Third-Party Risk Policies in the Netherlands

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A Historical Sketch

By

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PREAMBLE

This short history of the development of policies for the protection of citizens against third-party risks in The Netherlands resulted originally from a request by The Netherlands Council on Spatial Planning and Environment. This council wondered how the then, current policies had come about, what the problems were that the policies tried to solve and what discussions had already taken place in the preceding 25 years of policy development on this subject. This request led to a report in Dutch, which, after the council had read it, was only occasionally referred to again

Since then, I have sometimes expressed my surprise when discussions about third party risk just seemed to repeat the old arguments on accidents and incidents, which were repeats of previous similar incidents for which these policies had originally been developed, but nevertheless, these calls for new policies arose, not only in The Netherlands, but also in many other countries. My wife, Marga van der Toorn, had been pressing me for years, to write down what I remember about the subject, as I was involved in these developments in The Netherlands and internationally from the early stages. I have finally given in and this little book is the result.

Policy development is to a large extent the result of interaction between many people, of whom I was just one. It is thus impossible to list all the people involved in this process and acknowledging just a few would rightfully disappoint others. Therefore, no people are named in this book.

I am extremely grateful to my friend and colleague of over 40 years, David Slater, who was heading Technica at the beginning of the development of risk-management policies in The Netherlands. Technica developed the computerized risk analysis methods, which today probably would be called apps, that proved to be essential to get third party risk management off the ground. And at end of this process, he has proofread this book, which describes over 40 years of development, corrected it, and asked the right questions at the right time.

Rubigny, February 20, 2023
Ben Ale

CHAPTER 1

INTRODUCTION

At no moment in their history have the Dutch been healthier than they are now. Children born today can count on more than 80 years of life, the majority of which they will spend in good health (CBS 2018, Ruwaard and Kramers 1998). Never has Dutch society been safer. This is the result of the implementation of an extensive system of policies and regulations. This imposes standards which apply to substances that pose a threat to health, or to ecosystems. This effectively limits emissions to water, soil, and air. There are also rules for protection against radiation. Further, the quality of food is monitored. Finally, there is a management system for so-called external safety risks, which refers to the possibility of an industrial disaster.

Yet the Dutchman has mixed feelings about his safety, or so it seems. Fear and concern about his otherwise excellent health, seems to have crept into daily life (Twenge 2000). After every crisis there is a renewed call for additional policies, for example, in the aftermath of disasters, such as the crash of an airplane in the Bijlmer in 1992 (Dekker 1999, SDU 1999), the fireworks explosion in Enschede in 2000 (Ale 2002) and the fire in a bar in Volendam (Veerman 2001). Health concerns were sparked by the *Legionella* outbreak in Bovenkarspel (Den Boer, Yzerman, Schellekens, Lettinga, Boshuizen, Van Steenbergen and Van Spaendonck. 2002) and the crises surrounding food safety. These events have sparked a heated debate about potentially hazardous activities, such as the transportation of hazardous materials including chlorine, air traffic, cell phone use, the risks of power lines and other "electro smog" effects and the implications of genetically modified organisms.

More recently earthquakes, induced by the exploitation of natural gas fields in the north of The Netherlands, again raised the question of whether the safety of the population was sufficiently protected (Nationale Ombudsman 2021).

The social and political consequences of these events have revived the debate about risk. This concerns the possibility of becoming ill from exposure

to chemicals, being maimed, or killed in an accident, having property damaged and having to face the consequences of damage to the environment.

These concerns provoked and continue to provoke, discussions about whether governments and authorities should take measures to protect people and the environment, and what these measures should be. This results in several searching questions, how large the consequences are, or could be, whether probabilities of occurrence should be considered and if so, how large these should be. Although these questions seem technical and straightforward, there are significant uncertainties in the methods employed to estimate them, and thus in their results.

Subsequently, then, there are questions that need to be addressed as to whether the hazards, or risks, are adequately controlled, whether policies have the right form, the right objective and serve their objectives adequately. In the end, the discussion always returns to the question of whether the costs involved in these measures and policies, are worth the benefits of avoiding the potential consequences of the unwanted events, that these measures are meant to prevent (Ale, Slater and Hartford 2022).

The COVID-19 pandemic provides the ultimate illustration of this confusing entanglement of policy and science. Decision makers have often claimed to have followed “the science”, but the advice given, and the decisions made, have proved to be significantly different. Selecting what science to follow, and what science – or argument - is given more weight, such as virology, or economics, is itself a political decision. Additionally, opponents of the policies developed and measures adopted, cast doubt on the scientific evaluations used to underpin the measures applied. The validity of the prediction of the detailed behaviour of these phenomena reflects the state of development of the science involved. In the past, scientists used to do their work and publish their evaluations in the, to the layman, obscure, background literature. Discussions about what the “right” answer and the “right” science should be, took place in scientific circles. Today these scientists enter the policy debate and openly discuss the desirability of various forms of policy options and the scientific basis on which they should be based (Ale, Hartford and Slater 2021, Ale, Slater and Hartford 2022).

That these issues are raised and discussed in scientific and political circles and by the public, is not new. If an activity not only brought advantages and benefits, but also disadvantages and costs, discussions have always taken place about whether such an activity was acceptable, desirable, or even

permissible (Otway and Thomas 2006). Participation in these discussions has grown considerably with the rise of the internet and social media. Fifty years ago, it took three years for a report on an explosion in the United States to appear and another three years for a copy to arrive in The Netherlands (Burgess and Zabetakis 1973). The explosion of the ammonium nitrate storage facility in Beirut on August 4 2020, hit the news in minutes, an evaluation report was issued within a year (Al-Hajj, Dhaini, Mondello, Kaafarani, Kobeissy and DePalma. 2021) and the report was available on the internet in minutes after it was released. In the discussions about the desirability of vaccination, everybody had immediate access to almost every scientific and non-scientific paper written on the subject (Ale, Slater, and Hartford 2021).

It is said that the present society is a risk society (Beck 1992):and indeed, some of these risks are new, and because of the global connectivity of our societies, many risks are shared by all. That does not deny that many of the more ancient risks had a similar standing in the society in which they were dominant. Some of these posed a threat to the whole – known – world and all – known – societies were exposed. Between 1347 and 1350 the plague, or the black death, wiped out one third of the population of Europe. In the 17th century, the average life expectancy was 25 years and to reach 45 was exceptional. Also, what now is called industrial risk, has its roots in earlier centuries. Plinius described illnesses among slaves (Ramazzini 1700). In 1472 Dr U. Ellenbog from Augsburg wrote an eight page note on the hazards of silver, mercury, and vapours of lead (Rosen 1976). Ailments of the lungs found in miners were described extensively by Agricola. (Agricola 1556). In the seventeenth century, a significant percentage of the crews of ships sailing the East and West Indies never made it home. As recently as 1918, the Spanish flu killed 170,000 people in The Netherlands alone. Floods, explosions in flour mills, gunpowder stores and large fires in city centres, raised concerns about addressing these industrial and other risks, within the constraints of time and money. This raised the issues of the feasibility of enforcing such regulations and the willingness of society to accept the resulting constraints.

Attempts to regulate such risks were already apparent in the early 19th century when Napoleon issued a decree on “establishments that caused nuisance” (Napoleon 1810). In the 1980’s, many countries issued guidelines and policy documents on dealing with risk, the UK among them (HSE 2001). In The Netherlands, “Premises for Risk Management” (TKNL 1988), which appeared as an appendix to the first National Environmental Policy Plan in 1986, set out the course of risk management for the future.

Inevitably, social circumstances have changed significantly since then and further guidelines and documents have subsequently been issued. But the questions are still the same: how large are the risks to which the Dutch are exposed? How do these risks compare to other risks? How do Dutch people assess risky activities, and why do people accept one risk and not another? These questions become more pressing after each successive incident, but people also can quickly return to their classic state of complacency: “that won’t happen to us”.

The history of the development of risk policies in The Netherlands can provide lessons for the future. Understanding the reasoning and motivation behind past decisions can help to prevent a change in policy that could make old, apparently solved problems re-appear. The policies that were successful, policies that failed and policies that were reinvented several times, all provide lessons for future crises and can show how to deal with old persistent risks and the new emerging risks associated with the vulnerabilities of an ever more intertwined society.

In the following chapters these issues will be discussed in more detail, using developments in risk, risk management, policy, and regulation as guidance.

CHAPTER 2

THE 19TH CENTURY: THE ROOTS OF POLICY

As described in the introduction, the safety of workers and of the population has been a matter of concern in those societies with some form of industrial production. Hammurabi, who was king of Babylon from 1810-1750 BC, issued an extensive code of law specifying punishments for a wide range of offences (Renger 1999). One of these was for the faulty construction of a house, leading to its collapse and the death of the inhabitant. This was punishable by death.

The Netherlands is known throughout the world to be the "country below sea level", the lowlands, Pays Bas. Although the country is only partly below sea level, it is the delta of the confluence of three major rivers in Europe: The Rhine, the Meuse, and the Scheldt. Therefore, describing the country as historically being mainly a big muddy swamp would have been accurate, had the Dutch not been there. To create a habitable environment and to provide the necessary defences against inundation by the sea, cooperation and oversight was deemed essential. As a result, Water-Boards were created to protect the population. The members of these boards were elected by the population. These boards were then responsible for building and maintaining dykes and controlling the level of the water table. They were also authorized to raise taxes to cover the costs incurred.

Similar concern for safety in connection with industrial activities - within a company and its surroundings - is also a policy area with a long history. The growth of modern industry in the 19th century and the transport of hazardous materials, of which black powder and ammunition were initially a significant part, led to an increasing number of accidents. These affected not only the workers, who were initially of little concern to their employers, but also to the population. These latter implications made it a concern also for the authorities. Thus, the subsequent development of policies and regulations to control accidents in hazardous industries and their associated transport, has almost always been driven by major accidents and the ensuing reaction of the public.

The roots of the Law on the Environment (NN 1979), the legislation in The Netherlands that was primarily aimed at preventing and limiting danger, damage, and nuisance to the environment, go back to the beginning of the 19th century. Again, as usual, it was concerns about the potential of a major accident, not employee safety, that prompted action by the authorities in regulation and legislation.

Explosives

From 1568 to 1648 The Netherlands was involved in what is now known as the "Eighty Year War" against Spain. When that war was over, there was not much use for the remaining gunpowder, and these redundant stocks were stored in depots, usually in the form of a tower. One of these was in Delft, which at the time was an important fortified city. In 1654 that gunpowder storage depot exploded. Much of the city centre was destroyed. The current horse market location is still a reminder of this "donderslagh" (thunderclap). The debris of the houses, among which were many 17th century Delft Blue tiles, can still be found around the market, barely a meter below the current ground level. The noise could be heard in the city of Alkmaar eighty kilometres away. The – in The Netherlands - famous Dutch poet Joost van den Vondel wrote a poem in remembrance of this disaster (Vondel 1654). But lessons were learned, the new powder storage was located outside the city.

One and a half centuries later, storage and transport of explosives in and through cities was still forbidden, but enforcement had apparently lost its stringency. In 1807 the captain of a barge laden with 37,000 Dutch pounds (17 tons) of black powder felt he needed food and decided to take a detour through the city of Leiden to do some shopping. While he was away his shipmate started a fire on the deck of the barge to prepare for cooking. This proved to be a fatal mistake. A giant explosion followed, and the consequences were catastrophic: 151 dead and more than 2000 injured. Property damage was also significant. Hundreds of houses were made inhabitable. The current van der Werf parc is today's witness to this accident (figure 1).

Figure 1: Leiden after the explosion of a powder-barge in 1807 (https://en.m.wikipedia.org/wiki/File:Het_Rapenburg_in_Leiden_Rijksmuseum_SK-A-3925.jpeg)

The then King of The Netherlands, Louis Napoleon, asked his brother, the emperor Napoleon, for help. In 1810, Napoleon issued a decree, stipulating, among other things, that a license was required to run a business. The Imperial decree recognized three categories of establishments. These were firstly, establishments that could only be located at a certain distance from housing developments, far enough away such that should something go wrong, no third party would be damaged. Secondly, establishments that could only be erected near houses if it was established that they could not cause significant danger or nuisance, and finally, establishments that could not cause any nuisance to the environment and could be established in built-up areas.

A Royal Decree was issued, based on this imperial decree in 1814, with the aim of counteracting activities that could cause danger, damage, or nuisance to the environment.

It is remarkable that both the imperial decree and the royal decree, had attached a condition to granting a permit, that residents first had to be

informed and could submit objections to the establishment of a factory, or facility. In addition, the Royal Decree of 1814 stipulated that an official report had to be drawn up of any objections by residents, and what the authorities had done with these objections, before taking a decision on granting a permit. Furthermore, permission to set up a company could be subjected to these same conditions.

In 1875, the Royal Decree was converted into a law called the Factory Act. When the Safety Act came into effect in 1896, the Factory Act was renamed the Hinderwet (Nuisance Act). This law would last for nearly 90 years. It was not until 1984 that the Nuisance Act was merged with other legislation regarding the environment, such as the law on air pollution and noise constraints, into the Environmental Protection Act. (1993)

Transport

The transport of dangerous goods is an activity associated with industrial operations and thus involves significant safety interests. So, in the 19th century, more regulations were introduced in this area as well.

As a reaction to the disaster in Leiden, the law on the transport of gunpowder was introduced anew in 1815.

In 1876 the Maire and the board of governors of the city of Rotterdam received information that a company in Germany had developed a new method for the disposal of its poisonous waste. This involved loading a ship with barrels of poison in Germany and sending it on its way to the Port of Rotterdam. There, the barrels of poison would be transferred to a seagoing vessel, after which the barrels would be dumped into the sea. If the operation was a success, more shipments would follow from Germany and the load transferred to sea-going ships in Rotterdam harbour. The citizens of Rotterdam however, feared that an inland vessel on the river could have a collision and the poison would be spilled in the river. Therefore, a Poisonous Substances Act was drafted and passed by parliament in the same year, to prevent that company implementing its waste disposal plan.

This Poisonous Substances Act was subsequently, the predecessor of two new laws: the Law on Transport of Substances Act, which came into effect in 1963 and the law on materials that are dangerous for the environment, from 1981. This latter law was also merged into the Environmental Protection Act. The former law still exists as a separate law. The law reform announced in 2005, agreed in 2016, but to date not implemented, will

integrate third party risk regulation into the rest of the regulations regarding the design of the inhabited environment, but to date this new unified regulation has not been put into force, because of difficulties in the implementation and the complexity of the associated information infrastructure.

Pipelines

Special attention was given to transport by pipeline. Large quantities of liquid and gaseous oil-products were transported from the industrial and harbour areas near Rotterdam to the east, in the direction of Germany, and to the south, in the direction of Belgium. Also, natural gas was transported all over the country from the gas-fields in the north of The Netherlands. To safeguard space for these and additional pipelines and to prevent the development of housing estates that would block the routing of additional pipeline infrastructure, a special law was introduced that prescribed where new pipelines should go and what safety distances must be kept with respect to the indicated routes (NN 1985a). The necessity of these safeguards was reinforced by the explosion of a gas pipeline in Gellingen, Belgium, in which 24 people lost their lives.

CHAPTER 3

THE 70S AND 80S, RAPID POLICY DEVELOPMENT

In the 1970s and 1980s, third-party risk policy developed rapidly. This was prompted on the one hand, by a rapid expansion of the production, storage, transport, and use of hazardous substances, and on the other, by some very large accidents, in a short period of time, which led to great public unrest.

Hazardous Substances Coordination

In the mid-1970s, several of these serious accidents occurred in Europe. These included those in Flixborough (1974, 28 deaths), Beek (1975, 14 deaths) and the accident in Los Alfaques (1978, 216 deaths). All these accidents involved the explosion of a cloud of combustible hydrocarbons. These accidents indicated that an incident ten years earlier in Feyzin (1966 18 dead, 81 injured) was not an unusual exception (Figure 2). This created doubts about the safety of, not only handling flammable, volatile substances, but also the handling of hazardous substances in general.

In the Netherlands, the accidents at Flixborough and Beek created considerable political pressure on the government. The plant at Flixborough was partly owned by a Dutch company, which, when questioned over the accident, vehemently stated that such an accident was impossible in The Netherlands. Nevertheless, in 1976, a similar accident occurred in their home plant in the south of The Netherlands. In the 1979 budget year, the then Minister-President Van Agt, following his predecessors Den Uyl and Biesheuvel, announced in a letter to the President of the House of Representatives, the designation of a coordinating position for the Minister of Public Health and Environment, to oversee the integration of environmental policy into government policy and to initiate further developments in the field of protection of the environment.

This letter had three main elements: the creation of an organization to shape the policy in the field of third-party risk, the appointment of the minister

responsible for environmental policy as coordinating minister for hazardous substances, and the announcement of forthcoming legislation.

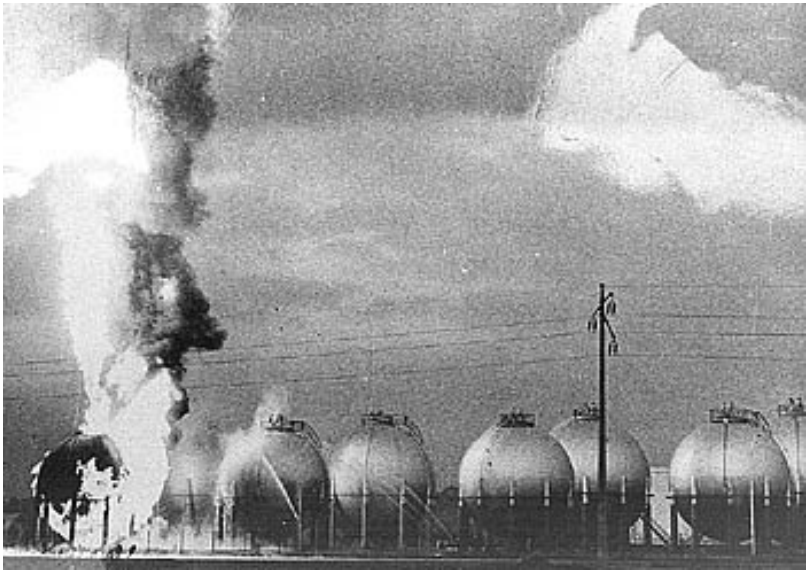

Figure 2: Explosion of LPG storage spheres in Feyzin (1966)

In his letter, prime minister Van Agt thus announced, “that the position of the Minister of public health and the environment would be strengthened, inter alia, in the field of hazardous substances”, and that he would also be charged with policy coordination for hazardous substances in general, and the development of necessary proposals to this end.

This role of policy coordination regarding hazardous substances in general, meant that it was the task of the minister of public health and the environment to promote a coherent policy in which all aspects of hazardous substances, from source to sink, are included in one harmonized set of legislation, which would apply to all the different parts of these processes, such as the production, the transport, and the use of dangerous substances.

In his letter, prime minister Van Agt also stated that, regarding the policy pertaining to safety outside the premises of a company, which is also called third-party risk, the minister of public health and the environment, in consultation with those ministers most concerned, will develop a proposal with a view to addressing the possible consequences of business activities

for the external environment. In answers to factual questions about the 1979 budget and its treatment by the Ministry of Health and the Environment, some aspects of third-party risk were further elaborated, such as the definition of third-party risk, the fragmentation of the current legislation in this area, the limited availability of expertise and how to improve it, regulation regarding environmental incidents and planning for crises and disasters (Van Agt 1979).

At the beginning of 1980, amongst other things, advice was requested from the Central Council for Environmental Protection about amendments to the legislation that may be required to improve the regulation on the limitation and reduction of third-party risk. Advice was requested from the Health Council on some other aspects of third-party risk: the acceptance and acceptability of risks and the setting of standards in the context of third-party risk limitation.

Partly in connection with the policy coordination for hazardous substances in general, a department was set up on 1 July 1979 within the Ministry of Health and Environmental Protection that was specifically concerned with third-party risk.

The COVO study

While the discussion on the national level was continuing, regional authorities started to worry as well. The Rijnmond Authority was especially concerned. Not only because of the explosion at the DSM works in Beek in 1976, but also because they saw this as a repeat of similar explosions in their own region. In 1968 an explosion at the Shell works killed 2 people and damaged thousands of houses, including a shopping mall. A similar explosion took place in 1974. Nobody was killed in the latter accident, but the damage was extensive. The Rijnmond is the general area stretching from Rotterdam west to the sea. The area comprises the harbour and industrial sites, amongst which are major chemical installations, storage for chemicals and fuel and, - at the time –, a third of Europe's refinery capacity. There were about two million people living in the area, who were obviously concerned about their safety. This concern was not decreased by statements of a Shell director, saying that people could choose between accepting the risk, or be unemployed (Datema 2018). Therefore, the Rijnmond Authority decided to produce their own plan. In November 1978 this "official work plan for safety" was published as a memorandum from the Rijnmond Authority, in which their plan for research in the field of industrial safety was also presented. To guide the research, the Rijnmond Local Residents

Safety Committee (Commissie Veiligheid Omwonenden, COVO) was set up to commission a study into the possibilities of quantifying the risks from the industrial installations. This study was inspired by a similar study conducted in the Canvey Island industrial area in the United Kingdom. (HSE 1978, HSE 1982)

The result of this study is a voluminous report: "Risk Analysis of Six Potentially Hazardous Industrial Objects in the Rijnmond Area", which was first published as a report and later in a book. (Cremer and Warner 1981).

During this study it became clear that quantitative analysis of the risks of industrial complexes was feasible, the results of which confirmed similar results in United Kingdom. However, these analyses were time consuming and were therefore, very expensive. This excessive cost could be overcome by automating the extensive "accounting" involved in carrying out detailed analyses and the repetitive calculations. At the suggestion of the Rijnmond Authority, the creation of computer-supported methods was taken over by the ministry of health and environment (VOMIL[1]). This eventually led to the SAFETI Package, which is a computer-based system for the analysis of chemical plant risk. This system has been further developed over the years and still is commercially available (DNV 2022, Ale and Whitehouse 1984). For permit applications in the Netherlands the use of SAFETI is now obligatory. The chemical industries that participated in the COVO study refused to contribute to the further development of these methodologies when requested, using the argument that they would not help to build weapons for the "enemy". (Van Lookeren Campagne 1981).

The discussions in the Local Residents Safety Committee and in other places, had highlighted that, in The Netherlands, as in the rest of the world, the quantitative results of an analysis of the consequences and probabilities of possible accidents do not directly lead to an unambiguous assessment of their acceptability. The complex social, psychological, and societal factors that play a role in the political debate, had already been the subject of extensive scientific research in the United States. Due to the expected cultural and other social differences between the US and The Netherlands, it was necessary for this work to be adapted to address the specifics of the Dutch situation. A second line of research into social and psychological aspects of risk acceptability was therefore initiated under the heading of "perception of risk". This led to investigations by, among others, Vlek en

[1] Volksgezondheid en Milieuhygiëne: Public Health and Environment Hygiëne

Stemerding (1984), Stallen and Thomas (1986) and Vlek and Stallen (2007), about which more will be said in later chapters.

LPG and LNG

In addition to the developments mentioned above, there was another highly significant development which -was largely responsible for the accelerated introduction of the large-scale use of hazardous substances in the Netherlands and thus subsequently became the subject of more difficult political decision-making.

In 1973, the first energy crisis occurred, in which the Dutch energy supply turned out to be particularly vulnerable, because it was largely dependent on a guaranteed supply of oil. In view of these expected uncertainties surrounding the ongoing availability of petroleum, an expansion of the supply of other energy carriers was considered urgent. It was realised that LNG and LPG could therefore make a useful contribution to this needed diversification of energy carriers. Partly because of this, shortly after the first oil crisis, Gasunie developed plans to import liquefied natural gas from Algeria and store and trans ship it on the then recent extension of the harbour and industrial area west of Rotterdam, which is called the Maasvlakte.

Due to its large scale, the supply of LNG and LPG was thought to be associated with considerable risk, although its extent was at the time, unknown.

To enable a governmental decision to be made in 1977, the Ministers of Transport, Public Works and Water Management, Housing and Spatial Planning and Public Health and Environmental protection requested that additional research be carried out. This additional research related to assessing the risks of the activities and the choice of a location for the storage and transhipment of liquefied natural gas, offshore, on the Maasvlakte, or in the Eemshaven area, the latter being in the North-East of The Netherlands.

Additionally, the main exporters of oil used to flare off unwanted gases that the oil companies did not want to buy (such as propane and butane), at source without charge. This changed after the oil-crisis. They were still prepared to flare off the unwanted products, but the whole “barrel”, including these gaseous components, had to be paid for. Thus, the oil companies sought and found further uses for these products, as source

materials for polymers and the automotive industry. The latter use was and is a large market.

And thus, the landing, storage, transport, and use of LPG became a highly topical concern in political decision-making, from the moment that this gas was no longer flared off in the extraction and refining of petroleum, and its use became commercially attractive. Subsequently LPG was also used as a raw material for the petrochemical industry and it contributed significantly to the Dutch energy supply, because it was also used as an automotive fuel.

The interim position

Before the problem of the large-scale landing of LPG became apparent, the efforts of the oil companies to popularize the use of LPG were increasingly successful, especially because the taxes on LPG were lower than those on petrol and diesel. As a result, the number of license applications for LPG filling stations for road traffic increased sharply. This would also lead to an increase in the transport of LPG. However, there was uncertainty as to whether there was sufficient insight into how this would affect the safety aspects of these activities. People still remembered, that in 1978, in Los Alfaques in Spain, a tank truck collided with a wall and exploded. In this accident more than 200 - mostly Dutch – people were killed. Also, in The Netherlands a near miss occurred during the supplying of LPG to filling stations. On December 18 1978, there was an explosion in Wijchen after a fire ignited under a road tanker. Fortunately, thanks to the quick reaction of the tanker driver, there were no casualties and the damage was limited to the tanker itself and the devastated LPG station (Ens 1981, Steunenberg, Hoftijzer and van der Schaaf 1981). That is why, in 1978, the then Minister of Health and Environmental Hygiene commissioned TNO to carry out an analytical study into the safety aspects of storage, transhipment, transport and use of LPG. This resulted in the LPG Integral Study in May 1983: a comparative risk analysis of the supply chain activities involved in the use of LPG (TNO 1983).

In anticipation of this, the then Chief Inspector of Environmental Protection, issued the so-called “interim position on LPG stations” (Enthoven 1978). In this interim position, it was established that LPG stations had to meet certain technical requirements and that the population densities in the area had to be limited to specified maxima. Table 1 shows which housing densities were allowed as a function of the distance to the LPG station and its storage tank.

Table 1. Zoning around LPG selling station, the interim position of the Inspector.

Distance to the storage tank and/or the point of filling (m).	Buildings	
	Housing (number)	Offices (number of occupants
0 – 25	None	None
25 – 50	max. 2	max. 10
50 – 100	max. 8	max. 30
100 – 150	max 15	max. 60
Larger than 150	No restrictions	No restrictions

This interim position statement is the first governmental policy and safety measure, in which consequences for spatial planning around the source of danger were linked to the risks to the environment and third parties.

The notice on landing LPG

The national government of The Netherlands tried to get the risks of the importation, transport, storage, and use of LPG under control, before the risk became too large. Therefore, it issued a policy document called "Aanlandings Nota" (Landing Note, TKNL 1979). This Landing Note was intended to address the emerging problems in the handling of LPG and to regulate bulk imports into seaports. This was because there was a need to expand the storage and transhipment capacity, because of the increasing flow of LPG into and across The Netherlands. Based on a study into the hazards and risks of this storage and transhipment, as well as of the transport risk with seagoing vessels, a policy was formulated in this so-called Landing Note. In the wording, a compromise between two lines of thought is clearly visible. On the one hand, the wish of the ministry of Health and Environment (VOMIL) to concentrate the LPG activities in the Rijnmond area west to Rotterdam and to achieve maximum safety. On the other hand, the desire of provinces other than South Holland, where Rijnmond is situated, to also bring in this type of activity and the desire of the business community and the Ministry of Economic Affairs to let the market determine the location. Literally, it says: "(er) is in Nederland slechts plaats voor een enkele terminal". This can be translated as "In The Netherlands there is only room for A terminal" or "there is only room for ONE terminal". The ambiguity in the translation is also present in the Dutch text. Consequently, the discussion remained unresolved.

A second element in the landing note gave impetus to a competency battle between the Ministry of Transport (V&W [2]) and VOMIL. Was it initially the intention to discharge the LPG from ONE terminal by pipeline to the hinterland? If so, the chosen ambiguous formulation undermines the – economic – support base of distribution of LPG by pipeline. This ambiguity had made freedom of mode of transport possible again. This fitted in very well with the idea of The Netherlands as a national transport hub, much coveted by V&W, and therefore was the interpretation chosen (TKNL 1980).

Working committee on LPG

The situation surrounding the landing note shows how difficult it was for the minister of VOMIL to impose his coordinating powers in the field of hazardous substances, against the resistance of V&W and EZ. Such a coordinating role proved too difficult to fit into the existing departmental structures. So, on June 20 1980, the cabinet decided to delegate the preparation of the "Integral Nota LPG" to a working committee of the National Planning Commission. This memorandum should have been the culmination of a development, in which positions already had been taken regarding the two activities under consideration: the LPG stations, to which the interim position applied, and the landing of LPG in seaports for which the Landing Note had been issued. When the Landing Note was discussed in the second chamber of parliament, the government promised an emergency LPG Act to temporarily fill the existing gaps in legislation until an integrated legislation could be established.

After several failed attempts, an emergency law was presented to the House of Representatives as a proposal drawn up by V&W. This draft law stated that a license or permit for the transport and storage of LPG could only be refused on grounds of public safety. In 1980, the Provisional Central Council for Environmental Protection (VCRMH) made an observation which had far reaching implications, as it turned out later, regarding the grounds for the refusal of such a permit,

However, it was immediately apparent that the powers created by law to opt for a certain structure of the transport supply chain on safety grounds, implied that market regulation could take place, which was highly objectionable to the business community, as well as to V&W and EZ.

[2] Traffic and Water Management.

To prevent this freedom of choice of transport modality from being restricted by safety regulations, V&W hastily introduced the Transport of Dangerous Goods Act. Transport safety is specifically incorporated in this initiative, so that there was no further need for coordination by the Minister of VOMIL on this point.

The VCRMH (Voorlopige Centrale Raad voor de Milieuhygiëne, Provisional Central Council for Environmental Protection) reacted unanimously and negatively to this law. The VCRMH stated that the scope of the law must be broadened to the supply, storage, transhipment, discharge, distribution, and consumption of LPG, both individually and in conjunction with each other. The aim of the law should be to limit the **probability** of an accident as well the extent of the **damage** to be expected in the event of an accident. So here, for the first time, probability enters law making in third party safety. In addition, the VCRMH believed that the coordinating minister for hazardous substances should be the primary author of the law.

The Pipeline

The LPG working committee quickly saw that the possibilities in the existing legislation to realize a policy proposal aimed at the safety of the entire LPG chain – from landing, via transport, storage to use and export – were extremely limited, while on the other hand, the decision to land LPG in Rijnmond had far-reaching safety consequences along the entire distribution chain – rivers, railways, and highways – and thus potentially, severe spatial planning consequences. Thus, new legislation to be implemented should offer the means to act in a regulatory manner.

This was particularly important for realizing a pipeline solution, which would provide a much safer alternative for the road and rail transport of LPG from Rijnmond to Germany. However, a pipeline would only be economically feasible if, as mentioned earlier, the legislation decreed that there would only be ONE terminal.

In the meantime, a terminal for LPG had been created in Vlissingen. In an attempt to save the pipeline, the authorities limited the volume of discharge allowed by barge, but now for both terminals, the one in Vlissingen and the one in Rijnmond, so that “a terminal” must now definitively be read as “some terminals.

In the meantime, it had become apparent that the increase in LPG transport was not as bad in terms of its risk, as was previously feared. The industry

therefore was reluctant to make new investments in Rijnmond. It preferred to expand existing facilities in Vlissingen and Amsterdam. This was now made possible by the updated – lenient - interpretation of the text of the "Landing Note".

However, this development and the ever-increasing estimates of the costs involved, finally made the realization of a pipeline impossible.

Nyhammer

To avoid licensing completely, the business community attempted to import and trans ship LPG, via a floating terminal, for which it was thought a permit was not required. The contents of a bulk carrier – the Nyhammer – was transferred to inland vessels, while it was moored to a buoy in the harbour. According to the initiators and the ministry V&W, which had always been in favour of unrestricted transport and a promoter of the "Netherlands Land of Transport" idea, no permit was required for this "laying down during transport". However, the State Council thought otherwise. The activity, they decided, could not go ahead without a permit and the permit was refused. The issue highlighted the conflict between the industry and V&W, which promoted transport, and VOMIL, who tried to keep things safe.

In view of the now impossibility of realizing a pipeline, VOMIL undertook an attempt to achieve safe transport in a different way: namely by the design of a collision-resistant barge, -the Shipknow study (TKNL 1984). With this initiative, however, VOMIL was entering the field of V&W. This was understandable from the point of view of VOMIL's coordinating role, but provided even more reason for V&W to vigorously reclaim powers regarding transport, for example by replacing the chairman of the working committee with a more V&W friendly one. However, this side effect of the Shipknow study proved to be more important than its primary result: a design that was never built. It opened technical solutions to the third-party risk problem to further scrutiny, beyond state controlled direct regulation. This in turn made it possible for government just to set the boundary conditions and let the industry do the rest, as will be seen later (Hopper, Pranger and Besseling 1990).

Residual risk

Despite all these complications, the committee took the first important decision. After all, the key question is this: if, ALL alternatives must be weighed on safety and NOT undertaking an activity is one of the alternatives,

AND safety is decisive, then this leads to a forced choice of one of these alternatives, namely the one with the lowest risks, possibly being the null alternative. This route is only avoidable if it is established that the residual risk is acceptable and the acceptability can be determined by weighing the pros and cons. In that case, the residual risk does not have to be zero, nor does it have to be the lowest of all alternatives. This laid the foundation for risk-based standards.

In 1981, an important role in the development of this position was played by the consideration of an existing risk problem that needed to be solved, concerning an American company in Bergen op Zoom. At that time, the Dutch business community still took the position that they were not prepared to even discuss a formal approach to third-party risk policy with the government. However, the company in Bergen op Zoom could only survive commercially if such a "residual" risk was accepted. To solve this problem, an arrangement was arrived at, based on a quantitative risk analysis analogous to the methods used in the study that was made in the Rijnmond area. The fact that this problem could be solved this way, illustrated that such arrangements could indeed be made in other instances, and for the problem of third-party risk in general, and thus the foundations for a future quantitative approach were laid.

The limit values

Initially, a comparison of alternatives remained central to the resolution of these issues. Using the results of the LPG integral study drawn up by TNO, an attempt was made to find such a solution with the best possible cost-benefit ratio.

The chairman of the working committee (Gruijters), then raised the question of whether this search for safer alternatives should be limited and be allowed to stop somewhere. This appeared to be possible, but only if a general framework was created for it, in the form of government policy, independent of the LPG chain itself. Such a form of government policy is found in environmental hygiene standards, which provide generally applicable limits for the acceptability of risks.

This quantitative interpretation led to limit values for individual and societal risk that are laid down in the Integral Memorandum on LPG.

On 2 February 1984, the Integral Memorandum on LPG was presented to the President of the House of Representatives by the Minister of Housing,

Physical Planning and Environment, also on behalf of the Minister of Economic Affairs and the State Secretary for Transport and Waterworks (TKNL 1983). The LPG policy was the first major policy-making process in which the third-party risk aspect was an explicit matter of concern.

The end and a new beginning

The LPG work program indicated which activities needed to be modified, to reduce the risks identified, to an acceptable level. Among other things, 800 stations selling LPG would need to be adapted, moved, or closed.

Of these approximately 800 LPG stations, whose risks were unacceptable according to the limit values, only 204 were ultimately remediated, due to lack of money. The other 600 would be deferred to an agenda, which envisaged considering a quick inventory of outstanding third-party risk issues, where the safety standards were being exceeded. This was finally drawn up after the disaster in Enschede in 2000, in which twenty-three people were killed by a fireworks explosion (Arcadis and TNO 2002).

At the end of 1983, shortly after the discussion of the Integral Memorandum on LPG in the House of Representatives, the third-party risk department at VOMIL, set up by letter from Van Agt, was dissolved. It was deemed that the third-party risk problem was solved and the money could be used elsewhere. This view was not held for long, however. On November 19 1984, a disaster occurred in an LPG distribution centre in Mexico City, killing 544 and on December 3rd, of the same year, a methyl isocyanate escape in Bhopal killed more than 3000 people. The decision to close the department was therefore withdrawn.

Premises for Risk Management

In addition to industrial corporations, there are many other sources of hazards and risk. Also, for these sources, risks cannot be reduced to zero, without the deployment of extensive resources. The discussion on how to deal with these risks culminated in the document “Premises for Risk management” (Premises). This was presented in a preliminary form with the Indicative Multi-Year Program for Environmental Protection of 1986-1990 (TKNL 1985) and later, in extensive form, with the first National Environmental Policy Plan (TKNL 1988). This document attempted to provide an organized solution to three issues.

In the first place, an attempt was made to reduce the differences in approach for different Government Agencies, by expressing the risks in comparable metrics and setting maximum limits for the acceptability of the risk, at least for the agents and activities to which environmental policy applied. An attempt was also made to find an operational expression for the observation that, especially in the case of major accidents, the magnitude of the consequences, also known as the effects, weighed much more heavily in the assessment by the public and society than the probability of their occurrence. Finally, it was expected that by presenting this approach in parliament and agreeing on a harmonized approach, the growing practice of extensive, often legal, discussions between the – future – neighbours and the permit applicant for each license, which was producing an increasing burden on the juridical system, could largely be stopped.

Hardly anything was known then about the actual risks of these kinds of activities, other than in the chemical industry. Therefore, it was difficult to assess the consequences of such a standardization on spatial planning and on licensing. However, because there was an urgent need to indicate a policy direction, it was not possible to wait for an extensive study of the consequences. It was therefore decided to postpone the implementation of the policy in mandatory regulations, until more information about the consequences was known. This was also indicated in “Premises for Risk management”.

In “Premises for Risk management” limits were set for individual and group risk – the probability of a disaster – and limits for negligibility were also indicated. In figure 3 the limits for individual and societal risk as given in “Premises” are set out. A later chapter on standardization and norms will go into the details and the background of these norms and standards in more depth.