

UNITED STATES

INPO's impact in the USA

*Born of TMI,
the Institute of Nuclear Power Operations
promotes excellence*

by Zack T. Pate

In the aftermath of the Three Mile Island (TMI) accident in 1979, the nuclear industry conducted significant detailed reviews to develop improved operation. In the Kemeny Commission report, the Commission recognized "that merely meeting the requirements of the government regulation does not guarantee safety; therefore, the industry must also set and police its own standards of excellence to ensure the effective management and safe operation of nuclear power plants".*

The establishment in 1979 of the Institute of Nuclear Power Operations (INPO) to promote the highest levels of safety and reliability — to promote excellence — in the operation of nuclear electric generating plants clearly demonstrated to the US public and to the world that the US nuclear industry was not satisfied with meeting minimum standards.

In the years since TMI, INPO has grown from a small organization staffed by a handful of loanees to a substantial organization of over 400 dedicated professionals who have extensive experience in nuclear power plant operations.

Programmes and reviews

INPO programmes have matured, are now well-defined, and are continuously being refined in order to support INPO's mission. Programmes are constantly examined for effectiveness by a number of mechanisms — the INPO staff, the industry review groups, the advisory council, and the Board of Directors. We also obtain feedback from the end-users at the plants and the corporate offices of our member utilities.

This formal feedback, as well as INPO's experience, has shaped and refined Institute programmes in many areas. One example is emergency preparedness. Until late 1984, INPO's emphasis in the emergency preparedness area was on programme review. It was determined that the industry would benefit more if actual performance was observed. So INPO began a formal assessment of utility emergency preparedness by observing nuclear plant emergency drills and exercises.

Industry, government support

INPO support continues to be strong from both the industry and the US Nuclear Regulatory Commission (NRC). The industry supports INPO in many ways. Some examples are the involvement of senior reactor operators and executive advisers on plant evaluations; peer evaluators on visits of accreditation

teams for training programmes; advisers on special-assistance visits; and observers on evaluations and reviews of emergency preparedness drills.

The NRC also has co-operated with and supported INPO in many areas. One example is the NRC support of the industry's accreditation programme by the deferral of rulemaking in the area of training. The NRC nominates one individual to serve on the National Nuclear Accrediting Board.

INPO also gains extensive experience from its staff of loaned personnel, both from domestic US utilities and from the 13 countries that have major nuclear programmes and participate in INPO. A small group of utility loanees first staffed INPO in 1979. Through the years, loanees have provided INPO with current industry experience in many technical areas. Today loanees from members and participants, as well as international liaison engineers, make up almost 20% of the Institute's technical work force. These professionals are among the best and brightest in the industry. They are proven, experienced managers from nuclear plants and related organizations in the US and abroad.

Technical programme overview

INPO's initial programmes were established in four major areas: evaluations, training and accreditation, sharing of operating experience information, and assistance. It is interesting to look at the wisdom of the INPO founders and at that of the Kemeny Commission as to how important and critical those four major programmes have been to improvements in the industry.

The evaluation process has been an important activity for INPO since its early days. Each INPO member utility receives regular, performance-based evaluations of nuclear plant operations about every 15 months. As of 24 June, 231 had been done, with 25 of these in 1986. Each utility's corporate support of its nuclear plants also is evaluated periodically, and as of 24 June there have been 64 total corporate evaluation and assistance visits.



A scene from one of INPO's emergency preparedness evaluations at a US utility. (Credit: INPO)

Mr Pate is President and Chief Executive Officer of the Institute of Nuclear Power Operations in Atlanta, Georgia, USA.

* The Kemeny Commission was appointed by the US President to investigate and report on the TMI accident.

Both individual utilities and the entire nuclear industry can benefit from each other's operational experience. This fact guides INPO's programmes on events analysis and information exchange. Through them, the nuclear utility industry has a system for collecting, reviewing, and analysing plant operating experience and for sharing and acting on the lessons learned. These programmes enable each of INPO's member utilities to benefit from the combined experience of the entire nuclear utility industry.

INPO conducts a wide-ranging assistance effort for its members and participants, with an emphasis on special assistance visits — those visits made at the request of a member or participant. These special assistance visits, which allow INPO teams to help utilities deal with specific technical concerns or problems, span all areas within INPO's scope. In 1985 alone, the Institute conducted 102 special assistance visits, on request, in such areas as training, radiological protection, chemistry, emergency preparedness, operations, operating experience analysis, technical support, and construction.

Training, accreditation

The training of operators, technicians, and craftworkers can mean the difference between adequate and superior plant performance. The INPO accreditation programme was established in order to elevate the quality of nuclear power plant training programmes. High quality, performance-based training programmes are essential to the industry's quest for excellence.

In the USA, the 61 nuclear plants that loaded fuel before 1985 have committed to have 610 training programmes ready for accreditation by the end of 1986. Progress towards achievement of that goal has been excellent. As of 24 June, 373 training programmes are ready for accreditation and the remainder are expected to be ready by the end of 1986. INPO has received accreditation self-evaluation reports covering 459 programmes. A total of 190 training programmes have been accredited at 41 sites.

Academy for training

To make even further improvements in the overall training of nuclear power plant personnel, the industry established in September 1985 the National Academy for Nuclear Training. Industrywide training and accreditation activities are brought together, strengthened, and appropriately standardized by the Academy.

The Academy consists of three major elements: (1) individual utility training facilities and staffs; (2) INPO training and accreditation activities; and (3) activities of the independent National Nuclear Accrediting Board. INPO administers the Academy and is responsible for its day-to-day operations. Each nuclear utility is a member of the Academy and has assigned a senior executive as its representative.

When a nuclear plant's first training programme is accredited, the plant becomes a branch of the Academy and is eligible to issue certificates to graduates of accredited programmes. When the utility achieves accreditation of all 10 training programmes for all of its operating nuclear plants, it becomes a full member of the Academy. To date, there are three full members of the Academy and 34 branches.

Quality training programmes, coupled with the recognition the Academy affords, enhance the professionalism and pride in nuclear station personnel and lead to improved plant performance.

Operating experience

To help bolster each plant's operating experience review programme, INPO is conducting in-depth reviews at 11 plants along with regular plant evaluations. These special evaluations began in April and will be complete in October. At the end of that effort, we plan to further strengthen exchange of operating experience information among utilities — an area that is already a landmark success for the industry.

Performance indicators

Since early 1981, INPO has been working to develop a performance indicator programme to support utility efforts in achieving high level performance. INPO has been collecting data in over 40 areas related to power plant safety and reliability.

It is widely recognized that nuclear plants with high equivalent availability, small numbers of forced outages, few unplanned scrams, few significant events, and low personnel radiation exposures are generally well-managed overall. Such plants are more reliable and can be expected to have higher margins of safety. Thus, the performance indicator programme and its use by utilities in setting long-range goals directly support improvements in plant safety and reliability. In recognition of this, in 1985 INPO — together with three outside *ad hoc* review groups — looked closely at how performance indicators could be used to foster long-term improvement.

Ultimately, 10 overall indicators were agreed upon as the best measures of nuclear power plant performance. Utilities are now tracking their performance in these 10 areas and establishing long-term goals in most of them. Each utility began reporting data to INPO on a quarterly basis during 1985. INPO analyses these data and provides periodic reports to its members on progress and trends. We also share these industrywide data with the NRC.

Examples of improved performance

As an example of performance improvements, the number of significant events that have occurred per unit is showing a reduction from 1.64 in 1981 to 0.53 in 1985.

A similar decrease is shown in the number of unplanned automatic scrams occurring in nuclear power plants from 1980-85. With effort by each individual utility, they have been reduced from six in 1980 to 3.5 in 1984.

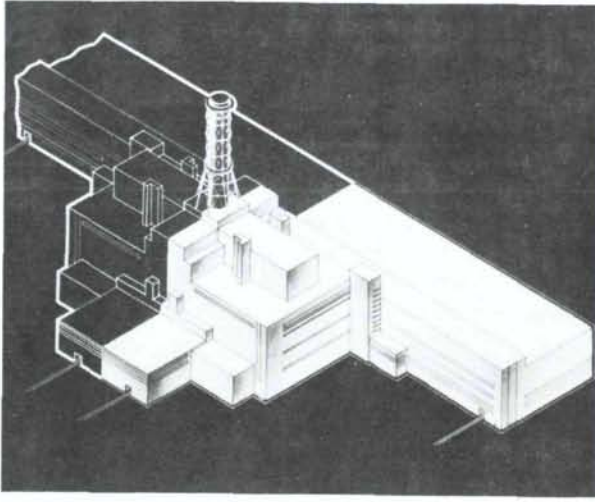
The industry's equivalent availability also has improved, showing a rise from 59.9% in 1980 to 60.7% in 1985.

Collective radiation exposure per boiling-water reactor (BWR) unit decreased from 1230 man-rem per unit year in 1980 to 896 in 1985, a decrease of 27%. For pressurized-water reactors (PWRs), this figure dropped from 597 in 1980 to 394 in 1985.

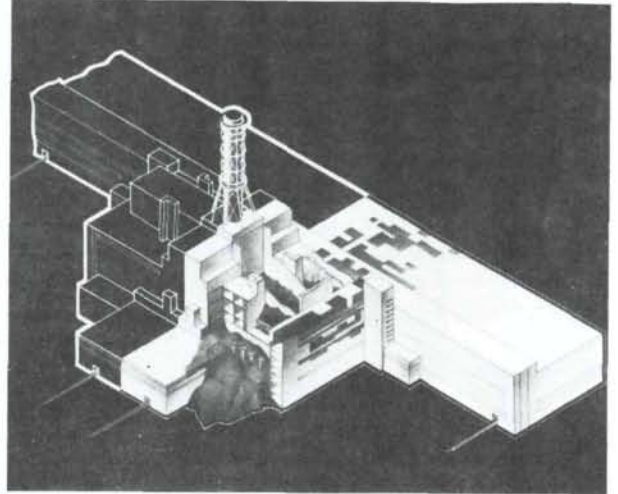
Low-level, solid radioactive waste shipped per BWR unit dropped from 1113 cubic yards per unit year in 1980 to 799 in 1985, a 28% decrease. For PWRs, this figure dropped from 586 in 1980 to 324 in 1985, a 45% decrease.

The "lost-time" accident rate for worker injuries involving days out of work (for every 200 000 man-hours worked) has decreased from 2.14 in 1980 to 0.64 in 1985, making the US nuclear power plant one of the safest industrial facilities in which any person can work.

At INPO, we see demonstrable evidence that the industry is making improvements overall.



These schematics show general views of the Chernobyl units 3 and 4 before (left) and after the accident.



The closing plenary on 29 August of the post-accident review meeting at IAEA headquarters.

