

## 1. Nuclear security regime

The overall objective of Chile's nuclear security regime, established by law, is to protect persons, property and the environment from illicit acts involving nuclear energy, materials and facilities; and to ensure compliance with international agreements or conventions on the matter to which Chile is a party.

The objectives in the regulations for the nuclear security for radioactive material, associated facilities and associated activities are:

- Protection against unauthorized removal of radioactive material used in associated facilities and in associated activities;
- Protection against sabotage of other radioactive material, associated facilities and associated activities;
- Ensuring the implementation of rapid and comprehensive measures to locate, recover, as appropriate, radioactive material which is lost, missing or stolen and to re-establish regulatory control.

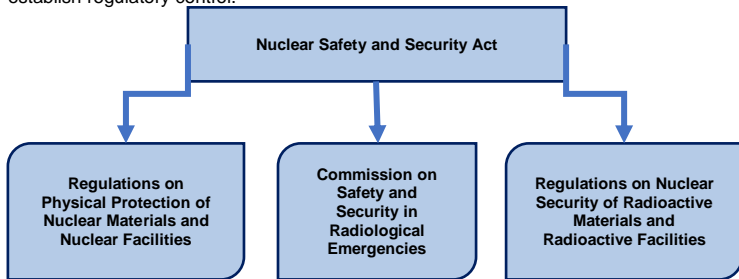


Figure 1. Nuclear Security Act and Regulations [1] [2] [3] [4].

## 2. Nuclear security elements

### 2.1. Integration and coordination

The integration and coordination of the competent authorities in nuclear security is carried out in a Commission on Safety and Security [4]. This Commission is made up of representatives of eighteen national organizations and coordinated by the Ministry of Homeland Security. The objectives of the Commission are to propose measures to strengthen national capacities to jointly face the different stages of an event that puts nuclear security at risk, advise for adequate intersectoral coordination and suggest actions aimed at dissemination of international knowledge and standards on nuclear security.

### 2.2. Measures and plans

Security measures and plans are based on a risk informed graded approach so that similar security is provided for material capable of resulting in similar potential radiological consequences arising from use in a malicious act. The Regulatory body has established a national register of radioactive sources. This register includes Category 1, 2 and 3 radioactive sources as described in Annex 1 to Code of Conduct on the Safety and Security of Radioactive Sources [5].

Operators must implement measures and plans aimed at the prevention, detection and response to incidents related to radioactive materials in radioactive facilities. These measures are classified as:

- (i) Detection Measures: Measures aimed at detecting a possible incident and allowing the cause of the alarm to be detected.
- (ii) Delay Measures: Measures aimed at preventing unauthorized access attempts or unauthorized removal of radioactive materials against these or first category Radioactive Facilities.

## 4. Discussion

In Chile, the physical protection of nuclear facilities and nuclear materials has been regulated since 1985. However, the nuclear security of radioactive materials was established as a requirement, with the publication of the regulation for the physical protection of radioactive materials, in July 2020 [2].

The new regulation establishes requirements for the protection of radioactive materials when the activity of radioactive materials in the radioactive facility exceeds a reference value. Three levels of physical protection are established in accordance with the Code of Conduct on the Safety and Security of Radioactive Sources [3].

The authorized party must carry out a documented safety assessment and a physical protection plan. This plan should include detection, delay and response measures in accordance with the level of physical protection. Annually, the authorized party must evaluate the effectiveness of the physical protection measures, and the result of the evaluation must be communicated to the regulatory authority.

The Chilean Nuclear Energy Commission is the regulatory body for the radiation safety and nuclear security of radioactive materials. During 2021, the regulator has modified its management system procedures to include nuclear security aspects in the review and assessment, and inspection. In addition, checklists have been generated and specific security inspections have been planned.

## References

- [1] Nuclear Safety and Security Act. Law N°18.320.
- [2] Regulations for the physical protection of nuclear facilities and materials. Decree N°87 of 1985, Ministry of Mining, Chile.
- [3] Regulations for the physical protection of radioactive materials in first category radioactive facilities. Decree N°82 of 2020, Ministry of Energy, Chile.
- [4] Commission on Nuclear Safety and Nuclear Security in Radiological Emergencies. Decree N°647 of 2015, Ministry of Homeland Security, Chile.
- [5] Code of conduct on the safety and secure of radioactive sources. International Atomic Energy Agency, Vienna, 2004.
- [6] Safety and security culture in organizations, facilities and activities with radiation sources. Ibero-American Forum of Radiological and Nuclear Regulatory Agencies, 2015.

- (iii) Response Measures: The actions undertaken as a result of the detection of an Incident, with the purpose of avoiding the consequences derived from it.

The physical protection plans must include the written procedures that determine the actions of the personnel and the authorization of the available means, in order to prevent and counteract the Incidents that occur in habitual, extraordinary and emergency situations, in radioactive facilities.

### 2.3. Preparedness and response to nuclear security events

The operator's security plan includes measures to effectively respond to a malicious act consistent with the threat.

In the event of an Incident, the Operator shall:

- (i) Adopt the appropriate Physical Protection Measures in order to provide the safety and protection of people, property and the environment.
- (ii) Immediately notify the Police and the regulatory body of the incident, including all relevant information.
- (iii) Submit to the regulator, within 24 hours of the occurrence of the event, a report on the causes of the incident and its consequences, and the response measures taken.
- (iv) At the request of the regulator, and within 30 days of the occurrence of the incident, present the new detection, delay and response measures it will adopt to detect, prevent and respond to the type of incident that occurred.

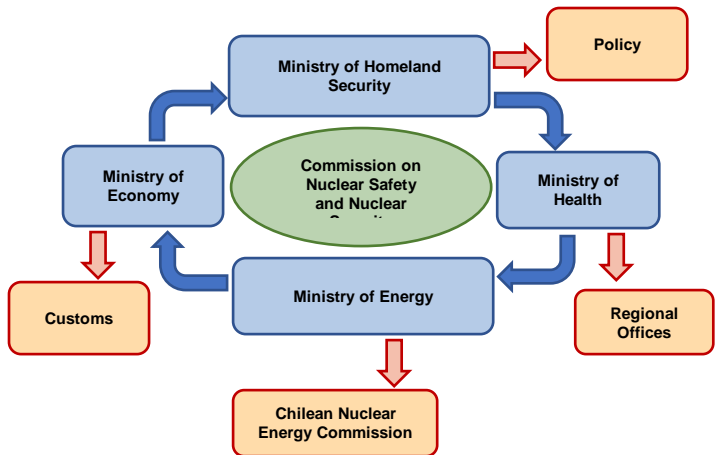


Figure 2. Governmental Agencies in the Nuclear Security System.

Regulatory body coordinates the actions taken to locate and to recover material following notification of lost, missing or theft of radioactive material to a competent authority (e.g., regulatory body or law enforcement agency) according to national regulations.

## 3. Implementation of the new regulations

Three years prior to the implementation of the requirements of the new regulation, the regulatory body initiated a two-stage outreach program.

— First, safety culture promotion workshops were held for all operators with category 1, 2 and 3 sources.

— Second, workshops were held to disseminate and apply the nuclear security requirements for radioactive sources.

In addition, it took one year to update the review and evaluation and inspection procedures.