Regulatory Arrangement and Current Developments in Mexico

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Ministry of Energy

PRESIDENCY OF THE UNITED MEXICAN STATES

MINISTRY OF ENERGY

NATIONAL COMMISSION OF NUCLEAR SAFETY AND SAFEGUARDS (CNSNS) [Semi-autonomous body]

ENERGY REGULATORY COMMISSION (CRE) [Semi-autonomous body]

NATIONAL COMMISSION FOR ENERGY SAVINGS (CONAE) [Semi-autonomous body]

FEDERAL ELECTRICITY COMMISSION (CFE) [Decentralized body]

MEXICAN REGULATORY AUTHORITIES - ENERGY

Utility

Research Institutes

ELECTRIC RESEARCH INSTITUTE (IIE)

NATIONAL NUCLEAR RESEARCH INSTITUTE (ININ)
Semi-autonomous Regulatory Agencies

– Mexican Law, allows Ministries to have semi-autonomous administrative units, to give effective attention to matters requiring specialized knowledge.

– These units shall have specific authority to resolve on matters under their jurisdiction, within the national territory.
Independence of the Regulatory Body

• The CNSNS is not administratively independent of the organisms responsible for promoting nuclear technology. However, since its creation, the Regulatory Body has been conducting all its affairs with complete technical independence.

• There are not ongoing measures to resolve this issue.
Mexican Nuclear Regulatory Authority

Comisión Nacional de Seguridad Nuclear y Salvaguardias
CNSNS

• Mexican regulatory authority is under the Ministry of Energy
• Annual budget about $6.5 million dollars
• 180 employees
• Headquarters located in Mexico City.
• Semi-autonomous agency of the Ministry of Energy, responsible for overlooking:
  » nuclear safety,
  » radiological safety and
  » physical security
  » safeguards.
Mexican Regulatory Body

CNSNS ORGANIZATION CHART

MINISTRY OF ENERGY

DIRECTOR GENERAL

EMERGENCY COMMITTEE

FINANZE

LEGAL AND INTERNATIONAL AFFAIRS DEP.

NUCLEAR SAFETY

EVALUATION DEP.

OPERATIVE VERIFICACION DEP.

REGULATORY ACTIONS DEP.

RADIOLOGICAL SAFETY

RADIOACTIVE INSTALATIONS DEP.

ENFORCEMENT AND QUALITY DEP.

SECURITY AND SAVEGARDS DEP.

RADIOLOGICAL EMBIROMENTAL SURVILLANCE

TECHNOLOGY, REGULATIONS AND SERVICES

REGULATIONS AND TRAINING DEP.

TECNOLOGY DEP.

INTERNAL COMPTROLLER

TELEMATICS AND INFORMATION SYSTEMS

MINISTRY OF PUBLIC FUNCTION

EMERGENCY COMMITTEE
Legislative Framework

- Political Constitution of Mexico
- International Agreements
- Regulatory Law of Article 27 of the Constitution on Nuclear Matters (Nuclear Law)
- Mexican Standards, IAEA BSS, ASME, IEEE, ASTM, etc.
- Commercial Operation License for Laguna Verde NPP Units 1 & 2
- Technical Specifications, Quality Assurance Manual
- Requirements: Before Refueling, During Refueling, After Fuel Reloading, During the Operating Cycle
<table>
<thead>
<tr>
<th>NAME OF THE TREATIES OR AGREEMENTS</th>
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<tbody>
<tr>
<td>Treaty for the proscription of nuclear weapons in Latin America</td>
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<tr>
<td>Treaty on the non-proliferation of nuclear weapons</td>
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<tr>
<td>Agreement for the application of safeguards related to the Treaty for the proscription of nuclear weapons and the Treaty on the non-proliferation of nuclear weapons</td>
</tr>
<tr>
<td>Subsidiary arrangements relating to the Agreement for the application of safeguards related to the Treaty for the proscription of nuclear weapons and the Treaty on the non-proliferation of nuclear weapons</td>
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<tr>
<td>Vienna convention on civil liability for nuclear damages</td>
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<tr>
<td>Convention on physical protection of nuclear materials</td>
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<tr>
<td>Convention on prompt notification of nuclear accidents</td>
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<tr>
<td>Convention on assistance in the event of nuclear accident or radiological emergency</td>
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<tr>
<td>Convention on nuclear safety</td>
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Mexican Nuclear Regulatory Authority

– Nuclear Law (Article 50 Fraction III) empowers the CNSNS as the agency responsible for the review, evaluation and authorization of the regulatory bases for:

• Sitting, design, construction, operation, modification, suspension of operation, permanent shutdown and decommissioning of nuclear and radioactive installations

• The fabrication, use, handling, storage, reprocessing and transport of nuclear materials and fuels, radioactive materials and equipment containing them; and

• The processing, conditioning, release and storage of radioactive wastes and their disposal.
Legislative Framework

• Legal and regulatory framework establish:

i) National requirements and provisions applicable to safety matters; including implementation of International Treaties and Conventions;

ii) Licensing process for nuclear installations;

iii) A regulatory evaluation and inspection system to verify compliance with regulations;

iv) Measures to enforce compliance with applicable provisions and requirements stipulated in licenses, including suspension, modification or revocation.
Regulatory Processes
Authorization processes:

– Licensing of Nuclear Installations
  » Construction Permit
  » Operation license
  » Power Up-rates
  » License renewal
  » Cease of operations
  » Decommissioning

– Changes to design basis
  » Plant Modifications
  » Technical Specifications

– ROs and SRO’s licensing
Regulatory Body

Surveillance Processes

– Review of Periodic Reports (in compliance to regulatory requirements or TS)

– Plant Event Analysis
  • Reportable Events

– Performance Assessment
  • Performance Indicators

– Inspections
  • Base Line Inspections
  • Especial inspection
    - Response to operational events, performance issues.
  • Resident Inspectors
Current programs and activities to improve safety by CNSNS

i) Quality assurance system update

ii) Enforcement procedures

iii) Adoption and adaptation of reactor oversight process

iv) Systematic Approach to Training to continue with the adoption and adaptation of Reactor Oversight Process

v) Application of Inspection Guides using risk information

vi) Continue the implementation of a Quality Management system based on ISO 9001-2000

vii) Continue the implementation of a Systematic Approach to Training
Mexican Nuclear Regulatory Authority

Future Activities

– Improved Tech Spec’s Evaluation (in progress)
– Licensing of 20% power up-rate
– Authorization of New Transient Analysis Methodology (in progress)
– Licensing of MELLA-PLUS
– Authorization of New Nuclear Fuel
– DSS-CD
– Periodic Safety Review for LV Unit 1 & 2
– License renewal
– Risk-Informed In-Service Inspection
– New Reactors?
Nuclear Installation in México

• A Nuclear Power Plant with two Units with 675 MWe each. It is located in Veracruz State.

• A nuclear research reactor (TRIGA MARK III) 1 MW, is operating since 1968. It is located in the Nuclear Research Institute (ININ) near México City.

• Two subcritical nuclear assembly
  – National Polytechnic Institute (IPN)- México City
  – Zacatecas University (UAZ)- Zacatecas State
Laguna Verde Nuclear Power Plant

– Built and operated by CFE (Federal Commission of Electricity).
  • Two BWR units (No 1, 1990; No 2 1995), 675 MWe each.
    – Unit 1 started operation in 1990
    – Unit 2 started operation in 1995
  • General Electric design

– Located 75 km North of the Port of Veracruz.

– 2.85% of the total installed capacity in Mexico (43,857.29 MWe)
Nuclear Power Plant
Laguna Verde

• The NPP is located more than 500 Km away from the Nearest country.
Laguna Verde Nuclear Power Plant

– Laguna Verde NPP increased the thermal power in 2000 year (1931 MWt to 2027 Mwth) in about 5%.

– In 2008 the CNSNS received the solicitude from CFE to increase the thermal power of Laguna Verde NPP up to 2317 MWTh each (20% over the original licensed power).

– Structural integrity of the steam dryer remain under evaluation by the Regulatory Body. Some Requirements of Additional Information remains without answers by CFE.
IAEA Documents used for regulation activities

Many IAEA documents are used by the regulatory body in order to have an international reference about regulation and technical issues

• Safety Standards
• Safety fundamentals
• Security guidelines
• Technical reports
• TECDOC’s
• INSAG reports
### Summary of Mexican Official Standards applicable to nuclear facilities

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Publication date</th>
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<tr>
<td>NOM-001-NUCL-1994</td>
<td>DOSE EQUIVALENT CALCULATION FACTORS</td>
<td>Feb-6, 1996</td>
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<td>NOM-002-NUCL-1994</td>
<td>REPRODUCTION OF ANNUAL INCORPORATION LIMITS FOR OCCUPATIONALLY EXPOSED PERSONNEL</td>
<td>Sep-2-2004</td>
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<tr>
<td>NOM-005-NUCL-1994</td>
<td>ANNUAL RADIONUCLIDE INCORPORATION LIMITS AND DERIVED CONCENTRATIONS IN AIR FOR OCCUPATIONALLY EXPOSED PERSONNEL</td>
<td>Feb-16, 1996</td>
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<tr>
<td>NOM-008-NUCL-2003</td>
<td>RADIOACTIVE CONTAMINATION CONTROL</td>
<td>Dec-29, 2003</td>
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<tr>
<td>NOM-012-NUCL-2002</td>
<td>REQUIREMENTS AND CALIBRATION OF IONIZING RADIATION MONITORS</td>
<td>Jun-19, 2002</td>
</tr>
<tr>
<td>NOM-018-NUCL-1995</td>
<td>METHODS TO DETERMINE ACTIVITY CONCENTRATION AND TOTAL ACTIVITY IN RADIOACTIVE WASTE PACKAGES</td>
<td>Aug-12, 1996</td>
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<tr>
<td>NOM-026-NUCL-1999</td>
<td>MEDICAL SURVEILLANCE FROM OCCUPATIONALLY EXPOSED PERSONAL TO IONIZING RADIATION</td>
<td>Jul-5, 1999</td>
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<td>NOM-031-NUCL-1999</td>
<td>REQUIREMENTS FOR THE QUALIFICATION AND TRAINING OF THE OCCUPATIONALLY EXPOSED PERSONAL TO IONIZING RADIATIONS</td>
<td>Dec-28, 1999</td>
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<td>NOM-034-NUCL-2000</td>
<td>SELECTION, QUALIFICATION AND TRAINING REQUIREMENTS OF OCCUPATIONALLY EXPOSED PERSONNEL IN NUCLEAR POWER PLANTS</td>
<td>Aug-4, 2009</td>
</tr>
<tr>
<td>NOM-036-NUCL-2001</td>
<td>REQUIREMENTS FOR FACILITIES FOR TREATMENT AND CONDITIONING OF RADIOACTIVE WASTE</td>
<td>Sep-26, 2001</td>
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Thanks you for your attention