

World Nuclear Association Annual Symposium  
7-9 September 2005 - London

## **Nuclear Safety – Our Industry’s Shared Responsibility**

Lucas Mampaey

Good morning. It is an honour for me to represent the World Association of Nuclear Operators before this distinguished audience.

Over the past several years, the worldwide nuclear industry has achieved an impressive record of performance. Many things have contributed to this improvement, but I believe it is due — in a very significant way — to unprecedented openness and sharing. And gatherings such as this thirtieth Annual Symposium of the World Nuclear Association help further the dialogue.

On the 26<sup>th</sup> of April next year we mark the 20th anniversary of the Chernobyl accident that shattered any illusions that nuclear power is not an international responsibility.

Chernobyl was both an end and a beginning. The accident sent shockwaves through the industry and marked the end of the old ways – the ways of isolation. It began a process of international cooperation and led directly to the birth of WANO – the World Association of Nuclear Operators – in 1989. I will return to this vital event later.

My aim today is to convey to you two key messages:

As we move into the 21st century, nuclear energy has a key role to play, both today and for our world’s future.

More than ever our industry has to work together worldwide in WANO to continue to improve the safety performance of our nuclear power plants.

So, let me start on a positive note: nuclear energy’s bright future.

We see today that in many parts of the world existing nuclear power plants are good business: they operate well with low stable operating costs and with uranium available in sufficient abundance from geopolitically stable sources.

Building new nuclear plants was a problem in countries where electricity markets were being liberalised: nuclear construction projects are of course characterised

by high investment costs, long construction lead times and long payback periods, all of which does not match very well with market price uncertainties. But we see now that building new nuclear plants is becoming a viable option. New construction and development is being seen in Asia: Japan, China, Korea, India, and also in Russia and the Ukraine. Even in Europe we are seeing new nuclear projects taking shape in Finland and in France, while in the US consortia are being set up to work together with the DOE to get new construction projects on track.

But the true nuclear renaissance lies at another level: our world’s future!

The numbers speak for themselves. The International Atomic Energy Agency has stated that, even by its most conservative estimates, there will be 427 gigawatts of global nuclear capacity in 2020. This is a rise of more than sixteen percent compared to today’s total of 367 gigawatts.

There is a combination of reasons behind this rosy outlook. The OECD predicts a 60% increase in world primary energy demand by 2030. Renewables cannot cope with this and fusion is too far away. The position of nuclear energy, particularly over the longer term, is strengthened by the climate change issue. This has given nuclear power’s advantage of low greenhouse gas emissions a tangible benefit.

All of this may sound very positive, but there is an important caveat, that has to do with the public acceptance of nuclear power, and that we must take into consideration very carefully.

Our industry has not yet completely recovered from Chernobyl. The proof is seen in the fact that many nuclear moratoria and phase out laws are in effect in countries around the world. On the other hand, we also see that in many parts of the world, public opinion is changing favourably. Informed members of the public and policy makers are becoming convinced of the inherent advantages of nuclear power.

One single accident, however, can tip this balance again, for many years: our actual businesses would be severely harmed, new construction and development projects would be suspended, and the nuclear renaissance could be postponed for 15 to 20 years, with all the consequences this would entail...

This brings me back to Chernobyl. For many members of the public that one, simple word sums up all their worst fears about the perceived dangers of nuclear energy.

The effect of Chernobyl on public opinion, and hence on the industry as a whole, was disastrous. Public opinion turned completely against nuclear energy. In the economic context, after Chernobyl, nuclear power stations became big old dinosaurs, threatened internally by ever-increasing operating and back fitting costs driven by ever-growing regulatory requirements, and threatened externally by Combined Cycle Gas Turbine technology and abundant cheap natural gas.

I certainly remember Chernobyl vividly. I was working at the time as Head of Systems Design at Tractebel in Belgium on the design of the fifth reactor at Doel nuclear power station. We had the systems descriptions and most of the equipment specifications ready, the safety analysis report was well advanced, and

all of a sudden the project was cancelled after the Belgian government declared a moratorium on new construction: it was a very frustrating experience for me personally.

If this dark cloud had a silver lining, it was the creation of WANO.

In 1989, the worldwide nuclear industry gathered together and created WANO as a way to prevent a similar accident from ever happening again, with the following mission statement:

‘To maximise the safety and reliability of the operation of nuclear power plants by exchanging information and encouraging communication, comparison and emulation amongst its members.’

The founders of WANO recognised that an adequate level of nuclear safety can only be attained by striving for excellence, not by just satisfying norms and inspecting. It was understood that nuclear safety must be an integral part of the business, not just an add-on: a nuclear utility cannot sustain its business without a high emphasis on nuclear safety. It was also recognised that one plant, or even one utility – however large – cannot strive for excellence on its own.

Every plant in the world needs to be in contact with the international nuclear community to get a clear vision of what excellence in nuclear safety looks like. An individual plant cannot develop this in isolation. A utility or a group of utilities with a large fleet could be tempted to think that they have a sufficiently large experience base on their own, but they would be bound to the error of ‘group think’ and would undoubtedly have developed cultural blind spots.

There is no alternative: we have to work together – Chernobyl has taught us that the cost of isolation is enormous.

From the beginning, the operator of every nuclear electricity generating station in the world has been a member of WANO. This unanimity is the key the WANO’s strength and its value.

Our membership today consists of 198 stations, with a total of 446 units, in more than 30 countries.

WANO is organised around four regional centres – in Atlanta, Moscow, Paris and Tokyo – with an overall coordinating centre in London.

Much has been realised in the 16 years since WANO was founded, but its role is as important today as it was back then. Our industry is facing many important challenges, and WANO’s mission is more relevant than ever.

We see important events that continue to happen: Fuel assemblies were severely damaged during cleaning at Paks nuclear power station in Hungary; boric acid at Davis-Besse in the US seriously damaged the reactor vessel head; a hydrogen explosion in a pipe connected to the reactor cooling system at Brunsbüttel in Germany left the reactor isolated from the containment atmosphere by only one checkvalve.

In Asia, tens of new reactors will come on line in the near future. China alone will commission two reactors each year in the coming decades. This is very good news in itself, but it poses an enormous human resources challenge: plant crews are very young and will have to grow to management positions very fast, without much time to accumulate operational experience.

When we look through our “WANO window” of operational experience exchange and peer review results at our four regions we see a spread that is too large between the best and worst performers. Plants have to learn from each other.

We also see that some of our plants do not participate very much in WANO activities and WANO does not know much about these plants: maybe they had a peer review more than 6 years ago, they do not report many events, they do not attend many workshops or seminars, they hardly ever send peers to participate on missions: they have essentially cut themselves off from the rest of the world, which is a potential threat to the rest of our industry.

When we look at our worldwide performance indicators, we see that the rapid improvements shown in the decade after Chernobyl have started to level off. Plant availability has been relatively flat since 2000, unplanned unavailability has increased and the number of unplanned automatic reactor trips is stagnating. Although these trends are not alarming in themselves, they show clearly that the battle is never won.

We are right to be pleased with the great progress we have made as an industry since Chernobyl. But we cannot afford to rest on our laurels.

In view of all this, what can nuclear leaders do? They can first of all ensure that their own fleet’s nuclear safety programme is very strong, and secondly they should ensure that others worldwide have strong nuclear safety programmes. You can be the safest plant in the world, but if something bad happens even half a world away you will read it tomorrow in your newspapers and even stronger: you will see it tonight on your television screen – and the public and the politicians in your region will have seen it too. We truly are hostages of each other!

All of this points strongly to my next point. Together – both WANO and the wider industry – we have to go one step further from where we are today.

It is not sufficient simply to run programmes like the peer review or the operational experience exchange programmes effectively. We must actively work together with plants and utilities in order to do three things.

We must absolutely prevent a new serious nuclear accident: this would harm our businesses and new construction projects harshly and postpone the nuclear renaissance for a very long period of time.

We must also prevent those important, costly precursor events. They are characterised by long shutdowns. They bring with them not only huge direct costs and production losses, but also important costs in terms of loss of goodwill with the public and government authorities.

We can only prevent these types of events if we keep sufficient margins worldwide: strong guardrails, that will keep us far from the edge of the cliff.

All nuclear power plants in the world have a collective responsibility to install and maintain these guardrails.

They can do that by reporting relevant events to their colleagues worldwide through WANO. We too often see during peer reviews interesting events that were reported internally and acted upon in stations, but that were not shared with the rest of the industry. A common sense criterion for reporting events is: “if this event had occurred somewhere else, would you have liked to hear about it?” Too many plants ignore this simple rule.

You can install another strong guardrail by submitting yourself to periodic WANO peer reviews, to have regularly a state-of-the-art diagnosis of where you stand in nuclear safety matters.

Peer reviews often identify areas for improvement that are difficult for a plant to handle: they can lie for instance in a plant’s or even a utility’s cultural blind spot. It is therefore important that close contact between the plant and the WANO regional centre is maintained between peer reviews. WANO can bring together small teams of experts in various fields to support plants to resolve all kinds of safety issues. This is a service that has been increasingly successful over the past few years.

From these examples it should be clear that we only can install and maintain strong guardrails if senior executives in our nuclear industry worldwide understand the nuclear business risk and their collective responsibility for the future of our industry.

Now, today, many new senior executives in our industry have little or no nuclear background.

Many new CEOs didn't grow up in this industry. They come from a different business environment — a very challenging, competitive one — and now they're operating nuclear plants. While financially astute, they don't share the ‘emotional operating experience’ of the founders of WANO.

It is vital for the CEOs of the world’s nuclear companies to be involved with WANO. CEOs play a key role in establishing the safety culture of their organisations. One of the most powerful tools for ensuring safe operation is for CEOs to clearly communicate their personal expectations about nuclear safety. A CEO who is visibly committed to WANO sends a clear, unambiguous message about the importance of nuclear safety.

WANO is absolutely necessary:

to alleviate public fear by helping plants achieve excellent performance

and

to address the fact that we all are vulnerable to the mishaps of others.

And finally: WANO is not an institution that exists outside the nuclear industry. You are WANO. We are WANO. WANO is the sum of its members. And WANO is all about safety.