



Safety seals at the HABOG plant

REPORT FROM DUTCH NUCLEAR WASTE INTERIM STORAGE FACILITY

The HABOG nuclear interim storage plant in the Netherlands is a unique concept. It stores both nuclear used fuel and all other types of high-level radioactive waste. The facility was designed and built to very high safety standards, including resistance to

fire, earth quakes, explosions and direct aircraft crashes. The Roxtec sealing system was chosen to solve penetrations with cables through walls and floors in areas such as electrical-technical rooms.

Roxtec for safety and easy maintenance



A typical view at HABOG: Roxtec G frame combinations protect cables passing through walls and floors in the technical-electrical rooms.

Marcel Israël (right), at COVRA maintenance, appreciates the simplicity and flexibility of Roxtec.



When the HABOG facility for storage of nuclear waste was built 1999-2003, the specification for its cable penetration seals was clearly defined. This was decided to include both requirements of safety and of functionality. In terms of safety, it meant cable penetrations with a proper sealing capacity. Important was the protection against the spreading of fire, gas and water through the many openings for cable that exist

in a facility like this. Regarding the requirements for functionality, there was a desire for cable penetrations that would be easy to use. This means simple to install and easy to open up for changes and maintenance work of electrical installations.

Long-term reliability

That safety is an important basic requirement in a storage facility for high-level radioactive waste is

no great surprise. It is vital that all electrical installations are kept tight and sealed for cables passing through walls and floors. It is also important that this protection can be kept intact over a long period of time. The HABOG facility will store the high-level radioactive waste for at least one hundred years. During this long time many things can happen. Subsequently, the facility has been designed to protect against potential hazards, such as



Mr Israël from COVRA (right) and Oscar Heesen (left) from Roxtec BV while doing follow-up inspection of the installations at the HABOG facility.



earth quakes and flooding as well as direct hits by crashing aircraft. Long-term mechanical reliability is a vital requirement, and at HABOG the need for reliable cable penetration seals was solved by the use of cable transits from Roxtec.

Easy maintenance

Even though the building phase of HABOG is over and there are no more major modifications expected during the facility's operation, a need for certain changes may still occur and must be possible. In particular this refers to changes to the electrical installations. Here, maintenance staff wants to perform this work as quickly and easily as possible. Marcel Israël, who is responsible for the electrical maintenance at HABOG, says that Roxtec presents a clear advantage compared to other alternatives.

"It is much simpler to use Roxtec, since we do not need any special tools to close the transits when we do the installations. Likewise, we

do not need any special tools to open up the existing installations for maintenance".

Fast cable installations

And talking about maintenance and the need to route new cables or replace old ones, Mr Israël continues:

"The Roxtec solution is quicker. It is easy to install several different dimensions of cable thanks to the adaptable modules. All the layers are already there in the modules and that makes it fast to do installation of a variety of cable sizes."

25 per cent spare capacity

With Roxtec it was also possible for the designers of the electrical installations at HABOG to plan and install extra capacity for future needs into the transits. This follows in line with the strategy of backup systems and safety factors that is practiced at HABOG. Multidiameter™, the Roxtec solution based on sealing modules with

removable layers, means that extra modules can be installed in the frame and opened up when a cable is to be installed.

"We have chosen to add 25 per cent spare capacity into every frame opening from Roxtec", says Mr Israël. "This way we have a safety factor even for unexpected needs".

Roxtec also protects the cables routed in and out of the Backup Power Diesel Generator Room.



Facts

Project types	Interim storage facility above ground for all types of high-level radioactive waste.
Customers	<p>COVRA N.V., the Netherlands. Design, mechanical and electrical installations and commissioning through Areva NC, France. Civil construction by the Dutch company HBG, now BAM.</p> <p>COVRA N.V., the Central Organisation for Radioactive Waste, manages all radioactive waste in the Netherlands. Its statutory task is to execute the Dutch radioactive waste management policy. This includes the long-term storage of all types of waste above ground for a period of at least a hundred years. To this end, COVRA started the engineering of the treatment and storage building for high-level waste, the so-called HABOG (the Dutch acronym) in 1999.</p>
Applications	Cable penetration seals (transits) in walls and floors of electrical-technical rooms.
Requirements	Fire-proof 120 minutes, water-proof, gas-proof and transits that are easy to install and maintain.
Roxtec products	<p>Roxtec G frame transits in galvanized finish with adaptable sealing modules.</p> <p>Typical frame sizes are G 6+6x5. Approximately 370 sets of Roxtec G frame transits have been installed at HABOG.</p>
Reasons for choosing Roxtec	<p>Easy to install and open up the Roxtec transits for maintenance without the need for special tools.</p> <p>Roxtec modules ready to accept cables of different dimensions. Possibility to add 25 per cent spare capacity from the beginning in each transit.</p>



Reference projects

Australia: **INVAP**, OPAL research reactor
China: **CNPEC**, Taishan 1 and 2, **Westinghouse**, Sanmen 1 and 2
Finland: **AREVA**, OL 3, **Fortum P&H Oy**, Loviisa 1 and 2, **TVO**, OL 3
France: **EDF**, Chinon
Germany: **EnBW**, Phillipsburg 1
India: **NPCIL**, Tarapur
The Netherlands: **COVRA**, HABOG storage facility
South Korea: **Westinghouse**, Shin Kori 3 and 4
Sweden: **FKA**, Forsmark 1 and 2, **Vattenfall**, Ringhals



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