GIVE THE PUBLIC SOMETHING, SOMETHING MORE INTERESTING THAN RADIOACTIVE WASTE

Hans D.K. Codée
COVRA N.V.
P.O. Box 202, 4380 AE Vlissingen
The Netherlands

ABSTRACT

In the Netherlands the policy to manage radioactive waste is somewhat different from that in other countries, although the practical outcome is not much different. Long-term, i.e. at least 100 years, storage in above ground engineered structures of all waste types is the first element in the Dutch policy. Second element, but equally important, is that deep geologic disposal is foreseen after the storage period.

This policy was brought out in the early eighties and was communicated to the public as a practical, logical and feasible management system for the Dutch situation. Strong opposition existed at that time to deep disposal in salt domes in the Netherlands. Above ground storage at principle was not rejected because the need to do something was obvious. Volunteers for a long term storage site did not automatically emerge. A site selection procedure was followed and resulted in the present site at Vlissingen-Oost. The waste management organisation, COVRA, was not really welcomed here, but was tolerated.

In the nineties facilities for low and medium level waste were erected and commissioned. In the design of the facilities much attention was given to emotional factors.
The first ten operational years were needed to gain trust from the local population. Impeccable conduct and behaviour was necessary as well as honesty and full openness to the public

Now, after some ten years, the COVRA facilities are accepted. And a new phase is entered with the commissioning of the storage facility for high level waste, the HABOG facility.
A visit to that facility will not be very spectacular, activities take place only during loading and unloading. Furthermore it is a facility for waste, so unwanted material will be brought into the community. In order to give the public something more interesting the building itself is transformed into a piece of art and in the inside a special work of art will be displayed. Together with that the attitude of the company will change. We are proud on our work and we like to show that. Our work is necessary and useful for society. We will not hide our activities but show them and make it worth looking at them!

INTRODUCTION

Waste is worthless material; hazardous waste is not only worthless it is also dangerous. Nuclear or radioactive waste is worthless, dangerous and it is a target for environmentalist actions. No wonder that the general public is not at all fond of radioactive waste.

Specialists and workers in the waste management area look at this from a completely different point of view. They will put the negative characteristics of the waste in perspective. At least five arguments will be quoted.

First, the waste is there because it is the by-product of something useful. Of course one should minimise the waste production as much as possible, but under practical circumstances waste will always be generated. The debate with many environmentalists will however be that nuclear power is unwanted and in that respect not useful. Campaigning against radioactive waste is equivalent to campaigning against nuclear power. This kind of campaigning however will not evaporate the existing quantities of waste and it will not result in a solution for the waste from non-power applications.
Second, radioactive waste is, compared to other waste streams in modern society, very modest in volume. This makes it easy to control and manage.
Third, radioactivity can be measured easily and very precisely. Direct measurement of chemically or biologically hazardous substances is seldom possible.
Fourth, you can calculate very accurately how long the waste will exist and can pose a threat to living species. When the answer is ten or hundred thousands of years, this seems for the general public less reassuring than the answer 'for ever'.
Fifth, workers in radioactive waste management see real benefits: a job, salary, work challenges, being an active participant in a project where a solution is found for a societal problem, etc.

The public at large will only see the 'benefits of the generation of radioactive waste' at a distance. For them there will be no direct link between the waste and electricity, good quality products, health care, etc. Thus, when the benefits are remote why should you be positive about accepting the waste? The NIMBY (not in my backyard) syndrome is natural behaviour in a community and is present for many activities that do not create immediate benefit to that community. There will never be one winning recipe to overcome NIMBY. Local, one of a kind, unique and casual factors will always play a role. This means that the greatest hurdle for waste storage and more strongly even for waste disposal programs is to get started at a site. But after the start it remains equally important to maintain a good relationship with the local community.

COVRA

All radioactive waste produced in the Netherlands is managed by COVRA, the central organisation for radioactive waste (1, 2, 3). Its only statutory task is to execute the policy of the government with respect to radioactive waste. The central philosophy in this policy is that hazardous materials must be isolated, controlled and monitored.
The main elements of the management system are:

- all kinds and categories of radioactive waste are stored for at least 100 years above ground, in engineered structures, which allow retrieval at all times;
- the long-term storage, together with a central treatment facility is considered as a normal industrial activity and is located on one single site;
- research will be performed on final disposal possibilities within the Netherlands or within an international framework;
- COVRA takes care of all the wastes produced.

Direct disposal is not yet feasible in The Netherlands. A disposal site for this type of hazardous waste is not available and the small volumes of waste do not require an immediate final solution. Furthermore the public acceptability for deep geologic disposal is low and the financial burden of a direct disposal facility is prohibitive for the small quantities concerned. The money can however be generated when a capital growth fund is allowed to grow over a substantial time period.

The small quantities of waste can easily be isolated from the environment by storing them for a long time in buildings. Such long-term storage also allows for the application of future international or regional disposal solutions or even completely new techniques to remove the hazardous constituents.

The choice to store for a long time was well considered and was not taken as a 'wait and see' option. This is clearly demonstrated by the fact that integral parts of the policy are: the establishment of the capital growth fund and a clear choice for the ownership of the waste that is transferred to COVRA. This policy does not leave the burden of waste generated today to future generations. Only the execution of the disposal is left as a task for the future. All the waste will be kept at one site, well isolated from the environment, well controlled and well monitored.

COVRA has a site available of about 25 ha at the industrial area Vlissingen-Oost. Here a facility is in operation for the treatment and storage of low- and medium-level waste. The facility was erected between 1990 and 1992. In 2000 a storage building for very low level radioactive waste from ore processing industries was commissioned (TENORM waste). The construction of a storage facility for high level waste started in 1999 and will be commissioned in 2003.

HISTORY OF SITE SELECTION

In 1984 a site had to be found for COVRA's storage and treatment facilities. This was considered to be a task of the government. Volunteers were not really expected and therefor a site selection procedure was set up (4, 5).

A small committee was appointed and the committee started with a desk-study to find potential sites using the following selection criteria:

- the site should be an industrial site in terms of physical planning
- the site should be large enough
- there should be a possibility to discharge (cleaned) waste water and possibly also cooling water
- there should be a good infrastructure available
- the site should not be adjacent to a dwelling area, because of the risk perception.

The desk-study resulted in twelve potential sites, spread all over the country. For these twelve sites the question had to be answered whether the local and provincial authorities were willing to co-operate in the licensing procedure to establish the facilities.
In October 1985 the site selection committee reported to the government that only two municipalities were willing to co-operate i.e. Borsele and Klundert. The others refused because of psychological and political reasons.

To assist government in the final site selection, COVRA drafted a "site independent environmental impact statement" (EIS). This report had to be written on the basis of guidelines forwarded by the Ministry of the Environment. Here participation of the general public as well as authorities was structured in a procedure.
On the basis of the recommendations of the site selection committee, the information given in the "site independent-EIS" and additional consultations with the two local authorities the Minister of the Environment planned to make a final choice early 1986.

However, the Minister of the Environment came to the conclusion that there were no major differences between the proposed sites. And since the treatment and storage of radioactive waste had to be considered as a normal industrial activity COVRA had to be treated as any other industry. Therefor the choice for the final site was left to COVRA. Approval of this choice by the government would be given by accepting the EIA and granting the necessary licences.
In June 1986 COVRA selected a site in the municipality of Borsele, a site close to the nuclear power plant at the edge of the industrial area.

The site selection process was loaded with side effects. In 1985 parliament discussed a governmental proposal to increase nuclear power production with 2000-4000 MWe. Both Borsele and Klundert were candidate-sites for these new nuclear power plants and in both municipalities opposition was growing.
Secondly the authority managing the industrial site at Klundert was in big financial problems and "backroom"-negotiations took place where financial assistance was offered by governmental representatives in exchange for the acceptance of the COVRA facility. These negotiations were kept secret to the site-selection committee and to the Minister of the Environment, but leaked to the press.
In the governmental preparations for the final discussion on the expansion of nuclear power to be held in April 1986, it was acknowledged that as a first step the site-issue for the COVRA facilities had to be solved. In the procedure for the COVRA site selection it was agreed that the choice of the final site would be made by the government. In the same week that the parliamentary discussion about new nuclear power plants had to take place the Chernobyl disaster started, leading to postponement of decisions on nuclear power expansion. Government left the choice of a site for radioactive waste treatment and storage to COVRA.

COVRA prepared the necessary documents for the licence application and submitted them to the authorities. As part of the licence applications an EIS was submitted to the authorities. The calculations in this statement showed that during normal operation as well as during incidents and accidents the individual mortality risks never will exceed the level of 10^{-8} per year. Generally such risks are judged to be negligible. In spite of the low risk impact of the facility at the aimed site, the psychological impact turned out not to be negligible.

In March 1988 the municipality of Borsele had to start the final procedure related to the application of the building permit. A last consultation of the municipal council was needed. Shortly before a "village council" was formed as a local initiative in the community of some 700 adults living at a distance of 1 kilometre from the selected site. This council polled the local opinion and expressed a majority discontent with the location of the site. The objections were not based at all on the potential level of risk but merely on the fact that the facility was too close to a living area and could easily be seen from the community. Furthermore the community claimed not to be informed properly on the precise location of COVRA's foreseen activities.
The municipal council did not want to ignore this communities concern and decided to investigate the possibilities of other available sites within the boundary of the municipality of Borsele. A new site was found at a distance of 2 kilometre from the opposing community. The former site was situated at the edge of the industrial area while this new site is more centrally located in the industrial area. The village council "approved" this new site.

The normal procedure for the application of the necessary licences had to be followed again for the new site. In spite of the "approval" by the village council now the amount of objections in the licensing procedure increased tenfold. Some 3,600 objections were counted.

In August 1989 all needed licences were granted to COVRA. This of course did not mean a full stop of all public opposition.

At that time two groups could be distinguished in the public opposition.
The first group is a small group of farmers living close to the facility-site who feared loss of value of their properties and an adverse effect on prices of crops. This group is seeking financial compensation via legal ways.
The second group is a varying group centred around the anti-nuclear movement in the Netherlands. This group is afraid that realisation of a centralised treatment and long-term storage facility for radioactive waste could politically be explained as a final solution for the waste problem of the nuclear fuel cycle and therefore ease further expansion of the nuclear capacity in the Netherlands. This group did not only use all available legal ways to raise objections against COVRA's activities but also organised demonstrations, office occupations and blockades of COVRA's waste transports.

THE FIRST TEN YEARS

With the history of the site selection procedure, COVRA had to start its activities in a negative environment. It was taken as a challenge to built a good relationship with the local population. During the site selection and licensing process the idea was put up to form a local liason committee. Such a committee should be composed of local representatives of the general public, farmers and other industries in the area. The purpose was to establish a good basis for communication between the public, authorities and COVRA during the construction and long-term operational phase of the facility. The initiative was taken by governmental representatives, but it never has been possible to find members for the liason committee.

In the period 1990-1992 the facilities for low and medium level waste were constructed and commissioned. In 1999-2000 a facility for TENORM waste was built and commissioned. In 1994 the licensing procedure started for the high level waste storage facility. The construction phase started in 1999. So during this first ten years COVRA got the opportunity to show real activities and COVRA could work on the process to obtain a position and to get acceptance by the community.

In the design of the facilities attention was paid to psychological and emotional factors. It was felt that a good looking exterior could help to establish a good relation.
In the lay-out of the facilities a tidy and open structure is created. No hidden corners or areas are present. In the architecture of the buildings the following items must be recognised: stability, carefulness, modesty, good quality, reliability. The buildings must look up to date for a very long time and should certainly not be provocative. The colour scheme used natural whites as a basis, with a quit blue-green colour and only a few signal-red accents. This colour scheme was used for the exterior as well as for the interior.

A fence would be required around the facilities. However, a heavy fencing structure would send the message that something very dangerous was taking place behind it.
At the entrance the fence could be completely avoided by constructing a pond, a canal as barrier, which gives a much more positive impression.

At the central entrance gate no guard is visible. During office hours the main gate is open, showing our openness. Of course the whole site is permanently guarded, but this is done from the central control room in the waste treatment facility. From this control room also the safety

inside the buildings and the safety of all operational activities is surveyed. Security and safety are both controlled here. The reception of the office-building and the exhibition area are directly accessible to visitors.

Whenever possible local constructors, suppliers and advisors are used. The benefit of our activities must be felt locally. The direct employment created by COVRA is modest. Only about fifty people are employed. Most of them are recruited from within the region.

Visitors are always welcomed. Normally they will get an explanation of what radioactivity is, of the uses and dangers of radioactive materials and they get a guided tour in the facilities. In total these visits take at least two, but most of the time up to three hours. Seldom visitors come to our facility without notification.
In the lay-out of all the installations the possibilities for visitors to have a look at the work as it is done, has been considered. Creating a good working atmosphere open to visitors was aimed at. For instance the entrance of daylight in the radiological areas is an example.

The local liason group was never formed, but since 1995 there is an annual meeting with the municipal government, the municipal board and representatives of the village councils. These meetings are open to the general public as well. Developments at COVRA during the past year and for the future are presented here and discussed. At one occasion also a representative of Greenpeace was invited to give his opinion.

The group of farmers that formed opposition against COVRA during the site selection procedure is now silent. There is no effect of the presence of COVRA on the value of their properties or on their crop, thus there is no argument anymore.

The openness, the attention paid to details such as the exterior of the buildings, the fact that COVRA's activities can really be shown from the inside and an impeccable conduct and behaviour over the past ten years, resulted in acceptance by the population.
Of course there are also positive factors that are not directly influenced by COVRA. A lot has been achieved in environmental protection in our society today and environmental items are not so dominant anymore in political discussions. The younger generation has a more realistic approach towards environmental problems in our country than the generation that was educated in the sixties. Our situation is seen in perspective to what is done in other countries. Another important factor is that until 2002 the possible growth of nuclear power was no discussion item. In 1997 the small nuclear power plant Dodewaard was shut down and a political decision was taken to stop nuclear power production in 2004 by closing down the Borsele plant. In 2002 this last decision was reversed, the nuclear power plant Borsele will continue to operate after 2004. This decision could mean a revival of the anti-nuclear movement.

A NEW APPROACH

Nowadays there is hardly any opposition against COVRA. From the region quite some people have visited our facilities and generally they take a positive attitude towards COVRA. This does not automatically mean that they are also in favour of nuclear power production, but it takes some of the emotions away from that discussion.

The construction of the high level waste storage building, the HABOG-building, attracts a lot of positive reactions. People from the region are interested to learn what is and will be done in

that building. Regularly the provincial press pays attention to the progress made during the construction phase. After the September 11th events, questions were asked about the safety of the HABOG-facility. The explanation that the building was designed to withstand an airplane crash immediately took fears away and added positively to the feeling that 'everything' was taken in account.

For the exterior of the HABOG-building the same philosophy was followed as for the other buildings. It should look nice, clean and certainly not provocative. The same colour scheme would be used as for the other buildings. This is shown in figure 1.

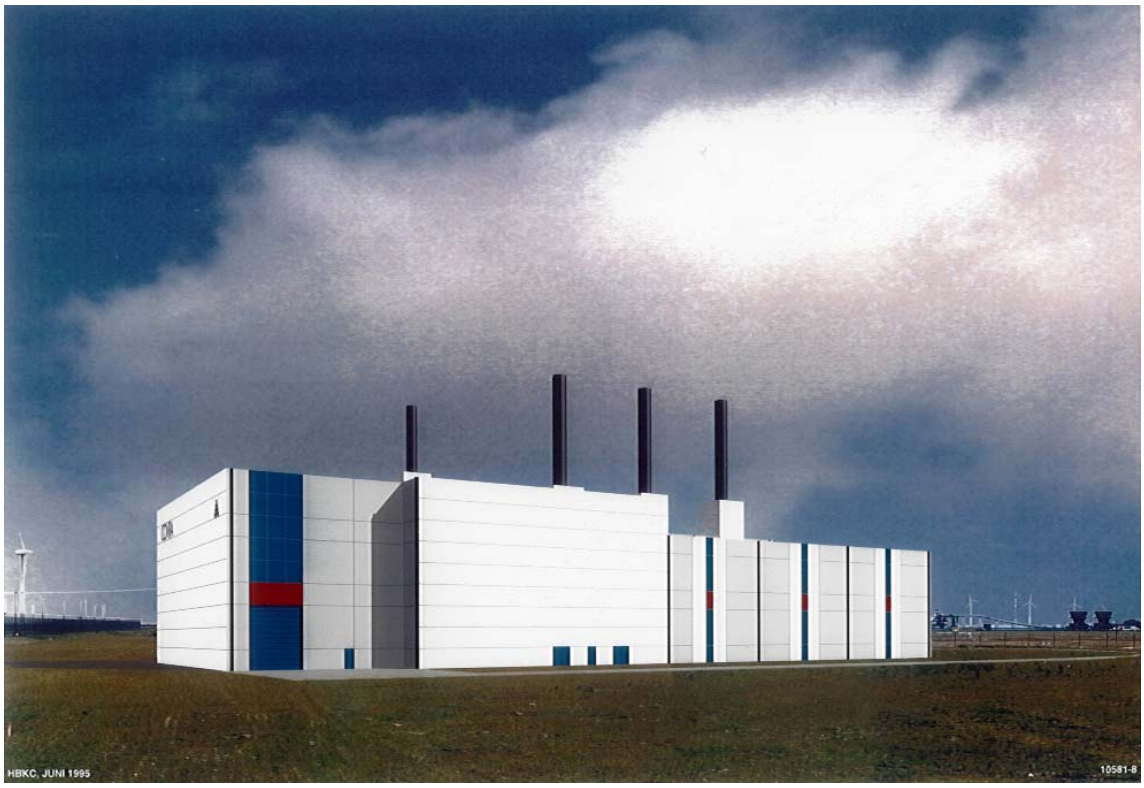

Figure 1. The original colour scheme for the HABOG-building.

During construction of the HABOG facility the idea was born to create a special wall painting in the loading hall for vitrified waste and spent fuel. This is a place that will be part of the guided tours into the COVRA facilities and here visitors will be standing right above the high level waste. Normally not much action is going on in the HABOG facility; only during loading and unloading activities take place. A special wall painting could add to the interest of the tour.

Discussions with an artist well known in our region resulted in an idea that went much further. This artist, William Verstraeten, creates pieces of art that are not only a joy to look at; even more important is that his creations invite you to think about things. In his works the effect or possible effect of physical phenomena is often addressed (6, 7). He became very intrigued by the nuclear processes, the care that has to be given to the waste for long but well known time periods and the interaction with society on these activities. He launched the idea to integrate the building into an artistically concept. He created 'Metamorphosis'.

Metamorphosis. The building itself is a piece of art, it is a statement by itself. In stead of the original modest colour scheme, the building will be transformed in a totally orange object. Orange because this explains the transition between dangerous (red) and safe (green). To make a link with the activities on the inside, on the outside wall three formulas are painted in green. The 'Einstein formula', written in the well known form as $E = mc^2$ as well as $m = E/c^2$ and 'Planck's formula', $E = h\nu$. Metamorphosis from mass to energy.

The vitrified waste in the building produces heat, but in the next 100 years the heat production will change from significant to insignificant. This change in heat production will be shown on the outside of the building. Every time that the building needs to be repainted this will be done in a colour that is slightly lighter then the existing one. After about 100 years the colour will be almost white in stead of orange.

Figure 2. The new exterior, metamorphosis of a storage building into an object of art.

Inside the building at four positions a special photograph of a beautiful landscape in the region will be shown. It is a landscape formed some 500 years ago and it shows the changes caused by the combination of human and natural activities. The photograph will be presented as a window to the outside world.
The beautiful landscape stands of course for the valuable environment that we have to protect. At a first glance nothing is special on the picture, however if you take a close look at it, it becomes clear that the horizon is two times present. This represents the fact that long term care is at stake in our work: 'look over the horizon that you normally take into account'.
Furthermore the photograph will be shown four times, three times as a colour transparency. This will represent the process of decay. The first colour transparency will be the full colour picture. In the second, third and fourth each time a major colour component, yellow, blue and

magenta, will be extracted. The result is a picture where the colours decay from full colour to bluish, to purple/reddish and finally to black and white. The last picture will not be a colour transparency but will be printed on a layer of goldleaf and so the last picture becomes the most precious one. A precious thing in a building to store worthless waste material. Metamorphosis of a colour picture, metamorphosis of something worthless into something valuable.
The pictures are positioned in the building such as that they correspond in colour to the colour scheme of Feng-shui. Feng-shui was developed 400 years ago in China and it follows the concept that chi-energy goes from one place to another. So here a completely other energy concept than the physical one of Planck and Einstein is introduced.

There are many more things that show transformations and relations between the art concept and the waste management concept. Both are mixed and related and cannot be separated anymore. The strictly rational scientific world and the emotional artistic world have become one.

The transformation process also affected the attitude within COVRA. In stead of the modest non-provocative and somewhat silent attitude, in the future we will try to be actively present.
We are proud on our work and we like to show that. Our work is necessary and useful for society. We will not hide our activities but show them and make it worth looking at them. Of course all radioactive waste produced in our country is brought into the community and we will take care of it but together with that we open the possibility to look at it differently. We also brought an object of art, something very worth visiting.

CONCLUSION

After a difficult period to find a site for the treatment and long-term storage of low, medium and high level radioactive waste, ten years of operational activities went by without problems. During that period acceptance by the public increased enormously.
COVRA is open to the public and is also open to the idea of looking at things from a different perspective. It is realised that bringing radioactive waste into a community is not welcomed with enthusiasm. Together with the high level waste however, we bring an interesting object of art into the community.

References

1. H.D.K. CODÉE, "Controlled Containment, Radioactive Waste Management in the Netherlands", Proceedings WM'02, February 23-28, 2002, Tucson, AZ.
2. H.D.K. CODÉE, "Radioactive Waste Management in the Netherlands; A Practical Solution in Full Operation", Proceedings IAEA International Conference on the Safety of Radioactive Waste Management, Cordoba, Spain, March 13-17, 2000. STI/PUB/1094, International Atomic Energy Agency (2000).
3. C. KALVERBOER, E. A. BACH, R. GATTEGNO, J. DELGRANDE, "HABOG: A new Safe and Economic Multipurpose Storage Facility", Proceedings Topseal '99, Antwerp, Belgium 1999.
4. H.D.K. CODÉE, "Siting and Licensing of a Centralised Radwaste Facility in the Netherlands", OECD – IAEA International Workshop on Public Participation in the Decision-making Process in the Nuclear Field, Paris, France, March 4-6, 1992.
5. H.D.K. CODÉE, "Environmental Impact Assessment for a Central Treatment and Storage Facility for Radioactive Waste in the Netherlands", Proceedings KASAM International

Seminar on Environmental Impact Assessment, Luleå, Sweden, October 24-26, 1994. ISBN 91-38-20056-2, ISSN 0375-250X (1995).

6. H.J. ZUIDERVAART, "Behind Kudelstaart the sky touches the earth. On physics in the artworks of William Verstraeten", Art centre 'deWillem3', Vlissingen, The Netherlands, October 21, 2001.
7. W. VERSTRAETEN, "Revolutions", catalogue of works 1975-2000. Published by ZenkasT Press, Verwerijstraat 28, 4331 TC Middelburg, The Netherlands. (wv@zeelandnet.nl).