



REPUBLIC OF ESTONIA
MINISTRY OF THE ENVIRONMENT

REMEDIATION PROJECTS IN ESTONIA

Conference/workshop on remediation of polluted sites in Latvia

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Themes

- Overview of the historical background
- Legal framework of polluted sites clean-up
- Implementing measures using EU and local funds
- Technological solutions
- Lessons learned
- View to the future

Historical background



Soviet Army activities:

- Military bases – fuel pollution
- Leaving 1992-1994, left off the bases

Industrial pollution:

- Oil shale industry (PAH, oil, fusses)
- Galvanic industry (Zn, Ni, Cr)
- Wood impregnation (Cu, As)
- Electric powerstations (PCB)

Agricultural pollution:

- Fertilizers (overdosing and storing)
- Fuel leaking and pouring off

Main problems in early 90's

Lack of responsibility

- No rules for pollution control
- Soviet Army left off, collective farms were broken

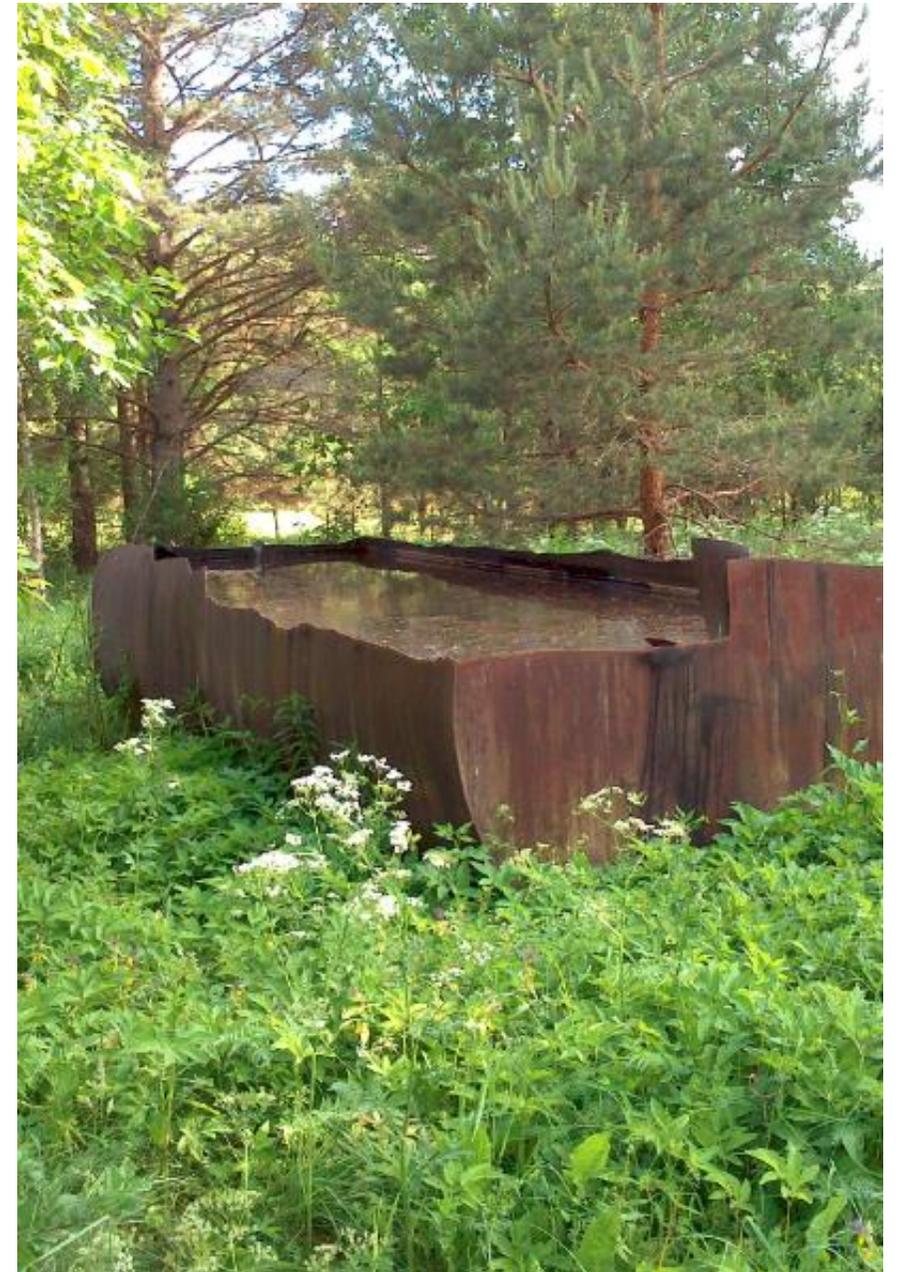
Lack of information

- Military objects had been secret zones with no or misleading data
- Amount of objects
- Pollution characteristics
- Possible solutions

Fuel and bitumen tanks, ponds and pools, also aging stores of agricultural chemicals – time bombs for groundwater

Need for building up the state – land ownership reform

- Privatization
- Real estate properties



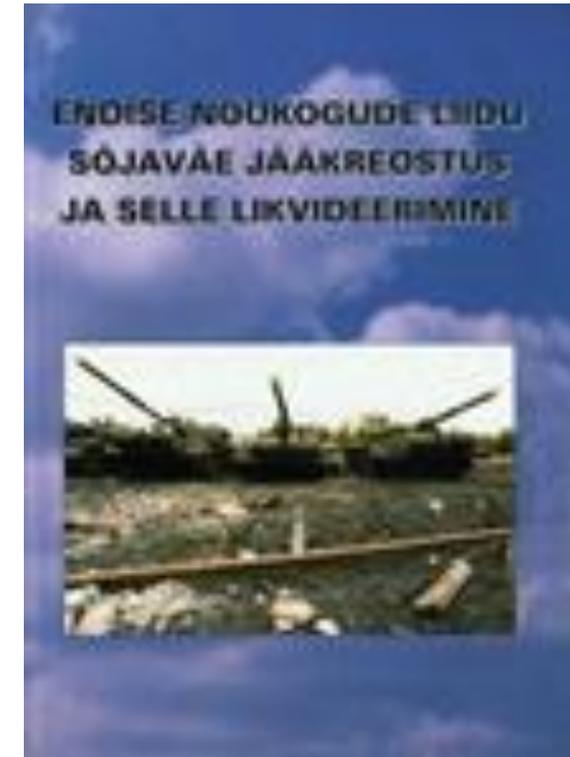
Solutions at starting point

Inventorisation of residually polluted sites

- Background data collection, sampling and analyzing on more than 300 objects, pollution characterizations, risk assessments
- TOP75 prioritized objects of national importance
- About 225 polluted sites of local importance

Making difference between historical residual pollution and nowadays pollution

- 1998 Chemical Act forces the Polluter Pays Principle (PPP)



1998

RESIDUAL POLLUTION

State takes the responsibility

Land owner is not forced to clean up the site

Remediation tenders by Env. Agency, Env. Board and Ministry of the Environment

NOWADAYS POLLUTION

Polluter is forced to take the responsibility

Environment Inspectorate investigates and then:

forces the polluter

or forces the landowner (unknown polluter)

Legal framework

Chemical Act

- Hazardous substances, REACH: 1999/45/EC
- CLP: 1907/2006/EC
- Polluter Pays Principle

Water Act

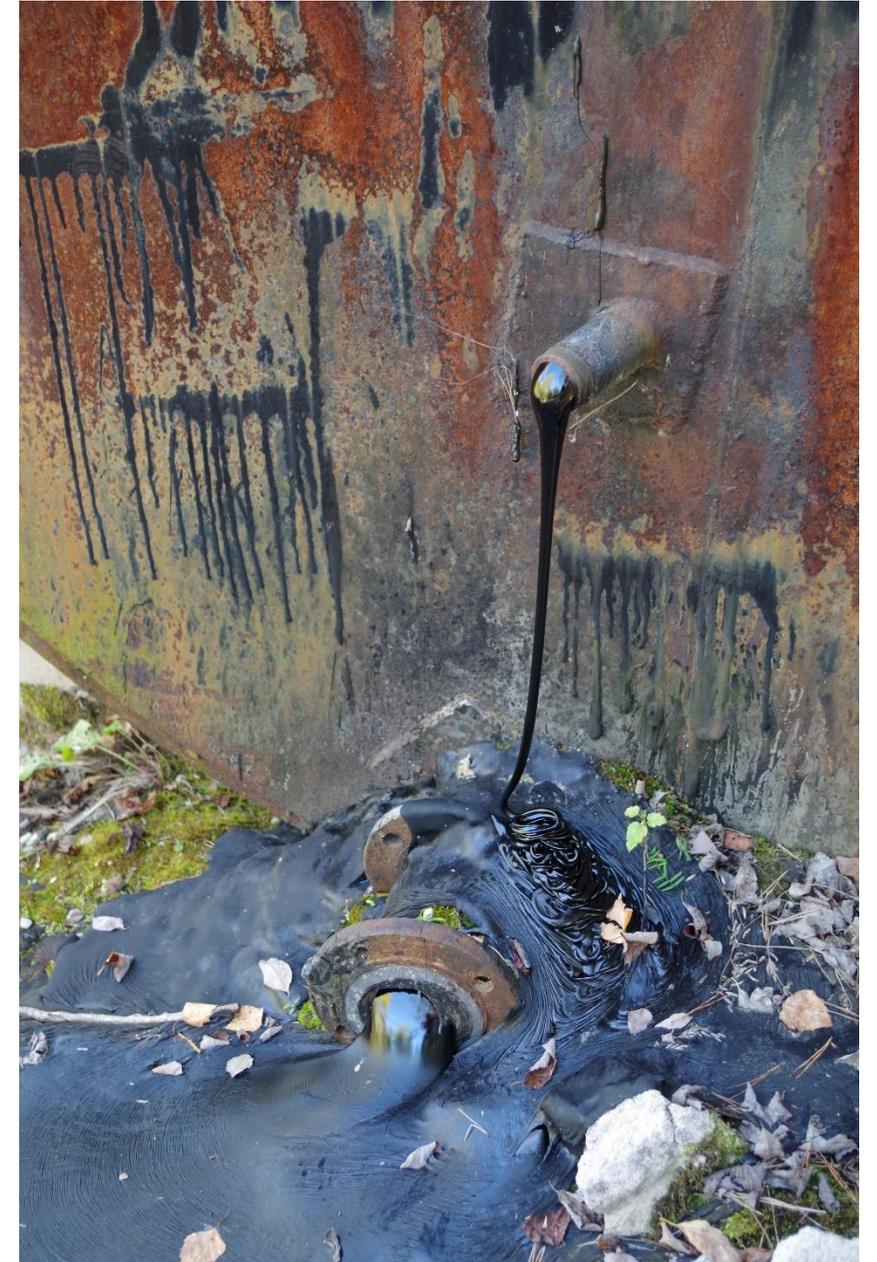
- Concentration limits of hazardous substances in soil – difference between industrial land and living land
- Quality limits for groundwater

Waste Act

- Polluted soil is waste if it is excavated out
- Contamination above the limits of industrial land → hazardous waste
- If PPP can not be implemented → land owner can be held liable

Building Act

- Demolition of a facility is a building activity → approval of stakeholders in the preliminary design process



Funding

EU Cohesion Fund period 2007-2013 money: 18,1 M€

- Clean-up of 14 sites of residual pollution – 15,5 M€
- Removal of the source of residual pollution on 8 sites – 2,6 M€

EU Cohesion Fund period 2014-2020 money: 38,8 M€

- Reorganization of A-category landfills – 8,2 M€
- Remediation of residual pollution on objects of national importance – 34,6 M€

Environmental Investment Centre – Water Program

- Remediation of residual pollution on sites of local importance – 1-2 M€/y

Private enterprises

- Real estate development
- Industry



Euroopa Liit
Ühtekuuluvusfond



Eesti tuleviku heaks



ENVIRONMENTAL INVESTMENT CENTRE

Technological solutions

Ex-situ (about 40 sites of 57)

- Soil bioremediation on treatment sites – similar to composting
- Soil landfilling or reusing for landscaping of industrial sites

On site (about 10 sites)

- Soil bioremediation at the object

In-situ (about 5 sites)

- Soil bioremediation without excavation
- Usually combined with ex-situ treatment

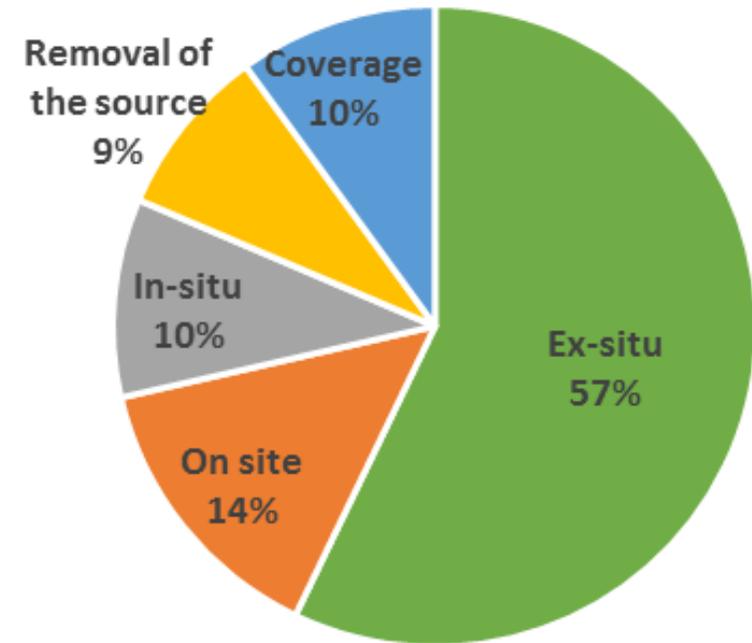
Removal of the source of pollution (6 sites)

- Polluted soil remains on site, but it is not hazardous for groundwater

Coverage (7 sites)

- Oil shale ash landfills, wood impr. landfill etc.

Technology used for TOP75 sites



Work status

Safe = contamination < limits

- Changing land usage from industrial zone to living land it may need further treatment

Source removed = fuel, chemicals, etc hazardous waste removed

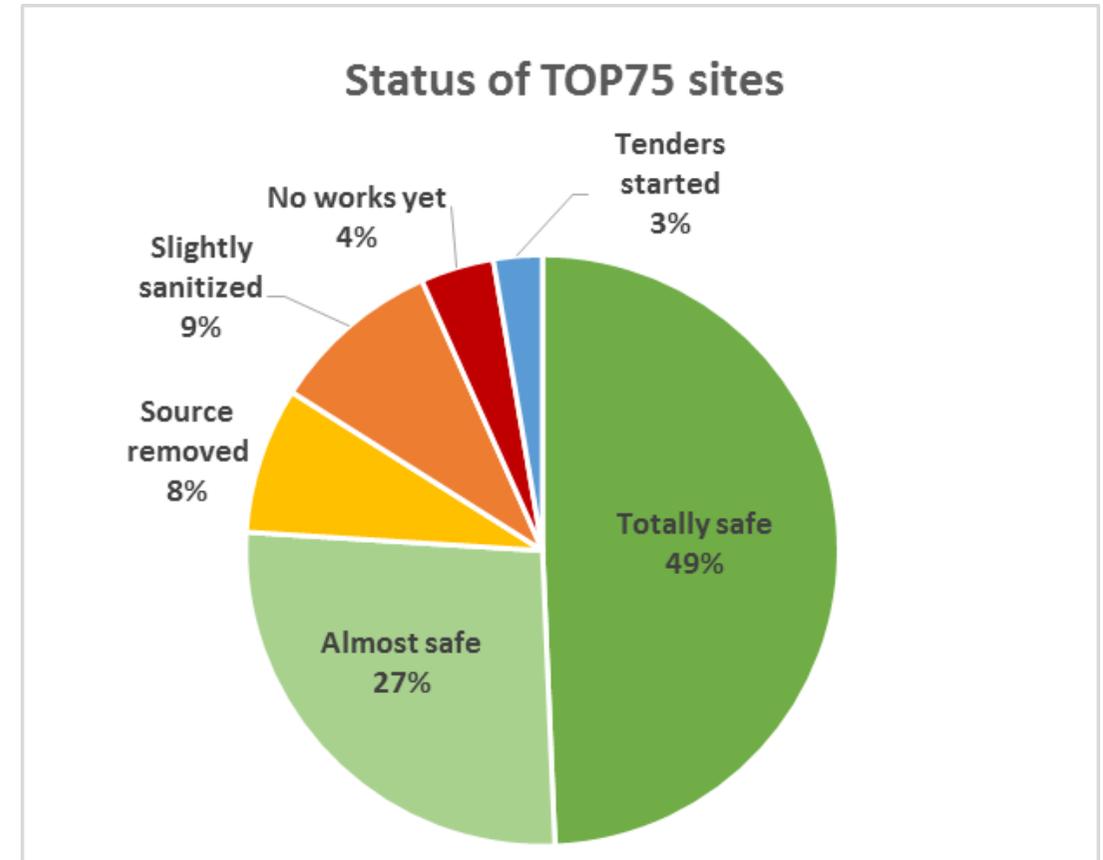
- Polluted soil remains, but it is not considered dangerous for groundwater

Satistics about local importance sites is not up-do-date

- Update of the database of residual pollution sites 1.07.2017
- Public registry of environmental data

Regular inventorying of polluted sites

- Projects of inventorization 2002, 2007, 2014 ...
- Groundwater monitoring at least 2 years after remediation works on TOP75 sites



Lessons learned

Competence is critical

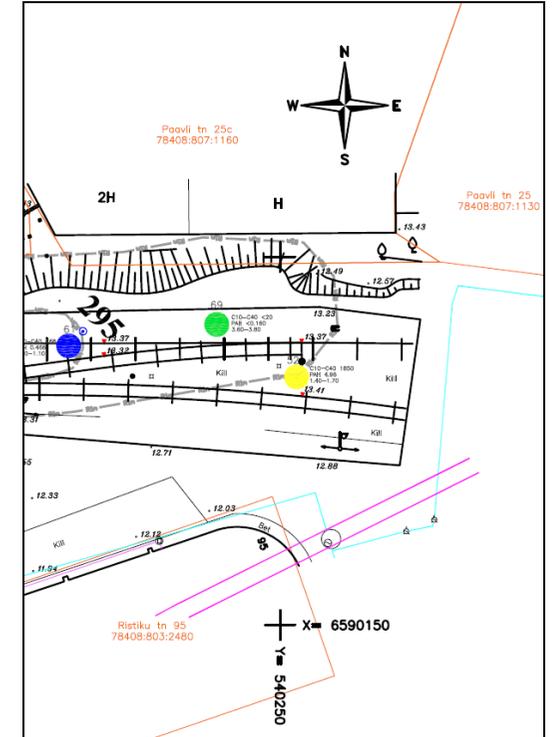
- High qualification criteria, joint tendering
- Jointed objects in a tender by site specialty
- Customer service supervisor

Working amounts are hardly predictable

- FIDIC yellow book – design and build contract
- Straight rules for budget changes
- Strait rules for warranty period

Contribution to the preparatory work

- Inventorization, prioritization, risk assessment
- Contamination characteristics (field and lab)
- Preliminary design of the solution, approvals from stakeholders



Trends for the future

More investments per site

- Unsolved sites are more difficult
- Pilot works as a part of preliminary design
- Construction market is busy

Integrated projects

- Similar sites jointed into one tender
- River basin or water sub-basin approach – different problems solved on one area

More investments from real estate enterprises

- Industrial and military zones in Soviet times were also in town centrals and close to sea
- Expanding city areas – dormitory districts and public areas expand on previous industrial zones





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