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Building a New Nuclear Safety Regulatory Authority for the United Arab Emirates

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Director General (Designate)
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UAE White Paper

- Nuclear power represents an option that the UAE found to be viable for secure future energy generation mix
 - Commercially competitive and environmentally friendly option for the generation of electricity within the UAE.
- Committed to the highest levels of transparency, non-proliferation, safety and security
 - Developing policies and actions to ensure high standards
 - Establish a *new model* for the evaluation and potential deployment of nuclear energy program
 - Setting an example to others on the importance of involving the international community in an open and collaborative approach
- It is this approach and our licensing strategy that I wish to cover briefly now

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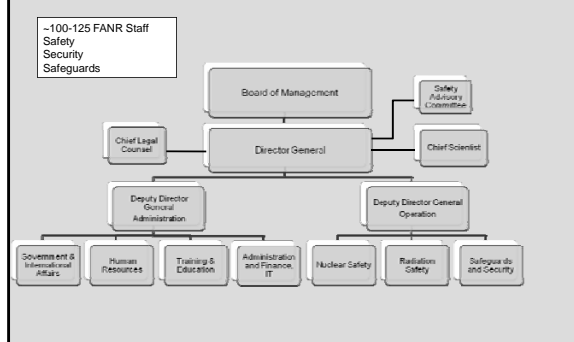
The UAE Government Principles of its Peaceful Intentions

- These principles are
 - Complete operational transparency across the program
 - Commitments to the highest levels of nonproliferation
 - Commitments to the highest standards of safety and security
 - Safety and security are to a large degree interconnected
 - Cooperation with IAEA
 - Working with governments and entities of responsible nations
 - A commitment to develop a program that maintains its long term sustainability
- UAE commitment to the highest standards of non-proliferation
 - Committed to forgo enrichment and reprocessing
 - Proactively support the development of proliferation-resistant technology
 - Support efforts to develop a network of multi-lateral fuel assurances, fuel bank
 - Contributed \$10 million to IAEA fuel bank proposal

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Core Values – Transparency

- Intended in a holistic sense: vis-à-vis the public, the regulated industry and other governmental bodies.
- Comprehensive communications program to provide information to the public in a transparent, technically sound, accurate, reliable and understandable manner
- Effective cooperation with and provision of information and advice to other relevant governmental authorities
- Authority to independently communicate its decisions and opinions and their basis to the public

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Core Values – Safety

- First principle of safety derived from awareness of unique nature and risks inherent in the use of nuclear power
- Policy commitment to establish an independent regulator to safeguard safety and transparency in the nuclear energy sector
- Legal commitment to safety, security, and safeguards as high as reasonably achievable, in full compliance with national law and international treaties
- Tradition of strong protection of public health and safety by the UAE – an area of “no compromise”

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Core Values -- Independence

- Fundamental to achieve and maintain public and international acceptance of a civilian nuclear power program
- *Appointments* - made for a defined period, clear and limited removal criteria, and no possibility to exert undue influence
- *Budget* - financial resources made available must be sufficient, predictable and not subject to undue control by external bodies
- *Technical judgments* - provision for adequate capacity in-house as well as for independent third party expertise
- *Government* - reporting structures that avoid direct Ministerial control over nuclear safety regulation

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Core Values -- Competence

- Essential to establish the prerogative that ensuring safety is a basic responsibility of the State
- Fundamental to maintain the confidence of the public and of the operators
- Necessary for the in-house mentorship and development of national human resources
- Condition to interact effectively within the wide networks of international associations the regulator will develop

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Human Resource Development

- Recruiting a core team of experienced international personnel having a strong training and mentoring background
- Developing a skilled cadre of UAE National personnel in nuclear safety regulation through in-house mentoring, training, and leveraging opportunities
 - Sustainability of the UAE program depends on effective development of national workforce planning

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FANR Activities (1/2)

- Regulations and Guidance
 - Development of National Regulations
 - ◆ Consistent with IAEA Safety Standards and regulation of internationally recognized regulators
 - ◆ Use of risk analysis and performance-based methodologies
 - ◆ Capitalizes on Certification (licensing) by country-of-origin
 - ◆ Capitalizes on over 30 years of operating and regulatory experience and advancement in science and technology
 - ◆ The regulatory regime will follow internationally recognized practices; "no surprises"
 - Development of Guidance
 - ◆ For industry--guidance for complying with National regulations
 - ◆ For FANR staff--to ensure consistency in the review to assure complying with the regulations

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FANR Activities (2/2)

- Oversight of Regulated Industry
 - Inspections
 - Assessment of licensees' performance
 - Enforcement
- Event Assessments
 - Trend analysis of incidents and operating experience
 - Identifying and resolving generic issues
- Supporting activities
 - Participates in International Cooperation
 - Contracts with internationally known TSOs
 - Independent advisory group

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FANR Licensing Strategy

- Two-step licensing reviews
 - Construction License
 - Operating license
- Leveraging the country of origin technical reviews
 - Increase regulatory efficiency
 - Enhance safety through cooperation with experts in the country of origin
- Memorandum of Understanding with the country of origin
- FANR will not provide prescriptive safety or security requirements, instead
 - Hi level, risk-informed and performance-based regulation will be provided
- FANR will adapt the best LWR practices in establishing its specific technical positions consistent with IAEA Standards and international experience
- Utilize the Multinational Design Evaluation Program (MDEP)
 - Goal--one issue, one review, one position

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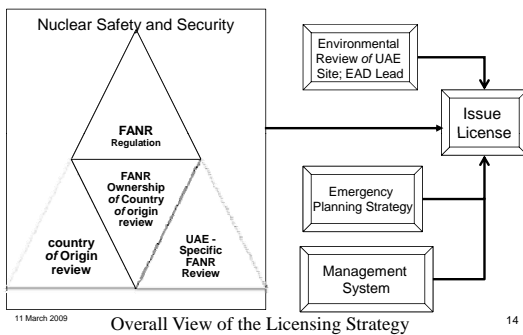
FANR Review of License Application of Emirates Nuclear Energy Corporation (ENEC)

- Information to be reviewed
 - Site characterization
 - Country of origin review of the selected design, technical bases, regulatory requirements, safety goals, and other relevant information
 - FANR familiarization and reliance on country of origin review, "Ownership"
 - ❖ Any change of a certified or licensed design will be discouraged absent strong justification; e.g., to accommodate unique aspects of the UAE site
 - ❖ FANR would not expect to backfit a certified or licensed design
 - FANR review of those UAE unique site and design
 - FANR licensing approach using probabilistic, performance-based and deterministic analysis techniques
 - Emergency planning strategy
 - Other significant special considerations (Management System, Inspection,...)

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Two-Step LWR Licensing Process (1/3)

- FANR review can start before formal application for a Construction License (CL) – topical reports, meetings, Preliminary Safety Analysis Report (PSAR)
- ENEC can use:
 - FANR draft regulatory guides, which describe acceptable approaches, or use existing regulatory guidance (e.g., NRC, IAEA), or propose new approach
 - Country of origin industry Standards
 - Country of origin Quality Assurance
- CL application is expected to contain site safety information, a complete environmental report (ER), preliminary design information, Management System, and a preliminary plan for operational programs

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Two-Step LWR Licensing Process (2/3)

- After the Construction License issuance, an Operating License application would be expected
 - Final Safety Analysis Report provide description of the final design information and operational programs
- Once construction is complete and the OL is issued, the FANR would grant authorization to load fuel
- To ensure stability and predictability FANR will use a modified two-step approach
 - Safety issues considered at construction permit stage will not be reopened at the operating license stage without evidence that safety is compromised

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FANR Licensing Approach (1/2)

- A combination of probabilistic, performance-based and deterministic safety requirements
 - Use of design-specific probabilistic safety assessment (PSA) to identify the most safety-significant systems, structures and components functions, human performance and event sequences
 - Measured or calculated performance to determine compliance
 - Emphasizing the defense-in-depth principle to account for uncertainty
 - Assess the adequacy of structures, systems, and components to either prevent or mitigate the consequences of certain accidents
- This approach as an overlay of the country of origin review is expected to enhance the FANR evaluation
- FANR regulations will not preclude ENEC from requesting approval of the design at the CL stage based on the country of origin certification
 - As such, finality of the design can be incorporated in the CL

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FANR Licensing Approach (2/2)

- PSA helps focus attention on the risk-significant aspect of the design and will be used in classifying the safety significant structures, systems, and component
- The emergency planning requirements will not preclude the option of large site, under the owner's control, that could eliminate evacuation or sheltering
- An important element is a description of the Management System (QA) Program to be applied to the design, fabrication, construction, and test programs
 - Meeting the requirements of the QA program is pivotal: early FANR inspections
- Application and safety review would cover licensee's Safety and Security Culture Program
- FANR expects strong Leadership, Management for safety, safety culture, Self assessment capability, Corrective actions programs, etc. from ENEC
- Security Plan should encompass Design Basis Threat (DBT) and Beyond DBT
 - For beyond DBT, identify design features or compensatory measures to prevent, delay or mitigate the consequences

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Closing Remark (2/2)

- The nuclear law will establish and give independent power to the Federal Authority for Nuclear Regulation
 - The UAE believes that the establishment of an independent, and effective regulatory authority is a cornerstone for stable, credible, safe and secure nuclear energy program
- Since ENEC will select an LWR that has already been licensed, the FANR review will significantly focus on the evaluation of UAE-specific issues
- By relying on the country of origin review, we can make complementary more focused safety decisions efficiently and effectively
- Risk-informed, and performance-based approach will facilitate assessment of plant safety margins, integrate safety and security considerations, and help focus inspections, maintenance, and operator training

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