Acquired Experience in the Use of National Radiological Incident Database in Chile Period 2013-2018

Chilean Nuclear Energy Commission

www.cchen.cl

Eugenio Finschi P.

POC-ITDB: eugenio.finschi@cchen.cl

INTRODUCTION

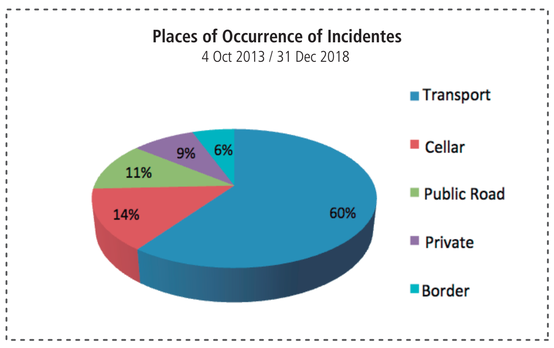
Chile has been one of the first countries to integrate the use of the Incident and Illicit Trafficking Database of the International Atomic Energy Agency, ITDB-IAEA. This poster is a study of the descriptive statistical analysis of the National Database of Notifications of Radiological Incidents in Chile, BADNIR.

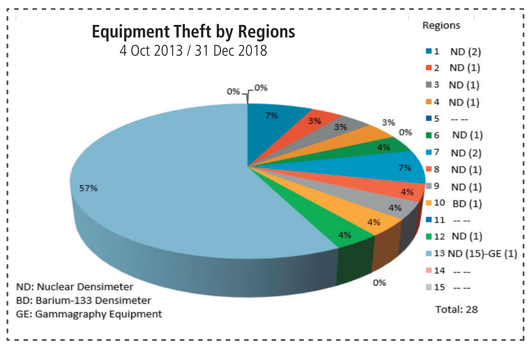
GOALS

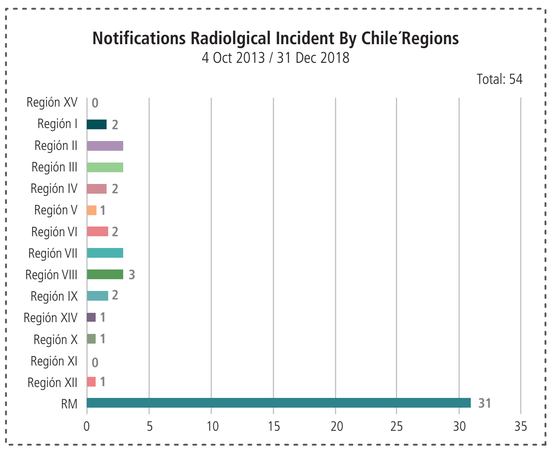
Evaluate the present situation, patterns and trends in the use of BADNIR.

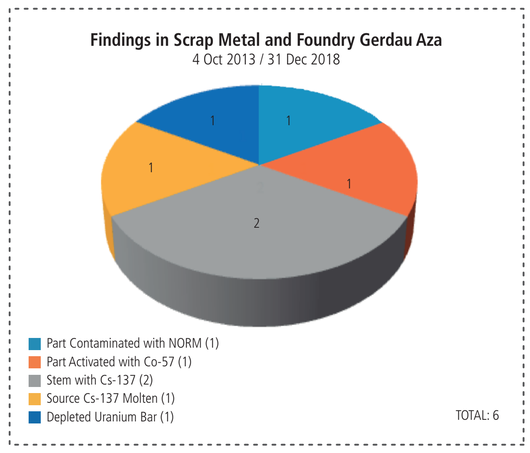
METHOD

The data of the forms of Notification of Radiological Incident R2 and R24 of BADNIR-Chile, between the years 2013-2018, were collected. From the descriptive statistical analysis of BADNIR, based on tables and graphs, it will be possible to visualize the current status of the radiological contingencies, and to make a diagnosis of the radiological events that occur in Chile, indicating, especially, what type of materials are reported, including those that are outside regulatory control and radioactive sources that have not yet recovered.







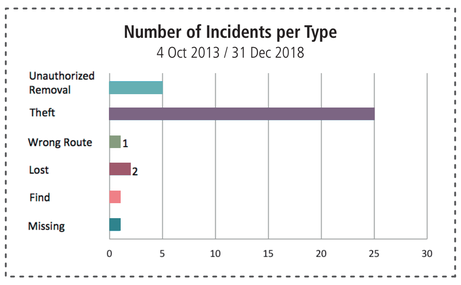


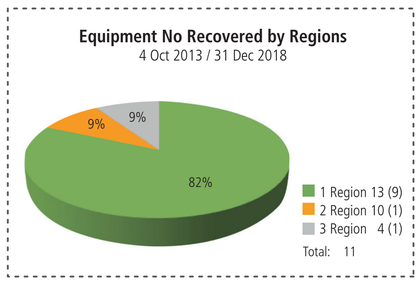
RESULTS

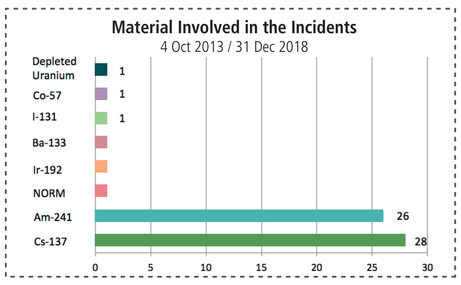
In the period of the last five years, there were 54 notifications of radiological incidents, broken down into 3, 8, 15, 10, 7 and 11 per year, respectively; the records include the incidents by region, city and commune, if it is an interior country or border, place of occurrence, type of incident, material type of scrap and equipment involved. In particular, we have: Nuclear density meters (91%), Ba-133 density meters (3%), gammagraphy equipment (3%), X-ray equipment (3%); equipment not recovered (61%); cases of radioactive material involved: Cs-137 (29), Am241 (Be) (26), Ba-133 (1), I131 (1), Iridium192 (1), Depleted Uranium (1) and Co-57 (1). The largest number of notifications sent to the ITDB-IAEA was the year 2015, with 11 reports, and the year 2018, with 8 reports; most of the thefts of equipment with radioactive sources occurred during transport, representing 86% of the cases, following from the storage warehouse; the findings occur, mainly, in the public thoroughfare, as a consequence of the campaign of diffusion in the press and television about the danger and risk of lost or lost nuclear or radioactive equipment; the majority of robberies occurred in the Metropolitan Region (57%); most of the findings occur in the Metropolitan Region (67%); of the eleven (11) Unrecovered equipment, nine (9) are from the Metropolitan Region, one (1) from the Coquimbo Region and another (1) from the Los Lagos Region; of the equipment not recovered ten (10) were Nuclear Densimeters that contain radioactive sources of Cs-137 and Am-241; the other type of lost densimeter contains a radioactive source of Ba-133; of the equipment not found, 82% corresponds to the Metropolitan region, corresponding 91% of them Nuclear Densimeters. Since some of the radioactive sources remain active in years, thousands of years and millions of years, their recovery is necessary as soon as possible, in order to remain under regulatory control.

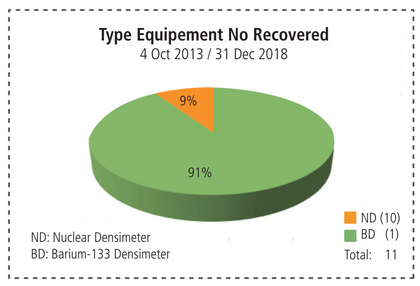
CONCLUSIONS

Ensure the continuity of notifications of radiological incidents, the inspection during transport of equipment with radioactive sources and the judicial investigation to recover the stolen materials, attending to their activity for hundreds, thousands and millions of years, and the institutional coordination between the national authorities competent. Consequently, the prompt recovery of equipment with radioactive sources, as well as the State's control actions, must be strengthened, in order to avoid damage to people, the environment, as a result of possible malicious or malicious use, and to avoid the economic impact that would mean an accident with a radioactive and / or nuclear source, normally of high cost.









EQUIPMENT AND RADIOACTIVE SOURCE NO RECOVERED

NATIONAL RADIOLOGICAL INCIDENTS DATABASE

Created on November 13, 2013 United Nations Classification of Dangerous Goods: "Radioactive Materials" Class of Dangerous Goods: 7

Period 4 Nov 2013 to 31 Dec 2018

	Equipment	Date	Radioactive Source	Commune City Region	National Category Risk	Police Report Number Carabineros o PDI Constancy	Single Role of Cause, Prosecution
1	Nuclear Densimeter, brand Troxler, model 3430, Series 34739, year 2003	23 Dec 2013	Cs-137/0,008Ci Am(Be)241/0,040 Ci	La Florida Santiago Metropolitan	3 Low	Part N° 6142, date 23.12.2013, The 36° th Florida Police Station.	1301255067-1 Florida Prosecutor´s Office
2	Nuclear Densimeter, brand Instrotek, model 3500 Xplorer, series 1571, year 2012	26 Jun 2014	Cs-137/0,010 Ci Am(Be)241/0,040 Ci	San Joaquín Santiago Metropolitan	3 Low	Part N° 2316, date 02.7.2015, PDI San Miguel	
3	Nuclear Densimeter, Branda CPN, model MC-1 DR, series MD 71104023, year 1997	04 Feb 2015	Cs-137/0,010 Ci Am(Be)241/0,050 Ci	Ñuñoa Santiago Metropolitan	3 Low	Part N° 505, date 04.02.2015, The 33° th Ñuñoa Police Station.	1500124887-9 Ñuñoa Prosecutor´s Office
4	Nuclear Densimeter, Brand Troxler, model 3430,series 27755, year 1999	06 Ago 2015	Cs-137/0,010 Ci Am(Be)241/0,050 Ci	Cisterna Santiago Metropolitan	3 Low	Constancy N° 4207 PDI´s Office	
5	Density Detector, Brand Laidos, model Xpose, series XP01800151, year 2014	14 Sep 2015	Ba-133/10 µ Ci	Puyehue Osorno Los Lagos	3 Low	Constancy N° 032, date 15.09.2015, Holding Birdie dependen on the 3rd Osorno Police Station.	1500917060-k Osorno Prosecutor´s Office
6	Nuclear Densimeter, Brand Troxler, model 3430, series 25379, year 1995	25 Sep 2015	Cs-137/0,010 Ci Am(Be)241/0,050 Ci	Lampa Santiago Metropolitan	3 Low	Part N° 2279, date 25.09.2015, The 59° th Lampa Police Station.	1501098589-4 Chacabuco Prosecutor´s Office
7	Nuclear Densimeter, Brand Troxler, model 3430, series 20609	10 Mar 2016	Cs-137/0,008Ci Am(Be)241/0,040 Ci	La Pintana Santiago Metropolitan	3 Low		
8	Nuclear Densimeter, Brand Troxler, model 3430, series 60808, year 2008	03 Mar 2017	Cs-137/0,008Ci Am(Be)241/0,040 Ci	La Cisterna Santiago Metropolitan	3 Low	Part N° 12th Police Station Commune San Miguel	
9	Nuclear Densimeter, Brand Troxler, model 3430, series 60651, year 2008	13 Abr 2017	Cs-137/0,008Ci Am(Be)241 /0,040 Ci	La Serena IV Region	3 Low	Part N° 1069 The 6°th Las Compañías Police Station.	1700366216-0 Prosecution La Serena
10	Nuclear Densimeter. Brand Troxler, model 3430, series 22646, year 1993	10 Jun 2018	Cs-137/0,008Ci Am(Be)241/0,040 Ci	Calera de Tango Santiago Metropolitan	3 Low		
11	Nuclear Densimeter, Brand Troxler, model 3430, series 36161, year 2004	25 Oct 2018	Cs-137/0,008Ci Am(Be)241/0,040 Ci	Quinta Normal Santiago Metropolitan	3 Low		

REGIONS OF CHILE

CHILE / SOUTH AMERICA

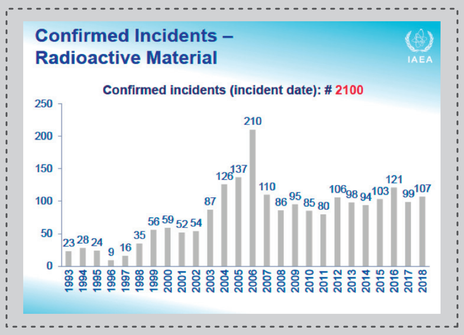
DISCUSSION

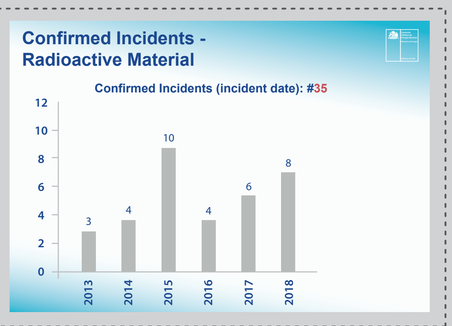
The information contained in the National Database of Radiological Incidents gives an account of the national situation, broken down by regions of the country; its analysis allows the identification of trends and common patterns of the loss of regulatory control of radioactive sources and nuclear material. Consequently, it allows to evaluate the threats and weaknesses of the national nuclear security; keep updated the basic threat of the design of the physical security of a nuclear installation (DBT), and is a great support for the development of the commitments acquired with the implementation of the Resolution 1540 of the United Nations.

The analysis shown in this Poster suggests the construction of tables and graphical types such as those presented by the ITDB-IAEA, in order to produce statistics at the national level, and to compare the situations that have occurred between neighboring countries and worldwide. The need for each state to design a database with common items, according to their needs, is made visible. The items in the Database should contain: correlative number of events, date of the event, place, type of source, sealed or open source, Isotope and its activity, area of the incident, brief summary of the incident; indication of the brand, model, serial number and year of the damaged equipment and its radioactive source, category of the national radioactive source and IAEA; if it was recovered, recovery date, and if the event was informed to the ITDB-IAEA, among others.

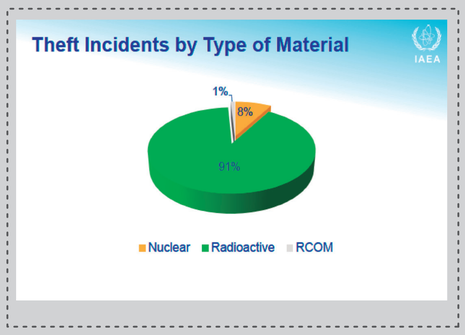
CONSTRUCTION OF TABLES AND GRAPHICAL TYPES SUCH AS THOSE PRESENTED BY THE ITDB-IAEA

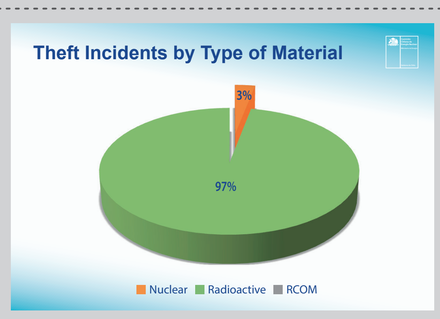
IAEA → CHILE



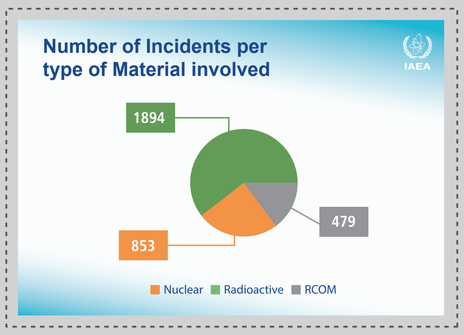


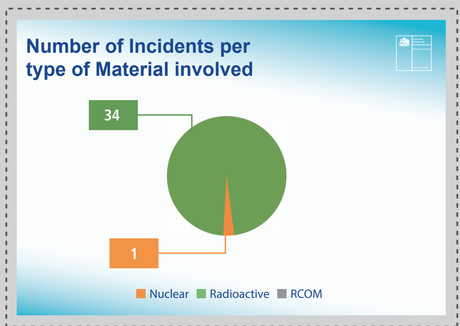
IAEA → CHILE



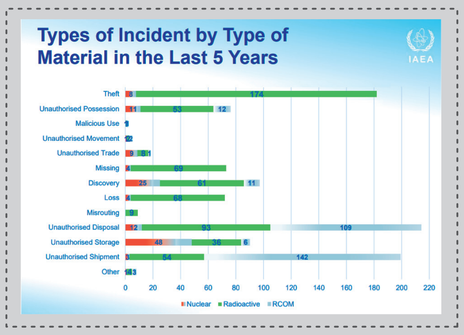


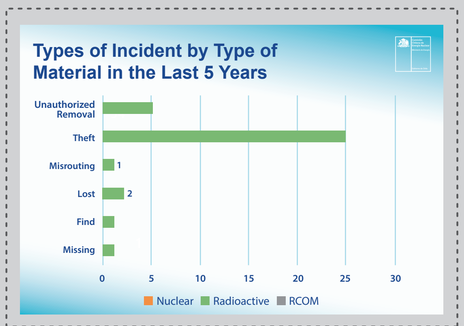
IAEA → CHILE





IAEA → CHILE





Poster Ref. Number: 80 International Conference on Nuclear Security: Sustaining and Strengthening Efforts (ICONS 2020) in Vienna, Austria, from 10 to 14 February 2020.