

Overview of International Cooperation in Europe in DSRS Management

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12/10/2010

National Institute for Radioelements -IRE

- Public Utility Foundation
- 125 employees
- Mission
 - ***To promote health***
 - ✓ Production of radioelements used in nuclear medicine for diagnosis and therapy
 - ***To protect environment***
 - ✓ Development of radiological monitoring equipments
 - ✓ Measurements of radionuclides in the environment



Three main activities

Radiochemical



$^{99}\text{Mo}/^{99\text{m}}\text{Tc}$

^{131}I

Radiopharmaceutical



$^{188}\text{W}/^{188}\text{Re}$

^{90}Y

Services



Expertise

IRE as a worldwide leader

- Major producer of I-131 and Mo-99
- Active Pharmaceutical Ingredients
- IRE's production of Mo-99
 - 6 millions of exams in the world
 - 4 millions of exams in Europe
 - ✓ 50 % of the European needs
- 95% of exportation
 - Europe, USA, Japan and Latin America

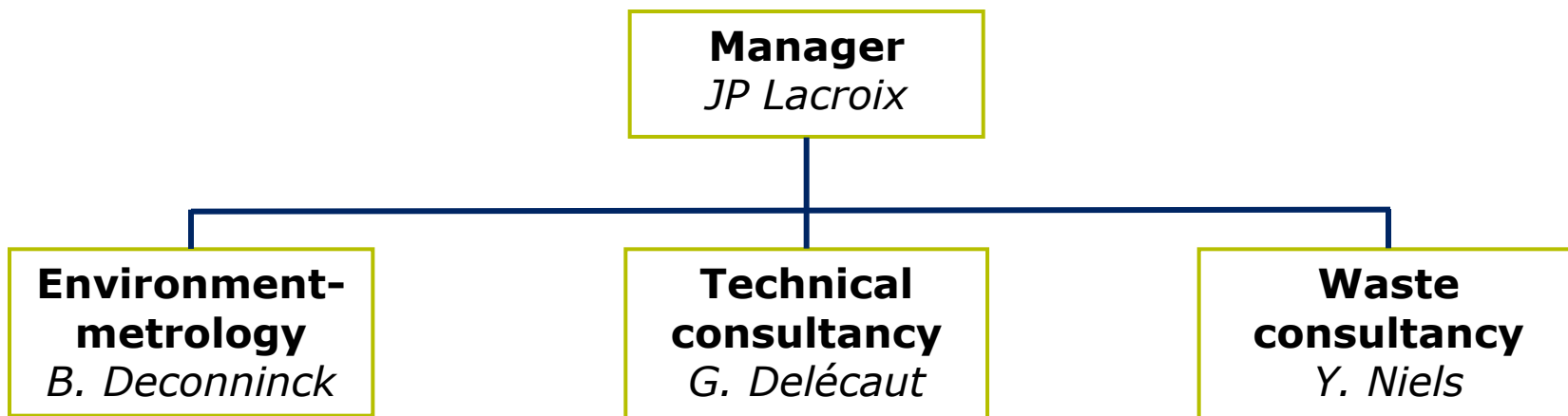


IRE ELiT as radiopharmaceutical producer

- Strategic development
- Drugs directly injected to the patients
 - Yttrium-90
 - Rhenium-188
- Therapy of cancers in nuclear medicine



IRE ELiT : Business Unit Services



The IRE was a manufacturer of SRS

■ Industrial sources

- Ir-192
- Co-60
- Kr-85
- ...



■ Smoke detectors

- Am-241



■ Lightning rods

- Kr-85



The IRE has the adequate facilities for the dismantling of DSRS

- Laboratories for low irradiating sources
 - Glove box, fume hoods, shielded containers
- Hot cell for medium activities
 - 50 cm concrete
 - 10 tons crane
 - Access to shielded storage (300 drums of 200 L)
- Hot cell for high activities
 - 1.2 m heavy concrete
 - up to 100 TBq Co-60
 - Shielded storage of 800 containers of 10 L



Dismantling and conditioning of SSRS for NIRAS-ONDRAF

■ Industrial and medical sources

- ~500 over the last 3 years
- Co-60, Cs-137, Sr-90, Am-241, ...



■ Smoke detectors

- 31 000 over the last 3 years
- Am-241
- Repackaging without dismantling of Ra-226

■ Lightning rods

- 600 over the last 3 years
- Am-241, Kr-85



Services supplied

- Consultancy and technical assistance projects
- Characterization, dismantling and reconditioning of radioactive source
- Characterization, segregation and reconditioning of radioactive waste
- Monitoring of liquid and gaseous effluents
- Design of radiological monitoring equipment
- Monitoring of the radioactivity level in the environment and in the food chain

The Business Unit expertise in projects of technical assistance

- Management of institutional radioactive waste
 - Analysis of legislation and regulations
 - Analysis of management system
 - Characterization
 - Sorting – repackaging
 - Storage
 - Recommendations
- **Management of DSRS**
 - **Source dismantling and/or reconditioning**

European Projects

- Funded from:
 - EC
 - Belgian Federal Public Service Economy and Energy
 - Costumer

- Sometimes in collaboration with:
 - Tractebel, GDF SUEZ
 - Tecnubel, Leniko, Institute Joseph Stephan (SLO)

Environmental Radiological monitoring

- Monitoring for food industry
- Monitoring of effluent for nuclear industry
 - Sébou river (Morocco)
 - Danube (Bulgary)
- River monitoring
 - Hydroteleray (France)
 - The Netherlands (Meuse and Rhin)
 - Détroit de Gibraltar
- Water station (Belgium, France, Romania)



Radiological monitoring of the environment

- Air Monitoring from nuclear industry
 - I, Xe
 - ^{135}Xe , ^{133}Xe
- Air Monitoring in Cernavoda and Bechet (Romania)
 - 48 stations (dose rate)
 - 1 central station in Bucarest
- Review of radiological surveillance program in Novi Han (Bulgaria)



Puspokszilagy disposal facility

- Feasibility study: conversion of unused building into an interim storage
- Analysis of constraints
 - regulatory requirements, building state, operating procedures
- Critical review of possible designs
- Definition of specifications
 - Building layout
 - Spent sealed Sources storage
 - Operating procedures
- Cost estimates



Upgrading of Sergiev Posad department of Moscow NPO Radon

- Critical analysis
 - Identification of weak points
 - Recommendations
- Assistance for the procurement of a fully automated gamma spectrometry characterization system
 - Basic design
 - Technical specifications
 - Tender evaluation



Management of medical radioactive waste

- Bulgaria, Croatia and Romania
- Albania, Bosnia Herzegovina, Macedonia, Kosovo, Montenegro and Serbia
- Assessment of regulations
- Evaluation of management practices
- Inventories
- Comparison with EU Member States
- Suggestions for improvement
- Technical seminar



Bilateral cooperation to improve nuclear safety

- Funded by the Belgian Ministry of Economy
- Bulgaria
 - State Enterprise Radioactive Waste (SERAW)
 - Novi Han storage facility
- Hungary
 - Public Agency for Radioactive Waste Management (PURAM)
 - Püspökszilagy disposal facility
- Slovenia
 - Agency for Radioactive Waste Management (ARAO)
 - Central Interim Storage Facility in Brinje

Management of spent sealed radioactive sources (DSRS) in Bulgaria

- Assessment of a new DSRS interim storage facility at Novi Han
 - Critical review of technical proposal
 - Recommendations

- Assistance to the Bulgarian Nuclear Regulatory Agency to improve the management of highly-active DSRS
 - Enhance the safety of the management system
 - ✓ service life time
 - ✓ disused sources
 - ✓ orphan sources



Evaluation of the management of DSRS produced and sold in the Russian Federation

- Analysis of regulatory framework and management practices
- Visit of manufacturers, main users and disposal sites (RADON centres)
- Comparison with Western Europe
- Recommendations

The IRE conducted two projects in Slovenia

- Improvement of the management of institutional radioactive waste
- 2004-2005
 - 77 drums
 - 8300 smoke detectors (Am-241, Ra-226)
 - 219 packages of SSRS
 - ✓ lightning rods with Eu-152/154
- 2008
 - 125 drums
 - 188 bulky items
 - 313 packages of SSRS



Improvement of the management of institutional radioactive waste



The projects were implemented on site

■ On-site operations

- Central Interim Storage Facility
- Jozef Stefan Institute
 - ✓ ventilated tent
 - ✓ shielded cell



■ Authorisation from regulatory bodies

- Actions plans
- QA program
- Technical specifications of new packages and drums

Waste processing (1/2)

■ Waste characterisation

- Contamination and dose rate
- Gamma spectrometry (ISOCS)



■ Waste treatment

- Dismantling
 - ✓ Smoke detector and SSRS
- Sorting
 - ✓ Contaminated/non-contaminated
 - ✓ Combustible/compactable/non-compactable
- Repackaging in new packages



Waste processing (2/2)

- Waste characterisation
 - Candidates for clearance
- Re-arrangement of storage facility
 - Increase storage capacity
 - Improve arrangement
 - Improve package identification



Conclusions

Regulatory bodies need help concerning:

- Inventory of radioactive Waste and Sources
- Acceptance criteria (conditioning, storage, disposal)
- Financing of Waste management
- Disposal and Storage availability
- Orphan Sources financing
- Environmental monitoring

- Transport of sources
 - Lack of type B containers for old sources
 - Preparation of the source
(dismantling and conditioning)

? Recycling of the Sources

Thank You !

