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Nuclear Plants and WANO: A Partnership for Safety

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Over the past several years, the worldwide nuclear industry has compiled an increasingly impressive record of performance. Many factors have contributed, but this improvement is due, in a very significant way, to unprecedented cooperation and information exchange. Forums like the Uranium Institute's Annual Symposium help further this dialogue and cooperation.

The World Association of Nuclear Operators (WANO) was formed in 1989 as a worldwide nuclear utility response to the accident at Chernobyl. Its mission is 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. Every organisation that operates a commercial nuclear power plant anywhere in the world is a member of WANO. We presently have 115 members in 34 countries.

WANO operates through four regional centres – Atlanta, Moscow, Paris, and Tokyo – with a coordinating centre in London. Each centre has a director and a small, experienced staff, many of whom are seconded from member organisations. Members belong to the regional centre of their choice. There is a governing board for each regional centre, and a central or worldwide governing board that provides overall coordination and direction. The central governing board is made up of an elected chairman – the position I currently hold – and representatives from each regional centre governing board.

This rather complex organisational structure has stood the test of time, and its success is a testament to the foresight of WANO's founders. Through this regional structure we have been able to transcend cultural and language barriers. As we move into WANO's second decade, I am pleased to report that the capability of the regional centres is steadily improving. Cooperation between the four centres is excellent, having become a matter of daily routine.

When WANO was formed more than a decade ago, few would have predicted the extensive level of communication and sharing that takes place today among nuclear utilities. At that time, many operators had essentially no contact with plants in other regions of the world, and often little meaningful exchange with plants in their own region.

One of WANO's first objectives was for nuclear staff from every plant in the former Soviet Union to visit plants in the West – and for personnel from the West to visit all the plants in the former Soviet Union. To the surprise of many observers, this objective was accomplished in the first two years of WANO's existence.

A great deal of ongoing plant to plant cooperation – often called twinning – grew out of these original exchange visits. Now we take these kinds of cross-plant visits and communication for granted, but it is important to remember

that less than a decade ago, this kind of interaction was rare for plants in many parts of the world.

Performance Improvement

The extensive interaction among nuclear utilities over the past decade has been a catalyst for significant improvement in performance. When plant personnel see something at another plant that is working better than at home, there is a strong human tendency to want to borrow, copy or otherwise emulate that better practice.

WANO compiles performance indicators which illustrate worldwide performance trends. Data is collected, trended and disseminated for 10 key parameters that provide insight into plant performance, and these are in use at every plant in the world (430 units) to set goals and to monitor progress.

I will highlight trends in four of the key performance indicators over the last decade:

- *Unit capability factor.* Figure 1 shows the median value, which increased from 77.2% in 1990 to 84.5% in 1999. Four hundred and twenty-two units reported unit capability factor data for 1999.
- *Unplanned automatic scrams per 7000 hours critical.* Figure 2 shows that the industry is averaging well under one scram per year per unit worldwide. In fact, 304 units had no scrams in 1999.
- *Collective radiation exposure.* Figure 3 shows the median value for this indicator. There is quite an impressive downward trend in worldwide radiation exposure.
- *Industrial safety accident rate.* The current performance level (Figure 4) establishes the nuclear industry as one of the safest industries in the world in terms of worker safety.

All of us in the nuclear industry can all take pride in the progress shown by these graphs. In my view, this record of success is due to openness and sharing among plants much more than any specific actions taken by WANO. Indeed, although WANO acts as a facilitator and a catalyst, it is those at the nuclear plants who have done the work.

WANO Peer Reviews

I will turn now to what I regard as one of the key WANO programmes, the voluntary peer review programme. Originally, peer reviews were not part of WANO's remit. In 1991, WANO began developing plans for a series of pilot peer reviews, and at the Tokyo Biennial General Meeting in 1993 WANO members formally adopted peer reviews as a WANO programme. Since the first pilot peer review at the Paks nuclear power plant in Hungary in 1992, 125 peer reviews have been conducted.

In July 2000, the WANO Governing Board approved a new set of long-term goals and a vision for WANO. A key goal relates to the peer review programme, and provides for establishing a periodic programme for peer reviews such that each nuclear station hosts an outside review of its performance at least every three years and a WANO peer review at least every six years. These goals are now widely accepted by WANO members.

It is significant that WANO has been able to conduct peer reviews in India. In January 2000, WANO conducted a peer review at the Narora nuclear power plant, which was the second WANO peer review in India. No governmental organisations have been allowed access to review the performance of Indian nuclear stations, so these WANO peer reviews were the first outside look at their performance.

Challenges for the Future

I will now turn to a discussion of the challenges the nuclear industry must surmount to continue its strong record of progress. As we consider the current environment, many of my WANO colleagues and I are worried about the effect of competition on the way nuclear plant personnel think and about how they may act under pressure.

The accident at Three Mile Island was 21 years ago, and the accident at Chernobyl was 14 years ago. It is an unfortunate reality that the memories of these accidents fade over time. This can so easily lead to complacency.

As competition grows and spreads to virtually every country where WANO members operate, the pressure operators are under to keep their plants running becomes intense. The risk of a non-conservative decision or series of decisions represents one of the greatest challenges to safety at our nuclear power plants.

In my view, one of the most powerful tools executives have for ensuring safe, conservative decision-making is clear communication of their expectations and their organisation's expectations about nuclear safety. This is true for utility executives as well as the heads of other nuclear industry organisations.

I would like to recall a key point from the speech I gave at the WANO Tenth Anniversary Biennial General Meeting in Victoria, British Columbia, Canada, in September 1999. In my presentation I gave three examples of where the wrong message from the top set the stage for accidents.

I then noted: "An organisation is strongly influenced by and is very responsive to perceived expectations from the top. And these perceived expectations can and often do have a profound impact on the behaviour of individuals in the organisation." I asked each executive: "...when you go home, step back and examine your own situation. And then to make sure you are communicating the right expectations on safety, and that you are committed to do so on a recurring basis."

Later we asked them to consider providing WANO some feedback on their organisation's approach to this matter. We have received many excellent responses to this request, and it is clear that most utilities are striving to ensure that people at the working level receive and perceive the right messages about safety.

At some utilities, the boards of directors have passed resolutions to underscore their commitment. I will reproduce an excerpt from one: "...this board recognises that competition is increasing and that pressures to achieve high levels of electricity generation are great; ...this board reconfirms that nuclear safety is of paramount importance to the company's success and shall have the absolute highest priority in the company's nuclear programme; ...the officers

of the company are hereby directed to convey the above resolutions to all nuclear programme employees in an appropriate manner.”

Such a statement from the board of directors, signed by the chairman and disseminated to operators and technicians, can go a long way toward communicating the right expectations. We are all aware of the value of clearly stating expectations, but it is good to rethink how we approach it from time to time. It must be an ongoing process if we are to overcome the temptations to take shortcuts under the pressures of cost and competition.

The Future for WANO

WANO began its second decade with its very successful Tenth Anniversary Biennial General Meeting in September 1999. A comprehensive internal review of all aspects of WANO's business was completed towards the end of its first decade, and WANO has just recently completed its responses to the internal review.

The WANO organisational structure has proven to be sound and effective. As intended by the founders, this unique organisational structure of four regional centres and a coordinating centre does allow WANO to successfully transcend cultural and language barriers. Policies that govern WANO business have been developed and refined and are now widely accepted. The WANO Charter has stood the test of time.

The organisation's programmes have been improved over the years and are now widely accepted by the membership. As I mentioned earlier, a progressive set of long-term goals has been approved by the WANO Governing Board, which provide a clear vision for WANO's future. Meanwhile, the performance of WANO members' plants has steadily improved over the past decade, as shown by trends in the performance indicators and other measures.

At this point in its history, WANO faces several challenges, including:

- Encouraging and achieving a greater level of participation by some members, especially the very small number of members whose participation is minimal.
- Continuing to improve the resources for some regional centres.
- Continuing to improve the quality of WANO programmes.

As 2000 draws to a close, the WANO Governing Board has set aside a special meeting in November to examine the need for changes to WANO programmes and policies, and membership requirements. This will be an “open” look at the needs of the worldwide nuclear industry for the future, for WANO's second decade. I encourage nuclear industry participants to offer comments and suggestions to me or to WANO regional centres as we consider the future needs of WANO members and, perhaps, potential new members.

I do not believe it is an overstatement to say that through improved plant performance a key cornerstone is being put in place for the foundation of a renaissance in nuclear power. But this foundation requires absolutely that nuclear plants remain accident free. That requires constant vigilance and a relentless commitment, not just to maintain the high standards the industry has today, but to make continuous improvements.

Figure 1. WANO performance indicators: unit capability factor, 1990–99, with 422 units reporting (median values).

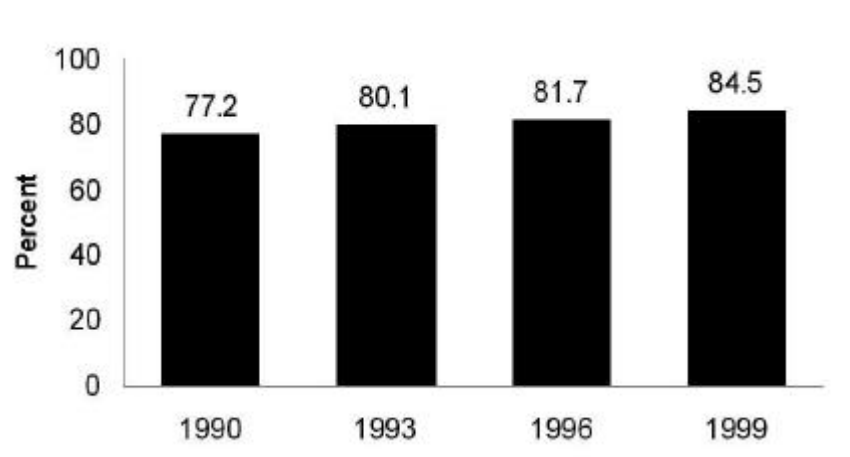


Figure 2. WANO performance indicators: unplanned automatic scrams per 7000 hours critical, 1990–99 (average values).

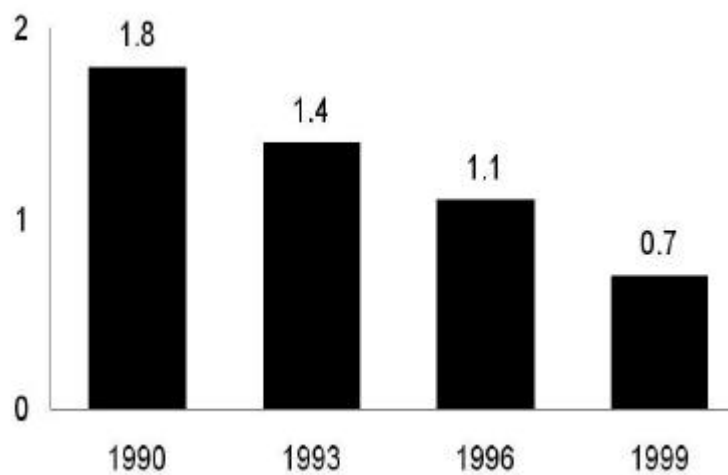


Figure 3 WANO performance indicators: collective radiation exposure per nuclear power unit, 1990-99 (median values).

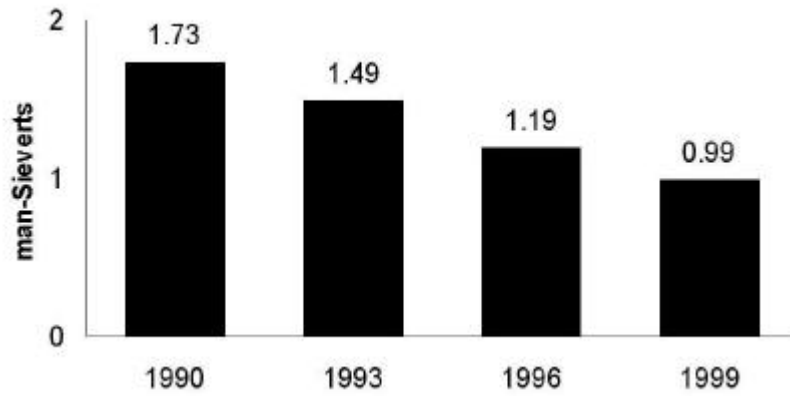


Figure 4. WANO performance indicators: industrial safety accident rate, 1990–99.

