

# **UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION**

**Title:** ANNUAL BRIEFING BY INPO

**Location:** ONE WHITE FLINT NORTH, ROCKVILLE, MARYLAND

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1 UNITED STATES OF AMERICA  
2 NUCLEAR REGULATORY COMMISSION

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4 ANNUAL BRIEFING BY INPO

5 \*\*\*

6 PUBLIC MEETING

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8 Nuclear Regulatory Commission  
9 One White Flint North  
10 Rockville, Maryland

11  
12 Tuesday, July 12, 1988  
13

14 The Commission met in open session, pursuant to  
15 notice at 10:03 a.m., the Honorable LANDO W. ZECH, JR.,  
16 Chairman of the Commission, presiding.

17 COMMISSIONERS PRESENT:

18 LANDO W. ZECH, Chairman of the Commission  
19 THOMAS M. ROBERTS, Member of the Commission  
20 KENNETH CARR, Member of the Commission  
21 KENNETH ROGERS, Member of the Commission  
22  
23  
24  
25

1        STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2                    A. BATES, Secretary

3                    W. PARLER, OGC

4                    S. ANDERSON, INPO

5                    Z. PATE, INPO

6                    T. SULLIVAN, INPO

7                    W. COAKLEY, INPO

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## P R O C E E D I N G S

[10:03 a.m.]

CHAIRMAN ZECH: Good morning ladies and gentlemen.

This morning we welcome Dr. Zack Pate, president and chief executive officer of INPO and the other executives accompanying him to brief the Commission on some of their current activities. This is an information briefing. The Institute of Nuclear Power Operations, referred to as INPO, has earned a very strong and positive reputation throughout the nuclear power industry for having provided constructive, competent support to nuclear power plant operations in a broad range of activities.

INPO has developed and implemented programs which provide support to nuclear utilities in training, in evaluation, in analysis of significant operating events, in operational assessment and in technical assistance visits to mention only a few areas of involvement.

INPO has and does make a difference in the successful operation of nuclear power plants in our country and has also contributed to the operations of nuclear power plants in countries overseas.

We at the NRC as regulators of nuclear licensees, have been aware of the significant improvements in the overall performance of nuclear power plants in our country. Many of the safety indicators that we look at show notable improvement.

1 Worker exposure is down. Volume of radioactive waste generated  
2 is down. Safety system challenges, unplanned scrams, forced  
3 outages are all down. Other indicators also show a clearly  
4 improving trend.

5 As I see it, our job as regulators at the NRC is  
6 complemented by the different job that INPO does in striving to  
7 provide excellence in nuclear power plant operations. We at  
8 the NRC as a government agency are charged under the Atomic  
9 Energy Act to assure that the public health and safety is  
10 protected.

11 Our requirements have been developed to ensure that  
12 this mission is executed. Recognizing that the licensee, the  
13 utility, has the ultimate responsibility for safe operations of  
14 the plant, INPO strives to assure and assist with this safe and  
15 reliable operations.

16 Therefore, INPO acts as an arm of the industry  
17 itself, to promote improved safety and reliability of the  
18 operations of nuclear power plants and therefore can be and is  
19 of great assistance to the NRC in carrying out our statutory  
20 responsibilities. With these thoughts in mind, we welcome you  
21 and we look forward to your presentation. You may begin, Dr.  
22 Pate. Welcome again to the NRC.

23 MR. PATE: Mr. Chairman. Commissioners. It's a  
24 pleasure for us to have this opportunity to brief you on the  
25 current status of some of INPO's activities. Let me just take

1 a moment and introduce the other speakers at the table.

2 To my right is Terry Sullivan, Vice President for  
3 Analysis and Engineering. On my far left, Walt Coakley is Vice  
4 President of Training and Education. Stan Anderson is Vice  
5 President and Director of the International and Supply  
6 Division. In the audience are Angie Howard, Pat Beard and Rick  
7 Jacobs, who we may call on for assistance in answering your  
8 questions.

9 Since we last briefed the Commission, we've had some  
10 management changes in INPO and I'll cover the highlights of  
11 those briefly. For example, Terry Sullivan succeeds Pete Lyon  
12 who retired as head of the Analysis and Engineering Group the  
13 first of this year. Pat Beard who did an outstanding job for  
14 us in heading the evaluation and assistance group for five  
15 years has been succeeded by Ken Strahm. Pat is now working in  
16 the government/industry relations area with Angie Howard.

17 Walt Coakley who had headed our Accreditation  
18 Division succeeds Ken Strahm as head of the Training and  
19 Education Group.

20 We plan to focus specifically this morning on four  
21 areas. First an update for the Commission on accreditation.  
22 Second, an update on the new World Association of Nuclear  
23 Operators planning and progress. We will provide some comments  
24 on maintenance and last talk about the professionalism  
25 initiative.

1           If you have questions of clarification, please do ask  
2           them as we go along. Otherwise, we would respectfully request  
3           that you hold questions until after we have completed our  
4           briefs as we may well answer some of your questions as we go  
5           along.

6           Now, let me ask Walt Coakley to give you that status  
7           of the accreditation program.

8           MR. COAKLEY: I appreciate the chance to give you an  
9           update on the status of accreditation in the nuclear utility  
10          industry. You may recall that in 1984, the nuclear utility  
11          industry made a commitment to pursue early accreditation of ten  
12          key programs at all plant sites. There were two parts to that  
13          commitment. First for plants that loaded fuel before 1985 --  
14          that's 60 sites -- the commitment was to have by the end of  
15          1986, all 10 self-evaluation reports for those programs  
16          accepted by INPO, this signifying programs that were ready for  
17          an accreditation review.

18          As we reported to you last year, that commitment was  
19          met. All accreditation team visits to review those 600  
20          programs were completed by the end of 1987. The other part of  
21          that commitment was to bring all 600 of the programs before the  
22          National Nuclear Accrediting Board by the end of June of this  
23          year. That goal was also met.

24          All of the 600 programs have now been presented to  
25          the Board for their review. To give a full accounting of the



1       600 presented over the past four years in this category, 598  
2       programs have now been accredited. The accreditation of two  
3       programs from the Nebraska Public Power District's Cooper  
4       Nuclear Station was deferred.

5               However, we expect those two programs to be reviewed  
6       again by the Board within the next month. Next, with regard to  
7       the 16 plant sites that loaded or loaded fuel after January 1,  
8       1985, the commitment for those utilities was that their  
9       programs would be ready for accreditation within two years of  
10      fuel load.

11             That is on schedule. Seventy-two of those programs  
12      of the total of 160 have already been accredited. Ten of those  
13      16 sites in that category. We're watching closely the progress  
14      of those plants and their training and providing assistance as  
15      needed. In the category of renewal of accreditation, the  
16      requirements are that accreditation must be renewed every four  
17      years for each program and that repeats the process of self-  
18      evaluation, INPO team review and an accrediting board review  
19      decision.

20             Forty-one programs at seven sites have been reviewed  
21      by INPO for renewal. To date, accreditation has been renewed  
22      by the National Nuclear Accrediting Board for five of those,  
23      for Oconee's operator programs. Those are on schedule and we  
24      will hold to the four-year renewal interval that we've  
25      promised.

1           INPO plant evaluations that the ANA group sponsors  
2           are tasked to take a hard look at these accredited programs  
3           between the four year renewal intervals. They check on  
4           implementation of the programs and they look at the performance  
5           of the people who have been trained by those programs. Those  
6           results are fed back also to the accreditation program process  
7           for follow-up.

8           NRC has been closely involved with accreditation in  
9           three ways during these past few years. Headquarters and  
10          regional staffs have sent one or more observers on 24 of the  
11          162 accreditation team visits that have been conducted.  
12          Thirty-eight of the 48 accrediting board meetings conducted to  
13          date have been observed by an NRC staff member and of course,  
14          each five-person accrediting board that reviews applications  
15          for accreditation includes one member nominated by the  
16          Commission.

17          The first of those you nominated, Dr. Forrest Remick,  
18          has just completed over five years of service on the  
19          accrediting board and is retiring from the board this month.  
20          He will be honored for his dedicated service at a plenary  
21          session of the board later this week.

22          We've had good cooperation and encouragement from you  
23          and the staff on training and accreditation issues and look  
24          forward to continuing that relationship.

25          CHAIRMAN ZECH: Thank you very much. Please proceed.

1           MR. PATE: Thank you, sir. I'll ask Stan Anderson to  
2 give you an update on the international part of INPO's work.

3           CHAIRMAN ZECH: All right. Thank you very much.

4           MR. PATE: Mr. Chairman, gentlemen. I have a few  
5 slides to describe our current status of the World Association.  
6 But before I do, a few words of background. After Chernobyl,  
7 we at INPO looked for ways to promote the exchange of  
8 information among operators.

9           We have an international program currently in place  
10 with 13 members but we thought we should look beyond that. So,  
11 we concluded among other things, that we should organize a  
12 meeting of nuclear utility executives. A worldwide meeting.  
13 So, with the encouragement of our Board of Directors and our  
14 international participant advisory committee, we planned that  
15 meeting and it was held as you know, in Paris, in October of  
16 last year. If I can have the first slide, please.

17           [Slide.]

18           The meeting was co-sponsored by INPO and UNIPED. It  
19 was hosted by Electricite de France and the chairman was Lord  
20 Marshall of the CEGB. There were about 130 representatives and  
21 they represented 29 countries. We were quite pleased with the  
22 attendance and here are the countries that did attend.

23           First, second slide, please.

24           [Slide.]

25           That's the first slide of the attendance and then the

1 next one, please?

2 [Slide.]

3 From the USA, we had a strong contingent and from the  
4 USSR, they were represented by Minister Loukonin from the  
5 Ministry of Atomic Energy. We had invited 32 countries and  
6 that was based on countries that had operating reactors or  
7 soon-to-be-operating reactors. The countries that did not  
8 attend the meeting were the Philippines. They sent a letter of  
9 regret, and then Romania and Pakistan. We expected Romania and  
10 Pakistan to show up but just at the last minute, they changed  
11 their plans.

12 At the meeting, we agreed to a resolution and if I  
13 can have the next slide, please?

14 [Slide.]

15 This is the heart of the resolution. That there  
16 would be World Association of Nuclear Operators with regional  
17 centers in Tokyo, Moscow, Paris, and Atlanta and a small  
18 coordinating center, perhaps in London. That's the basic  
19 structure of the organization.

20 MR. ANDERSON: Next slide, please.

21 [Slide.]

22 MR. ANDERSON: I'd like to mention a few other  
23 highlights from the resolution. First of all, we recognize  
24 that there were existing links in the world among operators,  
25 but this was to strengthen those links. Then the mission of

1 the World Association is to maximize the safety and reliability  
2 of nuclear power stations and we intend to do this by  
3 exchanging information, encouraging comparison and stimulating  
4 emulation.

5 Finally, that there be a steering committee  
6 established to carry out the work of the resolution. Next  
7 slide, please.

8 [Slide.]

9 MR. ANDERSON: Some additional items from the  
10 resolution -- I've already talked to the first two bullets, but  
11 let me call your attention to that last one. The coordinating  
12 center worked closely with the IAEA. We have been working with  
13 the IAEA from the beginning very closely and we intend to keep  
14 up that relationship, just as we have in this country with the  
15 NRC in forming the World Association.

16 We had Hans Blix as a speaker at the Paris  
17 conference. Next slide, please.

18 [Slide.]

19 MR. ANDERSON: I mentioned the steering committee.  
20 The mission and the main task of the committee are clear. With  
21 regard to the Chairman, at the Paris meeting, Zack Pate, in his  
22 remarks, proposed to the executives that Lord Marshall continue  
23 his role of senior statesman in organizing the World  
24 Association and all agreed as did Lord Marshall, so he does  
25 serve as the Chairman at the present time. Next slide, please.

1 [Slide.]

2 MR. ANDERSON: The steering committee has met. We've  
3 met three times. I represent the U.S. utilities in that body.  
4 The last time we met was about three weeks ago. The countries  
5 listed there are generally represented. Everyone is invited,  
6 however, and those that don't attend are called corresponding  
7 members and we keep them informed of the action of the  
8 committee. The INPO London office found themselves very much  
9 involved in the work of the steering committee, so we've  
10 designated them as the secretariat. Next slide, please.

11 [Slide.]

12 MR. ANDERSON: Regional centers -- they are being  
13 organized in Atlanta. INPO will sponsor the Atlanta Center.  
14 We have our first organizational meeting day after tomorrow.  
15 In Moscow, the All Union Research Institute for Nuclear Power  
16 Plant Operation will sponsor their center. They've had a  
17 meeting. They met on the 30th of June and had five countries  
18 in the Eastern Bloc attend.

19 In Paris, they're probably the furthest along.  
20 They've had several meetings and they now have a prospective  
21 director assigned. In Tokyo, they've had two meetings and at  
22 the last one, they had, as you see, Japan, Taiwan, Korea,  
23 Pakistan, the PRC and India present and we're pleased that both  
24 the PRC and Taiwan were at the meeting. Next slide, please.

25 [Slide.]

1           MR. ANDERSON: Finally, the date is set for the next  
2 meeting of the executives as a follow-on to the Paris meeting.  
3 It will be in Moscow. At the Paris meeting, Lord Marshall  
4 proposed to Minister Koukonin that the next meeting be held in  
5 Moscow and we pursued this in the months following. We hadn't  
6 heard anything so then we also proposed that the next meeting  
7 of our committee to organize the meeting, be held in Moscow and  
8 they accepted that. In April we went to Moscow to work on the  
9 plans for the next meeting.

10           The meeting was held in the All Union Research  
11 Institute of Nuclear Power Plant Operations. That's Dr.  
12 Abaygan's center. I had met him before and he's the gentleman  
13 that when I gave him my INPO card, he said, I have the INPO in  
14 Moscow. So that's the relationship there.

15           We were greeted at our meeting by Minister Loukonin  
16 and throughout the meeting in Moscow, it was attended by both  
17 the people from the Institute, Dr. Abaygan's organization and  
18 the Ministry of Atomic Energy. We held two days of meetings  
19 and finished with a session with another Minister, Minister  
20 Veronin down at the Ministry of Atomic Energy in downtown  
21 Moscow and Veronin was very enthusiastic about having the  
22 meeting and we actually set the dates.

23           The dates for the meeting are the 15th through the  
24 17th of May, 1989. That, sir, completes my brief. I'd just  
25 like to say that we've appreciated the support of the NRC in

1 this effort thus far and we would appreciate your further  
2 support. We currently are working on ensuring that we have  
3 concurrence from the U.S. Government on exchanging information  
4 with all countries and that is very important to our  
5 organization.

6 In fact, it's the key to our organization, that the  
7 membership is open to all and when we do get information in the  
8 World Association of Nuclear Operators, that it can be shared  
9 with all. Thank you, sir.

10 CHAIRMAN ZECH: Thank you very much.

11 MR. PATE: Thank you, Stan. Turning now to  
12 maintenance activities, I'll focus on INPO programs this  
13 morning as we are aware that the Commission is scheduled for a  
14 brief on August the 3rd on all industry initiative by utility  
15 executives, NUMARC, EPRI and so forth. We're also aware of the  
16 special workshop NRC is sponsoring on maintenance this week  
17 here in Washington.

18 We recognize the essential and broad role that  
19 maintenance plays in safe and reliable operation of nuclear  
20 plants and thus, the Commission's justifiable interest.  
21 Evaluation of maintenance has been an integral part of our two  
22 week evaluations since the first days of INPO. Some four years  
23 ago, a NUMARC working group with support from INPO, began to  
24 address elective maintenance issues and in late 1985, with  
25 encouragement from the NUMARC working group, we took a hard



1 look at what the Institute could do, above and beyond the  
2 normal programs, to assist the industry in improving  
3 maintenance.

4 Two key initiative were identified by this time and  
5 in support of these two initiatives, work had already been done  
6 on a comprehensive maintenance guideline. These guidelines  
7 were published to the industry in late '85. Thus, our first  
8 initiative was to request that all of our member utilities do a  
9 self-assessment of maintenance based on those INPO guidelines.

10 All 75 sites that are in operation, were included in  
11 that initiative. To date, 72 have completed and provided a  
12 report to INPO in the results of their self-assessment --  
13 again, against the INPO guidelines. Three others have  
14 committed to completion dates -- Yankee Atomic, South Texas and  
15 Monticello -- but haven't quite completed their work.

16 Our review indicates that most of the 72 self-  
17 assessments are candid and comprehensive and our evaluation  
18 team reviews corroborate this and the utilities are taking a  
19 number of initiatives to improve their own maintenance  
20 programs. A second initiative was to put together maintenance  
21 assistance and review teams to visit a plant and take a focused  
22 look just on maintenance.

23 To do that, we formed a special team that went beyond  
24 the historical approach INPO has used, in that the teams  
25 included not only three or four maintenance people from INPO

1 and a team manager from INPO, but we asked the plant to  
2 designate a carefully selected person like the maintenance  
3 manager or the plant manager, to in effect, be a member of the  
4 team. We asked EPRI to designate a member who could accompany  
5 our team.

6 We also asked the cognizant NSSS supplier. If the  
7 plant was a Westinghouse plant, we asked Westinghouse to  
8 identify a knowledgeable maintenance person to accompany this  
9 team. We also added to the team, a maintenance peer from a  
10 utility where we knew the maintenance program was working  
11 pretty well. So the team was a mixture of people, but all with  
12 a great deal of experts and expertise in maintenance and all  
13 with a common cause.

14 With these teams, we first conducted four visits to  
15 plants that we thought had good maintenance -- as good as there  
16 is in the industry. That was to see how to do it and to let  
17 our teams be calibrated to the highest standards that we could  
18 find in the industry. We then had the teams visit 11 plants  
19 where knew maintenance needed improvement. We have to date  
20 done 20 follow-up visits to review progress at those 11 plants.

21 Participation by the host utility or the utility that  
22 was being reviewed in this effort has been extensive. For  
23 example, we held open team meetings so that when we discussed  
24 the issues that our team had identified, the utility could have  
25 one of their managers present. To give you an idea of the

1 extent to which the host utilities participated, we've had 9  
2 vice presidents or other senior managers join these maintenance  
3 review teams to help evaluate their own sites.

4 We've had 6 site directors or plant managers do the  
5 same thing and 14 maintenance managers have made themselves a  
6 part of the team. I think that special team visit to review  
7 maintenance and those visits that have taken place over the  
8 past 2 years, have been one of our most successful initiatives  
9 in terms of identifying the real root causes of some of the  
10 maintenance problems and also in helping the utilities or the  
11 plant generate an action plan to upgrade their own maintenance.

12 Nonetheless, we follow up to these special visits.  
13 We continue to evaluate maintenance during the regular plant  
14 evaluations. We're incorporating the feedback gained from this  
15 process into a revision to the maintenance guidelines that we  
16 hope to publish soon. We are planning to provide a summary of  
17 the key results of the self assessments back to the industry  
18 and we'll provide the NRC with a copy of that.

19 In parallel, INPO is also involved in a number of  
20 other aspects of maintenance and I'd now like to ask Terry  
21 Sullivan to cover some of these activities.

22 CHAIRMAN ZECH: Thank you very much. You may  
23 proceed.

24 MR. SULLIVAN: Thank you, Zack. The analysis and  
25 engineering group's function is to analyze, gather and screen

1 and assist utility organizations in the application of  
2 operating experience. The Commission has previously been  
3 briefed on the significant event evaluation and information  
4 network commonly referred to as the SEE-IN program, so I won't  
5 go into detail there, except to stress that this analysis and  
6 dissemination of lessons learned and the rigorous follow-up  
7 during every plant evaluation on the implementation of those  
8 lessons learned, is a primary management focus at INPO.

9 At the same time, the industry is addressing the  
10 human performance and equipment performance problems that are  
11 the immediate causes of significant events. Recognizing that  
12 people have a tremendous impact on plant performance, the  
13 Institute has sponsored a program called the Human Performance  
14 Evaluation System and I'll refer to that as HPES. Since 1984,  
15 this program has been developed through a joint effort with  
16 several of our member utilities and international participants.

17 The program's goal is to help nuclear plant personnel  
18 minimize error in the performance of their jobs and I can  
19 report that HPES is currently a part of the management effort  
20 at over half of our domestic utilities and four international  
21 participants. HPES is showing that it can help manage human  
22 performance and strengthen plant team work.

23 INPO assists in training and program implementation  
24 and we provide feedback on evaluation techniques and corrective  
25 actions. In addition, we publish a newsletter focusing on

1 human performance problems. It's called "Lifted Leaves," and  
2 I've passed out an example. Our June issue focuses on tagging  
3 systems. Of course, that's a very important station control  
4 mechanism for protecting equipment and people.

5 Previous issues have focused on issues like  
6 communications, the importance of self-verification, labeling  
7 and that type of thing. An important insight from the  
8 application of HPES is that the cause of the those significant  
9 events is similar to the causes of non-consequential events.  
10 As a result, when plants correct the causes of day-to-day  
11 performance problems, they're also reducing the factors that  
12 can contribute to significant events.

13 Since the start of HPES, we have purposely controlled  
14 growth of the program to allow us to make adjustments needed to  
15 gain maturity. However, right now, all INPO members are being  
16 encouraged to participate in HPES on a voluntary basis and  
17 we're conducting workshops this year to train additional  
18 coordinators.

19 If I could shift now to the area of equipment  
20 performance -- of course, we recognize that this is also a  
21 major factor in plant performance and the operator's ability to  
22 respond to off-normal events. In that regard, the Nuclear  
23 Plant Reliability Data System is an extensive, computerized  
24 collection of industrywide component reliability information.  
25 Right now, we receive about 1600 failure reports every month

1 and in the database we have now almost 80,000 failure records.

2 That's a lot of valuable operating experience at the  
3 component level. We've done a lot of work on the software  
4 associated with the use of that system. New data retrieval  
5 software on INPO's IBM mainframe is now in use by INPO members  
6 and participants and also by the NRC staff. In May, we  
7 released a number of pre-formatted equipment reliability  
8 reports for use by the industry.

9 By the end of this year, we'll have new data  
10 reporting software which includes a computerized check of the  
11 input data for its quality and accuracy. We'll have that  
12 released by the end of the year. INPO is systematically  
13 screening NPRDS data for significant component failure trends  
14 and we're also looking for differences in performance in  
15 plants. We do this in preparation for every evaluation in the  
16 maintenance assistance review team visits that Zack mentioned  
17 and the evaluators are given specific follow-up leads and we  
18 also provide the results to the plants.

19 When we started using these techniques in the  
20 evaluation and assistance area, we found a lot of interest by  
21 utilities and so what we did was to begin to invite the  
22 utilities to send people to INPO to work with us on developing  
23 their plant-specific analysis. Typically, we'd get an NPRDS  
24 coordinator and a maintenance or system engineer to come down  
25 and work with us.

1           With their help, we've been able to streamline these  
2 techniques and select the best methods and we're going to be  
3 making this available to the utilities for their direct use  
4 later this year. Although few equipment problems are generic,  
5 we also use the component failure analysis results to look at  
6 industry-wide equipment performance. We've done this in a  
7 number of cases with reactor protection systems, auxiliary  
8 feedwater, motor operated valves, check valves, et cetera.

9           Where applicable, they feed into the SEE-IN products  
10 that we also measure and we also provide information to the  
11 plants on their performance for these particular components.

12           And where we don't seem an improving trend, we  
13 followup during evaluations. At this point, I'd like to talk a  
14 little bit about motor operated valves, because I think it's a  
15 good example of the type of equipment issue that I'm talking  
16 about here.

17           Continuing MOV problems were identified by the  
18 industry and the NRC beginning in the 1980's. We had issued a  
19 number of SEE-IN products and in 1983 we issued a significant  
20 operating experience report on motor operated valve problems  
21 with a number of key recommendations.

22           We also conducted a workshop and started to look at  
23 implementation during our evaluations. However, by 1986, it  
24 was becoming apparent that the failure rates were at best  
25 constant and certainly they weren't improving to the extent we

1 would like to see.

2 NRC noted the same thing in an AEOD case study report  
3 at the end of 1986. So we began a broader INPO-wide, and  
4 really industry-wide initiative to address motor operated  
5 valves.

6 We sent a letter to utilities senior management  
7 calling this problem to their attention. We began working with  
8 the Electric Power Research Institute and NUMARC to look at  
9 technical problems that needed to be resolved.

10 We, of course, kept applying the NPRDS data that I  
11 mentioned earlier, and during evaluations, we provided more  
12 specific training to our evaluators and, in fact, developed a  
13 couple of pre-specialized evaluators that we were able to send  
14 to selected plant evaluations, experts on motor operated  
15 valves.

16 We have continued to support EPRI's Nuclear  
17 Maintenance Assistance Center in this regard and we've also  
18 conducted a number of visits to plants that have good motor  
19 operated valve performance so we can feed back the positive  
20 aspects as well.

21 So I think you can see from the example that we are  
22 applying NPRDS to improve equipment performance. And an  
23 important byproduct of this effort I might mention is that, as  
24 we use NPRDS and as the NRC staff has used NPRDS, we also find  
25 problems in the database which we're able to correct.



1           In summary, I think the number of significant events  
2 with generic implications has steadily declined over the past  
3 several years, but the future gains will be tougher to achieve.

4           So we've got to focus on the human performance and  
5 equipment performance issues. INPO is taking a harder look at  
6 operating events and we're trying to integrate our events  
7 analysis activities with human and equipment performance  
8 analyses.

9           The results of these efforts, along with the  
10 analytical tools, are being provided directly to the utilities  
11 for their use.

12           We're not satisfied. The reactor events, as they  
13 occur, our goal is to prevent. We want to continue to reduce  
14 the number and severity of significant events and thereby  
15 prevent a serious accident.

16           Thank you.

17           CHAIRMAN ZECH: Thank you very much.

18           MR. PATE: The final area that we plan to discuss  
19 this morning is the professionalism initiative that was kicked  
20 off at our CEO conference in November of last year.

21           We challenged the industry to undertake two  
22 initiatives to enhance or strengthen operator professionalism,  
23 and we have now broadened that to professionalism kind of  
24 across the board.

25           These initiatives were as follows. First, the

1 development and implementation of a set of broad principles to  
2 guide management of operators and that could lead to an  
3 improved climate for professionalism.

4 That's kind of coming after the problem from the top.  
5 And second, development by each utility of a professional code  
6 for operators coming at the problem from the other direction.

7 I'd like to update you on activities aimed at  
8 implementing these initiatives, both of which have been -- a  
9 lot of have been received enthusiastically by the industry.

10 Taking the professional code for operators first, we  
11 held a workshop for senior reactor operators in Atlanta this  
12 past February.

13 Every nuclear plant in the United States and some of  
14 our international participants were represented, with a total  
15 of 173 senior reactor operators.

16 The SRO's discussed in starting with our input,  
17 developed a list of developments they felt should be included  
18 in a professional code.

19 The resulting elements, the principal product of the  
20 workshop, were then distributed to member utilities. The  
21 following seven elements were considered by the workshop  
22 participants to be the most important, and I know the  
23 Commission would identify with most of these elements directly.

24 Protects the public health and safety. That's the  
25 bigger part of the professional code for operators. I know we

1 all applaud that.

2 Personal integrity. Third, a commitment to  
3 excellence. Fourth, maintain and improve job-related knowledge  
4 and skill.

5 Fifth, accept responsibility for one's own actions.  
6 Next, monitor and respond promptly to plant conditions and  
7 abnormal indications.

8 And last, adhere to all applicable regulations of  
9 plant procedures. With this input over the past few months,  
10 all utilities have been working on a professional code.

11 We believe it very important that the operators feel  
12 ownership of these codes and, thus, in every case, the work is  
13 started with the operators.

14 To date, we have received reports along with copies  
15 of the codes from 19 utilities covering 24 sites. And by the  
16 end of this month, we expect to receive them all.

17 We ask for all of them by the end of July. Let me  
18 just read an excerpt from a couple of the letters giving us  
19 feedback on how this is going.

20 First is a letter from the American Electric Power  
21 and it's from the CEO, Pete White. He says, following your  
22 lead at the CEO conference, we carried out the concept of a  
23 professional code for operators to our plant management.

24 It goes on, they were receptive and sent  
25 representation to your workshop on this subject in February. A

1 series of meetings at the plant with operators led the  
2 appointment of a peer committee to draft a code.

3 This has gone through several revisions and we  
4 anticipate adopting an operator code pry to your suggested July  
5 1988 target.

6 This letter is dated April 15. He says, I strongly  
7 support the followup concept that a foundation should extend  
8 throughout the utility and we will pursue this concept building  
9 on the operator code.

10 I shall personally follow development closely and  
11 interject my corporate philosophy as required. To us, that's a  
12 good example of CEO involvement.

13 Here is a letter from Philadelphia Electric Company  
14 that furnishes a copy of their code and I think, in view of the  
15 situation that happened at Peach Bottom some time ago that we'd  
16 all be interested in the few elements of their code.

17 The first one is, and this was developed by the Peach  
18 Bottom operators, they call it their commitment to excellence.  
19 Remain diligent in maintaining plant and personal safety by  
20 identifying and actively pursuing resolution of concerns.

21 Next, constantly remain alert and maintain awareness  
22 of plant status, anticipating conditions that could adversely  
23 affect plant reliability.

24 Next, cooperate with independent organizations,  
25 recognizing the need for monitoring and review of nuclear

1 operations.

2 And next 'and the last one I'll read but not the last  
3 one on the list, be governed by and adhere to applicable  
4 Federal law by complying with technical specifications,  
5 procedures, and policies. And it goes on.

6 Here's a letter from Duke Power received just a few  
7 days ago, and this is from Bill Lee and he says, regarding the  
8 initiatives towards strengthening professionalism, a committee  
9 of our operators has developed a commitment to excellence.

10 They prefer this handle rather than the word code  
11 which has regulatory connotations. The committee of operators  
12 will present the commitment to excellence to management at a  
13 luncheon meeting later this month.

14 He goes on to say, in the last paragraph, all in all,  
15 thinking about commitment to excellence and professionalism is  
16 a very worthwhile process that has been stimulating to all who  
17 have participated.

18 We plan to continue high priority emphasis. And then  
19 the last one that I'll read, this is from Northeast Utilities.  
20 And the first paragraph says a working group of operators  
21 representing the reactor operators of our four nuclear stations  
22 have done a splendid job in developing an operator code.

23 And then it goes on with some points about the  
24 workshop and so on. It says in the last paragraph, I am  
25 pleased with the code developed by our nuclear station

1 operators.

2 I feel it encompasses a salient point presented by  
3 the various input sources, and I'm especially pleased with the  
4 enthusiastic participation and buy-in by our reactor operators.

5 Those are just some examples, but they were  
6 encouraging to us to see the real participation by the  
7 operators in the generation of codes that look like they're  
8 pretty sound.

9 The management principals, in parallel with the  
10 efforts to develop codes by the operators, utility executives  
11 have addressed a set of management principals designed to  
12 enhance and ensure the right climate for the operators.

13 To review this background briefly, at the CEO  
14 conference each utility was provided with a draft set of  
15 principals for review and comments.

16 And many comments were received. While a number of  
17 respondents took exception with a point or two in the  
18 principals, virtually all were supportive of the concept and  
19 many commented favorably on the need.

20 An ad hoc industry committee of experienced nuclear  
21 power executives, Chaired by Ed Utley, Carolina Power and  
22 Light, was formed to review the utility comments and to assist  
23 us in refining the principals.

24 And the people on that committee were some of the  
25 best utility executives from around the country with a

1       widespread in geography and plant type.

2               The committee did considerable work and, in my view,  
3       exceptionally fine work on this project. The final set of  
4       principals, entitled principals for enhancing professionalism,  
5       was distributed to our members and to the Commission's senior  
6       NRC staff in March.

7               We have copies with us in kind of a booklet form. I  
8       think copies are in front of the Commissioners.

9               Based on the Committee's input, the scope of the  
10      principles has been expanded to include all nuclear personnel,  
11      maintenance, technical and engineering personnel rather than  
12      limited it to operators.

13              In fact, that was one of the strongest suggestions of  
14      the Committee. The principles for these other areas are being  
15      drafted and will be distributed to utilities and copies  
16      provided to the NRC at a later date. We asked each utility,  
17      beginning at the CEO level to take an in depth look at its  
18      policies and practices and compare them to this set of  
19      principles. We've also asked them to share the results of this  
20      comparison with us by the end of August.

21              The reports of this review are already being received  
22      and I'll just read excerpts from one of those letters. This is  
23      Baltimore Gas and Electric where the CEO, George McGowan, says  
24      "the commitment and professionalism of nuclear people is a key  
25      ingredient for success of any nuclear program and our Calvert

1       Cliffs operations is no exception." He said "I have reviewed  
2       the copy forwarded with your March 30 letter and fully support  
3       the principles outlined in this document. The ad hoc industry  
4       committee did an outstanding job in summarizing the requisite  
5       managerial precepts to maintain an enhance professionalism."

6               He goes on later to say "I have distributed the  
7       principles with a cover letter throughout our nuclear  
8       organization and I emphasize the importance of applying the  
9       principles throughout our daily operations."

10              We believe that this is an important initiative as  
11       each utility formally adopts and puts into practice the  
12       principles that promote, encourage and reward professional  
13       performance of nuclear personnel. Nuclear plants will be  
14       operated at higher standards. I'd be remiss if I did not  
15       mention that the NRC has been very supportive of these efforts.

16              Discussions with Commissioners and with senior staff  
17       led to useful ideas that were incorporated into our thinking  
18       and into the principles. We explicitly included the staff's  
19       input into the guidelines for the operator codes. We very much  
20       appreciate the NRC's interest and support of this initiative.

21              Mr. Chairman, in closing, we value these  
22       opportunities to brief the Commission on our work. Such  
23       meetings and information exchange are vital to the industry and  
24       we look forward to each session. We'd be pleased to try and  
25       answer any questions.



1                   CHAIRMAN ZECH: Thank you very much. Question? Mr.  
2                   Roberts?

3                   COMMISSIONER ROBERTS: This is your information sheet  
4                   on the performance indicators? And the trends look very good,  
5                   but let me ask you this -- you say, talking about the very  
6                   first item -- equivalent availability factor. In 1986 and 1987  
7                   performance in this area was significantly affected by the  
8                   long-term shutdown of several plants with had equivalent  
9                   availability factors of zero percent. That's obviously TVA,  
10                  Peach Bottom, Pilgrim -- don't make the computation but how  
11                  would this number change if you eliminated them from  
12                  consideration?

13                  MR. SULLIVAN: It's about 68 percent.

14                  COMMISSIONER ROBERTS: Okay. Thank you. That's all  
15                  I have.

16                  CHAIRMAN ZECH: Commissioner Carr? Mr. Rogers?

17                  COMMISSIONER ROGERS: Well, yes, I've got a few  
18                  things I'd just like to hear a little bit more about if we can,  
19                  in various areas. With respect to the international programs,  
20                  have any concrete results come out of this effort so far that  
21                  actually involve the plants themselves. I mean, this seems to  
22                  me you're in an organizational phase, or have been in an  
23                  organizational phase up till now, have you seen anything  
24                  specific start to emerge that you can put your finger on in the  
25                  way of specific results other than agreements to work together,

1 to share information?

2 MR. ANDERSON: Do you mean out of the new  
3 organization that we're trying to form?

4 COMMISSIONER ROGERS: Yes.

5 MR. ANDERSON: It's really too early for that  
6 although we did have a group down in Duke Power just about  
7 three months ago and they looked at the way Duke was handling  
8 operating experience and just the way the material was being  
9 handled. Not specific material exchange, but we gained  
10 something from them because there were about seven nations  
11 represented in that effort so we're just getting started in  
12 that respect. But as to exchanging information, we just  
13 haven't done that yet because we were waiting for all these  
14 steps to take place, so nothing has really happened.

15 Our goal is to have it organized by May of 1989 but  
16 in the meantime, we're trying to get organized so we are ready  
17 to go at that time.

18 MR. PATE: Commissioner, I have a comment on that if  
19 I may. INPO has an international program which we've been  
20 operating for about seven years and we now have 14  
21 participants. The participants are the free world countries  
22 that operate nuclear plants. All of them except -- that have a  
23 sizeable nuclear program -- all of them except Switzerland.  
24 Yugoslavia has just joined our program as a participant, just a  
25 few months ago. The other 13 have been participants for a long

1 time.

2 It's just a simple reality that the Eastern Bloc  
3 countries aren't going to join a U.S. institute so we weren't  
4 exchanging anything with the Eastern Bloc countries, plus a lot  
5 of other countries for one reason or another wouldn't  
6 participate with INPO or just couldn't due to State Department  
7 policies. For example, South Africa. So a key reason for this  
8 initiative is to set up an organization that allows the  
9 information flow into all countries that operate nuclear  
10 plants.

11 With the 13, now 14, that participate with us, a good  
12 healthy exchange has been going on for years and all of those  
13 or virtually all of those countries maintain a guy in Atlanta  
14 on our staff who can literally, since our products are not  
15 confidential, he can siphon off and send home anything he wants  
16 to.

17 Stan, we made how many technical exchange visits to  
18 our existing participants, say, in the last 12 months?

19 MR. ANDERSON: About 24.

20 MR. PATE: And we just had a team of what, about 10,  
21 in Taiwan?

22 MR. ANDERSON: Almost 15, 14 people.

23 MR. PATE: Fourteen people in Taiwan at their  
24 request, to do a review of their operations, so a lot is going  
25 on in the INPO international program, but nothing as Stan said,

1 has happened under this new association that would broaden the  
2 operating experience exchanged to the hopefully the whole  
3 world. In fact, one of the things that our international  
4 participants stress is that they want a slow transition because  
5 they don't want to give up the exchange they already have with  
6 INPO.

7 COMMISSIONER ROGERS: Fine. Just turning to the  
8 maintenance area, when you started your program, review teams,  
9 you picked a person on each team from a plant with a clearly  
10 good maintenance effort. So you said. Now, the question is  
11 how did you decide who those folks were? What were the  
12 criteria for determining that you felt comfortable with that  
13 assessment?

14 MR. PATE: That's based simply on the evaluations  
15 that we've done over the years with each plant. We've been to  
16 each plant now, I think we've been to everyone at least five  
17 times and many six times, and we have for example, we have a  
18 maintenance department of about 19 people and over the years,  
19 they get to know the maintenance people in the industry pretty  
20 well.

21 Soon, they have a sense for which plant has pretty  
22 solid maintenance, maybe preventive maintenance, and so if  
23 we're going to a plant where we think preventive maintenance  
24 needs a lot of help, we try in a customized way to pick a guy  
25 from another plant that does that well and take him with our

1 team. It's purely a subjective choice, Commissioner.

2 COMMISSIONER ROGERS: Well, do you think there's any  
3 way that -- you know, what I'm trying to get at here is how one  
4 develops measures of excellence in this area and whether  
5 there's any thought being given to somehow being able to  
6 distill the approach of the experts into -- who render these  
7 judgments over time -- into some kind of a system. In fact, an  
8 expert system, that renders such -- pops out such a judgment.  
9 It's an area that of course, we're all grappling with, how to  
10 identify good programs and largely up to now, I suspect, it's  
11 being done as a matter of judgment by people who visit and look  
12 and consult with each other and decide, yes, this is good.

13 Can that somehow be taken one more step into a little  
14 more of a structured approach -- not necessarily fully  
15 structured, but a little bit more of a regularized approach  
16 that could be useful for other purposes.

17 MR. SULLIVAN: We've tried -- we have other  
18 indicators that we've been looking at now for six years, at  
19 least. The problem with that we find primarily is it's -- I've  
20 heard it said it's more like looking in a rear view mirror. It  
21 tells you where you've been but not where you're going. We  
22 haven't been able to come up with a way that substitutes for an  
23 experienced evaluator in the field observing work.

24 So, I think our assessments still get to looking at  
25 what's physically going on in the plant. As I said, we aren't

1 content really to just react to events or whatever happens,  
2 we're trying to anticipate problems but we found that the  
3 quantitative indicators that we've gathered data on really  
4 don't help us do that very much aside from looking at things  
5 like NPRDS which can give you a feel for where that plant's  
6 equipment is performing relative to the industry, but even  
7 there, it's only data.

8 It's got to be follow-up in the field to as I said --  
9 one obvious trade-off is, is it a data problem versus a real  
10 problem in the field? So, those are the kind of things we  
11 follow-up in the field and on balance, we found over time the  
12 evaluator in the plant is the one that gives us the best and  
13 most timely information.

14 COMMISSIONER ROGERS: Well, it's the problem of how  
15 to try to regularize something that can be looked at by the  
16 non-expert; is there a way? It's something, I guess, we're all  
17 hoping can emerge eventually. With respect to HPES, does your  
18 evaluation system involve any quantitative measures for  
19 evaluation? You're talking about human performance now. Are  
20 these again somewhat subjective and judgmental or can they be  
21 somehow distilled into quantitative measures.

22 MR. SULLIVAN: We are looking at the causes that we  
23 see in these day-to-day human performance problems I mentioned  
24 that we see that cause profiles are very similar to the causes  
25 we see in significant events. So, we have -- we're beginning

1 to gather data and try to look at where the problems are. I  
2 guess it's not a surprise to us compared to what we see in the  
3 evaluation things like procedures, communications, the  
4 workplace, equipment labeling, show up.

5 The program is really emerging and I'd say just  
6 beginning to mature, so we haven't tried to come up with a  
7 quantitative performance measure of its value at this point.

8 COMMISSIONER ROGERS: So far, that hasn't been part  
9 of it?

10 MR. SULLIVAN: Yes.

11 COMMISSIONER ROGERS: You think that you're moving  
12 towards that? Do you think that's a realistic expectation or  
13 is that something that's a question yet to be answered?

14 MR. SULLIVAN: I think it's the latter. It's yet to  
15 be answered. Right now, in just applying the techniques and  
16 looking at these day-to-day problems that occur and trying to  
17 understand why they occur, that -- and you know, in all these  
18 areas, I think it's safe to assume that the real results will  
19 show up in the overall performance indicators that we've  
20 developed, equivalent availability, the numbers of scrams, I  
21 mean, all those things reflect on human and equipment  
22 performance.

23 COMMISSIONER ROGERS: They're all final outcomes, not  
24 sort of intermediate measures along the way and that's where  
25 the difficulty comes; isn't it?

1           MR. PATE: Yes, sir. That's exactly where the  
2 difficulty comes.

3           COMMISSIONER ROGERS: Just with respect to your NPRDS  
4 record systems studies, what are you finding with regard to  
5 failures in instrumentation and control systems and their  
6 importance? I know you mentioned the motor operated valve and  
7 of course valve problems have been, you know, legion.

8           What is your experience so far, though, with  
9 equipment performance failures or component failures in the  
10 instrumentation and control area? This is one that somehow  
11 doesn't seem to be popping up in some ways and what have you  
12 been finding in this regard?

13          MR. SULLIVAN: We have looked specifically, for  
14 instance, at reactor protection systems and the principal  
15 conclusions were really, for instance, to lose an RPS function,  
16 the common cause failures are the things that are most  
17 important and have resulted in the significant situations. At  
18 the same time and this is true even in the case of motor  
19 operated valves, we see a distribution of performance among the  
20 plants.

21          There's always someone who's having more problems  
22 than the average. There are always some people who for one  
23 reason or another have figured it out. So, in the case of  
24 reactor protection systems a couple of the issues were  
25 instrument drift and calibration problems which could



1 contribute to failure but in general, we haven't noted any  
2 broad, generic problems in that area, but what we're finding  
3 and this is where I said it's going to be tough to make the  
4 future gains.

5 The problems are more plant-specific. So, we do this  
6 analysis in advance of every evaluation and we go into the  
7 evaluation knowing where this plant has an adverse performance  
8 trend for a particular component or where their performance is  
9 different from the industry, whether it's particularly worse or  
10 better.

11 Our sense is that the problems need to be attacked on  
12 a plant-specific basis.

13 MR. PATE: A study of reactor protection systems and  
14 that's why he is talking about that particular one. That was  
15 chosen with some care as a system as a system to study where we  
16 have to have a good payback but in doing that analysis a few  
17 plants were found to be having failures of detectors that sense  
18 power level and at the high power level lead to a reactor  
19 scram.

20 A few plants were having failures in the connections  
21 to the detector or the connections back in the cabinet. That  
22 takes me back 15 years to Navy experience where a lot of  
23 problems were experienced with these cabling connectors where  
24 you may have a dozen pins, each one picking up its own signal  
25 and if those connectors fail then the instrumentation doesn't

1 do its function or the detector doesn't do its function, so the  
2 study identified to those plants that they are an outlier in  
3 cable connections and hopefully then knowing that they could go  
4 in and find what everybody else is doing to make sure their  
5 connections are reliable, so that is a specific example of  
6 something we just distributed to the industry.

7 It is a little contribution but in the aggregate all  
8 those little contributions add up to reliability and we hope  
9 one of these days they will add up to improved availability  
10 throughout the industry.

11 MR. SULLIVAN: That's reflected in scrams too. I  
12 think that the reason we got interested in the RPS system was  
13 it is about 15 to 20 percent of the scrams as of 1985, but the  
14 scram rates now, even this year, are running about a little  
15 over 2 per unit year compared to -- I think there's a table  
16 shows --

17 COMMISSIONER ROGERS: That's an industry average?

18 MR. SULLIVAN: Right.

19 COMMISSIONER ROGERS: That's quite a substantial --

20 MR. SULLIVAN: Yes, it is and I think the increased  
21 care with the reactor protection systems is reflected in that  
22 and that gets back to the bottom line indicators but to get  
23 those results, the devils in the details, you've got to attack  
24 the problems at the plants.

25 COMMISSIONER ROGERS: And just one other area,

1 finally, the professionalism initiatives. How different are  
2 the elements of the individual utilities codes that are  
3 starting to drop in to you? When you review them, do you see  
4 any significant differences from one utility to another?

5 MR. PATE: Those are due into us, Commissioner, by  
6 the end of July, so we have about half and I have read them  
7 every one as they have come in, but we haven't done the  
8 analysis that my staff will do when we get them all, so  
9 answering your question just on the basis of my having read  
10 them, they are strikingly similar. That is not too surprising  
11 because they all went to that workshop and they all took home a  
12 guideline.

13 Yet there are variations. For example, the name of  
14 the thing, as Bill Lee says, his guys want to call it  
15 Commitment to Excellence. Others have called it A Code of  
16 Ethics. We recommended they call it A Professional Code, but  
17 that was specifically a recommendation. Some leaned more  
18 toward the ethical behavior where others leaned a little more  
19 toward a spectrum of professionalism in its full sense, but I'd  
20 say most places have 8, 10, 12 elements and the elements  
21 usually include integrity and following up on abnormal  
22 indications and adhering to the regulations and procedures and  
23 communicating carefully with the others in the control room and  
24 so on.

25 So while they vary over a fairly narrow spectrum that

1 I've tried to describe, I think the most striking feature is  
2 that they are quite similar. It would be a pleasure to talk to  
3 you about that after we've analyzed the full set.

4 COMMISSIONER ROGERS: Thank you very much.

5 CHAIRMAN ZECH: Let me just comment, first of all, on  
6 your training emphasis and your accreditation program and  
7 commend INPO for that initiative. It certainly in my judgment  
8 has shown an upgrading of training in the utilities and in the  
9 plants that I'd visited I note for example that whereas three  
10 or four years ago when I first started visiting the plants,  
11 training was mentioned but with not the enthusiasm and not the  
12 emphasis that I see today.

13 Your initiative regarding upgrading training I think  
14 has certainly been a significant one and has put training on a  
15 higher plane throughout the industry where it should be and I  
16 think that that is a very significant contribution of INPO.

17 On your maintenance program and the discussion we've  
18 had here this morning, I agree that it is difficult to come up  
19 with the performance indicators in the maintenance area,  
20 although I would prefer to look at it as a challenge rather  
21 than an impossibility. I think that if we continue to work at  
22 it, and I've talked to our staff and they are continuing to  
23 work on it, I would suggest that INPO continue to work on it  
24 also to see if you can't come up with something that could be  
25 helpful. It is difficult. Looking in a mirror is not a bad

1 way to describe it because you can see when it is over with,  
2 hindsight does show you where you have been, but I believe it  
3 is not impossible so I would look at it as a challenge to  
4 continue to see whether you can't come up with something.

5 We are going to do that and I believe that it could  
6 have a payback. We may find that it takes more than one  
7 indicator, maybe several, but it seems to me that it is not  
8 completely impossible to come up with something that should  
9 show us some measure of maintenance capability.

10 I think the focus we are putting on maintenance is  
11 appropriate and I can't help but feel that if we focused on  
12 maintenance we will indeed be able to come up with some  
13 measure, maybe quantifiable, maybe not, but certainly  
14 approaching quantifiable and will at least give us a better  
15 measure than we have now. I suggest that you continue to work  
16 on that.

17 As far as the performance indicators themselves are  
18 concerned, I know that INPO has had them for a number of years  
19 and as you well know, we are working on a program here. I  
20 think that our staff and INPO is working together on these  
21 indicators. I have recently thought that since this was kind  
22 of my initiative here, for the NRC to participate in a  
23 performance indicator program perhaps we should change the name  
24 to Safety Indicators because our focus on them is from the  
25 regulatory standpoint, as you know. I haven't discussed it

1 with my colleagues and I don't know if it would be important  
2 enough to do that or not but it does seem to me that perhaps  
3 that would show the emphasis that we are placing on the  
4 regulatory and the safety side of trying to get some measure  
5 that will assist us.

6 In any case, we are proceeding in that regard. Our  
7 indicator system is maturing and perhaps calling them safety  
8 indicators would be the appropriate thing to do but we will  
9 look into that in due course.

10 On professionalism I'd just like to comment that I  
11 think that that is a very important endeavor that you are  
12 undertaking. I think it is particularly appropriate that you  
13 involve the operators -- the maintenance people, I hope, as  
14 well as the operators. Those people who are on shift work at  
15 the plant in some capacity I believe can contribute to that  
16 professionalism but it is encouraging to me to hear what you  
17 have done so far in that regard.

18 We, too, had started a program in that regard you  
19 know, to have an enhanced control room professionalism. We  
20 will watch your program very carefully but I think that you  
21 have made an excellent start towards getting a commitment to  
22 safety and an improved operational professionalism and I think  
23 that the fact you have involved the operators again and a  
24 number of utilities and the people are really thinking about  
25 this very seriously has to result in the positive safety as

1 well as reliability improvements.

2 So that is an important program and when you get  
3 these plant personnel thinking about how they can do it better  
4 and committing themselves to doing it better, certainly that  
5 has got to be something that we all would applaud. I commend  
6 you for that program and am following it carefully, as I know  
7 my colleagues are and the staff here is too to see that perhaps  
8 we can even measure improved performance as a result of that  
9 program as you put it in place.

10 Those are my comments. Before we conclude this  
11 morning, let me ask my colleagues if they have any other last  
12 thoughts.

13 COMMISSIONER CARR: I've got one. On your world  
14 organization, how are you working the funding on that? Who is  
15 going to pay the bills?

16 MR. ANDERSON: That's a very good question. The  
17 Coordinating Center will need funds to operate and that is why  
18 we have specified that it be very small. Each of the regions  
19 will contribute to the Coordinating Center, probably in equal  
20 share. That hasn't been fully decided as yet.

21 COMMISSIONER CARR: And the regions are expected to  
22 get their funds from their participating utilities?

23 MR. ANDERSON: That is correct. The regions will be  
24 self supporting -- that is, the membership will contribute to  
25 the work of the particular regions, so that's our plan thus

1 far.

2 COMMISSIONER CARR: You don't have the same sort of  
3 leverage that you are used to in an international organization.  
4 I don't know how you take care of the guy who doesn't pay his  
5 bills. Just curious, that's all.

6 MR. ANDERSON: Well, we hope that everybody will be  
7 generous and pay their bills.

8 COMMISSIONER CARR: Like they do in the other world  
9 organizations.

10 MR. PATE: Well, that's inevitably why they're  
11 challenges.

12 CHAIRMAN ZECH: On that same subject, let me make one  
13 brief comment. I know you referred to your coordinating with  
14 our Government agencies and State Department and so forth.

15 MR. ANDERSON: Yes, sir.

16 CHAIRMAN ZECH: It's very important that you do that  
17 because I'm sure you're aware of that since you mentioned it.  
18 We need more leverage on that but I think that's important.  
19 I'm sure you'll follow through on that --

20 MR. ANDERSON: Yes, sir. We will.

21 CHAIRMAN ZECH: -- very carefully.

22 Mr. Rogers, anything further?

23 COMMISSIONER ROGERS: Well, just to say that we  
24 appreciate and I certainly appreciate very much hearing from  
25 you and the quality of the INPO products is clearly a very high



1 one that I think we appreciate seeing and hearing about and I  
2 just hope that we can always find ways of working  
3 constructively together on the safety aspects of nuclear plant  
4 operations. Obviously INPO's interests are broader with  
5 respect to performance than the NRC's in a certain sense but we  
6 certainly share an overlap very strongly in the safety area and  
7 I just want to commend you for your good work in the past. We  
8 look forward to working constructively in the future.

9 CHAIRMAN ZECH: Let me just conclude then by saying  
10 that we thank you very much for a very informative briefing.  
11 We look forward to this briefing as you do and I know I need  
12 not remind INPO that NRC is the Government authority. We do  
13 have the statutory responsibilities. Your industry group, on  
14 the other hand, you can and are making in my judgment and I'm  
15 sure that of my colleagues too, a significant contribution to  
16 safe operations and of course that is what we watch very  
17 carefully.

18 We want to continue working with you and we hope that  
19 you will recognize that this agency, the NRC, does indeed have  
20 the regulatory responsibilities for public health and safety.  
21 We intend to carry them out. We fully recognize though that  
22 the licensees, as I mentioned in my opening remarks, do have  
23 the responsibility for the safe operation of their plants and  
24 we charge them with that and therefore your participation in  
25 improving their safe operations does indeed support our

1 mission.

2           So whereas we have the regulatory responsibilities,  
3 the statutory authority for public health and safety, your  
4 significant contribution to improved operations and safe  
5 operations does complement our carrying out our  
6 responsibilities. We commend you for what you have done in the  
7 past. We encourage you to continue to focus on encouraging  
8 excellence and improved operations.

9           We thank you very much for being with us today. We  
10 appreciate it and stand adjourned.

11           [Whereupon, the meeting was adjourned at 11:17 a.m.]  
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CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: ANNUAL BRIEFING BY INPO

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: TUESDAY, JULY 12, 1988

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.



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Ann Riley & Associates, Ltd.

## SCHEDULING NOTES

TITLE: ANNUAL BRIEFING BY INPO

SCHEDULED: 10:00 A.M., TUESDAY, JULY 12, 1988 (OPEN)

DURATION: APPROX 1-1/2 HRS

PARTICIPANTS: INPO

45 MINS

### SPEAKERS

- ZACK PATE  
PRESIDENT/CHIEF EXECUTIVE OFFICER

INPO REORGANIZATION  
ACCREDITATION UPDATE  
INPO MAINTENANCE  
ACTIVITIES  
PROFESSIONALISM  
OF NUCLEAR PLANT  
PERSONNEL

- STAN ANDERSON, VICE PRESIDENT  
INTERNATIONAL AND SUPPLIER DIVISION

WORLD ASSOCIATION OF  
NUCLER OPERATORS

- TERRY SULLIVAN  
GROUP VICE PRESIDENT  
ANALYSIS AND ENGINEERING

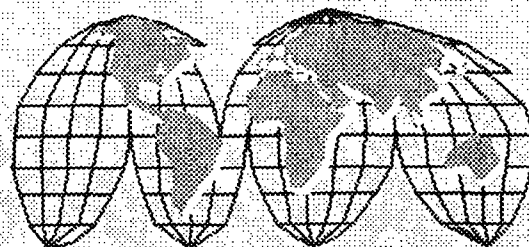
INPO MAINTENANCE  
ACTIVITIES

### OTHER ATTENDEES

- PAT BEARD, JR.  
VICE PRESIDENT  
GOVERNMENT RELATIONS

- ANGIE HOWARD  
VICE PRESIDENT  
INDUSTRY RELATIONS AND INFORMATION SERVICE

- WALTER COAKLEY  
GROUP VICE PRESIDENT  
TRAINING AND EDUCATION



# **Paris Conference**

## **October 5-6, 1987**

**Sponsored by**

**INPO**

**UNPEDE**

**Chairman**

**Lord Marshall - CEGB**

**Hosted by**

**EDF**

**Attendance**

**130 representatives**

**29 countries**

## Countries Represented at Paris Meeting

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**Argentina**

**Belgium**

**Brazil**

**Bulgaria**

**Canada**

**Cuba**

**Czechoslovakia**

**Democratic Republic of Germany**

**Federal Republic of Germany**

**Finland**

**France**

**Hungary**

**India**

**Italy**

## Countries Represented at Paris Meeting

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Japan

Korea

Mexico

Netherlands

Peoples Republic of China

Poland

South Africa

Spain

Sweden

Switzerland

Taiwan, Republic of China

United Kingdom

USA

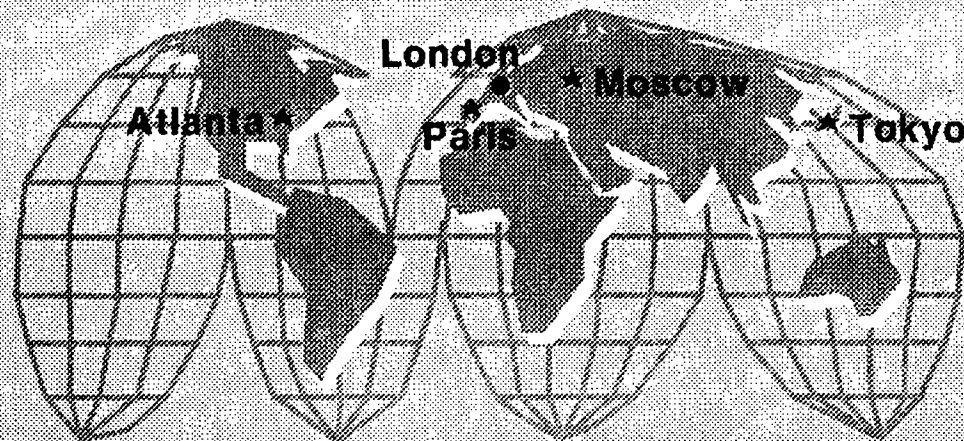
USSR

Yugoslavia



## World Association of Nuclear Operators WANO

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● Coordinating Center    ★ Regional Centers



## **Resolution of the Paris Meeting**

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- **To strengthen existing links and cooperation among nuclear operators by setting up a World Association**
- **That the Association's Mission is to maximize the safety and reliability of nuclear power stations' operation by:**
  - **exchanging information**
  - **encouraging comparison**
  - **stimulating emulation****among nuclear power station operators**
- **That a Steering Committee be established to implement the Organizational Principles that form the Association's basis**

## **Resolution of the Paris Meeting**

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- **That the key Organization Principles of the Association are:**
  - **The organizational structure will facilitate direct exchange, comparison, and emulation of member's operating experience**
  - **The organizational structure will include Regional Centers in Atlanta, Moscow, Paris and Tokyo**
  - **Members can participate in one or more Regional Centers**
- **That a Coordinating Center be staffed from each region and be located in a country not containing a Regional Center**
- **That the Coordinating Center work closely with the IAEA to ensure:**
  - **no unnecessary duplication of effort**
  - **the IAEA understands operators' needs**
  - **operators understand what the IAEA has to offer**

# **WANO Steering Committee**

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**Mission:**

**To implement the organizational principles  
stated in the Resolution**

**Main Task:**

**Set up the World Association of Nuclear  
Operators (WANO)**

**Chairman:**

**Lord Marshall  
Central Electricity Generating Board,  
United Kingdom**



## Steering Committee

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### Meetings:

December 2, 1987

March 1, 1988

June 21, 1988

### Countries Represented:

Belgium

Hungary

Spain

Canada

Italy

Sweden

Finland

Japan

United Kingdom

France

Korea

USA

W. Germany

Mexico

USSR

Secretariat: INPO London Office

## Regional Centers

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### Atlanta

- INPO to sponsor
- Organizational meeting scheduled for July 14, 1988

### Moscow

- All Union Research Institute for Nuclear Power Plant Operation will sponsor
- Meeting held June 30, 1988 in Hungary

### Paris

- Several meetings of W. European utility organizations
- Prospective Director assigned

### Tokyo

- Held meetings of regional utilities: Japan, Taiwan, Korea, Pakistan, PRC, India

# **Second Executive Meeting**

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**Moscow - May 1989**

**Decision by Executives  
to formally establish  
World Association of Nuclear Operators**

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# Principles for Enhancing Professionalism of Nuclear Personnel

**T**he purpose of these principles is to enhance professionalism of nuclear personnel. They are principles that management in the nuclear power industry considers important for fostering professionalism of all nuclear plant and corporate support personnel. They require continued management attention to be effective. This document provides examples of the types of principles that utilities should adopt and implement to recognize, enhance, and maintain a climate of professionalism. These examples should be used by utility management to examine its policies and practices and to make improvements where needed.

March 30, 1988

# **1. Managing for Excellence and Professionalism**

1. The corporate management philosophy and structure ensures that the senior nuclear manager possesses sufficient nuclear power plant knowledge and experience. Other corporate officers, managers, and staff personnel responsible for supporting plant operations possess the necessary knowledge and experience to understand nuclear plant activities, problems, and events. Corporate officers and directors above the senior nuclear manager are involved with and informed of plant performance and problems in sufficient detail to maintain a clear understanding of the status of plant safety. Necessary resources and support are provided in a timely manner.
2. Management provides an environment that is conducive to excellence and professionalism. This includes the following elements:
  - Senior management establishes an overall corporate philosophy that permeates the organization.
  - Management sets the example by conducting itself with commitment and integrity.
  - Management establishes safety as a personal, moral responsibility and ensures the safety of the public, utility personnel, and the plant.
  - Management maintains an atmosphere of open communication such that problems are brought to its attention undiluted.
  - Management sets goals that encourage continual improvement in performance and avoid a sense of self-satisfaction or complacency.
3. Management ensures that work is performed in accordance with established plans, schedules, and procedures to achieve maximum clarity of direction, quality of performance, and management credibility.
4. Appropriate levels of management are actively involved in the day-to-day activities of the plant, including routine operations, testing, and outages.
5. Management provides plant personnel with a quality plant to operate and maintain by ensuring that plant systems and components are reliable and maintainable and conform to approved design and that high standards for material condition are maintained.
6. Management is proactive and responsive. Solutions to problems are pursued with the objective of correcting root causes and improving performance. Solving problems is viewed as an opportunity for making productive improvements.



## **2. Managing Nuclear Personnel**

### **A. General**

1. People and their professional capabilities are regarded as the nuclear organization's most valuable resource. Authorized staffing is sufficient to perform all required tasks, and positions are filled with highly trained and fully qualified individuals.
2. Programs are established and implemented to recruit and select individuals with the qualifications and abilities to perform the jobs for which they are being hired and also with the ability to develop the skills and knowledge required for higher level positions.
3. Knowledge and skills are developed, maintained, and enhanced through appropriate training and career development. In addition, opportunities are provided for personnel at all levels to work with good role models to foster development. The initial and continuing training programs for applicable plant personnel are accredited by the National Nuclear Accrediting Board. Other training programs are also maintained at high standards.
4. Management practices and policies convey an attitude of trust and an approach that is supportive of teamwork at all levels. These practices and policies recognize and expect professionalism from all personnel. Policies that spell out expectations and standards of performance are well-established and documented. These policies are clearly communicated and are well-understood by all personnel and are routinely reinforced in training and in the daily conduct of business.
5. The line organization is the principal focus of management, the principal source of information, and the only source of management direction. Committees, review boards, and other activities that provide supplemental quality checks of information sources are not allowed to dilute or undermine line authority, accountability, or credibility.
6. Management practices encourage communication and require teamwork among and between groups that operate, maintain, and support the plant. These practices also encourage personnel to view themselves as a part of the overall "team" with successful operation of the plant being a common goal and that conflicts between the workers and management or between groups are resolved. Management conscientiously examines these issues on an ongoing basis.
7. Appropriate personnel have professional codes that set forth certain practices, including ethical practices, that they adopt as a part of their way of doing business. These practices embody high standards of technical and ethical performance and help build a foundation for safe and reliable plant operations. These codes are developed and maintained such that individuals feel ownership and pride in their code and its implementation.

## **Principles for Enhancing Professionalism of Nuclear Personnel**

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8. Management seeks input on the development, and feedback on the effectiveness, of policies and practices. Open channels of communication are established and maintained such that personnel at all levels are encouraged to provide complete, undiluted input and feedback.

9. Personnel receive appropriate recognition for their achievements, both within their work groups and in the company as a whole.

### **B. Developing Management Personnel**

1. Formal programs are established to select and develop individuals to fill key management positions.

2. Management development and selection practices reflect the fact that work in plant operations provides the broad, integrated view of plant activities needed by nuclear managers. Individuals with experience in day-to-day plant operations are considered as an important source of management talent. The policies and practices that govern career development ensure that individuals are aware of the opportunity to develop into management positions and that selected individuals are encouraged and provided with opportunities to pursue this career path.

3. Promotion and management development practices seek a balance between career operations individuals and others who obtain operations experience as part of their career development. Operations personnel with the potential to fill key management positions are provided an opportunity for acquiring experience in other groups. Also, other personnel with the potential to fill key management positions are provided an opportunity for obtaining an SRO license or certification and operations experience. Engineers who hold bachelors degrees in technical fields are considered a key source of such personnel.

4. The plant manager or assistant plant manager in the line organization holds or has held an SRO license or has been certified for equivalent SRO knowledge and has extensive nuclear power plant experience, preferably in the operations department. The operations manager or middle manager to whom the shift supervisors report holds an active SRO license and has extensive nuclear power plant operations department experience, preferably as a shift supervisor.

In addition, in the long term, it is highly desirable that other key plant management positions be filled by personnel with plant operations experience and who hold or have held an SRO license or certification. Examples of such positions include the following:

- maintenance manager
- technical services manager
- training manager

## **Principles for Enhancing Professionalism of Nuclear Personnel**

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- site manager
- outage manager
- the various assistants for these key positions

5. Management personnel and candidates for management positions are provided appropriate management and interpersonal skills training and experience to enable them to perform management and supervisory functions.

6. Candidates for management positions or for promotion to higher level management positions are provided with opportunities to work with and for individuals who can serve as role models to enhance the development of leadership and management capabilities.

7. Selected personnel are provided opportunities in a variety of functional areas in the nuclear organization and are given opportunities to work with utility groups and to visit other nuclear stations to broaden their exposure and perspective.

### **C. Managing Operations Department Personnel**

In addition to the practices and principles described above, the following apply specifically to operations department personnel.

1. The initial screening of applicants or candidates for operations positions takes into account the positions of great responsibility that these personnel are likely to fill, for example as reactor operators.

2. Subsequent screening, with nuclear line management involvement, is conducted as operators and others are selected as candidates for the senior reactor operator and shift supervisor positions. This screening focuses on leadership and management capabilities.

3. While a college degree in a technical field is not a necessary requirement for operations positions, operators with bachelors degrees in technical subjects have a greater likelihood of promotion to and success in management positions. Management practices ensure that an appropriate number of personnel with such degrees, or the potential and desire for acquiring such degrees, are selected for operations positions. In addition, management assists and encourages selected operators who have the potential to acquire bachelors degrees; programs that lead to degrees in technical subjects are given preference. To assist in accomplishing this, college credits may be sought for successful completion of utility training programs.

## **Principles for Enhancing Professionalism of Nuclear Personnel**

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4. Management practices governing the conduct of control room operations and simulator training ensure the following:

- The line responsibilities and authorities during off-normal or casualty conditions are spelled out with absolute clarity. To the maximum extent possible, the roles of control room personnel during an off-normal or casualty situation are the same as for routine duties. (A transfer in responsibility when things begin to go wrong is undesirable for many reasons, including the fact that personnel are often unable to determine when such a transfer should be made.)
- Simulator practices of normal, off-normal, and casualty situations are conducted, to the maximum practical extent, with the same personnel and with the same responsibilities and authorities that are assigned in the plant control room (the team concept).

5. Line management, up to and including the senior manager on site, is sufficiently involved in all phases of the training, qualification, requalification, and simulator programs to ensure that operators are properly qualified to perform their assigned tasks.

6. Management policies and practices ensure that the person responsible for the plant after hours (in effect, the person who acts for the plant manager), whether this is a shift manager, shift engineer, or shift supervisor, is selected keeping in mind the great responsibility that the person assumes. The individuals selected have the training, experience, maturity, and judgment to assume this responsibility. In selecting and approving these individuals, it is recognized that this person enforces the professional standards and sets the tone not only for the operators but for all personnel at the plant during off-hours. Final approval of the qualifications of individuals assigned to this position is reserved for an appropriate level of senior management.

### **D. Managing Maintenance Personnel**

### **E. Managing Technical Personnel**

### **F. Managing Engineering Personnel**

**NOTE:** Principles that specifically apply to maintenance, technical, and engineering personnel have been drafted and will be reviewed by utility personnel. After they have been finalized, they will be added to the management- and operations-related principles.



# LIFTED LEADS

HUMAN  
PERFORMANCE  
EVALUATION  
SYSTEM

Volume 4  
Number 2  
June 1988

...A publication about experiences in human performance

## TAGGING SYSTEM

The station tagging system is one of the most important controls for protecting plant equipment and personnel. Problems with tagging continue to occur and have recently resulted in unplanned scrams, equipment damage, and personnel injuries.

This issue of *Lifted Leads* focuses on tagging problems and the underlying causes of these events. Each event was analyzed to identify the causes and corrective actions needed to prevent recurrence.

## The One That Got Away

A valve that was caution tagged open instead of being danger tagged closed led to the draining of 1300 gallons of contaminated water into the auxiliary building.

During a refueling outage a tagging order that included draining the volume control tank was implemented to allow repacking of volume control tank discharge isolation valves and the bench testing of the charging pump discharge relief valve. When the repacking was completed, a portion of the system was realigned to reestablish a makeup water flow path from the refueling water storage tank to the reactor coolant system.

To realign the system, the tagout was revised. During the revision process, the operations coordinator did not notice that the charging pump suction valve used as a drain path during the isolation was caution tagged open. The tagout revision to realign the system was then implemented.

When power was restored, the supply valve from the refueling water stor-

age tank opened to refill the empty volume control tank. Due to the open charging pump suction valve, water flowed through the charging pump and out the flange where the relief valve had been removed.

Approximately 45 minutes later a roving security guard notified the control room that water was coming out of the room. The operators closed an isolation valve to stop the leak. An estimated 1300 gallons of contaminated water had leaked from the system.

The post event evaluation determined that the review of tagout revisions is not conducted as thoroughly as initial tagouts. Additionally, the tagging coordinators do not receive plant-specific systems training. The event highlights the importance of supervisory attention to detail when approving tagouts.

Recommended corrective actions included revising the procedure to ensure a more detailed review of tagging revisions and requiring systems training for individuals involved in preparing tagouts.

## TRIP & CAL





## Case of the Missing Tag

**A misplaced tag results in a reactor scram.**

The unit was in cold shutdown with a maintenance outage in progress. One of the maintenance activities for this outage was to remove and repair the level control valves for feedwater heater 5A. To support this activity a tagout was issued.

The tagout sheet did not identify the instrument air valves to be closed by number but provided the valve name instead (e.g., "instrument air isolation to SD-SI-128A"). Since many of the instrument air root valves were not labeled, it was easier to identify the valve by name. As a consequence, the equipment operator assigned to tagout the level control valve placed the tag on the air header root valve for the level control valve instead of the local isolation valve.

Later, after the job was completed, a different operator removed the tagout. He removed all the tags except the one on the air isolation valve, which he could not find. This was reported to the shift supervisor, and an unsuccessful search for the missing tag was conducted. It was assumed the tag had been lost, and the tagout was cancelled.

Two months later the reactor scrambled from 18 percent power due to high water level in heater 5A. Without instrument air, the level control valve had failed in the closed position.

The post-event evaluation indicated the wrong valve was tagged because the description on the tagout sheet was not clear and the instrument air valves

were not adequately labeled. Inadequate communication among personnel was a contributing factor.

The evaluation also indicated a turbine building instrument air valve check off was not performed prior to unit startup. Such a review would have identified the mispositioned root valve.

Corrective actions included the proper labeling of all instrument air valves, revising applicable procedures to address the handling of missing tags, ensuring that the instrument air valve line-up checkoff procedure is performed prior to startup, and discussing the event and lessons learned with operations personnel.



## Hang in There

**A deficient tagging order and an incorrect assumption caused a mechanic to be burned.**

Two maintenance men were assigned to adjust the packing on two steam valves and to replace the packing on a third. The steam system was tagged out by the operations group to support this work.

At the job site, the maintenance men noticed the valve requiring new packing was still blowing hot water and steam through the old packing. They proceeded to the other two valves and tightened the packing as required. When they returned to the first valve, they found the valve stem dry and the valve no longer blowing steam. Assuming the pressure had been relieved, they began removing the valve packing.

Suddenly the packing blew out with a burst of hot water and steam.

One mechanic was on a grating and able to get away, the second was sitting on a support girder 15 feet in the air and had nowhere to escape. He received burns on his legs and face, but fortunately did not fall to the concrete below.

The post-event evaluation revealed the order of the tagout had trapped steam in the pipe with none of the system vent or drain valves tagged open. Additionally, the system was not checked to ensure it had been depressurized.

Corrective actions included expanding the tagging system to include vent and drain valve positioning as well as requiring positive verification of system status prior to opening a previously pressurized system. Additionally, requirements for the use of scaffolding were discussed with maintenance personnel.




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### QUARTERLY QUOTE

*"Errors just don't happen, they are caused."*

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*Lifted Leads* is published by the Institute of Nuclear Power Operations, Suite 1500, 1100 Circle 75 Parkway, Atlanta, Georgia, 30339. Questions and comments about the newsletter or the Human Performance Evaluation System should be directed to Joe Bishop, manager, Human Performance Department, (404) 953-5463.