Currently Situation of RWM in Chile and new Challenges

26 May 2016
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Radioactive Waste Management Section
The Institution (1 of 3)

CCHEN is responsible for development of sciences and nuclear technology in the country.

CCHEN has an institutional mission to carry out research, development and applications of nuclear energy and its regulations, control and inspection, giving technological and research services and development to other institutions like ministries, public and private enterprises and universities.
The objective of Radioactive Waste Management Section is to centralize the activities related to the collection, treatment, conditioning, transport and storage of radioactive waste that is generated as a result of nuclear development in the country.

The final concept is the storage stage of conditioned radioactive waste, previous to be disposed of.
Facilities of Radioactive Waste Management in Chile
The Radioactive Waste Management Section has three facilities and two laboratories for development the activities of radioactive waste management.

_DECAY Facility : To Store Radioactive Waste in decay_

Very Short Lived Radioactive Waste generated mostly in CCHEN facilities, after a period of time they are eliminated as common waste, solely, once radiation features have reached natural level.
Radioactive Waste Treatment Plant
It has two areas for treatment of liquid and solid radioactive waste. The treatment consists in reducing the volume of radioactive material in order to confine a minor volume than the original in benefit of the economy of radioactive waste management.
Storage Facility of Radioactive Conditioned Waste
It is designed to keep in a safe and secure way under a controlled system the conditioned radioactive waste.

Support Research Laboratories
Two laboratories to develop characterization methodologies and define treatment guideline for radioactive waste management
It is foreseeable that in the next 20 years the sources of generation of Radioactive Waste will correspond to:

- Industries: SSRS
- Hospitals: SHARS, SSRS
- Research Reactor: Ion exchange resins, Spent fuel
- Nuclear research at Universities and Nuclear Research Centers: liquid and solid waste, and small calibration sources

This is considered for next future, until changes of energetic policy allows to introduce the nuclear option in the country.
Status of Radioactive Waste Management in Chile (2 of 6)

Present Status or plans related to national policies and strategies on radioactive waste management in the country (1 of 2)

National Policies

From 2008 we have a draft of National Policy.

The draft was sent to the high authorities of Chilean Nuclear Energy Commission and the discussion stage will have to begin in all the sectors out of CCHEN that documents requires.
Status of Radioactive Waste Management in Chile (3 of 6)

Strategies on radioactive waste management in the country and Status of the national practices of radioactive waste management (1 of 1)
Status of Radioactive Waste Management in Chile (4 of 6)
National legislation or regulations

Law Nº 18.302 of 1982 “Nuclear Safety Law”

Supreme Decree No. 133 of 1984 “Adopts regulation on authorization of radioactive facilities or equipment generating of ionizing radiation, personnel working in them, or operate such equipment and related activities”

Supreme Decree No. 3 of 1984 "Regulations on Radiation Protection Radioactive Facilities"
National legislation or regulations

Supreme Decree No. 87 of 1985 "Regulations on Physical Protection of Facilities and Nuclear Materials"

Supreme Decree No. 12 of 1985 "Regulations for the safe transport of radioactive materials"

Law 20.417 de 2010 "Law on General Bases of the Environment"

Supreme Decree No. 40 of 2013 "Rules of the System of Environmental Impact Assessment"
New Challenges (1 of 15)

Energy Policy 2050 & CENP Report

Step 1
Energy Agenda Ago-Dec 2014

Step 2
Vision and Roadmap Ene-Sept 2015

Step 3

- Technical Worktables
- Building the vision and Roadmap
- Energy Roadmap
- Making the draft of Energy Policy by the Energy Ministry
- Public Consultancy of draft document
- Official document Energy Policy 2050
Energy Policy 2050 & CENP Report

New Challenges (1 of 15)

Step 1
Energy Agenda
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Generación Nucleo-Eléctrica en Chile
Hacia una decisión racional

Nuclear Power in Chile:
Toward a Rational Decision

CENP (Nuclear Power Energy Committee)
Objective:

Determinate the status of national preparedness for taking a decision for launching-or-not an NPP.
New Challenges (3 of 15)

Overview

1. Reactor Technology
2. Fuel Cycle and Waste
4. Institutional and Legislative Framework
5. Regulatory Framework
6. Electrical Grid
7. Economic Aspects
8. Environmental Aspects
10. Site selection.
11. Public Opinion
12. Human Resources
13. Strategic aspects
New Challenges (4 of 15)

Among the conclusions are:

1. The information available today shows that ... the NPP is:
   - **Safe**, producing less accident technology to equal power generated.
   - **Sustainable**, having the lowest environmental impact during their operation and with a CO2 footprint comparable to wind and photovoltaic.
   - **Reliable**, introducing higher capacity factors and price stability without limitation of natural resources in the long term, and;
   - **Competitive**, showing levelized costs comparable to LNG and Coal Generation...
Among the conclusions are:

2. “Nuclear energy is one option available to reduce CO₂ emissions...” (IEA)... this supports the suitability of the NP...

3. ... further progress in closing gaps, keeping the nuclear option open... this involves an “insurance” in case of tight energy scenarios forecast.
New Challenges (6 of 15)

Recommendations

1. To include the nuclear Option in the prospective long-term agenda.

2. Reinforce CCHEN.

3. To promote Energy Education.

4. To promote Research.

5. Studies.
   - Lessons Learned from Fukushima...
   - Nuclear Technologies review...
   - Geological Survey information ...
   - Methodologies and location criteria...
   - Legal Framework...
   - State Role in a NPP...
   - Long Term Energy Planning...
New Challenges (7 of 15)

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New Challenges (8 of 15)

Energy Policy 2050 & CENP Report

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Ene-Sept 2015

Technical Worktables

Building the vision and Roadmap

Energy

Official document
Energy Policy 2050
ABOUT NUCLEAR

“... nuclear energy has not been included as a short-term option, because it requires research on key issues, such as its long-term economic viability in the face of various legal and market conditions, and the legal and institutional amendments required...”
Research focused on CCHEN

“…This research should be directed by the Chilean Nuclear Energy Commission (CCHEN) by drawing on competent national agencies. The next evaluation process of Chile’s long-term Energy Policy will review the appropriateness of incorporating this technology into the electricity generation matrix“… → 2020
New Challenges (11 of 15)

1. Fortalecer la capacidad institucional para abordar la NE

2. Posicionar a CCHEN como referente nacional en NE

3. Aportar al debate nacional a través de actividades de difusión sobre ENP

4. Desarrollar capacidad de asesoría en prospectiva tecnológica y energética

5. To provide expert information to the Energy Policy at 2020

To accomplish the mandate given by the Energy 2050 and its permanent mission.
New Challenges (12 of 15)
### New Challenges (13 of 15)

To provide expert information to the Energy Policy at 2020

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<td>Energy as a Driving Force for development</td>
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<th>Provide Information about NPP.</th>
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<td>Preliminary issues to be considered for an NPP according to the Chilean case.</td>
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New Challenges (14 of 15)

Task until 2020

Energy friendly with the environment

Contribute to the fight against climate change

Potential environmental and healthy people

Normal Operation
Emergencies cases
New Challenges (15 of 15)

Task until 2020

Options to waste management

- Currently and futures technics to waste management or minimisation of generation waste
- Role and Responsibilities on RWM
- Cost and strategies to finance the RWM
- Status of repositories
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