC on the issue of CFSI, and has accepted measures taken to date by ENEC. Additional controls and measures regarding CFSI have also been agreed to for the BNPP. The programmatic actions are generally consistent with best practices; however there remains to be several implementation issues that will require additional steps. FANR has briefed ENEC on these preliminary conclusions. The Board expressed that ENEC should increase its Quality Assurance (QA) and Quality Surveillance (QS) resources. The Board also expressed its desire to keep this topic on the agenda for future meetings.

Overall, the Board is satisfied with current progress and steps taken regarding CFSI by FANR and ENEC. FANR is planning on conducting inspections of ENEC and Korean suppliers going forward.

The ENEC QA program has been in place since early 2010 and is based on FANR regulations, US Nuclear QA Standard NQA-1, and IAEA standards. CFSI controls were further strengthened in October, 2013 following the emergence of the CFSI issues in Korea. At the time, ENEC formed a special work team to address the issues. Since then, extensive reviews have been performed for the BNPP. To date, there has not yet been a case of CFSI concerning equipment or materials supplied or installed at the BNPP.

The Korean government has increased jail and financial penalties considerably for CFSI cases. ENEC continues to make considerable progress to further enhance its robust QA programs and strengthen CFSI controls. The QA program at KEPCO has also been aligned with ENEC's QA program. Increased sensitivity and conservatism

has been included in the QA programs and extensive training on CFSI has been given to management and staff on site.

The latest developments include: QA programs being updated with a flow down of ENEC requirements to all of its suppliers. Quality verification documents from various Quality Control (QC) steps are kept and compared against original certificates by suppliers. Comprehensive checklists have been developed based on best practices and CFSI is a special topic within audits. Resident inspectors at site are increasingly using "Positive Material Identification devices" (PMI devices) for spot checks: this device identifies the material composition of the target component. The information from PMI devices can be compared with material specification in the component certificate issued by the manufacturer. The Board expressed satisfaction with the steps taken. The Board also stated that hand held devices that can check on elemental composition of components are a recent development, and their use at Barakah is bound to enhance certainty about material quality.

ENEC also presented a strategy and action plan to actively monitor CFSI issues across its supply chain, which includes actions such as independent reviews of ENEC / KEPCO CFSI programs and controls by industry experts in 2014, as well as an increase in QA and QS experts. ENEC and FANR are conducting more CFSI focused audits and inspections to verify program implementation and effectiveness.

The ENEC Chief Program Officer presented an overview of ongoing strategic goals and objectives. The UAE nuclear program has reached a point where it is beginning to transition from construction only, to construction and preparation of the organization that will oversee operations of the plants. The project delivery requires that: project safety performance is always ensured, the integrated construction schedule and budget be met, the Quality Assurance program strict compliance and regulation expectations are observed, and a seamless transition to plant operations must be ensured. In addition, it must always be understood that each goal has a safety related element, at a plant site which is soon expected to have 20,000 workers present.

ENEC's updated operating model is headed by the Board of Directors, with Chief Executive Officer, Mohamed Al Hammadi, reporting to the Board and supervising the Executive Team, which is comprised of:

- Chief Project Officer (CPO), responsible for guaranteeing project delivery
- Chief Nuclear Officer (CNO), responsible for ensuring operational readiness
- Chief Finance Officer (CFO), responsible for providing corporate support
- Chief Operations Officer (COO), responsible for developing capability

The Board requested that all four of the senior officials of the Executive Team be present at the next Board meeting in October 2014, if possible. It was emphasized that safety is the number one priority as the program moves towards first fuel load. ENEC continues to focus on building a Culture of Safety throughout the organization; and that safety as a principle must always come first.

The operational readiness program has three main areas: 1) People (staffing, training, nuclear culture of safety), 2) Process (models, procedures, information and communication technology, operating license application), and 3) Plant (supply chains for operations stage, commissioning, operating, physical security). Operational readiness must be delivered on time in order to ensure reliable and cost effective power production. The goal is to exceed the regulators' expectations across all aspects of the operational readiness program.

ENEC's CPO presented a BNPP construction update. The Unit 1 reactor containment building is proceeding and the reactor vessel is planned to be set on May 25, 2014. The Turbine building is also progressing well. The Unit 2 containment vessel construction is making solid progress. The reactor vessel for Unit 1 was completed by Doosan at the end of December, 2013 in Korea. Doosan also successfully carried out a hydrostatic test on the reactor vessel. It was shipped in late March, 2014 and is expected to arrive in Abu Dhabi in May, 2014. A full scope simulator located on site was taken for training use a couple of days before the IAB meeting. The plant will have two identical simulators that will be used for training purposes.

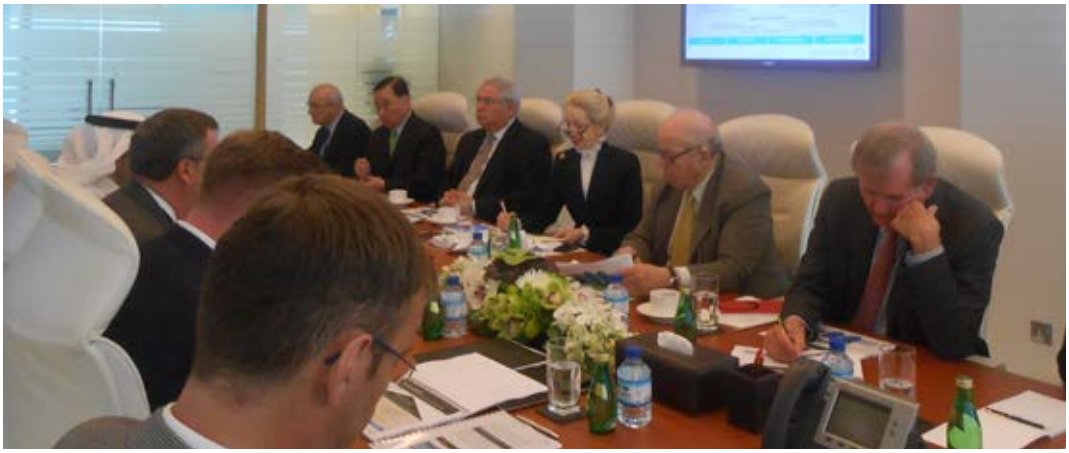
SAFETY

ENEC reported to the Board on progress made in emergency planning. The onsite Emergency Plan and procedures are being prepared well ahead of the first nuclear fuel delivery to the site. Initial drafts of the plan were prepared by an independent consultant, with ENEC's Emergency Preparedness team further enhancing the plan. An independent assessment of the Emergency Plan has also been performed by an external consultant against FANR and USNRC regulations. The draft plan has been found by FANR to fulfill the general intent of its regulations.

The Offsite Emergency Plan (Incident Commander [IC] Plan) is also being drafted and the Offsite program is currently 70% complete. All primary offsite stakeholders have drafted their parts of the Offsite Plan, while receiving significant input from the ENEC experts. A large Emergency Response Facility and Notification Point is being built, and is located 50km from the NPP site, outside the urgent protective action planning zone. It is scheduled to be completed in Q2, 2015. The facility has four separate areas under one roof: ENEC's emergency operations center, authorities' emergency operations center, public information center, and an environmental laboratory. The Board noted that close cooperation between ENEC and local authorities provides a good model for well-coordinated emergency planning and readiness.

The next steps are to: complete both the Onsite and Offsite emergency Plans and implementing procedures; select and test all of the components in the Emergency Response Facility (ERF) and the Notification Point, select and train the onsite emergency response organization members and the various external stakeholders having offsite emergency tasks, submit the final plans for review by FANR and to prepare and conduct an exercise to demonstrate to FANR that the onsite and offsite organizations can jointly protect the health and safety of the public.

SECURITY



Security assessment and recommendations

The first revision of the Physical Protection Plan (PPP) for Construction Phase I, extending until the receipt of the first Items Important to Safety on site, was submitted by ENEC along with the Construction License Application (CLA) for Units 3 and 4. FANR reviewed the PPP and submitted Requests for Additional Information (RAIs). ENEC responded with four commitments. The PPP for Construction Phase 2, extending until the delivery of nuclear fuel on site, was submitted by ENEC in January, 2014. This is under current review by FANR while other RAIs have been submitted to ENEC. ENEC is working on providing the design of the required Physical Protection System, target sets identification and vulnerability assessment.

As part of its requirements, ENEC submitted to FANR a Cyber Security Plan (CSP) in June, 2013. In response to FANR's review of the CSP, ENEC made 13 commitments, including plans for cyber-security incident responses, command and control, disaster recovery, business continuity, emergency and contingency, and strategies for mitigation and restoration of operations. Before issuing the Operations License for Unit 1, FANR will verify that ENEC has implemented the stated plans and has also a sustainability program in place.

The National Electronic Security Agency will be exchanging information across the business community and government. There have been no major attacks reported within the region since the recent cyber-attack on Aramco which, effected some 30,000 computers.

FANR reviewed the updated Aircraft Impact Assessment that had been initially submitted as part of the CLA for Units 1 and 2 and had been completed to demonstrate applicability for all four Units in the CLA for Units 3 and 4. Before issuing the Operating License FANR will verify that necessary operator actions required for the mitigation of the impact consequences can be performed and will review the enhanced design features, strategies and procedures.

As part of the development of FANR knowledge and competences in the Security area, one nuclear security inspector was seconded to the United States Nuclear Regulatory Commission for nine months. In addition, FANR has attended several international meetings on nuclear security in recent months: the IAEA Nuclear Security Guidance Committee in October 2013; a meeting with Sandia National Laboratories in the U.S. in February 2014 on potential physical security and cyber security training; an international workshop on nuclear security in the U.S. in February 2014; and an IAEA technical meeting at the IAEA also in February 2014.

NON-PROLIFERATION

Non-proliferation assessment and recommendations

Ambassador Hamad Al Kaabi for MOFA briefed the Board on non-proliferation and international cooperation. He noted the fifth anniversary of the UAE Permanent Mission to the International Atomic Energy Agency (IAEA). The IAEA has been well briefed throughout the years on the UAE approach to nuclear power and the ongoing dialogue between the UAE and the IAEA has been of great mutual benefit.

The IAEA continues to find feedback from the UAE program highly valuable and the UAE greatly benefits from guidance of the IAEA. Among other examples from the UAE-IAEA dialogue are: the close cooperation with the IAEA in implementing international agreements and conventions; obtaining assistance and advice from IAEA experts and peer reviews of UAE activities; close partnership in developing the work of the IAEA and its standards; the development of a positive recognition of the UAE nuclear program and its efforts as a model within the IAEA and its member states; and the evaluation of the UAE as an influential player at the IAEA policy making organizations as well as in IAEA technical work. As a sign of trust to UAE international competencies, a representative of the UAE has been selected to lead an IAEA mission to Jordan to assess the development of its national infrastructure in preparation for new nuclear build.

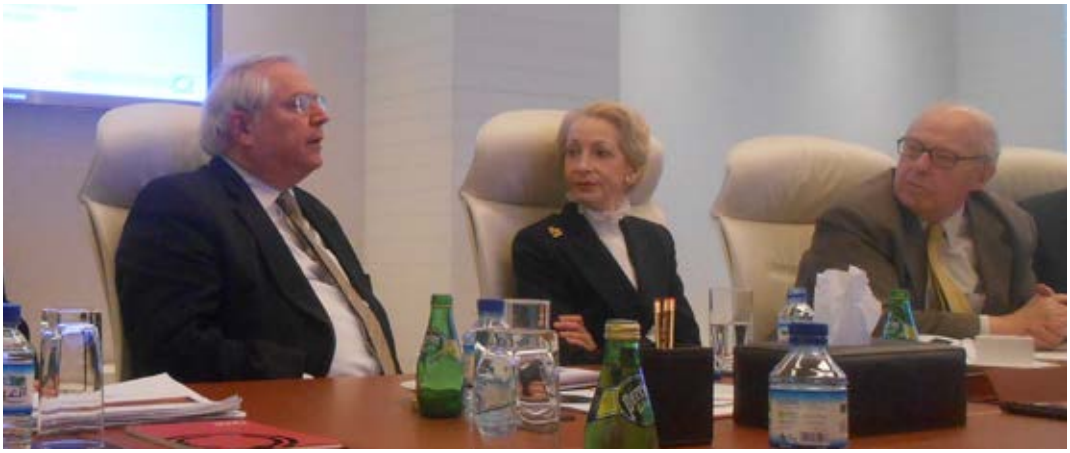
Ambassador Al Kaabi described the importance to the UAE program of technical cooperation with the IAEA. Building the foundation of cooperation with and among stakeholders (ENEC, Critical Infrastructure and Costal Protection Authority, Khalifa University, etc.) for the nuclear energy program has been significant. The stakeholders have not always been aware of what the IAEA has to offer. The UAE-IAEA Integrated Work Plan (IWP) signed in 2013, has significantly enhanced the efficiency and effectiveness of the partnership between the UAE and the IAEA. The current IWP (2013-2017) lasts until the planned start-up of the first NPP in 2017. Between 2010 and 2014, through UAE-IAEA cooperation, 11 national technical cooperation (TC) projects have been completed along with 59 regional/inter-regional projects. This implementation rate places the UAE first among countries in Asia and the Pacific in the execution of IAEA TC programs.

Ambassador Al Kaabi also noted that the UAE is moving to join the Convention on Supplementary Compensation for Nuclear Damage, which was signed in 1997 and is intended to complement the Vienna Convention, Paris Convention or respective national legislation but is not yet in force due to the lack of the required number of ratifications needed.

There were several matters to report with respect to multilateral international nuclear cooperation. The International Conference on the Safety and Security of Radioactive Sources held in October, 2013 in Abu Dhabi was a great success. The meeting attracted more than 300 participants from almost 90 countries and six regional and international organizations. The Conference highlighted achievements in the past decade since the IAEA General Conference endorsed the Code of Conduct on the Safety and Security of Radioactive Sources. The Code serves as a guide for national policies and although not legally binding, 118 states have expressed their political support for the Code and used it to establish national regulatory infrastructures. The UAE adhered officially to the Code in 2013 and submitted its implementation report to the IAEA. Ambassador Al Kaabi stated that before there can be a Convention, a broader understanding amongst the international community on how the Code should be implemented must be developed.

Also in October 2013, the UAE hosted and chaired a series of meetings of the International Framework for Nuclear Energy Cooperation (IFNEC), a forum formed as a partnership of countries to ensure that new nuclear initiatives meet the highest standards of safety, security and non-proliferation. The 2013 IFNEC Finance, Regulatory, and Energy Planning Authority Workshop (led by the UAE) was held on October 22nd, 2013 in Abu Dhabi.

In February 2014, the UAE MOFA signed an MOU with METI Japan to promote nuclear cooperation. The upcoming Nuclear Security Summit in Hague and the NPT Preparatory Committee meeting to be held in New York in late April – early May



2014, were mentioned in Ambassador Al Kaabi's report. With respect to the latter, Chairman Blix asked about the Conference on a Middle East nuclear free zone, agreed at the 2010 NPT Review Conference but never implemented. Ambassador Al Kaabi responded that it was a big issue, and that Egypt had walked out at last year's PrepCom. He noted there had been consultations but no new date for a conference has been agreed to so far.

The ENEC Executive Director for Fuel Management reported on behalf of ENEC on waste management developments. In 2011, MOFA, under the leadership of Ambassador Al Kaabi, invited, ENEC and FANR to develop comprehensive recommendations to aid in the establishment of a UAE national policy on nuclear spent fuel management. The project was concluded in 2012 and ENEC awaits the development of the UAE National Waste Policy.

Meanwhile ENEC has initiated a project to ensure that there will be sufficient storage space at Barakah for the construction of a dry cask storage facility if needed. ENEC awarded the contract for this project in December, 2013 and a study is expected to be completed in 2014. It will evaluate dry storage design, assess the adequacy of existing and planned BNPP fuel pool infrastructure for cask handling and loading and propose a dry storage facility size and location. The first spent fuel from Barakah is expected to be in the fuel pool by 2018. Worldwide experience to date has shown that spent fuel can safely spend at least 40 years in the spent fuel pool and the estimated safe storage time in dry storage is over 100 years.

As concerns with low and medium level radioactive waste generated during normal NPP operation and having not been transported anywhere on an industry scale beyond national boundaries, the proposed national policy should be established for an eventual final disposal in the territory of the UAE. ENEC has visited waste management facilities in Sweden and France and is in the process of training engineers for radiation protection and radiation waste management at Korean nuclear power plants.

With regard to import/export controls on nuclear-related items, FANR has been actively cooperating with the Ministry of the Economy on introducing the list of regulated activities of the nuclear sector into the national index of economic activities. There has also been active cooperation with Federal and local customs on the implementation of export/import control of regulated items. Awareness sessions for importers, exporters and shipping companies have been conducted as well.

TRANSPARENCY

Transparency assessment and recommendations

FANR public outreach events have been planned as follows: Dubai, April 15, 2014; Sharjah/Ajman, April 22, 2014; Ras Al Khaimah/Umm Al Quwain, October 21, 2014; and Fujairah, October 22, 2014.

All UAE federal government entities have been mandated to develop social media policies. Transparency is one of the Core Values of the UAE peaceful nuclear energy program. In order to foster this value, FANR:

- engages truthfully and objectively with stakeholders and communicates FANR's decisions and their bases;
- establishes clear channels of communication with the public and international nuclear community

In cooperation with national stakeholder organizations, the IAEA Public Information Division produced a five minute film, in addition to separate filmed interviews from the UAE's nuclear energy program. The film "Powering the Future", highlights the rationale behind the UAE's nuclear energy program and shows progress made in its implementation. There is also an interview with IAEA Director General, Yukiya Amano. Ambassador Al Kaabi noted that the interview demonstrates how nuclear countries are implementing IAEA guidance. The UAE is the only new nuclear program in 27 years.

SUSTAINABILITY

Sustainability assessment and recommendations

The IAB noted with appreciation the great efforts made in the UAE to train a highly skilled nuclear energy work force, and especially in encouraging citizens of the UAE to join the national nuclear energy program.

ENEC reported a highly diversified work force of 971 staff members, with 619 Emirati employees (67.2%) and 225 women. The IAEA has reported that the percentage of women in the world nuclear energy sector is 22.4%. Therefore, ENEC's figures are in line with general industry practice, while still recognizing that there is always room for improvement.

ENEC also updated the Board on its Energy Pioneers scholarship program. Through this program, 159 students are currently pursuing a Bachelors of Engineering in various specialties (21 females), with 78 of these at Khalifa University in Abu Dhabi, which has a nuclear minor program, MS program and PHD program, while a further 76 students are studying in the United States. ENEC also supports more than 120 students in the Higher Diploma of Nuclear Technology, as well as nine Masters of Engineering students, seven of which are females. Of these Masters students, seven are studying at Khalifa University, one at Texas A&M University and one is in South Korea participating in the KINGS program. Furthermore, there is also one PhD student at MIT in the United States. To date, more than 200 ENEC engineers have gone through practical training experience at Korean nuclear energy plants ranging between two to six months. Extensive training of Emiratis by Korean instructors is also underway.

The workforce at the Barakah site continues to increase. The UAE project is becoming recognized both in the UAE and the world over as a premier project, which is helpful for recruiting qualified staff, but there is still work to be done by ENEC to ensure the organization gets the people that it needs. Initial procedures for hiring are being streamlined, and recruitment remains an important issue for ENEC. By 2017, 1,600-1,700 people will be needed in operations and by 2020 over 2,000, with 400-500 more in ENEC corporate. This is more than doubling current levels.

ENEC has positioned itself as one of the preferred employers of choice for young Emiratis, competing with some of the best companies in the nation. The project is well-known and is seen as an attractive career opportunity. Therefore, hiring talented and experienced expatriates has become easier, but the competition on talented Emiratis is more demanding.

As the nuclear energy plants at Barakah will have at least a 60 year life, services have to be prepared for this. ENEC is increasing its international outreach program to hire experienced nuclear energy experts.

FANR also reported active work in capacity building. There has been an IAEA assessment of FANR knowledge management. FANR has joined the Halden reactor project as a capacity building measure. Five master qualified students have joined FANR in nuclear radiation safety. FANR has a policy of not building its own laboratory for radiation monitoring but instead it uses the environmental laboratory at Khalifa University. Khalifa University is expanding its capabilities with the construction of a calibration laboratory.

SUSTAINABILITY

Another important element of sustainability is the development of a local industry supply chain in the UAE Building sustainable industrial infrastructure in the UAE to support ENEC and KEPCO operations in the long term is an important goal for the program, and ways that the government can assist this have been discussed. While some areas of the prime contract require specialist support, there are many other areas where resources can be supplied from the UAE. General construction appears to be the accessible market for localization and ENEC has been encouraged to consider local companies in this area. Thus far there has been considerable success.

The involvement of local companies has already commenced and both ENEC and KEPCO have collaborated in engaging Emirati companies in the development of the nuclear energy program. More than 1,000 UAE companies are involved in the program and more than US $1.7 billion in contracts have been awarded to Emirati companies for a range of products and services to support the construction of the nuclear energy plants.

The Board in its discussion emphasized that it would like to hear from ENEC's CFO, CNO, COO and CPO. The next meeting of the IAB is scheduled for Sunday, October 12th and Monday, October 13th, 2014. The Board would also like to visit Barakah again in the fall.

The Board would like to receive presentations from ENEC on its recruitment strategy, to ensure that the company has enough resources to continue to guarantee project delivery and operational readiness in adherence to its safety and quality requirements, particularly to ensure witnessing of the Korean manufacturing.

The Board suggested that witnessing should be provided by independent third party inspectors, which is a common approach used during NPP construction in order to avoid large permanent staff that may no longer be required after plant commissioning.

In the Board's view, there should be more attention on the nuclear spent fuel management as well as waste management. ENEC should also focus on low and medium level waste which will be generated at the beginning of the reactor's operation. Such topics are complex yet significant and the Board would like to hear more on the topic at the next meeting.

The Board would also like to receive an update on the issue of on-site AC power supply reliability.

The Board requested an update on the confirmatory analyses for limestone. The Board would like to be assured during the next meeting that these confirmatory analyses have been completed with satisfactory results.

The IAB congratulates to Ambassador Al Kaabi for his extensive and effective work with the IAEA and very much hopes that this level of effort with the IAEA is sustainable for the UAE.

Once more the IAB commends MOFA, FANR, and ENEC for excellent presentations and finds the UAE nuclear power program to be firmly committed to the principles of safety, security, non-proliferation, transparency and sustainability.

ACKNOWLEDGEMENT

The International Advisory Board would like to thank all who were involved in developing this report.