

How will Belgium implement the European directive with regard to NORM ?

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BVS-ABR meeting "Why should we be concerned about NORM?", Brussels, October 28, 2016

Overview

1) NORM industries

- Belgian NORM industries and regulations
- NORM residues
- NORM and justification principle
- Decommissioning NORM facilities

2) NORM legacy sites

3) NORM and building materials

4) Conclusions

Belgian NORM industries

Phosphate industry from the 1920s



Titaniumdioxide production



Tin foundry



Groundwater treatment



Belgian NORM regulations

Directive 96/29/EURATOM => Transposed into Royal Decree of July, 20 2001

Art.4 lists “*work activities involving natural radiation sources*”

⇒ Updated with FANC decrees 01/03/2012 (+ 2013/2016)

⇒ **Most of sectors of Annex VI of EU BSS taken into account**

Art.9: industries are submitted to **declaration**

Objective of declaration: dose assessment (workers + population)

Dose must be **< 1 mSv/a**

– if not, **corrective measures** or **licensing**.

Royal Decree 20/07/2001	2013/59/Euratom
Declaration	Notification
Corrective measures	Registration
Authorization	Licensing

List of work activities

Sector	# declarations
Groundwater treatment facilities	27
Storage, handling and processing of zircon and zirconia	16
Storage, handling and processing of phosphate ores	10
Production of non-ferrous metals	8
processing, valorization and recycling of NORM residues	7
Production, storage, use and handling of thorium-based materials	6
Extraction and transport of natural gas and shale-gas	2
Titaniumdioxide production	1
Primary production of rare earths	1
Coal-fired power plant	1
Oil reffineries	1
Geothermal energy – including exploration phase	1
Distribution of consumer products with an activity concentration above RP 122	1
Primary iron production	0
Decommissioning and recycling of zircon(ia)-based refractories	0
Storage, handling and processing of pyrochlore, columbite, tantalite, ilmenite, rutile, cassiterite, monazite, garnet and silica fumes	0

Total: 82 declarations => 25 “corrective measures”, 1 authorization

NORM residues

⇒ Use of clearance/exemption levels of EC document “Radiation Protection 122 II”

Radionuclide	Activity concentration (Bq/g)
U-238sec (incl. U-235sec)	0.5
	0.1 (mono-landfill)
U nat	5
Th-230	10
Ra-226+	0.5
	0.1 (mono-landfill)
Pb-210+	5
Po-210	5
Th-232sec	0.5
	0.1 (mono-landfill)
Th-232	5
Ra-228+	1
Th-228+	0.5
K-40	5

If levels < RP 122 II (**exception**: mono-landfill): clearance from further surveillance

If levels > RP 122 II: *processing, valorization and recycling of residues = work activity*

⇒ **Declaration to FANC**

⇒ **Acceptance criteria imposed to the facility**

Currently **9 sites** registered for acceptance of NORM:

- 5 “mono-landfill” (4 related to phosphate industry, 1 titaniumdioxide)
- 2 landfills for hazardous waste
- 1 landfill for non-hazardous waste
- 1 incinerator for hazardous waste

NORM industries and justification principle ?

Justification principle

Planned exposure situation: “decisions introducing a practice should be justified in the sense that such decisions shall be taken with the intent to ensure that the individual or societal benefit resulting from the practice outweighs the health detriment that it may cause;”

↔ *Existing and emergency exposure situation*: “Decisions introducing of altering an exposure pathway shall be justified in the sense that they do more good than harm” .

NORM industries as planned exposure situations

⇒ Practical implementation of **Art. 19 EU BSS** to NORM industries ?

“1. Member States shall ensure that **new classes or types** of practices resulting in exposure to ionising radiation are justified before being adopted.

2. Member States shall consider a review of existing classes or types of practices with regard to their justification whenever there is new and important evidence about their efficacy or potential consequences or new and important information about other techniques and technologies.”

NORM and non-radiological hazards

NORM entangled with other Health & Safety aspects

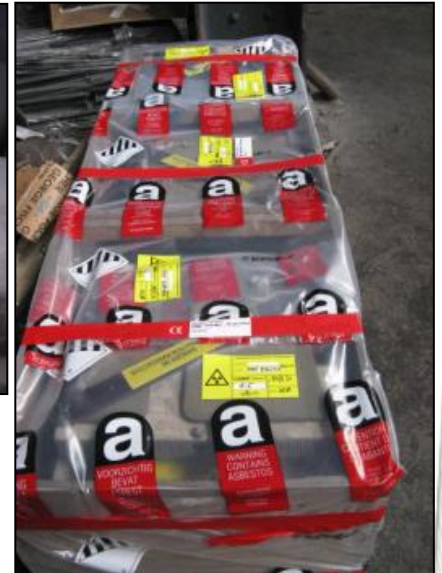
⇒ Need to **balance** NORM aspects with other Health&Safety issues

⇒ **Central role of Health& Safety Advisor**

⇒ Building “in-house” knowledge about NORM

⇒ interaction with environmental authorities and consistency in approaches (e.g. NORM residues and “**end-of-waste criteria**”)

e.g. NORM asbestos cement in electric circuit breakers (~ 3 Bq/g U-238sec)



Decommissioning NORM facilities

2 major **decommissioning** projects of phosphate facilities in Belgium in 2014-2016

⇒ Declaration to FANC

⇒ Higher risk of exposure than during production

Contaminated part	U-238 (Bq/g)	Ra-226 (Bq/g)
Scale in decanter	11	136
Scale in washing decanter	3	780
Incrustation in gutter	240	1
Scale in ammonium phosphate tank	228	0.1



Decommissioning in a legacy context

Decommissioning of former ammonium phosphate facility

⇒ Issue of **liabilities**

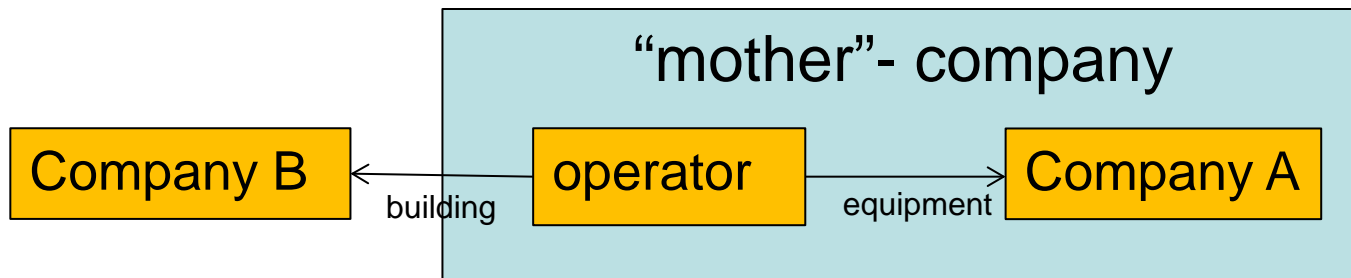
Operator ammonium phosphate production facility:

⇒ Never submitted a declaration

⇒ Went bankrupt

Operator ≠ owner of equipment (rented from company A)

≠ owner of building / ground (rented from company B)



Bankrupt operator without asset => who is liable ?

NB: 2015 agreement between parties - decommissioning carried out

NORM legacy sites in Belgium

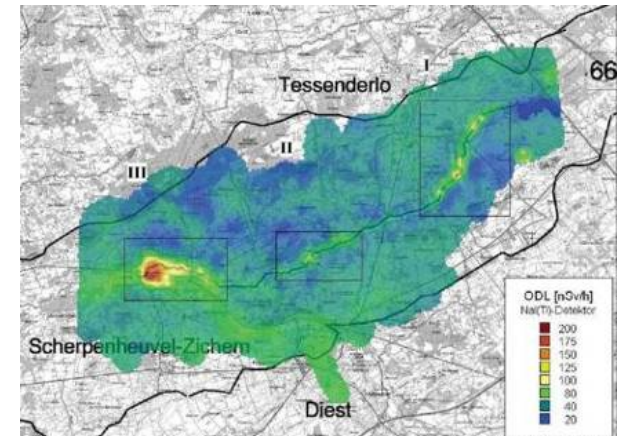
Essentially from phosphate industries

- phosphogypsum stacks and other disposal sites;

- **Flooding areas** impacted by NORM discharges [Ra-226] 1 – 10 Bq/g

Former FeNb industry

Upto 60 Bq/g Th-232



Contaminated areas in EU BSS

Art. 73: “Member States shall ensure that optimised protection strategies for managing contaminated areas shall include, where applicable, the following:

- (a) objectives, including long-term goals pursued by the strategy and corresponding **reference levels**, in accordance with Article 7;
- (b) **delineation** of the affected areas and **identification** of the affected members of the public;
- (c) consideration of the **need for and extent of protective measures** to be applied to the affected areas and members of the public;
- (d) consideration of the **need to prevent or control access to the affected areas**, or to impose restrictions on living conditions in these areas;
- (e) **assessment of the exposure** of different groups in the population and assessment of the means available to individuals for controlling their own exposure.”

⇒ Most of these aspects addressed by **FANC draft law proposal** regarding remediation of contaminated soil

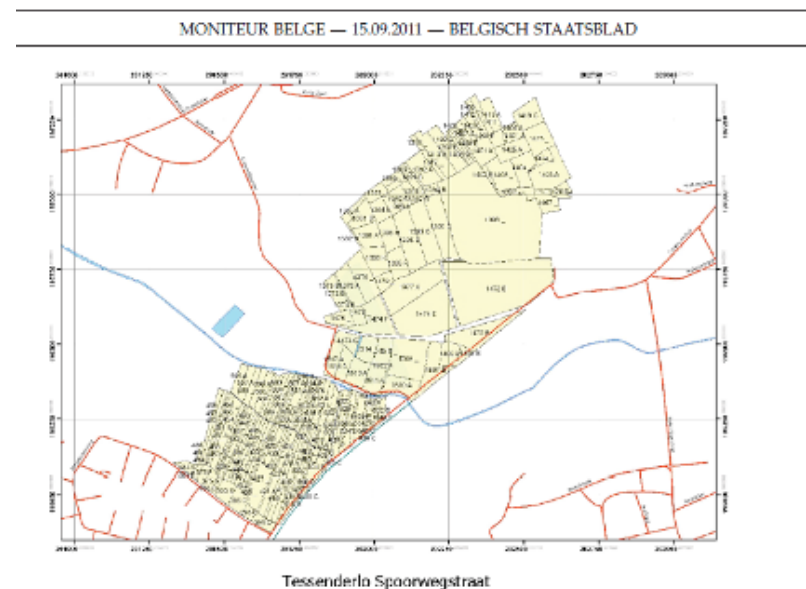
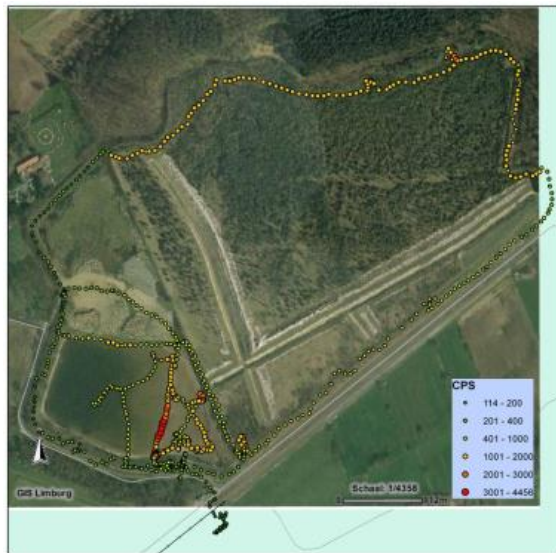
⇒ FANC law inspired by regional regulations regarding non-radioactive soil contamination

⇒ Liabilities, step by step administrative procedure, reference levels,...

NORM legacy sites

“delineation of affected areas”

- ⇒ **Ra contaminated sites** considered as “*anthropogenic*” radon prone areas
- ⇒ list of cadastral parcels in Belgian official Journal (15/09/2011 + 11/12/2015)
- ⇒ Radon-risk has to be taken into account in redevelopment of site



Environmental monitoring

- ⇒ Integration of NORM sites monitoring in FANC radiological surveillance program
- ⇒ Collaboration with environmental agencies

Website FANC: <http://www.fanc.fgov.be/nl/page/-norm-problematiek-en-bodemverontreiniging/1733.aspx>



NORM and building materials

Currently **no explicit regulations** for radioactivity in building material (**except**: *processing NORM residues with activity concentration > RP 122 in building material = work activity*)

Consultation of stakeholders in progress (many different professional federations) + exchange with **ministry of economy** regarding interface EU BSS and Construction Product Regulations (CPR)

FANC follows work of **CEN workings groups** on radiation in construction products :

- CEN/TC351/WG3/TG 31 working group “*Determination of activity concentrations of Ra-226, Th-232 and K-40 using gamma-ray spectrometry*”
- CEN /TC351/WG3/TG 32 working group “*Determination of dose-assessment and classification for emitted gamma radiation*”

Identification of building material of concern ?

According to current data, no specific “building material of concern” identified in Belgium

Phosphogypsum produced in Belgium already monitored (monthly reporting) => $I < 1$

Imported building material (such as natural stones) monitored through portal monitors of customs in Belgian harbours (Antwerp and Zeebrugge)

Company	Type of material	max	average	# detections
A	Glas fibers	250	150	134
F	Stone works	122	34	109
C	tiles	94	60-66	16
G	tiles	93	46	6
D	tiles	88	59	102

Pilot-study in progress => selection and analysis of specific building material based on portal monitor data

⇒ **Reinforcing collaboration and exchange of information with customs** regarding radioactivity of imported building material

⇒ **Regular survey** of natural radioactivity in building material produced or imported in Belgium



Conclusions

- **NORM industries**: most of requirements of EU BSS already implemented (identification of practices involving natural radiation sources, graded-approach, exemption/clearance,...)
- **NORM legacies**: addressed in FANC law proposal – waiting for approval at government level – identification as antropogenic radon-prone areas
- **Building material**: stakeholders consultation and pilot-studies in progress – focus on measurement data (regular survey) – collaboration with customs for monitoring imported building material

Entanglement of NORM with other environmental / Health & Safety aspects

⇒ Reinforcing collaboration with other involved authorities / agencies