

# The Problems Related to “Orphan” Radioactive Sources in Scrap Metal (Georgian Experience)



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# Contest

**Introduction**

**Monitoring at the borders**

**Tasks and problems**



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# Introduction

**Georgia is small country situated on the territory of south Caucasus region and neighbored by some countries having developed nuclear industries. The country has only one great factory proceeding with metals – Rustavi Metallurgical Plant having special unit for radiation protection, but due to some economical problems the plant can not start proper operation still.**

**Georgia had problems connected to s.c. “orphan” radioactive sources. There were found 283 such type sources in Georgia which increase likelihood of illicit trafficking of such materials within scrap metal**



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# Introduction (Cont'd)



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## Introduction (Cont'd)

**Notable cases for “orphan” radioactive sources refer to thermoelectric generators (RTG) based on  $^{90}\text{Sr}$ . Initial activity each of them was 35 000Ci. There were found and recovered six such sources. Especial attention can be paid to  $^{137}\text{Cs}$  radioactive sources used by troops for calibration purposes. There were found a number of these sources and fixed the attempt to transfer illegally the source out of Georgian borders.**



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# Introduction (Cont'd)



**Thermoelectric generators found in Tsalendjikha district**



**Typical container with  $^{137}\text{Cs}$  source found on former military base**



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## Introduction (Cont'd)

**Code of Conducts: “Every state should encourage bodies and persons likely to encounter orphan sources during the course of their operations (such as scrap metal recyclers and customs posts) to implement appropriate monitoring programmes to detect such sources. “**



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# Monitoring at the borders

**Scrap monitoring should be conducted at:**

**metal proceeding places**

**scrap collection places (scrapyard)**

**the country borders**

**At the collection places monitoring conducted by specialists of NRSS and special expertise bureau**

**Special attention is paid for scrap monitoring at the country borders**



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# Monitoring at the borders

**Establish of radiation checking portal monitors at Georgian border check points;**

**Equip Georgian border guards and customers with handle detectors and spectrometers to find, locate and identify radioactive sources;**

**Train border guards and customers to operate radiation detection system;**

**Establish special framework for to quick response on every emergency situation on borders.**



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# Monitoring at the borders (Cont'd)



View of portal monitor and obtained data

# Monitoring at the borders (Cont'd)

The portal monitors give the possibility to fix:

- **Gamma alarm**
- **Neutron alarm**
- **Any attempting to open detectors' boxes, Video camera failure and others**

**Sensitivity to gamma radiation:**

**At mean indication  $0.2\mu\text{Sv/h}$  an alarm should be triggered when the dose rate is increased by  $0.1\mu\text{Sv/h}$  (IAEA TECDOC-1312)**



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**Gamma (neutron) profile fixes the source location and radiation level**

## Monitoring at the borders (Cont'd)

To fix the source location and its identification the following criteria are used:

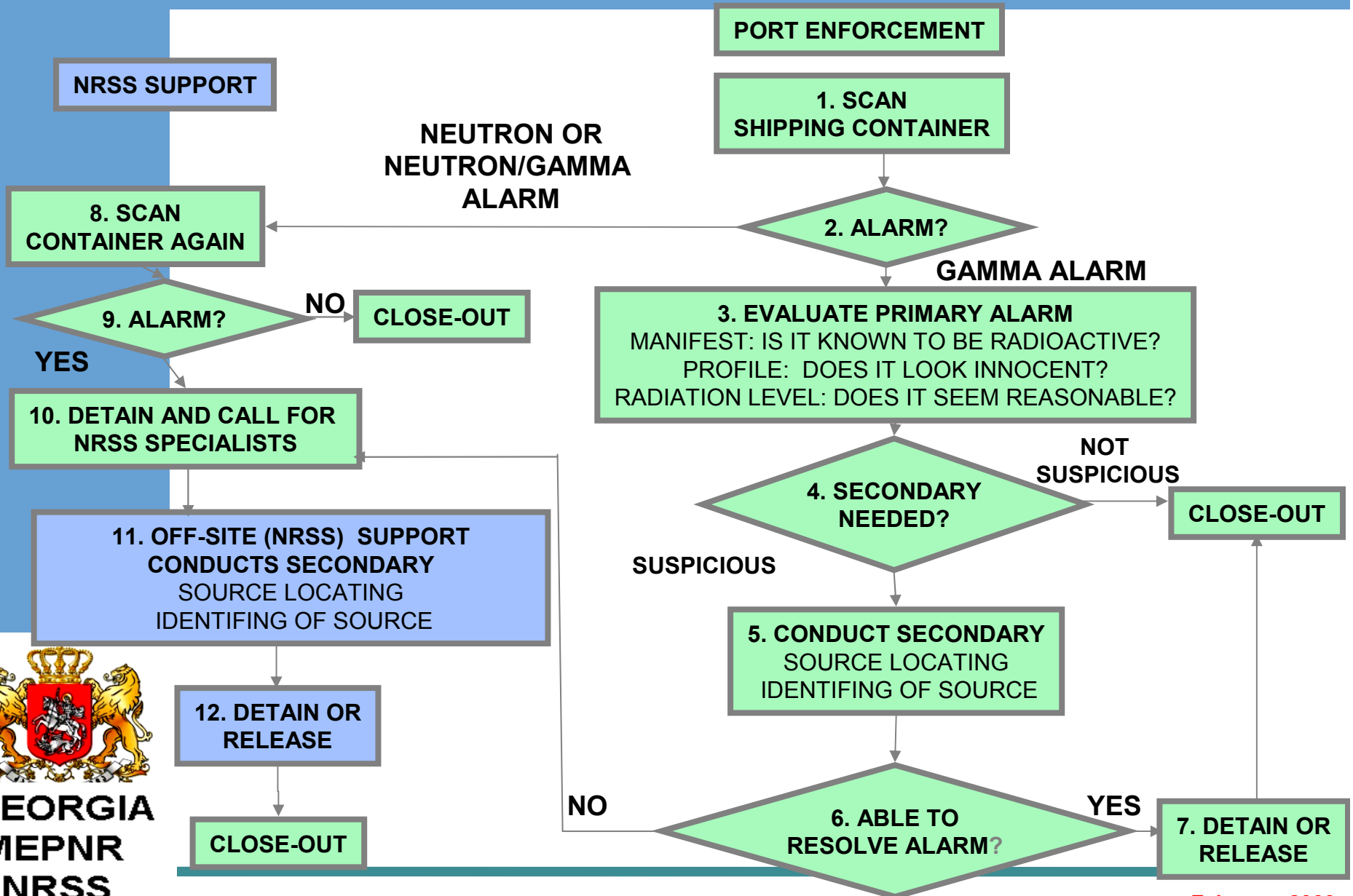
- Homogeneity of radiation level over the truck
- Type (neutron or gamma) and level of radiation
- Nuclide identification and its compliance with goods characterization.

To conduct activity according the criteria, every check points are equipped by “radiation pagers”, TSA dosimeters, fieldSpec spectrometers with neutron detectors.



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# Monitoring at the borders (Cont'd)



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## Monitoring at the borders (Cont'd)

Conducting the activities described by the chart, two cases of detect and detain orphan sources in metal scrap were fixed:

1. "Red Bridge"

Pu-Be well logging source.

2. Batumi sea port

Front sights for machine guns (contain  $^{226}\text{Ra}$  sources)



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# Monitoring at the borders (Cont'd)



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“Control and management of inadvertent radioactive material in scrap metal”-Tarragona, Spain, 23-27 February 2009

# Monitoring at the borders (Cont'd)



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# Tasks and Problems

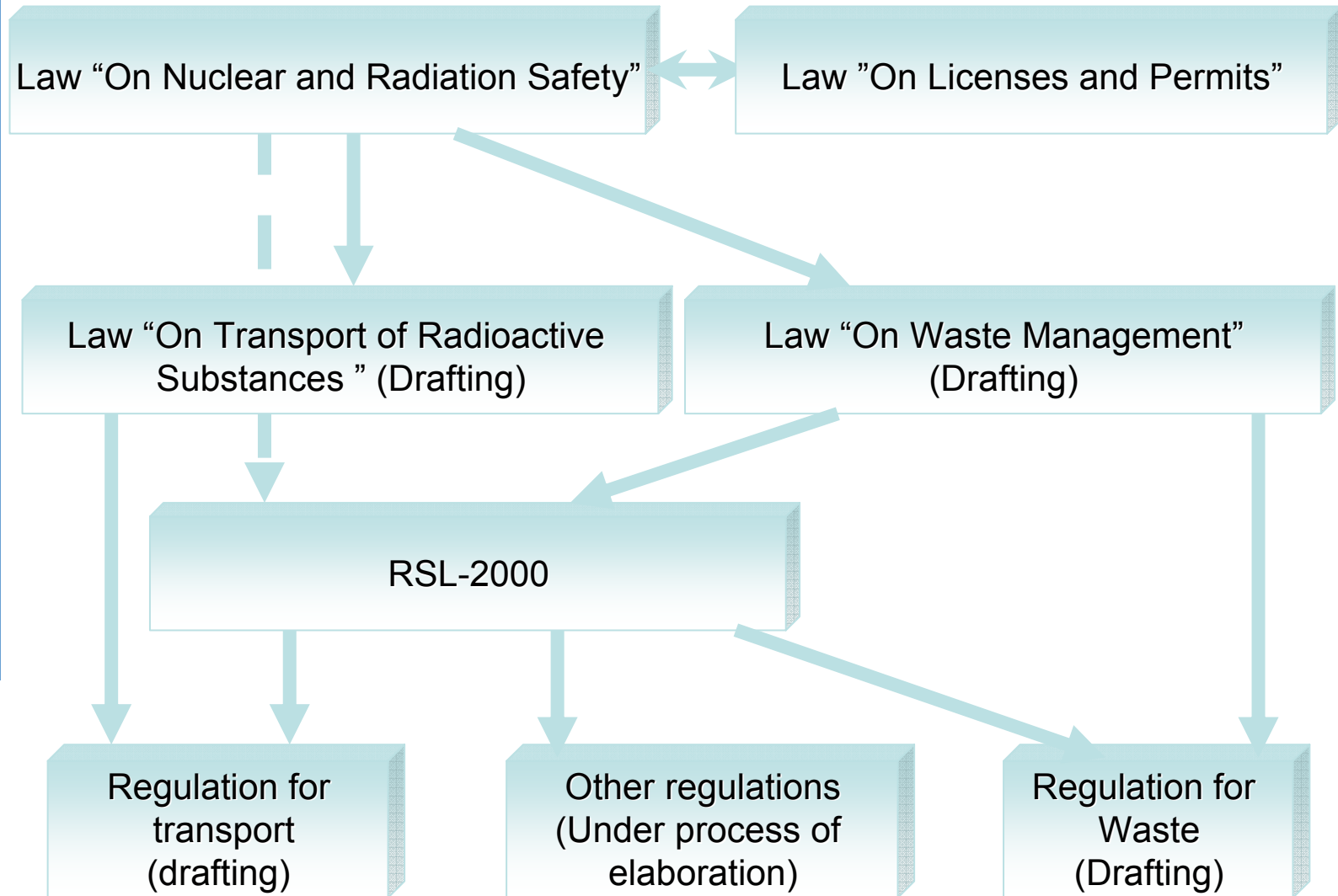
- **Legislative basement**
- **Trainings of personnel**
- **Equipment installation and its maintenance**
- **Source allocation**
- **Information transfer**
- **Response capability**
- **Cooperation of different agencies as on local, as on international level**



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# Tasks and Problems

## Legislative basement



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# Tasks and Problems

## Legislative basement

- **New version of frame law “On Nuclear and Radiation Safety” is elaborated.**
- **“ConOp” should be officially adopted.**
- **National Regulations for transport of radioactive goods and radioactive waste management should be issued.**
- **The concept of clearance level should be established.**
- **National Emergency Plan (Function 11)**
- **Bilateral agreements with neighboring countries should be issued for case fixing of orphan source at common borders**



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# Tasks and Problems

## Trainings

**Trainings of personnel operating the equipment should be continued as at special training center, as at job stations.**

**Adoption training materials to national legislative requirements and local situation should be continued.**

**Sharing experiences and skills between personnel should be enhanced**

**Establishment of inspection programmes**



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# Tasks and Problems

## Equipment installation and its maintenance

**All stationary equipment should be installed at the places with invariable background. All measures should be taken to remove other potential sources of radiation making operation of portal monitors not effective**

**Maintenance and calibration of the equipment.**



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# Tasks and Problems

## Source allocation

**On the territory of every check points should be assigned place where found orphan sources can be kept on the temporary base safely and securely until the transfer.**

**On the territory of every check point should be assigned place where car investigation can be conducted.**

**Sources found at Georgian territory should be sent to the storage. (Problem: conditioning)**



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# Tasks and Problems

## Information transfer

**Special communication system like intranet among check points and response expert group should be established.**

**The system should work within 24 hours per day allowing quick transfer of information: characterization of deterred goods, radiological data, gamma spectra and others**



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# Tasks and Problems

## Response capability

**NRSS should have more experienced staff (offices in the regions, especially in western Georgia) and technical support (appropriate dosimeters, transport means) quickly response on any radiation alarm on the borders.**



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# Tasks and Problems

## Cooperation of different agencies

**Cooperation among NRSS, MoIA and other national organizations should be based on corresponded legislative basement.**

**Strict international collaboration should be established to avoid overlapping or gaps at international activity level.**



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# Conclusion

**Existed situation in Georgia sets requirements to pay great attention to monitor scrap metal especially for possible orphan radioactive source. International collaboration is important for the country to solve this problem.**



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