

REMEDIATION OF THE "VOLGERMEERPOLDER" A NEW APPROACH

Kees Olie¹, Gerard J.M. Bockting² and Jip van Klaveren³

¹Institute for Biodiversity and Ecosystem Dynamics (Environmental and Toxicological Chemistry) University of Amsterdam Nieuwe Achtergracht 166 1018 WV Amsterdam The Netherlands

²IWACO Hoofdweg490 Postbox 850 3009 AM Rotterdam The Netherlands

³Milieudienst Amsterdam Project Bureau Volgermeer Entrada 305 Postbox 922 1000AX Amsterdam The Netherlands

Introduction

In the past household waste from the city of Amsterdam was dumped together with chemical waste in the Volgermeerpolder.

A lot of waste is dumped in drums. A rough estimate is that about 10.000 drums are dumped by one company. In 1981 the drums that were visible (1128) have been removed.

The chemical waste originates from factories producing herbicides and pesticides and other products.

An estimate is made that about .5-1 kg of dioxins is dumped in the site¹. The area is more or less in open connection with the surrounding areas. In the beginning of the eighties plans were made for the complete isolation of the site. Now a new approach will be used with complete isolation of the top no isolation for horizontal movement of the contaminants. If however leaching takes places and interception system will be installed.

Methods

Past and present situation:

The "Volgermeerpolder" and the surrounding polders belong to a managed water system. The Volgermeerpolder and the surrounding polders are below sea level (N.A.P.). Some of the surrounding Polders are at about the same level (-1.5mN.A.P.) while others are at a level between -4.5m and -6m. This causes a flow of water to the deeper polders as is seen in Fig.1

Peat was taken out until the mid forties and household waste as well as industrial waste was dumped in the area from the end of the twenties until 1980. According to Philips Duphar about 10000 barrels of waste are dumped and in 1981: 1128 of them are removed.

In 1980 it was found that the site was heavily contaminated . The groundwater contained Chlorinated Benzenes, PCDD's, PCDF's , heavy metals. Chlorinated Phenols PAH's. Also living organisms are contaminated. The bottom sediment of a canal that is in open connection with the site was contaminated^{2,3}. The bottom material of that canal is brought inside the landfill.

There are actual risks for human health and the ecosystem. This is due to direct contact with soil, water and water bottom. There is a risk for indirect contact when contaminants are moved out of the site with the groundwater and ended up in the surface water.

Recently a monitoring program has been performed round the dumpsite. Groundwater from different places outside the landfill is taken (Fig. 2) and analysed. Only one sample does contain a contaminant above background level. It is not certain whether the origin of this contaminant (a herbicide) is located in the dumpsite. The most probable reason for the slow or neglectable leaching from the side is due to the fact that the soil is very rich in carbon that has very good

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absorption properties. One of the risks still is that other oily contaminants will increase the solubility in water of the hydrophobic compounds like PCDD/F's. The decision has been made to remediate the landfill.

Goals for the remediation:

- 1 Risks for direct contact with the contaminants are taken away by application of a clean top layer
- 2 Risks for the leaking of the contaminants with the groundwater is controlled with the monitoring system. If it is clear from the monitoring results that unacceptable leaking takes place, an interception system will be installed.

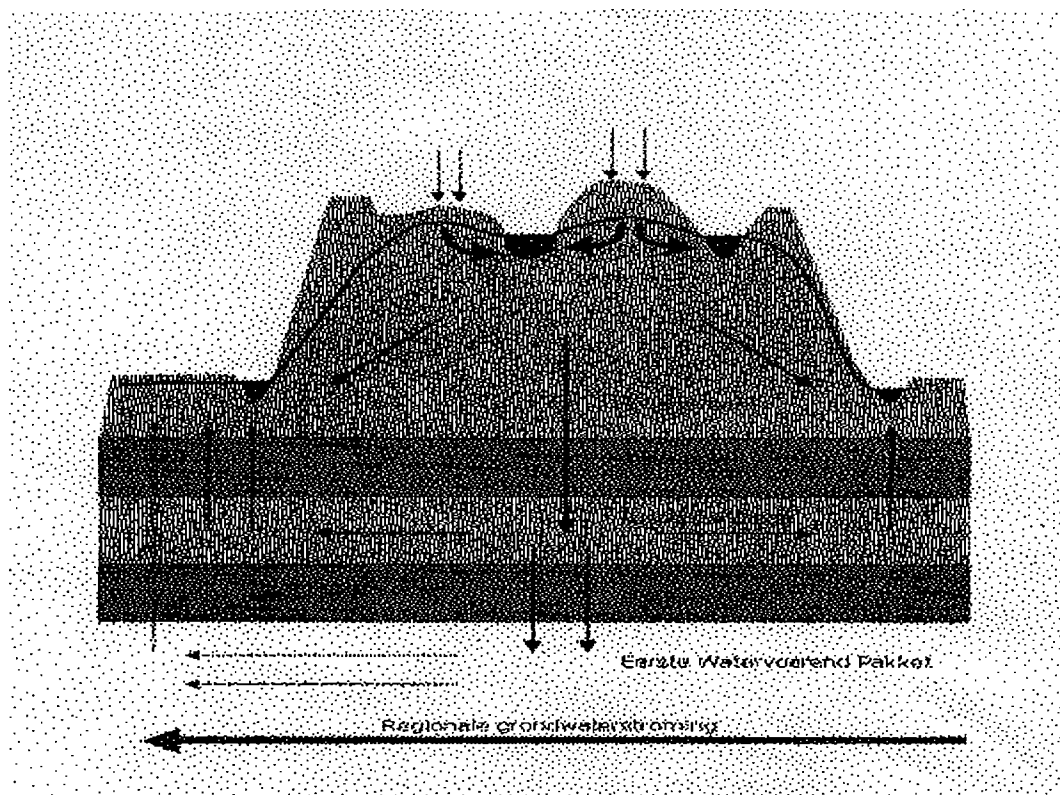


Fig 1.

The decision has been made that the surface of the site will be isolated with a layer of clay and textile to prevent roots going down to the contaminated area. A top layer of clean soil will be added and this layer will be kept wet.

For the groundwater a monitoring system will be build which contains of sampling pipes which are placed at such a distance that that a "plume" of contaminants will be detected before the

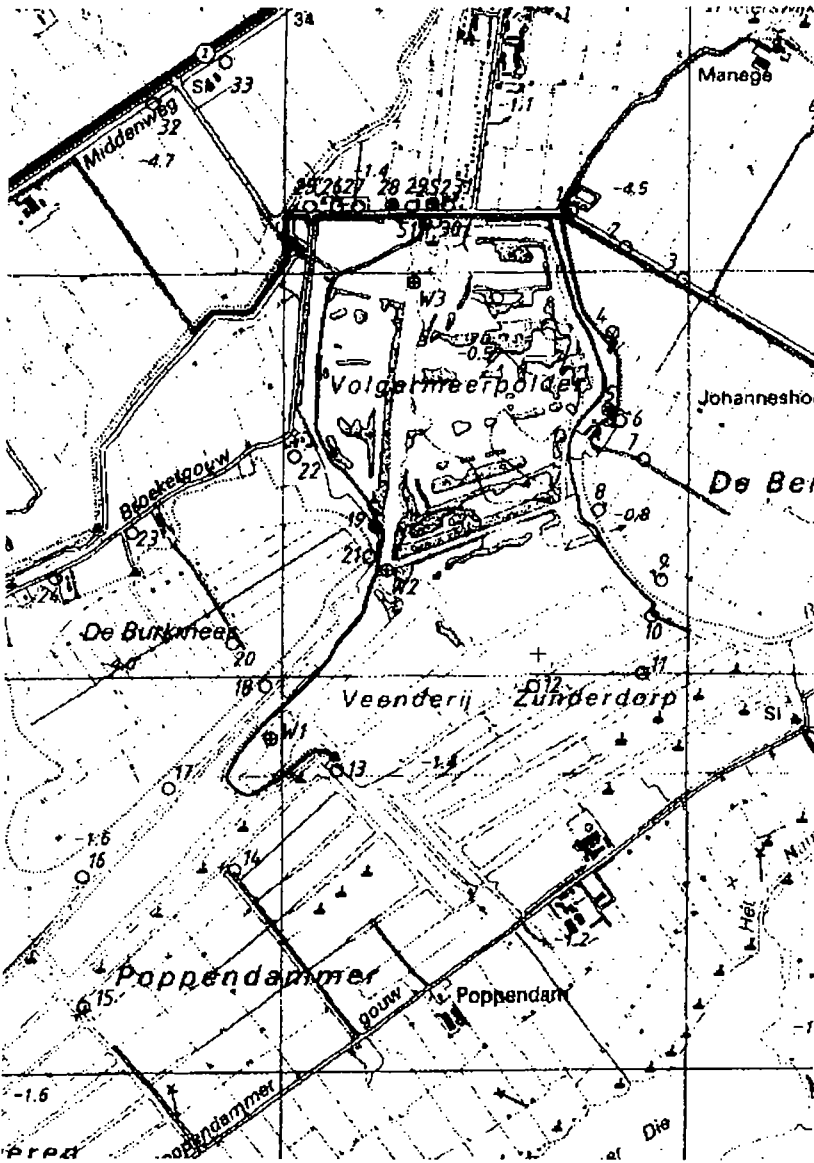


Fig. 2

distance of the contaminants to the landfill exceeds an acceptable amount (fig.3). The so called control zone will be 33m for the undep groundwater and 50m for the deep groundwater. In the neighbourhood of houses the control zone will be more narrow. Spreading outside the control zone is not acceptable.

If however leaching outside the control zone takes place an interception system will be made consisting of horizontal drains for the undep surface water and vertical pipes for pumping up the

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deep groundwater. The water from the drains and the pipes will be cleaned in an onsite cleaning installation.

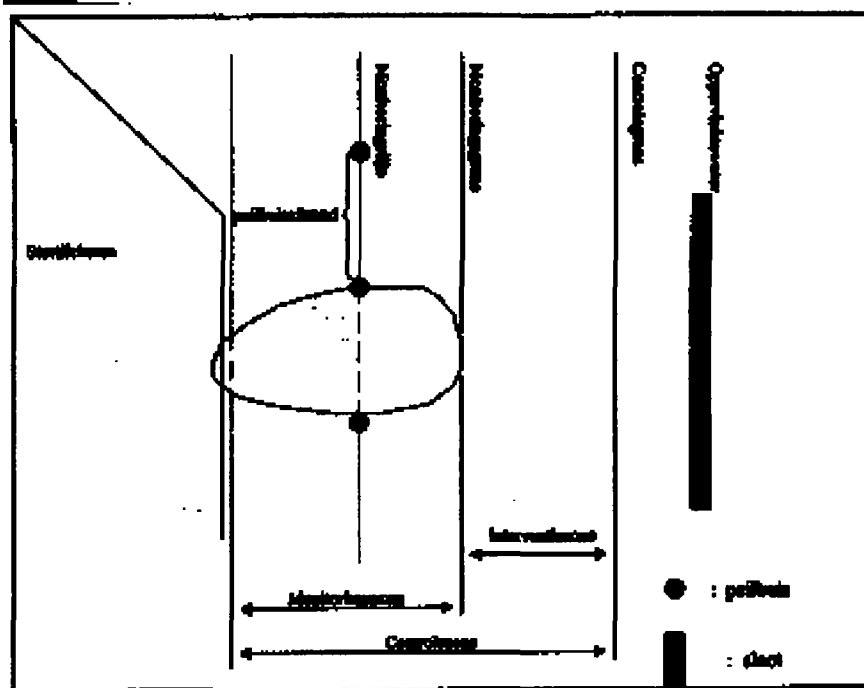


Fig. 3

Conclusions

This approach is safe and relatively inexpensive and is unique in the Netherlands and Europe. Due to the fact that the top of the site will be isolated with a clay layer the amount of rainwater that have been in contact with the contaminants in the site before it leaves the site will be small compared to the present situation.

References

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