

ZORAN STANČIČ

Deputy Director-General, European Commission, Directorate-General for Research

SPEECH

(Chairman, Ladies and Gentlemen)

I'd like to express my thanks to the organisers for the invitation and for allowing me, on behalf of the Directorate-General for Research of the European Commission, to present this overview of the European Union's research effort in the field of geological disposal. It is indeed a privilege to have the opportunity to address such a distinguished gathering of politicians, regulators and experts on what is a key subject combining both a high political profile with significant technological and societal challenges.

As a representative of the European Commission's Research Directorate-General, I will focus my intervention today on the scientific and technical rationale. My colleague from the Directorate-General for Energy & Transport has a view more from the political and strategic perspective, particularly in relation to the continued use of nuclear energy. Clearly these different perspectives are strongly interlinked and together form a coherent Community policy on the subject of geological disposal.

The legal basis for all research in the field of applied nuclear science and technology is the Euratom Treaty, one of the founding Treaties of European integration and celebrating its 50th anniversary this year. Already 50 years ago, this Treaty foresaw the importance of carrying out research at the Community level on key issues of interest to Member States. Over the intervening years, the Euratom Framework Programmes have demonstrated that this collaboration can be extremely effective, improving our understanding of the science involved, developing a common European view on the technical issues, maximising the Community added value, and thereby ensuring protection of the public and the environment in a field with important cross-border implications.

Over the years, the focus of the Euratom Framework Programmes in the field of radioactive waste management has shifted from fundamental research on basic phenomena in the early days during the 1980s, to more applied R&D in the later programmes. Throughout this period, important Community support has been provided to the research efforts in Member States in all areas of radioactive waste management, in particular geological disposal.

Late last year the European Commission launched the 7th Euratom Framework Programme. This was unanimously adopted by all European Union Member States. Management of radioactive waste remains a key thematic priority. This includes both "partitioning and transmutation", as well as continued research on the ultimate disposal of high-level and long-lived waste in geological rock formations. The programme clearly stresses the importance of "implementation-oriented" R&D, which includes research in underground research laboratories in the host rock environment, the demonstration of the actual engineering systems to be employed in disposal operations, and a harmonised approach to assessing performance and safety assessment of the disposal system for eventual licence applications to the regulatory authorities. As with previous Euratom programmes, there is a considerable "leverage" effect via the shared-cost nature of the support.

During the sixth Euratom Framework Programme, 2002 – 2006, some 90 million euros was committed to research on radioactive waste, of which half went on projects in the field of geological disposal. Many of the projects are still in progress. In particular, a small number of large "integrated projects" were launched covering the four principal fields of research:

- Firstly, there is the study of the so-called "near-field" – in other words the waste itself, the canister in which it is placed and the interaction with the repository environment.
- Secondly, the "far-field" – which includes the behaviour of radionuclides in the host rock and geosphere.
- Thirdly, the development and demonstration of the repository design and engineering systems.
- Fourthly, the area of performance and safety assessment methodologies requiring a more holistic approach that feeds off the results of research on individual processes.

The first of these projects will end this year. The others will finish over the next year or two. All of them are redefining the state of the art in their respective areas, and the Commission believes that this will enable the geological disposal community to push forward confidently towards eventual implementation of actual disposal systems in those countries where the socio-political climate is favourable. The integrating nature of these projects is also helping to fundamentally restructure the way research is being conducted in this field in Europe.

Looking further into the past, a total of 63 million euros were devoted to geological disposal over the 4th and 5th Framework Programmes. A significant part of this funding went on large-scale demonstration experiments carried out in underground research laboratories, for example heating experiments mimicking the effect of high-level waste canisters on the host rock.. These demonstrations had to run for many years. Preparation and decommissioning of the apparatus also took years. The construction of the underground research laboratories themselves takes even longer and can face the same delays and opposition as an actual waste disposal facility. This underlines the unavoidable long-term nature of research in geological disposal and the need for continuity in the funding support – something that has been provided by the Community programme. ... If we want to get the science right we must take the time to do it properly!

This advancement in science depends on a close interplay between theory, experiment, demonstration and reproducibility of results. Throughout this process there is an important principle of peer review, expert analysis and interpretation. In a complex multi-disciplinary field it is crucial to allow this scientific consensus time to become established. In geological disposal this process has resulted in widespread agreement within the scientific community regarding not only the feasibility of long-term confinement of radioactive waste in deep and stable rock formations, but also the fact that it is the only safe option. Significantly, this scientific community extends beyond those directly involved in the research effort itself. Many national geological societies and other academic scientific bodies have also published favourable opinion papers.

Of all the issues raised in this scientific debate, one stands out as the most intractable. How can we be assured of safety in the very long-term? Here it is important to appreciate the

limitations of science – research can never provide absolute certainty, nor demonstrate that risks are zero. However, research does allow us to understand and model the processes involved. For example, the study of analogues, both natural and man-made, allows an understanding of similar processes that have occurred in the past. The best known example is the natural nuclear reactor discovered at the Oklo uranium mine in Gabon.

Two billion years, conditions were right for the uranium deposits in this region to sustain a nuclear chain reaction. This produced several tonnes of fission products, the same found in today's high-level radioactive waste. Crucially, all these heavy metals and fission products have remained well fixed in the bedrock over the intervening millions of years, providing considerable assurance of the retardation properties of the geosphere. There are many other examples of analogues. For instance, the Cigar Lake uranium deposit in Canada, the durability of the cement used in the construction of Hadrian's Wall in the UK, or the well preserved nails discovered at a Roman legionary fortress in Scotland. Many of these analogues have been studied as part of the Euratom programme, and each gives an additional piece of information on how a particular element of the disposal system will evolve over time. Analogues can also be very effective in communicating the issues to a non-technical public.

Significant quantities of high-level radioactive waste already exist in interim surface storage, and it is inconceivable that these accumulations remain in this situation indefinitely. Sooner or later, society must implement a permanent long-term management solution that respects high levels of safety and adequately protects the public and the environment both now and in the future. The scientific consensus is that geological disposal is the only option capable of fulfilling these requirements, and most national waste management strategies now recognise this fact. These strategies must also recognise that it is the responsibility of the present generation to implement this solution, since we have benefited from the electricity produced by today's nuclear power plants.

However, to implement this option requires both political will and public acceptance, certainly in regions surrounding potential disposal sites. In this process, science must provide a neutral frame of reference in which to present technical issues. The research conducted

must be beyond reproach. It must be thorough, detailed and capable of supporting robust arguments. Throughout the Euratom programmes, these have been the guiding principles.

In today's world, the issue of governance has become increasingly important in all sectors faced with the construction of controversial facilities. In radioactive waste, these issues are especially difficult and demand a high degree of transparency, constructive dialogue, trust and respect by all parties. Within the 6th Framework Programme, Euratom has also committed 8 million euros of funding for research projects in the social sciences on these issues of governance and public acceptance. This has enabled a better understanding of broader stakeholder concerns, facilitating dialogue and the decision-making process.

Other areas of support with the Euratom programme include more strategic projects looking at the transfer of technology between larger and smaller waste management agencies, and whether countries could share waste management facilities rather than each having to construct the full range of installations. This is particularly important for Member States with small nuclear programmes, or with unfavourable geology. The Euratom programme also provides support to basic actinide science, which is important not only for research on geological disposal, but also in "partitioning and transmutation" and the fuel cycle in general.

Even though socio-political issues are now the main reasons for delays in implementation in most countries, questions of a technical nature still remain to be answered, and an integrated European research effort is the best guarantee that these can be addressed both effectively and efficiently. This effort should be clearly focussed on the key identified outstanding issues and solidly based on the wealth of accumulated scientific knowledge, to which must be added the results of on-going research in the 6th Framework Programme. The best people to drive this process forward are the national waste management agencies, since they are ultimately responsible for the implementation of disposal options in the respective Member States. The Technical Safety Organisations and major research institutes are also key players, and provide additional expertise ensuring that research and the interpretation of the results are robust and reflect the state of the art.

Last month in Brussels saw the launch of the "Sustainable Nuclear Energy Technology Platform". This was a pivotal moment in R&D in the nuclear sector in Europe, bringing together a broad range of stakeholders in the nuclear research and industrial sectors around a common vision for future research in the field of nuclear installation safety and advanced nuclear technology. The event was a big success, and later this month the governing structure of this Technology Platform will be established and the stakeholders can begin defining the all-important "Strategic Research Agenda" and "Deployment Strategy". This Technology Platform is particularly important in the context of the current debate on security of energy supply and climate change.

The scope of the Technology Platform also includes the nuclear fuel cycle, but with the notable exception of geological disposal. The reason for this exclusion is quite clear. The national radioactive waste management agencies, in order to maintain a high level of trust and credibility in their dealings with other stakeholders and especially the general public in the vicinity of potential disposal sites, must remain independent of any initiatives linked to the development of nuclear technology. Nonetheless, we recognise the importance also of establishing a similar "Technology Platform" approach to the European research effort in the specific field of geological disposal. Not only will this enhance integration of all research players around a shared vision of geological disposal, it will also enable a much more effective and targeted use of Euratom funding. A study being funded under the 6th Framework Programme will report back later this year on this issue. We hope this will enable the second Technology Platform to be launched next year.

With such a structure in place, and in view of the progress being made in general across the sector, the Euratom Programme will continue to provide invaluable support to national programmes in their endeavours to implement safe, timely and cost-effective geological facilities for the disposal of high-level radioactive waste.

Finally, I would just like to mention that on 20th to 23rd October 2008, the European Commission will be hosting in Luxembourg the next Euradwaste conference. This will be an opportunity to present the full range of results from the on-going Community research effort in the broad area of radioactive waste management, and to take stock of latest

achievements, in particular of the large integrated projects of the 6th Framework Programme. As in the past, the first day of the conference will be devoted to Community policy and strategy in the area of radioactive waste management. I would like to extend an invitation to all present today to attend this event.

Thank you