INVENTORY OF CONTAMINATED SITES IN SERBIA

Republic of Serbia
Ministry of Energy, Development and Environmental Protection

Serbian Environmental Protection Agency

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Legal framework in the area of soil contamination in the Republic of Serbia

- ***Law on Environmental Protection***, adopted in December 2004 with Changes and Amendments in May 2009, is the basic law which establishes the system of environmental protection in the Republic of Serbia.
- This Law defined that rehabilitation, i.e. remediation is the process of undertaking measures in order to halt pollution and further degradation of environment up to the safe level for future use of the location including also arrangement of the area, revitalization and recultivation thereof.
- According to Article 16 of this Law, any person who degrades the environment is obliged to perform recultivation or to rehabilitate in any possible way degraded environment in accordance with this and special laws.
- According to Article 43 of this Law, the status of endangered environment and the regime for rehabilitation and remediation in an area of importance for the Republic shall be determined by the Ministry which is responsible for environment, and for the area of local relevance by the local self-governance unit.

Legal framework in the area of soil contamination in the Republic of Serbia

- ***National Environmental Protection Program*** (adopted in 2010) establishes requirements for better and best practices for rehabilitation and remediation.
- Among medium-term goals of this Program (2010-2014) is establishing a list of locations with the status of particularly endangered environment, with the status of an endangered environment and set priorities for rehabilitation and remediation in 20% of the territory of the Republic of Serbia.
- Among long-term goals of this Program (2010-2019) are remediation of contaminated sites from the list of priorities, rehabilitation of existing dumpsites, and perform remediation thereof that pose the biggest risk to the environment, as well as remediation of contaminated soil.
- Also, the Waste Management Strategy for period 2010-2019 predicted to make an inventory of locations contaminated with hazardous waste and to define priorities for rehabilitation and remediation.

Legal framework in the area of soil contamination in the Republic of Serbia

- ***Regulation on the establishment of criteria for the assessment of the status of highly threatened environment, the status of threatened environment and for the establishment of restoration and remediation priorities***
- Article 9 provides the basis for determining the status of endangered environment. Criteria are given in details in Appendix of this Decree, but they are very sophisticated because require knowledge of great amount of data, and it is very difficult to apply them in practice.
- ***Regulation on systematic soil quality monitoring programme, indicators for assessment of risk of soil degradation, and methodology for preparation of remediation programmes*** is adopted in December 2010.
- Contaminated location is defined as the locality of the confirmed presence of hazardous and dangerous substances caused by human activity in concentrations that may cause a significant risk to human health and the environment.
- These sites include landfills (non-operational and operational) and other sites where waste is disposed of, locations of industrial facilities, locations of accidents and brownfield locations.

Legal framework in the area of soil contamination in the Republic of Serbia

MINISTRY OF ENERGY, DEVELOPMENT AND ENVIRONMENTAL PROTECTION

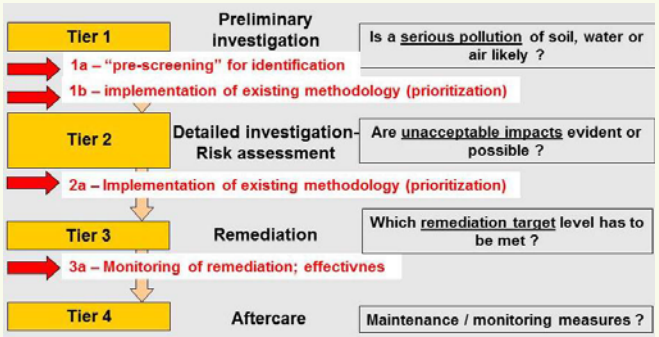
Environmental Protection Agency

- MINISTRY OF AGRICULTURE, FORESTRY AND WATER MANAGEMENT
- **Agricultural soil**
- **Water resources**
- **Forests**

Questionnaire for identification of contaminated locations

- The identification of potentially contaminated sites is the first major step in the management of contaminated sites in the Republic of Serbia is going to take.
- During the Twining project "Hazardous waste management" which was realized together with Austrian Environmental Agency the methodology was developed for simple identification of contaminated sites.
- The methodology is based on the screening method, as a simple, easy and inexpensive way to identify potentially contaminated sites without the need for extensive field research, and to perform rough risk assessment together with prioritisation.
- In case that some investigation has already been performed, additional data about main contaminant categories, investigated media and geological information can be very useful for additional estimation.
- Data from the questionnaire enable fast estimation of the probability of contamination.
- At the base of the data about a possible influence of contamination on human health or the environment, additional estimation related to potential hazard to human health or the environment should be performed.

Questionnaire for identification of contaminated locations



An overview of the overall framework proposed for contaminated site management

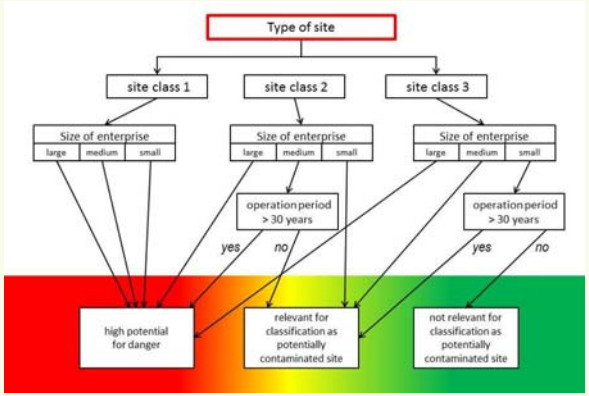
Questionnaire for identification of contaminated locations

General information about contaminated location	• **Name of location, District, Municipality** • **Official, Competent authority, Data source** • **Date of filling the questionnaire, Address of the location** • **Geographic coordinate, number of cadaster**
Data about categories and amount of contaminant at location	• **Type of location: Landfill/dumpsite, industrial/ commercial locations and other locations** • **Amount of pollution: Volume (m^3), Surface (ha) or Depth (m)** • **Physical condition of polluter** • **Reference period for polluting activity** • **Beginning of pollution (years) and Period of pollution/dumping/production (years):** • **Level of investigation of location**
Data about influence of contaminated location to humans and natural resources	• **Risk of pollution: exposure route to humans and Risk of resources** • **Possibility of flooding** • **Distance from surface waters (km)** • **Distance from water supply sources (km)** • **Distance from sensitive area (km):** • **Distance from buildings (km): individual building or settlement** • **Planned purpose**

Questionnaire for identification of contaminated locations

This column is filled only in the case when investigations are performed (Preliminary investigation, Main site investigation, Remediation performed)	• **Main contaminant categories on contaminated location** • **Investigated media** • **Geological information (and source of data)**
Data about waste which is deposited on landfill/dumpsite	• **Type of waste which is deposited** • **Description of the deposited waste** • **Bottom sealing (base liner): doesn't exist, natural, geotextile**
Data about polluting activities on industrial/ commercial location	• **Type of industrial/commercial activities and class of location at the base of division, group and class of activities which produces potential contamination or objects relevant for contamination (given in Appendix A** • **Description of causes of contamination** • **Number of employees in the appropriate periods of production**
Other sites	• **Military sites, War affected zones, Obsolete chemicals storage, Other storages, Oil spills sites, Other hazardous substance spills sites, Nuclear operations, Others**

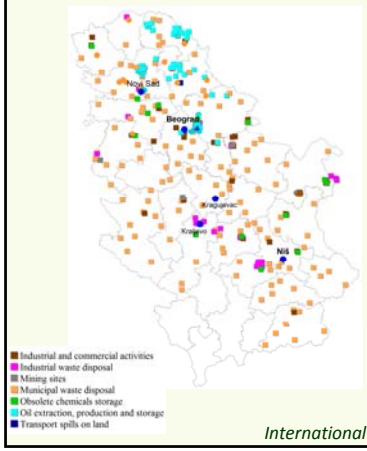
Scheme for classification of industrial/ commercial locations



Scheme of Prioritisation

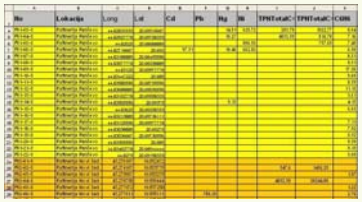
- ❑ Potentially contaminated sites are prioritised into three categories:
- Category A: not relevant for classification as potentially contaminated site, because probability of contamination is low and potential hazard, if is contaminated, is low;
- Category B: relevant for classification as potentially contaminated sites, but as probability of contamination is medium and potential hazard, if is contaminated, is low so no urgent need for verification/action
- Category C: Potentially contaminated sites with urgent need for verification/action, because probability of contamination is high and potential hazard is medium to high
- ❑ Data and information on sites with low probability of contamination and sites potentially contaminated without an urgent need for verification or action should be registered, but there will be no action required immediately.
- ❑ If the methodology shows that a certain site has high probability of contamination and potential hazard, further investigation work should be carried out in order to prove, whether a contamination can be verified or not (see Tier 2), and to take urgent actions for remediation if is necessary.

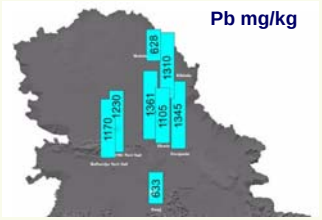
Analysis of contaminated sites management data

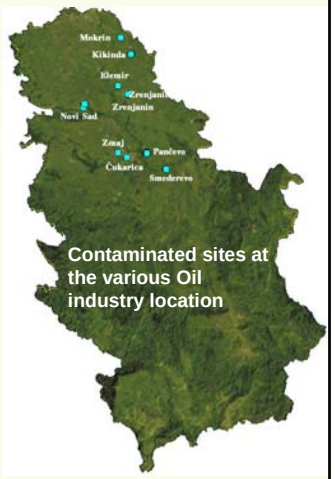


- Since 2005 Serbian Environmental Protection Agency started creation of National Inventory of contaminated sites.
- In the territory of the Republic of Serbia 338 potential contaminated and contaminated sites have been identified.

Database

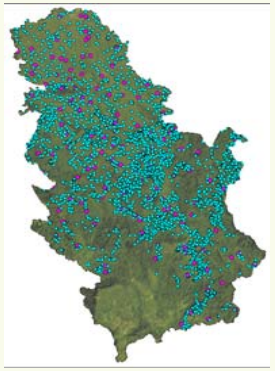




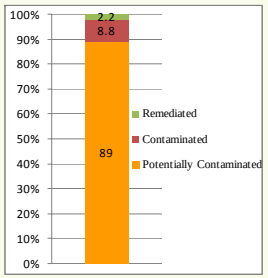


Illegal dumps and landfills

- 164 landfills (used by municipal public utility companies for waste disposal)
- 3528 illegal dumps

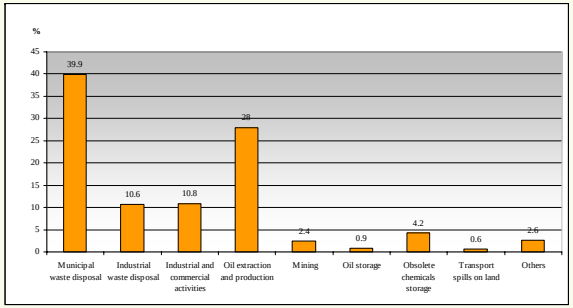


Progress quantification in the management of local soil pollution



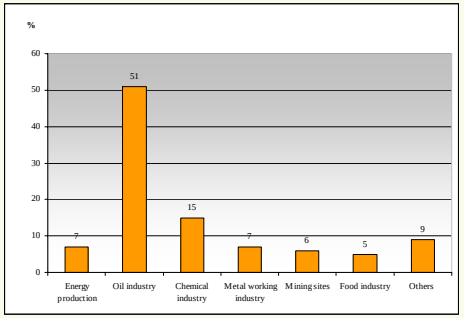
Number of sites	
Total number of sites	**338**
Potentially Contaminated	**301**
Preliminarily investigated	**83**
Contaminated	**29**
Main investigation	**12**
Remediated	**8**

Breakdown of activities causing local soil contamination [%]



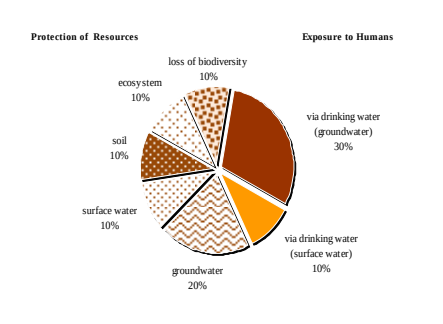
- The greatest number of registered sources of localized soil pollutions is related to municipal waste disposal (39.9%), oil extraction and production (28%) and industrial and commercial activities (10.8%).

Breakdown of industrial and commercial activities causing soil contamination (%)



- There were 189 potential contaminated industrial localities.
- The greatest part of the identified polluted soil localities within the industry belongs to the oil industry (51%), followed by the chemical industry (15%) and the metal working industry (7%).

Risk reduction priorities (%)



- Considered 338 sites the prioritie for risk reduction measure is pressure to humans via drinking water (groundwater).

CONCLUSION

- The greatest number of registered sources of localized soil pollution are related to municipal waste disposal sites, oil extraction and production sites and industrial and commercial activities.
- The data collected so far are not at the same level of quality at different locations and it is not possible to estimate a comparable level of pollution at different potentially contaminated and contaminated sites.
- The new legislation enacted in 2010 established the definition of contaminated sites together with reference values and provided a legal background for future prioritization studies and detailed investigations.
- The new methodology was developed in 2012 for simple identification of contaminated sites, together with appropriate questionnaire.
- Additional and more detailed surveys are needed in order to update the inventory of all sites.
- Resulting from these surveys, a National priority list for restoration and remediation of most polluted localities will be created.


THANK YOU !