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HAZARDOUS WASTE IN THE NETHERLANDS

DUTCH POLICIES FROM A LOCAL PERSPECTIVE

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FOREWORD

This paper is a result of collaboration between the authors and the IIASA project on risk assessment in hazardous waste management. It was part of a multiple collaboration in the Netherlands. The IIASA project compared institutional approaches to regulation of hazardous wastes in several countries, including the USA, UK, FRG, Austria and Hungary. In line with previous IIASA risk research, it focussed in particular upon the interactions between the forms of risk analysis, the technical regulatory instruments employed (such as hazard classifications), and the institutional processes of regulation in those countries.

The influence of institutional processes upon technical knowledge used in regulation has been increasingly recognized. However, it has yet to be adequately systematized in comparative research on different regulatory systems. Institutional structures cannot be easily transplanted from one culture to another. Nevertheless, through the normal flux of policy, institutional development slowly occurs anyway, in more or less ad hoc fashion. Comparative insight can help to direct reflection and adaptation in more deliberate and constructive ways.

In addition, this work is of importance for current attempts to develop effective international regimes of hazardous waste management, via harmonization of national approaches. The IIASA work demonstrates the limitations of approaches dependent upon technical harmonization alone. The present paper shows how pervasive and complex are the institutional forces which shape technical policy instruments in different practical ways, even within national systems.

The IIASA project was written up as a series of Working Papers published in May 1984. In revised form it will be published as a book in 1986 and will include a chapter on the Netherlands drawn partly from the present paper.

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ABSTRACT

This paper is about risk management and environmental policy. Conventional approaches to risk management (Wynne et al., IIASA Working Papers on Hazardous Waste Management) tend to assume that risk is a technical phenomenon, and that successful risk management involves the elaboration and use of precise technical analytic models and regulatory instruments. The aim of this work is to show that this general approach is unrealistic. Firstly, it is shown that different perceptions and definitions of policy issues shape legislative and regulatory agendas in ways which mean that environmental management and specific definitions of risk problems are only a (varying) part of the broader agendas and concerns of interacting groups. Secondly, it is shown that even after apparently precise regulations have been established, the process of implementation effectively continues the negotiation of the basic agenda of issues as defined by different interests. This is shown to be the case at national and local levels. The family of Dutch case studies presented supports the argument of the IIASA hazardous waste papers, that effective regulatory instruments can only be identified in the context of interaction between the institutional realities of regulatory decision making and appropriate forms of technical knowledge. These vary from one regulatory system to another, making technical harmonisation extremely problematic.

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1. Introduction

Institutional realities, including past experience, shape policy agendas, problem definitions, the setting and use of technical norms and the way uncertainties are managed in the field of risk management and hazardous wastes. Dirven¹ has given an account of the institutional processes which affected the formulation and implementation of regulations in the Dutch Chemical Waste Act, the main regulatory framework for current waste management, and the Soil Clean Up (interim) Act, the regulatory framework for dealing with wastes from the past. His account focussed mainly upon the central government level. To complete his analytical picture, however, requires attention to local processes, especially at the level of the municipality.

Municipalities, as well as provinces, are territorially dispersed² authorities having their own political identity; they are accountable to their own houses of representatives, the municipal and provincial councils respectively. In the situations we consider in this paper we also encounter so called functionally decentralized authorities, of which the water authorities (waterschappen en (hoog-)heemraadschappen) are important examples³.

The execution of quite a number of environmental acts has been delegated to lower authorities, especially provinces. Measures connected with the Nuisance Act, an act dating from 1875 and intended to reduce nuisance caused by industrial activity, are taken by the municipalities. But if an industrial facility crosses municipal boundaries, or if other environmental legislation is involved, provincial states coordinate licencing procedures. The Soil Clean Up (interim) Act has granted executive authority to the provincial level; however, in this case the financial authority is in the hands of the central government. Such a partial division of authority strongly influences the implementation of regulations.

¹ J.M.C.Dirven, first part of the Netherlands case study.

² We use this term to denote decentralisation without complete delegation of financial authority.

³ In some cases provinces and water authority coincide (e.g. in the province of Utrecht). A waterschap is in charge of the maintenance of dikes, roads, bridges and the navigability of canals.

According to the conventional view of implementation, central regulations enforced at local levels with varying degrees of competence, vigour, resources, information, etc., and thus varying levels of actual enforcement. Implementation can be improved by improving these factors. More recently, however, authors (such as Diver (1)) have shown that divergent institutional realities and rationalities prevail at the central and local levels. The respective parts of the overall regulatory systems are responding to different signals, constraints and imposed objectives within their institutional environments. Optimising their regulatory function means very different and not necessarily mutually consistent things at the different institutional levels.

Understanding implementation at the local level is therefore crucial for understanding risk management and regulation. Those affected by the enforcement of an act view the act from widely differing perspectives. For them it is a new factor of variable negotiability in dealing with problems already on their agendas. They have to fit the new features brought about by the legislation into the way they routinely deal with problems. It is a new resource or constraint introduced into the situation. Decision analysts and other students of policy processes tend to view policy problem definitions as given entities even in the environmental field. But as will become apparent from this paper, all problem definitions are socially shaped, therefore in flux and contingent. Central policy activities are only one of the factors influencing local problem definitions and agendas.

A new act is in this sense no starting point: it comes into being in an already existing structure of legal, social and institutional behaviour. Problems that are being dealt with can change by it, but will usually not disappear by the new regulation. Yet, new legislation does add to institutional uncertainty; additional experience may be needed to handle the features brought about by the new rules.

It is not only the 'implementation phase' of a new act that is viewed differently at different levels in society. In addition, the way the problem is defined at the central level may not resemble the problem as seen by residents or local authorities. As Dirven has described from a central viewpoint the chemical waste issue has been viewed primarily as a problem

industrial structure and management, whereas in the soil clean-up debate a risk management viewpoint was forced upon central government. But from the local viewpoint the risk management perspective was dominant in the issue of chemical waste as well as soil clean-up. This was largely due to the close interaction of local authorities with concerned residents.

By describing several cases in this paper we show the ways in which local municipalities interact with central and provincial governments, and local groups, in the implementation of hazardous waste management.

With respect to the Chemical Waste Act, the main Dutch concerns at the central governmental level relate to the problem of establishing a hazardous waste Treatment and Disposal (T & D) infrastructure. Therefore, the risk assessment dimensions of this issue have been rather abstract and technical (e.g. to do with the overall waste classification system, see Dirven). At the local level, however, the risk dimensions of the hazardous waste problem prevail, as can be seen by the local disturbance caused by industrial plans to establish a national waste disposal site; and by the activities of some national companies.

The scarcity of hazardous waste T & D facilities have created regulatory problems at the local level as is shown by the EMK/Uniser and Booy Clean cases. In these cases local authorities, confronted with the environmental and health risks caused by waste treatment firms, worked in conflict with regional and central government by trying to impose restrictions on those firms.

In a number of soil pollution cases, however, the situation is quite different. The differences are in three areas:

1. In the case of hazardous waste T & D, the waste management approach of central government was obstructed by a risk management approach of local government, but in the issue of soil pollution a risk management approach seems to be the overriding viewpoint on all levels.
2. With respect to hazardous waste, local citizens showed no divergence from the local government viewpoint, whereas in soil pollution cases there was much more antagonism between local government and residents.

3. Concerning hazardous waste Treatment and Disposal, the most important factor the government has to deal with is industry, whereas in the soil pollution issue industry successfully managed to avoid the financial burden.

These differences can be explained by the history of the soil pollution issue in the Netherlands and the characteristics of soil pollution as a problem. The issue of soil pollution arose almost overnight, and unexpected, when the pollution at Lekkerkerk was acknowledged by minister Ginjaar. The Chemical Waste Act and its consequences formed part of an ongoing regulatory debate. Before Lekkerkerk became an issue in 1980, some cases of soil pollution were known, but apart from the local residents and local and provincial authorities directly involved attention to these cases was scant. In Lekkerkerk a housing development was built on a landfill of chemical waste and household refuse. In 1980, the possibility that the inhabitants of the houses were exposed to the chemical waste was recognized. Government decided to remove the polluted soil. The clean up operation was performed within half a year at tremendous cost (almost 200 million Dutch guilders, or 80 million US dollars). The Lekkerkerk incident remained in the public attention for over a year and thus the soil pollution issue was associated strongly with public health. In this respect it is comparable to the Vac incident in Hungary (see E. Kiss, IIASA Hungary case study). The publicity around Lekkerkerk alerted the public to the general issue of soil pollution, attracting public attention to other cases. It stimulated the Ministry to organize a national inventory of suspected soil pollution cases. From this inventory it was concluded that it would be financially impossible to deal with other cases as thoroughly as Lekkerkerk.

An extensive procedure was laid down in the draft of the Soil Clean-Up (interim) Act to rationalize the approach of soil pollution cases and to adapt it to financial resources. Other soil pollution cases already in progress were forced into this procedure even before the Act was enacted. In this way government hoped to escape the financial burden which would be imposed by dealing with other cases as Lekkerkerk had been handled. It was felt that in Lekkerkerk too much money had been spent with too little knowledge of the pollution risks.

It was the shock of Lekkerkerk that prompted a different history for the creation and implementation of the Soil Clean-Up (interim) Act in relation to the Chemical Waste Act. The sudden emergence of a direct threat to public health occasioned a risk management approach. After this approach had been established in the case of Lekkerkerk, it remained

the starting point for action in soil pollution situations, even if less rigorous standards of risk reduction were applied.

2. CHEMICAL WASTE

In the case of soil pollution a clearcut local incident, Lekkerkerk, can be seen as the starting point for general anxiety, followed by legislation and the soil clean up operation.

No such single incident can be traced as a starting point for chemical waste legislation. This legislation resulted from the slowly growing anxiety about damage caused by hazardous waste to the public and the environment if uncontrolled, resulting in the provisional Chemical Waste Act in 1973¹. On the central level the hazardous waste problem was seen as a problem of establishing a new industrial organizational infrastructure. The main feature of the Chemical Waste Act was to provide for an organizational framework within which chemical waste would be removed effectively. The Act did not give any directives of how chemical waste should be treated, but for prohibition of disposal on land (see Dirven). The establishment of the necessary treatment and disposal facilities was left to industry.

Industrial Planning for Hazardous Waste Treatment and Disposal

The industry was thus confronted with the hazardous waste problem more clearly than before. The amount of wastes needing handling grew due to the growth of (chemical) industries and to the tightening up of discharge regulations (for example, the required water purification systems produce waste sludges with large amounts of toxic substances).

Also a number of former conventional routes of disposing of industrial waste became less viable (ocean dumping) or were forbidden (dumping on land), thus forcing industry to act. They did so, for instance, by trying to influence the final form of the Chemical Waste Act, e.g. by negotiating the standards for defining which waste is considered to be chemical or not. In this respect they found the Ministry of Economic Affairs to be an ally.

¹ The Chemical Waste Bill was sent to parliament in 1973 but was not enacted until 1979.

But they also tried to anticipate the situation that would result as soon as the act was enforced. From industry's perspective there was one essential cornerstone missing if they were to comply with the act, namely an opportunity to dump chemicals on a controlled site.

A number of large chemical firms like Akzo, Unilever and Dow Chemical founded Induval. Induval began in 1973, without any publicity, to develop a plan for a controlled chemical dumping site. The dump was intended to deal with those chemicals for which there were no effective and environmentally acceptable methods of processing.

The plan contained a technical elaboration of the dumping ground which was supplemented in 1976 with "a confidential investigation" of four possible dumping sites in the province of North Brabant. Contact was made with the Ministries of Economic Affairs and Public Health and Environment which gave the go ahead for the plan to be submitted to the County Aldermen (2).

The plan, however, had been leaked to the environmental Foundation, Nature and Environment, which strongly opposed the idea of a dumping ground. From their perspective such a dumping ground could lead to serious pollution of the soil and the groundwater and the primary industrial aim should be to prevent the production of chemical waste (3). Nature and Environment thought that industry was generally unwilling to look for "clean technologies" and good processing methods.

The leak created substantial opposition in North Brabant; the four favoured cities rejected plans for such a dump in their territory. In a discussion with the County Aldermen, of North Brabant the ministers of Economic Affairs and Health and Environmental Protection said that the Induval plan was consistent with the national Chemical Waste Act. Industry was to develop initiatives to store or process chemical waste (9).

The ministers announced, however, that they would review the plans of Induval. In 1977, a meeting took place between the ministers and Induval where a list of chemicals was drawn up that could be considered for storing and some technical changes in the blueprints of the dumps were made (4,5). In August 1977 Induval presented the second version of the plan in which the exact spot of the possible dumping ground was kept

open (6). Central government supported the plan because they thought it imperative for the functioning of the Chemical Waste Act (5). The plan was presented to the provinces of Overijssel, Gelderland, North Brabant and Limburg, all of which unanimously rejected (7). The reasons given were insufficient guarantee against leakage, insufficient description of wastes, and insufficient investigation of other processing alternatives (8). Because of the adamant rejection by the provinces, the Induval plan was abandoned.

The rise and fall of the Induval plan clarified the views taken by the different groups with respect to hazardous waste treatment and disposal facilities. Industry was striving for the undisturbed conduct of business in a cost effective way and independent from landfill facilities in foreign countries. Central government supported the Induval initiative because it fitted with a cooperative approach to the hazardous waste problem ("the industrial organisational infrastructure-approach"). Local and regional authorities, as well as environmental groups, were primarily concerned about the environmental risks and thus adopted a risk-management framework. They put emphasis on reprocessing of wastes and viewed landfill as the last resort solution.

As discussed above, discussion on the establishment of hazardous waste treatment and disposal facilities began in the early 70's. Negotiations at a central level have continued in the 80's and there are as yet no facilities in operation.

Yet, approximately 1 million tons of chemical wastes generated each year had to be handled in some way (10). In part, it was treated by the waste producing firms themselves, or stored on their premises¹; in part, it was exported to foreign countries, dumped legally or illegally, or handled by firms specialized in treating wastes.

¹ We have to bear in mind that storage of wastes on the premises of the firm that produced it is not regulated by the Chemical Waste Act. Such storage is only subordinate to regulations within the Nuisance Act.

It was this last category of firms that fulfilled an important role in the organisational infrastructure approach to the hazardous waste problem. Central government viewed these firms as the beginning of a crucial network treating all kinds of wastes and, therefore, was willing to offer support. But, some of these waste treatment firms caused severe nuisance at the local level. Problems arose because local authorities pursued a risk management policy that was at odds with the policy of regional and national authorities which support waste treatment firms.

The EMK case

This case study focusses on the history of the waste treatment firm EMK in Krimpen aan de IJssel from 1970 to 1980. In the late 70's EMK became a daughter company of Uniser, the biggest waste treatment firm in the Netherlands.

In 1981, a major scandal arose in the Netherlands concerning the way in which chemical wastes were processed by Uniser. Many laws had been infringed. Uniser had drained and dumped wastes illegally throughout the Netherlands. There was also a large-scale selling of hazardous wastes as oil and, after mixing with coal, as solid fuel. This scandal led up to prosecution of the top management of Uniser, the biggest environmental court case in Dutch history.

At the request of members of parliament a committee was set up by the Under Secretary of Health and Environmental Protection to undertake an inquiry into the conduct of Uniser and EMK. The report of this **Committee Hellinga** was the main source of material for the historical details below (11).

In 1970, the Exploitatie Maatschappij Krimpen Ltd. (**EMK**) was founded. It was located on the former site of the Chemical Industry Uithoorn Ltd., (**CINDU**) in Krimpen aan de IJssel. The CINDU had been processing tar and tar products under a 1965 Nuisance Act licence. EMK presented itself as a merchandizing company of oils and fats. In EMK vocabulary, however, the word merchandizing included regenerating, reconditioning and processing of the fats and oils as well.

Since EMK took over the site and premises the CINDU Nuisance Act licence was passed on to EMK. This licence formally covered the EMK activities (provided EMK stuck to the terms of the licence).

From the beginning there were complaints about severe stench from EMK and following a DCMR (the Rijnmond environmental control body) report on the bad situation on the premises of EMK, the Court of Mayor and Aldermen of Krimpen took action in August 1970. They requested that EMK apply for a new Nuisance Act licence for their entire organisation since, according to the DCMR, the old CINDU licence did not cover all the activities of EMK. Repeatedly EMK did not file a complete application. Following a number of deadlines from the municipality, as well as the threat of closing down EMK, a complete application was submitted in August 1971. During this year there were continuing complaints about stench nuisance. The old CINDU licence did not cover the processing of stench raising compounds; yet, there were several deliveries of the stench-raising compound Resinform at the EMK site. In November, 1970, a ship carrying approximately 530 tons of Resinform sank at the EMK embankment. The municipality repeatedly threatened to close down (part of) the EMK organisation if it did not stop the processing of stench-raising compounds. However, in September 1971, barrels with such compounds were still being stored on the EMK site.

From the summer of 1971 onwards several individuals and institutions reported to the Krimpen authorities the deplorable situation at EMK. In a confidential report of DCMR it was stated that "A vast part of the site is covered with a tar-like substance. A nearby ditch is nearly filled with the same kind of substance. Since a pipe from one of the tanks empties into the ditch one gets the impression that the state of the ditch is not being improved One can state that practically every regulation is being violated". (12)

In spite of this devastating report of DCMR the Court of Mayor and Aldermen did not take any real action except to increase inspection of the EMK in close co-operation with the Korps Controleurs Gevaarlijke Stoffen and the Centrale Meld en Regelkamer Rijnmond (the **Control body for hazardous substances, and the Central report and adjustment (regulation) office Rijnmond, respectively**).

In November 1971, EMK was installed a number of storagetanks, in spite of statements by the municipality that they were not to put tanks into use without the necessary building and Nuisance Act licences. In reaction the Krimpen municipality, with the help of the police, stopped this activity

of EMK and prohibited the use of the tanks. In response an EMK director announced that he would ask other government agencies to intervene. Employees from the Regional Environmental Inspectorate and the Rijnmond authority asked the municipality of Krimpen asking whether such extreme measures were necessary, emphasizing the importance of industrial removal, discharge and processing of chemical waste and waste oils.

At this time (1971), the municipality had been waiting several months for the Ministry of Health and Environmental Protection to respond to another problem apparently created by Ministry: allocation of part of EMK's site for storage of barrels of hazardous waste for ocean dumping.

The fact that an answer from the Ministry failed to come, combined with pressure from the Inspectorate over stoppage of EMK's tank installation made the Krimpen municipality feel abandoned by higher authorities. They expressed this feeling during exchanges with the Inspectorate, which agreed to keep in touch on the EMK case.

It still took some time before the Ministry responded, and then very generally. Apart from the statement that they did not approve a storage site, they responded that it was advisable to supervise private enterprise in the field of waste; the Regional Inspectorate should advise them in these matters.

The conflict between central and regional government and the Krimpen local authority reflected the government's overriding concern to maintain an industrial infrastructure for hazardous waste treatment. This is also reflected in the emphasis of the Chemical Waste Act on encouraging and creating such an infrastructure. The already fragile attraction for private investments into waste management would be further jeopardized by increased regulatory constraints, on this new industrial sector.

The Regional Inspectorate was concerned with the dumping of container rubbish, frequently containing industrial and chemical waste, in the surroundings of Krimpen, and the operation of EMK prevented, at least in part, the illegal dumping of chemical waste. This may explain the dismissive attitude of the Inspectorate.

Temporary closure of EMK

After the above mentioned incident, the activities of the municipality were intensified. Although there was a daily inspection of the EMK site by an employee, it was not very effective since, as became evident later, the Nuisance Act licence conditions were unknown to this controlling employee. Yet substances stored on the EMK site were regularly sampled and analyzed, which resulted once in the spotting of an infringement of the Nuisance Act.

In the continuing procedure for a new Nuisance Act licence, the municipality adviser concluded that the EMK application still did not meet the requirements. The municipality decided not to grant EMK a new licence and to wait for an opportunity to shut down EMK. That opportunity arose when analyses showed that EMK stored substances not covered by their Nuisance Act licence. Consequently, in 1972 the municipality ordered the immediate closing down of EMK, siting risks to life for the neighbourhood.

The EMK lodged an appeal with the Crown and instituted a law suit against the municipality. This led to a settlement by agreement, suggested by the judge. The compromise agreement between EMK and the municipality held that the old Nuisance Act licence from 1965 would remain valid with the addition of a number of new conditions limiting the kind of substances allowed to be stored and processed. It was also agreed that EMK would submit a new application for a licence.

In the following years the most important incident was the so-called Papendrecht affair in the beginning of 1977. It appeared that EMK had buried a number of barrels containing arsenic substances on a dumping site in Papendrecht. The EMK director was prosecuted, and fined and sentenced to a suspended imprisonment. The director subsequently resigned from the Dutch Advisory Committee on used oil, a statutory advisory office of the Minister of Health and Environmental Protection.

After long delays a new Nuisance Act licence to EMK was finally granted in August 1977. The Rijnmond authorities assumed responsibility for the Nuisance Act to assure better coordination of environmental protection on the regional level. EMK again appealed the conditions of the licence.

In 1977, EMK announced a transfer of its activities to Moerdijk. At the same time the Rijnmond authority agreed to a step-by-step renovation of EMK. EMK then repeatedly prolonged deadlines to the point when they announced in 1980 the closure of all activities in Krimpen. It had become evident that for them doing business within the frame of the Nuisance Act was impossible.

Meantime complaints continued about stench nuisance. Numerous infringements of the Nuisance Act were observed, and recorded in a so-called "black file" (**complaint book**) by the environmental protection agency of Rijnmond (13).

When dismantling on the EMK site began, a true catastrophe became apparent. The ground turned out to be very heavily polluted with oil and aromatic and phenolic compounds. Also enormous amounts of chemical waste were found on the site in tanks and storagecellars as well as in a moored boat (14). Thus, the first Dutch T & D facility turned into one of the worst soil pollution cases in Dutch history.

Continuing EMK within the Uniser company

After abandoning its site in Krimpen, the illegal activities of EMK continued on the industrial site of Moerdijk. In 1976, EMK had established the RTM (**Recycle Terminal Moerdijk**) in a joint venture with Drisolco, a firm handling chemical wastes.

These three firms, EMK, RTM, and Drisolco, were placed under the holding company, Uniser Holding Ltd., at the end of 1977. This combination created the image of the waste processing company in the Netherlands, which could offer an integral service (16). The waste flow from numerous (chemical) companies to Uniser grew, and in 1979 it received and processed some 100.000 tons of waste.

In commercial publications (15) Uniser advertised a division of labour between its companies: EMK was responsible for transport, Drisolco for storage, and RTM for processing waste oils and chemical wastes. But the actual situation differed so greatly that the public prosecutor in the courtcase against the Uniser referred to it as "a great fake show" (17). Uniser was the cloak masking such illegal activities as discharging, dumping and selling of wastes.

In 1980, a suspicious leak from a storage tanker hired by Drisolco was investigated, which led eventually to the arrest of the Uniser management in August 1981. The ensuing courtcase resulted in the imprisonment of the suspects for periods of 7 months to 2/ years.

Enforcement of environmental legislation with respect to EMK

In Krimpen full attention was given by the municipality to the enforcement of the Nuisance Act. Other regulations, such as the Act on the Pollution Surfacewater and the Provincial Regulation on Chemical Waste, did not play a part.

The aim of the Nuisance Act is to prevent "danger, damage or nuisance by installations" to their surroundings. This Act, dating from 1875, is considered to be the oldest environmental law in the Netherlands, although it was not primarily intended to be an environmental act. The Nuisance Act states that installations mentioned in the Nuisance Order (Hinderwet besluit) may not be operated or be extended or modified without a licence. This is normally granted on request by the municipality in which a firm is established. In most cases the licence contains conditions prescribing in detail the kind of activities permitted within the firm and the measures to be taken by the licensee to diminish danger, damage or nuisance to the surroundings.

Until 1979 the Nuisance Act contained only one administrative sanction: closure of the firm, preceded by a warning of proposed closure. The latter is not necessary in case of danger to life or unbearable nuisance to surroundings. Closure of the firm is prescribed imperatively if a firm is in operation without or in violation of a licence.

At first sight the Nuisance Act is a well prepared law providing for the necessary protection of surroundings against industrial activities. Despite this act, however, severe nuisance and pollution could not be effectively prevented in Krimpen. The reason appeared to be the weak attitude of the local authorities, yet in reality they were not supported by higher level authorities in enforcing the Nuisance Act. On the contrary, when the municipality was resolute, it was reprimanded by higher authorities.

Indeed leniency in enforcing the Nuisance Act was sanctioned in official guidelines from the Ministry. In a circular from the Ministry of Social Affairs in 1960 it is stated: "... it is not intended that the measure of closure be used immediately against firms which are found operating without a licence or in violation with a granted licence (18)".

Such guidelines can lead to a "symbolic enforcement" of the Nuisance Act, and one must keep this in mind when judging the events in Krimpen. The Krimpen municipality had given EMK considerable time (a year) to submit an application for a new Nuisance Act licence. In addition they did not close EMK down immediately when it was found to be infringing the law. This was in accordance with official guidelines of the central government. The consequence was that local authorities were kept on a string by a firm managing to obtain respite time and again, which seems to have been the case in Krimpen. Although, the authorities can, in theory maintain the initiative, for instance, by sending a warning of proposed closure (a possibility that was not used by the authorities in Krimpen). When they did close the EMK in May 1972 they risked being held responsible for the costs if it could be shown that prompt closure was not justified.

After the Rijnmond authorities took over the responsibility from Krimpen, the Nuisance Act was not enforced more tightly. In fact, the pollution did not cease until EMK itself decided to take refuge in Moerdijk. It can be concluded that the Nuisance Act was not an effective tool in controlling the activities of EMK.

One important question is why the Act on the Pollution of Surface water was not invoked with EMK. The damaging report of the DCMR in 1971 gave reason enough to suspect EMK of severely polluting the surfacewater (12). The Act, however, was rather new, and the authorities had had little experience in its implementation.

The EMK submitted an application for a discharging licence in December 1974 that was not granted until March 1979. The procedure was time consuming because the RIZA (**National Institute for Purification of Waste Water**) reacted very slowly in drawing up draft conditions for the EMK licence. A year after granting, the licence was withdrawn because EMK closed its operations in Krimpen.

Thus, the Act on the Pollution of Surface water did not play a part, for procedural reasons. But as will become clear from the Booy Clean discussed below, enforcement of environmental legislation may also be inhibited when different responsible authorities attach different importance to the availability of technological facilities.

Booy Clean

Booy Clean is located in Rotterdam harbour. The firm is cleans tanks and collects cargo remnants and slobs (remnants mixed with washing water) from ships and land installations (19).

In 1970, local newspapers began reporting complaints from neighbours and environmental interest groups about stench and illegal discharges (20). In 1973, an environmental group introduced a law suit against Booy Clean, during which a former employee of Booy Clean declared that "poison, oil and chemicals were regularly discharged in the Oude Maas". The judge acquitted Booy Clean on grounds that "there was no conclusive evidence that the declarations of the witnesses were based on facts observed " (21). At that time Booy Clean did not have a Nuisance Act licence because it was not subject to the Nuisance Order, only to the Harbour Regulations (22). In the two year period, 1971-1973 harbour inspectors had presented some twenty warrants against Booy Clean for infringing the regulations (23). A 1983 report prepared by Rotterdam authorities mentioned that river police alone presented sixty warrants, citing among other things, infringement of the Chemical Waste Act and the Act on the Pollution of Surface water (24). It can be concluded that the civil servants in Rotterdam did know of pollution caused by Booy Clean.

Following enactment of the Act on the Pollution of Surface water, Booy Clean was a "fictive licensee" because it discharged before the enforcement. Booy Clean submitted an application for a discharging licence in November 1979, which was granted in September 1980 under several conditions. These conditions presented restrictions on the substances to be discharged and required a reconstruction plan including an appropriate purification installation by the beginning of 1984. After the plan was submitted in March 1980, deliberations with Rijkswaterstaat (**the Governmental Water Agency**) began. Rijkswaterstaat was also responsible for the discharging licence by Booy Clean. During 1981 little progress was made in the deliberations and Booy Clean regularly violated the discharging licence (19).

In August 1981 Rijkswaterstaat evaluated Booy Clean's observance of the discharging licence and concluded that the situation was deplorable. They coordinated their efforts with the riverpolice, harbour service and the DCMR forcing Booy Clean to observe the discharging licence and to implement the reconstruction plan (19).

In reply to a letter from Rijkswaterstaat, Booy Clean denied any responsibility for the infringements noted by Rijkswaterstaat. In autumn, 1981, the waste water of Booy Clean was regularly inspected and, again, regulated pollutants

were found. At that time it was discovered that the sludge in Geul harbour, where Booy Clean had been established since 1976, was severely polluted, including chlorinated hydrocarbons for which discharge was forbidden.

In late 1981 a judicial inquiry was initiated on supposed environmental delicts committed by Booy Clean, including infringements of the Chemical Waste Act. In March, 1983, the director and manager of Booy Clean were taken into temporary custody on suspicion of forgery and defrauding.

Booy Clean's discharging licence was then withdrawn by the Ministry (29). Rijkswaterstaat took custody of the installations, buildings and (private) capital of Booy Clean to ensure that the firm would contribute to the costs of cleaning up the Geul harbour (25).

In the summer of 1984 these measures were reversed by the State Council (the highest appeal court in the Netherlands) (30). According to the State Council there was lack of evidence that Booy Clean had caused the pollution in the Geul harbour. Shortly thereafter Booy Clean paid half a million guilders to escape further lawsuits and announced that it would make a comeback as a waste treatment firm in combination with other firms (31,32).

A close look at the Booy Clean case reveals again that governmental agencies have diverging interests and often very different policy perspectives from official versions.

In a harbour such as Rotterdam, which is one of the busiest in the world, the existence of a tanker cleaning firm like Booy Clean is imperative. According to the Rotterdam alderman, van der Dunnen: "Our harbour is frequented by 40.000 sea vessels every year, and they bring in everything that God has forbidden. So there must be a firm to treat the wastes. Otherwise, the ships will drain their wastes in the open sea" (26). And according to Noe of the Rotterdam harbour agency: "It is nice, of course, to have a firm attitude, but as long as there are no other treatment facilities in the Netherlands, one should be pliant. We are aware of the fact that Booy Clean discharges, but there are not always alternatives" (21). The prosecution Council was very reserved in taking penal action because according to the public prosecutor it was possible that the firm could be reorganised in such a way that it could fulfill a useful function in the Rotterdam harbour (20). It was difficult for an environmental agency, such as the DCMR, to confront the interests of the powerful harbour agency, which had not granted a fixed buoy for Booy Clean's floating pontoon. This excluded Booy Clean as a firm regulated under the Nuisance Act, which in turn excluded the DCMR from the pontoon. The harbour agencies refused to give any

unsalaried appointments to the civil servants of the DCMR (27), in order to give them controlling powers.

In 1983, an international convention aimed at preventing pollution by ships, **the Marpolconvention**, required that sea harbours offer enough facilities for delivery and treatment of oil- and chemical remnants. As early as 1981, Booy Clean and three other firms had stated their desire to participate in this so-called harbour receipt facility (19). The central government namely the **Ministry of Traffic and Public works** was enthusiastic since the suggested plan was cheaper than similar plans developed by Rotterdam and Rijnmond (28). Because of this support from the Ministry, Booy Clean promised to grow into an all-round treatment firm for chemical wastes, despite its illegal activities. It was not until the end of 1983 that the minister lost his confidence in Booy Clean. The firm would not be permitted to participate in the harbour receipt facilities, and its discharge licence would be withdrawn (29).

Concluding remarks

The EMK and Booy Clean cases are good examples of administrative enforcement of environmental legislation with respect to waste T & D firms in the Netherlands. These cases show how enforcement can be paralyzed when the responsible agencies and levels of authority in the regulatory system have different views of the problem. Effective implementation of regulations requires coordination between different parts of the administrative system, and this is normally a problem.

If the hazardous waste issue is seen as a problem of industrial-organizational infrastructure, treatment firms are seen as a cornerstone in a national or local system of waste treatment. In a more risk-management oriented approach, such firms are seen as risk generating activities that must be closely regulated.

These different problem definitions do not directly coincide with the division between central and local authorities. In the Booy Clean case, for instance, the local harbour authorities supported that firm. Authorities are frequently blind to problems lying outside their policy domain and their management of problems is dominated by interests related to that policy.

3. SOIL CLEAN UP

In the introduction, we described how government dealt with the first big soil pollution case in the Netherlands at **Lekkerkerk**. There the sudden emergence of a direct threat to public health necessitated a risk-management approach. Lekkerkerk can be seen as the rallying point for future environmental action. The developing risk-management approach, however, did not and cannot determine uniquely how an issue can effectively be dealt with by the different institutions involved. Because issues are viewed differently at different institutional levels, regulations from the national government will not always be implemented as intended. This was especially true with respect to the soil pollution issue which suddenly and unexpectedly gained status on the political agenda, thereby generating institutional uncertainty on all levels.

The extensive and detailed regulations which were promulgated by the Ministry of Public Health and Housing, Physical Planning and Environment (**VROM**) have to be seen in the light of these uncertainties. The regulations go beyond the Soil Clean-Up (interim) Act. In what follows, we focus first on those regulations which have had a strong impact on the handling of soil pollution problems at the local level, and thus on the way central government regulations influence activities of local institutions. After that we analyze three cases in which antagonism arose between different institutions at the local level.

The items discussed here are the financing of the clean up operation and the selection of pollution cases serious enough to be taken up.

1. Financing clean up

The amount of money spent on soil clean up in the Netherlands is largely determined by central government, which contributes to operations that have been approved in a ministerial procedure described below (2). The municipality contributes a threshold amount of money (depending upon the number of residents of the municipality) plus 10% of the remaining clean-up

costs. Central government provides the remaining 90%. This may result in a high financial burden for any single municipality. The provinces, on the other hand, have a major part of the preparatory and executive policy, but have a negligible contribution in financing soil clean up (see also Dirven) (33).

Industry does not routinely contribute according to this procedure, but central government may if it has evidence hold individual industries responsible for specific soil pollution cases. However, under Dutch law such responsibility is difficult to prove and results in long procedures with uncertain results (34).

One consequence of this threshold procedure is that larger municipalities will pay for most or all of the initial (investigation) costs, without any guarantee that a clean-up will be implemented. Indeed, provincial and central government decide whether and how clean-up measures are undertaken. At the municipal level, the money needed for clean-up activities has to be reserved at the cost of other activities, since in general no additional income is gained. But this is only one aspect of the financial implications of soil clean up for Dutch municipalities. If, for instance, an area is designated for future housing, soil pollution investigations not only cost money, but they also result in serious delays, leading to costs such as penalties to estate development corporations, loss of payments by central government intended to support the building activities, loss of the chance to build a certain group of houses (which is especially important for quickly growing municipalities). It is, therefore, not surprising that Dutch municipalities view soil pollution as a problem with strong and negative financial dimensions, which influence their management approach. The institutional pressures encourage them to recognize pollution cases (to allay local groups) but then to minimize the risks and necessary treatment (to minimize costs). the sum of these pressures tends towards symbolic policy action only.

2. Selection of pollution cases

The selection of pollution cases for clean-up is performed in two stages. The first is the assessment of the specific case against a set of criteria, which include the (intended) function of the area, the local pollution situation and the nature and concentration of pollutants. Corresponding with the risk-management approach, these criteria were intended to assess the risk of a specific case to public health or to the environment.

Consideration for clean up is restricted to those cases where direct contact

between man (or the environment) and the pollution is considered possible. The concept of a 'local pollution situation' includes different local factors important for the possible spreading of polluting compounds to the surroundings. The concentration of and types of polluting compounds are measured against quantitative norms: the so-called test framework (35), (see also Dirven. Of the three criteria, the test framework offers the most clearcut criterion to decide on the seriousness of a case and it, therefore, deserves some elaboration.

According to the test framework, three values (A, B, and C) are assigned to approximately fifty compounds and compound families. The A-values supposedly reflect either the natural occurrence or the detection limit in Dutch soils. B- and C-values appear to be derived from the A-value by simple multiplication. The toxicological and physiochemical parameters were also considered (36), but how precisely remains unclear. Therefore, the scientific basis of the test framework is scant, but in view of the fragmentary knowledge about consequences of soil pollution to man and environment it is doubtful that any better based norms could have been produced (37). The text accompanying the test framework is very tentative about the reported values (35).

Despite its shallow scientific grounding, the test framework is the basis for the policy of the different governmental institutions. Those cases where pollutants occur above C-level are to be considered for clean up, and clean up operations should be aimed at reducing concentrations to A-level. The norms offer a simple and precise way to determine whether a specific case should be considered. The test framework appears to have been accepted without reservations by residents and environmental interest groups in their efforts to persuade government officials to take action on a soil pollution problem.

The three criteria, and especially the test framework, have been powerful instruments in reducing institutional uncertainty in soil pollution cases. However, the number of pollution cases requiring clean-up according to these criteria is so great that the money needed for clean-up exceeds the amount of money made available. Therefore an extensive priority setting procedure was set up by the Ministry of Housing, Physical Planning and Environmental Control (**VROM**). This priority setting procedure was partly specified in the Soil Clean-Up (interim) Act and made priority setting

primarily a provincial issue ¹.

The provinces play a key role in Dutch environmental policy and regulation. Without exception, each province had taken some measures regarding soil pollution at the time the ministerial procedure was proposed. Initially the priority setting procedure was unclear, and for this reason the procedure and its results differ somewhat between provinces. Yet, all provinces assign a high priority to those cases where drinking water is threatened (see page 28 of this paper). In some provinces planned housing areas receive high priority (38). This is understandable since municipalities are obliged to inform the province of soil pollution, and most housing areas are investigated before construction begins.

Before investigations or clean up measures are taken the provincial clean up programmes are subjected to a time consuming checking procedure at the ministry. This does not appear to change the provincial priorities significantly. This procedure is, however, time consuming, and provinces claim it is causing serious delays in pursuing soil pollution cases. In a recent evaluation of the Soil Clean up operation this complaint has been acknowledged and the minister has promised to stop preliminary checking of cases where little money is involved (39).

The application of the criteria and the priority setting and checking procedures can be seen as formal thresholds in the decision procedure on soil clean up. Another important threshold to actual clean up is the availability of technical facilities. All techniques available in 1981 originated from the civil engineering field and could only be used for temporary isolation. This problem was recognised early by the ministerial staff and two solutions were planned.

Firstly, all provinces had to provide temporary storage facilities for soil that could not be sanitized. The problems the provinces experienced in setting up these facilities were very similar to those the ministry encountered in trying to implement the Hoffman plan ².

¹ According to the Soil Clean up (interim) Act (51) the provincial Aldermen have to draw up a yearly clean up program. this program should include a priority classification of all known cases of soil pollution in the province in question.

² These problems included a strong resistance from local government and the public (see also Dirven).

The second route was to introduce incentives for the development of soil clean up techniques. Because of the pressure to put techniques into use quickly, attention to other environmental domains (air and water) has decreased. As a result, people living in the vicinity of a soil clean up facility object vehemently to the resulting air or water pollution.

In conclusion, we can distinguish three important thresholds which influence whether action is taken on a specific soil pollution case. The first is consideration of the criteria that determine whether a case will be considered or not. The second is the priority setting procedure performed by the provincial staff, and the third is the availability of temporary storage facilities. Accordingly, a pollution case having the greatest chance of being dealt with adequately is one that involves a small amount of polluted soil, is situated in the vicinity of a (future) housing or a water supply area, and is sited in a province where the authorities have provided temporary storage facilities. This may not be the most critical case from a risk management perspective nor typical of those cases that have made soil pollution a political issue. The formal rationality of the original regulations and the actual rationalities of implementation, are very different.

Antagonism between local government and residents

The way in which the Ministry crystalized the soil clean procedures indicates that the problem was perceived as the managing of risk to public health and the environment. From the way the procedures are implemented we can see that the threat to public health has become the foremost issue, whereas the threat to the environment has fallen into the background. The perception of soil pollution as a threat to public health seems to be fairly general in the Netherlands, but even this perception permits widely different priorities, according to several organisational factors.

The perception of soil pollution by both the central government and the municipalities has been influenced strongly by the established financial structure. Once a case emerges on the political agenda, the municipalities cannot easily influence it formally and at that point they lose a certain

control over their budget. Though this loss of control is undesirable the issue on the official political agenda is the threat to public health and only arguments in those terms can be ventilated publicly. As a result the municipal government welcomes optimistic interpretations of the available information regarding public health consequences and downplays the importance of inherent uncertainties in data, if these do not show evidence of immediate risks.

The opposite may be expected of the local population. Soil pollution means a health threat of unknown dimensions which might lead the public to demand - 'a worst case' approach to evaluating uncertain data. Seen in this perspective, it is remarkable that in most of the soil pollution cases the local population appeared not to be overly concerned. Even in those cases where people live on such sites they reacted only mildly to the national soil pollution upheaval. For instance, in Gouderak, where waste from the Shell aldrin/dieldrin plant (at Pernis) was dumped in the fifties, the residents were reluctant to do anything about it. Yet, in certain cases (like the three we describe **Volgermeerpolder, Griftpark and Merwedepolder**), there was a large public reaction.

There is no simple and obvious reason why public concern arose in the cases mentioned and not in other cases. A general feature of the cases considered is a history of distrust dating back to the time before soil pollution was an issue. Once the public became concerned, some features can be identified that appear to keep this concern growing. These features are not necessarily specific to soil pollution, but may be recognized in other confrontations between local authorities and residents. Though the arguments specific are about soil pollution, they may be masking more general conflicts between the residents and the public authorities. Another general feature of these cases is the lack of experience in handling this type of problem on the part of all the parties concerned. Official bodies were plagued by institutional uncertainties: no well known procedure exist to deal with either political or technical aspects. It is natural that these officials tried to avoid routes of action which threw them into yet more uncertainty.

As noted above, the soil pollution issue in the Netherlands is dealt with primarily as a risk-management problem. In some cases, very rigorous procedures existed for example, to reduce risks related to drinking water supply. The history of Lekkerkerk illustrates this point. It was not until the

drinking water appeared to contain pollutants that the environmental inspectorate took action by ordering emergency rationing of drinking water. Two weeks later the regional public health inspector considered this action inadequate, and it was decided to evacuate the area.

In general, no procedures exist to deal with soil pollution. Local government, therefore shapes the problem and its handling in ad hoc fashion. As will be illustrated by the following case, local government actions are driven by more general aims like pacifying the resident, avoiding negative publicity, and avoiding unknown financial obligations.

The Volgermeerpolder ¹

The Volgermeerpolder is a refuse tip belonging to the municipality of Amsterdam. Besides being the main user of the tip, the municipality had the legal duty of controlling the license for the tip under the Nuisance Act. Already before 1960 people demanded closure of the tip because of the stench it produced. The demand was ignored. When in the spring of 1980 barrels containing waste originating from Philips Duphar were seen on the site (so shortly after 'Lekkerkerk') an official working group was set up to coordinate research on the consequences. On April 29, 1980, the municipality of Amsterdam issued a press report stating that 100 to 200 barrels had been found filled with poly-chlorobenzenes (41). As a consequence of this press report, a memorandum was written by a biochemist and resident of Broek in Waterland, a small municipality near the site of the pollution. In this memo attention was called to the fact that, since the barrels originated from the Philips Duphar, site where in 1963 a plant producing 2,4,5-T had exploded, it might be the case that the Philips Duphar waste contains 2,3,7,8-TCDD (commonly referred to as dioxin) (40). Immediately following this memo the municipality of Broek in Waterland issued a press report in which it asked the municipality of Amsterdam to be given better information about the existing situation and for more research to be conducted on the possible dispersion of toxic waste (they did not request an investigation of the contents of the barrels). The municipality also demanded admission as a member of the official working group. This demand was acknowledged.

¹ Details of the historical part (first half of the case study) have mainly been taken from two reports: one by M. Hisschemoller (40) and another by an Amsterdam project group (41).

The number of barrels at the tip was estimated to be around 5000 barrels of 200 liters each. Due to the growing alarm among the inhabitants of Broek in Waterland a committee, the **Burger Comitee (BC) Vuilnisstortplaats**¹ was set up. The BC's demands for admission as a member of the official working group was first refused, but later acknowledged (40). It also demanded closure of the refuse tip. A range of chlorinated hydrocarbons had been measured in samples taken from the tip and several researchers from different institutions had measured dioxin.

In early 1981, the official working group issued a detailed report of the quantities and kinds of chemicals found at the refuse tip. About 10.000 barrels were found at the tip, of which about 8000 were estimated to contain polychlorobenzenes and about 2000 hexachlorcyclohexane. Also some barrels containing other organochlorines were found, among which was the herbicide 2,4,5-T polluted with dioxin. The report stated that the local population did not run higher risks than the Dutch population in general and that no pollution had been found in tap water. The report suggested measures to prevent the spreading of pollution and further research on the presence of dioxin (41).

Shortly after toxic substances were measured in samples of tap water in Broek in Waterland. Although the origin could not be traced definitively to the tip, it was decided that some plastic conduit pipes under a ditch leading to the tip had to be substituted by metal ones (41). The effect of the find was that the water administrator of the area, the **Hoogheemraadschap voor de Uitwaterende Sluizen**, ordered the municipality of Amsterdam to close down the refuse tip within two weeks. On February 6, 1981, the Court of Mayor and Aldermen of Amsterdam decided to close down the tip and to start execution of the Lepelplan ('spoon plan'), which meant that several hundred barrels lying at the surface would be 'spooned out' and deposited in a central place at the tip. The original idea to wrap the barrels in polythene was changed due to pressure by the BC. They would now be wrapped in steel containers (40).

As in Lekkerkerk, in this case official action was taken only when the drinking water supply was thought to be endangered. Although the water authorities

¹ The BC had a core of about 10-12 persons surrounded by a fluctuating group of volunteers living in Broek in Waterland. It also availed itself of the expertise of about ten experts in different fields, among them two biochemists, one biologist, one hydrogeologist and one general practitioner (42). Being formally a working group of the Vereniging tot Behoud van Waterland (VBW) the BC attained legal status which enabled it to litigate. The objective of this association (VBW) was to maintain and advance the natural habitat in Waterland.

would likely have had more difficulties in closing down the tip in the absence of public unrest, at stake in this badly defined decision problem was the authority of governmental institutions.

There is another parallel with Lekkerkerk, namely the supposed presence of a carcinogen. In Lekkerkerk, benzene was first measured in the spaces under the houses; yet, there had been a previous investigation in which no benzene had been shown. Therefore the technical working group in charge requested research by independent expertise. In two such reviews no benzene was shown. The results of these more reassuring reviews, however, were not known to minister **Ginjaar** when it was decided to evacuate the residents and to clean up the Lekkerkerk West area.

The Lekkerkerk experience may have influenced the way in which a similar issue was approached in the Volgermeerpolder. Whereas the amounts of most of the measured pollutants went almost uncontested, the presence and amounts of dioxin, which is considered to be a potent carcinogen, was a very controversial issue. Hisschemoller, who has studied the history of the Volgermeerpolder in detail, concluded that the municipality of Amsterdam showed selective caution with respect to the dioxin pollution. Twice the Governmental Institute for Public Health (RIV) ¹ in Bilthoven was asked to confirm the presence of dioxin, but only negative results were published. This led to a press report stating that no dioxin had been measured in water and sludge. Indeed, RIV had not been able to measure dioxin in sludge. But a week before the press report was issued a dioxin find by the Laboratory for the Environment of the University of Amsterdam had been reported to the Aldermen, by the Central Municipal Laboratory for the Environment of the City of Amsterdam (Gemeentelijk Centraal Milieu-laboratorium, GCM). And GCM was undoubtedly implicated in framing the press report.

¹ The RIV (Rijksinstituut voor de Volksgezondheid) was the largest single research institute of the Dutch government and had the status of a separate directorate general at the Department of Public Health. On January 1 1984 RIV was merged with two other governmental research institutes IVA (Instituut voor Afvalstoffen onderzoek) and RID (Rijksinstituut voor de Drinkwatervoorziening) into RIVM (Rijksintituut voor Volksgezondheid en Milieuzaken, governmental institute for public health and environmental affairs). Accordingly its official field of research has been broadened with environmental research.

In the spring of 1981 the presence of dioxin was no longer contested. The issue became whether the concentrations of dioxin present in the Volgermeerpolder formed a danger to public health. The discussion concentrated on the alleged carcinogenicity of dioxin. The estimate of the potential daily intake of dioxin by people living around the refuse tip was 100-150 picogram (1 picogram = 10^{-12} gram) (43). Despite the uncertainties that surround such an estimate it was not debated by any of the parties concerned. This may have been due to the fact that the estimate by the municipal health service amounted to 150 pg, and the one proposed by Copius Peereboom, an expert siding with the residents was 100-150 pg. The debate instead centered around the issue whether dioxin should be considered to be a normal toxic substance or a (complete) carcinogen¹. It was held that in the latter case no maximal daily intake can be established at which no effects occur. All parties in the debate took the view that, if dioxin is taken to be a complete carcinogen then a norm established by the World Health Organisation (WHO) should be accepted. This norm holds that one extra casualty due to cancer should be accepted in 70 years in a population of one million people exposed.

According to a report by RIV of November 1980, which considered dioxin as a complete carcinogen, this would yield an acceptable daily intake of 13 picogram (44). The policy of the municipality of Amsterdam, however, was that a norm for dioxin should be calculated in the same way as for a normal toxic substance, which yielded an acceptable daily intake of 240 pg per person. This was a difference of 20x, and was most relevant in view of the maximal daily intake that was held to be possible (100-150 pg). This norm was to be proposed in a second report by RIV according to which dioxin was not considered to be a carcinogen (45). The debate was strongest in the period before this second report was published. The main contested point was whether dioxin was a carcinogen. The debate came into the open in a television broadcast on November 22 1981 (46). In this broadcast Heida, the director of GCM, debated with Copius Peereboom. Heida held that according to a broad scientific forum dioxin is not a complete carcinogen, but can only promote cancer. He based his thesis on the report by RIV that had not yet been published, and on the fact that secretary of state Lambers-Hacquebard endorsed the conclusion of the promised report. If dioxin was not taken to be a complete carcinogen, and accordingly was held to have a threshold beneath which no toxic effect would occur, the quantities of dioxin

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A difference was made, between on the one hand compounds that could promote cancers but not induce them (promoters), which could be dealt with as 'normal toxic substances', and on the other hand genotoxic compounds that were supposed to be able to induce and promote cancers; the latter were called complete carcinogens.

present did not constitute a toxic intake.

Uncertainty played a central role in the debate, as was made explicit by Copius Peereboom. He based his conclusion that the situation was not safe on the earlier report issued by RIV, in which a level of 13 pg was held to be acceptable. Because the new report had not yet been published, Copius Peereboom concluded that no scientific forum existed to endorse the new conclusions drawn by RIV. He emphasized the inconclusiveness of the situation, and concluded that for this reason the municipality of Amsterdam could not hold that no danger to public health existed, whereas on the other hand Heida persistently stated that the same could be safely assumed.

The question of the dioxin norm, and the associated risk for public health, was highly topical until the publication of the second RIV report in 1982 and the termination of the execution of the Lepelplan. Activities around the Volgermeerpolder then fell away, since all parties agreed that a definitive solution for the pollution in the Volgermeerpolder could not be expected in the short run¹.

'Science' in the Policy Arena

In a soil pollution case like the Volgermeerpolder it is taken to be important to determine whether or not there 'is' a risk to public health. For the Amsterdam authorities 'no risk' meant that no action had to be taken; whereas the existence of a risk meant extensive action with severe financial consequences. It also meant admission of its own inadequacy with respect to the control of the refuse tip. For these reasons, it is not surprising that the Amsterdam authorities tried to prove that no risk existed, whereas the residents tried to show the opposite. These parties, respectively, argued a 'best' and a 'worst' case for the situation at hand. In this arena, the two reports by RIV played a crucial role, and, therefore, it is worth examining why these reports came to such different conclusions.

¹ Winsemius, Minister of VROM stated in an interview that with the present financial possibilities, clean up of the refuse tip would be delayed for five to ten years (47). The BC sympathized with the financial problems, but expected that industry (in this case Duphar) could be obliged to pay part of the clean up costs (42). The government plans to require Duphar to pay. In addition, the activities of the national environmental movement with respect to the Volgermeerpolder have diminished to virtually zero (48).

The first report reacted to press publications on a number of cancers in Kootwijk (a small village surrounded by forest), allegedly caused by occasional exposure to the herbicide 2,4,5-T, polluted with dioxin. RIV concluded in this rather hastily written report (44), that occasional exposure to 2,4,5-T could not be the cause of cancer. In reaching this conclusion, the authors evaluated the carcinogenicity of both 2,4,5-T and dioxin, concluding from three review articles that dioxin could act as a mutagenic substance and, therefore, should be considered a carcinogen. Even when this cautious stand was taken it could be concluded that no cancer risk was present in Kootwijk, because of the very low concentrations of dioxin calculated for the situation. It addressed a situation different from that of the Volgermeerpolder, where the estimated dioxin intake was of the same order of magnitude as the acceptable intake, and for this reason the authors were asked to reassess the risk of dioxin (49). As mentioned above, at that time the permanent advisory committee of the Ministry of Public Health had proposed to divide carcinogenic compounds into two categories according to whether they were considered to be a complete carcinogen or a promotor only, and to use different normsetting procedures for both.

A crucial change in the second RIV report is that the mutagenicity of dioxin is evaluated differently. Whereas the first report cautiously concludes that mutagenity of dioxin cannot be excluded, the second one reevaluates the data and now concludes in the negative (51). Being no mutagen, dioxin is not a complete carcinogen and falls into another normsetting regime, in which a threshold level exists under which there is no toxic effect. Using an arbitrarily chosen safety factor of 250 the norm of 240 pg is set. It is interesting that both the original value of 13 pg and the new value of 240 pg were calculated by using the same set of experimental data namely the results of only one animal experiment by Kociba et al. (50). The changed integration was occasioned by a supposedly different cancer-inducing mechanism, which, in turn, was occasioned by a re-evaluation of the literature, where several experiments were evaluated slightly differently (51). As a result, the tentative positive conclusion on the mutagenity of dioxin from the first report was reversed to a negative conclusion in the second report. It is, however, not only the re-evaluation of the mutagenicity which must be seen as relevant for the difference in results, but also the fact that it became relevant to put the question whether a compound is a carcinogen of a certain type, instead of simply carcinogenic. The way the two norms for dioxin were established is a clear example of the

way 'science' can be reinterpreted depending on the relevant problem and problem frame. It is worth emphasizing that the times at which both norms were put forward were less than three months apart, and by the same institution. Therefore, the differences can not be explained by changed evaluation criteria of the scientists in question, nor by a different data set. Rather they are explained by the differences in the situation for which norms had to be suggested (see also Brian Wynne, chapter 3). In this case, risk-management policies critically influence the interpretation of the scientific risk assessment data, thereby throwing into question the generally accepted paradigm, that risk assessment and risk-management are independent 'scientific' and 'policy' activities.

Although the soil pollution issue in the Netherlands comes on the political agenda as a risk management problem, as we have shown from the Lekkerkerk and Volgermeer cases, this does not mean that risk management is the central issue for each of the participating groups or bodies. It only means that risk for public health is accepted as the political issue for which action by the authorities can be justified. 'Risk', then is the acknowledged issue if not the real issue underlying action, as will be seen, for example, by the group of residents in the Griftpark case, described below.

The Grift park (52)

A soil pollution problem arose on the Grift Park in May 1980, well before the enactment of the Soil Clean Up (interim) Act. Four years later, it was still receiving press coverage. The strong involvement of the local population in this soil pollution case can, in part, be explained by actions and commitments dating further back than May, 1980.

The Grift park lies in a nineteenth century neighbourhood in the city of Utrecht and is owned by the municipality. The site was formerly used as an occasional rubbish dump and as an industrial site. The municipal gas works and a printing company had been located on it. Since the early 60's the area had been neglected and the residents of the neighbourhood had begun to use it as a park and a recreation ground for children.

In March 1971 the city council decided that the site would be used instead for residential building and for the establishment of the municipal waste removal department. The residents objected to the proximity of the department and resented the loss of their green area and as a result the council reversed its decision in April 1973. The site,

still a wasteland, was formally opened to the public; however, lobbying for residential housing for the site continued. The residents formed an action group and pressed the municipality to reshape part of the site into a park, and to use another part for house building. This action was successful; in May 1978 the council accepted a structure plan for the land use of the site that complied with the demands of the residents. The commitment of the residents to this structure plan strongly influenced their reactions to the discovered soil pollution, and later their reactions to proposals for the solution of the soil pollution problem.

In May, 1980 Grift park became a soil pollution case. Playing children found a barrel of corrosive acid (which later turned out to be 62v/v% sulphuric acid), and two days later an ex-worker of the former printing company informed the action group that his firm had illegally been dumping toluene on the site for many years (53). Since publicity around the Lekkerkerk case was only just peaking, these findings created a furore in the city districts surrounding the Grift park. A sharp conflict arose between the residents and the city council over the question whether the site formed a risk to public health. The issue at stake became whether the site could remain open to the public or should (in part) be fenced in to protect, amongst others, playing children from contact with pollution.

In response to the announcement of the council that an initial survey of the site, including some chemical analyses, had been started, the residents formed an action group: the Gif committee ('gif' means 'poison'). Their aim was to put pressure on the council. The Gif committee asked the CWU (Chemistry Shop Utrecht, an organisation consisting mainly of chemistry students, and connected with the University of Utrecht) to provide counter-expertise and to make its own investigations with respect to the occurrence of toxic pollutants in the soil of the site.

During this period the municipality adhered to the no-risk proposition (the situation is safe until it is evident that it is not), whereas the action group took the risk proposition (the situation must be regarded as unsafe until it is evident that it is not). The council repeatedly found reassuring interpretations of its investigations. The Gif committee, in turn, used its expertise to show that these investigations were not conclusive, and offered alternative data and interpretations. In the meantime the barrel of sulphuric acid, (provisionally fenced in with barbed wire), remained lying on the site for some weeks as a symbol of offence to the inhabitants.

This polarisation of the participants, where the authorities defend the best case interpretation and the action group adheres to the worst case interpretation, is probably typical for soil pollution cases when the issue concerns a threat to public health, and the scant data leave room for both

interpretations. We witnessed a similar situation in the Volgermeer case.

In the Griftpark case, in June the CWU discovered a thick layer of coal tar, which was later shown to have concentrations of toxic and carcinogenic compounds (aromates). The City Council, then, conceded to the claims of the Gif committee about the public health risk of the site, and the site was fenced in. The no-risk argument ceased being an issue between the municipality and the action group.

However, the action group realized, early on, that the soil pollution posed a serious barrier to the execution of the former plans for the area. This perception pervaded all further actions of the Gif committee.

After the acceptance of the pollution situation as such, the municipality was confronted with serious uncertainty: there was no legal framework, no accepted division of responsibilities for further action, no known and feasible way to clean up the pollution, and no indication of what the costs would be and who should pay for them. Significantly the absence of a test framework to assess the extent of the pollution at different spots on the site does not appear to have been a barrier for further action; probably the concentrations then known were above any value critical for action.

Further investigations were initiated to assess the extent of the pollution on the site, in latitude as well as in depth. The behavioural uncertainties mentioned can be held responsible for the slow progress as demonstrated by the following:

- only in June, 1981, did it become clear that central government would pay for a substantial amount of the costs of the clean up operation;
- only in the autumn of 1981 (after in May of the same year the draft Soil Clean Up (interim) Act had been published) did civil servants of the province begin deliberations with plausible clean up firms.

(Note that provincial authorities were responsible for deciding between clean up possibilities and for supervising clean up operations).

In the meantime the Gif committee was fully occupied ensuring the execution of the structure plan and pressing

the authorities to speed up the decision process. New information was provided more freely by the municipality, and was scrutinized for possible consequences for the structure plan. They generated a plan (54) in which parts of the structure plan could be executed at some locations on the site, while on other locations clean-up operations could start simultaneously. This plan was presented to the City Council and partly adopted by the municipality, which was even granted a municipal award for environmental activities. Meanwhile the local population organised a demonstration and an exhibition concerning the site situation.

A strong organisation was of vital importance for the impact of the Gif committee. The organisation was horizontal, the members of the committee and the number of members varied in time, depending on the expertise needed and the intensity of the activities (somewhat to the annoyance of the municipal officials). When discussions with the authorities became technical, feedback was given to the local population by distributing information papers, by organizing public meetings, and by resorting to highly visible actions. Contacts with (especially small left wing) political parties in the municipal council, with the press and with municipal - and later provincial - civil servants were established without having a clear distribution of responsibilities among the members of the Gif committee. The horizontal structure was very effective, also in the mobilization of desired expertise, and in time the action group was considered a serious discussion partner by the authorities.

In the autumn of 1981, the attention of the Gif committee shifted from the municipal to the provincial authorities since the latter has responsibility for the clean-up operations. It had become clear that the municipality and the action committee had converged to a roughly similar perception of the soil pollution case, although the residents were more strongly committed to the original structure plan. For a year negotiations between the province and clean up firms dragged on, because at that time there simply were no techniques available to deal adequately with the vast pollution.

These negotiations were scrutinized and criticized by the Gif committee, and new suggestions were made to facilitate matters. Finally, in January 1983, the clean up operation was started. The major part of the polluted soil was dug out, transported to another location, heated to 300 C to evaporate the aromatic organic substances - these volatiles were burned at 800 C before emission - and replaced on the original site. The total costs were estimated to amount to 12 million Dutch guilders (about 5 million US dollars).

The Gif committee, as such, was formally dissolved, but some expert representatives of the residents were asked to participate in a provincial technical working group that evaluated and supervised the progress of the clean-up operation. In the meantime house construction had begun

on clean areas of the site.

The clean-up operation continued during the greater part of 1983, attracting only minor public attention. But by the end of the year it became clear that digging out all the polluted soil was not possible since the extent of the pollution was much greater (especially in depth) than had been envisaged. The clean-up operation was interrupted to evaluate the new data. Again suspicion arose among the residents who perceived another setback to the execution of the structure plan. Following this new information the perceptions of the provincial authorities became more clearly visible. The pollution was regarded as a major threat to the quality of the groundwater beneath the site.

As noted above, much attention is devoted in the Netherlands to maintaining the quality of the groundwater. The management of groundwater reserves is legally the task of provinces which act in close co-operation with the publicly owned drinking water companies. Therefore, if the quality of the drinking water becomes an issue, immediate action can be expected, as was the case in Lekkerkerk and the Volgermeerpolder. Regarding the quality of the drinking water there is no behavioural uncertainty among the authorities; the no risk option pervades all measures, which can be easily effected.

Indeed, the local drinking water company had shown interest in the Griftpark case early on, and had analyzed groundwater samples and made explicit demands with respect to the clean-up operation (55). The Gif committee had also asked for groundwater analyses, but this committee was more interested in the near surface groundwater and its effects on public health conditions in the future park. It was hardly interested in groundwater quality at a depth of, say, below five to ten meters. So, when at the end of 1983 it became clear to all parties that excavating the pollution to the depths it had migrated was financially infeasible, the contours of a new conflict between the residents and now the provincial authorities were shaped. The provincial authorities tended mainly to finance measures beneath the surface level. In recent plans a 42 meters deep wall is proposed (56) to insulate the pollution from the surrounding groundwater, a measure which will cost up to 40-60 million guilders according to recent estimates. If total costs remain constant, this means less money can be spent on the surface and near surface layers. This is to the extreme dissatisfaction of the residents who have asked members of the Chemistry Shop to investigate whether this strong concern for deep groundwater quality by the authorities might be somewhat unbalanced. A risk trade-off issue has risen to the top of the agenda.

At the same time (January-May 1984) the resident representatives in the official working group were designing plans that might satisfy the provincial authorities at lower costs so that measures could also be directed at the surface

layer, i.e. the execution of the structure plan (57). Interestingly the municipality appears at the moment to be on the side of the residents, perhaps because of financial interests, but possibly also because institutionally a municipality has little concern for greater depth groundwater quality, but does have an interest in the establishment of a politically popular park.

We see that the actual concerns of a group involved in a soil pollution case may change considerably following external shocks and surprises. Although the generally accepted issue is public health which may stay formally central, the real issues at hand might diverge. For the residents around the Grift park the availability of the park for neighbourhood activities seems to be the crucial point. The municipality is on the side of the neighbourhood as long as this stand is financially feasible. Provincial authorities are mostly concerned with the risk to the groundwater.

In the Merwedepolder case discussed below, we see the same shift from the official issue of public health to other underlying issues. An interesting feature of the Merwedepolder case is that the local action group (VAVM) had a character which was in some ways distinctly different from the Gif committee.

The Merwede polder

The Merwedepolder is a residential area of Dordrecht, a middle sized town near the largest Dutch petrochemical area. When the municipality planned this residential area during the sixties several sections of the Merwedepolder were exploited as landfills. This exploitation was at that time under municipal responsibility and was only partly licensed under the Nuisance Act. These landfills were filled with household refuse, harbour sludge, chemical waste, etc. Dumping ended in 1971. In 1974, residential building began, and in 1975, the whole area was a middle-class housing district (58). Almost from the time the inhabitants moved into the houses there were complaints about stench and health problems. There were also complaints about construction shortcomings of the houses, thought to be caused by sagging of utility pipes. The complaints lasted, yet according to the residents were never taken seriously: 'you are living on a dumping ground that always stinks' (59).

When in May 1980, the municipal energy board inspected the natural gas pipes, these pipes appeared to be discoloured at some spots. At the request of the Regional Inspection of the Environment, the groundwater was analyzed. The groundwater contained small quantities of compounds "that do not belong there" (aromatics and tetra).

A special investigation was considered necessary, however, it was concluded that there was no reason for worry. When, the air in the cellars was analyzed, none of these compounds were detected and no further research was considered necessary.

Somewhat later the foundations of three houses were inspected because of complaints about sagging. This inspection had to be stopped because of unbearable stench. Groundsamples from these houses were analyzed and were measured to contain 25% benzoic acid, 10% phenol and 10% aromatic compounds: it was rather 'pure' chemical waste.

This discovery was quickly relayed to the Aldermen, and the following day the responsible Alderman addressed the inhabitants in person. According to the municipality "on September 17, 1983 the Merwedepolder problem was born" (59).

The inhabitants of the polder immediately reacted by forming an action committee which was later transformed into an association called VAVM. This association was allowed to participate in the municipal technical group on the Merwedepolder. Soon after the waste discovery it became clear that the pollution was not limited to a few houses. A deep controversy emerged between the municipality, which wanted a carefully planned approach based on thorough investigations, and the residents, who wanted a quick clean up. This municipal approach is clearly dictated by institutional uncertainty.

A great number of investigations were carried out. Their results left room for many, often contrary, interpretations. For instance, based on the results of a soil survey, the government proclaimed certain areas to be clean. Yet, in those 'clean' areas inhabitants repeatedly dug up barrels containing chemical waste (60), which deepened distrust of the population towards governmental activities.

In the Merwedepolder the presence of chemical waste caused severe social and emotional problems among the inhabitants. Both municipality and VAVM were apt to underestimate these problems. The municipal authorities dealt with them as individual cases having no relation with the chemical waste (61). The result of the investigations made clear that a larger part of the area was more or less polluted. The provincial aldermen ordered demolition of the houses in part of the area but not of the nearby home for elderly people. The main reason was that these houses would not be able to stand the isolation measures intended. Demolition began in April 1984.

A total clean up was considered by the VAVM to be less feasible due to the vast dimensions of the pollution. Therefore, its demands shifted from clean up towards a free choice of living place for the inhabitants. They did not feel free to move because generally the houses were heavily mortgaged. Because nobody buys a house built upon poison, the market value of these houses went down to virtually zero. Central government finally reacted by enabling the municipality of Dordrecht partly to indemnify the inhabitants.

So underlying the Merwedepolder case as given shape by VAVM, was the issue of homeowners who wanted to be indemnified.

Organisation of the action

In the Merwedepolder case, in contrast to the Griftpark case, we see a division between different groups of residents. Whereas in the Griftpark case the connections of the Gif committee with the rest of the socially mixed neighbourhood were very strong, and measures were taken to strengthen them even further, the very active committee VAVM in a middle class area alienated itself somewhat from the rest of the residents. The VAVM wanted to mobilize the inhabitants, demanding from the municipality both an explanation and a quick solution (61). The VAVM, which was structured hierarchically, was started by some inhabitants of the area with seriously sagged houses. These inhabitants formed the board of the VAVM which was represented in every VAVM working group. The association started to gain expertise in various fields, partly from the outside, but to a large extent from its own members in order to support the expert negotiation strategy chosen to approach the local government (62).

Every contact with the outside Merwedepolder world was to be conducted via two members of the VAVM board, which had a strong influence on the VAVM strategy due to its advantage in information and the strong wish of the inhabitants to form a united front. The board managed, for instance, to delay the formation of a tenants group. The interests of house owners and tenants were not entirely the same (62).

The alienation of the board gave rise to all kinds of extra initiatives of inhabitants that were only reluctantly acknowledged by the board. Striking initiatives included the refusal to pay municipal taxes, to pay rent, and the occupation of the Dordrecht City Administration and the Communal Health Service (62).

In a sense this resembled the situation in the Volgermeerpolder. There the Burger Comitee (BC) concentrated its activities on collecting expert knowledge and on legal actions. More than once it was suggested that the BC did not keep in touch with the other inhabitants¹. It has been

¹ A program was broadcast in which the gap between BC and the local population was emphasized. It seems that preparation for the broadcast itself diminished what gap existed (41).

suggested (amongst others by the BC itself) that the supposed gap between BC and other inhabitants was the motive behind the municipality of Amsterdam organizing an information meeting. At this meeting the alarm among the local people appeared to be much greater than either the BC or the municipality of Amsterdam had imagined (41). Yet, the Municipality of Amsterdam still refused to close the tip even though the Inspectorate for the Environment supported closure. Tension among the inhabitants of the area ran so high that cables of bridges were cut several times to prevent boats loaded with refuse to come near the tip. The BC was against such illegal activities (40).

An important feature all three cases is that the inhabitants were able to organize themselves effectively. Although this in itself, seems vital, apparently different types of organisations can be effective.

In the Merwedepolder, a hierarchical organization with a strong central group was formed, which alienated itself from the backbenchers of the involved inhabitants. These backbenchers dissented sometimes in spontaneous operations, which at first came as a surprise to the central group but afterwards were recognized as a part of the total action. In the Volgermeerpolder the organization was not directed to mobilizing the population at large. It was more of an expert group of which the main aim (closing down the refuse tip) was supported by the other inhabitants. In the Griftpark case no clear distinction can be made between the action group and other inhabitants. The group had a very horizontal structure and a size and composition that varied with time (somewhat to the annoyance of the municipal secretary for environmental affairs - a civil servant - who did not always know whom to address). No dissenters appear in the Griftpark which may partly be due to the fact that this action group, besides tackling the authorities with technical discussion and more or less formal opposition, also engaged in more visible and, to the layman, more appealing manifestations like a demonstration and an exhibition in which all inhabitants, and not only experts, could participate. The groups in Volgermeerpolder and Merwedepolder, themselves, did not use such demonstrations (other than public meetings and petitions); perhaps this inspired dissenters to take action (e.g. in the Merwedepolder the occupation of the town hall).

Expertise

A striking similarity of the three cases is the ability of the action groups to mobilize expertise, not only expertise concerning formal procedures and knowledge about state institutions, but also technical scientific expertise. This expertise can be present in the members of the action group, or can be hired in e.g. the Chemistry Shop in the Griftpark case. The assembled expertise proved to be highly effective in countering the scientific arguments put forth by the authorities; the action groups repeatedly demonstrated that "scientifically justified" reassurances of the authorities were not valid. This undermined the authority of the official bodies, and fed distrust. The expertise seems to have been recruited in search of the bleakest possible interpretation of the scanty data, probably as a reaction to the optimistic interpretation put forward by the officials.

Not only is the ability to evaluate official scientific reports important, but also access to scientists, scientific literature, and institutions helps to formulate alternative arguments. In the Griftpark case, the chemical analysis of soil samples by the chemistry shop confronted the authorities with data that were more serious than their own and not less legitimate.

In general, the action groups had information available earlier than the authorities, or the results of investigations were known before publication by a municipality. The mobilization of expertise seems to have been of crucial importance for an action group to remain intact, when facing a body of scientific information forwarded by authorities. However, when expertise is used as a weapon, the debate tends to become a technical and lengthy dispute between experts. Arguments cannot be understood or checked, and unless the experts translate the content of the dispute for the laymen, there is no way of knowing if there is any progress in the matter. This may be one cause for the "dissident" action seen in the Merwede case. Another effect can be that the public loses interest in the case. In the Griftpark case, the action group recognized this and deliberately organized the demonstrations, not only to put pressure to the authorities, but also to restore the feeling in the public that it was their business.

Toxicological evaluation of the pollution situation

In Volgermeerpolder and Merwedepolder toxicological evaluations of the pollutants were carried out. As discussed in the Volgermeerpolder case the main issue was the difference in the norm to be set for dioxin. This norm was considered relevant because the estimated maximum individual dose of ingested dioxin was in the same order of magnitude as that which is considered acceptable.

However, the uncertainties in the scientific information backing the original 13 pg norm set by RI, were quite large. When this norm was shown to be lower than the estimated population dose a revised norm was set.

The official bodies did not, however, concede these uncertainties in their argumentation. The keenness of the official bodies in the Volgermeerpolder case to create and use new information contrasts with the use that was made (or, rather not made) of toxicological conclusions in the Merwedepolder.

The public risk of the soil pollution in the Merwedepolder was evaluated by a so called independent committee. Members of the committee included, amongst others, two of the most prominent Dutch scientists in the fields of toxicology and soil pollution. This committee was formed after the Provincial Aldermen's decision to level all the houses in a certain area, excluding the home for elderly. This seemed strange to the board of that home, so they invited the expert committee to evaluate the governmental research.

The expert committee did so by comparing the measured pollution levels in the cellars of the houses in the Merwedepolder with both local open air and with the concentrations found in a study of the indoor-environment of 133 houses in Ede (a town in the province of Gelderland). From this comparison the committee concluded that only nine of the 109 condemned houses were slightly polluted, and the rest were considered clean. The final conclusion of the committee was that in this part of the Merwedepolder most people were not exposed to pollution of any importance (63). The concentration of two pollutants, benzene and tetrachloroethylene, were compared to toxicological data. The tetrachloroethylene concentrations found in the Merwedepolder, for instance, were two to five times lower than the concentrations detectable in the exhalation air of people living in the neighbourhood of dry clean firms. This example was

explicitly meant to show that at other places in the Netherlands people were exposed to much worse, but generally accepted, levels of pollution (63). This method of comparison reflects the implicit assumption of the committee, namely that these other types of pollution were acceptable.

From both comparisons the expert committee drew the conclusion that there existed no direct threat to human health. Yet, the province considered clean up measures necessary because the absence of threat could not be guaranteed in the long run. If the province had agreed to a more specific clean up as was proposed by the expert committee, it would have increased its own uncertainty on the consequences of its own decisions.

The Merwedepolder was already considered to be a case for clean up, because test values of contamination had exceeded those of the regulatory test framework. If, following the experts' report, the province had decided against clean up, then the validity of the whole test framework would have been publicly thrown into doubt. In addition, a final decision to take measures had already been made, and for psychological reasons a retreat would not have been acceptable.

We see that, in practice, the normsetting framework does not serve as an evaluative yardstick for toxic effects, but rather helps to distinguish those cases where immediate measures are called for from those where such measures can wait. When a case becomes a major concern other yardsticks are used to evaluate the potential risks to public health. The framework has the function to pinpoint those cases where action is legitimized. Therefore, if an action group suspects serious soil pollution, then it should show that there is cause for concern by proving that one or more C values have been surpassed. Only then does the process of negotiation really begin. The test framework has the function that a threshold is set for 'allowed' cases.

An important effect of the test framework might be to screen the cases which deserve attention, thereby reducing the procedural uncertainties. It is possible that a number of past activities with respect to soil clean up might, with hindsight, have had the function of developing standard procedures in this new policy field, which erupted so suddenly after the discovery of Lekkerkerk.

Summary and discussion

In each soil pollution case scientific and behavioural uncertainties abound. It is impossible to determine the boundaries of the system at issue. Is an area clean if no measurements have been taken or should it be considered otherwise if a pollution has been found nearby? No agreed-upon extrapolations have been found. The level of pollution measured may fluctuate widely, as is even more true for the toxicological evaluations. In quite a number of cases there is no agreement on the interpretation of the available data. This is not only due to the scientific uncertainties, but also because no standardized and agreed upon evaluation procedures exist, as we saw with respect to the pollution levels in the Grift park and the evaluation of the toxicological situation in the Merwedepolder. Different institutionalised traditions of theory and methods create different evaluative frameworks which generally generates scientific uncertainty.

The parties involved choose different combinations of the scantily available data, thereby making cases which might not hold up against further evidence but which cannot be refuted by the data available. From the fact that the potential intake level of people living around the Volgermeerpolder was not disputed, whereas the carcinogenicity of dioxin was, we can see how haphazard possible points of dispute can be (64). Therefore we can say that in some ways dispute generates uncertainty.

In the dioxin case we saw that not all possible points are indeed debated. Some are chosen for discussion and others, though suitable candidates for debate in principle, are left out. The initial positions of the parties involved seem to be important in that choice.

In soil pollution cases not only scientific uncertainties are ubiquitous, but also institutional uncertainties. As seen in the case studies, there exist no standard procedures to deal with soil pollution. We can see, however, that bureaucracies tried to reduce institutional uncertainties in a number of ways. One example was the standard framework which, in theory, enabled the participants to decide unambiguously whether a soil pollution case was worth further investigation. In practice it operated as a de minimus threshold for the negotiation of more complex interests, perceptions and agendas around the focus of 'public health risk'.

In addition, defining the problem as a public health issue set into gear a certain type of bureaucratic rationality, which, in turn, determined which types of scientific uncertainty were open for debate.

More immediate measures are taken when a familiar type of reaction is called for, as for instance, in those cases where water supply was at stake. On the other hand, the authorities procrastinate in those situations where no familiar procedures exist, or where their actions would create further institutional uncertainties. In those situations the governmental bodies concerned must shape the problem and its management 'on the spot'. Their actions are then driven by more general concerns like pacifying residents, avoiding negative publicity, and avoiding unforeseen financial obligations.

Although the public views soil pollution as a risk management problem, the detailed structure of the problem may be very different for local government and residents, the latter of whom are concerned primarily with their immediate surroundings. To them, soil pollution may represent not only a threat to their health but also to their standard of living generally. In the Griftpark case, for instance, the pollution was not perceived as an immediate and unavoidable threat to life and limb. Also for local government the 'public health problem' has different overtones, mainly of a financial character.

Therefore on the surface it may seem as if all those concerned with soil pollution view the issue in the same way, whereas on closer inspection they do not. The way different groups deal with each other in a soil pollution case is not only shaped by their respective problem definitions but also by the way they interpret their possible reactions. These reactions were not only given form by the Lekkerkerk incident and the ensuing regulation, but also by variable concrete local histories of action between governmental bodies and residents. In the three cases discussed here history involved an earlier confrontation creating distrust between the two local parties.

The groups discussed in our cases seem to have been effective in influencing problem definitions and decision force because of a number of comparable features. They were all highly structured and had access to scientific expertise. The exact organisational form of the action group did not seem to matter in relation to effectiveness; it did, however, matter for the way the action group was viewed by the other residents. For its effectiveness an important feature appeared to be the development of

alternative policy solutions to the soil pollution, which could be asserted in negotiations with the authorities. If neither the authorities nor the local group have alternatives available for debate, all other actions lose their effectiveness.

4. Conclusions

Hazardous waste legislation, as well as legislation in other areas, is not the starting point for government policy but a way of directing an area in which history has already partly been written. Future action which is based on former behaviour and experience is only partly shaped by the formal legislation. In comparing the Dutch policy fields of chemical waste Treatment and Disposal and soil pollution, it is striking how much the latter provoked alarm and participation of the local population, although the physical problems are similar. For instance, the severe stench problems and other hazards to public health connected with the operation of EMK seem comparable with the risks of living on polluted soil. This points to the fact that other factors influence the way in which a problem becomes a concrete issue. The chemical waste problem is strongly connected with industry's general interest in an undisturbed and unregulated market. Policies that result in high costs for hazardous waste T & D or interfere with production routes are generally not welcomed by industry.

The Induval plan, for instance, was intended to create a legal alternative to the dumping of hazardous waste following enactment of the Chemical Waste Act. The government also reckons with industry's interests in enacting laws. Although reducing and preventing dangers for the neighbourhood is a legitimate governmental function, we see that e.g. in the (non-)implementation of the Nuisance Act, often a weak compromise was struck between industrial growth and a safe environment. With respect to soil pollution such a divergence of interests seems, at least at first sight, not to exist, since no-one appears to oppose reducing risks to public health. Here, however, the balance is struck between public health on the one hand and clean up costs on the other. In Lekkerkerk and the Volgermeerpolder finding that the drinking water was polluted implied an unquestioned risk to public health, which led to action by the responsible institutions. Maintenance of drinking water is an area of long-accepted and authoritative governmental policy. A number of different authorities

have responsibilities in this field, and they have clearly defined responses to problems. Norms for drinking water are clear cut and generally accepted: in other words, there exist little or no institutional uncertainties.

Implementation of the Nuisance Act is somewhat different. Similar, however, is that many areas covered by this act are generally accepted and there are clearcut responsibilities of government, especially in what is called 'nuisance in a strict sense', where detailed regulations exist that can be easily implemented¹. However, the Nuisance Act has been used to cover continuously shifting areas, and it is especially the newer areas, like hazardous waste (but also new technologies) in which institutional uncertainties pervade and paralyse official action.

Returning to the question why soil pollution became a burning public issue whereas chemical waste did not, it may be relevant that the main consideration for cleaning up soil pollution is a financial one; there are no institutionalized interests preventing action in this field, as exist for chemical waste. This observation suggests that issues only emerge as public concerns when there is some feeling that they are tractable; if deeper forces are at work making them resistant to policy manipulations, the public agenda reflects a pragmatic orientation and looks elsewhere for overt concerns.

¹ E.g. the regulation for a storage tank for oil.

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