



## INTERNATIONAL COMMITTEE ON CONTAMINATED LAND

### QUESTIONNAIRE ABOUT LEGAL FRAMEWORK FOR SOIL/SITE CONTAMINATION MANAGEMENT

**COUNTRY: CANADA / QUEBEC**

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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.

In our Environmental Quality Act,

- **soil** is defined as: any land or underground space even if submerged in water, including an area of land covered by a structure;
- **contaminant** is defined as: a solid, liquid or gaseous matter, a microorganism, a sound, a vibration, rays, heat, an odour, a radiation or a combination of any of them likely to alter the quality of the environment in any way

Moreover, the section IV.2.1 of Environmental Quality Act deals specifically with the Land Protection and Rehabilitation. It is stated at the beginning of this section that «for the purposes of this section “land” includes the groundwater and surface water present».

There is no specific definition of “contaminated site” or “contaminated soil”

2. Is Groundwater included in this definition?

It is included in the definition of Soil and Land

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

There is currently no definition for brownfields, sediments, etc.

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

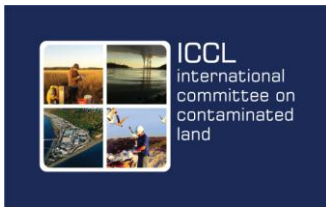
Basically, the Policy is targeting any land (soil and groundwater) contamination resulting from industrial (including storage and transport), commercial, institutional or residential (example: heating oil tanks) activities. Agricultural activities are not



targeted, but the conversion of agricultural land to other uses (residential) is, if persisting pesticides have been used (ex: DDT). The conversion of industrial or commercial land to agriculture is also targeted.

## **LEGAL FRAMEWOK**

5. Does your country have legislation with respect to contaminated land management? **Yes**
- 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.)  
Section IV.2.1 of the Environmental Quality Act is dealing specifically with the Land Protection and Rehabilitation. There is also three regulations dealing with contaminated land. Besides all this, there is also the Soil Protection and Land Rehabilitation Policy
  - b. If there is no legislation, please be precise how you tackle the problem.
  - c. What are the main policy objectives?  
There are 4 main objectives:
    1. Maintain the quality of the non degraded soils (no more land contamination).
    2. Make sure that the existing contaminated sites do not impact human health and the environment;
    3. Foster the contaminated sites reuse while making sure to protect the health and goods of the future users as well as the environment.
    4. Manage soundly the excavated soils, groundwater and others contaminated materials
  - 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, ...)  
Polluter pays and fit for use. Risk assessment and management (leaving contamination in place) are allowed (except for petroleum products contamination) but strictly regulated. More then 90% of the cleanup are excavation to generic criteria.  
  
Stand still principle is incorporated into the regulation. Transparency expresses itself through the obligation to register contamination on land title. Moreover any reuse project where contamination beyond generic criteria will stay on the land must go to a public hearing.
6. What is the Chain of Liability for the management of contaminated land?
- a. Polluter? Land owner? Last operator? Occupier?  
The Ministry may order assessment and clean-up to the polluter (no restriction in time) and to the actual or former (up till 20003) guardian (operator, occupier, etc) of the site.
  - b. Is there any difference between new and historic contamination?



No.

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

The Ministry will always have the possibility to revert to the original polluter, even if, knowing that an agreement has been concluded, he will first ask the actual guardian of the contamination.

- 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.

- e. Are you facing specific situations (e.g. privatization of the industrial activities, war impacted areas,) needing special programme? No.

7. Are there any specifications at regional / local level? No.

8. Are there specifications for site closure?

**Environmental Quality Law Article 31.51** specifies that. A person who permanently ceases an industrial or commercial activity of a category designated by regulation of the Government is required to perform a characterization study of the land on which the activity was carried on within six months of the cessation or within such additional time, not exceeding 18 months, as the Minister may grant, subject to the conditions fixed by the Minister, with a view to the resumption of activity. Upon completion, the study must be transmitted to the Minister and to the owner of the land.

If the characterization study reveals the presence of contaminants in a concentration exceeding the regulatory limit values, the person who carried on the activity concerned is required to transmit for the Minister's approval, as soon as possible after being informed of the presence of the contaminants, a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule and, where applicable, a plan for the dismantling of the installations on the land.

9. Is there any legal requirement to conduct investigation for potential contamination in the sale of the property? No. But

**Environmental Quality Law Articles 31.53 and 31.54** specify that :

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.

Yes. All sites for which the Ministry receive an assessment indicating that the soil is contaminated beyond the regulatory values will be register on the ministry inventory. This database is public. Most assessments are provided to



the Ministry because it is legally compulsory for the owners or the polluters to do so.

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

Strong points:

- It is compulsory to provide an assessment and a cleanup plan in many regulated situations
- There is a good treatment infrastructures for organic contamination
- Government programs (Revi-Sols and ClimatSol) helps developers to cleanup and reuse contaminated sites
- The public divulgation of the governmental contaminated sites liability (number of sites and \$ for assessing/rehabilitating) helps assuring the budget and effort to clean or control those sites.
- There is a good cooperation between the Health and Environment ministry
- Stakeholders (industries, cities, population) are confident in the governmental approach (generic criteria, risk management, policy, etc )

Weak points:

- There should be more beneficial uses accepted for treated and slightly contaminated soils;
- There should be more prevention, more specifically making sure that operating or new industries have the financial means to face spills and accidents
- Residential heating oil industries should be better control (tanks, installation, oil delivery, etc)
- There is no treatment technologies implemented for heavy metals contaminated soils

## **TECHNICAL ISSUES RELATED TO THE LEGAL FRAMEWORK**

12. Are there site investigation requirements?

Yes. The law targets some situations (cessation of regulated industrial activities, change of use of sites where regulated activities have taken place, etc) where it is compulsory to proceed to a site assessment. In all those cases, it is compulsory for the owner or polluter to perform a site assessment respecting all requirements of the Ministry document "Land Assessment Guideline" (Guide de caractérisation des terrains). An assessment which would not respect this guideline would not be accepted by the Ministry.

13. Are Risk Assessment & Management the main tools?

No. Risk Assessment & Management is applied for less than 10% of the rehabilitation projects. Moreover, Risk Assessment & Management is not accepted for petroleum products contamination. If someone is doing a risk assessment, he must follow the guideline produced by the Health Ministry to assess the health potential impacts and the guideline produced by the Ministry of the Environment to assess the ecosystem potential impact.

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). Yes for Human Health (HH), Ecosystems, Groundwater (GW), Surface waters (SW),
- b. On a site by site specific approach, or by derivation of guideline values? If possible, please detail your answer. Generic guideline values are first applied to any case of contamination to decide if the site is, based on a generic evaluation of the risks, contaminated and needs rehabilitation. At this stage, the responsible person may decide to use the generic criteria and solve the problem by excavating or treating in situ all contamination to the use based generic number. Instead, he may opt for doing a specific risk assessment, using the tools mentioned at number 14. In Quebec, the guideline values are used for the 3 following purpose:
  - Derivation of soil quality standards/thresholds
  - Assessment of actual or potential risk at specific site
  - Derivation of remediation objectives
- c. Do you take into consideration others sources of pollution in the risk assessment? No.

15. If the national policy uses guideline values, please be precise in describing the following points:
  - a. Reasons for derivation of generic values. To provide a sound and easy system allowing all involved persons to understand what they must do and perform sites cleanup allowing their reuse. Generic values also provide an «egalitarian» approach, where everyone plays by the same rule, has the same cleanup goals. Following a cleanup, it reduces to nothing or a minimum the need for follow up.
  - b. Objectives / levels of implementation (investigation, risk assessment, remediation). investigation, risk assessment, remediation
  - c. Priority substances.

**Contaminants**

**Limit values  
mg/kg of soil  
(dry matter)**

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I- METALS AND METALLOIDS

Silver (Ag)	20
Arsenic (As)	30
Barium (Ba)	500
Cadmium (Cd)	5
Cobalt (Co)	50



Chromium (Cr)	250
Copper (Cu)	100
Tin (Sn)	50
Manganese (Mn)	1000
Mercury (Hg)	2
Molybdenum (Mo)	10
Nickel (Ni)	100
Lead (Pb)	500
Selenium (Se)	3
Zinc (Zn)	500

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#### II- OTHER INORGANIC COMPOUNDS

Available bromide (Br <sup>-</sup> )	50
Available cyanide (CN <sup>-</sup> )	10
Total cyanide (CN <sup>-</sup> )	50
Available fluoride (F <sup>-</sup> )	400

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#### III- VOLATILE ORGANIC COMPOUNDS

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##### **Monocyclic aromatic hydrocarbons**

Benzene	0.5
Monochlorobenzene	1
1,2-Dichlorobenzene	1
1,3-Dichlorobenzene	1
1,4-Dichlorobenzene	1
Ethylbenzene	5
Styrene	5
Toluene	3
Xylenes	5

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##### **Chlorinated aliphatic hydrocarbons**

Chloroform	5
1,1-Dichloroethane	5
1,2-Dichloroethane	5
1,1-Dichloroethylene	5
1,2-Dichloroethylene (cis and trans)	5
Dichloromethane	5
1,2-Dichloropropane	5
1,3-Dichloropropylene (cis and trans)	5
1,1,2,2-Tetrachloroethane	5
Tetrachloroethylene	5
Carbon tetrachloride	5
1,1,1-Trichloroethane	5
1,1,2-Trichloroethane	5
Trichloroethylene	5




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#### IV- PHENOLIC COMPOUNDS

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##### **Non-chlorinated**

Cresol (ortho, meta, para)	1
2,4-Dimethylphenol	1
2-Nitrophenol	1
4-Nitrophenol	1
Phenol	1

##### **Chlorinated**

Chlorophenol (2-, 3-, or 4-)	0.5
2,3-Dichlorophenol	0.5
2,4-Dichlorophenol	0.5
2,5-Dichlorophenol	0.5
2,6-Dichlorophenol	0.5
3,4-Dichlorophenol	0.5
3,5-Dichlorophenol	0.5
Pentachlorophenol (PCP)	0.5
2,3,4,5-Tetrachlorophenol	0.5
2,3,4,6-Tetrachlorophenol	0.5
2,3,5,6-Tetrachlorophenol	0.5
2,3,4-Trichlorophenol	0.5
2,3,5-Trichlorophenol	0.5
2,3,6-Trichlorophenol	0.5
2,4,5-Trichlorophenol	0.5
2,4,6-Trichlorophenol	0.5
3,4,5-Trichlorophenol	0.5

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#### V- POLYCYCLIC AROMATIC HYDROCARBONS

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Acenaphtene	10
Acenaphtylene	10
Anthracene	10
Benzo (a) anthracene	1
Benzo (a) pyrene	1
Benzo (b + j + k) fluoranthene (combination or each)	1
Benzo (c) phenanthrene	1
Benzo (g,h,i) perylene	1
Chrysene	1
Dibenzo (a,h) anthracene	1
Dibenzo (a,i) pyrene	1
Dibenzo (a,h) pyrene	1
Dibenzo (a,l) pyrene	1
7,12-Dimethylbenzo (a) anthracene	1



Fluoranthene	10
Fluorene	10
Indeno (1,2,3-cd) pyrene	1
3-Methylcholanthrene	1
Naphtalene	5
1-Methylnaphtalene	1
2-Methylnaphtalene	1
1,3-Dimethylnaphtalene	1
2,3,5-Trimethylnaphtalene	1
Phenanthrene	5
Pyrene	10

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VI- NON-CHLORINATED BENZENE COMPOUNDS

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2,4,6-Trinitrotoluene (TNT)	0.04
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VII- CHLOROBENZENES

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Hexachlorobenzene	2
Pentachlorobenzene	2
1,2,3,4-Tetrachlorobenzene	2
1,2,3,5-Tetrachlorobenzene	2
1,2,4,5-Tetrachlorobenzene	2
1,2,3-Trichlorobenzene	2
1,2,4-Trichlorobenzene	2
1,3,5-Trichlorobenzene	2

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VIII- POLYCHLORINATED BIPHENYLS (PCB)

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Summation of the congeners	1
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IX- PESTICIDES

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Tebuthiuron	50
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X- OTHER ORGANIC SUBSTANCES

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Acrylonitrile	1
Ethylene glycol	97
Formaldehyde	100
Dibutyl phtalate	6

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XI- INTEGRATING PARAMETERS

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Petroleum hydrocarbons C	to C	700
	10	50

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XII- DIOXINS AND FURANS





Summation of chlorodibenzodioxins and chlorodibenzofurans expressed in toxic equivalents 2,3,7,8-TCDD (NATO, 1988)  $1.5 \times 10^{-5}$

- d. Protocols of derivation (including acceptable risk levels used).  
The acceptable risk levels is 1/1 000 000. The protocols are all in French. If you really need them, tell me, I'll send them to you.
16. What are the drivers for remediation?
- To what level is clean-up required? (i.e. acceptable risk, land use values, ...). Land use values if you use the generic approach. Acceptable risk if you use the specific risk approach.
  - Does your national policy use cost-benefits analysis for the choice of the remedial solution? No.
17. What are the main remediation strategies or treatment techniques used in your countries (including Natural Attenuation)?
- Distribution of techniques? There are 27 approved treatment centres. 25 of them use bio-ventilation/biodegradation, 2 thermal, 2 chemical and 1 incorporate contamination into an industrial process (foundry). Some treatment centres use more than one technology. Besides this, 21 companies have performed in situ treatment over the last 5 years; the in situ treatment technologies performed are chemical oxidation, biological degradation, pump and treat, enhanced biological and phytotreatment.
  - Evolution in time? The first treatment centres, bioremediation, was build in 1991.
  - Acceptance of innovative treatment techniques? Any treatment techniques may be proposed and will have to go through a protocol to be accepted.
18. Are you considering sustainability in the national approach?
- If yes, how? In particular, how the three pillars of sustainability are considered and balanced. A sustainable approach should aim at
    - removing as much contaminants as possible from the environment, thus foster definitive solution (treatment following excavation or in situ) instead of leaving contamination in place and «eternally» controlling/managing it;
    - Foster beneficial reuse of the treated soils, even if still slightly contaminated.Removing as much contaminant as possible form the environment is a balancing act between the three pillars: ideally, everything should be taken out but, economically, this would be a non sense and leads to doing nothing in most of the case. Land use generic criteria should be devised so that most of the owner/polluter will be willing / able to apply them, providing the removal of a large share of the contamination at an



acceptable cost, and allowing the reuse of the site without complicated follow up. By doing so, environmental, social and economical aspects of the problem are taken into account.

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

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

- a. Land planning programmes? The generic criteria applied for the site cleanup are related to the future use of the land (zoning)
- b. Public health programmes (aggregation of impacts on surrounding populations) The Health Ministry is involved in the elaboration of the generic criteria as well as in the health part of any specific risk assessment and management proposal.

## **FINANCIAL ISSUES**

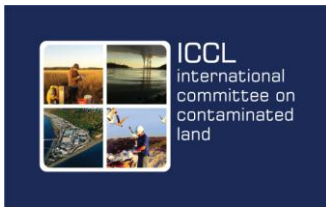
20. What are the specific practices with respect to “Orphan sites”?

In 2007, the Quebec Government asked all its ministries to dress the list of «their» contaminated sites, meaning the one they polluted themselves or the orphan sites that they have now the responsibility to manage. The later mostly revert to the ministry of the Environment when they become a threat to the human health, public security or the environment. Besides listing their sites, each ministry had to evaluate how much it would cost to assess/clean them. Those figures became the contaminated sites governmental liability and appear in the province accounts as a debt. Currently, this liability reaches 3.2 billions \$. Each ministry submit yearly a list of assessment and cleanup that they wish to perform on some of those sites and are financed by the government to do so.

As a whole, Ministries tried since many years to avoid becoming responsible of new third parties contaminated sites (orphan sites). But, there are situations where there is no other options then take control and manage those sites.

21. Do you have an idea of the annual budget allocated to Soil Contamination Management? No.

- a. How is it divided between public, private and others? No.
- b. What are the main financial / funding systems in place in your country?
  - 1) The polluter pays, developer pays principles applied to all private sites. The private parties must finance themselves
  - 2) Through the Climat Program (2007-2015) the Ministry of the Environment provides 50 millions to the cities and the private site owners for financing part of the assessment/cleanup projects on contaminated sites
  - 3) Government contaminated sites assesment and cleanup are financed by the government as described at question 20 (e.g. Financial guarantees, insurance, public – private partnerships, special foundation, industrial consortium, enforcement, ...).



- c. Between the different steps of management (investigation, remediation, monitoring...)? **No.**

## **ORGANISATIONAL ISSUES**

22. How are stakeholders and in particular communities involved in the approach? For any reuse projects involving specific risk assessment and living in place contamination beyond the generic criteria, a diffusion of all information (including, assessment, risk assessment, projects description, clean up land must be made available to the public. At least one public meeting must be held, a summary of the comments and a description of how the promoter will take care of the public concerns provided to the Health and Environment Ministries.
23. Is there a specific approach for:
- Brownfields? **No.**
  - Megasites? **No.**
  - Widespread pollutions? **No.**
  - Reuse of excavated soils? (e.g., in relation to their quality) **There is in the Policy an excavated soil management grid explaining what can be done with soils contaminated at different levels.**
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 (experts). The experts must have more than 10 years of experience into assessment and remediation. They must also pass with more than 70% the Ministry test. Their role is related to the application of the Environmental Quality Law. In all situations targeted by the law, they must :**
- Certified that the assessment has been made following the Ministry guideline**
  - Certified that the summary of the assessment which must be registered on the land title really reflects the assessment**
  - Certified that the cleanup plan approved by the Ministry has really been the one implemented on the land**
  - If the site has not been cleaned up to the generic criteria (risk management), he is certified to the city which should give a building permit that the envisioned project is compatible with the soil quality and risk management put in place.**
  - Do you have any training / capacity building programme, any management accountability and performance measurement? **The experts must assist to the formation given by the Ministry (normally, once every two years).****
25. 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, ). 1) Health and Environment ministries are working constantly together on different risk assessment/management projects. 2) There are joint committees between each major industrial sectors stakeholders (chemical products, petroleum products, mining, etc) and the ministry. There are meetings around 3 times a year where formerly identified topics are discussed. There is also such committee with the cities. 3) Any new laws or regulations or guidelines are submitted to a review process including all stakeholders. 4) Many environmental stakeholders (consultants, laboratories, etc) are members of networks which regularly exchange with the ministry and will be consulted when new laws, regulations or guidelines are issues.

## **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, ...)?

- We are currently working on a new version of the Soil protection and Contaminated Sites Rehabilitation Policy which should replace the actual 1998 version
- We are also working at merging the three existing regulations existing on contaminated land into a single one, while adding at the same time new provisions.

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.). It is important to be kept informed on how other policies evolve. Punctually, it is good to be able to ask advice on specific themes or problems to peers to guide choices which had to be made home.

## **REFERENCES**

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

### 1) Act

The Quebec *Environmental Quality Act* (EQA) Section IV.2.1 (articles 31.42 till 31.52) ([http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/Q\\_2/Q2\\_A.html](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/Q_2/Q2_A.html))

### 2) Regulations

a) Soil Protection and Sites Rehabilitation Regulation



[http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q\\_2/Q2R37\\_A.htm](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R37_A.htm)

b) Regulation respecting the burial of contaminated soils

[http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q\\_2/Q2R18\\_A.htm](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R18_A.htm)

c) Regulation respecting contaminated soil storage and contaminated soil transfer stations

[http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q\\_2/Q2R46\\_A.HTM](http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R46_A.HTM)

3) The Soil Protection and Contaminated Sites Rehabilitation Policy (in French only)

<http://www.mddep.gouv.qc.ca/sol/terrains/politique-en/index.htm>