



INTERNATIONAL WORKSHOP ON SUSTAINABLE MANAGEMENT OF DISUSED SEALD RADIOACTIVE SOURCE

Lisbon, Portugal

11-15 October 2010

**STATE OFFICE FOR RADIOLOGICAL AND
NUCLEAR SAFETY**

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NATIONAL INVENTORY OF WASTE GENERATORS

Users

MEDICINE	678
INDUSTRIAL	126
VETERINE	35
SCIENCE	16
OTHER	34

(Excl. lighting-rods)



LEGISLATIVE FRAMEWORK

up to 2010.

**STATE OFFICE FOR NUCLEAR
SAFETY (SONS)**

**STATE OFFICE FOR RADIATION
PROTECTION (SORP)**

after 2010.

**STATE OFFICE FOR RADIATION
PROTECTION AND NUCLEAR
SAFETY (SORPNS)**



LEGISLATIVE FRAMEWORK

Act on radiological and nuclear safety (NN 28/10)

Replaced:

Act on ionising radiation protection and safety of ionising radiation sources" (O.G. 64/06)

And

Act on nuclear Safety (O.G. 173/2003)

Second level legislation is in force until new documents are promulgated according to 2010. Act.



LEGISLATIVE FRAMEWORK

In line with:

- **IAEA BSS**
- **Council Directive 2009/71/EURATOM**
(Establishing a Community framework for the nuclear safety of nuclear installation),
- **Council Directive 96/29/EURATOM**
(laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation);
- **Council Directive 2006/117/EURATOM**
(Supervision and control of shipments of radioactive waste and spent fuel)
- **Council Directive 97/43/EURATOM**
(Health protection of individuals against the dangers of ionizing radiation in relation to medical exposure),
- **Directive 89/618/EURATOM**
(Informing the general public in the event of a radiological emergency)
- **Council Directive 2003/122/EURATOM**
(Control of high-activity sealed radioactive sources and orphan sources)

LEGISLATIVE FRAMEWORK FOR RADIOACTIVE WASTE MANGEMENT

Act on radiological and nuclear safety (NN 28/10)

Prescribes:

State Company for RadWaste Management

Authorised for :

Collecting, dismantling, transport, conditioning and storing for disposal, and disposal of RadWaste including DSRS, and spent fuel.

Drafts:

National strategy for spent fuel and RadWaste mangement, which the Government accepts.

Program for implementation of the Strategy, SORNS aproves.



LEGISLATIVE FRAMEWORK FOR RADIOACTIVE WASTE MANGEMENT

State Company for RadWaste Management

- *financing* :
 - RadWaste generators fee
 - State budget in the case of orphan's
 - Governmental Subvention



LEGISLATIVE FRAMEWORK FOR RADIOACTIVE WASTE MANGEMENT

Second level legislation:

- Regulation on conditions and method of disposal of radioactive waste, spent sealed radioactive sources and ionising radiation sources which are not intended for further use (O.G. 44/08),

Prescribes:

- *DSRS offered to another user, reurn to manufacturer, final solution - stored at CNSF - IRB*
- National strategy for Spent Fuel and Radioactive Waste Management (O.G. 44/08)
 - *includes disposal of DSRS and other RadWaste in “Krško” repository*



HISTORY OF RADIATION PROTECTION IN CROATIA AND THE REGION

Croatia has a long history of regulatory control and usage of radioactive materials in the country.

First procedure for usage of X-ray machines dates from year 1917.

Existing records in medical, industrial and research fields dates from 1940's,...

In the year 1947., first Ordinance on radiation protection for the use of X-ray machines and radioactive materials, was promulgated with jurisdiction on the territory of former Yugoslav Republics.



PRESENT SITUATION - RADIOACTIVE WASTE MANGEMENT

Two storage facilities for institutional waste:

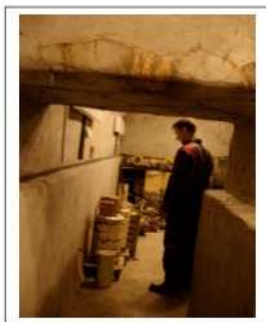
Institute for Medical Research and Occupational Health (IMI)

Institute Rudjer Boskovic (IRB)

PAST SITUATION - RADIOACTIVE WASTE MANGEMENT IMI

IAEA/EU Joint Action, remediation activity in 2007.

Closed interim storage of disused radioactive sources at the Institute for Medical Research and Occupational Health (IMI) had been used for 40 years until 2000.



PRESENT SITUATION RADIOACTIVE WASTE MANGEMENT IMI

Over 600 sealed sources conditioned

- Eu-152, Cs-137, Co-60, Sr-90, Ir-192, Am-241, ...
- 4 × 50l barrels of contaminated objects
- few 1000s of smoke detectors
- complete source inventory obtained

⊕ Principal Radionuclides found in IMI closed repository

Radionuclide	Number of sources	Total activity (GBq)	Application
^{152,154} Eu	118	289.4	- Lighting rods
⁶⁰ Co	211	407.4	- Lightning rods - Ind. radiography - Level gauges - Medical appl.
¹³⁷ Cs	N/A	173.8	- Level gauges - Ind. radiography - Medical appl.
²²⁶ Ra	N/A	580.3	- Medical appl. - Smoke detec. - Calibration

Other radionuclides found: ¹⁹²Ir, ⁵⁵Fe, ⁸⁵Kr, ⁹⁰Sr, ¹⁴⁷Pm, ²⁴¹Am, ²²⁶Ra-Be, ²⁴¹Am-Be.
 4 × 50l plastic containers of contaminated objects – mainly solution from research activities.
 Total of more than 600 sealed sources were conditioned during remediation action.

Table 1: Radionuclides found during remediation action in closed repository at IMI.





INSTITUTE FOR MEDICAL RESEARCH AND MEDICAL HEALTH LICENSING STATUS

Storage facility on IMI is closed and it is not to be used any more.

PRESENT SITUATION - RADIOACTIVE WASTE MANGEMENT IRB

IRB repository comprises of two areas of cca. 43m³ and cca. 53m³, with the first licence given in 1967.

It accommodates various contaminated objects such as filters, gloves, robes, etc. mainly aggregated over time from research activities and source production that took place some twenty years ago with cyclotron, and national institutional waste.



PRESENT SITUATION - RADIOACTIVE WASTE MANGEMENT IRB

IRB storage facility is only operational waste storage facility in the country.

Security measures of the repository were upgraded through EU-IAEA project 2 of the agreement “Strengthening of Security of Radioactive Materials in Non-Nuclear Applications”.

Apart from smoke detectors, SS are mostly in original containers.

⊕ Principal Radionuclides in IRB repository

Radionuclide	Number of sources	Total activity (GBq)	Application
$^{152,154}\text{Eu}$	124	3246	- Lighting rods
^{60}Co	92	54.2	- Lightning rods - Ind. radiography - Level gauges - Medical appl.
^{137}Cs	77	197.6	- Level gauges - Ind. radiography - Medical appl.
^{226}Ra	299	47.2	- Medical appl. - Smoke detec. - Calibration

Other radionuclides in IRB repository: ^{192}Ir , ^{55}Fe , ^{85}Kr , ^{90}Sr , ^{241}Am , ^{109}Cd , ^{204}Tl , ^3H , ^{14}C .

Table 2: Representative radionuclides for the IRB source inventory. Not decay corrected.



INSTITUTE RUĐER BOŠKOVIĆ LICENSING STATUS

Repository is licensed for collecting, keeping and final accommodation of LL and IL solid and liquid radioactive waste.

According to Governmental decree from December 2009., IRB location will content National RW Storage Facility,

– present storage upgrades are in progress



INSTITUTE RUĐER BOŠKOVIĆ UPGRADING ACTIVITIES

IAEA

CRO3/002 Establishing a National Radioactive Waste Storage and Processing Facility

Report 1 : **Formulation of activities** to be completed for upgrades
- done

Report 2 : **Formulation of safety report with these activities**
- in progress

Report 3 : **Formulation of a report leading to a justification for NOT** needing and environmental assessment report
- in progress



INSTITUTE RUĐER BOŠKOVIĆ UPGRADING ACTIVITIES

EU

IPA 2010 Improvement of Conditions of the Radioactive Waste Storage at Ruder Boskovic Institute

- performance of required remediation activities / repackaging and facility building up-grades, including security measures, as necessary

Outcome:

IRB prepared as National Radioactive Waste Storage Facility according to best international practice, for licensing



INSTITUTE RUĐER BOŠKOVIĆ FUTURE ACTIVITIES

Licensing will be done through new IAEA TC project:

CRO2010001 Renewal of Licence for the Central National
Radioactive Waste Storage Facility



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JOINT CONVENTION CODE OF CONDUCT SYNERGIES

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
(ref. IAEA: INFCIRC/546) (O.G. 03/99)

National Reports in 2003, 2006 and 2009

The Code of Conduct on the Safety and Security of Radioactive Sources (ref. IAEA: INFCIR/663)

State	Code of Conduct	Supplementary Guidance on the Import and Export of Radioactive Sources		
	Notification pursuant to GC(47)/RES/7.B ¹	Notification pursuant to GC(48)/RES/10.D ²	Contact Point Designated ³	Response to S.A.Q. ⁴
19. Canada	X	X	X	X
20. Chad	X	X	X	
21. Chile	X		X	
22. China	X	X	X	
23. Colombia	X	X		
24. Costa Rica	X	X	X	X
25. Croatia	X	X	X	X
26. Czechia	X			



JOINT CONVENTION CODE OF CONDUCT SYNERGIES WESTERN BALKANS COOPERATION

In 2007 Croatia initiated regional cooperation between Western Balkan countries in order to strengthen control of consignments of radioactive materials (legal and illegal) in transport/transit over Croatian and Western Balkans territory.

Cooperation is based on a good understanding and knowledge of regional political situation, and situation in national radiation protection fields.

The cooperation provides a platform for harmonising procedures among countries and knowledge exchange.

Two meetings were held, in Zagreb(2007.) and Belgrade (2008.) respectively.

Participating countries are: Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia Slovenia



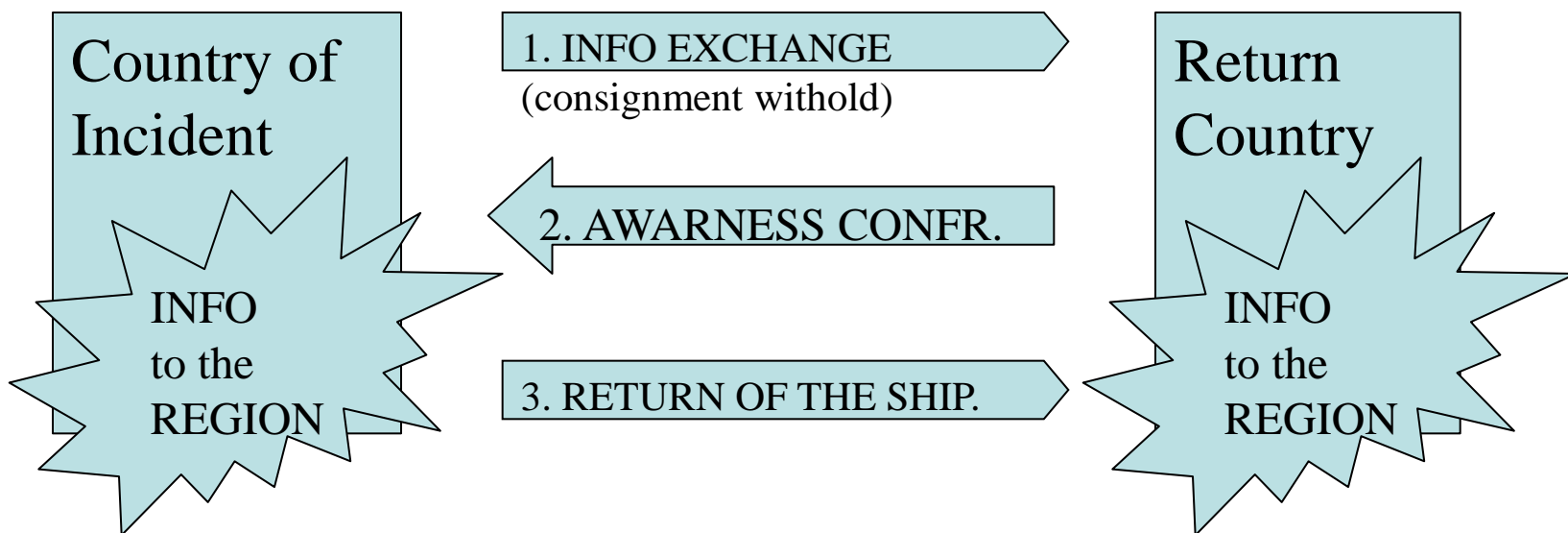
JOINT CONVENTION CODE OF CONDUCT SYNERGIES WESTERN BALKANS COOPERATION

- Main outcome of the first meeting was that countries agreed on:
 1. How to inform each other of the transport incidencies
 2. Return shipments will be held until confirmation of the return country is aware of the return shipment.
 3. In the case of transit, participating countries agrees on allowing transit according to provided information from the participating countries.
- Countries participated in the meeting with high ranked officials coming from the regulatory bodies in the field of radiation protection, customs and police.
- Participating countries intend to sign sort of a memorandum of cooperation through their national Ministries of foreign affairs.



JOINT CONVENTION CODE OF CONDUCT SYNERGIES WESTERN BALKANS COOPERATION

It is a pleasure to say that information exchange between contact points exchanged on the first meeting never ceased to function.





JOINT CONVENTION CODE OF CONDUCT SYNERGIES WESTERN BALKANS COOPERATION

In the mean time:

- Croatia, Montenegro, Serbia and B&H promulgated new Act's
- Montenegro and Serbia established RB (nominated Directors)
- Macedonia had a change in a directorate position in the regulatory body.
- Croatia established one RB for the fields of radiation protection and nuclear safety

Afore stated changes significantly improved preconditions for efficient cooperation among countries.

Based on these facts, Croatia initiated holding of the third meeting in B&H.



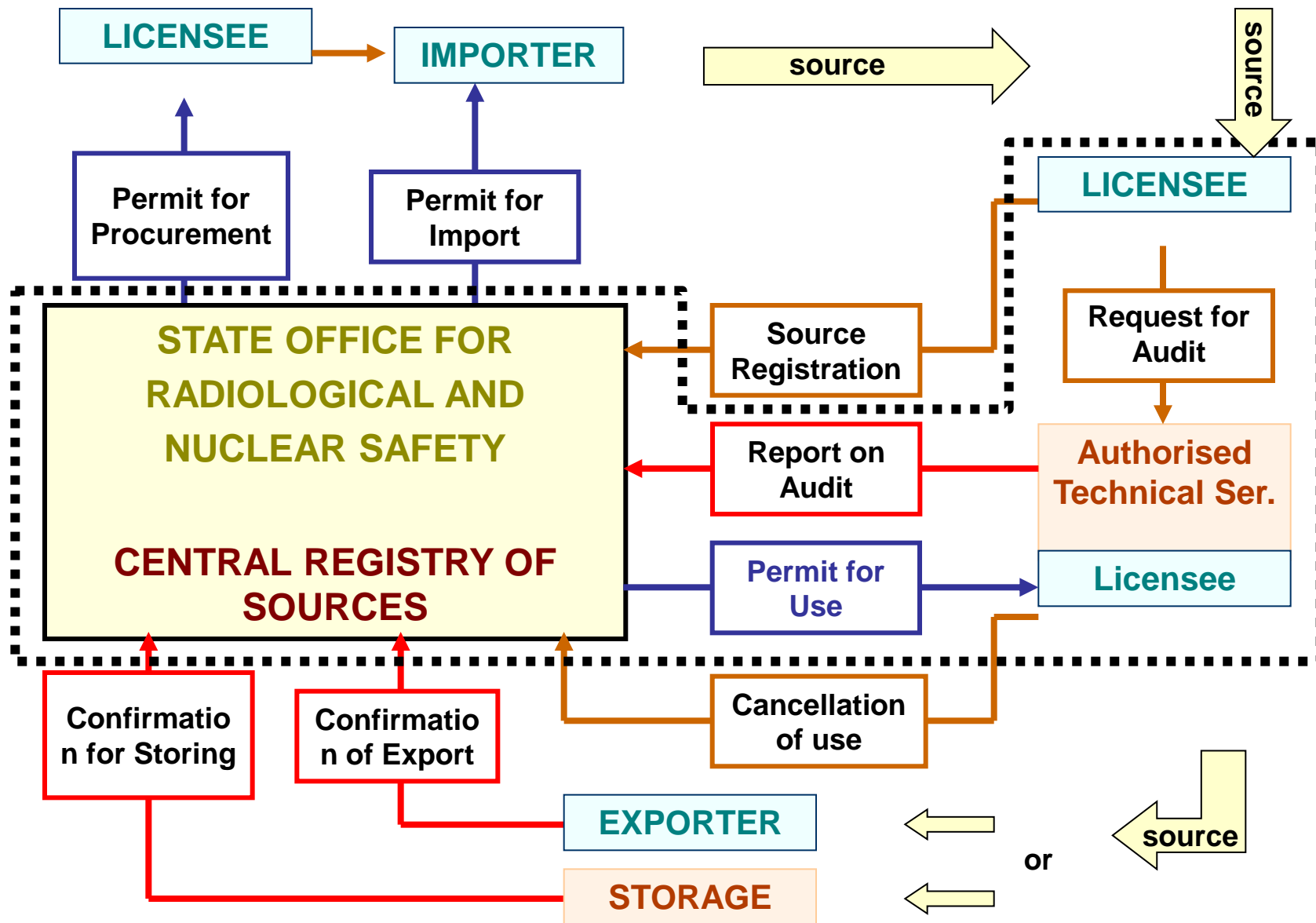
JOINT CONVENTION CODE OF CONDUCT SYNERGIES

Ordinance on the manner and procedure for supervision during **import** or **export** of material for which there is justified suspicion of contamination by radionuclides or of containing radioactive sources (O.G. 114/07)

- *un-authorized or “suspicious transport”*

Ordinance on the register of activities, requirements and the manner of issuing, and the validity of **licences** for work with sources of ionising radiation and the use of sources of ionising radiation (*Official Gazette No. 125/06*)

- *authorized transport*





JOINT CONVENTION CODE OF CONDUCT SYNERGIES

Licensing proceduree for IMPORT/EXPORT



Code and the Import/Export Guidance (INFCIRC 663)



JOINT CONVENTION CODE OF CONDUCT SYNERGIES

PROBLEM AREAS:

Return of Shipments coming to the country by SEA or PLANE.

-usually, material is already through the Customs Zone and transporter is away, when detected

Management of contaminated object found in a transport.

-usually containing reinforcement materials for industrial, military or other purposes

- bulky, voluminous, heavy, possible decontamination issues (phosphate industries, oil drilling pipes,..) – often warrants sizeable space volumes

REGIONAL COOPERATION

2008. SLO – CRO – B&H BORDER INCIDENT

B&H scrap metal (lead) transport was detained because of elevated radiation on SLO/CRO border cross point.



Incident management steps:

1. SLO informed CRO (region) on the incident.
2. In agreement with CRO, SLO “decontaminated” the shipment and stored radwaste in SLO due to elevated radiation (>50*bck.)
3. In agreement with SLO, CRO organized shipment return to B&H
4. Region informed on outcome.