

## **LOW AND INTERMEDIATE LEVEL WASTE REPOSITORIES: PUBLIC INVOLVEMENT ASPECTS**

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### **ABSTRACT**

The nuclear energy acceptance creates several problems, and one of the most important is the disposal of the radioactive waste. International experiences show that not only environmental, radiological and technical questions have to be analyzed, but the public opinion about the project must be considered. The objective of this article is to summarize some public involvement aspects associated with low and intermediate level waste repositories. Experiences from USA, Canada, South Africa, Ukraine and other countries are studied and show the importance of the population in the site selection process for a repository.

### **1 - INTRODUCTION**

The effective information for the public is essential in any consultation process. In the particular case of LILW - Low and Intermediate Level radioactive Waste, this is a responsibility of governments, waste management agencies and producers, among others. The communication with the public should be objective and transparent to increase the public trust towards their possible support. Discussions during any consultation process should be based on facts, much more than in emotions. The process can last a very long time. If the potential areas communities were consulted in preliminary phases of the project (and also later) in a frequent way, this would optimize the process.

It is a fact that the nuclear industry finds a lot of obstacles for its expansion, mainly due the rejection it suffers from many sectors. But international data also show that South Korea, China and other countries are making their energy expansion plans considering the construction of new nuclear power plants. In the future this option can be used in countries where it is not present yet. As example, Malaysia population already supports the construction of nuclear power plants. The country is actually seeking the obtaining of the necessary knowledge to develop this sector [1].

## 2 - INTERNATIONAL EXAMPLES

There are some low and intermediate level waste repositories in operation all over the world. Examples that show the public involvement aspects and some government programs in several countries, associated to nuclear waste disposal, are listed below.

**Argentina** – At the beginning of the 70's decade when the Ezeiza Radioactive Waste Management Area site was developed, it was not necessary to have social consensus for the location of a repository. The radioactive waste generation was seen as a normal consequence of the nuclear programme. But after the Chernobyl accident a real public concern about the low level waste repository environmental impact became much bigger. Even with significant educational efforts in schools, civilian associations, municipality, participating in debates and round tables, inviting people to visit the Ezeiza Atomic Center, among other actions, the suspicion of general public remains as a challenge. To worst the problem, antinuclear groups convinced most of the community that the water obtained from the local aquifer is not drinkable due to a radiological contamination.

The federal government believes that is necessary to implement a social communication programme to change the negative public perception on radioactive waste management. It will be also necessary to establish a Social Forum with representatives of all stakeholders to facilitate a dialogue in order to clarify the present situation of the site. To reach the societal and political approval of a new site for a repository it is necessary to develop a permanent communication link with the national, provincial and municipal representatives together with other opinion leaders such as NGO's, private companies, schools, professionals and neighborhood associations. It is essential to identify clearly all stakeholders and involve them from the very beginning of the project in order to improve the decision making process.

The authorities concluded that the social communication activities must be carefully undertaken in order to move forward with the appropriate management of the radioactive wastes generated in Argentina [2].

**Bulgaria** - the Bulgarian government understands that nuclear activities cannot be carried out without public acceptance and transparency in the decision making process. This creates the need for a proper and working public relations programme. The State works towards providing information on safety of installations, and to distribute this to the public after a careful process of identifying the potential target groups and research on their particular needs for information, to prevent further misunderstandings and misuse of the information. The main idea is to increase the level of public information and to lower the level of fear.

This open communication with the interested public tends to increase the transparency in the decision making process and to establish confidence in the population that live near by an existing repository. Presenting the information on time and including all needed details is another way to minimize the negativism at the local level. To answer the public's requests for 24-hour information availability, a web page was launched with all needed information. Further details can be asked by email. Also, two information centres close to Novi Han Repository were created. Besides the paper informational materials, the interested public can find more detailed information in a database available at the information centres.

The Programme for Information and Cooperation at Local Level also gives opportunities to visit the Repository. Interested local people, representatives of the local authorities, NGOs and the national media visited the Open Doors on 2005. Another Open Door Day was held for the school children of the village of Gabra (close to Novi Han Repository). The number of requests for information from the local public increased, what demonstrates the success of the program.

**Canada** - In Canada the municipal district of Kincardine, that accommodates nuclear facilities from middle of 1960, began in 2002 a dialogue with the competent authorities, to discuss the installation of a low and intermediate level waste repository in its territory. The contacts took the signature of a memo and the search of one systematic appropriate for the transport process. In 2004, the Municipal Council approved the continuity of the enterprise, when intense works began seeking communication with the public. A center of information and a weekly newspaper, besides correspondences for the citizens, were parts of the implanted methodology. At the end, a research including 72% of the population was accomplished, and 60% of the interviewed were favorable to the installation of the repository. 22% were against, 13% neutral and 5% didn't want or didn't know how to answer. After this phase, the neighboring communities were also visited and took science of the process, being also able to express their opinions.

Canadians understand that the vital factors for the success of the process were the visits to international repositories that members of Municipal Council made, invited by the entrepreneur, the attention given to the neighboring communities, the correspondences sent to the population and the contact with the local press in the beginning of the process. The presence of the employees from the nuclear power plant located in the same area, acting like "ambassadors" of the project and the presence of local inhabitants in the communication center were also considered as much important factors [2].

**India** - apart from continuous monitoring and surveillance of the seven Indian repositories, due care is taken to address the basic socioeconomic and public acceptance aspects related to them. Authorities believe that simple and transparent information must be provided to the public. Also, good public relations must be maintained.

Exhibitions are held at reactor sites, and emphasis is given on the safe waste management practices and measures taken to ensure minimum impact on the environment. As a part of information, tours to the surrounding areas are also undertaken. The communication activity is aimed mainly at establishing, maintaining and enhancing the confidence and the support of the local population. The objective of all these events and programmes is to establish a long-term relationship between the operators and the local communities. Strategically, the nuclear area employs families whose lands were acquired for siting nuclear facilities.

The Indian Nuclear Society conducts a full day workshop at various locations all over the country, which help to create a good social image. These workshops highlight the positive impact of nuclear energy in medicine and agriculture, in addition to emphasizing safe management of radioactive waste. Also, a great deal of printed information such as annual reports, newsletters, brochures, papers and publications are made available both on the national and local level.

A good relationship is also established with the professional journalists working in the media. The bi-annual journalists meeting is a regular feature where seminars are conducted highlighting the technology developments and safe practices for the disposal of radioactive waste. Due to these questions and the growing energy requirements of the country, there is good acceptance of nuclear power in India.

**Poland** – the local community access to information on the siting, assignment and construction of the Polish repository was very limited. During its operation from 1961 to 1988, results of the radiological monitoring and the impact of the repository on the environment reached the local community and authorities only occasionally and in a limited scope. The situation changed in 1988, when IAEA experts visited Poland to estimate the safety of the facility. Documents prepared for IAEA became public, and this fact improved the relations of the local public and the authorities with the repository operator. However, these facts also made the local community realize that the information had been hidden from them, and it deepened the mistrust of the people.

To obtain the confidence of the population, some measures were done such as the involvement of the local people in the decision making processes. Also, honest information was provided to the media and the local population about matters related to the repository, including the estimation of profits lost due for example to the drop of tourist attractiveness in the region. A broad information campaign was run, mainly among the school youth. The selected site received multiple forms of compensation including financing of investments and fees. As result, the repository is now able to continue its operation until 2020.

**Romania** - The nature and extent of public involvement and participation in near-surface disposal at Saligny depends actually upon the existing national legal and political framework and the existing cultural context. The national radioactive waste management agency should organize in the near future audiences for public involvement activities and include representatives from local communities and administrative units (local, regional and federal), government officials, regulatory authorities, scientific community, public interest groups, environmental organizations, industry and trade groups and the news media.

Public involvement and other non-technical matters have been included in the repository development. Social, economic and environmental impacts at local and regional levels have been considered to be a significant part of the facility operation preparatory stages. Corresponding measures have been identified to reach the public acceptability of the repository, but they will be extended for the whole facility lifetime.

The repository construction process in Romania is still in study, as well the preliminary investigations for the construction of a geological facility [3].

**Russia** - the information activity for the waste disposal site began in 1990 with the first appearance of information in the Russian mass media about its existence and operation. At that time a division on public relations was set up with its primary aim of preparing and delivering articles to popular publishing houses and reports for radio and television. Specialists of the division on public relations carry out explanatory activities by means of technical tours to the disposal site facilities, organizing public discourses to decrease radiophobia and unawareness among local community and stakeholders.

Besides leading experts of the responsible company, there are editorial board members of well-known Russian magazines, which publish information on its scientific and practical activities. Due to comprehensive programmes including social factors, public relations, permanent publications and reports on radio and television, the authorities cope with proving the safety of their technologies and harmlessness to the local community and environment from radioactive waste storage.

**Slovenia** – In 1991 a Radioactive Waste Management Agency was founded by the Government to provide conditions for the final disposal of all radioactive waste. The first site selection using a technical approach with 43 obligatory criteria failed. The detailed analysis showed that the main reason for the failure of the siting project was inadequate public participation. A new site selection procedure is a combination of technical screening and volunteer siting, which includes strong public involvement and the negotiations with the local communities. Only if the negotiations are successful and further steps agreed with the local community, field investigations to assess the suitability of the potential location will be done.

Later, negotiations with the local communities started with the legal basis for financial compensations to the hosting community. A decree defines the fixed compensation of 2.3 million EUR due to the limited land-use to the local community who would host the repository [4]. The only exclusion parameter in public acceptability was the eventual rejection of participation in the siting procedure by a local referendum. The proposed 12 sites were classified first by ranking local communities, based on public acceptability criterion. In the second step, all other aspects were considered equally and the sites were ranked again. If the potential site were excluded only because of one aspect it would be excluded from further evaluation.

The repository site selection process was foreseen to be concluded at the end of 2008, and its operation should begin in 2013. The process was based on technical criteria and public acceptance issues [5].

**South Africa** - The hosting communities did not support the initial establishment of a repository. The activities did not provide the benefit of employment opportunities as initially expected. Also, promises made to the upgrading and further development of local infrastructure and electricity supply to rural areas did not realize. Population believe that the repository affect the local image and the sale of local sheep farming products. The obtained contributions are negligible when compared to the real needs for the growth in the area. The involvement of the South African Nuclear Energy Corporation generated unrealistic expectations on the part of the communities, inevitably leading to a certain amount of disappointment and resentment.

In 1996 a Communication Forum was established in order to clarify some questions, obtain the trust of the population and help to solve non-nuclear related stakeholder issues like vermin control, maintenance of fences and general assistance with infrastructure needs. Also, there were several visits to the repository from Provincial representatives responsible for Environmental Affairs.

However, some incidents attracted the attention of the media and led to negative publicity. In 1997 some concrete drums containing intermediate level waste developed hairline cracks. An expert mission from the IAEA declared that the repository was indeed safe, but there were certain issues that required attention, such as a better communication program and the need for improving the quality of the concrete drums and covering them with back-filling material as soon as possible. In 2001 seismic events took place in the area where the repository is situated. In 2002 there were several allegations from former employees that they contracted a diversity of illnesses as result of exposure to radiation during their period of employment. There have also been some incidents involving the transport of waste. One incident in particular involved allegations made by farmers that their cattle had died due to the radioactive waste shipments being transported past their properties. The outcome of the investigation showed that the allegations had no substance.

Deep lessons were learned from these incidents, mainly that safety public perceptions were of crucial importance despite technical arguments to the contrary. Also, the public perception of repository safety appears to be largely based on the quality of the engineered barrier system. A major effort needs to be done, as the implementers of waste disposal programmes, to build up and maintain a position of trust and confidence with its stakeholders. Confidence could typically be achieved by means of forums, which are only effective after a long period of sustained efforts at achieving transparency.

**Ukraine** – in Ukraine the nuclear sector public acceptance is vital because there are several facilities for the storage, processing and disposal of radioactive waste generate within the country. A consultative referendum and public hearings are considered as tools to involve the public in decision making. The indicated approach is helpful in finding a common understanding between the nuclear facility operators and the local public. The State Nuclear Regulatory Committee of Ukraine declared the importance of *“openness and accessibility of information on these aspects, involvement of citizens and public organizations, regional authorities and local governments in making decisions related to siting of radioactive waste and spent fuel storage facilities”*.

To inform the public on the storage facility safety articles are systematically issued in regional mass media and regular information is provided on the local TV. Lectures and visits are arranged for students and inhabitants of the 30-km zone to the nuclear facilities. Each nuclear power plant visitor receives a booklet and brochure titled *“Zaporizhyya NPP and the Environment”*.

**United States** - 73% of college graduate voters and 65% of all adults supports the use of nuclear energy in the U.S. Of those polled, 31% are opposed to its use and 4% did not know how to answer this question. 62% of college graduate voters and 55% of all adults answered that it would be acceptable to add a nuclear plant next to the nearest power plant that is already operating. Also, 34% of college graduate voters and 40% of all adults said it was not acceptable. In answer to the question “We should definitely build more nuclear energy plants in the future” 59% strongly agree or somewhat agreed, while 26% agree strongly. Residents of the Midwest and South are more susceptible to accept a new plant (by margins of 70% and 66%) than those of the West and the Northeast (57% and 50% respectively) [6].

Studies regarding the public acceptance of the Hanford repository showed that initially there was great resistance on the part of the local population. Several researches question the safe storage of radioactive waste and the eventual contamination of soils and underground waters. In Oregon, the results demonstrated that the real problem was actually any type of waste [6].

In order to obtain the support of the local community, the company responsible for the Barnwell repository developed several activities such as investments in the local fire brigade and in areas of environmental protection (Carolina Bay, 267 acres of wetlands), support to organisms that defend the wild life, to the department of sea resources, to the municipal arts council, to the historical committee, to several sports activities, and also to anti drugs programs. Also projects were accomplished to help children that have special needs, the American Society against the Cancer, the Association of Muscular Dystrophy and the American Red Cross [8].

Regularly, students, industrial groups and the public in general visit the Barnwell repository. In the place, the visitors see a film, receive safety instructions and are escorted along the facility. In the last years, approximately 900 visitors (per year) went to the facility. During the last decade, people from 25 countries visit the repository. The leaders of the community visit the facility regularly, where they also meet the responsible for the Barnwell activities, and receive the needed information. The local community and their leaders are favorable to the enterprise due to the generated benefits, and gave support to it in the public audiences for the renewal of its license.

### 3 - CONCLUSIONS

In most countries worldwide, public involvement/participation is an integral part of the approval process for the site selection process for the disposal of LILW. Public perception of radioactive waste repositories as being risky objects and therefore unacceptable by local communities comes from bad information, the feeling of being sidelined from the decision process and fear of being abused for the interests of local authorities. The integration of different communication approaches and the wide range of addressed public applied have proved to be successful. The integral communication approach helps in confidence building and provides conditions for future negotiations with the local communities. Implemented governmental assistance such as compensation mechanisms for limited land-use on the site of a nuclear facility and also some strategic documents on radioactive waste management policy provide necessary support for the site selection process [9].

Finally, is always necessary to have in mind that the experts must supply the public all the process pertinent information, but also listen and assist the population in their concerns that can include not technical considerations. It is fundamental that a two-way road manages the whole process [10].

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