



**National Agency for Regulation of Nuclear and Radiological Activities
Republic of Moldova**

The use of Innovative Approaches in the Search for and Regaining Control Over Orphan Radioactive Sources in Republic of Moldova

International Conference on the Security of Radioactive Material

**3-7 December 2018,
Vienna, Austria**

**Dr. Ionel Bălan,
Deputy Director**

ionel.balan@anranr.gov.md



Introduction to Moldova

- **Area: 33,850 km²**
- **Population: 3,5 million**
- **Type of Republic -**
Parliamentary Republic
- **Capital – Chișinău**
- **Official Language - Romanian**
- **National Currency –**
Moldovan Leu (1Euro≈19 LEU)



*The Republic of Moldova, a small country in South-Eastern Europe, is bordered on the east by Ukraine and on the West by Romania. The official language of the Republic of Moldova is Romanian. Most of the population can speak both Romanian and Russian. The Republic of Moldova is one of the most densely populated countries in Europe. It has a population of around **3.5 million** people.*



NARNRA FUNCTIONS

As a Regulatory Body, NARNRA has the following functions:

- authorization;
- state control and supervision;
- enforcement;
- State accounting of ionizing radiation sources and nuclear materials;
- development of legal acts and regulations;
- part of the national first response team;
- nuclear forensics activities



Detection and consolidation of orphan radioactive sources





RESPONSE

to radiological and nuclear events

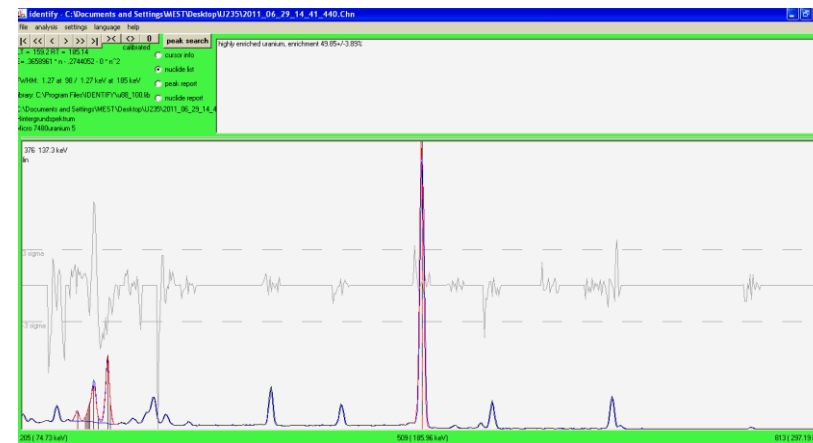
- Up to the present day – **there are no domestic norms or regulations for response to radiological and nuclear events.**
- Procedures for response to FLO (front line officers) are approved and tested by NARNRA
- NARNRA MEST (Mobile Expert Support Team) responds 24/7
- Hot line for communication with domestic FLO (phone +373 22 311136)





Cases of illicit traffic of nuclear materials

With the radiation detection equipment delivered by the IAEA we were able to detect and identify nuclear and radioactive materials seized during sting operations aimed at combating illicit trafficking in the summers of 2010, 2011, winter 2014, 2015 and summer 2016 two cases.

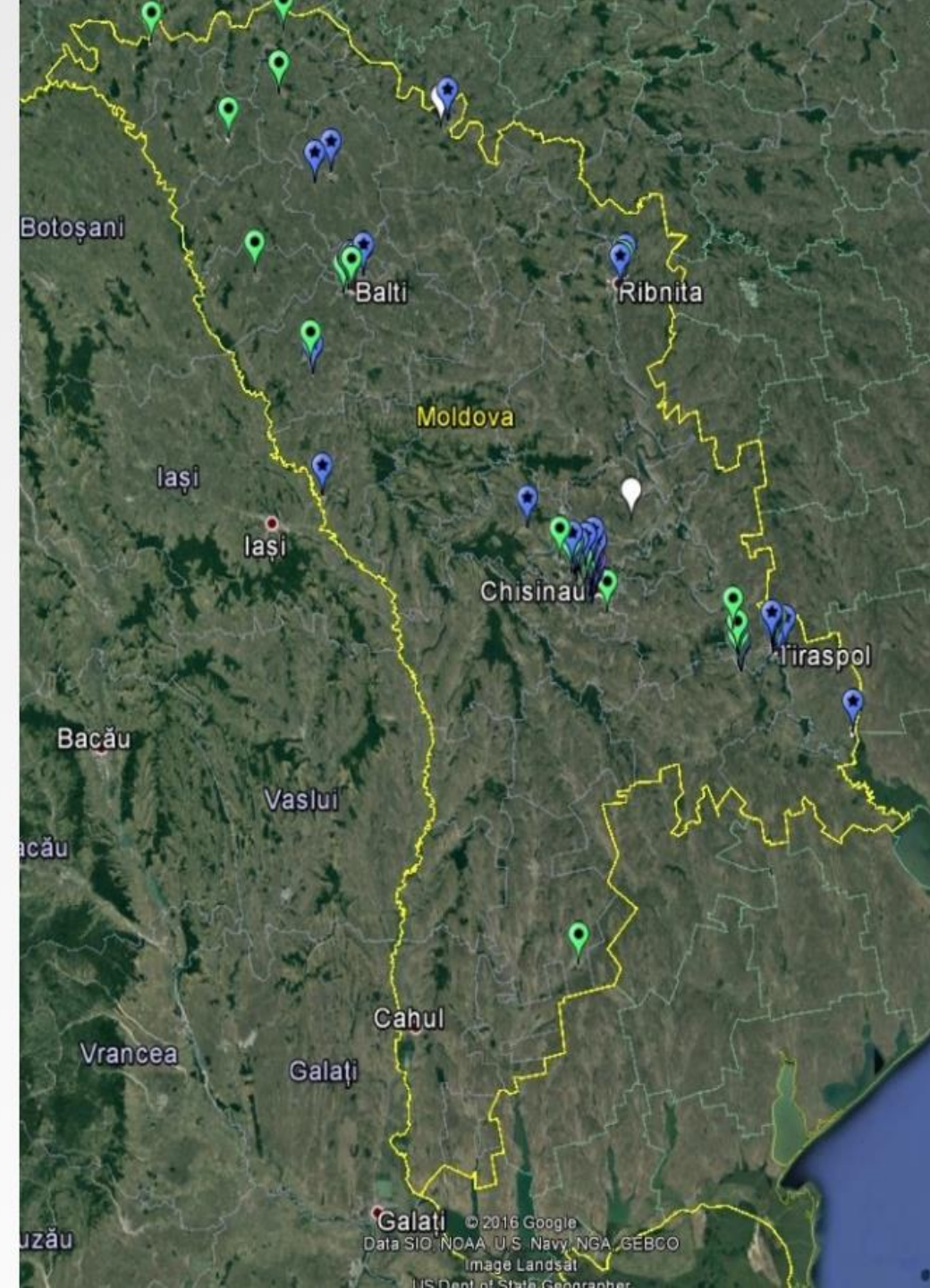




* The Method

- * NARNRA provided CNS a list of 101 facilities
- * CNS collected background information on each facility and built a map showing each facility's location

Through partnership between the James Martin Center for Nonproliferation Studies (CNS) and the National Agency for Regulation of Nuclear and Radiological Activities (NARNRA)





* Database Construction

- * CNS built a database to organize this information, linking employees with employers

ID	Name (Roman) LAST, First	Name (Cyrillic) LAST, First	Social media #1	Last activity	Social Media #2	Notes	Degree
666	BERDAGA, Kharlampy	БЕРДАГА, Харлампий	http://ok.ru/kharla	5/12/2016		Currently lives in Russia.	0.05
140	#3129131 (Superjob)		http://krasnogorsk	3/31/2016			0.12
902	KIORESKO, Valerka	КИОРЕСКО, Валерка	http://ok.ru/kiores	5/21/2016			0.06
810	RUSAK (KABANTSOVA), Zoia	РУСАК (КАБАНЦОВА), Зоя	http://ok.ru/profile	5/23/2016		Currently lives in Russia	0.03
383	KEKHTER, Tatiana	КЕХТЕР, Татьяна	http://ok.ru/profile	5/10/2016		Married to Nicolai PODDUBNII.	0.0
272	KREIMER, Ura (Rubin)		http://ok.ru/uraru	5/9/2016		Currently lives in Ashdod, Israe	0.07
24	#1071820 (Superjob)		http://www.superj	4/21/2016			0.03
131	#7074647 (Superjob)		http://tiraspol.md	12/25/2015			0.05
3	#7860288 (Superjob)		http://www.superj	3/30/2016			0.06
603	LOYANICH, Vitalik	ЛОЯНИЧ, Виталик	http://ok.ru/profile	5/12/2016			0.0
85	GORLOVA-BUDICH, Iraida	ГОРЛОВА-БУДИЧ, Ираида	http://ok.ru/profile	6/11/2013		Currently lives in Ulyanovsk, R	0.06
202	COSARCIUC, Valeriu		https://md.linkedin		https://www.facebc	Former member of Parlaiment	0.03
304	FASTOVA, Lilia	ФАСТОВА, Лилия	http://ok.ru/profile	5/9/2016			0.04
295	PEROV, Dmitri	ПЕРОВ, Дмитрий	https://ok.ru/profil	4/28/2016		Odnoklassniki profile indicate:	0.0
403	BULATOVA, Natalia	БУЛАТОВА, Наталья	http://ok.ru/profile	5/10/2016		Currently lives in Russia.	0.05
938	#2220579 (Superjob)		http://saratov.supe	11/18/2015		Currently lives in Moscow, Rus	0.06

CNS used this list to locate current and former employees of those facilities through data analysis (total of around of 1015 media files);



Approaches

- CNS used the facility list from NARNRA to locate current and former employees through data analysis;
- In parallel with these actions, CNS and NARNRA worked on an interview/survey that was conducted electronically and by direct questioning of workers from potential enterprises which use or store radioactive sources;
- Total number of people interviewed by NARNRA: 47 (December 2018);





First outreach attempt: “Odnoklassniki” social media network

Messages were sent to over 200 people using a NARNRA profile.

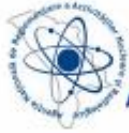
Unfortunately, no one responded to the messages.

Analysis - perhaps people do not trust or they are afraid to disclose former confidential information.

The screenshot shows the Odnoklassniki website interface. At the top, there is a navigation bar with links for Mail.Ru, Почта, Мой Мир, Оdnokлассники, Игры, Знакомства, Новости, Поиск, and Все проекты. Below this is a secondary navigation bar with icons for Сообщения, Обсуждения, Оповещения, Друзья, Гости, События, Музыка, and Видео. The main content area displays the profile of the group 'НАРЯРД (Национальное агенство)'. The profile picture is the NARNRA logo. The description states: 'Страница, Правительственная организация, Кишинёв, Молдова. Национальное агентство по регулированию ядерной и радиологической деятельности (Национальное агентство) является административным органом, учрежденным Министерством охраны окружающей среды со статусом юридического лица. Национальное...'. Below the description are tabs for 'Лента', 'Темы 2', 'Видео', and 'Ещё'. A search bar is visible on the right. The main post is dated '10 марта 2017' and contains the text: '“Бесхозный источник” означает радиоактивный источник, который не находится под регулирующим контролем, потому что он либо никогда не находился под регулирующим контролем, либо был оставлен без присмотра, утерян, помещен в ненадлежащее место, похищен или передан без надлежащего официального разрешения. (Кодекс поведения по обеспечению безопасности и сохранности)'. At the bottom of the post are buttons for 'Комментировать 0', '0', and '0'. The left sidebar shows '3 участника' and buttons for 'Участник', 'Пригласить друзей', 'Пожаловаться', and 'Закладка'.

Second attempt

Questionnaire through Survey Monkey



GUVERNUL REPUBLICII MOLDOVA / MINISTERUL MEDIULUI
**AGENȚIA NAȚIONALĂ DE REGLEMENTARE
A ACTIVITĂȚILOR NUCLEARE ȘI RADIOLOGICE**

Vă mulțumim pentru disponibilitatea Dumneavoastră de a participa la acest sondaj de opinie. Prezentul sondaj își propune să colecteze informația, al cărei scop este asigurarea securității populației. Nici o măsură administrativă sau penală nu vor fi aplicate Dumneavoastră ori altor persoane terțe în baza informației prezentate.

Dacă considerați necesar, puteți să consultați persoane terțe care dețin informația solicitată în chestionar.

Agencia Națională de Reglementare a Activităților Nucleare (ANRANR) are drept obiectiv asigurarea securității populației Republicii Moldova prin stabilirea mecanismelor de identificare a surselor necontabilizate de radiații ionizante, prevăzută în Legea nr.132 din 08.06.2012 privind desfășurarea în siguranță a activităților nucleare și radiologice.

Pentru început, vom defini termenul de material radioactiv și nuclear – acesta este orice material, în orice stare de agregare, generatoare de radiații ionizante. Aceste materiale sunt de cele mai dese ori încapsulate în dispozitive metalice, care se numesc surse de radiații ionizante. Utilizarea greșită a acestor surse poartă efecte negative asupra vieții și sănătății populației, mediului și a securității în general.

În chestionar se va folosi și termenul de „sursă radioactivă necontabilizată” – sursă radioactivă, a cărei utilizare nu este reglementată prin lege din mai multe cauze, fie că nu a fost inițial contabilizată și luată la evidență sau a fost lăsată fără control, pierdută, furată sau transmisă fără o autorizare prealabilă.

Sursele radioactive pot fi de diverse forme și mărimi. Aceste surse pot fi utilizate în multe sectoare de producere și în diverse scopuri. De exemplu, sunt folosite în detectoarele anti-incendiu:



Sursele radioactive și materialul nuclear sunt marcate cu “pericol radioactiv” folosind unul din următoarele simboluri/marcajuri:



• 1. Reținând din cele expuse mai sus, vă rugăm să răspundeți la următoarele întrebări.

Ați operat vreodată cu surse radioactive sau materiale nucleare? Ați beneficiat de instruire privind utilizarea acestora?

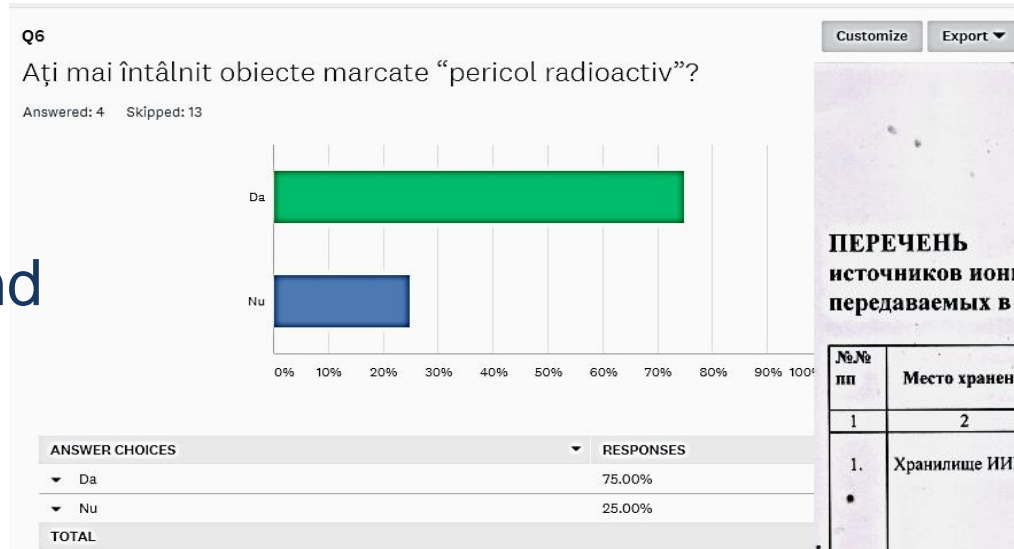
- Da
 Nu

Următorul



Survey Monkey

The results of the survey are used and will be used for planning future on-site inspections



УТВЕРЖДАЮ
Технический директор
О.Л. Кучеренко
" " " 2018 г.

ПЕРЕЧЕНЬ
источников ионизирующих излучений
передаваемых в Специальные Объекты 5101 и 5102

№№ лп	Место хранения ИИИ	Тип источника	Дата выпуска	Изготовитель	Заводской номер
1	2	3	4	5	6
1.	Хранилище ИИИ	Кобальт 60 (Co 60)	05.03.13 г. 27.01.03 г.	BERTHOLD Германия BERTHOLD Германия	№1311-08-12 (S0854), №1307-08-12 (S0855) 246-02-03 248-02-03 Итого: BERTHOLD Co-60 - 4шт.
2.	Хранилище ИИИ	ИГИ-Ц-4 Цезий 137 (Cs 137)	02.84г.	Таллинский ПСЗ	6802(S0859), 6786(S0860), 6792(U0018), 6705(U0019) Итого: ТПСЗ Cs- 137- 4шт.
3.	Хранилище ИИИ	Кобальт 60 (Co 60)	09.84г.	Киевский институт автоматики	2(U0020) Итого: КИА Co-60 - 1шт.
4.	Хранилище ИИИ	SD-112	05.08.01г.	JABLONTRON Чехия	EL-91606, EL-91324, EL-91343, EL-91344, EL 91322 EL 91311



New radiological facilities have been identified - "Topaz" , "Valan" JSC "Moldova Steel Works" and "Effes- Vitanta" SRL.

Since 2016 approximately **634** radioactive sources (mostly category IV and V and 5 sources III category) have been detected or stored.



NARNRA-developed approaches to searching for radioactive sources

Methodology based on open source information stored on the Internet and focused on "target" elements containing radioactive sources such as:

Vehicles (airplanes, trains, ships) with radioactive sources

The most common sources are Sr(Y)-90 sources in the RIO-3 and BIS-1 ice detector systems found in Miliev type "Mi-2", "Mi-8", "Mi-17", and some "Mi-24" helicopters and Antonov type planes "An-24", "An-26", and some Yakovlev "Yak-40" planes.





Methodology

We use related search terms on internet search engines

For example: "sale "Mi-2"", "Mi-17", "Mi-8" or "An-24" and "An-26"





Search results

Молдова сегодня 1 427 объявлений **Топ весёлых объявлений. Часть 14**

[мои объявления](#) · [мои контакты](#) · [избранное](#)



подать объявление

найти в объявлениях

[Главная](#) > [Транспорт](#) > [Воздушный транспорт](#) > [Вертолёт МИ-2](#)

Вертолёт МИ-2 ☆

bereza7777

10 янв. 2018, 22:08

Продам

9 997 (сегодня 9)

[подписаться](#)

[пожаловаться](#)



Civil Aviation Authority of the Republic of Moldova

Civil Aircraft Register

AIRWORTHINESS DEPARTMENT

Nr.	Type of aircraft	Registration marks	Serial No.	Operator
46	Ми-2	ER-20121	543022073	MLE
47	Ми-2	ER-20727	527544032	MLE
48	Ми-2	ER-20739	547636052	MLE
49	Ми-2	ER-20830	548103033	MLE
50	Ми-2	ER-23334	529223055	MLE
51	Ми-2	ER-23237	5210238057	MLE
52	Ми-8 ПС	ER-MGY	10731	AMM
53	Ми-8 ПС	ER-MGJ	10734	AAM
54	Ми-8Т	ER-MGR	98308422	PXA
55	Ми-8МТВ	ER-MGH	93507	VLN
56	Ми-8МТВ-1	ER-MHH	96121	VLN
57	Ми-8МТВ-1	ER-MHZ	96078	VLN
58	Ми-8МТВ-1	ER-MHF	95862	AAM
59	Ми-8МТВ-1	ER-MHG	95861	VLN
60	Ми-8МТВ-1	ER-MHD	95864	AAM
61	Ми-8МТВ-1	ER-MHE	95865	AAM
62	Ми-8МТВ-1	ER-MHK	95863	AAM



Site no. 1 and 2 "Private Aero Parking and Soviet Era Museum" and Entertainment "Curtea moshului" Discovered three Sr(Y)-90 "BIS-1" type radioactive sources and two Ra-226 sources.



MATERIAL RAD

Numărul mostrei _____
Descriere BIS-3
Locație Calaceos
Data 28.06.2018
Colector 1 Tonel Bălan
Colector 2 Natasha Vasileva

INFORMAȚIA DE BAZĂ

Debitul dozei (10 cm) $\mu\text{Sv/h}$ 10 $\mu\text{Sv/h}$
Rata dozei (contact) $\mu\text{Sv/h}$ 18 $\mu\text{Sv/h}$
Test Frotiu imp/sec Nr
Materialul Suspect tipul α β γ _____
Supraveghetor Tonel Bălan
Data 28.06.18
Ora 14⁰⁰



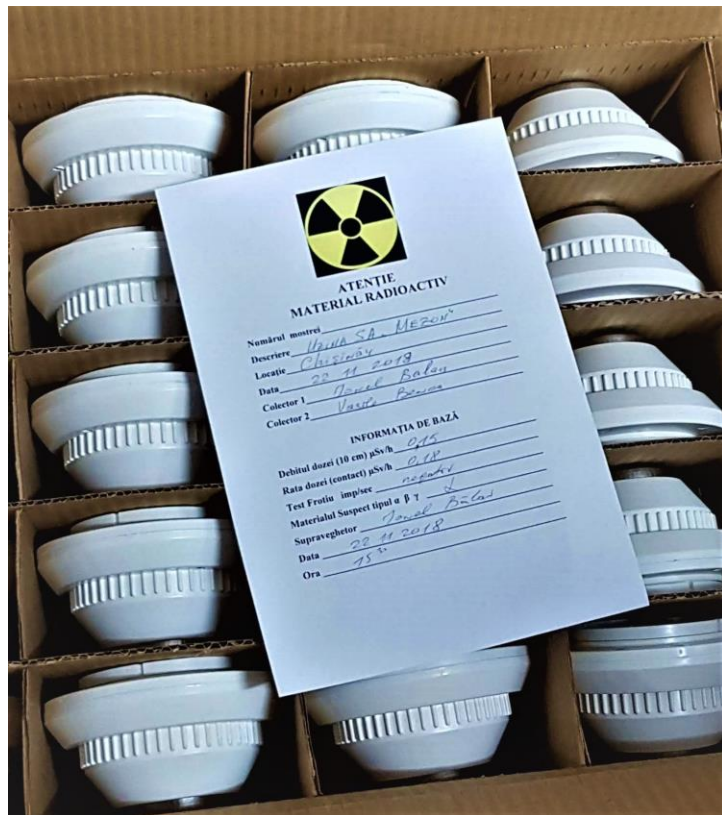
Fig 1, 2 & 3 Helicopters with Sr(Y)-90 "BIS-1" sources



Drone approaches



RECENT "CAPTURES" in 2018



155 RID-6M and 11 Ki-1 (Pu-238 and Pu-238), February 2018;
 4 BIS -1 (Sr(Y)-90) and 2 Ra-226;
 177 - RID6M, November 2018 and 224 sources from "Moldavian Steel Works" december 2018



Conclusion

- New approaches and methodology used by CNS and NARNRA in tracking orphan sources have proved to be useful, effective and sustainable;
- NARNRA was able to customize these approaches to improve its search capacity with minimal resources;
- NARNRA plans to continue using the methodology in its future regulatory activities.



Thank you for your attention!

