

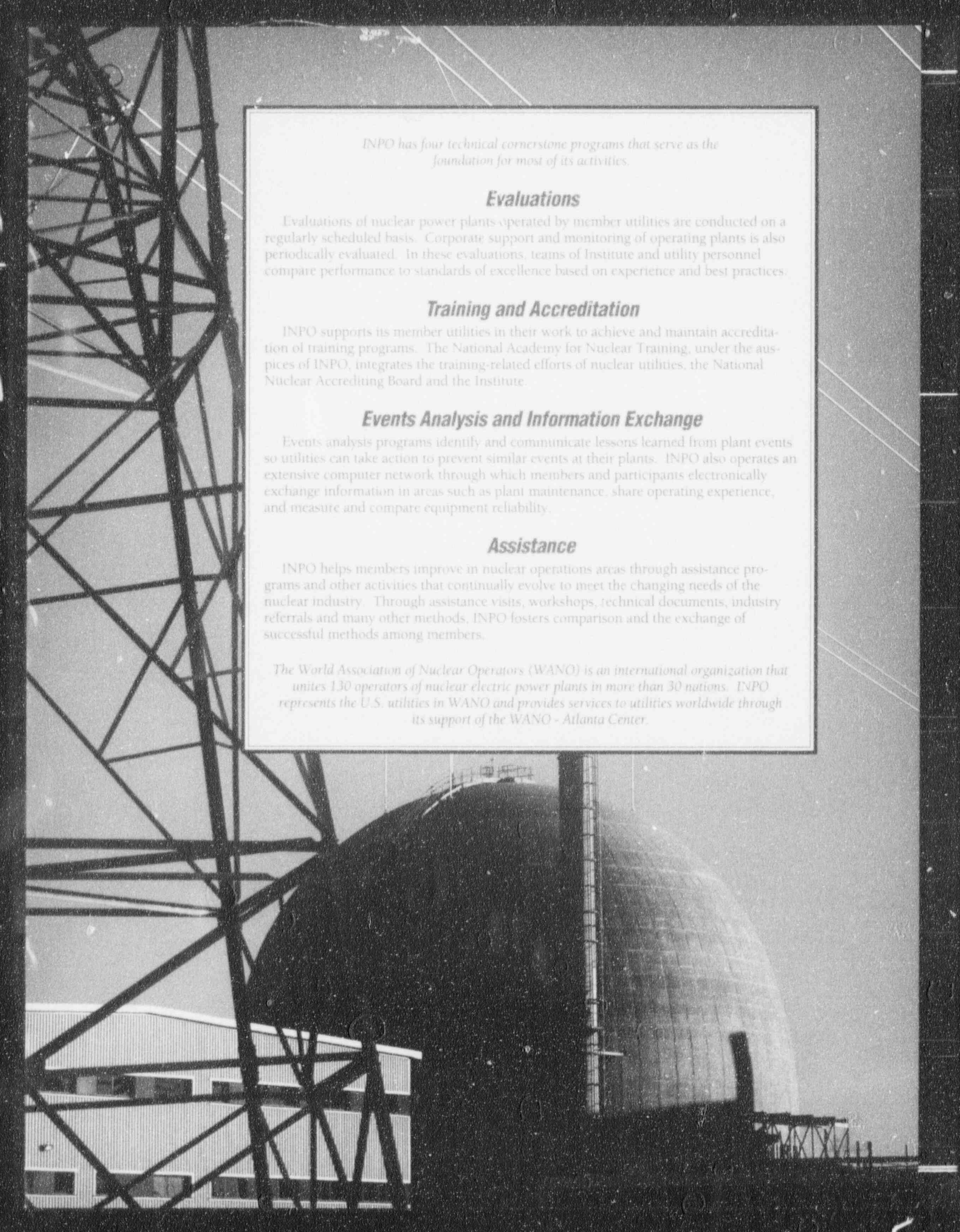
INPO

Institute of
Nuclear Power
Operations

Annual Report 1992

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INPO has four technical cornerstone programs that serve as the foundation for most of its activities.

Evaluations

Evaluations of nuclear power plants operated by member utilities are conducted on a regularly scheduled basis. Corporate support and monitoring of operating plants is also periodically evaluated. In these evaluations, teams of Institute and utility personnel compare performance to standards of excellence based on experience and best practices.

Training and Accreditation

INPO supports its member utilities in their work to achieve and maintain accreditation of training programs. The National Academy for Nuclear Training, under the auspices of INPO, integrates the training-related efforts of nuclear utilities, the National Nuclear Accrediting Board and the Institute.

Events Analysis and Information Exchange

Events analysis programs identify and communicate lessons learned from plant events so utilities can take action to prevent similar events at their plants. INPO also operates an extensive computer network through which members and participants electronically exchange information in areas such as plant maintenance, share operating experience, and measure and compare equipment reliability.

Assistance

INPO helps members improve in nuclear operations areas through assistance programs and other activities that continually evolve to meet the changing needs of the nuclear industry. Through assistance visits, workshops, technical documents, industry referrals and many other methods, INPO fosters comparison and the exchange of successful methods among members.

The World Association of Nuclear Operators (WANO) is an international organization that unites 130 operators of nuclear electric power plants in more than 30 nations. INPO represents the U.S. utilities in WANO and provides services to utilities worldwide through its support of the WANO - Atlanta Center.

PRESIDENT AND CHAIRMAN'S JOINT MESSAGE



Zack T. Pate
President and Chief Executive Officer



E. James Ferland
Chairman of the Board

Ours is an industry with a track record of impressive accomplishments. At our 1993 annual CEO Conference, we recognized 23 plants — the highest number ever — for excellent performance. When managers of those plants gathered to be honored, they symbolized the collective success our industry has achieved in recent years.

Today our industry faces the challenge of improving economic performance while sustaining and further enhancing high levels of safety and reliability. This year INPO revised its *Institutional Plan* to reflect input from an extensive review of our mission and role in the economic area. While the revised *Institutional Plan* reaffirms our fundamental — and unchanged — mission of promoting excellence in safety and reliability, it also emphasizes INPO's role as a resource in assisting members with efficiency and the effective use of resources.

Recent industry reviews of our evaluation, assistance, and training and accreditation cornerstone programs confirmed the

effectiveness of these programs in contributing to improved plant performance over the last decade. Additionally, these reviews provided valuable feedback that is being used to further align INPO resources to meet member needs. You'll read about many of these initiatives throughout this annual report.

These actions also support the industry-wide *Strategic Plan for Improved Economic Performance*, which makes extensive use of INPO's many avenues for information sharing and assistance.

The sharing of information now extends beyond U.S. borders into nuclear power plants around the globe. At its Biennial General Meeting in April, the World Association of Nuclear Operators (WANO) formally adopted a voluntary peer review program — a program that closely resembles the INPO program used to evaluate U.S. nuclear power plants. The fact that more than 20 utilities have volunteered for WANO peer reviews in 1994 and beyond indicates the value our international counterparts place on learning from each other.

Information exchange among the world's nuclear operators is also taking place through international technical exchange visits, including a series of INPO-coordinated visits in the training area between utilities in the U.S. and France. Additionally, the Institute expanded its efforts to

improve the operational safety of Soviet-designed nuclear power plants by assisting in the Department of Energy's U.S./Russian Operational Safety Initiative and the Lisbon Nuclear Safety Initiative.

Experience has shown that, when utilities exchange information on best practices, industry progress is achieved. In 1993, industry progress, as measured by the plant performance indicator program, continued to be impressive.

For the first time, the U.S. industry surpassed the 1995 goals for unplanned capability loss factor — which improved from 6.8 percent to 4.3 percent this year — as well as the unplanned automatic scram rate — which had a median value of only 0.9 scrams per 7,000 hours critical. The industry also began efforts this year to determine the performance indicator definitions and approach to goal setting that would best serve the industry's needs after 1995. A complete update on the plant performance indicators is included in this annual report.

While our industry strives for continued improvements, as well as increased cost effectiveness, another emerging issue — management and leadership development — requires our attention because it too will impact our future.

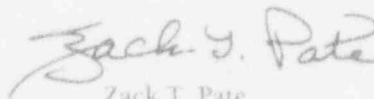
Thus, INPO will increase its focus in assisting members with their management

development efforts. This important issue will be emphasized during plant evaluations and in National Academy for Nuclear Training seminars and courses. In addition, the Institute's loaned employee and reverse loaned employee programs will continue to serve as avenues to develop the nuclear work force.

Striving for even higher levels of safety and reliability, achieving more economic and efficient operations, and developing effective managers and leaders are the tough challenges the industry and INPO face — and the tough challenges we will successfully meet in the 1990s.



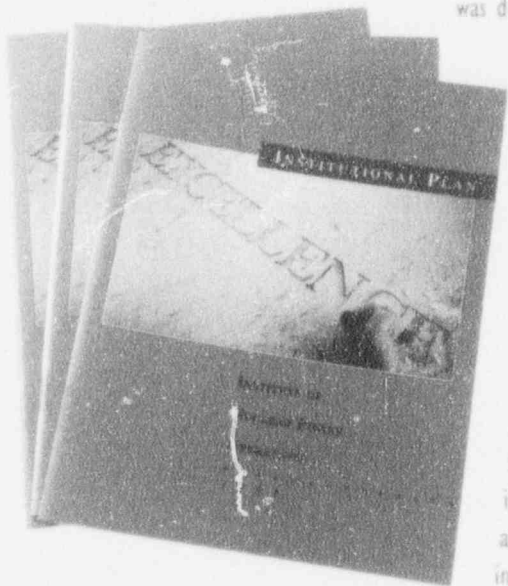
E. James Ferland
Chairman of the Board



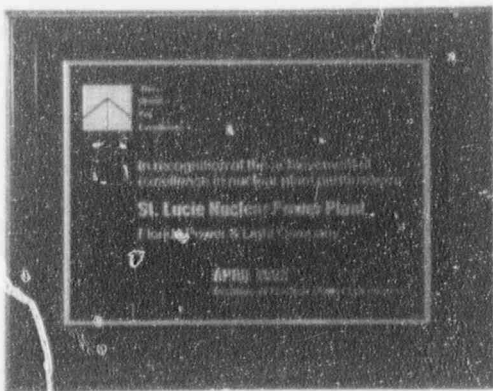
Zack T. Pate
President and
Chief Executive Officer

HIGHLIGHTS

A revised *Institutional Plan for the Institute of Nuclear Power Operations* was distributed to the industry. The revision upholds and reaffirms INPO's fundamental mission of promoting excellence in safety and reliability. The plan also recognizes the Institute's increasing role in assisting members in improving the economic performance of nuclear plants.



The industry honored 23 plants for excellent performance — the highest number ever — at INPO's 14th annual CEO Conference. More than 170 utility executives, including 28 international participants, attended the conference, which focused on continuing the industry's quest for excellence.



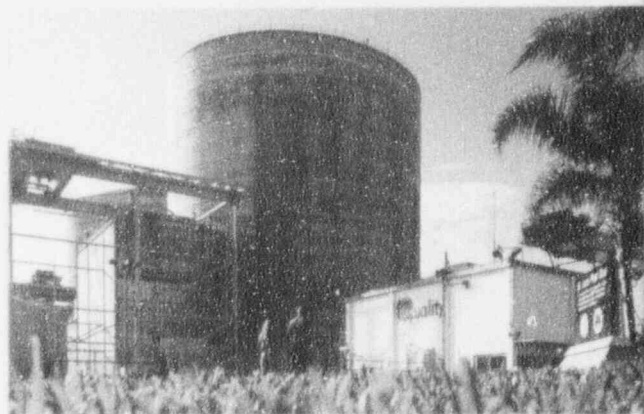
The Institute established a Plant Performance Division to support two industrywide strategic plans. In response to the industry's request that INPO be involved in effective use of resources — a building block in the *Strategic Plan for Improved Economic Performance* — Institute personnel and utility peers visited five domestic and three international sites to identify and collect cost-effective practices to share with member utilities.

Evaluation teams conducted 47 operating plant evaluations in 1993. This brings to 595 the number conducted since the first evaluation in 1980.



Also, the Advanced Light Water Reactor (ALWR) Standardization Project completed five milestones in the *Strategic Plan for Building New Nuclear Power Plants*, including writing a set of guiding principles and key objectives for the operation and support of families of standardized nuclear plants.

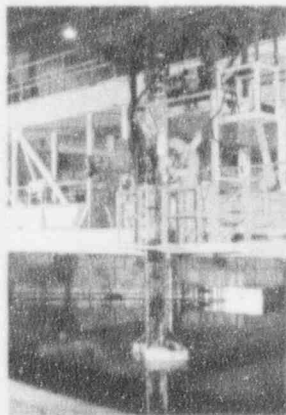
Member utilities continued to contribute to the effectiveness of plant evaluations. Evaluation teams included 50 senior reactor operator (SRO) peers, 53 maintenance peers and 45 peers in other areas. An additional 49 SRO peers and 37 host utility SRO peers participated on simulator observation teams.



Teams of INPO personnel, peers from other utilities and host utility peers conducted four review visits to support the evaluation process and provide plant management with insights on progress achieved in addressing previously identified performance weaknesses.

Thirteen outage review visits were conducted to assist utilities in maintaining plant safety while shut down, ensuring equipment reliability and availability, and increasing overall outage effectiveness.

The National Academy for Nuclear Training fully implemented an enhanced accreditation process. The process resulted in greater efficiency and improved use of utility training resources.

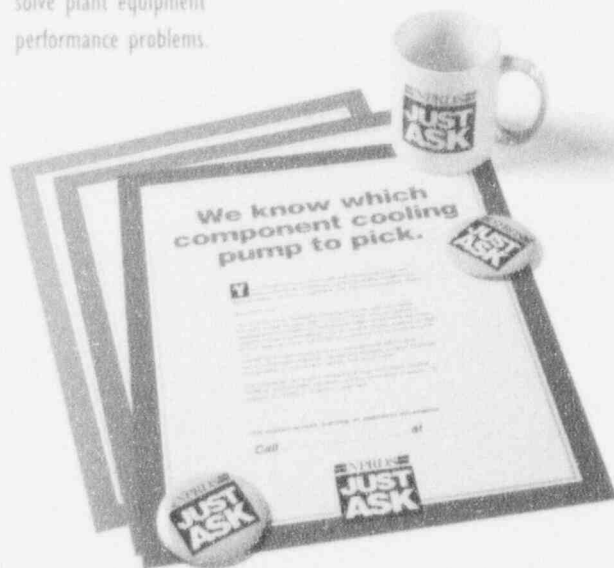


Accreditation renewal continued to progress on schedule as the National Nuclear Accrediting Board renewed accreditation for 201 programs at 30 plants; 99 industry peers participated in 30 accreditation teams.

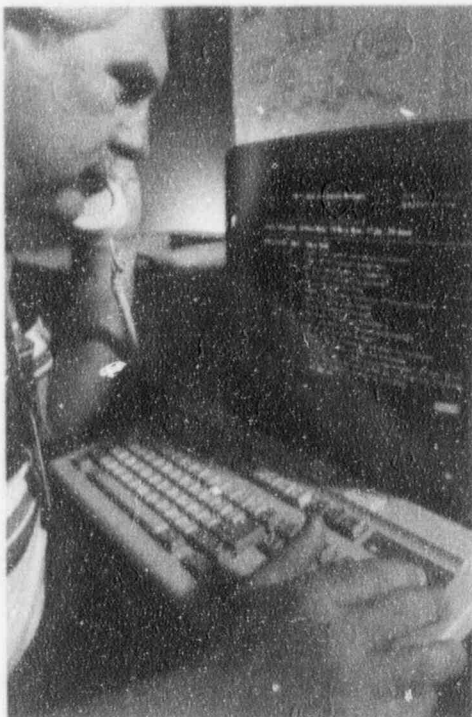
INPO issued 20 new or revised technical documents to assist members in their efforts to achieve excellence in operation, maintenance, training and support of nuclear plants. Fifty-eight SEE-IN (Significant Event Evaluation and Information Network) documents were also distributed, including a Significant Operating Experience Report entitled *Diagnosis and Mitigation of Reactor Coolant System Leakage Including Steam Generator Tube Rupture*. This report described important improvements that can be made in the preparation, procedural guidance and training for steam generator tube ruptures to improve operational response and minimize radiological impact.



Member utilities searched the Nuclear Plant Reliability Data System for equipment information more than 108,000 times in 1993 to identify and help solve plant equipment performance problems.

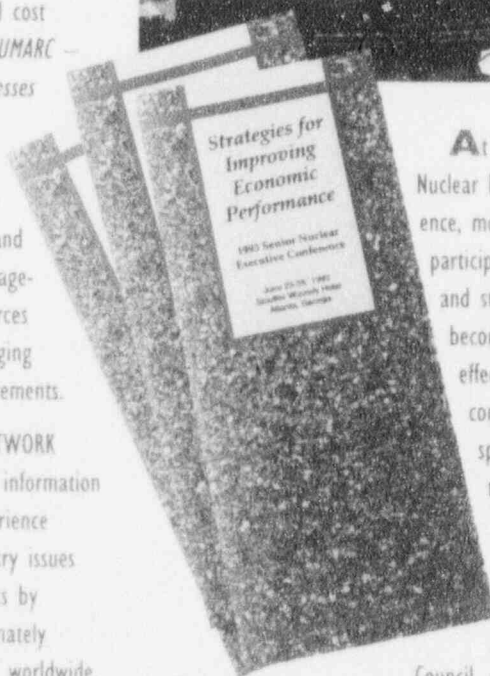
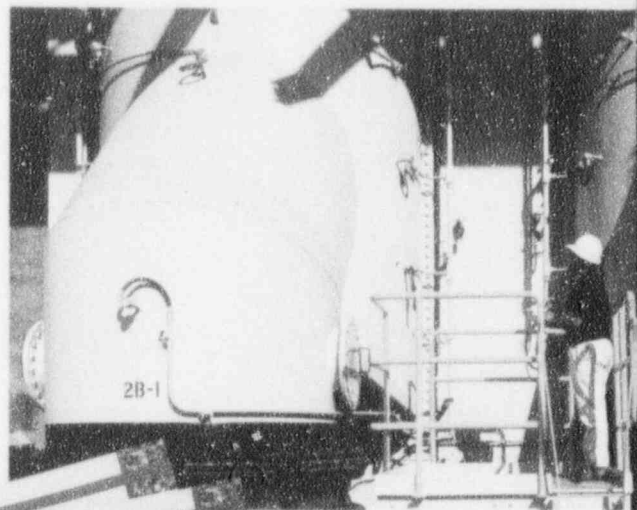


HIGHLIGHTS



NUCLEAR NETWORK[®] added three new topics. *Probabilistic Safety Assessment Applications* facilitates the exchange of probabilistic safety analysis information. *Strategic Plan — Improved Productivity and Cost Effectiveness* allows utilities to share information on improving plant operational cost effectiveness. *NUMARC — Regulatory Processes and Interactions* facilitates information exchange among utilities and the Nuclear Management and Resources Council on emerging regulatory requirements.

In 1993, NETWORK users exchanged information and shared experience about key industry issues and recent events by sending approximately 14,200 messages worldwide.

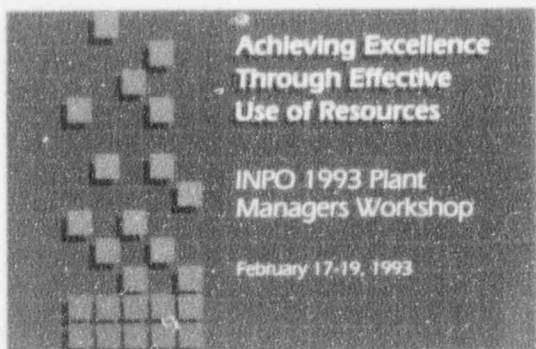


At a three-day Senior Nuclear Executive Conference, more than 175 participants shared ideas and strategies about becoming more cost-effective. The conference, jointly sponsored by INPO, the Electric Power Research Institute and the Nuclear Management and Resources

Council, also focused on the utility portions of the *Strategic Plan for Improved Economic Performance*.

The Institute conducted 18 Human Performance Enhancement System (HPES) training sessions to assist utilities in identifying and correcting the root causes of human performance problems. Currently, 43 member utilities and seven international participants use the HPES methodology.





The 1993 Plant Managers Workshop focused on *Achieving Excellence Through Effective Use of Resources*; 110 utility personnel, 11 international participants and four liaison engineers participated.

A workshop entitled *Managing the Radiological Environment — Achieving Exposure Reduction* was held on three occasions, with a total of 166 radiological protection managers attending.

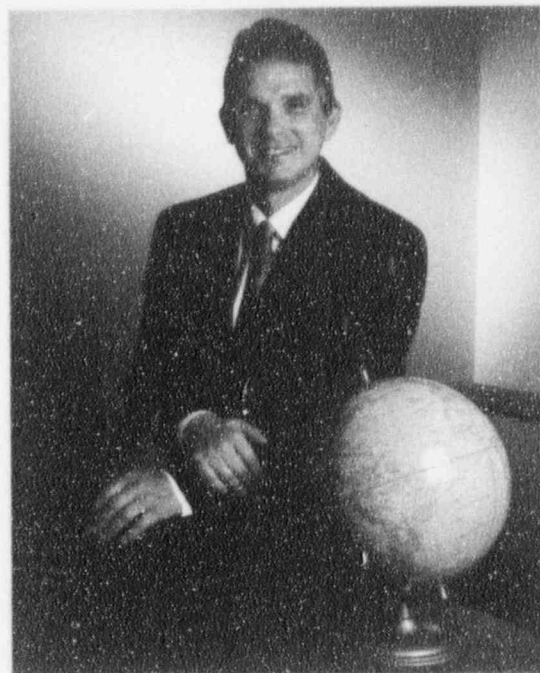
A seminar to enhance operating experience programs at international utilities attracted 11 attendees from nine countries.

Keys for Outage Success: People and Processes Working Together was the theme of the Maintenance and Outage Managers Workshop, which drew 215 attendees.

The World Association of Nuclear Operators (WANO) met its goal set in 1991 to perform eight pilot peer reviews by the end of 1993. Peers from 23 nations participated in these reviews, which are patterned after INPO's plant evaluations. Peer reviews were conducted at nuclear plants in Brazil, Japan, Russia and Taiwan in 1993.

Twenty-seven engineers from 10 countries outside the United States served as liaison engineers at INPO, thus advancing the worldwide exchange of resources and information.

In 1993, 47 INPO personnel and 18 peers from 12 U.S. utilities participated in 18 technical exchange visits to identify strengths that can be shared worldwide, as well as opportunities for improvement at the host utility. These visits involved 16 international plants as well as four international corporate offices and training facilities.



At year's end, 19 INPO employees were on reverse loaned assignments at 11 U.S. utilities, seven employees were on international assignments and one employee was at the Electric Power Research Institute.



Keys for Outage Success: People and Processes Working Together
1993 Maintenance and Outage Managers Workshop

HIGHLIGHTS — 700 GALLERIA

The Institute's new corporate office at 700 Galleria provides a permanent work location for the INPO staff to support the activities of the Institute, the National Academy for Nuclear Training and the Atlanta Center of the World Association of Nuclear Operators (WANO). The National Academy and the WANO — Atlanta Center share space in the building.

The building was specially designed to meet INPO's needs in serving the nuclear industry. Training and conference facilities on the second floor accommodate the increasing number of professional development courses INPO and the National Academy offer the industry.

State-of-the-art electronic equipment, including a Computer Training Center, helps serve the information management system needs of the industry and INPO staff.

Special sequestering areas provide a working environment for plant evaluation and accreditation teams to prepare for evaluations and accreditation visits.

In addition to reflecting the pride the Institute takes in helping the industry excel, the building symbolizes the worldwide nuclear industry's commitment to excellence — a commitment made possible because thousands of nuclear professionals have taken personal responsibility for ensuring a safe and reliable technology.

In recognition of this commitment, a building dedication ceremony was held on June 5, 1993. INPO's first president, Dennis Wilkinson, was honored at the ceremony, which included the unveiling of a portrait of Mr. Wilkinson. This portrait now hangs in the conference center area on the second floor.

A building dedication plaque was unveiled by INPO Chairman E. James Ferland. Also installed on the second floor, the dedication plaque has this inscription:

*This building is dedicated to the
professional men and women
who operate nuclear electric
generating stations throughout
the world.*





1993 OVERVIEW

Throughout 1993, the Institute focused its resources in a number of key areas, including enhancing the evaluation program, providing assistance to better meet member needs, offering professional development opportunities to nuclear personnel and encouraging information sharing among international and domestic utilities.

These efforts demonstrate INPO's ongoing commitment to help the nuclear industry achieve excellence in operational safety and reliability.

Evaluation Enhancements

Since INPO conducted the industry's first performance-based plant evaluation at Dresden Station in 1980, its fundamental mission has remained the same: to promote the highest levels of safety and reliability — to promote excellence — in the operation of nuclear electric generating plants.

In 1992, a team of industry executives performed a comprehensive review of the evaluation program and associated areas. The industry team had several findings and recommended improvements. The team also confirmed the effectiveness of the evaluation program in helping to achieve industry progress over the past decade.

To keep pace with this impressive progress and in support of the industry's review, INPO focused intensely on the team's recommendations as well as on other changes to its evaluation methods. These changes are aimed at ensuring that evaluations continue to add value and result in accurate plant performance assessments for members.

Cross-functional approach

During the year, evaluation team members formed small cross-functional groups within the overall team to determine the causes of problems in areas that extend beyond organizational boundaries such as equipment performance, human performance and work management. A key to the success of this approach has been its ability to test the interfaces within a plant's organization — including teamwork and communication.

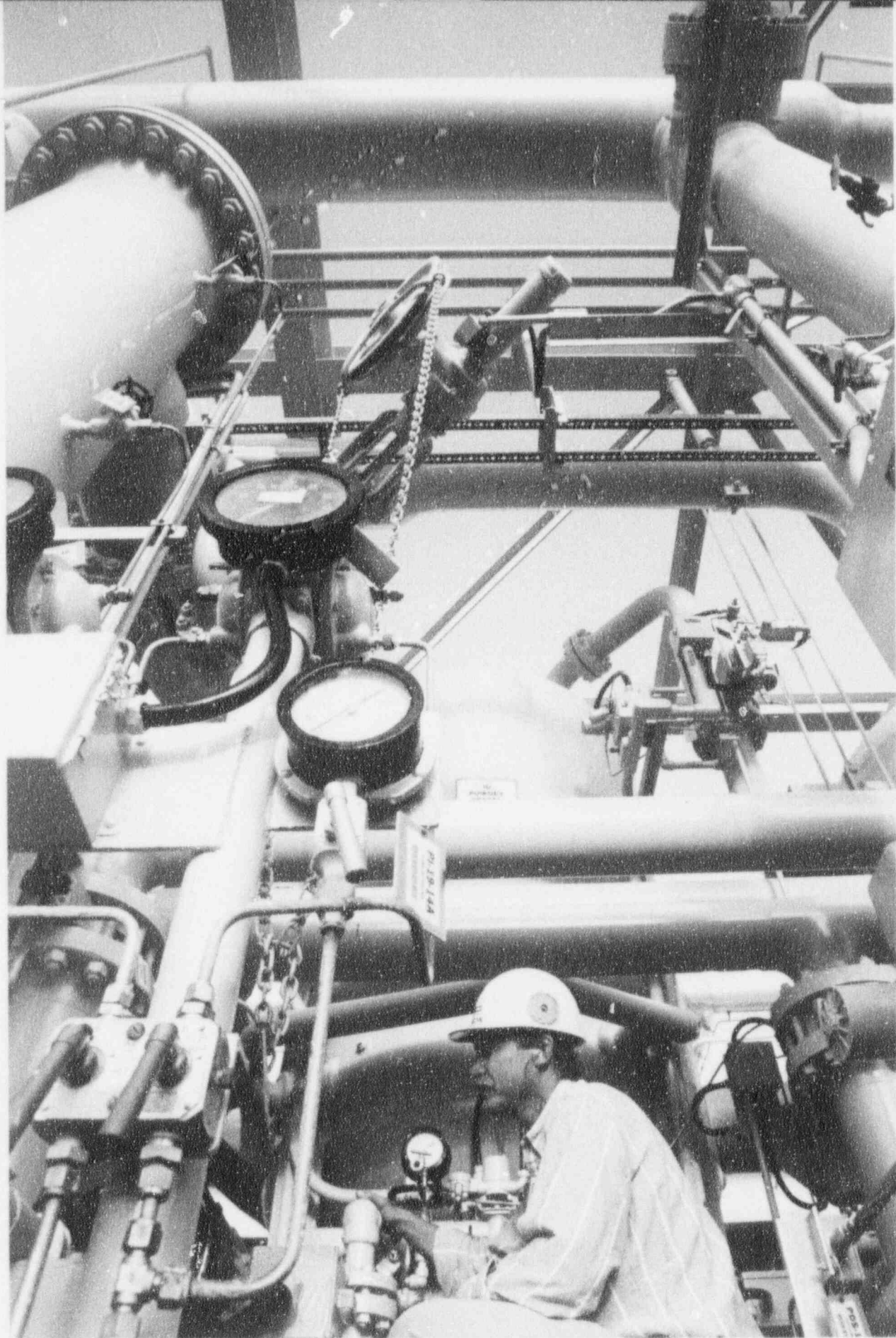
Report content

To give a more balanced picture of plant performance, evaluation reports were expanded to document more fully a plant's strengths as well as all worthwhile improvement opportunities. Teams also placed increased emphasis on citing industry or plant-specific experience as a basis to identify potential performance deficiencies. This allowed a team to provide a plant with early warning of shortfalls that could lead to more significant performance problems.

More enhancements

Other enhancements included a closer look at efficiency and the effective use of resources during evaluations. Senior INPO representatives also were assigned to certain plants to support continued improvement efforts at these utilities and to communicate more frequently with utility management about plant performance.

Additional steps piloted in 1993 ensure that the evaluation program continues to meet member needs. Host utility peers often served as evaluation team members, thus providing unique insight into a variety of areas at the station and helping teams be more efficient in reviewing activities.



Robert Dawson, maintenance superintendent at St. Lucie, was one of more than 200 utility peers who served on INPO plant evaluation teams in 1993. Here, he performs a monthly inspection of the condensate polisher at St. Lucie to ensure that the equipment is working properly.

1993 OVERVIEW

During evaluations, INPO teams look at all aspects of plant operations, including utility training programs. Here, Susquehanna technical instructor Ralph Dailey (right) explains control rod drive maintenance to mechanic George Webster.



Teams also performed detailed plant system reviews to examine the condition and performance of key systems and components. In addition, during simulator observations, teams began to observe scenarios involving abnormal operating procedures to better evaluate the operating crews' diagnostic skills.

Assistance

The station's chemistry manager, an INPO chemistry evaluator and a senior chemistry specialist from a member utility discuss the plant's revised procedures and implementation of chemical controls. At another site, a team of Institute representatives and industry peers helps personnel identify the root causes of human error. And, at a third plant, an INPO assistance team provides suggestions on improving the predictive maintenance program.

These examples illustrate the different types of assistance visits INPO conducts in response to utility requests. In 1993, the Institute sent 201 teams on assistance visits—the highest number ever performed in one year. The visits covered such diverse areas as use of abnormal operating procedures, chemistry, use of the Nuclear Plant Reliability Data System, cost effectiveness, human performance, engineering support, simulator training effectiveness, maintenance work planning and training in conducting accreditation self-evaluations.

Designed to give utilities a fresh perspective from a team of objective and

knowledgeable peers, assistance visits are conducted independent of INPO's evaluation programs. Team members observe plant activities, study the area of concern and interact with all levels of plant staff to help the utility gain insights and develop solutions based on industry experience.

Team size and the length of an assistance visit are tailored to a plant's specific request and needs. The assistance visit may focus on a broad area such as improving radiation protection practices or on a more specific area such as improving the maintenance of a single, but important, power plant component.



INPO assistance visits may focus on a specific area such as proper maintenance of a plant component, or some other important aspect of overall nuclear plant operations. Here, mechanics at Susquehanna align a condensate pump.

A Valuable Exchange

The Institute's loaned employee and reverse loaned employee programs assist the industry and INPO in sharing information and expertise. Both programs offer nuclear professionals a variety of challenging assignments that enhance the development of industry and Institute personnel.

Loaned employee program

Member utility personnel on loan to INPO, often for as long as two years, bring valuable utility and plant experience to Institute activities. Most loaned employees visit numerous plants during their INPO assignments and return to their parent companies with broader nuclear industry experience.

At the end of 1993, 46 loaned employees were working at the Institute, serving in a variety of positions — from evaluators and team managers to division director — in all of INPO's four cornerstone areas. Since the program began in 1979, more than 400 industry personnel have served as loaned employees.

Reverse loaned program

The reverse loaned employee program places INPO personnel in assignments at member utilities, typically for a one-year period. These employees assist utilities and plants in specific areas while gaining a fresh perspective of nuclear utility operations.

At the end of 1993, 27 INPO employees were on assignments at domestic sites, international utilities and industry associations in positions ranging from outage projects supervisor to vice president, nuclear engineering. Since the program started in 1984, INPO employees have served on 94 reverse loaned assignments.

On the following pages, you'll meet four participants in INPO's loaned employee and reverse loaned employee programs.

1993 OVERVIEW

This year, 188 utility peers made a major contribution to the success of the assistance visit program. Usually selected from plants that have experienced the same challenge as the requesting utility, peers bring up-to-date expertise to the team, thus broadening the team's perspective. Utilities providing peers also benefit because the peers gain valuable experience and insight into the operation of other plants.

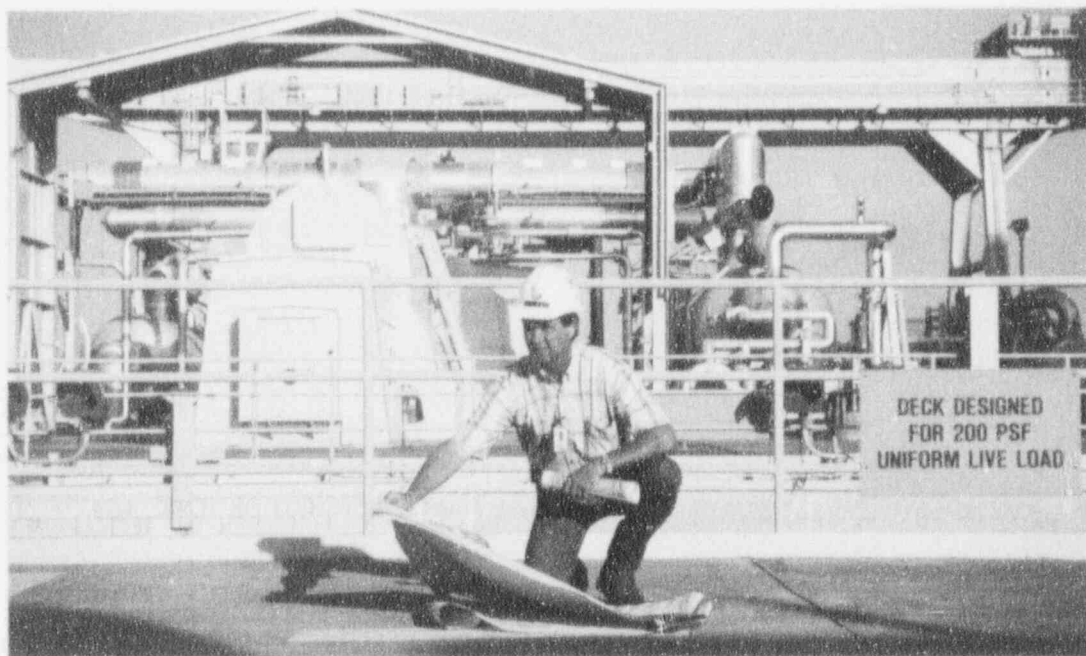
Other resources

Throughout the year, INPO also placed emphasis on assisting members in specific areas where efficiency and the effective use

of resources support safe and reliable operations. As part of this emphasis, a newly created Special Projects Department focused efforts on identifying and sharing with the industry efficient and cost-effective practices to help members meet the economic challenge.

Approximately 1,100 industry personnel exchanged new ideas and operating experiences at INPO-sponsored workshops and working meetings.

The Institute also conducted 11 work management assistance visits as part of an initiative to help members streamline work



Effective use of main turbine work planning has resulted in more efficient turbine outages at St. Lucie. Unit supervisor Ron Ball determines how turbine components will be organized on the turbine deck during the plant's upcoming outage.

processes to improve plant safety, reliability and cost by optimizing efficiency and reducing the backlog of work. Teams visited sites for approximately one week to review coordination of individual work functions and to provide suggestions for improving the integrated work management process. Host utility peers as well as peers from other utilities served extensively on these teams.

Professional Development

When the 10 managers collected their learning materials and left the Institute's Atlanta headquarters at the end of the day in March 1993, the industry reached another milestone. These managers had successfully completed the 25th offering of the National Academy for Nuclear Training's Senior Nuclear Plant Management Course.

This milestone demonstrates how the National Academy, operating under the auspices of INPO, continued this year to devote resources to the professional development of member utility personnel. During 1993, 40 participants graduated from four Senior Nuclear Plant Management Courses. Of the current U.S. plant managers, more than 60 percent are graduates of this course, which was first offered in 1986.

Throughout the year, participation in other offerings such as the Shift Supervisor Professional Development Seminar, the Control Room Teamwork Development Course and the Senior Nuclear Executive Seminar remained high.



Bob Querio began his loaned assignment to INPO in August 1993 after working for several years in nuclear oversight functions at Commonwealth Edison's corporate office. Querio served as manager of Byron Station for eight years and Braidwood Station for three.

At INPO, Querio is director of the recently created Plant Performance Division. This division includes the Special Projects Department, which supports utility efforts to be more cost effective, and the Advanced Light Water Reactor Standardization Project.

"I believe I offer INPO an everyday, practical awareness of the nuclear power plant business. This is a direct result of my years of experience working at a plant and thinking from a plant point of view.

"It's been challenging to organize and manage the business activities of a new INPO division that focuses on identifying good practices at today's plants and good practices that will be needed at future plants. In both cases, our goal is to look beyond past experience and create something new and better in the process."

1993 OVERVIEW

St. Lucie shift technical advisor Mike Snyder inspects the main feedwater block valve as part of the plant's performance monitoring efforts.

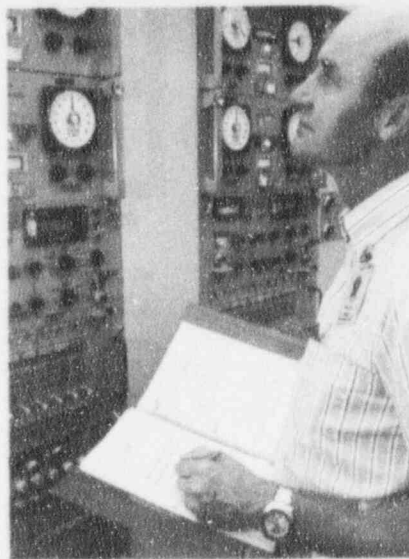


Courses and seminars included a new module — presented by an industry mentor — that addressed nuclear safety and cost effectiveness. In addition, the National Academy presented two new offerings — the Maintenance Supervisor Professional Development Seminar and the Reactor Technology Course for Utility Executives.

For maintenance supervisors

Eighteen participants attended two pilot sessions of the Maintenance Supervisor Professional Development Seminar.

The two-week seminar, which augments the National Academy's *Guidelines for Maintenance Supervisor Selection and Development*, seeks to enhance the skills and



Jim Kawa, an instrument and control lead supervisor at St. Lucie, monitors the plant's reactor protection system. He participated in one of two pilot Maintenance Supervisor Professional Development Seminars conducted in 1993.

knowledge of newly qualified, second-line maintenance supervisors in the management and supervisory aspects of their position.

Five seminars for maintenance supervisors are scheduled for 1994.

For senior utility executives

Ten industry executives participated in the pilot Reactor Technology Course for Utility Executives, jointly sponsored by the National Academy and the Department of Nuclear Engineering at the Massachusetts Institute of Technology (MIT).

Conducted on the MIT campus, the five-week course is designed for senior utility executives whose responsibilities include or are expected to be closely involved with nuclear electric generation. The course provides emphasis on the fundamentals of nuclear technology by focusing on the behavior of the reactor core and on critical safety functions.

This course will again be conducted in summer 1994 on the MIT campus.

Industry review

A team of industry executives recommended improvements to the Institute's training and accreditation activities, while confirming that the accreditation process continues to contribute to improved plant performance. This review team determined that INPO training activities could make better use of industry event data to assess the overall effectiveness of Institute training activities and the accreditation process.



Steve Quinn joined Consolidated Edison as technical support manager at Indian Point Station Unit No. 2 in 1984. In 1986, he became plant manager of the utility's fossil plant in downtown Manhattan, and in 1988, Quinn became plant manager of Indian Point 2.

Quinn started his loaned assignment to INPO in June 1993. Since then, he has qualified as a team manager. As a team manager, Quinn coordinates and directs INPO evaluation teams during plant evaluations.

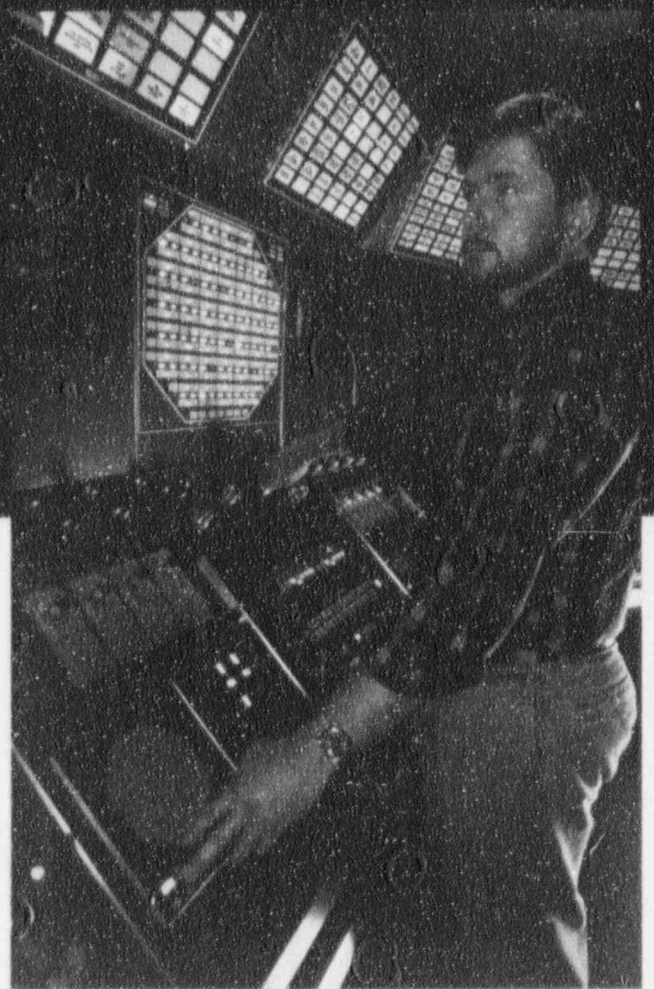
"As a result of my experience at Indian Point 2, I've walked in the shoes of many plant managers and have faced many of their same problems. What I bring to the Institute is the sense of 'having been there,' which I believe can help increase the credibility of INPO and its evaluations.

"At the same time, I hope to increase my understanding of the industry and the challenges ahead. Already, I've been exposed to a number of good ideas at other utilities that I hope to share with my colleagues at Indian Point 2."

1993 OVERVIEW



The year 1993 marked the 25th anniversary of the world's first full-scope nuclear plant control room simulator. Today, virtually every utility training center includes a state-of-the-art, computer-driven control room simulator that replicates the plant control room. (above) Simulator instructors at Susquehanna set up and monitor realistic control room scenarios. (right) Simulator instructor James Burke validates a scenario before operating crews participate in a training exercise.





Mike Flasch began his reverse loaned assignment in July 1993 at Washington Public Power Supply System, where he is director of engineering at WNP-2. Prior to this, he completed a reverse loaned assignment as manager of engineering at Duane Arnold Energy Center.

Flasch began working at INPO in 1984. His responsibilities have included serving as an assistant team manager, a corporate evaluator and a senior evaluator in engineering support. He also was assistant manager of the Operating Experience Applications Department.

"My reverse loaned assignments have helped to build upon my INPO and prior industry experience. While at INPO, I participated in more than 100 plant visits, so I've been exposed to lots of ways to get things done and ways not to get things done.

"It's personally rewarding to return to work in a utility environment. It reinforces the importance of teamwork and communication and the results that can be achieved when these concepts are implemented effectively."

1993 OVERVIEW

As a result, Institute training personnel are becoming more closely involved in events analysis activities. Accreditation and evaluation teams are also increasing the emphasis on training implementation and the results of training — worker performance on the job.

New tools

Using training resources more effectively received attention as part of Institute activities that support the industry's *Strategic Plan for Improved Economic Performance*.

In 1993, the National Academy distributed a new *Training Resources Catalog* to help members share training resources and develop training materials more efficiently. The catalog contains input from 41 utilities,

with more than 350 descriptions of training resources on subjects ranging from accident management to work practices.

The industry also received *Guidelines for General Employee Training*, which provides a standardized approach to industrywide general employee training. The document includes lesson plans and student training materials to help utilities develop a more consistent and efficient approach to general employee training.

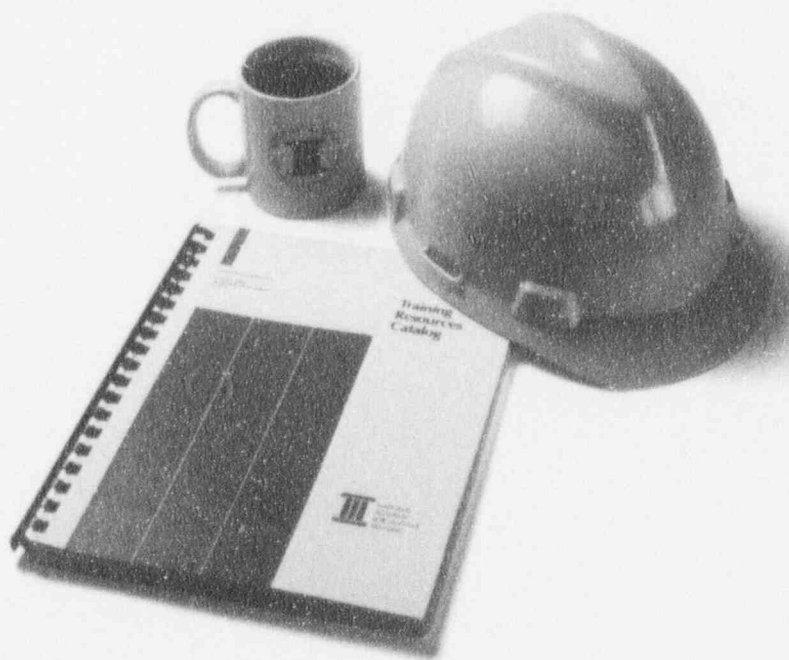
International Sharing

After returning from his first trip to an international utility, one assistant nuclear plant manager in the U.S. commented that the weeklong technical exchange visit went beyond his expectations.

Not only was this nuclear professional impressed with the international site's use of robotics to do inventory control, he also returned to his parent company with numerous ideas to share with his coworkers — ideas he thought could be implemented successfully at his plant.

This assistant plant manager served as an industry peer on one of INPO's 18 technical exchange visits conducted in 1993. These visits are part of the global exchange of information through the Institute's international participant program. International participants operate more than 220 nuclear reactors in 14 countries and offer a wealth of cumulative nuclear experience and achievement in the areas of safety, reliability and production.

In 1994, Eskom in South Africa will join INPO's international participant program.



Emphasis on strengths

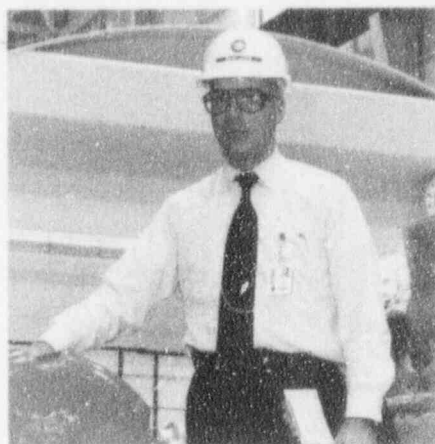
This year saw a greater emphasis on identifying international strengths during INPO technical exchange visits and peer reviews conducted by the World Association of Nuclear Operators and sharing this information with U.S. and international utilities.

Teams identified international strengths in areas as diverse as dose reduction using shutdown chemistry control, system engineer ownership, shutdown cooling contingencies, self-coverage for radiological protection, long-range outage planning and hands-on training for operators and maintenance workers.

Global communication

So domestic and international utilities benefit from the good practices of their global counterparts, thereby having another resource by which to improve plant performance, international strengths are now available to the industry under the *Good Practices* topic of NUCLEAR NETWORK®. NETWORK users have access to about 250 international strengths in 10 categories — chemistry, corporate support, engineering support, maintenance, operating experience, operations, organization and administration, outage management, radiological protection and training.

Throughout the year, the Institute staff shared international strengths with member utilities during plant evaluation and assistance visits. In addition, international speakers were featured at INPO workshops, and participants received a listing of international strengths related to that workshop's technical area.



Grant Lewis is manager of the Nuclear Production Support Services Division at American Electric Power Service Corporation. He started this reverse loaned assignment in January 1993. Previously, he had completed a two-year reverse loaned assignment in Electricité de France's Corporate Operations Department.

Lewis joined INPO in 1985 and has served as a team manager and a corporate evaluator. In addition, Lewis was assistant manager of the Organization and Administration Department as well as manager of the Chemistry Department.

"My current assignment is a rewarding opportunity to work as a senior corporate manager at a utility committed to excellence. Observing the best industry practices at more than 30 domestic plants and at 30 plants in four other countries has allowed me to help benchmark standards of excellence at Donald C. Cook Nuclear Plant.

"It's also exciting to be a part of Cook's successful effort to improve its cost effectiveness. This effort reinforces the fact that high standards of safety and competitive economic performance can be mutual goals."



It's that the entire
plant, every inch, is
now a standard in part of
the plant's preventive main-
tenance program.

INPO

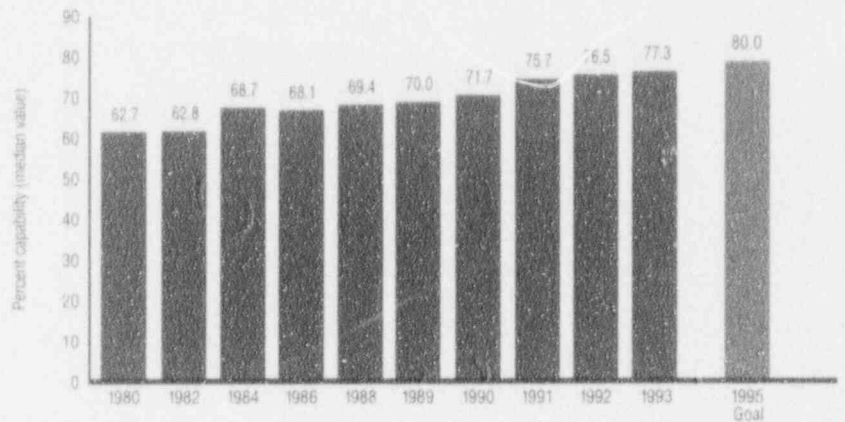
**Institute of
Nuclear Power
Operators**

**1993 PERFORMANCE INDICATORS FOR
THE U.S. NUCLEAR UTILITY INDUSTRY.**

Unit Capability Factor

Unit capability factor is the percentage of maximum energy generation that a plant is capable of supplying to the electrical grid, limited only by factors within control of plant management. A high unit capability factor indicates effective plant programs and practices to minimize unplanned energy losses and to optimize planned outages, maximizing available electrical generation.

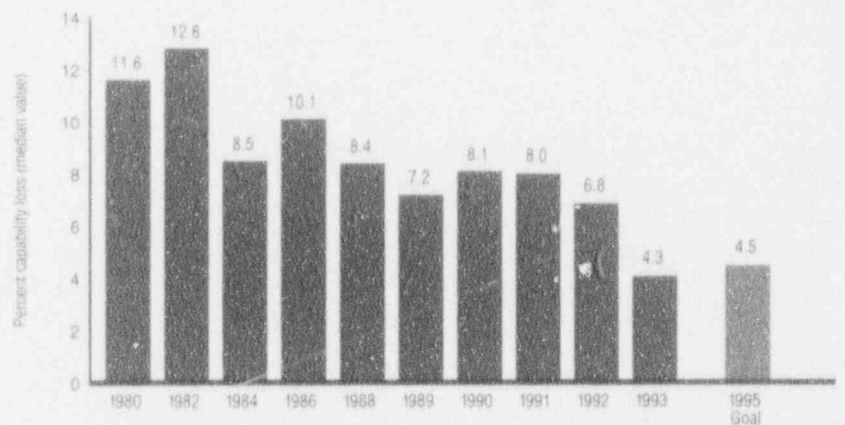
The 1993 industry median value of 77.3 percent shows continued progress and is a marked improvement over performance in the mid-1980s. Values before 1990 are estimated from available data.



Unplanned Capability Loss Factor

Unplanned capability loss factor is the percentage of maximum energy generation that a plant is not capable of supplying to the electrical grid because of unplanned energy losses (such as unplanned shutdowns, outage extensions or load reductions). Energy losses are considered unplanned if they are not scheduled at least four weeks in advance. A low value for this indicator indicates that important plant equipment is reliably operated and well maintained.

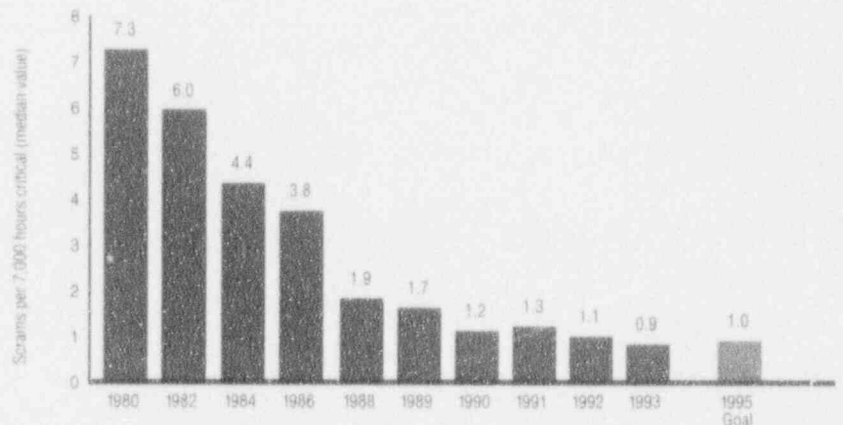
The 1993 median value of 4.3 percent continues the trend of performance improvements since the mid-1980s and is slightly better than the 1995 goal. Values before 1990 are estimated from existing outage information.



Unplanned Automatic Scrams per 7,000 Hours Critical

This indicator tracks the average scram rate per 7,000 hours of reactor criticality (approximately one year of operation) for units operating with more than 1,000 critical hours during the year. Unplanned automatic scrams result in thermal/hydraulic transients in plant systems.

The 1993 median value of 0.9 reflects continuous improvement and is slightly better than the 1995 goal.



Safety System Performance

The safety system performance indicator monitors the availability of components in three important standby safety systems at each plant. Safety systems that are maintained in a high state of readiness have a high probability of being capable of mitigating off-normal events.

Specific 1995 goals have been set for each of the three standby safety systems. The industry's goal is to encourage a high state of readiness, with at least 85 percent of these systems meeting the specific 1995 goals. The 85 percent target allows for normal year-to-year variations in individual system performance.

By the end of 1993, 92 percent of safety systems were performing at the level of the specific 1995 safety system performance goals.

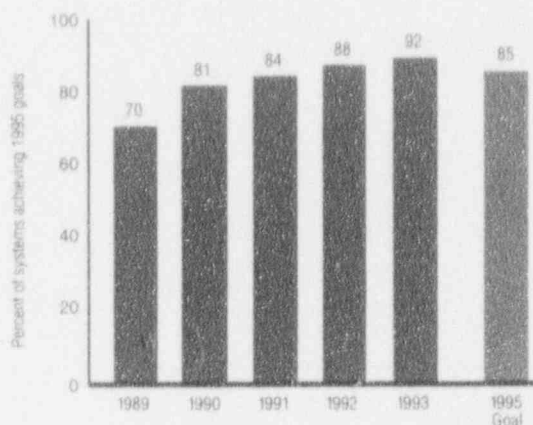
INPO and the industry monitor two additional performance indicators: fuel reliability and the chemistry index.

Fuel Reliability

The fuel reliability indicator monitors progress in achieving fuel integrity. Maintenance of fuel cladding integrity reduces radiological impact on plant operations and maintenance activities. The long-term industry goal is that units should strive to operate with zero fuel cladding defects.

Achievement of this goal is measured by improving current fuel performance so that at least 85 percent of plants are operating without fuel defects.

Data collection for the fuel reliability indicator began in 1987, and the indicator definition was revised in 1992 to improve its accuracy. The industry has steadily improved fuel cladding integrity each year since 1989. At the end of 1993, 71 percent of all units were operating with no cladding defects.



Chemistry Index

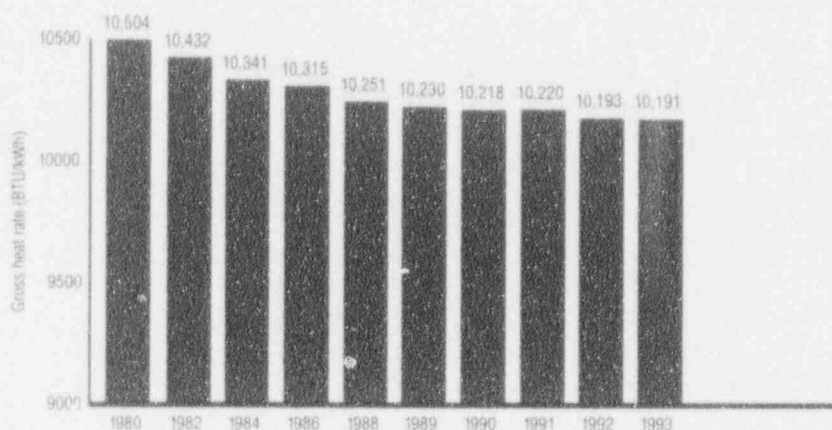
The chemistry index provides an indication of progress in controlling chemical parameters to retard deterioration of key plant materials and components. These parameters are already being maintained within the strict guidance developed by the industry.

INPO and the industry are continuing to review this indicator. A modification to the chemistry index has been proposed that will monitor the concentrations of selected impurities and corrosion products that are important in maintaining the integrity of major plant systems. Based on additional experience, a determination will be made concerning the use of this new, modified chemistry indicator.

Thermal Performance

A low gross heat rate reflects high thermal efficiency. Efficient, well-tuned plants produce more electrical energy and enable operators to detect abnormal trends and correct them early, contributing to more reliable operations.

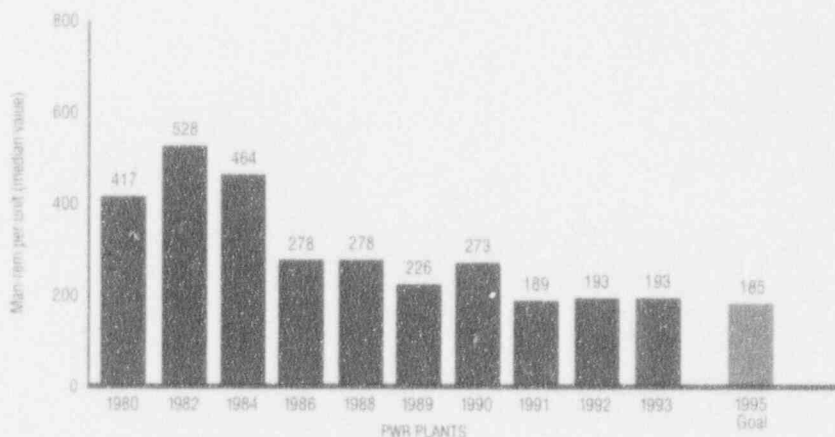
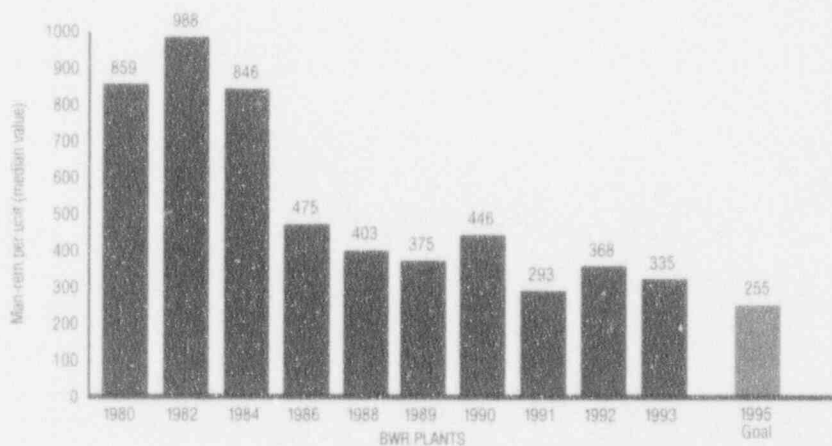
For industry trending purposes, the graph shows industry gross heat rate value, expressed as British thermal units per kilowatt hour (BTU/kWh). In 1993, the industry average was 10,191 BTU/kWh. The 1990 goal was 10,260 BTU/kWh, which was met in 1988. An industry 1995 gross heat rate goal has not been established; rather, the goal is for individual units to strive to achieve 99.5 percent of design gross heat rate by 1995. In 1993, the industry median value was 99.4 percent.



Collective Radiation Exposure

Collective radiation exposure is presented for both boiling water reactors (BWRs) and pressurized water reactors (PWRs). Low exposure indicates proper management attention to control of radiation and radioactive materials, and that radiological protection programs are effective.

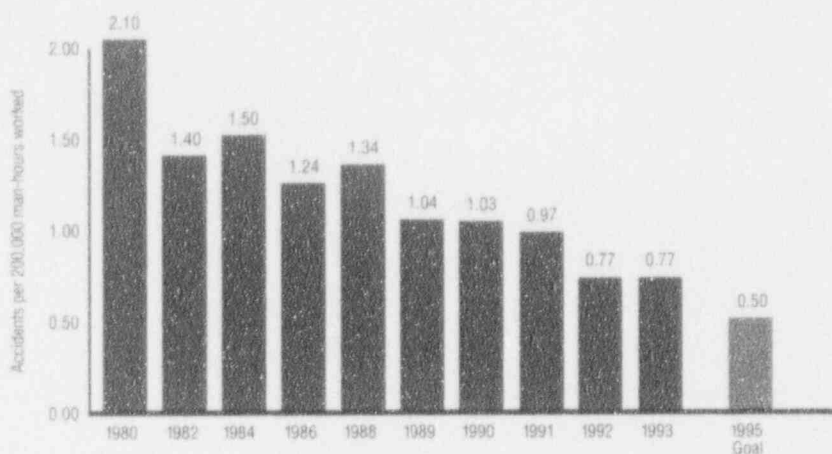
The 1993 median value for BWRs is 335 man-rem. The 1993 median value of 193 for PWRs is unchanged from 1992. Both these values reflect a continuation of the overall trend of reduced worker exposure over the past 10 years.



Industrial Safety Accident Rate

Progress in improving industrial safety performance is monitored by the number of accidents that result in days away from work, days of restricted work or fatalities per 200,000 man-hours worked. The 1995 goal represents an accident rate substantially better than the 1990 accident rate of the entire electric services industry and the private sector as a whole.

The 1993 industry value of 0.77 industrial accidents per 200,000 man-hours worked is unchanged from 1992, but the industry continues to provide one of the safest industrial work environments.

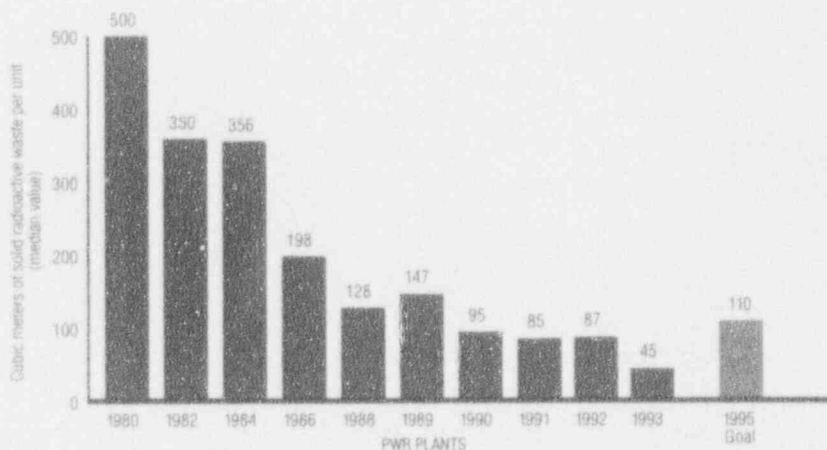
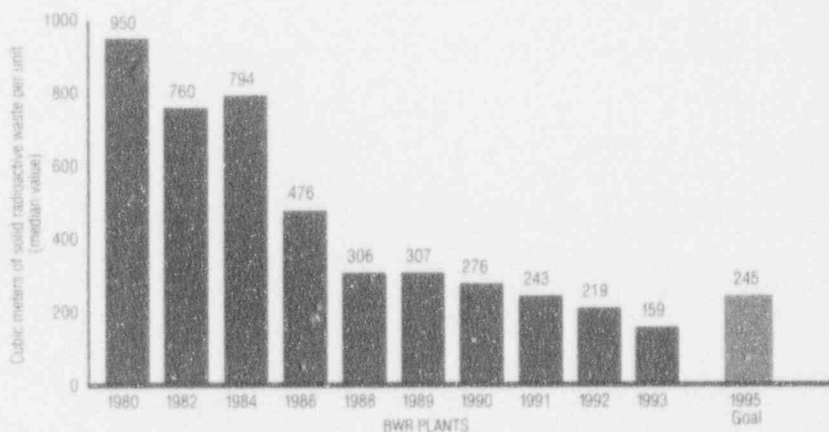


Volume of Low-Level Solid Radioactive Waste

The volume of low-level solid radioactive waste per unit is shown for both BWR and PWR units. Minimizing the production of radioactive waste reduces storage, transportation and burial needs, thereby reducing the environmental impact of nuclear power. Management attention to and control of plant activities that generate and process radioactive materials are required to minimize waste production.

Technological advances, as well as major reductions in the extent of contaminated areas inside stations, have also contributed to a substantial decrease in low-level solid radioactive waste quantities over the past several years.

The 1993 median values of 159 for BWRs and 45 for PWRs continue to surpass the industry 1995 goals.



1993 PERFORMANCE INDICATORS

Nuclear plants with good performance, as measured by the World Association of Nuclear Operators' (WANO) set of performance indicators, are generally recognized as well-managed plants. These plants usually are more reliable and can be expected to have higher margins of safety.

In recognition of this and in keeping with its mission to promote excellence and the highest levels of safety and reliability, the Institute of Nuclear Power Operations (INPO) collects U.S. industry data on key performance indicators and shares this information with its members and participants.

Developing the U.S. program

The performance indicator program, now in its 11th year, was refined in 1985. Three special industry review groups joined INPO in developing a set of 10 performance indicators that could be used to promote long-term industry improvements and monitor plant performance. In 1985, each U.S. utility with an operating unit set challenging long-term 1990 goals for most of the overall indicators. These individual unit goals were averaged to determine industrywide targets.

Establishing an international program

In 1988, INPO began reviewing the U.S. performance indicator program to determine refinements that would be needed for 1990 and beyond. An ad hoc review group was formed, consisting of U.S. utility executives along with representatives of WANO, the International Union of Producers and Distributors of Electrical Energy, the Nuclear Management and Resources Council and the Electric Power Research Institute.

This review group agreed on a set of performance indicators and definitions that nuclear operating organizations worldwide could use to support the exchange of performance information. These international indicators would allow consistent communication and comparison of plant performance, and emulation of the best international practices.

In May 1989, the WANO Governing Board adopted these performance indicators for use by utilities worldwide. Worldwide data collection began in 1990.

Setting U.S. 1995 goals

In 1990, each U.S. utility set long-term goals for its units in the areas monitored by the international performance indicators. U.S. industry goals for 1995 were then developed from individual utility goals. The industry goals were reviewed by INPO's review and advisory groups, and finally by the INPO Advisory Council and Board of Directors. The 1995 goals for U.S. utilities provide the industry with challenging, achievable targets.

Looking beyond 1995

The performance indicator program has traditionally been reviewed at five-year intervals due to performance improvements and changes in the industry operating environment. In 1993, an ad hoc group of industry executives began reviewing the performance indicator program to determine the performance indicator definitions and approach to goal setting that would best serve the industry's needs after 1995.

This foldout section provides performance data from 1980 to 1993. Current indicator definitions and graphs showing U.S. industry progress are included for selected WANO performance indicators, along with the 1995 goals. For some performance trends, industry results from prior years have been estimated from data collected for other indicators.

A discussion of two additional plant performance indicators — fuel reliability and the chemistry index — is also included.

INPO

**Institute of
Nuclear Power
Operators**

**1998 FINANCIAL REPORTS
AND ROSTERS**

FINANCIAL REPORTS

Balance Sheets

As of December 31, 1993 and 1992

	<u>1993</u>	<u>1992</u>
ASSETS		
Current Assets:		
Short-term cash investments	\$19,220,089	\$20,106,119
Accounts receivable	914,534	722,012
Prepaid expenses	366,657	868,857
Total current assets	<u>20,501,280</u>	<u>21,696,988</u>
Property and Equipment, at Cost:		
Land	5,283,845	5,283,845
Building	19,732,977	0
Equipment and leasehold improvements	18,629,246	16,907,919
Construction in progress	0	19,371,249
Accumulated depreciation and amortization	(11,927,171)	(12,755,462)
Net property	<u>31,718,897</u>	<u>28,807,551</u>
Bond Proceeds Held by Trustee	2,655,365	10,663,199
Other Noncurrent Assets	79,333	85,000
Total assets	<u>\$54,954,875</u>	<u>\$61,252,736</u>
 LIABILITIES AND MEMBERS' AND PARTICIPANTS' EQUITY		
Current Liabilities:		
Current maturities of long-term debt	\$1,220,000	\$1,165,000
Accounts payable and accrued liabilities	1,988,983	1,515,201
Other accrued employee benefits	2,862,872	4,185,574
Total current liabilities	<u>6,071,855</u>	<u>6,865,775</u>
Long-Term Debt	22,615,000	23,835,000
Long-Term Portion of Employee Benefits	5,680,610	8,003,991
Other Liabilities	0	1,917,610
Total liabilities	<u>34,367,465</u>	<u>40,622,376</u>
Members' and Participants' Equity	20,587,410	20,630,360
Total liabilities and members' and participants' equity	<u>\$54,954,875</u>	<u>\$61,252,736</u>

The Balance Sheets do not include prepayments of members' and participants' assessments (i.e. payments of 1994 dues late in calendar year 1993 or 1993 dues late in calendar year 1992) which were \$7,873,312 in 1993 and \$7,701,722 in 1992.

Statement of Revenues and Expenses

For the Years Ended December 31, 1993 and 1992

	<u>1993</u>	<u>1992</u>
REVENUES		
Member assessments	\$44,987,465	\$44,518,536
International and supplier fees	3,962,865	3,590,819
Interest income	1,193,556	1,440,692
Other income	4,332,599	1,812,000
Total revenues	<u>54,476,485</u>	<u>51,362,047</u>
EXPENSES		
Salaries and benefits	32,533,952	32,400,121
Travel	5,478,879	5,411,685
Computer services and telecommunications	3,338,714	3,821,679
Outside services	2,816,656	2,749,105
Training, workshops and meetings	1,110,179	1,373,097
Scholarships and fellowships	970,750	987,672
General and administrative	4,727,999	5,341,944
Depreciation	3,542,306	3,227,848
Total expenses	<u>54,519,435</u>	<u>55,313,151</u>
Excess of expenses over revenues	<u>\$42,950</u>	<u>\$3,951,104</u>

Under the terms of Indemnity Agreements between INPO and its member utilities, INPO has obtained Directors and Officers Liability Insurance in the amount specified in the agreements. The cost of this coverage is included in general and administrative expenses.

INPO's financial statements are audited by independent certified public accountants. Copies of the complete financial statements are available to members and participants upon request.

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Carolina Power & Light Company	Illinois Power Company	South Carolina Electric & Gas Company
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Commonwealth Edison Company	Maine Yankee Atomic Power Company	Southern Nuclear Operating Company
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Duke Power Company	North Atlantic Energy Service Corporation	Vermont Yankee Nuclear Power Corporation
Duquesne Light Company	Northeast Utilities	Virginia Power
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Florida Power Corporation	Omaha Public Power District	Wisconsin Electric Power Company
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*Special thanks to St. Lucie Nuclear
Power Plant and Susquehanna Steam
Electric Station for their assistance with
the photography in this annual report.*



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 1, 1994

MEMORANDUM FOR: Darlene Huyer
Anstec, Inc.

FROM: Tremaine Donnell, INPO Coordinator
Records and Archives Services Section
Information and Records Management Branch
Division of Information Support Services

SUBJECT: ESTABLISHMENT OF DATA RECORD FOR INPO
DOCUMENTS

The Records and Archives Services Section has received the attached INPO Document.

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Enclosure: As stated

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