

What's the story?

Using art, stories and cultural heritage to preserve knowledge and memory

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“Once upon a time, a long, long time ago, there were a people that used electricity as a source of energy. In the first years they generated the electricity by burning coal and, later, used oil and gas. In the middle of what was called the twentieth century, they also started to use nuclear fission to produce electricity. Burning carbon products generated, of course, carbon dioxide as a waste, which could not be kept under control. The nuclear fission process generated waste.”

This could be the start of a story told more than thousands of years from now. A story told by people living in a way difficult to imagine today. But as we know about the past, it seems unlikely that future generations will be ignorant of the past. Story-telling is an ancient and powerful craft to pass on information to the future. Today, we still enjoy the Iliad and the Odyssey, telling us about the events that took place around 1 200 BC: that is some 3 000 years ago. These poems from Homer are believed to be the oldest literature of the Western world and were written around 800 BC. Between 1200 BC and 800 BC the information was kept alive because the stories were told over and over again. Storytelling is a way to preserve knowledge and memory and when a written base exists then the content can, to some extent, be controlled over time. The oldest written texts are found in Egypt and Mesopotamia. The oldest book is believed to be the Chinese “Diamond Sutra” dating from AD 868.

Even older than the stories and written texts are the pictures that give information to others and pass it on to next generations. The oldest drawings in the world can be found in southern France; drawings of animals, dated by C-14 method, are 30 000 to 32 000 years old. As pictures do not require any knowledge of words and language, the drawings can have a meaning far into the future. At the same time, pictures leave more freedom for interpretation and hence deviation from the original “knowledge”. When paintings and sculptures telling a story are also meant to be a thing of beauty, there is a reason to keep them forever. The importance and power of religion, as well as of emperors and institutional governors, is told and passed on to future generations through art. Historical events such as battles, coronations, floods as well as the beauty of

landscapes, flowers and animals are preserved in art paintings and sculptures forming our cultural heritage.

Art, stories, and cultural heritage are long-term tools to preserve knowledge and memory.

The story of time

What is the story with radioactive waste? Radioactivity decays with time, and time will ultimately make radioactivity harmless. In radioactive waste management there is awareness of the importance of time. Managing the waste covers periods longer than a hundred thousand years, entailing that information has to be passed on to many generations to come.

In our daily life, “forever” is generally translated into the period of a human life or three generations, but in radioactive waste management such a period is short term. The awareness of the need to consider timeframes covering many, many generations, or even the period in which homo sapiens exist, should be present in all aspects of environmental management, but is dominantly found in radioactive waste management. Obviously, the reason is that “forever” has no numerical value as compared to the half-life of uranium-235 of 704 million years. Preservation of records, knowledge and memory is seen as an important aspect of radioactive waste management. The tools such as art, stories, and cultural heritage could help us tell the story of management of radioactive waste.

Management of radioactive waste at COVRA in the Netherlands

In the Netherlands, the Central Organisation for Radioactive Waste (COVRA) will store all kinds and categories of waste in buildings for a period of at least hundreds of years. This is done at a central location in the south-western part of the country. After the foreseen period of long-term storage, all remaining waste will be brought into one deep geological repository in salt or clay, scheduled to start from 2130. How to preserve knowledge and memory during the period of long-term storage and communicate the tasks to be executed to at least three generations in the future?

A story of art

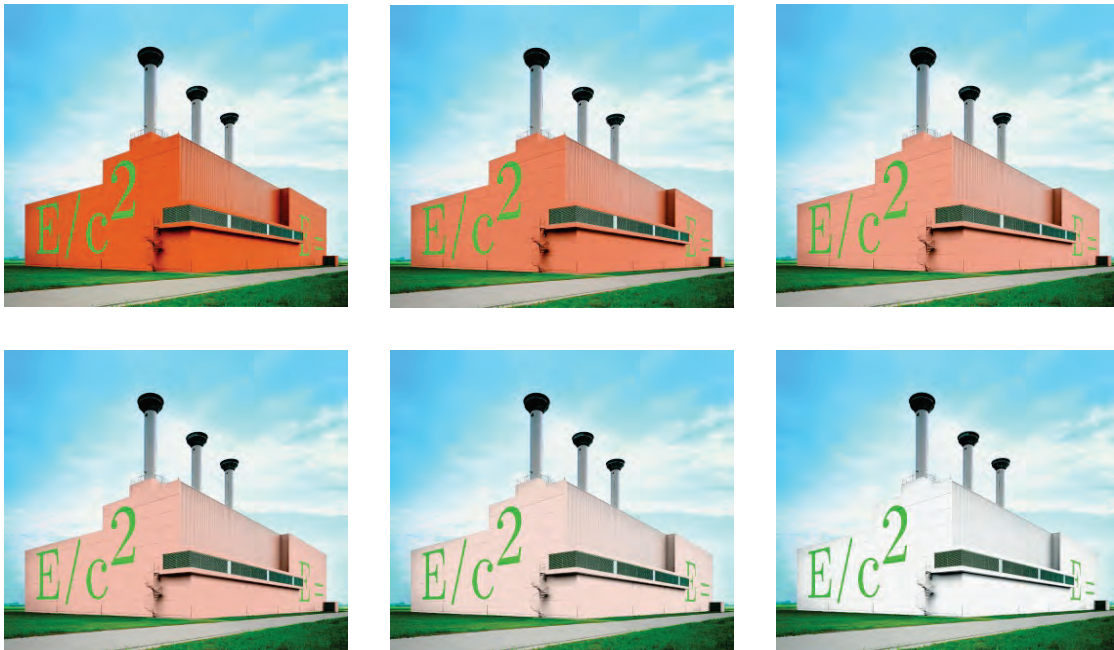
The idea of using art to tell the story of radioactive decay was born during the construction of the high-level waste treatment and storage building (HABOG). Discussions with a local artist, William Verstraeten, resulted in a provocative, and as it turned out, brilliant idea. He launched the idea to integrate the building in an art concept. In 2003, he created “Metamorphosis 2003-2103”. The inclusion of art in the activities of COVRA shows pride in the work performed. At the same time, art creates opportunities for communication.

The building itself is now a piece of art; it is a statement by itself. The building is an orange object. The colour orange was chosen to represent the metamorphosis of something dangerous (red) into a safe situation (green). To tell a story about the activities inside the facility, 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 decrease in heat production of the high-level waste will be shown on the outside of the building. Every 20 years the building needs to be repainted. This will be done in a colour that is slightly lighter than the last one. After around a hundred years, the colour will be white instead of orange; a fading colour creating a story to explain radioactive decay. Inside the building there are many more relations between the art concept and aspects of waste management. Both are mixed and related, and cannot be separated

anymore. The strictly rational scientific world and the emotional world of art have to become one. With “Metamorphosis 2003-2103” COVRA offered to the local community the largest work of art in the region together with the storage facility for radioactive waste. It is not questionable that the art work will be preserved “for ever”.

Figure 3: HABOG changing from orange in 2003 to white in 2103



A story of cultural heritage

How can we explain the long-term aspect of radioactive waste management in a way that people can relate to? The answer is surprisingly simple: show people that we have a very long history of preserving things, things that are often far more difficult to store than immobilised waste. Ask people how long we should preserve our cultural heritage such as the paintings of Rembrandt or Van Gogh. The answer is generally: “forever”. The link between the long-term preservation of art and the management of radioactive waste helps people to visualise and trust the concept of long-term management. Interestingly, a real connection with the cultural heritage could be created. Museums in the region where COVRA is situated, have endured shortage of storage capacity for the artefacts that are not exhibited. This represents generally some 90% of their collections. While looking for suitable storage space, the museums and COVRA found each other. The conditioned COVRA storage buildings for low and intermediate level waste have enough unused space to store the museum’s artefacts. This space is available as a result of the robust construction of the storage building and this space cannot be used for the radioactive waste itself. The climate conditions are favourable because there are only gradual temperature changes and air humidity is under 60%. In 2009, the storage space has been offered for free to the museums by means of a contract for a hundred years. Such a long-term contract is unique, even for museums. The National Museum of the Netherlands (the Rijksmuseum) for instance, where works by Rembrandt can be seen, only has a 40-year contract with a storage depot.

A story of the future

Telling stories to future generations in view of passing on knowledge and memory is a demanding craft. To make the story last, it has to be a thing of beauty and it needs vivid descriptions that appeal to emotions. Boring, complex, or difficult to understand metaphors, can turn an imaginative journey into a lifeless plot. Emotions are subconscious and they will leave a trace long after the words have been forgotten. Art and cultural heritage give such stories and provide compelling metaphors for radioactive waste.

Now that the storage capacity for both depleted uranium and high-level waste has to be extended, art will be included again. The storage facility for depleted uranium will become a sundial, whereas the extension of HABOG will create a special event only twice a year. The sun will perform a visual play with the building in the same tradition as in Stonehenge or as in the pyramid of Quetzalcoatl in Mexico. To communicate these new plans, a short movie with time animation has been produced.

The combination of art, stories, cultural heritage and the management of radioactive waste may result in long-term preservation of knowledge and memory.