

INTERNATIONAL COMMITTEE ON CONTAMINATED LAND

QUESTIONNAIRE ABOUT LEGAL FRAMEWORK FOR SOIL/SITE CONTAMINATION MANAGEMENT

COUNTRY: SWEDEN

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OVERALL CONTEXT

1. Does your national policy have a specific definition of “contaminated site”, “contaminated soil”? If yes, please provide the definition.

Yes. Definition: A contaminated site is a site where land and water areas, buildings and structures that are so polluted that they may cause damage or detriment to human health or the environment.

(Overall policy: Environmental problems need to be tackled now, and not passed on to future generations. That is the thinking behind Sweden's environmental objectives – goals that are crucial to welfare, and intended to guide the sum total of Swedish efforts to safeguard the environment. Contaminated sites are contained in the concept of Sweden's environmental objectives, specifically in the goal “A non-toxic environment” that states that contaminated sites should not cause a threat to human health or the environment.)

2. Is Groundwater included in this definition?

Yes.

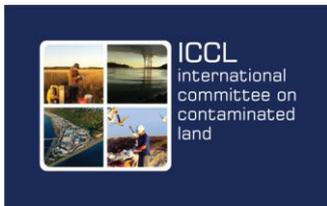
3. Does your policy on contaminated sites/land/soil include other definitions (i.e. brownfield, sediment)?

Yes.

4. Which sources are you considering? Industrial operations? Transport? Urban contamination? Etc.

Historical activities and ongoing industrial activities mainly. According to the Swedish Environmental law persons who pursue or have pursued an activity or taken a measure that is a contributory cause of the pollution (operators) shall be liable for the after-treatment of areas, buildings and structures.

LEGAL FRAMEWOK



5. Does your country have legislation with respect to contaminated land management?

- a. Whatever the situation is, please be precise if it's a specific or a common legislation, if integrated in a more general one (including prevention of emissions, soil protection, land planning, environment & health, etc.)

Contaminated sites are handled in the Swedish environmental law, the Environmental code (provided in English : <http://www.regeringen.se/sb/d/108/a/1348>). The regulations regarding contaminated sites are mainly found in the 10th Chapter in the Environmental code. Some other regulations like the Planning and Building Act.

- b. If there is no legislation, please be precise how you tackle the problem.
c. What are the main policy objectives?
d. What are the foundational principles on which the national policy is based? (e.g., polluter pays, risk-based, fit-for-use, stand-still, transparency, ...).

The principles are based on the PPP. Remediation actions are intended to reduce the risks for human health and the environment. When remediation is considered a risk assessment is carried out to find out if and to what extent risks have to be reduced. Then technical and economic aspects are also considered. First what is environmentally motivated are stated, then what is technically and economically reasonable and feasible is considered. A transparent, thorough investigation process is recommended and requested by the authorities.

6. What is the Chain of Liability for the management of contaminated land?

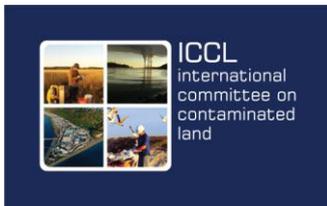
- a. Polluter? Land owner? Last operator? Occupier?

It is the operator who is primarily liable to investigate and carry the costs of remediation, according to the Environmental code (the Swedish environmental legislation). It is primarily the operator that carried out the contaminating activity. If a later operator has taken over and carried on with the same activities, that operator can be responsible. A liability can also be split between more than one operator. The property owner can also be held responsible for remediation if the property was purchased after 31 December 1998. The cost of treatment associated with exploitation is often carried by the property owner. In such cases, the latter does the clean up that is required, for example, to transform a previous industrial area into a residential area.

- b. Is there any difference between new and historic contamination?

The Environmental code was adjusted to the EU-directive ELD (Environmental liability directive) in 2007. For activities initiated after 2007, the rules are slightly different, than "historic" ones. For historic contamination, the liabilities are decreased for activities and contamination carried out prior to 1969, the year when the Swedish environmental law first came into place. For activities after 1969 that have causes contamination, there is a full liability. Basically this means that for activities carried out before 1950 no one can be hold responsible, and the responsibility is then reduced for activities between 1951-1968 according to recent juridical praxis.

- c. Can a responsible party pass on the liability to a purchaser? (under statutory law? Contractually?)



Yes, according to the Swedish environmental code, the property owner can be held responsible for remediation if the property was purchased after 31 December 1998, and if the owner should have known (should know) about the contamination (even if only potential by the time of the purchase. Then the purchaser should investigate to find out, due to the “land code”, the Swedish Land and Cadastral Legislation).

- d. Do you separate the obligation to remediate soil pollution and the liability regarding the damage caused by soil pollution and the related remediation measures?

No, the responsibility covers both soil pollution and another media (ground- or surface waters, sediments) to where the pollution is mitigated.

- e. Are you facing specific situations (e.g. privatization of the industrial activities, war impacted areas, ...) needing special programme?

Some State organizations such as the Swedish Transport Administration and the Swedish Armed Forces work on their own to identify, classify, and treat areas which they have contaminated. Some of the petroleum companies have a private financed, special program to investigate and remediate old petrol stations (see www.spimfab.se). But all these examples are not initiated due to specifically heavy pollution, but more a question of organization and the state taking its responsibility and so on.

7. Are there any specifications at regional / local level?

The legislation regulating remediation is the national legislation, and there are no other, specifications at regional or local level.

County administrative boards work with overriding regional work, handling subsidies, surveys and investigations, supervision and guidance, planning, and inspection of environmentally hazardous operations, and is also the authority to which municipal matters are appealed. They have the important task of identifying, classifying and risk assessing potentially contaminated areas. Municipalities work primarily with their own objects of supervision, and are also as the responsible authority with regard to objects that are publicly subsidized.

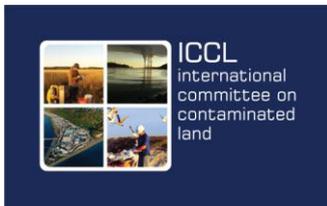
If operators or property owners discover contamination on their premises it is their responsibility to notify this to the supervisory authority (either the County administration or the municipality).

8. Are there specifications for site closure?

Many companies do some sort of environmental classification to evaluate their environmental risk. On the time for closure, in a dialogue with the supervision authority (either the County administration or the municipality) the obligations of remediation are set. This can also be done by an injunction by the authorities. In some cases, mainly for larger industries, the question of remediation can be handled in the permission for the activity.

9. Is there any legal requirement to conduct investigation for potential contamination in the sale of the property?

Please, see question 6 c).



10. Does your national policy have any kind of inventories/registers? If yes, please be precise regarding which sites are registered, how the data are collected and if the databases are public.

We are well informed about where in Sweden the potentially and observed contaminated areas exist. There are approximately 80,000 sites in Sweden where there have been operations that *may* have caused contamination. We estimate that there are approximately 1,300 sites where contamination can be a major environmental and human health risk (risk class 1, very high risk). Further 16,000 sites belong to risk class 2, high risk for environment and human health. It is mainly the County administrative boards (21) that have carried out the inventory work. The state has paid for this work, through a subsidy handled by the Swedish Environmental Protection Agency (Swedish EPA). The inventory is kept in a national database which is owned and administrated jointly by the County Administrative boards. The information in the database is public on request.

11. What are the strong, weak points and the major bottlenecks with respect to the current regulations in your country?

The major weak point legally, is the liability is reduced for an operator (or property owner) if the polluting activity has taken place before 1969. Most of the heavy pollution in Sweden occurred prior to 1969, due to the Swedish Environmental law in place since 1969, which has strongly affected the environmental impact from on-going industry, due to regulations for discharges etc.

The liability of a contaminated site has been strongly reduced due to the juridical practise since 2010. This is due to that the Swedish Environmental legislation came into place 1969 and regarding activities carried out before 1969, the liability are reduced. A main part of the contaminating activities occurred before 1969, since industrial emissions and so on have been regulated since 1969 due to the legislation in place. This is a problem in Sweden today, that it is not possible to hold some one fully responsible for the contamination.

TECHNICAL ISSUES RELATED TO THE LEGAL FRAMEWORK

12. Are there site investigation requirements?

It is not regulated in the law, how to carry out an investigation, just that liability to do so. The Swedish EPA provides guidance on how to investigate and remediate a contaminated site.

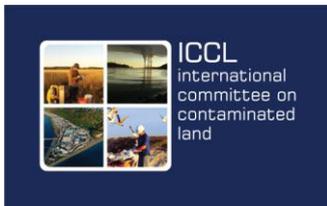
13. Are Risk Assessment & Management the main tools?

Yes, risk assessments and risk evaluations.

14. Are there specific technical approaches used?

- a. For Human Health (HH), Ecosystems, Groundwater (GW), Surface waters (SW), other targets (i.e. buildings, infrastructures, ...please be precise).

The Swedish EPA provides guidance on how to carry out a risk assessment. A risk assessment deals with all possible risks at a specific site and can include HH, Ecosystems, GW, SW and buildings and structures. Protection of human health includes both acute and long-term risks. Protection of the environment on-site is based on maintaining the functions of the contaminated area (e.g. degradation of organic material or the production of oxygen). The



contaminated site should also not lead to unacceptable risks for threatened or protected species on the site itself or in surrounding areas. When assessing the impact of a contaminated site on its surroundings, the starting point is that the transport of contaminants should not lead to an increase in background concentrations or contaminant load, which could threaten the quality of surface water or groundwater resources in the long term.

- b. On a site by site specific approach, or by derivation of guideline values?
If possible, please detail your answer.

The guidance from the EPA includes both a general approach for at risk assessment and a more detailed, site-specific approach. The more basic one include comparisons with calculated generic guideline values for soil for two types of sites/use of land, “sensitive land use” (housing, etc.) or “less sensitive land use (industrial use, etc.). In the site-specific assessment guideline values are calculated for the specific site and the specific exposure and the objects that should be protected. It can also contain many other types of investigations and assessments.

In a risk assessment, estimates are made of the risks related to the current and future contamination situations, as well as the extent of risk reduction needed to avoid unacceptable effects and to reach the remedial goals for the site. This information forms part of the basis for evaluation of remedial alternatives and subsequent remedial selection.

- c. Do you take into consideration others sources of pollution in the risk assessment?

Yes, for example that a contaminated site should not cause all the exposure to humans regarding a specific contaminant, or if a recipient is polluted from many sources, the contamination load from a contaminated site cannot be accepted if calculated on the contaminated site as the single source of pollution.

15. If the national policy uses guideline values, please be precise in describing the following points:

- a. Reasons for derivation of generic values

The Swedish generic guideline values have been derived for two different types of land use, sensitive land use (KM) and less sensitive land use (MKM). The generic guideline values are intended to protect people living on or visiting the site. The assessment of health risks takes into account exposure caused by direct contact with the contaminated soil as well as indirect exposure which can occur by the transport of contaminants to air, groundwater, and plants. The guideline values also take into account protection of the soil environment on the site. Groundwater and surface water are also protected against effects which occur as a result of the transport of contaminants. Please, also see question 14 above.

- b. Objectives / levels of implementation (investigation, risk assessment, remediation)

The process of risk assessment includes appraisals in several steps to determine whether a site is contaminated and if remediation to reduce risks is needed. SEPA defines a contaminated site as one in which contaminant levels exceed background values. If a site is contaminated, a



basic or detailed risk assessment should be used to determine if the contaminants entail any risk and if the risks are acceptable or not. The first step is to formulate a problem description including a conceptual model that describes how contaminants can spread and affect human health, the environment and natural resources. This problem formulation is also used to identify data gaps and the need for additional investigations and studies. Risk assessment also includes an analysis of the degree of contamination, contaminant transport and exposure (exposure analysis), an effect analysis and a summary risk characterization. A stepwise procedure allows one to adapt the assessment's scope and direction in order to reach a reasonable degree of confidence and level of expectation in both basic and detailed risk assessments. Prior to each new step, it is important to evaluate whether continued investigations and research are motivated. Whether a basic or detailed risk assessment should be performed is decided on a case-by-case basis.

c. Priority substances

d. Protocols of derivation (including acceptable risk levels used).

16. What are the drivers for remediation?

a. To what level is clean-up required? (i.e. acceptable risk, land use values, ...)

Acceptable risk and taking into account what can be considered environmentally motivated, economically reasonable and technically feasible.

b. Does your national policy use cost-benefits analysis for the choice of the remedial solution?

It can include a cost-benefit analysis, or other tools to find out what is environmentally motivated, economically reasonable and technically feasible. The guidance of the SWEPA includes information on this.

17. What are the main remediation strategies or treatment techniques used in your countries (including Natural Attenuation)?

a. Distribution of techniques?

It is still dominated by dig and dump approach. However, many different methods and techniques are tested/have been applied at single sites.

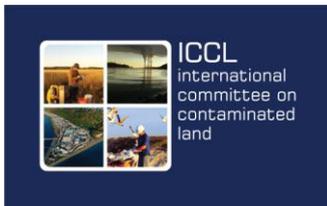
b. Evolution in time?

An on-going but slow process in finding and applying different, more innovative techniques are taking place, and have taken place for some years now.

c. Acceptance of innovative treatment techniques?

For example, guidance from the SWEPA on how to choose remediation methods describes and promotes other methods but dig and dump. However, in many places some digging must be carried out anyway and if many different contaminants are found, it can be hard to apply just one different method. The acceptance from the supervision authorities has been a little hard to find, but it is slowly increasing with increasing positive experiences.

18. Are you considering sustainability in the national approach?



- a. If yes, how? In particular, how the three pillars of sustainability are considered and balanced.

Yes. Risk assessment should be carried out in both a short and a long term perspective and if there is an unacceptable risk, the risk should be reduced. Remediation should however be considered environmentally motivated, economically reasonable and technically feasible.

- b. If no, explain the reasons and the future challenges.

19. How does your country bridge the CLM approach with:

- a. Land planning programmes?
- b. Public health programmes (aggregation of impacts on surrounding populations)

FINANCIAL ISSUES

20. What are the specific practices with respect to “Orphan sites”?

If there is no liable party according to the law, then the government can defray the costs. In order to receive a subsidy from the Swedish Environmental Protection Agency, issues of responsibility must be clarified. This is often done in a special liability study. If it is shown that there is no one who is currently liable, then the contaminated area can be the object of a government subsidy. A remediation project that is financed by a subsidy must have someone who is responsible for the economy and purchasing functions (a contractor). Further, a site must be of high priority (very high risk to human health or the environment) to be able to get a subsidy for remediation.

21. Do you have an idea of the annual budget allocated to Soil Contamination Management?

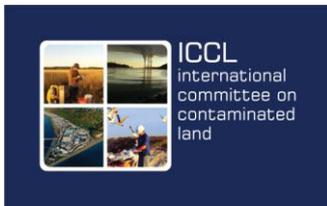
Yes, the state budget is about 46-50 million Euro a year (by 2013).

- a. How is it divided between public, private and others?

The state budget is covering investigations and remediation where no one can be held liable or where the liability is not full. Further, a site must be or be expected to be of high priority (very high risk to human health or the environment) to be able to get a subsidy for remediation. So far, about 10-20 actual remediation actions have been carried out per year by the state funding. However, the funding has also covered all the inventory work of contaminated sites, many investigations, supervision, etc.

On the other hand, private financing of remediation actions (including investigations), are about two to three times the state funded work a year, but then some of the remediation actions are less extensive. A lot of remediation is also carried out due to exploitation for new housing areas or industrial sites. Then, remediation is mainly private financed.

- b. What are the main financial / funding systems in place in your country? (e.g. Financial guarantees, insurance, public – private partnerships, special foundation, industrial consortium, enforcement, ...).



The Swedish government has set aside funds to defray the expenses associated with the investigation and remediation of contaminated areas where no liable party can currently be identified. The Swedish Environmental Protection Agency manages the money and grants funds to investigate and remediate contaminated sites. The municipalities (local governments) apply to their county administrative board (regional authority) for subsidies. The county administrative board, in turn, applies to the EPA for subsidies. The subsidies can cover for studies, investigations, remediation and follow-up. There is a government ordinance which describes how the subsidy can be used. Each year a regulatory letter is used to convey government decisions as to which activities we are to carry out the following year.

Please, see also question 6 e) above.

At this time, there are no insurance (it has been such in place in Sweden, but it did not work that time) or public – private partnerships, special foundation, in place, but probably solutions for financing will be looked into soon.

- c. Between the different steps of management (investigation, remediation, monitoring...)?

The liability to investigate goes further than the liability for a remediation action, so the polluter could often be held responsible for investigations (if still in place). PPP goes further for investigations. If no one is liable the state funding can be used for both investigation, remediation and monitoring (see above please).

ORGANISATIONAL ISSUES

22. How are stakeholders and in particular communities involved in the approach?

The Swedish Environmental Protection Agency works nationally as well internationally and has an advisory role. County administrative boards work with overriding regional work, handling subsidies, surveys and investigations, supervision and guidance, planning, and inspection of environmentally hazardous operations, and is also the authority to which municipal matters are appealed. They have the important task of identifying, classifying and risk assessing potentially contaminated areas. Municipalities work primarily with their own objects of supervision, and are also as the responsible authority with regard to objects that are publicly subsidized. If operators or property owners discover contamination on their premises it is their responsibility to notify this to the supervisory authority. Many companies do some sort of environmental classification to evaluate their environmental risk.

23. Is there a specific approach for:

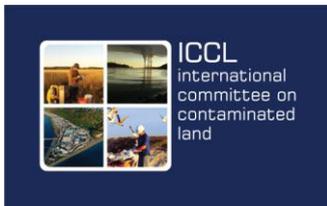
- a. Brownfields?

No

- b. Megasites?

No

- c. Widespread pollutions?



No (well, they can off course be of high priority for state funding for example, if no one can be found responsible).

d. Reuse of excavated soils? (e.g., in relation to their quality)

The supervision authorities set the limits for when and how soil can be reused. The Swedish EPA have a guidance on at which contamination levels reuse of excavated soil can be carried out with very low or low “acceptable risk”.

24. Does your national policy include any accreditation system for consultants or service providers? If yes, please provide some details.

There is an accreditation system for consultants regarding sampling (groundwater and soil) by the Swedish Geotechnical Society (<http://www.sgf.net>).

25. Do you have any training / capacity building programme, any management accountability and performance measurement?

There are a lot of courses and conferences available in Sweden, both at University level and for working people, which deal with contaminated sites. The Swedish Geotechnical Institute has a certain responsibility to work on knowledge capacity and scientific research regarding contaminated sites (www.swedgeo.se).

26. How is the necessary inter-governmental coordination for CLM organized? (e.g. with Health Protection Department, with the public site owners, with state or local public sector environmental organizations, with special interest advocacy groups,)

Please, see the questions above, for example 6 and 22.

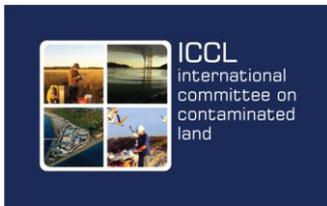
CRUCIAL DEVELOPMENTS IN THE FUTURE

Are there any additional issues to be further developed in the following months/years whatever they are (Research and Development needs, organisational issues, ...)?

Unofficially or officially, do you see any opportunities for collaboration in the coming months or years that may improve overall coordination among international organizations? (e.g., conferences, workshops, international (technical or policy) initiatives, growing alliances (e.g., in support of redevelopment /reuse of contaminated lands, etc.).

REFERENCES

Please give most important references (documents, website, projects, and case studies) that could be relevant for explaining your national approach



Methods for inventories of contaminated sites (Swedish EPA report, in English):

<http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/Publications-in-English/>

On how to choose remediation method and carry out investigations (summary in English): <http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/5900/978-91-620-5978-1/>

On Swedish generic guideline values (summary in English): <http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/5900/978-91-620-5976-7/>

On risk assessment (summary in English): <http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/5900/978-91-620-5977-4/>

On Swedish Environmental quality objectives: <http://www.swedishepa.se/Environmental-objectives-and-cooperation/Swedens-environmental-objectives/>

Swedish EPA: <http://www.swedishepa.se/>