

Author: Loreto Villanueva-Zamora
Chilean Nuclear Energy Commission
loreto.villanueva@cchen.cl

ABSTRACT: In Chile, interface between safety and security has been experienced in practice due to the creation of a national coordination mechanism for safety and security in radiological emergencies, that meet all agencies with roles and responsibilities in these matters, 18 governmental and 2 autonomous permanently invited members. This coordination mechanism has experienced a synergy in its work, that started from the mutual knowledge of their specific roles, functions and technical capacities, obtaining an increasing understanding of nuclear and radiological safety and security issues, specific to the country. This coordination mechanism is allowed to improve results when faced to solve radiological emergencies and nuclear security events.

1.- Introduction

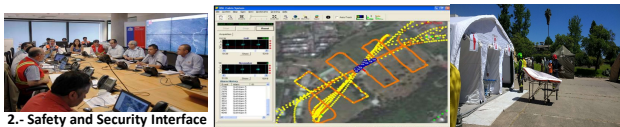
In Chile, the Commission for Safety and Security in Radiological Emergencies, CONSER, was created by Decree No. 647, in December 2015 with the mission to advise and support the Presidency of the Republic, in strengthening the capacity of prevention and reaction of the competent institutions to nuclear or radiological incidents, that may affect public security, safety of people or the environment. Its objectives are:

- Propose measures to strengthen national capacities to jointly face the different stages of an event that puts nuclear or radiological security at risk.
 - Advice for adequate inter-agency coordination.
 - Suggest actions for the dissemination of knowledge and international standards in matters of nuclear and radiological security.
- It is currently chaired by the National Emergency Office, representing the Ministry of Interior and the Ministry of Health, and the 2 radiological regulatory bodies: Chilean Energy Commission, CHEN, and Ministry of Health, Moh, the role of Executive Secretariat. It is integrated by 18 governmental organizations and 2 other autonomous organizations, as permanent invited members.



In general terms, the functioning of the Commission has developed steadily, not being exempt from the difficulties inherent in a coordination mechanism, but important efforts are being made to fully develop the monthly meetings established and execute the planned activities, some of which are briefly delineated in this work. It should be noted that this coordination mechanism was informally generated in 2010, from a table-top-exercise, TTX, for response to a radiological emergency originated in an terrorist act. This TTX was organized by the Chilean Nuclear Energy Commission with the support of the US-DOE.

The CONSER does not have budget for operation, however, through the CCHEN and the Ministry of Foreign Affairs has received support from various international agencies and Cooperation Initiatives, through projects, expert missions, exercises, meetings, training activities, obtaining donations of radiation detection equipment and training in radiological protection and nuclear security, which has allowed a substantial strengthening of the national capacities for response to radiological emergencies. It also draws on the specific budgets assigned to the different CONSER's organizations for the execution of their own activities, some of them related to topics of radiological safety and security, with the focus on emergencies.



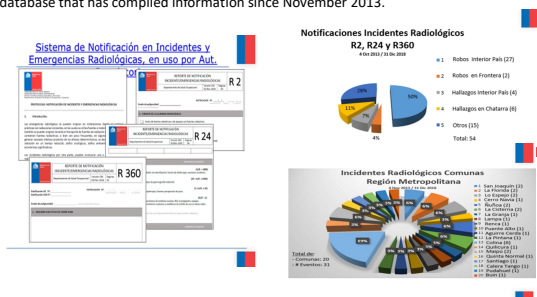
2.- Safety and Security Interface

Since March 2016 to now, CCHEN has accomplished all the activities assigned to its role as a member of Executive Secretariat of the CONSER, which has generated a strong interface at the national level between activities for preparation and response to radiological emergencies with activities for prevention and response to nuclear security events. Some examples of this strong interaction and permanent interfaces are the following:

- As of 2018, the Presidency of the CONSER mandated the Executive Secretariat to act as technical leaders in the priority activity related to "Generation of National Emergency Plan for Radiological Risk Variable". To date, December 2019, work carried out is 80 % complete, and it is expected to have the complete draft finalized by first quarter of 2020. It is expected to get an IAEA Expert mission to review the final draft, under the framework of an on-going TC project.
- Participation of CONSER's organizations in several training activities developed locally in Chile through the NSSC-CHHEN project: The last ones organized during 2018, have been:
 - Regional Workshop for Development of Regional Human Capacities in Nuclear Security, oriented to representatives of Customs, Police, Law Enforcement, and Regulatory Bodies of several countries from the region: Bolivia, Ecuador, Costa Rica, Honduras, Jamaica, México, Paraguay, Perú, Uruguay and Chile as the host. September 2018.
 - Workshop - Mission to update the Integrated Nuclear Security Support Plan, INSSP, agreed with IAEA, with participation of 30 members of 15 CONSER's organization, October 2018.
 - Since its inception, representatives of CONSER's organizations have actively participated in training activities and expert missions related to both fields, Preparedness and Response to Radiological Emergencies and also related to different Nuclear Security topics, that have been carried out through IAEA TC projects and Chile's INSSP activities. Topics covered ranged from First Response to Radiological Emergencies including in-the-field exercises, Public Protection Measures in Radiological Accidents, Transport Security, Systematic Approach to Training for Nuclear Security and quite few others. In most of them, CHHEN as local organizer has identified the same agencies and almost the same participants for both type of activities.
 - Through CONSER's interaction, application of coordinated follow-up and planned response protocols for programmed transport of high-intensity radioactive sources have been carried out, that was facilitated by the mutual knowledge among CONSER's agencies.

3.- Radiological Incidents Analysis

Other regular activity of CONSER is the dissemination and discussion of radiological incidents occurring at the national level, generated from information communicated by the two regulatory agencies and notified at a national level to all CONSER's organizations and also to the National Civil Protection System. This has allowed the generation of valuable information, a database that has compiled information since November 2013.



This official notification is the base to report the nuclear security incidents to IAEA, ITDB. These national radiological incidents database records the number of events, type of event, radioactive source or nuclear material involved, location, etc. This information is beginning to be analyzed in a more systematic way to identify and implement, new national coordination measures aimed at minimizing its occurrence and facilitating the resolution of the incidents. The average occurrence of a radiological incident is about one per month, involving mostly loss or theft of small mobile radioactive sources during transport and findings of orphan sources at the entrance of scrap smelters.

4.- Practical experience and influence of coordination mechanism in response to radiological emergencies and nuclear security incidents

During 2018 and 2019 several nuclear security and radiological safety incidents have occurred, i.e., finding of several small orphan radioactive sources, loss or thefts of different types of radioactive sources, sealed sources like nuclear density meters but also open sources, like radioisotopes for medical uses, and also 2 thefts of dangerous mobile radioactive sources, i.e. gammagraphy devices.

In the resolution of several of these incidents, especially in the incidents involving dangerous sources, coordinated efforts have been performed to solve the radiological emergency originated by the loss of regulatory control of those sources, and for the successful resolution of these situations the coordination among CONSER's organizations has been a key factor, involving mainly Police Forces, Regional Prosecutor, Emergency Office and Regulatory Bodies acting coordinately through confidence and technical competence built by CONSER's regular functioning. In these two last cases, a plan for search and secure those stolen radiological devices was implemented and it was possible, with coordinated efforts to solve the situations in a few hours in one case and in the other, the recovery of stolen device was performed during the third day of Police's activities, which conducted a comprehensive search, through police's intelligence activities and instrumental search supported by a technical radiological team from CCHEN at the field and at the command post, in which several CONSER's organizations supported the search of stolen device, demonstrating an efficient coordination among different organizations.



In a small country like Chile, with a low-medium level of development in nuclear and radiological industry, technical and specialized resources, human and equipment are scarce and positive interaction among different agencies is an asset to solve successfully both type of situations, radiological emergencies from technical origin as well as nuclear security incidents.

During the third quarter of 2019, Chile through several CONSER's agencies, was planning the design and implementation of a comprehensive nuclear security plan for large public events, i.e., APEC and COP-25, and a lot of inter-agency work was developed in order to prepare the full plan, including IAEA expert mission, training of first line officers, loan of detection equipment received from IAEA, development of procedures, that finally due to some internal and unexpected circumstances at the country, were cancelled but an important first-hand experience in this new topic was acquired.

Through the establishment and regular functioning of CONSER, the country has made progress in complying with the recommendations of the International Atomic Energy Agency, IAEA, regarding the establishment of a coordination mechanism among all national organizations involved in the preparation and response to radiological emergencies and nuclear security events.

In summary, it has been possible to combine and coordinate the efforts of at least 18 national organizations that have functions and responsibilities at the national level in the response to radiological emergencies either inside the country as well as at border points, and in the application of response protocols to events that affect public security, such as nuclear security events, generating a strong interface between nuclear and radiological safety with nuclear security, that has allowed maximize results with rather few resources.

5.- Challenges for the the near future and coming years

New challenges and tasks have arisen from the implementation of this coordination mechanism, most of them, good examples of interfaces between safety and security:

- Establish a national HRR training program with its own budget, for responders and officers involved in radiological emergencies and nuclear security events. b) Develop and approve a National Response Plan for Nuclear Security Incidents, planned after finalization and approval of National Radiological Emergency Plan, currently in its final phase. c) Continue the maintenance of technical capacities, through national table top and field exercises for response to radiological emergencies and nuclear security incidents. d) Implementation of Nuclear Security Plans for Large Public events in the coming years. e) Joint exercises, continuing activities in both fields, i.e., implementation of a strong nuclear security architecture and strengthening the practices applied for Radiological Emergency Preparedness and Response.

6.- Conclusions and Acknowledgments

Through the establishment and regular functioning of CONSER, the country has made progress in complying with the recommendations of the International Atomic Energy Agency, IAEA, regarding the establishment of a coordination mechanism among all national organizations involved in the preparation and response to radiological emergencies and nuclear security events.

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