



## Common Forum – Working Document

### Compilation of standards for contamination of surface water, ground water, sediments and soil

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### Synthesis of the answers received after Roman's request (Slovak Republic request) (19/11/2009) Updated on December 01, 2009

#### REQUEST

In the name of our partners from Comenius University in Bratislava, department of geochemistry, I would like to ask you for help us with **compilation of standards** for contamination of **surface water, ground water, sediments and soil**, actually valid in EU. We want to **compare limit (threshold) values** (mainly As and Sb) in these particles of environment, valid in national legislatives of **EU countries**, with **Slovak regulations**.

We would be very glad, if you or your colleagues will be able to offer your national limit values, or recommend some sources about limit values in EU. Thanks.

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#### ANSWERS FROM COUNTRIES

##### **Austria / Gundunla Prokop (25/11/2009)**

With regard to Austria: exactly one year ago we had a similar request from a Hungarian colleague.

Please find attached the results ([Annex 1](#)) - no changes occurred in the meantime.

Apart from this information I would also like to refer to the HERACLES report, which you probably know already.

A DERIVATION METHODS OF SOIL SCREENING VALUES IN EUROPE. A REVIEW AND EVALUATION OF NATIONAL PROCEDURES TOWARDS HARMONISATION.

It can be downloaded from the JRC website or I can send you the full report.

[Derivation Methods of Soil Screening Values in Europe. A review and evaluation of National Procedures towards harmonisation](#)

EUR 22805 EN - 2007

(PDF file via <http://eusoils.jrc.ec.europa.eu>)



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#### **Belgium – Walloon region / Esther Goidts (24/11/2009)**

You will find here joined the Soil Decree being just implemented in the Walloon Region (southern Belgium). However, we do not have an English version of this document, so if you feel like reading French...

The first annex of the Soil Decree (p.18-23) indicates all the values that need to be considered when investigating soil (and consequently groundwater) pollution, in the context of an "orientation study" (first step when investigating a site for potential pollution). This annex should also give some answers to the demand from our Slovakian colleague.

To understand the first annex, here is the meaning of some abbreviations used: "VR" stands for "Valeur de Référence" which corresponds to the background level of the pollutant in the soil (this is, in principle, the reference value to reach when cleaning operations have to be undertaken for the polluted site), "VS" stands for "Valeur Seuil" and corresponds to the threshold value over which a characterisation study (i.e. detailed investigations) must be done after the orientation study, and "VI" stands for "Valeur d'Intervention" which is the threshold value over which a cleaning project must be done.

Note that not all pollutants have a threshold value specified in this annex (this is the case for Sb). However, a screening has to be done by the soil expert during the orientation study when the nature of the pollutants presents is uncertain, such that the danger from a pollutant not specified in the annex will be taken into account within a case-by-case approach.

#### [Soil Decree](#)

(via [www.ejustice.just.fgov.be](http://www.ejustice.just.fgov.be))

#### **United-Kingdom / Paul Nathanail (23/11/2009)**

Please note that the UK updated the scientific basis for its soil guideline values earlier this year so much of the information in the report Giovanni kindly reminded us of is now out of date; I attach the [relevant 2009 report for Arsenic](#) (PDF file via [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)). Antimony is not covered by the environment agency or by the LQM/ CIEH values I presented in Helsinki but MAY be included in a forthcoming report which I will send on if/ when it appears. The SGV apply to soil and seek to protect human health; drinking water standards or water body specific standards apply to groundwater and surface water.

#### [Soil Guideline Values \(SGV\)](#)

#### [Soil Guideline Value reports published using the new approach](#)

(via [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk))



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#### **Netherlands / Margot Meijer (24/11/2009)**

Herewith I send the most recent Circular of soil remediation.

[Soil Remediation Circular](#)

(via [www.vrom.nl](http://www.vrom.nl))

#### **Norway / Qno Lundkvist (20/11/2009)**

Norway is not a member of EU. Norway does have standards for

Regarding soil please contact Mr Pål Spillum ([pal.spillum@sft.no](mailto:pal.spillum@sft.no)). Some info in English is available here: State of Environment Norway

<http://www.environment.no/Tema/Kjemikalier/Forurensset-grunn/#B>

Regarding sediments please contact Mrs Ingvild Marthinsen ([ingvild.marthinsen@sft.no](mailto:ingvild.marthinsen@sft.no))

Regarding water please contact Mrs Anne Sundby ([anne.sundbye@sft.no](mailto:anne.sundbye@sft.no)). Some info in English is available here <http://www.environment.no/Topics/Water-pollution/> To your information there is dietary advice (advice against consumption) in 32 Norwegian fjords. This mainly due to high levels of PCB, PAH or mercury in marine organisms (and sediments).

I also attach a link to "[Report no 14 \(2006-2007\) Working together towards a non-toxic environment and a safer future](#)" (PDF file via [www.regjeringen.no](http://www.regjeringen.no)). Among other things this report contains info regarding sediments a polluted soil.

#### **France / Jean-Luc Perrin (24/11/2009)**

In France, Arsenic belongs to the dangerous substances allowing to characterise the ecological state of water bodies. The frontier between good and bad state has been fixed to 4,2ug above the geological background values.

For Sb there is a temporary environmental quality norm fixed to 113 µg above the geological background values

For Soil we do not have such threshold: with our last return on experience we assessed that these values did not take into account all pathways of exposure and decided, for soils, to have a case by case study, linked with reference values for eating or drinking, closer to the use.



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#### **Germany/ Andreas Bieber (24/11/2009)**

The values for Germany mentioned in the EUR report are still valid.

There is in addition a compilation from 2008 of values for substances, which are not yet covered by the German Soil Protection Ordinance (SPO). The scientific basis and method of derivation is the same as for the values in the SPO. I regret that this compilation is only available in German.

[Federal Soil Protection and Contaminated Sites Ordinance](#)

(PDF file via [www.bmu.bund.de](http://www.bmu.bund.de))

[Bewertungsgrundlagen für Schadstoffe in Altlasten](#)

[Informationsblatt für den Vollzug](#)

(PDF file via [www.labo-deutschland.de](http://www.labo-deutschland.de))

#### **Lithuania / Kęstutis Kadūnas (24/11/2009)**

This is from legislative act (no official translation) ([Annex 2](#)).

#### **Belgium – Flemish region / Griet van Gestel & Marijke Cardon (27/11/2009)**

In the present Soil Decree of Flanders, we have following standards for arsenic (for Sb no standards are provided): Soil remediation values for soil (depending on land use type):

agriculture and nature: 58 mg/kg ds; residential area's: 103 mg/kg ds;  
recreation and industry: 267 mg/kg ds.

These values are based on protection of human health. The documents describing the derivation, are available, however in Dutch. Soil remediation value for groundwater: 20 µg/l (based on drinking water quality).

Target value (objective for remediation, and value for the use of excavated soil in all cases): 35 mg/kg ds

I attach a [paper by Provoost et al. on the comparison of different soil remediation values in Europe](#), which might be useful.

(via <http://www.springerlink.com>)



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#### ANSWERS FROM OTHER CORRESPONDENTS

##### **Netherlands/ RIVM – HERACLES / Frank Swartjes (23/11/2009)**

Do you have our 2007 HERACLES report of 2007? It includes the soil quality standards (SQSs) for 16 EU countries for soil and groundwater. Moreover, you have to be aware of the fact that comparing SQSs is difficult for several reasons (also see the report). You certainly should have this report, Mr. Hangáč. Please find it attached (careful with printing, it's huge).

[Derivation Methods of Soil Screening Values in Europe. A review and evaluation of National Procedures towards harmonisation](#)

EUR 22805 EN - 2007

(PDF file via <http://eusoils.jrc.ec.europa.eu>)

I also attach a link to more recent HERACLES info, It might be of interest to you.

[Towards consistency in risk assessment tools for contaminated sites management in the EU](#)

(via [www.rivm.nl](http://www.rivm.nl))

##### **Joint Research Center – Europa / Giovanni Bidoglio (23/11/2009)**

Maybe the attached report will provide you the answer that you need.

[Derivation Methods of Soil Screening Values in Europe. A review and evaluation of National Procedures towards harmonisation](#)

EUR 22805 EN - 2007

(PDF file via <http://eusoils.jrc.ec.europa.eu>)

##### **Joint Research Center – Europa / Marco d'Alessandro (25/11/2009)**

Please find hereafter the links to some documents related to your problems:

[Towards consistency in Risk assessment tools for contaminated sites management in the EU - The HERACLES strategy from the end of 2009 onwards](#)

(PDF file via <http://www.rivm.nl>)

[Derivation Methods of Soil Screening Values in Europe. A review and evaluation of National Procedures towards harmonisation](#)

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## **Common Forum – Working Document**

### **Compilation of standards for contamination of surface water, ground water, sediments and soil**

#### **Annex 1**

#### **Results for a similar request from Austria**

# THE ISSUES OF CONTAMINATED SITE MANAGEMENT IN AUSTRIA

## Questioner

*We would like to update our information on Austrian legislation on contamination management. We kindly ask you please to overview the following questioner, check the validity of information provided during NORISC survey in 2001 and update them according to changes in last years. Please provide references of new relevant regulation/law (title, article, etc.) and send to us their English version or links (decrees, decisions, laws, standards, protocols, etc.).*

### 1. General legislation in the field of management of contaminated sites

- *What regulations concern generally the polluted sites (soil and groundwater) including the issues of investigation, clean up, (hazardous) waste management, technical requirements, etc?*

In 1984 the principle of **integrated environmental protection** was established in the Austrian constitution. **§1 of the corresponding Federal Act** (Federal Legal Gazette no. 491/1984) contains the following provisions:

(1) The Republic of Austria commits itself to integrated environmental pollution.

(2) Integrated environmental pollution means protecting the natural environment as basis of human life against detrimental impacts. Integrated environmental protection mainly comprises measures aiming at clean air, clean water and soil as well as preventing noise pollution.

The **Austrian Water Act** (Federal Legal Gazette no. 215/1959, the Act as amended), which came into force in 1959, is already characterised by the precautionary principle. The legal goal of keeping waters clean was defined as "maintaining water in its natural condition". Since more than 99% of the Austrian drinking water supply is covered by groundwater, groundwater protection is key. Pursuant to the Austrian Water Act groundwater has to be kept clean in a way so that it can be used as drinking water.

In Austria, with regard to potential hazards from contaminated sites and related remediation measures the main emphasis is placed on preventing groundwater pollution. This is why, here again, the Austrian Water Act is the key legal document. In line with the principles laid down in the Austrian Water Act the approaches to risk assessment are characterised by the precautionary principle as well.

Apart from the Austrian Water Act, there are mainly two other pieces of legislation containing provisions which have to be taken into account in contaminated sites risk assessment, namely the **Industrial Code** (Federal Legal Gazette no. 50/1973, as amended) and the **Austrian Federal Waste Management Act** (Federal Legal Gazette no. 325/1990). In connection with approval procedures and the closing down of industrial sites the Industrial Code mainly aims to protect the interests of neighbours and water bodies. The Waste Management Act determines when waste collection and treatment is required in the public interest. In order to safeguard public interest and to reduce potential hazards the authorities may impose obligations to dispose of waste and waste-oil and thereby contaminated soil in an environmentally sound way. In this context it has to be mentioned that the Federal constitution contains provisions for keeping the soil clean, but there is no specific national soil conservation act. Up to now, soil conservation has been in the competence of the Provincial authorities which have enacted corresponding laws. These laws,

however, aim exclusively at restoring and maintaining agriculturally used areas and do not deal with soil conservation as such.

The **Act for the Clean-up of Contaminated Sites (ALSAG)**, enacted in 1989 (Federal Legal Gazette no. 299/1989) was primarily meant to be a means of funding clean-up measures. Charges levied for the disposal and export of waste are put into a fund from which grants for remediation projects are available. The Act for the Clean-up of Contaminated Sites furthermore obliges the Federal Minister for Environment, Youth and Family to survey, investigate and assess contaminated sites on a national scale and to co-ordinate corresponding measures.

## 2. Expected short term changes in relevant regulation for contaminated site management

- *Do you know if there are any new environmental regulations expected to enter in force in the coming two years?*

Currently a large project "Contaminated sites management 2010" (short title ALM 2010) is in operation. The project is being co-ordinated by the Austrian Federal Environment with the participation of the Ministry of Environment, representatives from the Federal States and partners from universities. Overall objective is to establish a risk-based policy for the management of contaminated sites and to reach broad consensus with all partners involved. New aspects that will be taken on board are: exposure assessment (human health), impacts on eco-systems (basic principles), use specific orientation values, models for pollution migration in groundwater, economic assessment of environment impacts, and support of innovative technologies.

The results of the project shall lead to an amendment of the current contaminated sites legislation (ALSAG).

## 3. Any E.C. Directive or other legislation adopted as a model (n° and title);

None so far

## 4. The application of limit/reference values concerning the assessment of contamination and the determination of clean up target values;

- *Is there an official list determining soil and groundwater contamination limit values?*
- *How the clean up target value is determined? Is there any regulation for the methodology?*

**There are no general intervention values for the evaluation of polluted subsoil.** Introducing such values would be fairly improper considering basic approaches especially with regard to water and soil conservation as well as different geogenic conditions or man-made damages.

Therefore, any case of damage needs to be evaluated separately. *See Question 5 on risk assessment.*

Guidelines and other rules and regulations should define criteria and **comparable standards that may be helpful in practical decision-taking.** Generic criteria should serve as a starting point for evaluation, which, together with the actual site conditions, lead to conclusions for risk assessment and the resulting need for action.

### Groundwater

According to **Austrian Standard ÖNORM S 2088-1** three criteria form the basis of risk assessment for groundwater:



- potential of hazardous substances
- geological and hydro-geological site conditions
- dispersal of noxious substances in ground water

### **Assessing the harmful potential of hazardous substances**

The hazardous substances in a **waste deposit or in the polluted subsoil** as well as their dispersal in the three-phase system solid - soil gas - water are described by assessing analysis results from direct sampling at a suspected contaminated site.

To evaluate the potential of hazardous substances reference values are provided for:

- analysis results from eluate investigations,
- analysis results from soil gas investigations,
- analysis results of total contents.

These values were determined according to relevant specialist literature and standards. Groundwater is categorised into that which is important for water-supply, and hence enjoys special protection, and that which is not exploited. There are more stringent reference values for the former.

### **Geological and hydrogeological on-site conditions**

Assessment of a site, considering geology and hydrogeology with regard to the possible dispersal of hazardous substances in the subsoil (identifying relevant paths and geological barriers).

### **Dispersal of hazardous substances in groundwater**

Assessing if and to what degree a waste deposit or industrial site causes changes in ground water quality. **To support the evaluation of analysis results from ground water, screening values and intervention values are discussed, although they are not utilisation-oriented.**

By definition excess screening values require further inquiry and investigation to determine the facts. Thus, sites with levels below the screening values are determined not to be potential risk. Excess intervention values imply higher potential risks. This usually requires safety and clean-up measures or, at least, their consideration. The intervention values are generally determined according to drinking water standards.

However, it must be underlined again that reference values only support the risk assessment of waste deposits and industrial sites. Any decision has to be made in view of the specific site conditions.

### **Austrian Standard S 2088-1 for Risk Assessment Concerning Groundwater (ÖNORM S 2088-1 ALTLASTEN-GEFÄHRDUNGSABSCHÄTZUNG FÜR DAS SCHUTZGUT GRUNDWASSER)**

Groundwater is categorised into that which is important for water-supply, and hence enjoys special protection, and that which is not exploited.

To evaluate the harmful potential of hazardous substances and to assist the interpretation of chemical analysis results, the following reference values are provided for the following components:

- Eluate concentration
- Soil gas concentration
- Total concentration of contaminants in geological medium

- **Screening values** ('Prüfwerte' They trigger the need for further investigation.)
- **Intervention values** ('Massnahmen-schwellenwertE' They indicate higher potential risk and usually require safety and/or clean-up measures, or at least their consideration. They were generally determined according to drinking water standards.)

For groundwater reference values are given independently from the sensitivity of the area. Also difference value is provided that shows the magnitude of the contamination related to the background level depending on the accuracy of the measurements.

As the screening value is exceeded by any parameters gained during survey or monitoring, all other parameters must be determined. Contaminant concentration in groundwater over the intervention values just indicate the necessity of clean up measure, but generally a complex evaluation of all parameters is in concern. The intervention values relevant for groundwater are determined regarding the Chapter B1 "Drinking water" of the Austrian Book of Consumables (3rd Edition, 1993).

### **Soil**

Austrian Standard S 2088-2 for Risk Assessment Concerning Soil (ÖNORM S 2088-2 ALTLASTEN-GEFÄHRDUNGSABSCHÄTZUNG FÜR DAS SCHUTZGUT BODEN)

This guideline provides assessment criteria for soil contamination and its direct effect on humans, plants and animals is established.

Screening values and intervention values are given for different land use:

- Areas with direct human exposure (oral uptake possible from the 0-10 cm upper soil)
- Agricultural, horticultural and other areas where directly plants are exposed

For industrial and other areas the reference values for agricultural areas or those given in ÖNORM S 2088-1 are helpful to be applied.

Exceeding the screening values further investigation and risk assessment are recommended (as Standards are not obligatory) to concern the potential harm on human, consumable plants and groundwater or ecosystem according to the feature of the site.

**Please update this chapter and provide actual information on limit values. Are the soil values the same as described here and listed in Annex? Are there groundwater limit values available?**

### **5. The application of environmental risk assessment and financial assessment in evaluation of contamination situation;**

- *For contaminated site assessment, is there need for risk assessment to be included?*
- *What type of risk has to be considered (human health, ecological, groundwater quality, other)?*
- *Is there any regulation relevant to this issue?*

In Austria, the assessment of the risk emanating from contaminated sites is carried out in line with the legal provisions for precautionary environmental protection. In this context, the **Austrian Water Act which provides for the conservation of water in its natural state** is of particular importance.

Against this legal background the Austrian Federal Environment Agency developed a methodology of risk assessment which applies the so-called "repair principle", at the same time taking into account the objectives of precautionary environmental protection.

Risk assessments have to be done on a case-by-case basis and should be tailored to the widely varying site-specific conditions and uses. Soil contamination may be tolerable to a certain extent, provided that a further dispersal of pollutants can be avoided. Hence, reference values for soil degradation are determined with regard to land use, whereas reference values for groundwater are not utilisation-oriented and fixed in line with the drinking water standards.

Risk assessment requires the consideration of geological, hydrogeological, geographical and hydrological conditions. They are crucial when it comes to decide the necessity and scope of further measures. Risk assessment is seen as a comprehensive documentation and evaluation of risks regarding a waste deposit or industrial site. Investigations such as analyses of ground water and soil serve as basis for risk assessment.

Are there any risk assessment protocols/guidelines available for in addition to relevant ÖNORMS? Do you apply internationally used standards such US EPA guidelines and RBCA Tool Kit for Chemical Releases? At the moment no additional national guidelines or protocols are available. The methodology of risk assessment used was developed by the Austrian Federal Environment Agency.

## **6. Applicable technical standards and protocols for site investigation (including sampling and analysis), site assessment and clean up measures;**

The Federal Environment Agency has published a detailed guideline on how to identify contaminated sites: Guideline on the identification of potentially contaminated sites (Erhebung von Verdachtsflächen, Umweltbundesamt, 1995)

National Standard S 2087 on Identification and Investigation of Potentially Contaminated Sites (ÖNORM S 2087 ALTLASTEN-ERKUNDUNG, Erhebung und Untersuchung von Verdachtsflächen, Österreichisches Normungsinstitut, 1997)

ÖNORM S 2088 -1 and - 2 require analytical methods for different pollutants specified in the following Austrian and German Standards:

ÖNORM L 1085 Chemische Bodenuntersuchungen – Bestimmung der mineralischen Naehr- und Schadelemente im Saeureaufschluss

ÖNORM L 1092 Chemische Bodenuntersuchungen – Bestimmung wasserlöslicher Stoffe

ÖNORM L 1094-1 Chemische Bodenuntersuchungen – Extraktion von Spurelementen mit Ammoniumnitratlösung

ÖNORM S 2087 Erhebung der Untersuchung von Verdachtsflaechen und Altlasten

ÖNORM S 2088-1 Altlasten – Gefaehrdungabschaetzung für das Schutzgut Grundwasser

ÖNORM S 2100 Abfallkatalog

ÖNORM S 2115 Bestimmung der Eluierbarkeit von Abfaellen mit Wasser

ÖNORM S 2120 Bestimmung des Gesamtgehaltes an Kohlenwasserstoffen und des Gehaltes an Kohlenwasserstoffen im Eluat in Abfaellen mit IR-Spektroskopie

ÖNORM B 4400 Erd- und Grundbau – Bodenklassifikation für bautechnische Zwecke und Methoden zum Erkennen von Bodengruppen

ÖNORM B 4401-1 Erd-und Grundbau – Erkundung durch Schürfe und Bohrungen sowie Entnahme von proben – Aufschlüsse im Lockergestein

ÖNORM B 4401-2 Erd-und Grundbau – Erkundung durch Schürfe und Bohrungen sowie Entnahme von proben – Aufschlüsse im Festgestein

ÖNORM M 6245 Wasseruntersuchung – Übersicht über Wasseranalysenverfahren – Nachweisgrenzen, Einsatzbereiche, statistische Angaben

ÖNORM M 6290 Untersuchung von Klaerschlämml – Aufschluss mit Königswasser zur Bestimmung saurelöslicher mineralischer Bestandteile

ÖNORM S 2072 Eluatklassen – (Gefährdungspotential) von Abfällen

ÖNORM S 2090 Probenahme und untersuchung von Bodenluft auf leichtflüchtige organische und anorganische Verbindungen

DIN 38407-9 Deutsche Einheitsverfahren zur Wasser-, Abwasser – und Schlammuntersuchung – Gemeinsam erfassbare Stoffgruppen (Gruppe F) – Bestimmung von Benzol und einigen Derivaten mittels Gaschromatographie (F 9)

DIN 38409-13 Deutsche Einheitsverfahren zur Wasser-, Abwasser – und Schlammuntersuchung – Summarische Wirkungs- und Stoffkenngrößen (Gruppe H) – Bestimmung von polycyclischen aromatischen Kohlenwasserstoffen (PAK) in Trinkwasser (H-13-1 bis 3)

DIN 38409-18 Deutsche Einheitsverfahren zur Wasser-, Abwasser – und Schlammuntersuchung – Summarische Wirkungs- und Stoffkenngrößen (Gruppe H) – Bestimmung von Kohlenwasserstoffen (H-18)

DIN 38414-4 Deutsche Einheitsverfahren zur Wasser-, Abwasser – und Schlammuntersuchung – Schlamm- und Sedimente (Gruppe S) – Bestimmung der Eluierbarkeit mit Wasser (S 4)

## 7. Legal process and operative steps for management of contaminated sites including duties and liabilities by observation, site investigation, clean up measure, post remedial actions; and monitoring.

According to the **Federal Clean-up Act**, local authorities have to report potentially contaminated sites to the Ministry of the Environment. Site identification is based on desk studies and ends whether a site shall be registered and hence requires site investigation.

**Austrian Standard on Contaminated Site Management and Remediation** No. S2085 (ÖNORM S 2085 ALTLASTEN - Ablauf der Bearbeitung von Altablagerungen und Altstandorten) gives the steps of contaminated site management:

- site identification – record in Contaminated site register
- pretermission of all on-site activities
- site assessment
- site investigation
- risk assessment
- evaluation, decision on further investigation or remedial action – record in Altlastenatlas
- detailed site investigation
- priority classification
- clean-up measure
- control investigation
- evaluation, decision on further measure
- termination of site remediation

The above text is still valid

Please update this chapter and provide actual information.

- **What is the legal first step if pollution is observed, i.e. notification of an authority or preliminary investigation?** If pollution is observed, according to the Austrian Water Act prevention measures have to be taken and the local authorities have to be notified.

- **To whom shall it be reported first? How the site owner is obligated for site investigation and remedial action?** See above; in cases of danger in delay the mayor or the bodies of public security service have to be notified. According to the Austrian Water Act the site owner can be obligated in those cases, where the site user (the polluter) cannot be obligated, provided that the site owner agreed to the plants or measures, from which the pollution emanates, or at least tolerated them and omitted reasonable preventive measures. This is valid also for legal successors of the site owner, if they knew about those plants or measures, or must have had knowledge with due attention.

- **Is the site investigation enforced then by the relevant authority in specific decision or shall be done automatically by the relevant regulation?** If a site is recorded in the suspected contaminated site register (Verdachtsflächenkataster) the site investigation is done automatically following the provisions of the ALSAG. Otherwise site investigation is enforced by the local authorities in specific decision.

**What is the necessary content of this environmental site investigation (determination of the spatial distribution of contaminants, geological survey, qualitative or quantitative risk assessment, determination of clean up target value, evaluation of clean up methods, proposal for further action, etc.)?** The necessary content depends on the individual case, e.g. type and extent of contaminants, spatial distribution of contamination, source identification, possible migration pathways (ground water, surface water, soil gas, ambient air, plants, oral uptake), geological, hydrological, geo-hydrological, pedological and climatic site conditions, location and dimension of installations. Qualitative and quantitative risk assessment is based on these contents. Site investigation usually is conducted step-by-step (see question 7). If remediation is required, the risk assessment should propose clean up targets, clean up methods to be evaluated within a further investigation step and further actions.

**Who decides whether the site is contaminated?** If a site is recorded in the contaminated site register the decision whether a site is contaminated (and clean up is necessary) is made by the Austrian Federal Environment Agency, otherwise by the local authorities. In the former case the site is assigned a degree of priority and recorded in the contaminated site register (Altlastenatlas).

**How the clean up requirements are determined then? Can clean up target values be proposed using an expert study? Or does the authority decide it on its own assessment?** Clean up requirements are determined by surveying remediation options. Target values are prescribed by the local authorities, on an individual basis they can consult an expert study. If a site is recorded in the contaminated site register clean up target values are prescribed by the Provincial Bureaus. In the latter case the Austrian Federal Environment Agency is involved in the clean up process and can recommend target values.

- **Can remedial action be also proposed? Yes. How it is assessed and approved by the inspectorate?** E.g. on the basis of monitoring measures, periodic reporting, preservation of evidence

- **What shall we do with residual contamination? Can request for monitoring of groundwater quality in longer term or land use restrictions be expected?** It has to be assessed whether a residual contamination represents a serious environmental risk or not. This is done on an individual basis. The decision on further measures (further clean up, long term monitoring, land use restrictions, safety measures) should be based on this assessment.

## 8. Scheduled periods of time for the remediation project approval;

- *If a report or an action proposal is submitted to the relevant authority, is there any time period defined for official response/approval?*

This information can be obtained from the Local Authorities (BEZIRKHAUPTMANNschaften) and Provincial Bureaus (AEMTER DER LANDEREGIERUNGEN)

**9. Administrative, authorial and public structures involved in evaluation and approval of the remediation projects on local and national level (the structure of the environmental authority);**

The **liable party for the contamination** has to follow the instructions of the Local Authorities, otherwise the authority acts on the remediation measure but at charge of the responsible party. In those cases, **where no polluter can be made liable**, the Minister for Agriculture, Forestry, Environment and Water Management is responsible for performing remediation activities. Administrative and public structures that evaluate and approve the remediation projects on local and national level;

Local Authorities (BEZIRKHAUPTMANNschaften) and Provincial Bureaus (AEMTER DER LANDEREGIERUNGEN) act under the provisions of the Austrian Water Act and Industrial Code, they report contaminated sites to the Ministry for Agriculture, Forestry, Environment and Water Management and the Federal Environmental Agency is in charge of keeping federal registers. The Ministry and Kommunalkredit are competent in receiving remediation project when public fund would be allocated.

In execution of the Water Act local authorities - and for granting funds Kommunalkredit - confirm termination of remediation activities. Federal Environment Agency is responsible for assessment success of remediation activities with regard to the federal register.

The above text is still valid

**10. Identification of responsible party, duties for the responsible of the pollution (operative, financial, etc.);**

- *Who is the responsible party for eliminating the contamination? Probably the polluter. What is the situation if the polluter can not be identified or does not exist currently?*
- *We meant here: who is financially responsible for the contamination of an area/land? What is the procedure in case of an identifiable polluter, what is the procedure in case of a contamination dating back decades in time, with no legally existing past polluter*

The **"polluter pays" principle** is applied as far as possible, but practically the liable party can not cover the whole clean-up cost in most cases and public funding is allocated according to the **Federal Act on the Clean-up of Contaminate Sites**.

The financial background of funding is based on money retrieving from waste deposit taxes. This fund to some extent covers the costs of site investigation and remediation. Funds are provided for abandoned and operating waste deposit sites and industrial sites. Contamination existed before 1989 is taken exclusively into consideration and the provision of funds is carried out according to priorities set at national level. Fund can be applied by the liable party from KOMMINALKREDIT.

The Minister for Agriculture, Forestry, Environment and Water Management coordinates the activities related to the Federal Clean-up Act and is responsible for the allocation of money to fun clean-ups.

The above text is still valid

11. A contaminated site inventory on national level, ranking of polluted sites (priority list);

- *Is there any register for contaminated sites available in Austria?*
- *Are the site ranked by the hazard and the importance for intervention?*
- *What is the evaluation method for determining the level of the problem?*

Since 1989, **inventories on contaminated sites** are run and up-dated. The governments of the 9 Federal States are obliged to report potentially contaminated sites to the national authorities. Provisions are given in the Water Act, Trade Regulation concern the identification of potentially polluted sites, as well as there are systematic regional surveys are conducted in particular high-risk regions.

The Federal Environmental Agency (UBA) (<http://www.ubavie.gv.at>) is responsible for central control, the maintenance of contaminated site register (VERDACHTS-FLAECHEKATASTER and ALTLASTENATLAS), as well as the assignment of priorities to sites which are supposed to be publicly funded. UBA issues appropriate technical guidance to site investigation and clean-up measures. The Verdachtsflächenkataster contains the particulars of the registered area, while specific information concerning the contamination can be found in the Altlastenatlas, such as the priority of the site, a brief description of the pollution, a summary of risk-assessment, the status quo of remediation, or the termination and result of clean-up measure.

The register covers industrial and waste sites, not military bases and large-scale contaminations, such as impact on agricultural field, pollution from air emission. The information for this directory was gained from systematic surveys carried out in selected regions of Austria.

**The above text is still valid**

12. Requirements for companies and experts that provides services in contaminated site management (consultancy, field investigation, laboratory, site assessment, clean up measures, etc.);

- *What company can be contracted for the site investigation (accreditation, standards, etc.)?*
- *Are there authorial sampling and analytical measurements also necessary for verification?*
- *Are any related standards, protocols, regulations available?*
- *If a company carries out environmental services, what permits, accreditation will be needed, particularly for site investigation and remedial actions?*

**Please provide information...**

In principle any company possessing the respective business license may provide these services. Usually companies will be selected on criteria, such as experience, references, technical equipment, accreditation. Some laboratories and consultancies are accredited pursuant to EN ISO/IEC 17025.

The Austrian Federal Environmental Agency is randomly conducting analyses on key parameters for verification during site investigation as well as in the course of remediation. Sampling and analytical measurements may also be done at the instigation of the Local Authorities and Provincial Bureaus.

### 13. Summary/comments

You suggested the following improvements to be made to the existing legislations in 2001. Is there any development made concerning these issues?

The current legislation for contaminated sites (ALSAG) will be revised in the near future. Overall objective is to establish a risk-based policy for the management of contaminated sites and to abandon the purely groundwater oriented approach as it is now the case.

The target level of groundwater cleaning is generally relevant to the drinking water limit values. This would be relieved, and specified clean-up levels would be determined according to ecological conditions of the polluted area, as well as particularly to the current or planned land use.

Technology development and research concern mainly the remediation techniques, however the origin and reasons of contamination would be also studied more and pollution prevention strategies would be developed (Altlasten-management).

Site characterisation and remediation actions relevant to the environmental legislation and norms would cover all the environmental elements of the site together.

The liable party (land owner, land user) would involve more responsibility; its contribution to the cost of clean-up measures would be more adequately determined.

The contaminated site management would be proceeded more on ecological necessity.

The budget of the public fund for clean up would be extended, new sources would be included.

The new act would consider more social and nature conservation issues.

### REFERENCES

#### REFERENCES AND FURTHER INFORMATION

ÖNORM S 2085: Altlasten – Ablauf der Bearbeitung von Altablagerungen und Altstandorten (Normentwurf; Wien, 1. Dezember 2008)

ÖNORM S 2086: Altlasten – Benennungen und Definitionen (Normentwurf; Wien, 1. Dezember 2008)

ÖNORM S 2087: Altlasten – Erhebung und Untersuchung von Verdachtsflächen und Altlasten (Wien, 1. September 2001)

ÖNORM S 2088-1: Altlasten – Gefährdungsabschätzung für das Schutzgut Grundwasser; Contaminated sites – Risk assessment concerning the pollution of groundwater which is to be safeguarded (Wien, 1. September 2004)

ÖNORM S 2088-2: Altlasten – Gefährdungsabschätzung für das Schutzgut Boden; Contaminated sites – Risk assessment for polluted soil concerning impacts on surface environments (Wien, 1. Juni 2000)

ÖNORM S 2088-3: Altlasten – Gefährdungsabschätzung für das Schutzgut Luft; Contaminated sites – Assessment of risk for public asset air which is to be safeguarded (Wien, 1. Jänner 2003)

ÖNORM S 2089: Altlastensanierung – Sicherungs- und Dekontaminationsverfahren; Remediation of contaminated sites – Methods for security and decontamination (Wien, 1. Jänner 2006)

ÖNORM S 2090: Bodenluft-Untersuchungen; Sampling of soil gas (Wien, 1. Jänner 2006)



ÖNORM S 2091: Altlasten – Feststoff-Probenahme – Entnahme von Feststoffproben von Altablagerungen und Altstandorten; Contaminated sites – Sampling of solids – Sampling of solids from waste deposits and industrial sites (Wien, 1. Mai 2006)

ÖNORM S 2092: Altlasten – Grundwasser-Probenahme; Contaminated sites – Sampling of groundwaters (Wien, 1. Juli 2008)

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**ANNEX**







Ground water		Classification for Risk Assessment Austria																							
Progr.	Type of pollutant	Low	Moderate	High	Very high	Other classification															Orientierungswerte - Reference values for groundwater [mg/l]				
						Eluatium reference values [mg/kg dry matter]				Bodenluft-Analysenergebnisse - soil air reference values				Gesamtgehalt des Bodens - total amount in soil (mg/kg)											
						a) sensitive *)		b) not sensitive **)		a) sensitive *)		b) not sensitive **)		a) sensitive *)	b) not sensitive **)		Prüfwert - screening values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Prüfwert - screening values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Mindestbestimmungs-grenze - Required lower detection limit value (LDL)	Differenzschwellen-wert A - difference value, if the measured value < 5 x LDL	Differenzschwellen-wert B - difference value, if the measured value > 5 x LDL
	<b>Metals</b>					Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Prüfwert - screening values	Prüfwert - screening values	Massnahmen-schwellwert - intervention values	Mindestbestimmungs-grenze - Required lower detection limit value (LDL)	Differenzschwellen-wert A - difference value, if the measured value < 5 x LDL	Differenzschwellen-wert B - difference value, if the measured value > 5 x LDL	Prüfwert - screening values	Massnahmen-schwellwert - intervention values				
1	Al					5	-	20	-										0,01	300%	150%	0,12	0,2		
2	Sb																	0,0005	300%	100%	0,003	0,005			
3	Ag																								
4	As					0,1	1	0,5	1									50	200	-	0,001	300%	100%	0,006	0,01
5	Be																								
6	Cd					0,05	0,5	0,05	0,5									2	10	-	0,0002	300%	100%	0,003	0,005
7	Co																								
8	Total Cr					0,5	5	1	10									100	500	-	0,001	300%	100%	0,01	0,05
9	Cr (VI)																								
10	Fe					10	-	20	-										0,02	300%	150%	-	-		
11	Hg					0,01	0,02	0,01	0,05									1	5	-	0,0002	300%	100%	0,0006	0,001
12	Ni					1	5	1	5									100	500	-	0,001	300%	100%	0,012	0,02
13	Pb					0,1	1	0,5	1									100	500	-	0,001	300%	100%	0,006	0,01
14	Cu					1	10	5	10									100	500	-	0,001	300%	100%	0,06	0,1
15	Se																		0,001	300%	100%	0,006	0,01		
16	Mn					5	-	10	-										0,02	300%	150%	-	-		
17	Tl																								
18	Zn					10	-	30	-									500	1500	-	0,02	300%	100%	1,8	-
19	Ba																								
20	Mo																								
21	Sn																		0,005	300%	100%	0,05	-		
	<b>Inorganic pollutants</b>																								
22	B																		0,02	100%	50%	0,6	1		
23	Free cyanides																								
24	Cyanides at pH 4.5																								
25	Thiocyanates																								
26	Total Cyanides					0,5	-	0,5	-									25	250	-	0,005	200%	100%	0,03	0,05
27	Fluorides					20	-	50	-										0,1	200%	100%	0,9	1,5		
28	Nitrites					2 (nitrogen)	-	2 (nitrogen)	-										0,01	200%	100%	0,3	-		
29	Ammonium					10 (nitrogen)	-	20 (nitrogen)	-										0,01	200%	100%	0,3	-		
30	Nitrates					100 (nitrogen)	-	100 (nitrogen)	-										1	100%	50%	50	-		
31	Sulphates					2500	-	2500	-										1	100%	50%	150	-		
32	Phosphates																								
	<b>Organic aromatic compounds</b>																								
33	Benzene									2 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	to be set on an individual basis	1	1	-	0,5 µg/l	200%	100%	0,6 µg/l	1 µg/l				
34	Ethylbenzene																								
35	Stirene																								
36	Toluene																	0,5 µg/l	200%	100%	6 µg/l	10 µg/l			
37	Para -Xylene																								
38	Meta - Xylene																								
39	Orto - Xylene																								
40	Alkane-benzene																								
	<b>Polycyclic aromatic</b>																								
41	Benzo (a) anthracene																								
42	Benzo (a) pyrene																								
43	Benzo (b) fluoranthene																								
44	Benzo (k) fluoranthene																								
45	Benzo (g,h,i) perylene																								
46	Chrysene																								
47	Dibenzo (a,h) anthracene																								
48	Indeno (1,2,3 - c,d) pyrene																								
49	Pyrene																								
50	Total aromatic polycyclics (total PAH)																								
51	Naphthalenes					0,02	-	0,02	-										0,1 µg/l	200%	100%	1 µg/l	-		
52	Phenanthrene																								
53	Anthracene																								







180	Resorcine																								
181	Chloro-naphtalene																								
182	Total halogenated aromatic hydrocarbons																								
183	Total chlorophenols																								
184	Totale phenoles																								
185	pH >7																								
186	pH <7																								
	Perchloroethene + Trichloroethene																				0,1 µg/l	100%	100%	6 µg/l	10 µg/l
	Benzo(b)fluoranthene + Benzo(k)fluoranthene + Indeno(123cd)pyrene + Benzo(ghi)perylene																				0,05 µg/l	200%	100%	0,1 µg/l	0,2 µg/l
	Methyl-t-butylether (MTBE)																				1 µg/l	100%	50%	5 µg/l	
	Total organic cabon					50	-	100	-																

\*) Areas significant with regard to Austrian Water Act or significant with regard to water supply and distribution, and sites exhibiting low pollutant retention within the unsaturated zone

\*\* Other sites, at which due to hydrological, geological and hydrogeological conditions the possibility of an entry of pollutants into the groundwater is considerably reduced

\*\*\* 15 PAH congeneres (16 EPA-PAH, exclusive of naphthalene)

\*\*\*\* 1000 mg/kg: low mobility mineral oil products (e.g. lubricants), main part of pollutants exhibit boiling range >300 °C, analysis done according to EN14039

Areas significant with regard to Austrian Water Act or significant with regard to water supply and distribution, and sites exhibiting low pollutant retention within the vadose zone



## Common Forum – Working Document

Compilation of standards for contamination  
of surface water, ground water, sediments and soil

### Annex 2

Legislative act from Lithuania

**THRESHOLD VALUES (From „ORDER OF THE MINISTER OF ENVIRONMENT REGARDING ENVIRONMENTAL REQUIREMENTS FOR SITES CONTAMINATED BY CHEMICAL SUBSTANCES (2008))**

Substance	Soil				Groundwater	
	Sensitivity (land use)					
	I	II	III	IV	I	II, III, IV
	mg/kg dry mater.				µg/l	
Arsenas (As)	10	20	30	80	10	50
Alachloras	NT	NT	NT	NT	0,1	20
Alavas (Sn)	10	20	30	40	20	1000
Aldrinas	0,05	0,05	0,1	0,2	0,1	1
Anglies tetrachloridas (tetrachlormetanas)	1	1	5	20	6	10
Anilinas	5	5	100	500	NT	NT
Antracenas	0,5	5	70	2000	0,01	5
Atrazinas	0,2	3	6	30	1	150
Baris (Ba)	500	700	1000	1500	700	2000
Benz(b)fluoroantenas	2	2	12	30	0,2	1,2
Benz(g,h,i)perilinas	20	160	3000	4600	0,05	0,2
Benz(k)fluoroantenas	10	10	22	400	0,05	0,76
Benzenas	0,25	0,5	15	50	10	50
Benzo(a)pirenas	0,1	0,5	1,5	3	0,5	1
Berilis (Be)	5	10	15	20	5	50
Bifenilas	0,9	4	10	1000	350	1700
Boras	40	50	200	400	1000	5000
Chlordanas	0,05	0,1	0,3	6	0,1	0,2
Chlorfenvinfosas	100	300	700	1000	1	25
Chloridai (Cl)	60	60	350	350	200 mg/l	500 mg/l
Chlorpirifosas	50	100	230	3000	1	100
Chrizenas	0,5	2	10	19	0,01	1,5
Chromas (Cr)	50	80	300	600	25	100
Cianidai (bendras), CN	5	5	5	50	50	100
Cinkas (Zn)	75	300	600	1200	300	1000
1,2-dichloretanas (DCE)	0,02	0,035	2	4	30	400
1,2-dichlorpropanas (1,2-DCP)	0,12	2	10	40	5	80
1,2-dibromo-3-chlorpropanas (DBCP)	NT	NT	NT	NT	0,1	10
2,4-D (dichlorfenoksiacto rūgštis)	0,1	0,1	0,5	9	20	100
2,4-DB	NT	NT	NT	NT	40	100
2,4-dimetilfenolis	1	1	1600	20000	140	20000
2,6-dimetilfenolis	1	1	50	600	25	25
3,4-dimetilfenolis	1	1	70	1000	40	40
DDD	0,1	2	2	100	0,1	6
DDE	0,1	1,6	1,6	8	0,1	20
DDT (dichlordifeniltrichloretanas)	0,01	0,1	1,9	8	0,1	10

	Soil				Groundwater	
	Sensitivity (land use)					
Dichlormetanas (Metilenchloridas)	0,13	0,35	2	3,5	20	1000
Dieldrinas	0,005	0,005	0,04	0,2	0,1	0,1
Endosulfanas	0,2	0,6	6	60	0,1	5
Endrinas	0,05	0,1	23	300	0,1	0,1
Etilbenzenas	1,5	5	10	50	5	300
Fenantrenas	5	60	1200	1600	0,01	5
Fenolis	5	10	40	60	20	2000
Fluoridai, F	200	200	2000	6000	1500	8000
Fluoroantenas	20	20	40	240	1	4
Gyvsidabris (Hg)	0,25	0,5	0,75	1	1	1
Heksachlorbenzenas (HCB)	0,05	0,5	5	55	0,1	0,5
Heksachlorcikloheksanas (HCH)	0,02	0,4	0,5	4	0,1	4
Heksachloreitanas	0,5	1	5	10	2,5	15
Heptachloras	0,005	0,05	0,1	4	0,1	0,3
Heptachloro epoksidas	0,005	0,05	0,1	4	0,1	30
Hidrohinonas	NT	NT	NT	NT	0,2	800
Inden(1,2,3-cd)pirenas	1	12	25	390	0,05	0,1
Kadmis (Cd)	0,75	1,5	2,5	3	1,5	6
Kobaltas (Co)	20	40	60	120	25	100
Ksilenas	0,1	5	15	50	50	500
Manganas	1000	1500	2000	10000	NT	NT
1-metilnaftalenas	NT	NT	NT	NT	10	10000
2-metilnaftalenas	4	4	300	4000	10	10000
Metilchlorpirifosas	NT	NT	NT	NT	1	10
Metoksichloras	2	4	300	2000	0,1	20
Molibdenas (Mo)	2,5	5	7,5	15	250	400
Naftalenas	1,5	5	15	160	10	70
Nikelis (Ni)	50	75	150	300	20	100
Nitratai, NO <sub>3</sub>	130	130	130	130	50 mg/l	100 mg/l
Nitrobenzenas	2	2	40	500	5	200
4-nitrofenolis	0,5	0,5	400	5000	40	290
Pentachlorbenzenas	1	1	60	400	0,6	29
Pentachlorfenolis	0,5	100	100	250	9	45
Pirenas	5	125	250	1000	0,05	90
Polichlorintieji bifenilai (PCB)	0,1	0,3	1	20	0,02	0,2
Prometrinas	0,5	3	50	100	1	150
Propazinas	0,5	3	1200	1200	1	250
Selenas (Se)	0,75	1,5	2,5	4,5	10	100
Sidabras (Ag)	0,25	0,5	0,75	2	10	40
Simazinas	0,2	1	5	140	2	50
Stibis (Sb)	5	10	15	30	5	20
Stirenas	0,3	0,5	5	100	20	300
Sulfatai (SO <sub>4</sub> )	NT	NT	NT	NT	200 mg/l	1000 mg/l
Švinas (Pb)	50	80	150	500	25	75
Tetrachloretilenas (PCE)	0,05	0,5	1,5	5	40	100

	Soil				Groundwater	
	Sensitivity (land use)					
Toluenas	0,3	5	135	200	500	1000
Trichlorbenzenai	2	20	30	80	20	70
Trichloretilenas (TCE)	0,5	1,5	2	10	40	500
Trifluralinas	NT	NT	NT	NT	20	100
Uranas (U)	10	20	30	40	2	15
Vanadis (V)	80	150	300	450	100	200
Varis (Cu)	35	75	100	200	60	2000
Vinilchloridas	0,02	0,02	0,15	0,35	0,3	5