ENEC Management System and Quality Assurance Program

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ENEC Management System & Quality Assurance

- Background
  - UAE Nuclear Law / FANR Regulations/ Standards
- ENEC Management System
  - Quality Assurance Program
- Prime Contractor Program & Alignment with ENEC
- Status of Implementation
  - ENEC Program / PC Program / Supply Chain
- Key Processes / Grading
- Summary
- Q & A
Management System - “A set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner”
Quality Assurance – “The function of a Management System that provides confidence that specified requirements will be fulfilled”
The Licensee shall ensure that there is a Management System in place and adequate financial and human resources are provided to ensure Nuclear Safety. The Licensee shall determine the responsibility and authority of individual bodies within its Management System in order to achieve the requirements of the previous paragraph.
FANR* Regulations for Management Systems

- The Federal Law by Decree No.6 of 2009, Concerning the Peaceful Uses of Nuclear Energy
- FANR-REG-01: Regulations for Management Systems for Nuclear Facilities
  - Senior Management shall be responsible and shall demonstrate its commitment for the MS and shall ensure it is established, implemented, assessed and continually improved.
  - Ensuring that health, environmental, security, quality and economics requirements are not considered separately from Safety requirements

* FANR- Federal Authority for Nuclear Regulations
FANR* Regulations for Management Systems

- FANR-RG-002; Regulatory Guide “Application of Management Systems for Nuclear facilities”
  - Acceptable methods and guidance for implementing the requirements specified in FANR-REG-01.
    - IAEA SG GS-G-3.5 “The Management System for Nuclear Installations”
    - ANSI/ASME/NQA-1 “Quality Assurance Requirements for Nuclear Facility Applications”

* FANR- Federal Authority for Nuclear Regulations
FANR* Regulations for Management Systems

- Graded Approach:
  - The application of MS requirements shall be graded as to deploy appropriate resources, on the basis of the consideration of:
    a. The significance and complexity of each product or activity
    b. The hazards and the magnitude of potential impact (risks) associated with the Safety, security, safeguards, Radiation Protection, environmental, quality and economics elements of each product or activity; and
    c. The possible consequences if a product fails or an activity is carried out incorrectly.
  - Grading of the application of MS requirements shall be applied to the products and activities of each process

* FANR- Federal Authority for Nuclear Regulations
Emirates Nuclear Energy Corporation (ENEC)

- ENEC was established after the UAE government determined that nuclear energy was a viable and sustainable solution to the nation's energy supply challenges.
- ENEC will be responsible for the deployment of the UAE's peaceful civil nuclear energy program
  - Design, construction, operations of nuclear power plants
  - Integration with the UAE government and industrial infrastructure
  - Future strategic investments in the nuclear sector, both domestically and internationally
ENEUC Management System

- 2008 / early 2009
  - Started ENEC formation; Experience of Personnel
  - Benchmarking of MS /QA standards
  - Country of Origin Standards / Practices
- 2009 February- Concepts & Documentation Structure for MM/MS developed
- UAE Nuclear Law & FANR established
- 2009 December – ENEC established / Contract signed with KEPCO
Key Challenges for Management System Development

- FANR REG-01/RG-02 requiring an integrated Management System
- Need specific requirements and level of prescription for a country getting into nuclear
- Country of origin standards
- Holistic approach to management to achieve corporate goals and objectives
**ENEC Management System Origin**

- Based on industry experience

**Regulations**
- Nuclear Power Plant Safety Analysis Reports

**International Standards**
- ASME NQA-1, Quality Assurance Requirements for Nuclear Facility Applications
- IAEA GS-R-3, The Management System for Facilities & Activities

**Benchmarking**
- Commercial Nuclear Fleet Utilities
- Government Nuclear Sites

**Best Practices**
- European Foundation for Quality Management
  - Fundamental Concepts of Excellence
- ISO 9000 QMS series
Purpose of ENEC Management System?

- Management System for Corporate Governance
  - To meet ENEC Business Objectives, Mission & Vision
  - Based on widely used and proven national & international standards and best practices
- Covers:
  - Health & Safety
  - Environment
  - Security
  - Quality
  - Economics / Business and
  - Other key areas
ENEC Quality Assurance

- An integral part of ENEC Management System
  - Focus on Nuclear Safety
  - Based on proven & widely used nuclear standards
  - Alignment with country of origin / nuclear supply chain
  - Provides specific & rigorous requirements
## ENEC Management System Elements

### Vision
Powering the future growth and prosperity of the UAE through a safe, clean, efficient, and reliable civil nuclear energy program

### Mission
To deliver safe, clean, efficient and reliable nuclear energy to the UAE grid by 2017 and beyond

### Core Values
- Safety
- Integrity
- Transparency
- Efficiency

### Strategic Goals

| Business Development | Financial Management & Control | Information & Communications Technology | Program Governance | Strategic Planning & Performance Management
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<td>Human Resources Development</td>
<td>Legal &amp; Export Controls</td>
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### Functional Elements/Processes

#### Management Processes

- Business Development
- Financial Management & Control
- Information & Communications Technology
- Program Governance

- Capacity Building
- Fleet Management
- Internal Audit
- Program Management

- Document Control & Records Management
- Human Resources Development
- Legal & Export Controls
- Safeguards & Security

#### Core Processes

- Construction Management & Oversight
- Engineering, Design & Technical Services
- Nuclear Operations Planning & Oversight
- Procurement & Supply Chain
- Waste Management

#### Support Processes

- Communications & External Affairs
- Health, Safety & Environment
- Licensing & Permitting
- Quality Assurance
- Training

#### Stakeholders
- UAE Citizens
- UAE Governments
- ENEC Employees
- EAA
- FANR
- EAD
- CNIA
- NCEMA
- IAEA
- GCC
- ADWEA
- ADWEC
- Transco
- Urban Planning Council
- Western Region Authority
- Others
ENECC Management System Structure

• Enables ENEC’s Vision and Mission through strategic planning
  – Focused on organizational goals & objectives
• Organized by Functional Elements
  – Functions stable, independence from organizational changes
    • Functional leads responsible for their processes, procedures, documentation & implementation
• Consistent with ENEC Core Values and best practices
• Supports stakeholder engagement
• Robust performance monitoring, Corrective Action & Continual Improvement
Hierarchy of Nawah MS/ QA Document

- Policies
- MS Manual
- QA Manual
- Process Descriptions
- Supporting Procedures/ Work Constructions
Scope & Responsibilities

ENEC is the Owner and License Holder for the Nuclear Power Plant

Responsible for all activities including program management and oversight of the Prime Contractor (KEPCO) to address:

- Siting, design, engineering, procurement, construction, commissioning, operation, waste management & decommissioning phases of the NPP

Prime Contractor has full scope responsibility for all aspects of the materials to be supplied, activities to be performed and work to be completed to fulfill Owner’s requirements to achieve final completion of all units.
ENEC’s Integrated Management System

- ISO 9001: Quality Management System
- ISO 14001: Environmental Management System
- ISO 18001: Occupational Health & Safety Management System
- ISO 20000: Information Technology Service Management System
- BS 25999: Business Continuity Management System
- ISO 27001: Information Security Management System
- CIPS Gold: Procurement Integration
- INVESTOR IN PEOPLE
- M.A.K.E. AWARD: Knowledge Based Management
- INVESTOR IN PEOPLE
- ISO 14001: Environmental Management System
- ISO 20000: IT Delivery & Support

ENEC
Use of Nuclear and Generic Standards

Federal Law No. 6 of 2009 concerning the peaceful uses of nuclear energy.

FANR Regulation 01 for Management Systems for Nuclear Facilities.

ASME NQA – 1 - 1994

Suppliers and Stakeholders

Customer Satisfaction
Assessments & Trends – ENEC QS on PC
Levels of Quality Oversight on BNNP Program

1 = Corp. QA Oversight of ENEC
2 = CPO QA oversight of KEPCO & subs
3 = KEPCO QA oversight of Subs

QA (1,2&3)

QS #2
ENEC oversight of KEPCO QS

QS #1
KEPCO oversight of contractors (random)

Contractor / Supplier QC – 100% responsible for inspections
Presently ENEC QS is providing Oversight activities on site on a weekly basis.

Starting the beginning of 2012 ENEC will have permanent staff on site to perform oversight activities on the contractor KEPCO and its Sub contractor HSJV and their sub contractors.

Surveillance Plan for 2012 is to assign 8 ENEC QS staff in the 1st quarter and increase to a staff of 12 by the beginning of 4th quarter.

Presently no safety related work is being performed site.
ENECE MS/QA Program

- Some of the key processes / procedures:
  - Safety Culture
  - Security Culture
  - Self-Assessment
  - Condition Reporting & Corrective Action
  - Deficiency Notification Report
  - Graded Approach for Management System Requirements
  - Management System / QA Program Review
ENEQ provides the oversight function, Owner and License Holder:

- Prime Contractor (KEPCO) has full scope responsibility for all aspects of NPP at BRAKA site
- Within the PC program, the program is managed based on quality designations:
  - Safety Related (Q)
  - Safety Impact (T)
  - Reliability Critical (R)
  - Industrial Standard (S)
ENEC MS/QA Program – Graded Approach

- ENEC Corrective Action Program:
  - A robust and comprehensive CA program called “Condition Reporting”, put in place in 2010
  - Based on IAEA GS-G-3.1/3.5; ASME NQA-1
  - CRs raised through audits, self-assessments, self raised, areas for improvements, etc.
  - CRs classification- A,B,C, D levels
    - A,B,C level CRs- develop & document CA Plan
    - D level CRs- develop CA Plan, or close to trend
    - A,B level CRs- Causal Analysis (RCA,ACA)
How to initiate a Condition Report

Select Functional Element that should address the issue

Select:
• Your name
• Your department
• Your manager

Describe the condition and any actions taken

CR number is automatic

• Date condition occurred
• Attach pictures / documents

Click submit! Your manager will get an email and will process the CR.
Human Performance

- EQAM requires “performance-based” training programs for key personnel including Operations, Engineering and technicians
- We all should identify error precursors and utilize human performance tools!
Regulated Activities

- FANR license is required for:
  - Selection of a site for Construction
  - Preparation of a site for Construction
  - Construction of a Nuclear Facility
  - Commissioning of a Nuclear Facility
  - Operation of a Nuclear Facility
  - Safety significant modifications to facility or management system
  - Possession, use, manufacture, handling, import, export, transportation, storage, disposal, of regulated material
  - Introduction or removal of regulated material from facility
  - Any other activity designated by FANR regulations
Licenses Obtained

- **Site Selection License- Approved 28 February 2010:**
  - Allows investigation of site
  - Not site specific and no end date
  - License Conditions require FANR notification of changes and an annual report

- **Site Preparation License- Approved 8 July 2010:**
  - Allows construction of non safety-related structures and excavation for safety-related structures
  - Authorizes work on all 4 units
  - License Conditions require FANR notification of changes and an annual report

- **Limited Construction License for Manufacturing – Approved 8 July 2010:**
  (Amended to add MMIS and Intake/Discharge- 2 March 2011)
  - Allows fabrication and assembling of selected safety related components, systems and structures
  - Authorizes work on all 4 units
  - License Conditions require FANR notification of changes and an annual report
License Applications Submitted

- **Braka Units 1 & 2 Construction License**
  - Submitted 27 December 2010
  - Will allow manufacturing and construction of Units 1 & 2

- **Braka Units 1 & 2 Limited License**
  - Submitted 13 October 2011
  - Will allow preparatory work for first safety-related concrete prior to Construction License
Assessments & Trends – ENEC MS/QA Program

- FANR Inspections:
  - FANR conducted 4 inspections in 2011
  - No major issues noted for QA
  - Some areas for improvement identified
    - Clarification sought on scope / responsibilities between ENEC; KEPCO and its contractors
BNPP Construction Wharf Excavation
BNPP Current Statistics

- More than 3000 staff and labour on site working on Infrastructure and Site Preparation works.
- Site service road, power supply, communications and water service to support construction completed.
- Over 70 infrastructure buildings, including housing, workshops, batch plant, construction offices and training facilities under construction or in operation.
- ENEC employ over 100 staff engaged in Oversight Work through it Chief Program Office.
Overall Summary

- ENEC has a comprehensive integrated management system for its corporate governance
  - MS is based on best practices and widely used standards
    - A robust, fully functional system, covers all key areas and focused on nuclear safety
  - Quality Assurance Program is an integral part of the MS, focused on nuclear safety, compliant with NQA-1
    - PC and Supply Chain QA programs are aligned with ENEC QA requirements
- A balanced and innovative approach to manage nuclear corporation with a broad civil nuclear program
Thank You