

The Challenges of Safety and Security of Radioactive Sources in Albania (1960 – 2008)

Luan QAFMOLLA Center of Applied Nuclear
Physics
Tirana - Albania



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CONTENT

1] CANP and RPO performed a study for SRS & (RTG's) situation 1960-2008 period

2] Working group discovered some SRS penetrated by neighbors

3] Results of investigation for SRS and sporadic cases of illicit trafficking of RAM are described

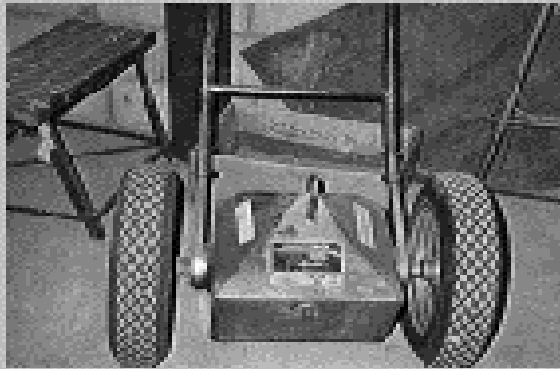
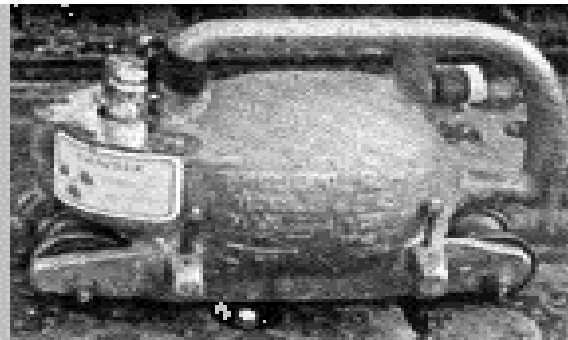
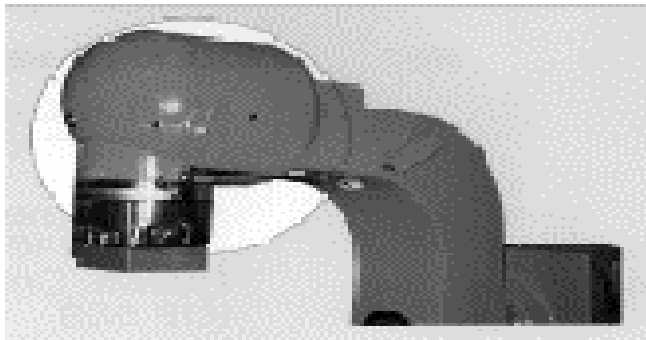
4] Important outputs of the study was the listing and putting in evidence the orphan / lost / found and conditioned SRS in Albania

A} The evaluation of Sealed Radiation Sources (SRS) situation

The use of SRS in Albania has begun in the early '60 years in geological research works and some military divisions. These sources were mainly ^{226}Ra , ^{60}Co and ^{90}Sr . The first teletherapy ^{60}Co source unit, (A=150 TBq), used in Tirana Hospital 1965

After establishment of the (INP now CANP) the use of SRS was expanded in branches of economy, medicine, industry, agriculture and researches. A large number of SRS was imported like: ^{60}Co , ^{137}Cs , ^{90}Sr , ^{192}Ir , ^{241}Am , ^{238}Pu etc.

For the period 1970 -1992 the INP has been in charge for the whole country import-export, transport and inventory of RAM entered in Albania. Based in this responsibility the INP has created the registry and inventory of all RAM for this period



In 1995 Albanian Parliament approved the RP Act (No 8025, date 9.11.1995) and based in this Act was established the (RPC) the national regulatory body for field of licensing and inspection of the activities with radiation sources. A year later was established (RPO) as executive body of the RPC. For the period 1992-2000 in the country was applied a decentralized policy for import-export of RAM.

After that period and especially after the Minister Council Ordinance (No. 56, date 27.02.2000)) for the control of import-export of radioactive materials by the licensed institutions, the RPO has under control the SRS. During the period 1960 up to now, there were observed in many cases the irregularities in the use of radioactive materials, which created the conditions for the lost of the control of SRS.

During the unrest events in 1997, some radioactive sources were stolen from military divisions and for that period the situation is ambiguous and unclear. During the period 1992-2000 some local and foreign companies imported-exported radioactive sources without proper procedures. These radioactive sources entered into the country together with their special equipment.

B} The situation of radiation sources during transition period

During the transition period (1990-2000), when the license and inspection control were not well established, probably some SRS were out of the control of regulatory body, and actually are transformed in lost / orphan sources

In the same period a number of state companies, which have used SRS were closed and therefore the SRS were lost or are in unidentified situation. In some companies the sources may be are stored in safety places, but this fact needs to be verified carefully under the investigation process by CANP and RPO

Regarding the SRS used by military units of Ministry of Defense, after the agreement between the Ministry of Defense and INP (2003), it was confirmed that all spent RS were storage / conditioned in INP

In the framework of study project, CANP/RPO has contacted officially with Ministry of Defense and they confirmed that has not more lost / orphan SRS.

During the control of radioactivity contamination in the metallic scrap at the customs entry/exit points, exported by different Albanian companies, were found SRS, mainly used by army and industrial applications. Recently (2004) three ^{60}Co sources, which belonged to military divisions were found in north of Albania by state police. In entry/exit points of the custom office in Tirana (2006) are found 4 peaces $^{241}\text{Am} / \text{Be}$ ($A= 0.4$ GBq) and 1pc ^{137}Cs , ($A\approx 750$ mBq), used for industrial applications. We evaluate that other radioactive sources, may be, are lost or stolen during the 1997 unrest events (^{60}Co , ^{90}Sr). Another one ^{137}Cs was found by CANP staff, which is not included in inventory list of SRS used for period 1960- 2007. As seems these metallic scrap and sources have penetrated by neighbor countries by illicit traffic.

The database of radioactive materials entered in Albania through legal procedures is located in CANP and a copy of the inventory is hosted in RPO.

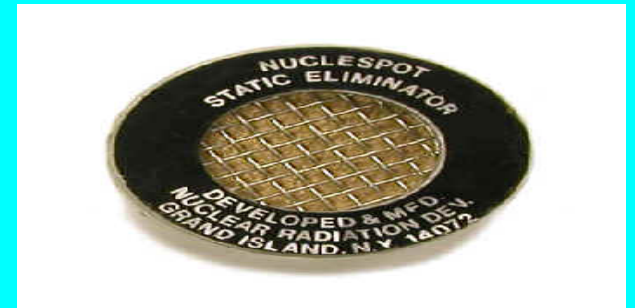
^{60}Co - military source



^{60}Co - big industrial source



$^{241}\text{Am}/\text{Be}$ research source



^{137}Cs - medical source



^{90}Sr - industrial sealed source

Radioactive Thermoelectrically Generators (RTG)



usually ^{90}Sr , $A = 10^4 \text{ Ci}$

The Albanian military divisions have had in use a radioactive thermoelectrically generators (RTG), based at non official information

Material and Method

In the framework of the General Order Agreement⁵ (RTR GOA-A/1) and the Statement of Work (SOW-02), Albanian institutions (CANP and RPO) have undertaken the study of the SRS and RTG' s situation in Albania during the period 1960-2008, supported by USA Department of Energy.

To carry out the task, described in Statement of Work, a special working group was established with experts from CANP, RPO and Geophysical Center. This group has hold some meetings examining carefully the most important documents, related with import - export of radiation sources in Albania.

The working group has performed a voluminous job with documents related with import of RAM and an important output of this study was the listing and to putting in evidence of all orphan / lost SRS in Albania territory studying: invoices, reports, contracts, and registers for radioactive sources in use, storage, conditioned and suspected (Table 1)

Table 1. The situation of radioactive sources in Albania 1960-2008

No	Nuclide	Quantity	Activity	Production Year	Users	Imported	Licensed
1	Ra-226	3	0,5 mCi	1960	GEFier		No
2	Co-60	1	500 mCi	1961	NFFier		No
3	Ra-226	2	0,8 mCi	1961	Hospital		No
78	Am/Be-241	1	1,50GBq	2003	Mapa Constru	Imported	Yes
81	Cs-137	1	20 Ci	2004	INP	Imported	Yes
86	Ir-192	3	150 Ci	2005 /2006 / 2008	OilC / So-Epro	Imported	Yes
95	Co-60	1	8800 Ci	2008	Hospital	Imported	Yes

The Interim Storage Facility (17 x 6 x 3,20 \approx 300m³) for conditioned RW



In ISF are some ten conditioned drums, with $A \geq 400$ TBq and, some others are in processing. RW are placed into drum, until an $A = 20$ GBq has been reached.

Based in the inventory registers in CANP and RPO, conditioned spend RS were verified and the total number of existing SRS used by public or private sectors.

At the same time, based at the documents, were identified the responsible persons, who have in charge SRS at respective facilities, their addresses, in order to contact them during the next steps for localization, identification and recovery.

In fundamental register in INP are recorded all nuclides, the activities and the owner companies; as well the towns and regions, where the SRS are in use or in storage.

The presentation of these data is based in the registers of INP (1960-1992) and RPO (2000-2008), which are recorded in the RAIS program. The present study shows that 16 SRS, used by public/ private sectors are suspected, lost or found (Table 2).

No	Nuclide	Quantity	Activity	Status
1	Ra-226	solution	unknown	lost
2	Co-60	1 pc	100 mCi	suspected
3	Co-60	1 pc	unknown	suspected
4	Am/Be-241	1 pc	2,1 Ci	lost
5	Am/Be-241	4 pc	100 mCi	conditioned
10	Co-60	1 pc	5 mCi	suspected
11	Co-60	1 pc	5,2 mCi	suspected
15	Pu-239	1 pc	30 mCi	lost
16	Cs-137	1 pc	22 mCi	found

Results and Conclusions

Based at the documents studied and at the data of SRS / RAIS programs, shown at the table 1, the investigation situation is under the control: from 95 items of the SRS, 26 items of SRS are conditioned, 43 items SRS are in use/ storage, 10 items are turned back to suppliers, while 16 items are suspected and need to be investigated further

- 1] Our study includes only suspected SRS, based in registers and documents of CANP (1970-1992) / RPO (2000-2008). The situation before 1960 and between 1992 and 2000, actually is unclear and doubtful
- 2] Based at the documents, were identified the responsible persons, who are charged with SRS at respective facilities, their addresses, in order to contact next steps for localization, identification and recovery
- 3] The financial support of this investigation for suspected / lost / found SRS, needs to be ensured by Albanian government, CANP & RPO and from other resources