



# Practical guide to handling extensive increased contaminant levels in soil

## ARBEITSHILFE ZUM UMGANG MIT GROßFLÄCHIG ERHÖHTEN SCHADSTOFFGEHALTEN IM BODEN

In Baden-Württemberg there are areas with extensive increased contaminant levels in the soil. Within such areas, a differentiation must be made between human settlement-related and natural geogenic causes, depending on the origin of the contaminants.

### AFFECTED AREAS

A large number of human activities and behaviour patterns have resulted in diffuse substance input over long periods of time. Increased contaminant levels in the soil may have been caused by businesses and traffic, domestic heating fuel, garden use and municipal waste and wastewater.

In the case of mining areas, it lies in their very nature that geogenically increased contaminant levels also exist there. The very fact that unusual quantities of materials, which are important for the economic cycle (e.g. ores), are present in a particular location is the very reason for the mining activity.

Examples of settlement-related extensive increased contaminant levels are:

- Old mining areas: Areas with "extensive increased contaminant levels" (in the following referred to as "geS" for short) may have been caused, for example, by the deposition of rock (overburden dumps) or are even process-related, due to the chemical or physical breaking down of the exploited raw materials.

- Flood areas and soils from river meadow sediments, which are affected by historical ore mining locations in the upper reaches of the water courses,
- Urban soils with decades of settlement history and deposits from debris and other soil materials with foreign material fractions,
- Sewage farms and soils containing concentrated contaminants through other materials, e.g. sewage sludge,
- Silt deposits resulting from the dredging of water courses, due to contaminants that have accumulated in the sediment,
- Extensive ground modelling and made ground, for example, when building polders and large-scale construction sites (e.g. road construction),
- Immission areas with airborne contaminant inputs, for example, near emitting production sites.

### AFFECTED SOIL FUNCTIONS

If the soil contains contaminants, the soil function as a "habitat for humans, animals, plants and soil organisms", as "part of the balance of nature" or as a "degrading, mitigating and formative medium for material effects due to its filter/buffer and material conversion properties, especially for protection of the groundwater" can be affected.

Consequences for owners / leaseholders

If areas with extensively increased contaminant levels exist, this can have substantial effects on the use of the areas affected, with consequences for the owners and leaseholders of land.

Plots of land can be subjected to use restrictions, for example, because it is no longer possible to grow certain crops or other plants. Protection and restriction measures primarily affect agriculturally used areas, where use and farming are adapted, for example, limiting agriculture to plants with low contaminant accumulation capacity. Equally, it is also possible that the excavated material of construction projects cannot be freely reused.

A practical consequence of this can therefore be reduced productive capacity of an area, increased cost for construction projects or even financial burden due to the duty to investigate and in the worst case remediate. Although this tends to be the exception in geS areas. The existence of soil contamination always affects the market value of a property. From experience, this is even the case when there is no need for remediation. Soil contamination therefore also affects property transactions.

#### **MEASURES**

In general, remediation in the form of removing contaminants is not considered; therefore, the primary aim is to appropriately handle existing extensive contaminations. In the majority of cases, a solution can be found which also satisfies the interests of the landowner concerned. To achieve this, it is important that all parties involved "put all their cards on the table". This requires appropriate knowledge of the type and scope of any contaminants. Before information can be passed on, it must be gathered and the authorities and private persons concerned must be notified. In most cases there are no acute risks. However,

precaution-orientated handling of extensive contaminations also involves taking them into account in any usage of the land and ensuring that soil contaminations are not "spread" into previously uncontaminated areas by "rearrangement" or redeposition, for example, during construction projects. Redeposition is always tolerable, if it does not cause any worsening of the existing situation at the place of deposition. This evaluation requires knowledge of the contamination in the place of origin and in the place of deposition.

#### **INVESTIGATIONS**

The aim of recording and investigating areas with extensive increased contaminant levels, apart from determining the spatial extents of these levels, is primarily to be able to assess the specific potential hazard and therefore, also to clarify which safe and precaution-orientated uses are possible, and if applicable, under which basic conditions.

#### **LOCAL AUTHORITIES**

For local authorities, as the bodies responsible for urban development planning, information about areas with extensive increased contaminant levels is of central importance. One of the core tasks of local authority self-government is to regulate uses within their authority area according to its needs and possibilities. It is obvious that contaminant-related restrictions in use have a considerable influence on planning decisions, for example, regarding the designation of new building development areas.

#### **PROCEDURE**

Soil conservation laws provide systematically phased investigations for the risk assessment of harmful soil changes and site contamination and accordingly for potentially contaminated sites.



These are characterised by alternation between investigation and assessment steps, in which each step has a growing level of knowledge and understanding.

The systematic process of Germany's Federal Soil Conservation Law and Regulations (BBodSchG / BBodSchV) for the evaluation of harmful soil changes or relevant grounds for assuming potential contamination is based on an approach that differentiates according to exposure pathways.

The Federal Soil Conservation Regulations (BBodSchV) differentiates between the following exposure pathways:

- Soil – human,
- Soil – crop plant and
- Soil – groundwater

The fundamental approach of soil conservation law is not to view soil contamination "per se" to be problematic and a "hazard", but instead to take into account the specific circumstances, especially the "concerns" in the sense of detrimental effects on the environment.

The type and scope of investigation measures relate to:

- Type and concentration of contaminants
- Possibility of their propagation in the environment
- Intake by humans, animals or plants
- Use of the property
- Determination and assessment of the extents of sub-areas with different contaminant levels
- Identification of representative contaminant concentrations and determination of the spatial extents of increased contaminant levels, where necessary broken down into sub-areas or spatial units.
- Estimation or determination of the actual contaminant transfer from soil to the sen-

sitive receptor (human, crop plant or groundwater), based on detailed information on the use and exposure conditions.

#### **SPECIAL FEATURES OF GES**

The Federal Soil Conservation Law / Federal State Soil Conservation and Contaminated Site Law (BBodSchG / LBodSchAG), familiar instruments in contaminated site management and remediation, are in principle also comprehensively applicable to geS. This applies with respect to the empowerment principles for official interventions and the question of responsibility as well as the choice of the "offender" or polluter. Nonetheless, when applied to geS there are several peculiarities, which are based on the characteristics of this case group.

It is typical for geS that

- a single "polluter" or their universal successor under § 4 Para. 3 Sentence 1 BBodSchG can usually not be named,
- due to the extensiveness of the contamination in the soil, a large number of properties are affected and
- there is no marked "contamination source/focal point".

The consequence of these peculiarities is that the official obligations to determine the facts – at the cost of the authority concerned – extend particularly far and only in exceptional cases is it possible to oblige property owners and leaseholders (other beneficiaries) to carry out investigation and remediation measures.

However, as mentioned initially, private persons are nonetheless affected in diverse ways, if their property lies within geS areas. Therefore, knowledge of the type and scope of contaminations is important for all those involved and is in



their own interest.

#### **ADVANTAGES OF A PLANNED APPROACH**

Lack of knowledge results in uncertainties in the assessment and technical evaluation and consequently necessarily also leads to unease when handling contaminations. This not only applies to private persons, but also to the authorities. The consequence is obstacles in planning, use and property transactions. The objective of the investigations is to remove existing uncertainties and, with the assessment, to enable the potential danger to be evaluated.