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Umweltbundesamt

CONTAMINATED SITES IN AUSTRIA

• ALTLASTEN/CONTAMINATED SITES

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CONTAMINATED SITES

Groundwater contamination caused by old landfills, emissions of landfill gas or contaminated soils in the vicinity of abandoned industrial sites - these problems of contaminated sites are getting more and more to the general public's attention.

The term "contaminated site" was created in the late 70s, not at least because the German expert council for the environment pointed out the risks which can result from old landfills and illegal dumps and directed the attention to the grievances in connection with the effects of waste disposal.

Originally, the interest focused on the inappropriate dumping of waste. Now the term "contaminated sites" does not only include abandoned landfills but also industrial sites which represent a considerable danger to the health of human beings or the environment.

1 Reasons for the Problems Concerning Contaminated Sites

The problems concerning contaminated sites are closely connected with the development of modern industrial and consumption-oriented society, the methods of waste disposal during the past 20 or 30 years, and the formerly sometimes careless use of chemicals and means of production in industry and commerce.

The most common method to dispose of waste from households or commercial enterprises was the deposition in garbage pits and dumps. In most cases no precautions in view of the protection of the environment were taken. Furthermore, due to the increasing technicalization of production and the mentality of the throw-away society the amount of waste has augmented drastically in the past few years. The development in the field of the production of chemical substances brought about that increasingly dangerous waste accumulated. More and more frequently the effects of such disposal methods can be seen in many cases of contamination, especially of the groundwater.

Apart from the inappropriate dumping of waste another reason for the development of contaminated sites is the contamination of soil and groundwater caused by the use of hazardous substances at industrial and commercial locations, on the one hand locations of production enterprises like chemical, metal- or mineral oil-processing companies and service companies such as dry-cleaning shops and petrol stations on the other. In view of the extensive use of chemical substances there is hardly any commercial sector where the possibility of soil or groundwater contamination in the course of operation can be excluded. The contaminations are caused by handling losses, defects, industrial accidents, and the depositing of wastes within the company site.

War-induced damage, e.g. the destruction of oil storage tanks, which can also be the reason for subsoil contamination, are a special case.

A changing environmental awareness, new findings on the behaviour of pollutants in the environment and developments in measuring techniques are additional factors which have contributed to the realisation of the problems in connection with contaminated sites during the past few years.

2 Dangers of Contaminated Sites

Dangers caused by contaminated sites can be of various kinds and impairments of water, soil and air and the interrelations between them may have immediate effects on the health of human beings.

The extent of the danger or impairment depends considerably on the type and amount of the pollutant on the one hand and the exposition of the protected medium (e.g. groundwater) in any individual case on the other.

Threats and dangers to the environment caused by contaminated sites can be seen from the following examples:

- impairment of groundwater quality by contaminated leachate from contaminated sites
- direct contact (touching, swallowing) with polluted soil (e.g. on a children's playground) on areas formerly used by industry or commerce
- explosion hazard in case of an accumulation of landfill gas in closed rooms (e.g. cellars)
- contamination of surface waters by pollutants (leachates, run-off) from contaminated sites
- absorption of pollutants by (useful) plants from the soil
- vegetation damage due to a displacement of soil air by landfill gas in the root zone of plants
- damage by settlements and slides of buildings constructed on waste deposits
- corrosion of underground pipelines and building components due to the impact of contaminated leachates

3 Dimension of the Contaminated Sites Problems in Austria

The exact number of contaminated sites in Austria cannot be said at present. This is due to the fact that a great number of suspected contaminated sites (i.e. old landfills and abandoned sites of industrial and commercial enterprises likely to be contaminated) are known, that, however, the available information, especially in the form of investigation results, proving if and to which extent these sites may be a severe threat to the health of human beings or the environment is not sufficient to state the exact dimensions of the contaminated sites problems.

The Federal Environment Agency estimates the number of suspected contaminated sites in Austria at approx. 80,000. 70,000 of which are sites of industrial and commercial enterprises (industrial sites) and 10,000 old landfills (waste deposits). It can be assumed that a major part of the estimated 10,000 waste deposits has been registered, whereas only approx. 30% of the 70,000 industrial sites have been recorded.

How many of these suspected contaminated sites actually have to be cleaned up can only be said when extensive chemico-physical investigations are carried out and the results of these are available. These investigations are normally carried out

- by any legally obliged person at the request of the responsible authority in execution of the relevant acts of law (above all Federal Water Act and trade regulations)
- in urgent cases in execution of the Law for the Clean-up of Contaminated Sites if no person can be charged with the investigations and
- because the persons concerned are interested in them (e.g. in the course of building activities on suspected contaminated sites)

By analysing the investigation results (risk assessment) it is determined whether a considerable danger to the health of human beings or a threat to the environment and, thus, the need for cleaning-up, exists.

According to estimates there are 1,000 - 2,000 contaminated sites which have to be cleaned up.

By the end of the 1980s, only a few selected contaminated sites of greater size had been cleaned up, e.g. the Rautenweg (Vienna) or the landfill in Linz-Asten and the Köglerweg (Graz). Due to the usually high, sometimes extremely elevated costs of clean-up measures and the experiences made with the "Fischer Landfill", the Law for the Clean-up of Contaminated Sites was passed with the aim of financing the clean-up of contaminated sites.

4 The Law for the Clean-up of Contaminated Sites (ALSAG - abbreviation for "Altlastensanierungsgestz" in German)

The experiences made during the 1980s concerning clean-ups and the discussion in connection with the "Fischer Landfill" made clear that appropriate legal regulations governing the instigation of clean-up measures on the one hand and the provision of funds for these usually very expensive measures on the other are prerequisites for a successful tackling of contaminated sites problems. The entering into force of the Law for the Clean-up of Contaminated Sites (ALSAG) in July 1989 was a first step towards that aim.

The execution of the ALSAG belongs to the jurisdiction of the Federal Minister for the Environment. According to the provisions of the law the suspected contaminated sites are identified by the Provincial Governments. Data are then transmitted to the Federal Ministry for the Environment, Youth and Family Affairs and recorded in a register of suspected contaminated sites by the Federal Environment Agency. On the basis of a risk assessment the Federal Environment Agency identifies those suspected contaminated sites which are a considerable threat to the health of humans or the environment. Risk assessment is based upon adequate investigations and studies like groundwater and soil analyses.

If the investigations show that a considerable threat or danger to the environment exists, the suspected contaminated site will be identified as contaminated site and

recorded in the register of contaminated sites, as it is called. The urgency of clean-up measures is expressed by means of a three-stage priority classification.

According to the objectives of ALSAG, public funds are made available for financing the clean-up of contaminated sites. The means for the necessary measures are raised by levying charges on the depositing, exporting and intermediate storing of waste. 85% of the funds available are used for supporting clean-up measures at contaminated sites, 15% for investigating suspected contaminated sites which have to be treated with priority. The following table shows the development of the charges since the entering into force of the ALSAG:

Table 1: Contribution Income since 1990

Year	Contribution Income
1990	143,6 Mio öS
1991	172,7 Mio öS
1992	167,3 Mio öS
1993	215,7 Mio öS
1994	211,1 Mio öS
1995	285,2 Mio öS
1996	144,9 Mio öS (January - July)

The financial means are used for measures at landfills as well as industrial locations. It has to be pointed out that the support of clean-up measures at sites in operation is possible as well. According to the guidelines concerning the support of clean-up measures even the person(s) causing a contaminated site can apply for financial support. When the amount of means is determined, the extent of responsibility for the contamination is taken into consideration.

In recent times serious bottlenecks in financing the clean-up of contaminated sites have occurred. On the one hand, since the entering into force of the Law for the Clean-up of Contaminated Sites the funds levied in the form of landfill duties have not at all fulfilled the expectations, on the other hand more and more projects for cleaning up contaminated sites are to be carried out. Nevertheless, the ALSAG is an important contribution to tackling the contaminated sites problem and to financing their clean-up.

4.1 The Register of Suspected Contaminated Sites According to ALSAG

In accordance with the provisions of the Law for the Clean-up of Contaminated Sites suspected contaminated sites are reported by the Provincial Governor to the Ministry for the Environment, Youth and Family Affairs. By means of this suspected contaminated site notice selected information on the site concerned is transmitted. On the basis of this information, a preliminary-assessment of whether the suspected contaminated site bears considerable risks shall be possible. If the transmitted information contains to the minimum information necessary for this assessment, the sus-

pected contaminated site will be recorded in the register of suspected contaminated sites.

The data in the register of suspected contaminated sites is essentially information which has been reported by the Provincial Governor to the Federal Minister for the Environment by means of the suspected contaminated site notice. This information is devided into the following subject areas:

- localisation, owner(s)
- pollution potential: deposited types of waste or materials in the production process: type, state and amount of the materials; pre-treatment, emplacement, storage, etc.
- technical facilities (concerning waste deposits): leachate collection systems, degasification, surface sealing
- company description (concerning industrial sites): sector, products, size, period of operation, processed materials, waste materials, processing methods, plant description, etc.
- geology, hydrogeology: geological subsoil characteristics, type of groundwater resources, number of groundwater storeys, groundwater flow direction and velocity, groundwater level, etc.
- utilisation, land-use: present and planned land-use, location of the suspected contaminated site in relation to single buildings, settlements, surface waters, drinking water wells
- legal situation: administrative proceedings, licenses issued by public authorities, ...

The information is stored in a database in the Federal Environment Agency. In addition to these data items, administrative data, such as the date of the suspected contaminated site notice, the present state of affairs concerning the work in the Federal Environment Agency on a specific case or an overview of the correspondence, is registered there.

The Federal Ministry for the Environment, Youth and Family Affairs is, in case of inquiries, obliged to give information on whether a property is recorded in the register of suspected contaminated sites and whether a suspected contaminated site is a waste deposit or industrial site.

4.2 The Register of Contaminated Sites According to ALSAG

Contaminated sites are all those suspected contaminated sites which have been proved to constitute a considerable threat to the health of human beings or the environment. The basis for the assessment whether considerable danger originates from the site (risk assessment) is the availability of appropriate investigation results, like e.g. groundwater, waste or soil gas analyses.

According to the provisions of the Law for the Clean-up of Contaminated Sites, the contaminated sites, which have been suggested by the Federal Environment Agency in the course of risk assessment and identified by the Federal Minister for the Environment, Youth and Family are laid down in the register of contaminated sites. By recording them in this register, the necessity of clean-up measures is documented.

The urgency of such measures is expressed by means of a priority classification, where three classes of priority are distinguished. The adequate priority class is suggested by the Federal Environment Agency when assessing the contaminated site and determined by the Federal Minister for Environment. This priority class is then entered in the register of contaminated sites.

Under the provisions of the ALSAG, the register of contaminated sites is, like the register of suspected contaminated sites, administered at the Federal Environment Agency. A copy of the register of contaminated sites is available at the Federal Ministry for Environment and any of the nine Provincial Governments for inspection by the general public.

The following information regarding every contaminated site can be found in the register of contaminated sites:

- locational definition: Federal Province, district, municipality, cadastral unit, property number(s)
- name and type of contaminated site
- priority classification
- date of entry in the register of contaminated sites and date of determination of the priority class
- description and risk assessment of the contaminated site
- clean-up measures carried out

Due to continuing new identifications of contaminated sites, the register is constantly updated.

The identification of a suspected contaminated site as contaminated site and the determination of a priority class are prerequisites for a possible financial support by the Federal Government for clean-up measures.

4.3 Present Situation of the Registers of Suspected Contaminated and of Contaminated Sites (January 1997)

Since the entering into force of the Law for the Clean-up of Contaminated Sites in 1989 a total of 28.121 waste deposits and industrial sites have been reported to the Federal Minister for theEnvironment, Youth and Family Affairs 4.184 of which are old waste deposits and 23.937 suspected contaminated commercial or industrial sites.

The number of notices varies greatly from one Federal Province to another. This is due to the fact that, on the one hand, in some Provinces many suspected contaminated sites, especially industrial sites, have not yet been identified and that, on the other hand, in some cases not all suspected contaminated sites known to the Provincial Governments have been reported. The total number of waste deposits and industrial sites is estimated at approx. 80,000 by the Federal Environment Agency. The figures and the table below show the number and the distribution of waste deposits and industrial sites reported according to ALSAG by January 1997.

Fig 1: Notices of waste deposits and industrial sites according to the Law for the Clean-up of Contaminated Sites (ALSAG)

Table 2: Total number of waste deposits and industrial sites reported according to the provisions of ALSAG (January 1997))

Federal Province	waste deposits	industrial sites	sum
Burgenland	97	1	98
Carinthia	470	29	499
Lower Austria	488	543	1.031
Upper Austria	1.417	1.798	3.215
Salzburg	419	5.601	6.020
Styria	360	22	382
Tyrol	644	1.449	2.093
Vorarlberg	7	1	8
Vienna	282	14.493	14.775
Total	4.184	23.937	28.121

2.545 sites of the total of 28.121 suspected contaminated site notices received have been recorded in the register of suspected contaminated sites. For these sites the information needed for further treatment by the Federal Environment Agency has been transmitted.

2.387 of the 2.545 suspected contaminated sites are waste deposits, 158 are industrial sites. The figure and table below show the number and distribution of the suspected contaminated sites recorded in the register of suspected contaminated sites.

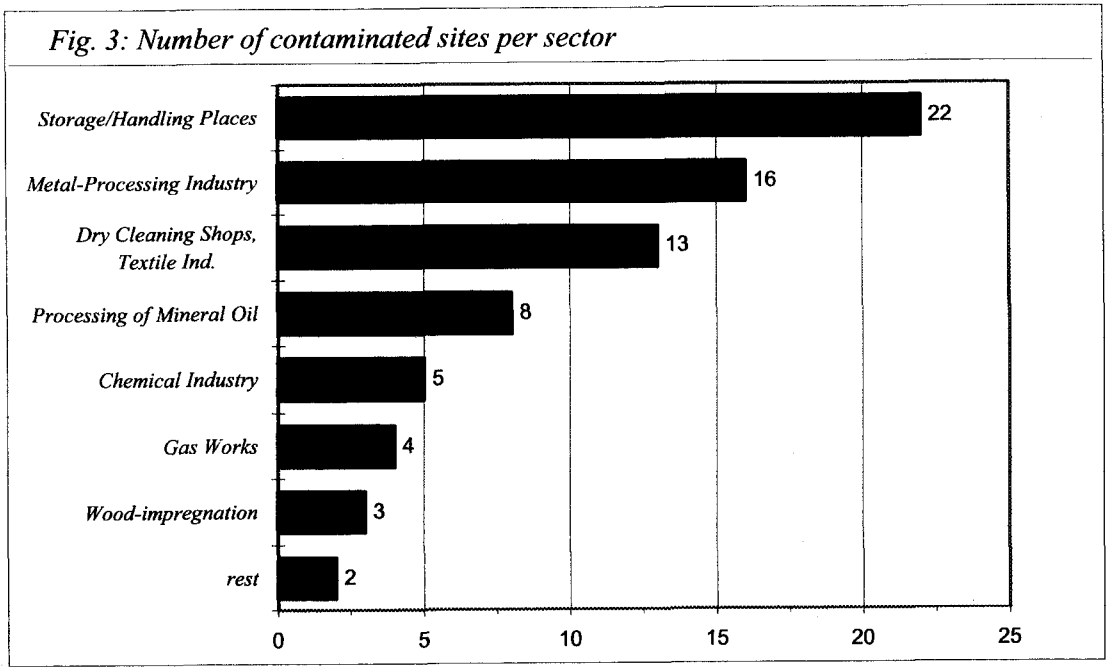
Fig. 2: Suspected contaminated sites recorded in the register of suspected contaminated sites. All those sites are recorded for which sufficient information has been presented by the Provincial Governors in order to carry out a preliminary assessment of the risk potential

Table 3: Total number and number of suspected contaminated sites recorded in the register of suspected contaminated sites (January 1997))

Federal Province	waste deposits	industrial sites	sum
Burgenland	37	1	38
Carinthia	25	14	39
Lower Austria	319	21	340
Upper Austria	1.320	91	1.411
Salzburg	232	8	240
Styria	321	12	333
Tyrol	110	5	115
Vorarlberg	6	0	6
Vienna	17	6	23
Total	2.387	158	2.545

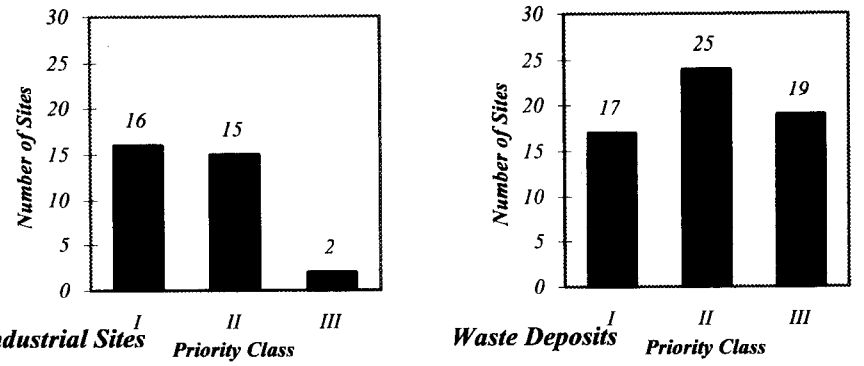
By January 1997, 130 of the reported suspected contaminated sites were identified as contaminated sites and recorded in the register of contaminated sites. 68 of the 130 contaminated sites are waste deposits and 62 are industrial sites. 52 of the contaminated sites are deposits of primarily municipal waste or similar substances (old municipal or district landfills), 16 are deposits of mainly commercial waste. More than half of the industrial sites identified as contaminated sites are (abandoned) storage or handling places of water-polluting substances or metal-processing companies. The figure below gives an overview to which sector the industrial sites identified as contaminated can be assigned (double entry possible):

Fig. 3: Number of contaminated sites per sector



By January 1997, a priority class was determined for 94 contaminated sites, namely for 61 waste deposits and 33 industrial sites. In 33 cases, the contaminated site was allocated to priority class I (most urgent need to act), in 40 cases to priority class II and in 21 cases to priority class III. The following figure shows the distribution of priority classes concerning waste deposits and industrial sites.

Fig. 4: Distribution of the waste deposits and industrial sites identified as contaminated sites regarding priority classes (priority class I signifies the most urgent need to act)



At the moment six contaminated sites are recorded as cleaned up in the register of contaminated sites; at 27 contaminated sites clean-up measures are being carried out.

The figure below gives an overview of the yet identified contaminated sites.
Fig. 5: Contaminated Sites According to ALSAG

Fig. 5: Contaminated Sites According to ALSAG