Technical Meeting of the Complimentary Safety Reports, Development and Application to Waste Management Facilities

Terms of Reference for CRAFT application cases:
“Radon” facilities
draft v. 1.1

IAEA Regional Workshop
11-15 June, 2012, IEAE
Content

- Background
- Objectives
- Scope
- Input
- Output
- Details
- Work Plan
- Participants
The system of RADON enterprises was established in the USSR in early sixties of the XX\textsuperscript{th} century.

- Collection, transportation, processing and disposal of LILW wastes and DSRS, generated or used in medicine, research institutions, various branches of industry.
- 35 “Radon” facilities in the Soviet Union.
- 16 of them in the Russian Federation.
Background

1 - Moscow «Radon» Facility
2 - Leningrad «Radon» Facility
3 - Volgograd «Radon» Facility
4 - Nizhny Novgorod «Radon» Facility
5 - Grozny «Radon» Facility
6 - Irkutsk «Radon» Facility
7 - Kazan «Radon» Facility
8 - Samara «Radon» Facility
9 - Murmansk «Radon» Facility
10 - Novosibirsk «Radon» Facility
11 - Rostov «Radon» Facility
12 - Saratov «Radon» Facility
13 - Sverdlovsk «Radon» Facility
14 - Bashkirskiy «Radon» Facility
15 - Chelyabinsk «Radon» Facility
16 - Khabarovsk «Radon» Facility
Background

- Typical historical repositories are vaults below the ground level with the volume from 200 to 9000 m³,
- basement made of concrete plates,
- walls made of monolithic reinforced concrete or concrete blocks,
- divided with concrete or wooden walls into cells (sections),
- the top is covered with reinforced concrete plates, sand and waterproof asphalt layer
Background

depth –3-6 m,
width – 5,5 up to 32 m
length – 16 up to 100 m.
Background
Background

1 - carbon steel conical socket
2 - stainless steel loading channel
3 - steel-enforced concrete well
4 - concrete
5 - stainless steel cylindrical vessel
6 - drainage channel
Background
Background

- Designed and operated as disposal facilities for institutional LILW without intention of the waste retrieval
- Don’t fit with the safety requirement for near surface disposal (long loved alpha emitters, high active DSRS etc.)
- Don’t fit with the safety requirements for long term storage (waste package inspection, retrievability etc.)
Additional options

- Combined disposal of solid and liquid waste
- Two-storeyed facilities (Moscow)
- Storage tanks for liquid wastes
- Ponds (Moscow)
- DSRS borehole type facilities
- Large diameter boreholes (Moscow)
- Above ground storage transferable into disposal (Moscow)
Background
Background

INTERIM PERIOD (MAX 50 YEARS)
Background

INSTITUTIONAL PERIOD (MAX 300 YEARS)
Operators of RADON type facilities are obliged to perform safety assessment and upgrade safety.

Decision making depends not only from the safety issues but from socio-political, technical and economic aspects.

Most common decisions include:
- decommissioning of facility
- upgraded storage facility
- upgraded disposal facility

Measures are often considered:
- partial or complete RW retrieval and conditioning
- reconstruction
Background

- The DS284 methodology can be applied to RADON type facilities to assess safety of their operation as storage facilities and to assess safety of waste retrieval operations and/or reconstruction of engineering barriers to support (or input in) the decision making process.

- The SAFRAN tool can help users to undertake safety assessment of waste management facilities in a consistent and transparent manner.
Objectives

- to adopt the safety assessment methodology presented in the DS284 for the RADON type facility needs
- to develop illustrative test cases for applying this methodology to RADON type facilities using SAFRAN tool
- to provide Member States with the supporting information for decision making regarding the future of existing historical RADON type facilities
Scope

- Typical near surface RADON type storage facilities
  - vaults (below ground level, above, both, two-storeyed?)
  - borehole type repositories for DSRS
  - tanks for liquid waste
  - old type facilities (trenches) -?
  - vaults before or after corrective actions (re-cementation, final multilayer cap?)
  - new type facilities (LDB, 103) -?

- Waste processing facilities
  - cementation
  - compaction
  - around 14 more (Moscow)
- Results of the SADRWMMS project
- SAFRAN tool
- DS284
- Draft of the TINT facility test case
- Information from existing SA/SC for Estonian Radon storage facility decommissioning
- Information from operation/upgrading SA/SC of Moscow Radon site
- Information from existing SA/SC performed for similar objects (such as Pushpoksilagy)
Output

- Illustration on application of DS284 methodology and SAFRAN tool
- Proposals to improve the methodology
- Proposals to improve SAFRAN
- Safety assessment methodology for RADON type facilities based on DS284 guide
Details

- Illustrative examples proposed before:
  - Solid LILW storage facility in operation (Moscow, Russia)
  - Waste retrieval operations at Tammiku (Estonia)

- Illustrative examples on the table for discussion:
  - New operating storage facility (Moscow Radon)
  - Operation of waste cementation installation (Moscow Radon)
  - Including DSRS into lead matrix
  - Waste retrieval from historical vaults (Murmansk Radon)
  - Waste retrieval operations at Tammiku (Estonia)
  - More examples?
Details
莫斯科的氡气问题
Details

Interim Period (Max 50 Years)

Storage

Institutional Period (Max 300 Years)
Details

Cementation
Технология захоронения отработавших источников:
1 — Контейнер;
2 — Транспортно-перегрузочное устройство;
3 — Установка «Москит-Т»
Details

Murmansk
Details

Murmansk
Details

Murmansk
Details

Tammiku
Work plan

By June 2012:

- Drafts of the documents prepared and presented to the working group:
  - Moscow Test Case (Nikolay Anisimov)
  - Estonian Test Case (Merle Lust)
  - Historical Overview, explanation of the problems (Nataliia Rybalka)
- Discussion of the draft documents on the workshop of the working group.
- Starting of the drafting process of the methodology for RADON facilities
Work plan

By June 2013:
- Final versions of the test cases approved by the working group
- Discussion of the draft methodology
- Consultation of the test cases with the regulatory working group

By June 2014
- Approval of the methodology for the RADON Type Facilities safety assessment by the working group
This week working plan

- Discuss and agree on TOR

- Discuss and agree on illustrative examples

- Discuss and agree on realistic group work plan for the CRAFT project
Thank you for your attention