RADIOACTIVE WASTE MANAGEMENT REGULATORY FRAMEWORK IN MEXICO

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Abstract

The purpose of this paper is to present an overview of the current regulatory framework, concerning the radioactive waste management in Mexico. It is intended to show regulatory historical antecedents, the legal responsibilities assigned to institutions involved in the radioactive waste management, the sources of radioactive waste, and the development and preparation of national standards for fulfilling the legal framework for low level radioactive waste. It is at present the most important matter to be resolved.

1. REGULATORY ANTECEDENTS

The radwaste generation data in Mexico start from the 50's, coming from the application of radioactive materials in industry, research and medicine, to a few decades later from the generation of nuclear power. In 1955, The Commission of Nuclear Energy (CNEN) was the first governmental organism with regulatory functions on nuclear aspects. Also, the CNEN assumed all type of responsibilities on research, training, mining and milling of uranium ores, nuclear fuel business and radwaste management. In 1972 the CNEN was substituted by the National Institute of Nuclear Energy (INEN), which established the Radiation Protection Committee whose functions were to inspect and to implement standards, regulations and guides on radiation protection.

With the objective to delineate clear responsibilities, in 1979, the INEN was divided in three institutions:

- Nuclear Research National Institute (ININ). Responsible of development, research, training on nuclear aspects, including storage, handling, transport and treatment of radioactive waste,
- Mexican Uranium (URAMEX). In charge of mining and milling process, including enrichment trade. In 1985, this institution disappeared,
- National Commission of Nuclear Safety and Safeguards (CNSNS). Responsible of Nuclear Safety, Radiation Protection and control of Nuclear Safeguards.

The current law on nuclear matters [1], issued in 1985, regulates in a generic way the mining and milling of uranium ores, the use and application of nuclear and radioactive materials, the development of nuclear technologies, and all matters related with the nuclear industry. Particularly, this Law assigned to Mines and Energy Ministry (at present Energy Ministry (SE)) the responsibility of radioactive waste management, while the regulatory activities related with the radioactive waste management were ratified to CNSNS.

In 1988, CNSNS issued a Radiological Safety Regulation [2] that establishes basic radiation protection rules, dose limits, licensing process for radioactive materials and specifically for radioactive wastes establishes only generic points about their classification and the licensing process for temporal and definitive storage. This regulation does not establish specify technical criteria for the different stages of radioactive waste management such as: criteria for their classification and characteristics for temporal and definitive storage, requirements related with their treatment and conditioning, and requirements for definitive storage facilities of radioactive wastes. In 1994, the

CNSNS began to elaborate national standards that addressing the detail criteria and requirements on radwaste management activities.

2. RESPONSIBILITIES ASSOCIATED WITH THE RADIOACTIVE WASTE MANAGEMENT

The Law on nuclear matters states that CNSNS has responsibilities like the following:

(a) To surveillance and enforce compliance with the established and statutory framework for safety and radiological environment protection;
(b) To review, approve or reject applications and to issue, amend, modify, suspend, cancel licenses or other authorizations for nuclear and radioactive facilities, including radioactive waste management facilities;
(c) To develop and update the rules, criteria and guidelines on nuclear and radiological safety;
(d) To review radiological environmental impacts and safety for nuclear and radioactive facilities;
(e) To implement and inspection programs on nuclear and radiological safety;
(f) To advise and recommend to energy secretariat about the nuclear and radiological safety aspect on the facilities.

As pointed out above, the current Law established that SE is the responsible entity for radwaste management. However SE partially delegated the responsibility to two institutions:

- Federal Commission of Electricity (CFE) — Has the responsibility for management of the radioactive wastes arising from Laguna Verde Nuclear Power Plant, including their disposal. At present, the radwaste are treated, conditioned and temporary stored in the site,
- Nuclear Research National Institute — Has the responsibility for management of radioactive waste arising from small users (medicine, industry and research). At present, the institution performs the recollection, treatment and conditioning, transportation and temporal storage activities.

3. TYPES, SOURCES AND QUANTITIES OF RADIOACTIVE WASTE FROM NUCLEAR FUEL CYCLE

At present, the most important facility in Mexico related with the nuclear fuel cycle is the Laguna Verde Nuclear Power Station (LVNPS), which is operated by CFE and is located in Veracruz. It has two BWR GE reactors with nominal electrical output of about 654 MW(e) for each unit. The type of radwaste generated are Low Level Radioactive Waste (which are treated, conditioned and stored inside the site) and spent fuel which is stored in the reactor´s pools.

The disposable solid radwastes (e.g. contaminated clothing, rags, paper, lab equipment, and supply item, etc.) are compressed into 200 liter drums by an hydraulic compactor. The liquids and slurries (wet solid wastes) and spent filter cartridges are solidified into 200 liter drums, while the spent resins, filter sludges and concentrates are packaged in High Integrity Containers (HIC). These processing activities are carried out inside the plant and later the drums and HIC are stored in onsite facilities. According to operational experience, the average annual generation of radwaste is about 615 drums and 22 HIC´s.

There are the following three temporary storage facilities in the site.

(1) Storage in plant: It is designed to storage a year of radwaste generation coming from both units; the purpose is to reduce the radiation levels by radioactive decay. For this purpose drums and HIC´s are stored there. The inventory is 24 HIC´s and 707 drums.
(2) Wet radwaste temporary storage: The capacity storage is 273 HIC´s and 4100 drums of wet radwaste. The inventory is 157 HIC´s and 890 drums.

(3) Dry radwaste temporal storage: It is designed to store 8290 drums of dry radwaste. The inventory is 4351 drums.

The spent fuel generation is about 92-102 assemblies in each refueling stage, and it is temporarily stored in the reactor's pools which have capacities to store all the fuel generated during the useful life of the plant. To date, the accumulated volume is 875 assemblies (900 tons of uranium).

Taking into account the capacity of the on-site temporary facilities and the generation of low level radioactive wastes, it is projected that within five years the storage will reach its capacity and therefore it is necessary to define the strategy for the radwaste management. In this context, CFE is considering diverse alternatives such as: to analyze new technologies for the radwaste minimization and volume reduction, to construct an additional temporary storage facility in the site, and the possibility to construct, in a short term, a disposal facility.

4. CURRENT REGULATIONS AND POLICY

Considering the primordial need for to construct a final disposal facility for low level radioactive waste, and as pointed out earlier that our regulation does not have specific criteria for regulating the activities related with the radioactive waste management stages, it was necessary to begin establishing national standards and guides to accomplish the legal regulatory framework concerned with the final storage of this type of radioactive waste, with the objective of licensing, controlling and surveillance of these activities. For such purpose, the national standards were created which set forth detailed requirements on:

(a) Criteria for the classification of radioactive waste produced by nuclear industry, establishing requirements on the classification of low level radioactive waste for their final disposal in a near surface facility;
(b) Radwaste management in facilities that using unsealed sources, taking to account measures for minimizing the radwaste generation;
(c) The methods for determining the activity, activity concentration, and identification of the radionuclides contained in a radioactive waste package, for its treatment, conditioning process and disposal;
(d) Requirements that the waste package must comply in order to be accepted in a near surface final disposal facility;
(e) The requirements for the siting, design, construction, operation, closure and institutional control for a near surface disposal facility of low level radioactive waste.

Additionally, the regulatory body is working in the elaboration of additional standards related with the criteria and requirements for clearance, from regulatory control, of radioactive waste and the requirements for radioactive waste treatment and conditioning facilities. With the latest standards, we think that regulatory requirements will be fulfilled for low level radioactive waste management. The program of implementing these standards according to the characteristics of the wastes produced in México and the criteria and the requirements mentioned for above standards are based in the recommendations in the IAEA Safety Series reports [3-8] and the NRC regulations established in 10CFR Part 61 [9].

Also, the CNSNS is participating in the IAEA Coordinated Research Project on "Improvement Safety Assessment Methodologies". The experience and exchange information gained on this matter will be useful to evaluate the safety of the near surface disposal facilities.

The current radwaste policy is undergoing revision to take into account our needs and considering the fundamental principles for the safe management of radioactive waste. The revision, among others, is considering strategies for:

- The environmental surveillance of the Peña Blanca Disposal Facility, where were disposed uranium tails generated during the operation and decontamination of mining and milling facility;
- The environmental surveillance of the Piedrera facility, where have been disposed the contaminated material coming from the 1984 Cd. Juarez accident with a Co-60 source;
- The recovery of the radwaste disposed in trenches of Radioactive Waste Storage Center. At present, this Center temporary storage the radwaste arising from small users;
- The decommissioning of LVNPS and others facilities.

5. CONCLUSIONS

As in other countries, Mexico is facing the problem of the final disposal of radwaste and other aspects related with their management. The current priorities are:

(a) To begin with the site selection process for final disposal of low level radioactive wastes arising from LVNPP, medicine, industry and research applications. It is possible that the 'three barriers design' concept may be used, as that concept has already been used and proved in other countries;
(b) To accomplish the radwaste management policy, in accordance with the IAEA recommendations, for assuring that the radwaste are safely managed, by developing additional laws and regulations and developing the necessary operational experience;
(c) To analyze and implement technologies for volume reduction and to establish programs for minimization of radwaste;
(d) To establish specific regulatory requirements for intermediate and high level radwaste;
(e) To define the final policy related with the spent fuel;
(f) To establish regulatory criteria for decommissioning of nuclear and radiological facilities.

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