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NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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DISCUSSION OF SALEM UNIT 1 RESTART

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PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Monday, May 9, 1994

The Commission met in open session,
pursuant to notice, at 2:30 p.m., Ivan Selin,
Chairman, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission
KENNETH C. ROGERS, Commissioner
FORREST J. REMICK, Commissioner

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STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

JOHN HOYLE, Acting Secretary

KAREN CYR, Office of the General Counsel

JAMES TAYLOR, Executive Director for Operations

WILLIAM RUSSELL, Director, NRR

THOMAS MARTIN, Region I Administrator

ROBERT SUMMERS, AIT Team Leader

CHARLES MARSCHALL, Senior Resident Inspector,
Salem/Hope Creek

E. JAMES FERLAND, Chairman of the Board and Chief
Executive Officer, PSE&G

STEVEN E. MILTENBERGER, Vice President and Chief
Nuclear Officer, PSE&G

JOSEPH J. HAGAN, Vice President, Nuclear Operations
and General Manager, Salem Operations, PSE&G

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

2:30 p.m.

CHAIRMAN SELIN: Good afternoon, ladies and gentlemen.

We would like to thank the representatives of Public Service Electric and Gas for coming in to meet with us today. Today's presentation concerns the recent event at Salem, a little bit of the history, the actions Public Service Electric and Gas has taken in preparation for restarting the plant.

After the licensee's presentation, the NRC staff will also make a presentation on their results of the review of the licensee's activities, particularly the AIT that was just conducted.

Copies of the slides for both presentations are available at the entrance to the room.

Commissioners, do you have anything?

Mr. Ferland, thank you for being here. The floor is yours.

MR. FERLAND: Thank you, Mr. Chairman and welcome to the other Commissioners. It's good to see each of you again.

For the record, my name is Jim Ferland and I'm the Chairman and Chief Executive Officer of PSE&G.

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1 I have been extensively involved in the nuclear
2 industry for more than 20 years, including duty as
3 manager of the three unit Millstone site at Northeast
4 Utilities and have held a senior reactor operator
5 license on Millstone Unit 1.

6 In March of this year, I completed a six
7 year term on the Board for the Institute of Nuclear
8 Power Operations, the last two years as Chairman and
9 I am currently an Executive Committee member of the
10 Board of the recently formed Nuclear Energy Institute.

11 PSE&G has ownership interest in the Peach
12 Bottom, Salem and Hope Creek nuclear plants and
13 operating responsible for the latter two. These
14 facilities and the investment in them exceeds \$6
15 billion and last year PSE&G's share of their output
16 represented over 43 percent of our total electric
17 generation. The successful operation of our nuclear
18 units is of paramount importance to me and to the
19 organization that I represent and I hope that in my
20 remarks today I can convey some sense of that to you.

21 In a few moments I'll turn the program
22 over to Steve Miltenberger, our Chief Nuclear Officer,
23 on my right, and then to Joe Hagan on my left, our
24 Vice President and General Manager of the Salem
25 station for a review and discussion of the April 7th

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1 incident at Salem.

2 Beyond their in-depth discussion of that
3 event, I felt it important to provide a context in
4 which you might consider this event and our response
5 to it. Therefore, I've also asked Steve to describe
6 our very recent history at Salem, focusing on
7 important areas where we've been trying to improve our
8 performance, highlighting improvements where apparent
9 as well as areas where we clearly have not met our own
10 expectations. We'll describe how we are addressing
11 these deficient areas and the means we're using to
12 monitor the effectiveness of the corrective actions
13 that we are taking.

14 The Salem units and Hope Creek are located
15 on a common site in Southwestern New Jersey. All
16 PSE&G nuclear personnel are located right at that
17 site. The performance of our Hope Creek unit has been
18 outstanding and this plant has been formally
19 recognized by the nuclear industry for excellence in
20 operations in each of the past several years.

21 Despite its close proximity and despite
22 the common management of many of its activities, we
23 have not met our goal of bringing Salem station to the
24 same level of performance. We're very open about this
25 and within the past few weeks I reported to our

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1 shareholders at our annual meeting that Salem
2 performance had not met our expectations. Over the
3 past several years, PSE&G has committed very
4 substantial resources in terms of both personnel and
5 dollars aimed at improving Salem's performance. Steve
6 will describe in some detail the nature of this
7 commitment.

8 In general terms, the dedication of these
9 resources was intended to strengthen three aspects of
10 Salem's operations, the performance of our people,
11 including operations, engineering and other support
12 personnel, the physical condition of our plant and its
13 equipment, and the quality of the procedures our
14 employees use to operate and maintain this facility.
15 As Steve will describe, we've improved each of these
16 areas. Some very substantially, others not enough.

17 I'd like to comment very briefly on the
18 senior level oversight of our nuclear program. I had
19 earlier described the significance of our nuclear
20 program to PSE&G and, not surprisingly, senior
21 management and Board of Director oversight is
22 comprehensive. Information available ranges from
23 computerized executive information systems which
24 provide real time nuclear status reports to very
25 detailed monthly and quarterly performance indicator

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1 reports which address more than 100 measures of
2 performance in key areas, including safety and
3 performance and cost.

4 A summary review of nuclear operations is
5 provided at monthly board meetings and on a quarterly
6 basis our independently chartered Nuclear Oversight
7 Committee reports directly to our board. That
8 committee is chaired by Doctor Shirley Jackson, a
9 member of the board, and among its other members
10 includes Phil Bayne, Sol Levy, Neal Todreas and Hank
11 Houckle.

12 At this point I suggest that Steve and Joe
13 provide their portion of our presentation. Following
14 their presentation, I have a very brief summary of the
15 message that we've tried to convey this afternoon.

16 Being acceptable, I look to Steve.

17 MR. MILTENBERGER: Thank you, Jim.

18 I'd like to cover some of the specifics of
19 the April 7th event. I'd also like to talk over some
20 of the issues over the last several years and our
21 overall assessment of the Salem facility.

22 (Slide) As we take a look at the
23 specifics of the sequence of events from the April 7th
24 event, we see this as a complicated event that
25 challenged my staff. And as I look it overall, with

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1 a few exceptions, my operators in the plant did
2 perform well.

3 As we take a look at the beginning of the
4 event, both Salem Unit 1 and Unit 2 were at 75 percent
5 power. The reason for holding the plants at 75
6 percent power was the experience we'd been having
7 earlier in this year due to the grass at the intake
8 structure, causing the intake screens to plug up and
9 the loss of circulating water pumps. Providing the 75
10 percent power range provided some additional room for
11 the operators in maneuvering the plant and additional
12 cushion based on the loss of circulating water pumps.

13 On this particular day of April 7th, we
14 experienced a large intrusion of grass into this
15 intake structure. Power was rapidly reduced because
16 of this excessive grass at the circulating water
17 intake structure. We had previously assigned special
18 crews out at the intake structure that were supervised
19 and included both operations and maintenance personnel
20 to maintain this facility around the clock, seven days
21 a week. So, we had provided some additional coverage
22 at the intake.

23 To give you some flavor of the amount of
24 grass that we were seeing is that we actually monitor
25 and measure the grass through one of our consultants

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1 that we have in the Delaware Basin. Over the last 20
2 years, we've been taking data and information on it
3 and during this particular year, 1994, it's the
4 highest we've seen in the last 20 years and this
5 particular day one of the very high peaks. We
6 experienced about four times the normal concentration
7 of grass we would see in the highest during a spring
8 activity. This particular winter was exceptional in
9 that the large number of ice storms that we had and
10 experienced created ice back in the back marsh. As
11 you're aware, our plant is surrounded in the Delaware
12 Basin by the marsh and the grass. The significant
13 high tides we had, along with the ice, combined to
14 provide the opportunity for grass to be carried into
15 the river stream.

16 Power was reduced to less than ten
17 percent. Going less than ten percent enabled the 25
18 percent reactor trip. At this point, the shift
19 supervisor had made a decision to take the unit off
20 line and was in preparation of doing that. The
21 operator pulled the control rods to raise temperature,
22 causing the plant to trip at 25 percent power.

23 (Slide) One train of safety injection --

24 CHAIRMAN SELIN: Before you go on --

25 MR. MILTENBERGER: Excuse me.

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1 CHAIRMAN SELIN: As I understand it, there
2 was a -- I'll make this a question. Was there a
3 certain lack of synchronization between the reactor
4 operator and the turbine operator's actions up to the
5 point where power dropped to ten percent?

6 MR. MILTENBERGER: Yes. I'm going to go
7 into that in some more detail and talk about the
8 operator actions and what we found as far as the root
9 cause or causal factors. That was a piece that
10 contributed. The communications between the shift
11 supervisor and the operators contributed to the
12 temperature going low and the turnaround in pulling
13 the rods to have temperature come back up. Trying to
14 do that too quickly caused us to reach the 25 percent
15 power trip.

16 We had one train of safety injection
17 spuriously actuated and this also caused us to declare
18 the unusual event. This spurious signal that we
19 received was due to a pressure wave on the main steam
20 system which caused an indication of high main steam
21 flow which, combined with low temperature created a
22 very short duration spike into the system of about 30
23 milliseconds. This very short duration spike caused
24 some of the relays to actuate and others to not
25 actuate, complicating the event. So, one train

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1 actuated, the other train did not.

2 We went through intensive review and
3 analysis of those timings of the various electronic
4 spikes and found that all of the relays were in spec
5 and that if a real steam flow signal had been actuated
6 or indicated by high steam flow, both safety trains
7 would have functioned as designed.

8 The pressurizer proceeded to go solid and
9 the power operator relief valve cycled to maintain
10 pressure. There was additional time that was required
11 by our operators in dealing with the emergency
12 operating procedures because of the two different
13 trains now being out of alignment. They had to
14 analyze the conditions, understand what equipment had
15 not functioned, and put that equipment in place as
16 directed by the emergency operating procedures, which
17 they did.

18 During the next 30 minutes or so, as
19 temperature increased in the primary system and
20 secondary pressure increased due to residual heat, and
21 our operators not manually opening the main steam
22 relief valves, we had a main steam safety valve that
23 opened causing the reactor plant to cool down and a
24 reduction in pressure. This cool down because the
25 pressurizer was now solid is what caused the pressure

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1 in the pressurizer to go down rapidly under a solid
2 condition.

3 (Slide) That rapid reduction in pressure
4 caused a second safety injection due to that low RCS
5 pressure. The operators went back into the emergency
6 operating procedures as directed, worked their way
7 through them and then shut the safety trains back down
8 as directed by those procedures. We then declared an
9 alert as a precautionary measure to ensure the proper
10 technical support personnel were in place to review
11 the plant shutdown. This was not required by the
12 technical conditions of the plant, but we decided it
13 was the prudent action to take.

14 Later on, pressurizer level was restored,
15 emergency procedures were exited and normal cool down
16 was initiated and the alert was terminated later in
17 the day.

18 (Slide) Before we start on the causal
19 factors, let me cover how we view the event relative
20 to safety significance. The event is significant and
21 has been recognized by PSE&G by a thorough analysis
22 and corrective actions that we've undertaken relative
23 to the event. This event represented a number of
24 challenges to our safety systems to include a trip,
25 two safety injections. The second safety injection

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1 was pressurizer solid that repeatedly challenged the
2 PORVs.

3 Significant challenges to the operations
4 crew during this event with the rapid power reduction
5 and the low power operation, complicated event caused
6 by spurious signal, which led to a misalignment of the
7 safety injection trains. That misalignment
8 significantly contributed to the complication.

9 Although some errors were made by our
10 operators and a number of challenges from what was
11 going on in the plant, the operators responded well to
12 really diagnose what was happening and shut the plant
13 down in appropriate fashion.

14 There's a number of important lessons
15 learned for PSE&G and the industry and I will cover
16 those in my corrective actions.

17 We did both a plant and independent review
18 in accordance with our policies at our facility and
19 directed the plant not be restarted until we
20 thoroughly understood and made the necessary
21 corrections. Our review led us to the following
22 causal factors. I'd like to break these into three
23 components. The first is the reactor trip. The
24 control operator withdrew the control rods too quickly
25 and improperly monitored the plant parameters. In

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1 addition, the shift supervisor inadequately carried
2 out command and control of monitoring the plant
3 parameters and directing the resources to the priority
4 of tasks that were needed. This addresses the earlier
5 piece.

6 CHAIRMAN SELIN: Except that that's true.
7 That's the tactical problem in what happened at the
8 turbine and the reactor got out of synchronization,
9 but then there's a broader problem which is why did
10 they try to keep power? Why didn't they just scram
11 the reactor at that point altogether? I read a little
12 bit ahead. I cheated. I'm sorry about that. But
13 that doesn't seem to be addressed in the other points.

14 MR. MILTENBERGER: What we saw is they had
15 already made -- they felt that the plant was stable at
16 the time. We're working through the procedure because
17 they had made a decision to take the turbine off line.
18 They were working vigorously to do that in a very
19 planned, organized fashion and follow the procedures
20 in a methodical fashion to take the turbine off line.
21 Some additional guidance that we provided them is we
22 want them to just take the turbine off and we want
23 them to do it by a turbine trip if that's what's
24 called for because as you look back at this scenario
25 you can see that if they merely would have tripped the

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1 turbine and/or tripped the reactor, which would have
2 tripped all the systems, they very quickly would have
3 come out of this. But they felt that the plant was
4 stable and that they would methodically take the plant
5 off-line and not challenge it by giving it the trip
6 signal.

7 CHAIRMAN SELIN: I could see a number of
8 possible reasons for that. One is the procedures
9 weren't explicit and they just didn't know what to do.
10 The second is they're going on an assumption that each
11 time you trip a turbine or trip a reactor, something
12 might happen and you should avoid these if not
13 necessary or the third is some kind of an idea that
14 it's embarrassing to have a trip and you should avoid
15 them if you can. Are any of these the cause?

16 The information I got, and I may pass this
17 to Joe in just a minute, the information that I got is
18 I look at the picture of what they saw. They thought
19 the plant was stable and they did not want to actuate
20 a trip, not from the standpoint of embarrassing or any
21 other situation, but they felt that they did not want
22 to challenge the emergency systems or other systems --

23 CHAIRMAN SELIN: If they didn't have to.

24 MR. MILTENBERGER: -- if they didn't have
25 to and they thought they were on a very good path to

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1 methodically take the plant off.

2 Joe, do you have anything to add?

3 MR. HAGAN: We asked the operator
4 specifically why didn't you trip the turbine. At the
5 point they were in the scenario, their answer, the
6 senior shift supervisor and the shift supervisor, was
7 that they were concerned about introducing a secondary
8 plant transient until they had recovered the primary
9 system, which was to restore the reactor coolant
10 temperature. We asked them specifically, "Why did you
11 hesitate because that was clearly your plan of attack
12 up until this point in time?" Their answer was that
13 they wanted to make sure that the primary plant was in
14 the condition where they felt comfortable before they
15 introduced a secondary plant transient.

16 CHAIRMAN SELIN: Are the procedures mute
17 as to what to do in the situation? Is it too
18 specialized a scenario to go to the procedures and
19 find guidance? Do you leave that to the operators to
20 judge? I just think conversely, is it clear that
21 according to their instructions they should have
22 tripped either the turbine or both, but they didn't?

23 MR. HAGAN: Within the guidelines that
24 they had, the procedural guidelines at the time, it's
25 up to the individual's judgment on when to do that.

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1 What we've done since that time is actually given them
2 explicit direction on when to take the turbine off
3 line in accordance with certain parameters. We
4 also hesitate when we give them direction, but not to
5 be too prescriptive.

6 CHAIRMAN SELIN: Is a scenario like this
7 one against which people train? Had they seen
8 something like this in their training or is this
9 somewhat new to them?

10 MR. HAGAN: There's training scenarios
11 that would involve rapid down power scenarios. This
12 particular one, I do not believe we have an exact type
13 of scenario for a loss of circulators that follow the
14 same pattern. There are rapid down power trending
15 that's given.

16 CHAIRMAN SELIN: In which they normally do
17 trip one or the other of the systems?

18 MR. HAGAN: In this particular case, I
19 don't know which they would have done. I've not gone
20 back and looked at all the scenario results to see
21 which -- actually what they look at is what the
22 results have. In a certain case --

23 CHAIRMAN SELIN: Say that again. I didn't
24 understand that. What they look at is what the
25 results are?

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1 MR. HAGAN: What the results were in the
2 simulator scenario for rapid down power. A shift
3 supervisor will make a decision on what to do based on
4 the circumstances they have. This particular
5 circumstance I'm sure we did not have that was
6 duplicated over the loss of the circulators and the
7 way they were going.

8 CHAIRMAN SELIN: So they were sort of on
9 their own, not just because of the written procedures,
10 but it's your impression that neither the written
11 procedures nor the training really covered something
12 very close to this scenario?

13 MR. MILTENBERGER: Let me cover that a
14 little bit.

15 CHAIRMAN SELIN: Okay.

16 MR. MILTENBERGER: My expectation is
17 through the simulator and the training activities that
18 we go through. I know that when I went through the
19 SRO certification and training program, you go through
20 a number of scenarios not exactly like this, but you
21 go through a number of scenarios where you look at
22 your various plant parameters. When those plant
23 parameters get out of bounds in certain areas, that's
24 what keys you in to make certain decisions about
25 tripping the turbine and/or tripping the reactor

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1 systems. So, within those training scenarios you
2 would find examples that would fit some of the
3 elements of this but not exactly the element of this.

4 CHAIRMAN SELIN: Which would suggest that
5 they should have tripped the --

6 MR. MILTENBERGER: Our review of this is
7 that they should have tripped the turbine. That
8 should have been an early on decision. They did make
9 the decision to take the turbine off, but they felt
10 that they were stable enough at the time to do it
11 through a procedural removing rather than reaching up
12 and merely tripping the turbine.

13 CHAIRMAN SELIN: I'm not trying to ask you
14 what three Ph.D. engineers -- we know better than to
15 trust a Ph.D. engineer -- what three advanced
16 engineers would have done at this point. I'm saying
17 given the total between procedures, training, et
18 cetera, what would you have expected the operators to
19 do, not what you would have done yourself.

20 MR. MILTENBERGER: What I would have
21 expected the operators to do was trip the turbine.

22 CHAIRMAN SELIN: Okay. Thank you.

23 COMMISSIONER REMICK: Elaborate a little
24 bit on the wording that they withdrew the control rods
25 too quickly. This immediately makes me think of a

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1 period scram rather than 25 percent. By too quickly
2 do you mean too far too soon or --

3 MR. MILTENBERGER: Too far and too fast.
4 They were operating the unit down about eight percent
5 power at the time and they observed that T_{ave} was below
6 set point and below the tech spec requirements for
7 that. They were in the process of recovering that.
8 The operator withdrew the control rods too quickly and
9 too far over a short period of time as he was
10 monitoring temperature and looking at other parameters
11 and hit the 25 percent power trip. We never should
12 have gotten to the 25 percent power trip.

13 COMMISSIONER REMICK: But if you'd pulled
14 the rods quickly but not too far, you would not have
15 exceeded 25 percent.

16 MR. HAGAN: The rate is predetermined.
17 It's the amount of control rod you withdrew.

18 COMMISSIONER ROGERS: I see. That he was
19 aware though that it would trip at 25 percent power.
20 In reading some of the background material, it sounded
21 to me as if the operators were not aware that it would
22 trip when they hit 25 percent.

23 MR. MILTENBERGER: My understanding is the
24 operator was aware of that, and Joe, you can fill in
25 some data here. Never expected to get close to over

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1 25 percent level, yes.

2 MR. HAGAN: His intention was not to
3 increase power to anywhere near 25 percent. It's not
4 clear to us that on our review, to make it clear from
5 what we know, we believe the individuals in the
6 interviews realized that they had gone below ten
7 percent power and from their training they know what
8 that means as far as arming P-10. It was not clear to
9 us that they had communicated that amongst the crew so
10 the crew knew that. But from our review of the rod
11 reactivity increase, he had no intentions of bringing
12 power up that high. It was to restore T_{ave} .

13 MR. MILTENBERGER: Now, you touched on
14 another point and Joe touched on it. That's
15 communications amongst the crew, which is an area that
16 we've done additional work in. They didn't feel that
17 that was a piece and it's part of command and control
18 and that communication fits in with that.

19 COMMISSIONER ROGERS: Maybe you'll touch
20 on it someplace along the way, but reading background
21 material on this seems to suggest to me that there
22 might have been a team training problem, a question of
23 whether these folks had really -- were functioning as
24 well as they should as a team and been trained as a
25 team as much as they were as being held accountable as

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1 individual operators and individual performers. I'd
2 like you to say something sometime before you're all
3 finished as to how you see the team functioning in the
4 kind of training that you may feel may be called upon
5 to emphasize the team functioning much better than the
6 sum of its parts, which is what you hoped to get and
7 apparently didn't get in this case.

8 MR. MILTENBERGER: We might as well touch
9 on that now and I'll cover some and maybe Joe will
10 touch on some.

11 The team training and team aspect of the
12 training is an area that we've provided some
13 additional training and additional work to the
14 individuals and to the groups and all of our crews
15 relative to this from the experiences of what we've
16 learned out of it. The communications piece really
17 ties in significantly with the performance of a crew
18 and how they pull together to have the whole perform
19 better than any one individual. So, that was a piece
20 that we wanted to concentrate in and emphasize on.

21 There's sort of two different pictures, as
22 I look at it. If I look at the teamwork amongst that
23 team prior to the trip, the number of pieces that they
24 missed and could have improved upon, following the
25 trip and the safety injection, which tended to be a

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1 very complicated event for them at that time, the team
2 seemed to come together as a team, communication
3 seemed to change. We did have one problem later on
4 that I'll talk about, but the team really came
5 together as a team and functioned well to manage the
6 plant and ensure what was going on in the facility.
7 So, we see two aspects of that. That's a piece that
8 we feel we need to work on. So, we did see both
9 aspects of that.

10 The first safety injection, the operator
11 allowed primary system temperature to go too low
12 coincident with a false short duration high steam flow
13 pulse. This is what caused the misalignment of the
14 safety injection trains and caused the A train to
15 actuate and the B not to actuate. A false high steam
16 flow signal was due to a design vulnerability which we
17 learned from this event and have proceeded to
18 institute design changes to remove that vulnerability
19 from the system. I'll talk about that some more.

20 (Slide) The second safety injection, the
21 causal factors were less than adequate group
22 communications. We talked about this some and this is
23 a piece in the second half since the trip. Recovery
24 of the temperature, as primary temperature was coming
25 up, secondary pressure was also increasing. The

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1 operator, not taking manual control of the main steam
2 relief valve, which he had been trained to do so,
3 caused us to hit the steam safety valves. The design
4 of the steam relief valve automatic control system,
5 which is a known problem and a design modification
6 that had been planned but was not implemented.

7 (Slide) I'd now like to cover the
8 corrective actions and I'd like to cover these in
9 three different categories dealing with personnel and
10 training, procedures and equipment. In many ways,
11 those three can tie together, but I'd like to break
12 those into the parts. We've conducted additional
13 simulator training for all of the operating crews to
14 reinforce low power operation, solid plant operation,
15 command and control and communications, resource
16 management, operator actions following an automatic
17 safety injection. In particular, train misalignment.

18 We have reinforced and clarified
19 management's expectation to all operating crews
20 dealing with low power and rapid power reduction,
21 along with turbine trip and reactor trip that we've
22 already talked about.

23 In the procedures area, we saw a number of
24 enhancements that we could make to our procedures to
25 provide some additional guidance; enhanced operating

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1 procedures for rapid power reduction and low power
2 operation; revised operating procedures to include
3 minimum condenser vacuum and circulators and service
4 criteria for a manual trip; revised operating
5 procedures for restoration of pressurizer level and
6 these procedural changes were reinforced through the
7 training activities.

8 In the third area of equipment --

9 COMMISSIONER REMICK: Excuse me. Am I to
10 interpret those changes had been made where it says
11 "revised?"

12 MR. MILTENBERGER: Yes.

13 COMMISSIONER REMICK: Okay.

14 MR. MILTENBERGER: Those changes in
15 procedures have been made and all of the crews trained
16 on them.

17 In the equipment, we've made modifications
18 to improve the automatic operation of the main steam
19 relief valves. As I mentioned, this modification was
20 planned, but it could have been implemented earlier.
21 We made modifications to dampen the steam flow
22 transmitter sensitivity to the pressure pulses it sees
23 from the main steam system.

24 COMMISSIONER REMICK: Was that the design
25 vulnerability that's referred to?

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1 MR. MILTENBERGER: This is the design
2 vulnerability that when the main steam stop valves
3 close on a turbine trip it sends a pressure wave down
4 the pipe and because of the flow transmitter having
5 two taps and it sees that wave, it creates a short
6 duration oscillation amongst those two taps and about
7 a 30 millisecond pulse is what we saw.

8 We have some planned modifications to the
9 circulating water traveling screens which will enhance
10 their ability to cope with the grass. Even though I
11 talked about the significant amount of grass that we
12 did see this particular year, these modifications are
13 looking at lighter and faster screens, new improved
14 rakes and some other modifications we expect to make
15 in the future.

16 (Slide) There were some other issues that
17 came out of the various reviews. One of them was the
18 reactor vessel level indication system. Because of
19 the identification of that by the NRC and by my staff
20 in reviewing it, we've extended the utilization to
21 shutdown. That system was never intended for that,
22 but we see it being beneficial and utilized for that.

23 The pressurizer, power operator relief
24 valves, we're going through an extensive engineering
25 analysis of the valve internals. Our valves did

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1 perform very well, did show some signs of wear and
2 some minor cracking which had to be evaluated and is
3 an ongoing evaluation. There will be some important
4 lessons for us into the future.

5 In emergency plan communications, we are
6 incorporating some additional guidance to be provided
7 from the NRC, particularly at the unusual event level.
8 There was a request for some additional technical
9 information to be provided we did not have at the
10 time. We intend to include that into our procedural
11 guidance in the future.

12 Some of the lessons learned are being
13 shared with our Hope Creek unit and with the industry.

14 (Slide) I would like to move from this
15 specific topic to the broader picture, the Salem
16 station. We recognized a few years ago that Salem
17 plant condition and performance was not meeting our
18 expectations. At that time, we instituted specific
19 improvements to equipment, procedures and personnel.
20 This improvement focus on these three areas.
21 Equipment dealt with materiel condition upgrade,
22 corrective and preventative maintenance and backlog
23 reduction. In procedures, procedure upgrade process,
24 we revised 3500 procedures in a facility and those
25 have been issued. In the people area, it dealt with

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1 supervisory effectiveness, communications, work
2 practice, standards and teamwork.

3 As I take a look at this perspective, and
4 I'll show you some results in a minute, the equipment
5 side has made some progress and we are pleased with
6 that over the last several years, but we still have
7 room to go. The procedural area is essentially there
8 and has moved to, I'll say, state-of-the-art in the
9 industry. The people side --

10 COMMISSIONER REMICK: Excuse me. When you
11 say state-of-the-art, does that include human factors
12 considerations in the procedures of simple things like
13 headings and things, make them easier to read and
14 understand?

15 MR. MILTENBERGER: Yes, it does.

16 COMMISSIONER REMICK: It's not only
17 correcting them technically, but making them more
18 readable.

19 MR. MILTENBERGER: This complete rewrite
20 of our procedures was done in a very planned
21 methodical basis. We actually had INPO come in twice
22 early on in the process to review with the guidance
23 that we wanted to not just improve the procedures, we
24 expected those procedures to move to a significant
25 step change from where they were and equal in the

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1 industry and that has been done.

2 On the people side, we have not made the
3 progress that we expect to make. We recognize this as
4 a very tough issue and is receiving our increased
5 focus. Joe Hagan will cover this area later in the
6 presentation.

7 I don't intend to cover in detail the next
8 few slides. I intend to go through those fairly
9 quickly.

10 (Slide) On the materiel condition upgrade
11 side, we've completed for Unit 1 and/or Unit 2 a
12 number of modifications in the facility. Just a
13 couple I would mention. The control room
14 modifications and human factor upgrades amounts to
15 about a \$45 million expenditure to do that. The
16 upgrade of 18,000 linear feet of service water piping,
17 safety related, is in excess of \$100 million. The
18 switchyard expansion and upgrade is on the order of
19 \$77 million.

20 As I take a look at the total expenditures
21 since 1990, we're somewhere in excess of \$300 million
22 on specific upgrades to the facility. That's up to
23 1994. We expect to expend about \$100 million in
24 additional in 1994 and \$75 million in '94 as we're
25 moving the equipment to the state we want it to be in.

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1 In addition to that, as we take a look at
2 the design changes that have been implemented, about
3 100 of those design changes were specifically
4 implemented to assist the operator and operator
5 actions. There's a lot of design changes with that.

6 I brought with me a very simple before and
7 after book to provide just a couple of pictures.
8 There's only about a picture of before and after in
9 the book and not really intending to cover it in
10 detail, but we could do that. As you flip through
11 here, before is on the left and after is on the right.
12 Those of you that have not been in the plant in
13 awhile, we would invite you to come, pay us a visit
14 and take a look at the plant today.

15 COMMISSIONER ROGERS: Gee, it looks like
16 you turned the whole plant.

17 MR. MILTENBERGER: If I could move ahead
18 with some of the slides, since I don't plan to cover
19 those in detail.

20 (Slide) Corrective maintenance backlog,
21 wanted to show you some history of that. We've moved
22 from the 2500 mark several years ago to the 1000 mark.
23 This does compare favorably with industry standards.
24 Preventative maintenance overdue, similar improvement.

25 (Slide) Reliability centered maintenance

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1 program, we have instituted on 34 programs at the
2 Salem facility, 34 systems. That project is now
3 complete.

4 (Slide) As I mentioned, the procedures
5 upgrade program, you can see the progress that we've
6 made over the years and that project is now also
7 complete.

8 (Slide) As I take a look at the personnel
9 side, and as I mentioned, Joe will cover this in more
10 detail in a minute, we've done work practices and
11 standards expectations, work monitoring by both line
12 management and a secondary monitoring by our QA
13 organization. Work control process improvement,
14 supervisory face to face time, additional root cause
15 training for the organization, supervisor and
16 management training and manager and supervisory
17 dialogues. We now see the personnel area where we had
18 to concentrate on three areas previously. This past
19 year and into the future we see significant
20 concentration of energy and effort on the personnel
21 side.

22 (Slide) A couple of indicators and I just
23 pulled a couple of licensee event reports, you can see
24 that we've made progress in that, and personnel error
25 LERs at the Salem facility, we've also made progress

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1 in that area.

2 (Slide) The assessment of results is we
3 see improvement achieved in a number of areas.
4 Personnel performance improvement is noted but is not
5 meeting our expectations. The plant performance is
6 also not meeting our expectations, particularly
7 dealing with uneventful operations and reliability of
8 the facility.

9 (Slide) Because of this and a number of
10 reviews, we identified the need for a comprehensive
11 performance assessment that was done this past year.
12 This comprehensive performance assessment was done by
13 a full-time multi-disciplinary team of 12 people for
14 four months of dedicated time, reported directly to me
15 and performed a comprehensive assessment of
16 occurrences over the last two years. We looked for
17 broader root causes, failed barriers, contributing
18 causal factors and common threads.

19 (Slide) The results from that
20 comprehensive performance assessment has defined
21 specific problem statements within three categories:
22 management philosophy, skills and practices; people
23 performing the work and problem solving and follow-up.

24 (Slide) From the results of that
25 comprehensive performance assessment we have defined

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1 responsibilities for resolution, prepared action plan
2 and schedules for each problem area and identified
3 performance indicators to measure progress and
4 effectiveness at a facility. Such things as work
5 practices and standards and both line and QA
6 supervisory face to face time and leadership feedback
7 results of the performance of our supervisors. This
8 event provided some specific lessons learned but
9 overall fit into our comprehensive performance
10 assessment and the broader picture that we are working
11 on.

12 At this point, I would like to have Joe
13 Hagan talk about the emphasis on people. Joe is newly
14 assigned to the Salem facility. He was previously
15 Vice President of Nuclear Operations and General
16 Manager of Hope Creek. Joe brings the Hope Creek
17 management philosophy with him and an excellent record
18 of dealing with the people side of the business.

19 Joe?

20 MR. HAGAN: Thanks, Steve.

21 As Steve said on people's performance --
22 let me clarify one other thing that Steve said. I did
23 work at Salem from 1977 to 1983. I had Salem
24 experience prior to going to Hope Creek. Coming back,
25 my aim coming back was to look at the Salem

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1 performance and the Hope Creek performance and say
2 what's different, why does it seem to work and we're
3 having difficulties on the other, and really look at
4 people's performance and convince people that Salem's
5 performance is truly people's performance because
6 that's what our assessment is. How Salem performs is
7 really a reflection on how well its people perform.

8 Going in, I talked to the managers, did a
9 personal discussion with the managers who were there.
10 Did my own assessment of where they were, what they
11 were feeling, whether they believed that, whether the
12 change was through the people. Based on the
13 interviews and based on what we saw elsewhere in the
14 industry, I asked the managers to put together a plan
15 of improvement, letting them know that the
16 restrictions were that the -- really the only
17 restriction was the outcome had to be successful. We
18 were looking for successful organization. The
19 conclusion I came to was there was some people --
20 changes need at the Salem plant. Not only the number
21 of people, but who were in positions at the time. We
22 did the assessments, made some personal changes.
23 Those included most recently here the department
24 heads. A number of the department heads who were
25 reassessed were selected to go to other slots.

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1 Additional people were promoted and brought in. We
2 did bring some of the Hope Creek people over, keeping
3 in mind that they were people who were needed at Salem
4 and were in the position on Hope Creek side as far as
5 performance, were in line for promotion. We decided
6 to give them an opportunity at the Salem plant.

7 The staffing levels that we talked about
8 I asked the management team to put together the
9 organization, looking from my assessment on three key
10 areas that I saw that needed improvement and we
11 defined them as focus, ownership and teamwork for the
12 individuals in the Salem staff. They put together an
13 organization with no restraints.

14 Looking at the organization in place is
15 comparatively low as compared to the industry.
16 There's about -- at the time that I became VP of
17 Nuclear Operations, it was 530 line functions, line
18 people. We increased that number to -- it was 570.
19 I may have said 530, it was 570. We took that to 630
20 people, looked at it again, looked at what the
21 situations were in terms of work load, decided that
22 the organization that would work the best for us was
23 partially unitized for Unit 1, Unit 2 within
24 maintenance, operations and station planning, and with
25 that decided on a number of about 700 people. That's

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1 still up in the air a little bit with a few people,
2 but it's about 700 people, which gives us about 350
3 people per unit.

4 Looking at the industry and our experience
5 on Hope Creek side, the line management right now
6 feels comfortable with an organization that's going to
7 do the job for us. As part of the rebidding, I said
8 the Department engineers were reselected here. The
9 next line or next level of supervision is the senior
10 supervisor level. That's a second level supervisor.
11 They're going through an assessment process where we
12 had brought in an outside firm to put together the
13 assessment process for us. We combined that with our
14 own interviews and make selections for the best people
15 or putting the right people in the right jobs, which
16 from what we see right now there's some individuals
17 that are in the process of being changed out. So, we
18 want the right people in that can do the job and get
19 the people behind them as far as doing the work.

20 Part of the areas that we're looking to
21 improve or we have our emphasis on is the training.
22 As far as people skill training, there's about 2400
23 individuals in the Nuclear Department. All those
24 individuals have gone through what we call reaching
25 our vision training, which is overall assessment of

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1 what the company is trying to do, what the department
2 is trying to do. We also have a set of team training,
3 we call making the difference. That's being
4 implemented now. We've just started that this year.
5 We've had a number of people through that. They go
6 through as teams. We also have developed the business
7 leadership training for our supervisory personnel.
8 That's a five week program that's spread out over a
9 six month period where you go for a week and then
10 you're back for a month to implement the things you've
11 learned. All the supervisory personnel will go
12 through that training.

13 The increased supervisory time in the
14 field, one of the major things I'm stressing coming
15 back in is to make sure that we are out in the field
16 doing essentially the supervisory skills that have to
17 be done, the monitoring and assessment of what our
18 people are doing in the field. The managers know my
19 expectation is that they will spend approximately 40
20 percent of their time in the field doing just that.
21 I won't say that we've been extremely successful in
22 getting the 40 percent time in the field right now,
23 but it is much improved on where it was. I use my
24 assessments when I'm out in the field. My
25 observations are what I'm seeing to judge how well

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1 it's being done.

2 The accountability through performance
3 appraisals, this is an emphasis on making sure we give
4 honest feedback to people. Too many times in the past
5 we've seen them just used as a checklist. We want
6 honest assessment of people's performance, their
7 ability and direct feedback to the people as far as
8 what the expectations are in terms of performance.

9 We've developed the dynamics of leadership
10 model, as we call it. It's training that was
11 developed between myself and the human resources
12 personnel with people who we deem to be very
13 successful supervisors and those in the organizations
14 who are supervised and defining what they see as
15 behaviors for excellent supervisors. We developed the
16 training. I personally gave the training to all
17 supervisory people. There's about 440 or so.

18 (Slide) That's the model on the next
19 couple slides here. The supervisory model is the
20 round model. These are a couple take aways or walk
21 aways that we have for the training.

22 What we tried to do was to develop the
23 model to build it around the sense of teamwork and the
24 elements are there.

25 (Slide) The back of the card, the next

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1 slide, are what I call the basic behaviors, to make it
2 very simple, on what's expected. The emphasis is on
3 the identification and the solution of problems. As
4 I said, we tried to keep it very clear in terms of my
5 language, if you will. What it boils down to, if it
6 doesn't look right, feel right, smell right, then say
7 something because it probably isn't right. That's
8 what we emphasize with the supervisors. That's what
9 they have to encourage from their people. This really
10 was our answer to supervisors who say, "Well, how do
11 you want me to supervise? What is it that I am
12 supposed to do?" Very simple form or a clear format
13 on, "Here's what we want to do. Here's what we think
14 is important that you be doing."

15 COMMISSIONER REMICK: Joe, what's the time
16 period of the performance assessment and then the
17 corrective action that you've been referring to?

18 MR. HAGAN: The performance appraisal --

19 COMMISSIONER REMICK: Yes, how recently.

20 MR. HAGAN: The actual enforcement and the
21 changes that we started in December. So, the changes
22 are in place, but the actual performance appraisal
23 cycle is a year. If there's performance problems
24 there, then it's really -- part of what the training
25 shows, it's up to the supervisor to deem whatever time

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1 frame that is. You can have performance appraisals on
2 a monthly or quarterly basis if the performance
3 warrants that.

4 COMMISSIONER REMICK: And you mentioned
5 the form of team training that is recent. Your staff
6 in the past had the standard team training that
7 industry developed?

8 MR. HAGAN: Yes, the operation staff
9 within their training has the team training. We went
10 through the INPO supply team training. That's just
11 for the Ops. staff. This training is for all
12 individuals within the department.

13 COMMISSIONER REMICK: I see. Thank you.

14 CHAIRMAN SELIN: Mr. Hagan, how long have
15 you been at Salem?

16 MR. HAGAN: I've been at Salem as the
17 General Manager since the beginning of March.

18 CHAIRMAN SELIN: This program predated
19 you, this training program? I'm a little confused on
20 the chronology now.

21 MR. HAGAN: The actual training program
22 was developed by myself as the Vice President, Nuclear
23 Operations.

24 MR. FERLAND: Joe, I might be able to help
25 out here. I think I can see where the Chairman is

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1 coming from.

2 Prior to taking the position Joe is in now
3 as Vice President and General Manager of only Salem
4 Station and focusing all his activities there, he was
5 Vice President of Operations of both units. So he had
6 some influence over Salem, but it was not a full-time
7 commitment. Given the situation at Salem, we just
8 thought it was sufficiently important to get the best
9 person we feel we have in our organization. And this
10 is his full-time responsibility and he's going to stay
11 there until the place is straightened out.

12 CHAIRMAN SELIN: So you got there a month
13 before this particular incident?

14 MR. HAGAN: Yes, it was about a month.

15 (Slide) The next slide is the -- with
16 anything you put in place, any program, you have
17 measurements. The next slide is the measurements that
18 we've put in place, work practices and standards,
19 monitoring by the line management and QA. That's the
20 actual field observation of individuals' work
21 performance to the standards and then the tabulation
22 of those. And the results are shared by the managers
23 with myself and we use that to trend not only that it
24 is being done but what's the quality. What are we
25 seeing? What are the problems that we're seeing? Are

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1 problems correcting or being corrected?

2 The supervisory face to face time, that's
3 another assessment by another supervisor of how well
4 the time is spent in face to face time, what's being
5 said, what's being discussed.

6 Human performance, the performance
7 indicators, we look at the incident reports that we
8 have that are related to personnel matters. Those are
9 analyzed in terms of root cause and to see what common
10 threads are there, what changes need to be done in
11 terms of training or reemphasizing to our people on
12 supervisory skills if it is a supervisory issue.

13 The leadership feedback results are a form
14 that we developed and we have the buy-in from our IBW
15 Union membership that this is really a form that's
16 used to say how we're doing, to tell us flat-out how
17 are we doing. You don't put your name on it. You
18 fill it out and it's an assessment of how we walk and
19 we talk. Are we doing what we said that we would? We
20 think it's important. You tell us.

21 We talk to the union leadership, that we
22 have their buy-in, and that's something that we're
23 doing. We're doing that on a tabulation right now on
24 a quarterly basis. And we also encourage the
25 supervisors and the people that are supervised to use

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1 that to give feedback to their boss or their
2 supervisor on what they're seeing.

3 And the comprehensive safety index is an
4 overall performance indicator that we use. It
5 includes such things as safety system availability and
6 reliability, contaminations, radiation exposure, how
7 we're doing against our composite goals.

8 With that, I'd like to turn it back to
9 Steve for --

10 COMMISSIONER ROGERS: I have just a
11 question, and this might be a good time to do it, on
12 this emphasis on a unitized organization or unitized
13 organizations at Salem. Can you say a little bit
14 about what the situation was that you felt needed to
15 be corrected by emphasizing taking a unitized
16 approach? Just exactly what does that mean? What
17 does it mean in terms of how the teams in Salem 1 and
18 Salem 2 interact with each other and share information
19 and so on?

20 MR. HAGAN: We're in the process of
21 actually in implementation now. The Department of
22 Engineers at the department level are the first level
23 to be unitized. This is going to be out over about a
24 year and a half, two year time frame, because we are
25 gathering additional licenses on the operations side

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1 so we can have a unit 1, unit 2 licensed operator
2 organization.

3 We went out in the industry and looked at
4 a couple plants who are organized. When I stepped
5 back, what I looked at and said what do we need, you
6 know, why, I didn't go in and say we want to unitize
7 the plants. I went in and said, what seems to be
8 missing? And the areas that I came up when I looked
9 for my assessment I felt that needed improvement were
10 the focus.

11 Say focus, that's the discipline on what
12 you're doing, what you're doing, whether you're
13 cleaning up the floor or you're doing a valve repack
14 or you're doing a surveillance on a solid state
15 protection system, maintaining your focus, or your
16 planning in the outages, keeping the discipline on
17 what you're doing to make sure that what you're doing
18 is the best job that you can do.

19 The other was the ownership,
20 identification and solution of problems. I just
21 didn't have the sense of ownership, that we can make
22 the difference, this is our plant and we have to do
23 what's right; a reliance, if you will, on somebody
24 else doing it. And therein lies the teamwork aspect
25 of this. I didn't see them working well as a team.

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1 And so, they were the elements. I went in
2 and said, well, what can we do collectively? What can
3 we do to improve the overall performance? Unitization
4 was a piece of the answer.

5 What I view unitization as is an
6 opportunity for us to improve the areas that I've laid
7 out, just the opportunity. It's there for us to do.
8 We have to do it.

9 When I looked at the work load, say in
10 maintenance, what comes into maintenance or operations
11 as far as a unit in an outage or not in an outage,
12 therein lay the opportunity to say, well, what can we
13 do in these particular groups to increase that focus,
14 ownership and teamwork? What can we do?

15 There were a couple of the departments
16 within the station that really didn't fit the
17 unitization from their focus, it seemed to be. That
18 was RAD/PRO Chemistry. RAD/PRO Chemistry can do it
19 equally well whether it's Unit 1 or Unit 2. Also,
20 System Engineering, Technical. There's some unitation
21 right now within Technical, but it's not totally that
22 way.

23 So the organization itself will be Unit 1,
24 Unit 2, at the department head level all the way down
25 to the technicians within Maintenance, Operations, and

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1 Station Planning.

2 COMMISSIONER ROGERS: Well, I can see some
3 gains in ownership. I just would like to point out to
4 you, though, that you have to be very careful that
5 this doesn't lead to a competition between 1 and 2
6 that results in people not sharing information.

7 I remember one site I visited some years
8 ago where plants were identical and management thought
9 it was a great idea to put one reactor in competition
10 with another reactor and they stopped sharing
11 information and they all went down and they got into
12 real problems as a result of it. So a sense of
13 ownership is great, but I think you don't want to lose
14 the sense that what we learn on Salem 1 can very well
15 be useful to improving the performance of Salem 2.

16 And if management's view is we'll put 1
17 and 2 in competition with each other and they'll both
18 do better because they'll be trying harder, there are
19 some very serious negatives that can come out of that
20 by, you know, 1 doesn't want 2 to get ahead of them so
21 they just don't tell them everything, and I think that
22 can be very bad.

23 So the sense of ownership is great, but I
24 would just caution you to be careful that you don't do
25 anything that disturbs the sense that we're all trying

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1 to make the site the best that it can be and that
2 sharing information that could have safety
3 implications and result in one plant doing a little
4 bit better, one of the two plants doing a little bit
5 better than the other one, is something that shouldn't
6 be -- there shouldn't be any problems with that.
7 There should be very free exchange of information on
8 how to improve performance, and so I'd just caution
9 you a little bit on that because there is a temptation
10 to say, well, let's put them in competition with each
11 other and see who does best and reward that, and that
12 can lead to some serious problems.

13 MR. FERLAND: Thank you for the caution,
14 Commissioner.

15 Steve?

16 MR. MILTENBERGER: Just a brief summary.

17 We've completed our detailed analyses and
18 reviews.

19 We've completed our equipment and
20 procedural corrective actions.

21 We are working on one piece of equipment,
22 which is the pressurizer PORVs, so there's one piece
23 of work still ongoing and we're completing that.

24 We have completed our required retraining
25 for the operations personnel and we've confirmed the

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1 broader equipment and personnel issues that are
2 addressed by long-term actions. A number of those
3 we've covered today, what we're accomplishing.

4 Based on our analysis and corrective
5 actions that we've undertaken, I have the confidence
6 in the Salem management team and their ability to
7 safely operate the Salem facility.

8 Jim?

9 MR. FERLAND: If I can just sort of
10 summarize, this is a lot of information really in a
11 short time period.

12 If there were only two things you could
13 come away with from this meeting, I would hope that
14 those would include, one, that the safe and reliable
15 operation of all of our nuclear facilities is of
16 paramount importance to our organization, which it is.

17 I would hope you'd come away feeling that
18 the senior management and the directors of the
19 corporation are involved and feel fully responsible
20 for the activities that are going on at our
21 facilities.

22 We do acknowledge the need to further
23 improve Salem's operations. It's not at the Hope
24 Creek quality level yet. We want it to be. We are
25 committing the necessary resources to produce that

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1 result, whatever those may be.

2 And we have exhaustively analyzed the
3 April 7th event. I think we understand its safety
4 significance and our corrective actions, both the
5 short-term and the longer-term ones that we've
6 described, are responsive, we feel, to the identified
7 deficiencies. With the improvement programs that
8 we've generically had underway for several years that
9 Steve has described adjusted to include some of the
10 lessons learned from this event, we are confident that
11 Salem will continue to operate safely, as it has, and
12 that its performance will continue to get better in
13 the future.

14 Thank you very much for your time and
15 attention. We'd be pleased to answer any questions
16 you might have.

17 CHAIRMAN SELIN: First of all, we just
18 thank you for coming. We'd like you to stay until we
19 hear the staff, because there may be some questions
20 for you after they --

21 MR. FERLAND: Absolutely.

22 CHAIRMAN SELIN: The message I've gone
23 away with, let me just tell you what it is and you see
24 if you tend to agree.

25 Number one, you're a proud company, proud

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1 of your personnel practices and what you're doing, and
2 therefore you're embarrassed by the difference between
3 Salem and Hope Creek. I mean, good corporate
4 management should lead to a certain level of
5 continuous performance.

6 The second, you really weren't surprised
7 by the event. I don't mean the specifics, but you had
8 taken actions a while ago, hopefully right after the
9 turbine event at Salem, because, if you hadn't taken
10 actions, something might happen. And in fact, it did.
11 I mean, you just -- you know, it takes some time. You
12 didn't get to that point, but you probably were quite
13 concerned that something like the April 7th incident
14 would happen. Maybe not exactly that one, but that
15 was the kind of thing you were worrying about.

16 And third, I think you've said it quite
17 precisely, Mr. Ferland. You've adjusted your plan,
18 but your plan was in place in advance to keep things
19 like this from happening. You may have learned some
20 particulars, but the call to action had gone out
21 already.

22 Fourth, you've done a whole lot of things
23 right.

24 And fifth, you still have problems.

25 So, you're not done there by any means.

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1 Takes some time. But the problems of Salem, they're
2 not enormous problems but they go back for quite a
3 while.

4 I guess what you're saying is this time
5 you don't want to come here every two years, that this
6 time you really want to get down to the statistically
7 untreatable level of event and no worse than that.

8 Is that what you're saying?

9 MR. FERLAND: I don't think, Commissioner,
10 that I'd disagree with anything I heard in there.

11 Certainly we are a proud company,
12 embarrassed by the fact, frankly, that we'd not been
13 able to bring Salem to the levels of Hope Creek, that
14 we'd not been able to do better than we had.

15 With regard to expectations on its
16 performance and what we thought, maybe characterize
17 just a little different way than the way you've said
18 that. We have taken a lot of action over the past
19 several years and if you had asked me as recently, I
20 would say, as maybe even the third quarter of 1993,
21 because of some of the results that Steve has pointed
22 out to you today where personnel errors are going
23 down, I would have said things were looking pretty
24 good.

25 We went into the fourth quarter of last

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1 year and we had one of the units out for an extended
2 outage. We were doing a lot of this backfitting,
3 found a problem with the sleeves on the diesel
4 generators which then carried over and we had to take
5 down the second unit.

6 Sometimes you learn something when you
7 really stress an organization, which we did. We had
8 one unit down for many months, a second one down, and
9 sometimes if you really stress a unit you learn a few
10 things. When we started looking at some of the data
11 we were rolling up in the fourth quarter of 1993 --
12 and it's information which INPO has since
13 substantiated and you're own staff, the regional
14 people, have come to -- we started finding some
15 personnel errors and some people not driving for
16 excellence every time, every minute during the fourth
17 quarter, and that caused us some concern and it's why
18 we did decide that we had to take some additional
19 action well before April and shortly after the first
20 of the year we started looking at how we could realign
21 the top management at the station and the people under
22 them.

23 I don't want to delegate responsibility
24 for our shortcomings strictly to the people at the
25 plant, because I really feel like when you don't get

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1 the results that you want the management of the
2 corporation from the first line supervisor to the CEO
3 has all got some accountability and responsibility for
4 that. I certainly feel responsible for our inability
5 to get that facility where we want.

6 We think we've taken the steps that are
7 necessary. If we haven't, we're going to learn from
8 everybody we can learn from. We'll adjust it again as
9 we go on down the road.

10 CHAIRMAN SELIN: Commissioner Rogers?

11 COMMISSIONER ROGERS: One thing that you
12 said, Mr. Miltenberger, caught my attention and it
13 somewhat connects with just this little discussion
14 here. That was that, in your opinion, if I've got it
15 right, very early on in this event the control room
16 team didn't quite come together the way they should,
17 but as the events unfolded they did, and that the way
18 they ultimately handled the situation was one that you
19 felt was well done and you felt comfortable with it so
20 that you really could look at the event as having two
21 phases in a certain sense with respect to the way the
22 team itself in the control room behaved.

23 Is that --

24 MR. MILTENBERGER: That's a good
25 characteristic of it.

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1 COMMISSIONER ROGERS: Well, if that's the
2 case, you know, then it seemed that that's the typical
3 complacency problem, in a certain sense, that the
4 ability to do the job is there and when the pressure
5 gets high enough all of a sudden the best is brought
6 out in everybody and the team as a group functions.
7 But up until that point, somehow they haven't really
8 done as good a job as they're capable of doing, either
9 in being alert to little things or whatever.

10 If that's the case, it seems to me that
11 that's part of the issue that you have to deal with in
12 corrective action and that is probably the biggest
13 problem of the whole industry, and that is that it is
14 very, very difficult to keep everybody at their peak
15 all the time. It isn't that the capability doesn't
16 exist, but we've seen so often groups of people that
17 are really-- they have the resources, they have the
18 smarts, they have everything, but somehow they slip
19 because they've allowed themselves to not keep that
20 edge that really has to be there day in and day out,
21 hour in and hour out in running a nuclear power plant.

22 I would hope that somehow that in your
23 program here that you have a way of kind of testing
24 yourselves with respect to how close to peak
25 performance people are actually operating at, because

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1 most of the time you don't need it. I mean, things
2 are running well and you feel pretty good about
3 things, but that team then has to go into operation
4 very, very quickly at its best. Not at its second
5 best, but at its best. That's a very severe challenge
6 to put on anybody or any group of people and yet
7 that's really what one has to strive for.

8 I don't know whether in your planning and
9 thinking here you've explicitly tried to deal with the
10 question of how do we know that we aren't slipping a
11 little bit? It's a very difficult question. It's not
12 easy at all because the evidences of a slight
13 softening of the crispness that ought to be in an
14 organization is sometimes very difficult to detect.
15 But it seems to me that that's really what
16 management's job is all about, to be able to sniff
17 that out and detect it before it starts to get very
18 far.

19 So, your characterization of the episode
20 here is one that I think is very interesting, but you
21 may have seen yourself what your job really is.

22 MR. MILTENBERGER: That's a very good
23 perspective that you provided and it fits in for us,
24 particularly with the operation staff. We had the
25 ability with the simulator and an actual job

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1 performance, us as management, in observing how that's
2 carried out. Just try to see that crispness and, as
3 Jim mentioned, everybody carrying out their function
4 to the top all of the time and to see how that's
5 carried out.

6 The simulator gives us an opportunity to
7 do that. We have that in place and are continuing
8 with that, but we have some new initiatives we're
9 working on in that area and also actually on the job
10 place and how simulator types of activities are
11 carried out in the work place and how those
12 differences characterize themselves. That's our job
13 as line management, to provide that type of
14 observation and characterization and direction to the
15 staff.

16 COMMISSIONER ROGERS: And the other one
17 is, I guess we haven't really asked you that question
18 and you really didn't address it, but how ready are
19 you until we start?

20 MR. MILTENBERGER: Where we are relative
21 to restart, we really are in the process of resolving
22 the PORV issue and installation of some new internals
23 in those valves. Expect that work to be done in the
24 next day or so and then we'd be expecting to start the
25 unit later on this week, early next week.

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1 COMMISSIONER ROGERS: Thank you.

2 CHAIRMAN SELIN: Commissioner Remick?

3 COMMISSIONER REMICK: We haven't seen the
4 AIT report yet, but it was my impression that
5 subsequent to the event you found some non-
6 condensibles in the reactor vessel. What was the
7 situation there?

8 MR. MILTENBERGER: The situation with the
9 non-condensibles dealt -- and I did mention it very
10 briefly in here, but I really didn't cover the kind of
11 detail maybe that you're looking for. That dealt with
12 the RVLIS system identified by the NRC. The RVLIS
13 system was drifting down and then observation and
14 subsequent analysis by our staff determined that we
15 indeed did have in mode 5 of operation in cold
16 shutdown with the unit depressurized and intrusion of
17 nitrogen gas that was coming out of solution in the
18 vessel and gradually moving the level of the vessel
19 down.

20 Subsequent analysis of that, we did vent
21 that off, determine and measure what it was and it was
22 essentially nitrogen that was coming in from the
23 volume control tank where nitrogen is introduced in
24 that tank and equipment. We subsequently vented that
25 off. It is part of normal plant start-up conditions,

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1 but in the mode we were in it was shut down. We could
2 see that drifting down and had to take corrective
3 action on it.

4 A lesson learned there for us is the
5 utilization of the RVLIS system in shutdown. It was
6 a system that was not really designed or intended use
7 in that system, but we definitely see that as an
8 opportunity of equipment that is available, can
9 provide some indication of what the level is doing in
10 the vessel. There's some further analysis work and
11 some work with the owners groups for utilization of
12 that equipment, not only with our facility but with
13 other facilities in lessons learned.

14 COMMISSIONER REMICK: Was this nitrogen
15 dissolved and then carried over and then came out
16 of --

17 MR. MILTENBERGER: Yes. It was dissolved
18 within the reactor coolant system. It was introduced
19 at the volume control tank, went into solution and
20 because of the difference in pressure between the
21 volume control tank and the reactor vessel, it would
22 come out of solution in the vessel.

23 COMMISSIONER REMICK: Is there any reason
24 why RVLIS hasn't been used in those conditions before?

25 MR. HAGAN: We don't instruct our people

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1 to use RVLIS in mode 5 because as advertised it's not
2 a calibrated system. It's not cold calibrated. So,
3 it gives you a qualitative indication of level, but
4 it's not one that you would base your procedures on.
5 As we understand the system, our mode 5 log was not a
6 required log. When the question was asked to the
7 operator, the answer was really in that particular
8 mode they weren't used to looking at RVLIS. They
9 didn't have a crisp answer or understand on the spot
10 what it was because we just don't take that reading.

11 COMMISSIONER REMICK: So, the indication
12 was available, but they're not used to looking at it
13 in that mode. Is that what you're saying?

14 MR. HAGAN: Yes, that's essentially it.

15 COMMISSIONER REMICK: I see. And although
16 not calibrated, it would show changes in level?

17 MR. HAGAN: Qualitatively.

18 COMMISSIONER REMICK: Qualitatively, yes.

19 MR. HAGAN: Qualitatively it would.

20 COMMISSIONER REMICK: Okay. Thank you
21 very much.

22 CHAIRMAN SELIN: Let's change places and
23 see what our folks have to say.

24 Mr. Martin, I have to tell you. I peaked
25 at the slides and we know what an AIT is. So, why

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1 don't you go lightly on the procedural stuff and
2 concentrate on what we learned from the specific event
3 compared to the prepared presentation.

4 Mr. Taylor?

5 MR. TAYLOR: Good afternoon. With me at
6 the table are Bill Russell from NRR and from the
7 region, Regional Administrator Tim Martin. Bob
8 Summers, to my right, is the project engineer, and
9 Charlie Marschall, who is the senior resident at
10 Salem/Hope Creek.

11 The licensee has pretty well outlined the
12 course of the event and our discussion today will
13 concentrate on NRC's response to the event. First,
14 response to the resident and the agency's immediate
15 response, and then through the augmented inspection
16 team.

17 Tim?

18 MR. MARTIN: The licensee informed the
19 resident staff of the unit trip within about 15
20 minutes of it occurring. The senior resident
21 responded to the control room and notified the Region
22 I staff subsequent to that. The senior resident was
23 supported by two resident inspectors, an emergency
24 preparedness specialist who he used to monitor and
25 assess what was going on in the plant, and he later on

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1 dispatched one of the resident inspectors to the tech
2 support center once it was established to monitor and
3 coordinate NRC activities from that point.

4 Subsequently when the NRC set up their
5 incident response center, we set up the reactor safety
6 management counterpart link which the resident came up
7 on frequently to keep us abreast of what was going on
8 from his assessment.

9 The resident staff provided continuous
10 coverage and communications for the rest of that
11 evening and until the next morning when the augmented
12 inspection team arrived.

13 (Slide) Next slide, please.

14 With regard to the regional response to
15 the event, the licensee declared the unusual event at
16 about 11:00. It would be notified to the NRC formally
17 at 11:31. The senior resident had already informed
18 the branch chief of what was going on. The branch
19 chief informed the deputy regional administrator. The
20 assessment at that point was that it was a trip with
21 complications, clearly something that we needed to
22 monitor and pretty clear it was probably going to
23 result in an augmented inspection team, at least from
24 what we knew at that point in time.

25 The deputy regional administrator got in

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1 touch with Ed Jordan and discussed what was the proper
2 mode for NRC to respond. It was decided that both
3 region and Headquarters would monitor this situation.
4 The region and Headquarters activated their instant
5 response centers and went into a monitoring of the
6 activities. That continued on until about 9:00 that
7 night.

8 As you know, the licensee terminated the
9 alert at 8:20 that evening.

10 With regard to the augmented inspection
11 team, as I indicated earlier we had already decided
12 that one was probably appropriate. The deputy
13 regional administrator contacted NRR and AEOD and it
14 was agreed that an AIT was warranted for this event.
15 That decision was made during the afternoon while we
16 were still monitoring. The AIT was initiated due to
17 the event complexity and the unexpected system
18 response.

19 The deputy regional administrator informed
20 the licensee of our plans to initiate an AIT once the
21 plant was shut down and in a stable situation. We
22 didn't want to go out there and start the
23 investigation prematurely and cause them problems. We
24 also discussed some expectations of the licensee in
25 establishing stable conditions and maintaining the

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1 plant so that an adequate investigation could be
2 conducted.

3 The management lead for the AIT was
4 assigned to our Division of Reactor Safety. Bob
5 Summers, who is down at the end, was selected as the
6 team leader and we selected team members from region,
7 NRR and AEOD based upon technical expertise. We also
8 had two state observers who participated in various
9 parts of the inspection activity, but did not stay in
10 a continuous manner.

11 (Slide) May I have slide 5, please?

12 The AIT charter was developed and issued
13 on the 8th, which was the day after the event. It
14 required a review of the plant trip and the response
15 of management, operators and systems. It required the
16 development of a sequence of events. It required them
17 to perform an assessment of the personnel, procedures
18 and equipment performance. It required the
19 identification of root cause and the preparation of a
20 report.

21 (Slide) May I have slide 7, please.

22 We also issued a confirmatory action
23 letter. As a result of our plan to launch the AIT,
24 the deputy regional administrator formalized our
25 expectations with the licensee and we assured the

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1 licensee was at that point comfortable with us
2 starting the AIT activities. The licensee was
3 committed to keep the plant in cold shutdown, to
4 cooperate and support the AIT activities, and to gain
5 agreement of the regional administrator prior to
6 restart.

7 (Slide) May I have the next slide,
8 please?

9 COMMISSIONER REMICK: Could you explain
10 the purpose of a confirmatory action letter in a case
11 like this?

12 MR. MARTIN: The purpose was -- the
13 licensee had already decided to go to cold shut down,
14 but we wanted to make sure that we understood the
15 event, that we understood the peculiar system
16 interactions that we saw, and we wanted to make sure
17 we had time to do that before they moved forward and
18 started up. We found no indication the licensee was
19 planning otherwise, but this was the document --

20 COMMISSIONER REMICK: That's the point of
21 my question. I know it's a routine action for us to
22 take, but I sometimes wonder when licensees appear to
23 be willing to cooperate in all the things we're trying
24 to achieve, why we officially issue a confirmatory
25 action letter? I've asked this question before,

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1 but --

2 MR. RUSSELL: Yes. I believe from a
3 policy standpoint that it's important to document what
4 are the specific concerns that the NRC has and what
5 are the understandings that exist between the utility.
6 These are voluntary. If the understandings are
7 different and they so inform us, we can take other
8 actions. But this is then recognized as a useful tool
9 to have the short of formal action on the context of
10 orders or other requirements. It does need to be
11 looked at in each case. We don't require it in all,
12 although it has been practice to use a CAL in most
13 cases. It needs to be done early to identify what are
14 the particular issues because as time goes on other
15 issues could be added and you want to have a
16 relatively high threshold for adding other items on.

17 So, it really constitutes a written
18 understanding between the licensee and the NRC as to
19 what are the issues that need to be addressed and the
20 fact that we are interested in having resolution of
21 those items prior to a restart decision.

22 COMMISSIONER REMICK: How much is it
23 influenced from an enforcement interest?

24 MR. TAYLOR: None.

25 MR. RUSSELL: I can tell you from past

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1 experience that a CAL has been recognized and we did
2 revise our enforcement policy to indicate that that
3 could be used. That was actually supported in a court
4 case where we used a CAL in lieu of orders or other
5 approaches. It's a tool that provides us a basis for
6 documenting what those agreements are and as long as
7 those agreements are followed, that satisfies our need
8 and it's the least --

9 MR. TAYLOR: It is not really an
10 enforcement action per se.

11 MR. RUSSELL: It is not an enforcement
12 action, but --

13 COMMISSIONER REMICK: No, I realize it's
14 not an enforcement action, but does it serve some
15 legal purpose --

16 MR. TAYLOR: It goes a clear understanding
17 between the management of the agency and the licensee
18 of what the condition is. I think it's very useful.
19 So, we both understand before restart that the issues
20 behind an event are clearly understood by all the
21 concerned parties, particularly the licensee and the
22 agency. That's really what it's intended to do.

23 MR. MARTIN: Commissioner, I would add, in
24 this particular event we had a desire to interview
25 people. Because of the CAL, it resulted in

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1 negotiations when certain people would be available.
2 They were going off-shift. So, basically it
3 established a protocol for interaction. It basically
4 required them before they took pieces of equipment out
5 and started troubleshooting that we had some
6 discussion so that we wouldn't later on say, "Well,
7 why didn't you let us take a look at that?" So, it
8 resulted in a much more orderly interaction and as a
9 result there were then negotiations with the team
10 leader and the licensee to make sure that expectations
11 were not inadvertently overlooked.

12 COMMISSIONER REMICK: Yes. And I
13 understand the need for clearly identifying what it
14 is. I guess maybe I associate something with a CAL
15 maybe that I shouldn't. If it's purely agreement of
16 what we agree upon, I guess I've never quite viewed it
17 that way. But if that's it, I certainly understand.

18 MR. TAYLOR: And in the aftermath of an
19 event, it sometimes is important for this type of
20 thing just to be simply -- it's usually a one page
21 type letter.

22 MR. RUSSELL: It's characterized as a
23 related administrative action in the enforcement
24 policy in Part C and it simply says a confirmatory
25 action letter are letters confirming a licensee's or

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1 vendor's agreements to take certain actions to remove
2 significant concerns about health and safety
3 safeguards or the environment. So, it's not an
4 enforcement action per se, but it's --

5 COMMISSIONER REMICK: No. I didn't know
6 if it added some legal protection if the licensee
7 decided to start up without the regional
8 administrator, if it gave us some additional legal --

9 MS. CYR: Only in the sense of it's a
10 commitment from them about certain actions that they
11 might take. For instance, notify us before they
12 might. It's an agreement between us and them in that
13 sense.

14 CHAIRMAN SELIN: It's intended to protect
15 both parties. It's not that the licensee would
16 otherwise start up without talking to us. That would
17 be quite a foolish thing to do, but that way in a
18 sense we've said, "Here are our concerns," and the
19 licensee knows when those concerns are met. Then it's
20 up to them. And conversely, it protects us so that
21 equipment is able to be examined or people are able to
22 be interviewed. But it's a kind of a limitation of
23 interest, not just a statement that we have certain
24 items.

25 MR. TAYLOR: I agree with that.

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1 CHAIRMAN SELIN: There's a question mark
2 at the end of the statement. It is my understanding
3 that --

4 MR. TAYLOR: I think that's right. We're
5 available around the clock to talk to the licensee.
6 If they were ready at 3:00 in the morning, we'd be
7 ready to act. It isn't meant to inordinately delay in
8 any way.

9 Want to continue?

10 MR. MARTIN: (Slide) Go to the
11 chronology, slide 9, please.

12 The augmented inspection team arrived on
13 the site on the 8th and they would complete their on-
14 site inspection activities on the 26th. The team
15 leader held conference calls daily with regional and
16 Headquarters managers to keep them informed of the
17 status and the inspection findings. The team leader
18 also supported an event briefing on the subsequent
19 Wednesday to make sure that NRR, AEOD and various
20 regional staff were aware of the event and what we
21 knew at that time.

22 Early that next week, the senior resident
23 identified the fact that there had been a gas pocket
24 that formed in the reactor vessel and that the
25 licensee had not recognized that. That resulted in a

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1 Commissioner assistance briefing subsequently.

2 The licensee had described their
3 corrective action plans in letters dated 4/25 and
4 4/29.

5 COMMISSIONER REMICK: Excuse me. How
6 extensive was the gas pocket? I meant to ask that
7 earlier.

8 MR. MARSCHALL: The RVLIS was indicating
9 that 93 percent, Commissioner, and it equates to a
10 very, very small volume of gas, nothing of any safety
11 significance at all.

12 COMMISSIONER REMICK: Thank you.

13 MR. MARTIN: The team leader also
14 conducted a number of briefings of congressional
15 staff, including Senator Biden's staff, the Senate
16 Subcommittee on Clean Air and Nuclear Regulation and
17 the House Subcommittee on Energy and Mineral
18 Resources. That was conducted on the 24th.

19 The AIT had their preliminary exit in the
20 public on the 26th at the Salem site. The team has
21 since been involved in the assessment of the findings
22 and report preparation, while the resident staff has
23 been involved in inspecting and verifying licensee
24 actions and preparedness for restart.

25 On the 5th of May, we briefed Senator

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1 Biden's staff at their Wilmington, Delaware office,
2 and on the 6th of May we had a public meeting at Salem
3 again, to discuss licensee's status and plans for
4 restarting the facility.

5 As a result of this AIT, we have concluded
6 that there was no abnormal releases of radiation to
7 the environment as a result of the event. The event
8 and the operator response to it challenged the RCS
9 pressure boundary through multiple actuations of the
10 pressurizer PORVs, through multiple operator errors
11 which occurred and complicated the event.

12 Management allowed problems to persist and
13 that made responding to the event difficult for plant
14 operators. Some equipment was degraded by the event,
15 but overall the plant performed as designed.
16 Operators' use of emergency operating procedures was
17 regarded as good and the licensee investigation and
18 trouble shooting efforts were also good.

19 With regard to remaining activities, the
20 licensee currently owes us two letters, one to
21 describe their evaluation of the PORV operability and
22 the modifications they've made, and a second to
23 describe why it is not a problem with the main steam
24 flow calibration drift that has been reported in the
25 past which had some role in this event. The second

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1 part is confirming to us their believe that they are
2 ready for restart and their basis for that and
3 requesting our agreement.

4 The NRC must obviously evaluate the
5 licensee's rationale for restart. We must
6 independently conclude that the plant is ready and we
7 must coordinate with NRR and the EDO's office in
8 releasing the licensee from the CAL.

9 We plan once the restart has started to
10 provide around the clock inspection coverage until the
11 plant is in a stable mode one situation. We'll use
12 resident and region-based staff for that activity.

13 We still need to issue the AIT report.
14 That's due later this month. We finally must
15 determine and direct any follow-up activities and that
16 includes some long-term actions that the licensee is
17 committed to relative to that specific site where we
18 have to actually verify that those are completed.
19 There may be some generic issues which we'll need to
20 hand off to NRR using task interface agreements.
21 That's formally tracked. We'll have to examine our
22 inspection plans to see if this event results in us
23 changing or needing to change those inspection plans.
24 Obviously we need to consider what enforcement action
25 we're going to take. We have not made that decision

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1 yet.

2 MR. TAYLOR: So that concludes the staff's
3 presentation.

4 CHAIRMAN SELIN: I have a couple questions
5 I'd like to put. Most of the discussion that the
6 licensee put forward had to do with training and
7 personnel and I think that's appropriate. But I was
8 sort of concerned, I am sort of concerned that at the
9 time of the overspeed turbine event there were
10 solenoids that were known to need to be fixed that
11 hadn't been fixed. We have an analogous situation
12 here, the list of -- it wasn't clear to me whether
13 they were overdue actions, but repairs that had been
14 scheduled to be done that hadn't been done.

15 As I remember the solenoid event, it
16 wasn't that the management had deliberately slowed
17 down the repair, but that communications on the status
18 of some of these repairs was just sloppy and
19 management really didn't know where they stood and he
20 wasn't holding the maintenance folks and the generic
21 people to the schedule.

22 Was this a pattern or is it a fluke? Are
23 you concerned about this? Are we going to have a --
24 if there were another event, are we going to find
25 other actions well known but not implemented?

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1 MR. MARTIN: We are concerned about this.
2 This is one of the issues that came out of the AIT.
3 We identified several examples where management knew
4 what the situation was but had made a decision^a to live
5 with the situation. In other cases, they had not
6 considered the integrated impact upon the operators in
7 trying to deal with the plant when a number of these
8 equipment problems were existing. In other cases,
9 they just hadn't yet sold the operators that the
10 systems had been returned to reliable operation.

11 So, I'll tick them off for you. The
12 atmospheric steam dump on the main steam -- they lived
13 with that problem for 17 years. Yes, they did have
14 plans to fix it, but obviously didn't get to it in
15 time and it certainly complicated events and was one
16 of the primary causes for leading to the second safety
17 injection.

18 The fact that the control rod drive system
19 had been worked on for about four weeks. There were
20 some problems with it earlier. The operators saw some
21 early response when they tried to put it in automatic
22 during the event that didn't jive with their
23 expectations based upon their previous concerns and
24 knowing that the trouble shooting hadn't been
25 completed on it. They didn't trust it. So, they

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1 didn't have that there to support them.

2 CHAIRMAN SELIN: Was that just a bad break
3 or was that something in retrospect? You know, I'm
4 looking at these significant findings and except for
5 the second one about the event challenging the RCS
6 pressure boundary through multiple operations of the
7 pressure-operated release valves, this could have been
8 the finding two years ago at the overspeed. The other
9 one wasn't disaster, but management allowed equipment
10 problems to exist. It was degraded, the plant
11 performed its design, operators did well once they
12 were finally --

13 MR. MARTIN: The only one that is just
14 clear the licensee tolerated too long was the
15 atmospheric steam dumps. The others, they were
16 working on them. It's a question of priority and
17 considering given all these individual problems, did
18 you consider the overall impact on the distractions of
19 operators and we don't think they did a good enough
20 job there.

21 CHAIRMAN SELIN: Okay. But it wasn't a
22 cavalier attitude towards --

23 MR. MARTIN: I don't think so, sir. It
24 appears they made management decisions based upon
25 their assessment of the facts at that time.

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1 CHAIRMAN SELIN: Okay. Second question is
2 normally events which require AITs, I guess, are more
3 serious events. But we tend to have the AIT in hand
4 before the restart comes forward. Are you comfortable
5 that even though we don't formally have a report
6 you've gone through the material and you know what you
7 need to know to permit the restart?

8 MR. MARTIN: With the exception of their
9 evaluation of the PORV, we believe that we are
10 tracking right with them in terms of their assessment
11 of the problems and our independent assessment of what
12 the problems are. We have examined their corrective
13 action. They committed to corrective actions back in
14 late April. We basically came to the same conclusion
15 those were the right corrective actions. We've been
16 monitoring those corrective actions. They seem to be
17 implementing them well. The thing that remains is
18 they're evaluation of the PORVs and their affirmation
19 that they believe that they're ready to start up. If
20 we don't find any additional problems in the next
21 couple of days and we get that and we independently
22 conclude that evaluation is acceptable, then we will
23 be prepared to support restart.

24 CHAIRMAN SELIN: The Commission has not
25 taken this responsibility upon itself. We're

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1 monitoring what you're doing. We're not intervening
2 on the restart process.

3 MR. RUSSELL: I would characterize that
4 there is one advantage also of having the CAL and that
5 is you identify the issues that are of concern, that
6 are under discussion, review between both the NRC and
7 the company and then the process provides that the
8 regional administrator will actually issue in writing
9 our findings as it relates to those matters and the
10 process of releasing from the CAL. Now, there may be
11 other issues that are identified in the process of
12 developing the final report, but we believe the
13 activities of briefings, the exit meetings, the
14 management involvement, the fact that the team leader
15 reports directly to the regional administrator and
16 communicates on these matters, that the mechanism of
17 using the CAL to provide the vehicle for release and
18 documenting our findings is a substitute. It takes us
19 30 days or so to put the full inspection report
20 together with the findings.

21 CHAIRMAN SELIN: Well, you certainly had
22 a fair share of public meetings during all of these
23 discussions. I gather you're pretty comfortable with
24 the licensee's description of the situation at this
25 point.

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1 MR. MARTIN: We are, sir, yes.

2 CHAIRMAN SELIN: Okay. Commissioner
3 Rogers?

4 COMMISSIONER ROGERS: Yes. If you could
5 say a little bit more about the PORVs. Is the issue
6 a question of whether they were operating correctly or
7 whether they were damaged as a result of the event and
8 correctly repaired?

9 MR. MARTIN: The question is one of
10 correctly repaired and do we have the right material
11 in those PORVs. The plant was taken to the point
12 where it was full of water. The pressurizer no longer
13 had a bubble in it and the PORVs operated some 200
14 plus times. As a result of that, we questioned
15 whether there was any damage to those valves. They
16 did open them up and inspect them and, sure enough,
17 there was abrasion on the plug. There was gauling on
18 the stem, and there was a crack on the pin from the
19 stem to the plug.

20 Their subsequent analysis has shown that
21 they can't be confident that with that crack in there
22 it wouldn't have continued to propagate, so that was
23 a decision on their part that they're going to have to
24 replace that.

25 There was also a different material in

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1 Unit 1 than there was in Unit 2 and it is speculated
2 that that better material resulted in less damage to
3 the valve and may have actually supported more
4 operations than occurred. The valve never stuck.
5 When it's challenged that many times, that's a plus.
6 But when they went back and did their analysis, they
7 concluded that they're going -- my understanding of
8 their analysis right now is that they are going back
9 to the original material, and we'll have to wait to
10 see what that evaluation says and whether we agree
11 with it.

12 COMMISSIONER ROGERS: Yes. Okay. I think
13 I understand the situation now.

14 How much work do you think is necessary
15 for you to be able to feel comfortable with the status
16 of those valves?

17 MR. MARTIN: We obviously have seen
18 pictures of the valves. We've actually done some
19 inspections of the parts that were taken out. What we
20 need to do is evaluate their engineering analysis and
21 that provided by the valid vendor. Since we don't
22 have that document in hand, I can't tell you how long
23 that's going to take. But other than that, we are
24 certainly following the maintenance activities and the
25 reassembly of the valve. We're satisfied with that,

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1 if we are satisfied with the material. It's the
2 material issue right now that's probably the biggest
3 concern to us.

4 COMMISSIONER ROGERS: Who was notified?
5 What governmental agencies were notified during the
6 time of this event?

7 I notice you had state observers with the
8 AIT. You said "observers." Were they from two
9 different states or only from one state?

10 MR. MARTIN: From one state.

11 COMMISSIONER ROGERS: New Jersey?

12 MR. MARTIN: New Jersey Department of
13 Environmental Resources.

14 COMMISSIONER ROGERS: And what government
15 agencies were informed about this at the time that the
16 thing was evolving?

17 MR. SUMMERS: Commissioner, in terms of
18 the notifications of the event, the Licensee has their
19 routine notification process. It included the NRC and
20 then we make certain notifications of other government
21 agencies as a result of the alert declaration.

22 COMMISSIONER ROGERS: Well, I was thinking
23 of the states and communities.

24 MR. SUMMERS: Yes. States and locals were
25 notified in accordance with the licensee's plan.

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1 MR. TAYLOR: By the licensee.

2 MR. SUMMERS: By the licensee.

3 MR. TAYLOR: That's normally the process.

4 MR. MARTIN: And we are required to back
5 that up when we go the AIT. We did notify both New
6 Jersey and Delaware, because they're both in the ten
7 mile EPZ.

8 COMMISSIONER ROGERS: Right, but that was
9 pretty well along in the event.

10 MR. SUMMERS: However, when the Agency was
11 monitoring and we staffed up the region's incident
12 response center, one of the positions we staffed was
13 the government liaison, and so routine contacts were
14 made with the states through that position also during
15 the event.

16 COMMISSIONER ROGERS: All right. That's
17 all.

18 CHAIRMAN SELIN: Commissioner Remick?

19 COMMISSIONER REMICK: I noticed when
20 Chairman Selin started out he had looked through the
21 slides and I think he was concluding there wasn't too
22 much meat in there. It's the same conclusion I had
23 when I sneaked a preview. It was more or less a
24 process, who struck John and what time, and not really
25 until he asked a question and Commissioner Rogers did

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1 the staff get into any detail. And I realize the
2 report is not out. I'm sure your findings aren't
3 formalized. Your recommendation aren't made and any
4 decisions of enforcement, but I guess I'm a little
5 surprised you didn't provide us a little more meat on
6 the findings as they stand at the moment.

7 Are there other things that you wish to
8 tell us about impressions good or bad that we should
9 know about other than the AIT was formed on this date
10 and we went there and did this and that? I'm more
11 interested in your findings and your feelings at the
12 moment. I'm thinking for the good of the order in the
13 future and so forth, I think we want a little bit more
14 detail.

15 MR. MARTIN: We obviously had more detail
16 and when -- the licensee actually had two separate
17 investigations they did and we obviously did our own
18 independent investigation. We have found through the
19 number of public meetings we've had that we track
20 almost right on top of each other, and so in the
21 interest of time we did not want to repeat all those.

22 But I have the team leader here who can
23 amplify on anything you'd like to hear.

24 COMMISSIONER REMICK: What are some of the
25 highlights that you would like to tell us about from

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1 your findings?

2 MR. SUMMERS: Okay. In terms of the
3 findings, much as Mr. Martin just said, the
4 independent investigations tracked very closely even
5 though we weren't working together. However, we did
6 share information and toward the end of our inspection
7 I found that the licensee's SERT process, which is
8 their event response team, they had almost the
9 identical charter and had almost identical facts in
10 terms of their development of the sequence of events
11 and the causal factors as the AIT.

12 In terms of important findings, early on
13 in the event, much as the licensee has responded to
14 your questions today, there was a lack of command and
15 control exhibited in the control room that was
16 compounded by, as Mr. Martin just spoke about briefly,
17 a problem with the rod control system in manual. That
18 was a short-term problem, however during the down-
19 power transient and the rapid down-power transient it
20 did compound the operators' actions, made that
21 transient more complex. It did result in the
22 operators getting out of sync, as one of your
23 questions to the licensee earlier described. That
24 type of problem early on is notably absent after the
25 reactor trip safety injection occurs.

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1 It appears as though the focus of the
2 shift crew in the control room changes. The following
3 of the EOPs is very good. The meeting of the
4 termination criteria of the EOPs was very well
5 established by the crew. So, there is a dichotomy in
6 performance at the beginning of the event and
7 subsequent to the reactor trip safety injection that
8 was a concern of the team trying to deal with that
9 dichotomy of response.

10 COMMISSIONER REMICK: I assume these were
11 system based EOPs that they were using and they
12 appeared to show familiarity with them?

13 MR. SUMMERS: Yes. Salem has, I guess, a
14 unique format for PWRs. They use a flow chart format
15 and the operators were very familiar with their use.

16 There was later on in the event, as the
17 licensee explained, there were a couple of operator
18 errors that occurred later that resulted in the second
19 safety injection in monitoring primary temperature
20 parameters and secondary temperatures and pressures.
21 That was compounded again by the failure of the
22 automatic control system on the steam generator power
23 operated relief valves and not maintaining a no-load
24 set point. The operators were trained on the use of
25 that system so as to ensure that it would control

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1 properly. Operators overlooked that part of their
2 training or forgot that part of their training. I'm
3 not sure that they forgot. It was in the heat of the
4 battle. There were a number of other activities that
5 were demanding their attention.

6 It was a very complex event for the shift
7 because of the logic response being out of sync where
8 the A train of protection sensed the condition warning
9 safety injection and the B train did not, resulted in
10 many components being out of expected alignment which
11 the operators had to correct. The operators' response
12 to that, that was very good.

13 COMMISSIONER REMICK: Thank you. As AIT
14 team leader, are there any things that you found about
15 the type of expertise that you were provided or
16 anything about procedures or anything on the AIT
17 process that you would have recommendations on or
18 things that you were pleased with?

19 MR. SUMMERS: Well, one of your questions
20 earlier, and it was really a policy question on the
21 use of a CAL --

22 COMMISSIONER REMICK: Yes.

23 MR. SUMMERS: I as team leader found that
24 the CAL helped establish a very good protocol between
25 myself and plant management in order to ensure that we

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1 would have an appropriate chance to review an activity
2 prior to the licensee going off and completing that
3 activity. That ensured that we were all working from
4 a common work practice and that I had whatever
5 opportunity I needed to review their investigation as
6 well as equipment before they began an investigation
7 on it.

8 COMMISSIONER REMICK: How about proper
9 expertise on the team in general?

10 MR. SUMMERS: Expertise in general, I
11 found that the group -- I didn't realize what the
12 complement was until I had the team on site and got to
13 know them. Being from the region I don't always know
14 all of the Headquarters personnel, however I thought
15 that the team that was given to me was an excellent
16 team in terms of expertise as well as previous
17 exposure to these types of events and the
18 investigation thereof, and so I was pleased with the
19 way the team worked.

20 I think that's about it on that.

21 COMMISSIONER REMICK: Okay. Thank you
22 very much. Appreciate it.

23 CHAIRMAN SELIN: Thank you.

24 In closing, I also am a little concerned
25 how sketchy the results present to us in the AIT. I'm

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1 personally satisfied with Mr. Summer's description.
2 I take that as being an implicit compliment to the
3 licensee for having done really a quite thorough fact
4 finding and not pulling their own punches in dealing
5 with this themselves.

6 Am I supposed to draw this conclusion?
7 You don't want me to go away with an unnecessarily
8 favorable conclusion of anything, do you, Mr. Martin?

9 MR. MARTIN: I would tell you that any
10 time the licensee mounts a SERT, they usually do a
11 damn good job.

12 CHAIRMAN SELIN: Okay. Thank you very
13 much, Mr. Taylor.

14 (Whereupon, at 4:16 p.m., the above-
15 entitled matter was concluded.)
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PUBLIC MEETING

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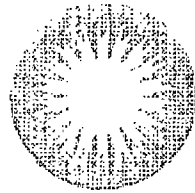
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PS&G

**Public Service
Electric and Gas
Company**

**MEETING WITH
NUCLEAR REGULATORY COMMISSION**

MAY 9, 1994

SALEM UNIT 1 TRIP AND SAFETY INJECTION SEQUENCE OF EVENTS

Plant operating at 75% power.

Rapid power reduction initiated due to excessive grass on circulating water intake screens (10:16 am).

Power reduced to $< 10\%$, enabled 25% trip.

Operator pulled control rods to raise temperature causing the plant to trip at 25% (10:49AM).

SEQUENCE OF EVENTS (CONTINUED)

One train of safety injection spuriously actuated -
"Unusual Event" declared (11:00AM).

Pressurizer went solid and power operated relief
valves cycle to maintain pressure.

Main steam relief valve opened causing reactor plant
cool down and reduction in pressure.

SEQUENCE OF EVENTS (CONTINUED)

Second safety injection due to low RCS pressure (11:28PM).

"Alert" declared as precautionary measure (1:16PM).

Pressurizer level restored, emergency procedures exited, and normal cool down initiated (5:15PM).

"Alert" terminated (8:20PM).

SAFETY SIGNIFICANCE

Event significance recognized by PSE&G

Represented challenges to safety systems

Significant challenges to operations crew

- Rapid power reduction and low power operation
- Complicated event caused by spurious signal

Important lessons learned for PSE&G and Industry

CAUSAL FACTORS

Reactor Trip

Control operator withdrew control rods too quickly and improperly monitored plant parameters.

Inadequate command and control.

First Safety Injection

Operator allowed primary system temperature to go too low coincident with a false short duration high steam flow signal.

False high steam flow signal due to a design vulnerability.

CAUSAL FACTORS (CONTINUED)

Second Safety Injection

Less than adequate crew communications.

Operator not taking manual control of steam relief valve.

Design of the steam relief valve automatic control system.

CORRECTIVE ACTIONS

Personnel/Training

Conducted additional simulator training for all operating crews to reinforce:

- Low power operation
- Solid plant operation
- Command and control/communications
- Resource management
- Operator actions following an automatic safety injection

Reinforced and clarified management expectations to all operating crews.

CORRECTIVE ACTIONS (CONTINUED)

Procedures

Enhanced operating procedures for rapid power reductions and low power operation.

Revised operating procedures to include minimum condenser vacuum and circulators in-service criteria for a manual trip.

Revised operating procedures for restoration of pressurizer level.

Procedural changes were reinforced through training.

CORRECTIVE ACTIONS (Continued)

Equipment

Made modification to improve automatic operation of main steam relief valves.

Made modification to dampen steam flow transmitters' sensitivity to pressure pulses.

Planned modifications to circulating water traveling screens will enhance ability to cope with grass.

OTHER ISSUES

Reactor vessel level indication system

- Extended utilization to shutdown

Pressurizer power operated relief valves

- Engineering analysis of valve internals

Emergency Plan communications

- Incorporating additional guidance from NRC

SALEM IMPROVEMENT FOCUS

Equipment - materiel condition upgrade, corrective and preventive maintenance backlog reduction.

Procedures - procedure upgrade process, 3500 procedures issued.

People - supervisory effectiveness, communications, work practices and standards, teamwork.

MATERIEL CONDITION UPGRADES

Completed for Unit 1 and/or Unit 2

Control room modifications and human factor upgrades.

Upgrade of 18,000 linear feet of service water piping.

Secondary chemistry laboratory.

Switchyard expansion and upgrade.

Bus instrument inverter replacement.

Containment steam generator blow down valve upgrade.

Pressurizer insulation replacement.

Safeguards equipment controller installation.

Installation of system to add chemicals to auxiliary feed system.

MATERIEL CONDITION UPGRADES (continued)

Completed for Unit 1 and/or Unit 2 (continued)

Circulating water mechanical upgrades.

Boric acid concentration reduction.

Ugraded boric acid and primary water flow instrumentation.

Small bore piping replacement > 5,000 feet.

Steam generator feed pump control oil system upgrade.

Rod control 24 VDC power supply replacement.

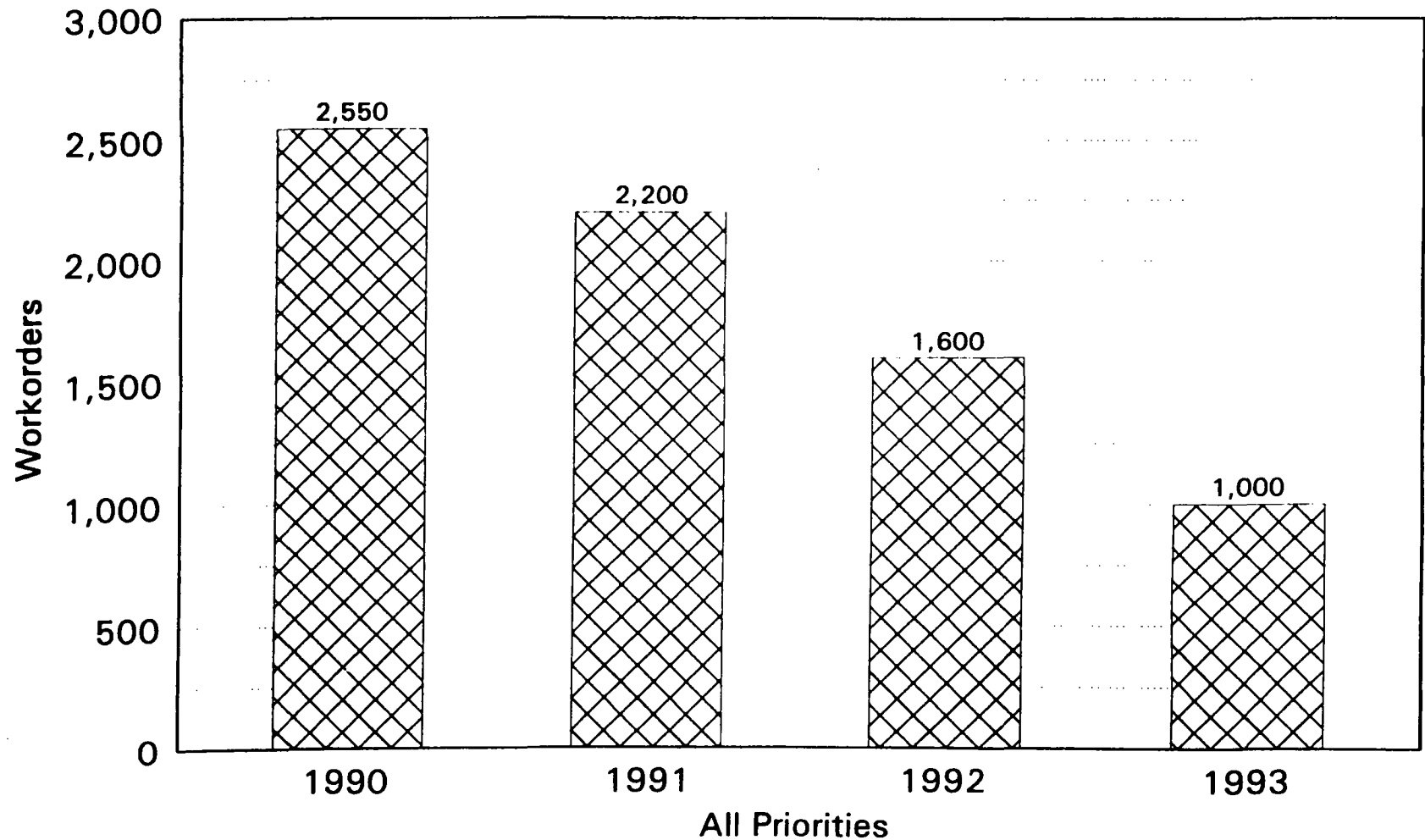
Mid loop instrumentation modifications.

Diesel generator HVAC improvements.

S/G feed pump independent control oil system.

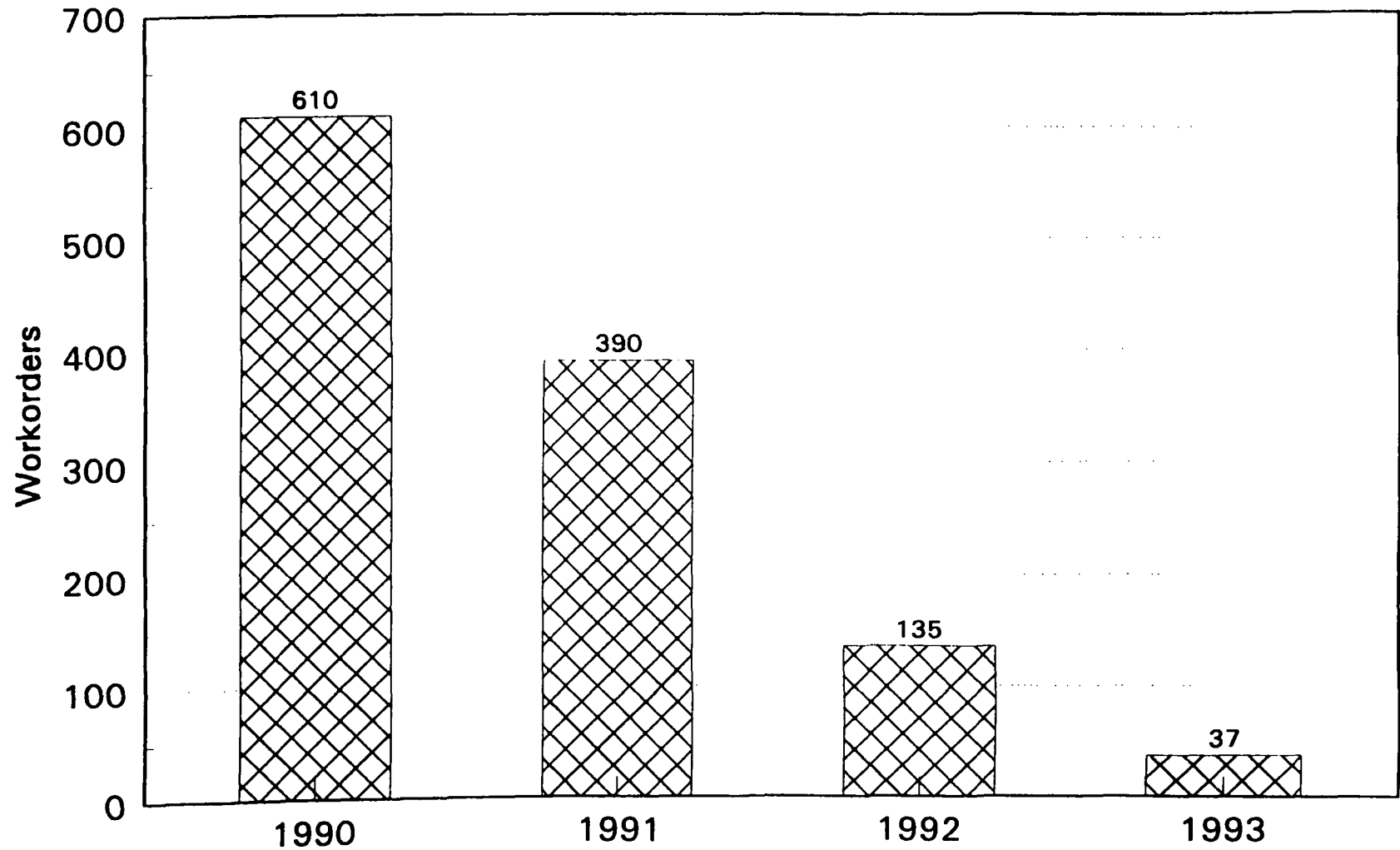
Salem upgrades since 1990 > \$300M

Corrective Maintenance Backlog Salem Station

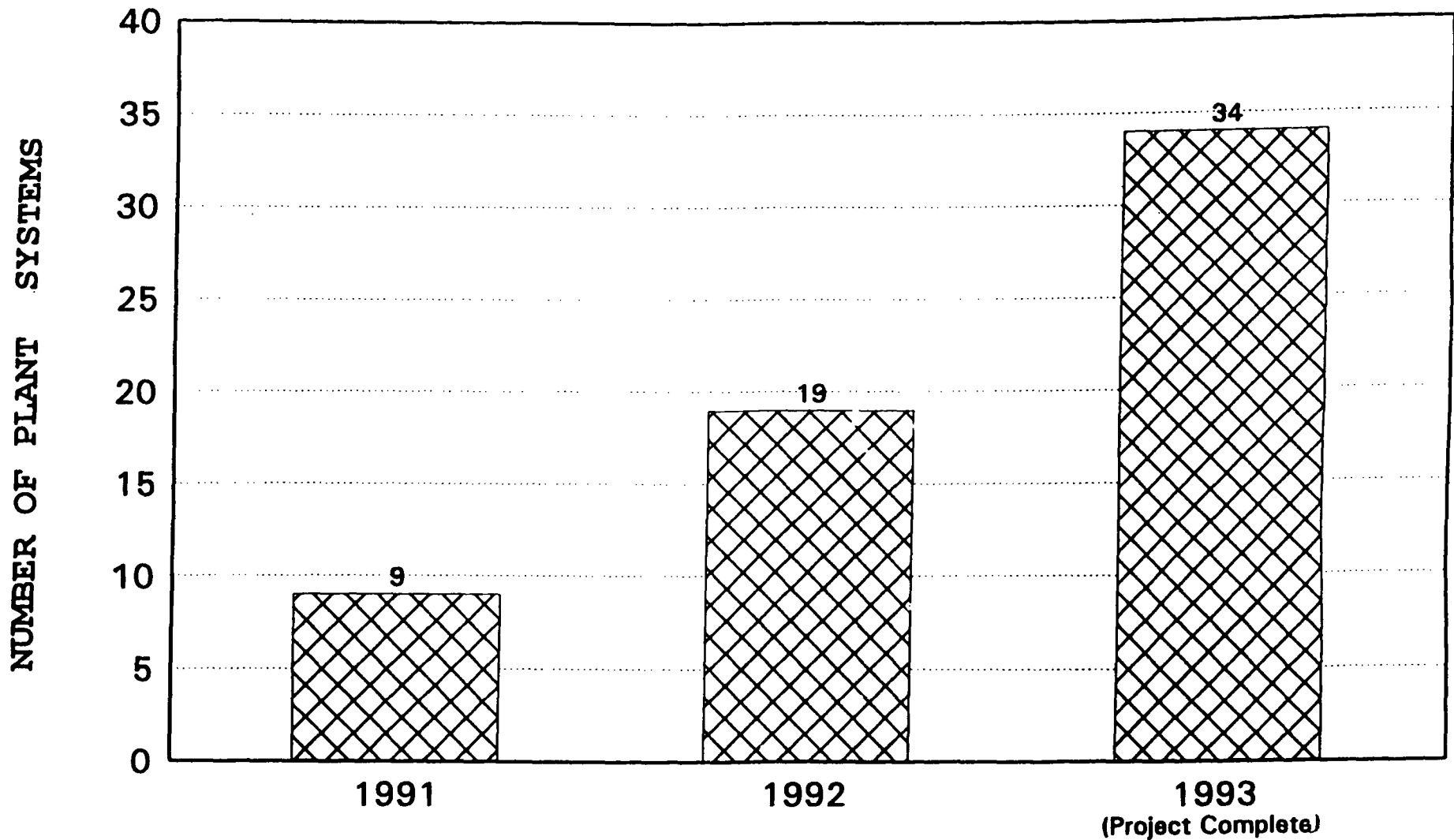


Preventive Maintenance Overdue

Salem Station (Maint Dept)

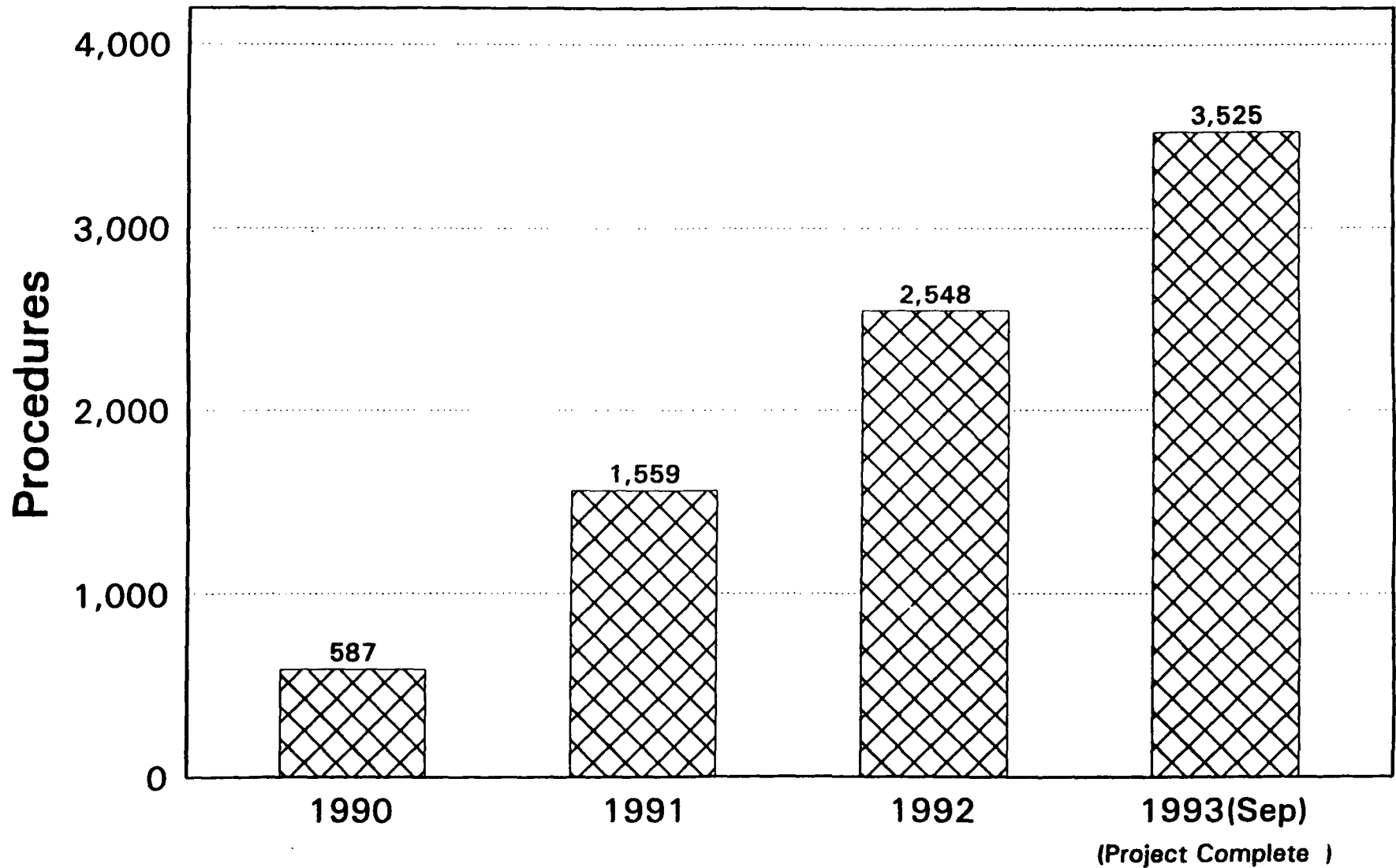


Reliability Centered Maintenance Salem Station



Procedures Upgrade Project

Salem Station



KEY PERSONNEL ACTIONS

Work practices and standards expectations provided.

Work monitoring by line management and QA.

Work control process improvements.

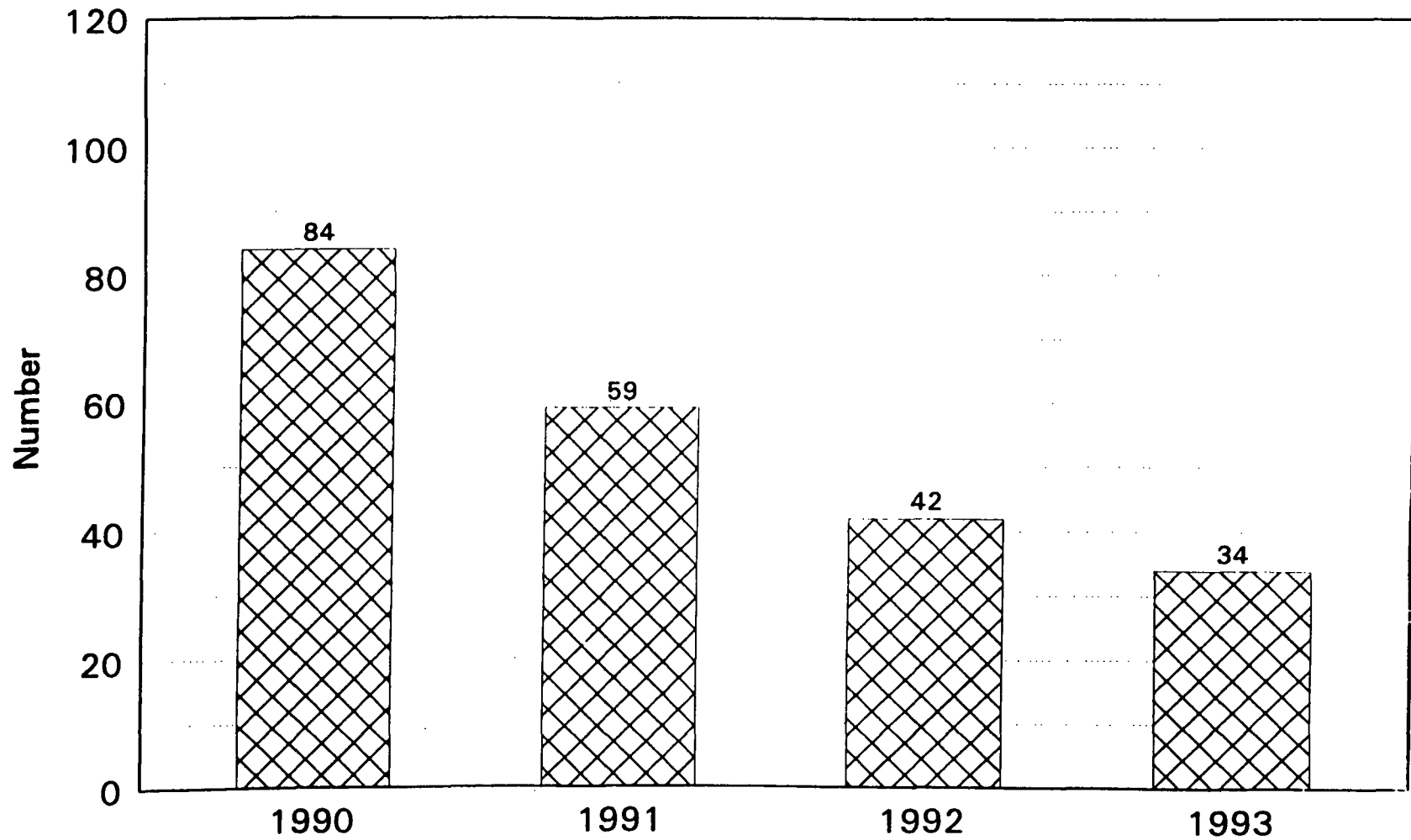
Supervisory face-to-face time.

Root cause training.

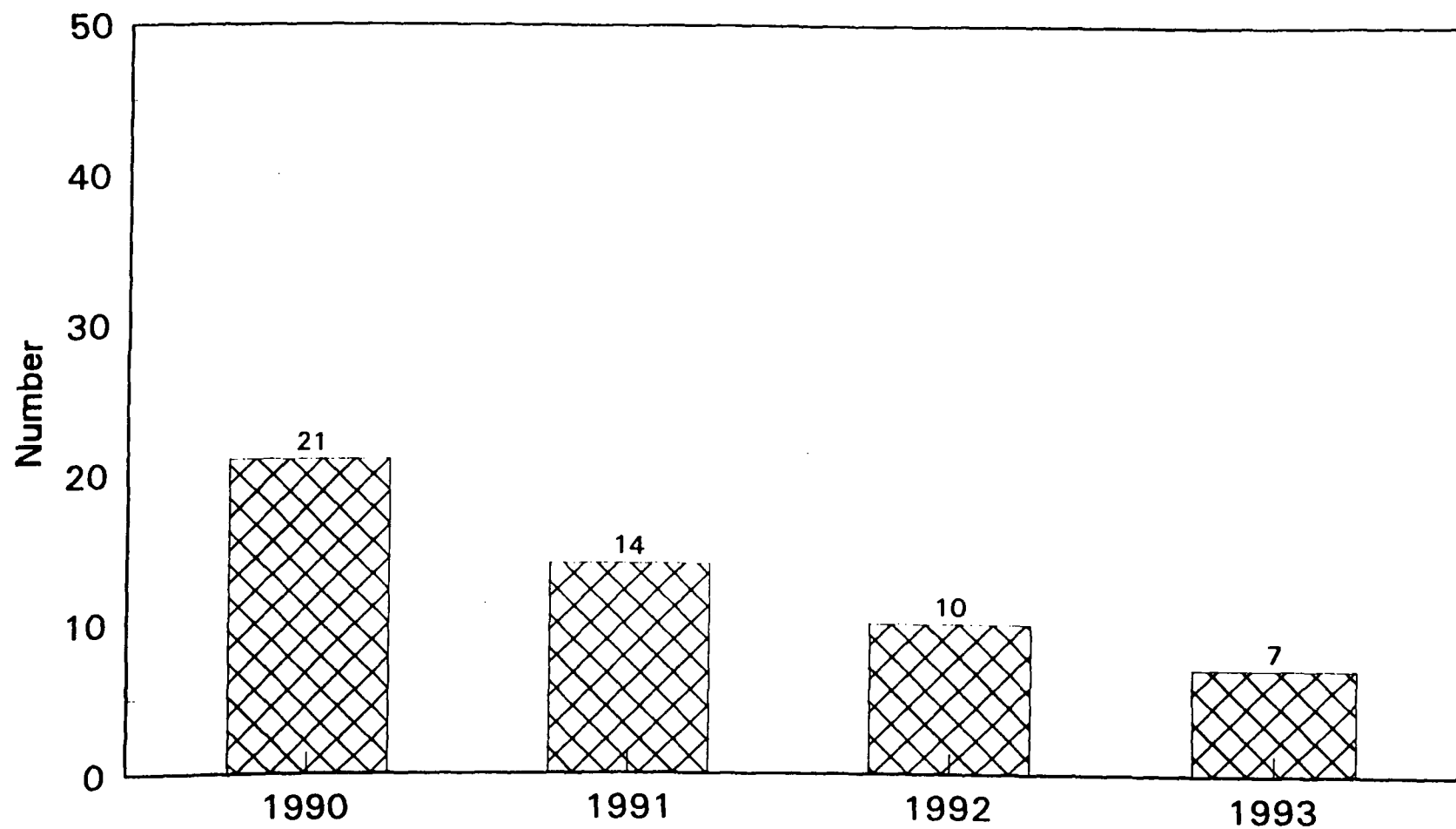
Supervisory and management training.

Manager and supervisory dialogues.

Licensee Event Reports Salem Station



Personnel LER's Salem Station



ASSESSMENT OF RESULTS

Improvement achieved in a number of areas.

Personnel performance improvements noted, but not meeting expectations.

Plant performance not meeting our expectations.

Identified need for Comprehensive Performance Assessment.

COMPREHENSIVE PERFORMANCE ASSESSMENT

Process

Full-time, multi-disciplinary, dedicated team of 12 people for 4 months.

Reported directly to the Vice President and Chief Nuclear Officer.

Performed a comprehensive assessment of occurrences over a two year period.

Looked for broader root causes, failed barriers, contributing causal factors and common threads.

COMPREHENSIVE PERFORMANCE ASSESSMENT

Results

Defined specific problem statements within three categories:

- Management Philosophy, Skills and Practices
- People Performing the Work
- Problem Solving and Follow-Up

COMPREHENSIVE PERFORMANCE ASSESSMENT

Actions

Defined responsibilities for resolution.

Prepared action plans and schedules for each problem area.

Identified performance indicators to measure progress and effectiveness of actions.

EMPHASIS ON PERFORMANCE THROUGH PEOPLE

Management and supervisory changes at Salem

Staffing increases at Salem

Unitized organizations at Salem

Re-bidding/assessment - placing right people in right job

Training/development initiatives

Increased supervisory time in field

Accountability through enhanced personnel performance appraisals

Dynamics of Leadership Model

BUSINESS LEADERSHIP DEVELOPMENT

Nuclear Department Dynamics of Leadership



**To meet tomorrow's
business challenges**



Nuclear Department Dynamics of Leadership

- Own the identification and solution of problems
- Stay involved - provide timely, accurate and honest feedback
- Good or bad, write it down so you can give valid feedback
- Remove barriers that impede performance
- If it doesn't look, sound or feel right - take action because it probably isn't right
- Explain decisions so people will support them
- Set performance standards
- Know when to let your people decide
- Be a team player - give and get help
- Support decisions
- Expect and give respect
- LISTEN to your people

Consistently among the best...Working together to produce competitive electrical energy through nuclear excellence

MONITORING EFFECTIVENESS OF PERFORMANCE THROUGH PEOPLE

Work practices and standards monitoring by line management and QA.

Supervisory face-to-face time.

Human performance indicators.

Leadership feedback results.

Personnel error Licensee Event Report.

Composite safety index performance.

COMMISSION MEETING SALEM 4/7/94 EVENT



May 9, 1994
Presented By: Thomas T. Martin

RESIDENT STAFF RESPONSE

- **PSE&G informs resident staff of unit trip**
- **SRI responds to control room and notifies Region I**
- **Continuous resident staff coverage and communication maintained until Augmented Inspection Team arrival**

REGIONAL RESPONSE TO EVENT

- **PSE&G declared Unusual Event at 11:00 a.m.; and Alert at 1:16 p.m.**
- **Region I and HQ activate response center for event monitoring from 1:00 p.m. until 9:00 p.m.**
- **PSE&G terminates Alert at 8:20 p.m.**

AUGMENTED INSPECTION TEAM

- **Region I, with NRR and AEOD approval, decided to dispatch AIT**
- **AIT initiated due to event complexity and unexpected system responses**

AUGMENTED INSPECTION TEAM

(continued)

- **AIT Team members selected**
 - **Region I Lead**
 - **Members from Region, NRR, AEOD personnel selected relative to technical expertise**
 - **State observers**

AIT CHARTER

- **Developed and issued on 4/8/94, including:**
 - **Review plant trip and response of management, operators, and systems**
 - **Development of sequence of events and associated causal factors**

- **Assessment of personnel, procedures, and equipment performance**
- **Identification of root causes**
- **Prepare report**

CONFIRMATORY ACTION LETTER

- **(CAL) 1-94-005 issued on 4/8/94,
including:**
 - **Commitment to remain in cold shutdown**
 - **Commitment to cooperate and support ALT activities**
 - **Commitment to gain agreement of Regional Administrator prior to restart**

CHRONOLOGY OF AIT ACTIVITIES

- **AIT arrived on site 4/8/94 and completed on-site inspection activities on 4/26/94**
- **AIT maintained daily contact with Region and Headquarters managers**
- **Gas pocket forms in reactor vessel head and identified by SRI**

- **Licensee describes corrective action plans in letters dated 4/25/94 and 4/29/94**
- **AIT preliminary findings presented at public exit on 4/26/94 at Salem**
- **AIT currently involved in assessment of findings and report preparation**
- **Resident staff involved in inspecting and verifying licensee actions for restart readiness**

- **Region I staff briefed Senator Biden's staff on 5/5/94**
- **Public management meeting with PSE&G on 5/6/94 at the Salem facility**

SIGNIFICANT AIT FINDINGS

- **No abnormal releases of radiation to the environment occurred during the event**
- **Event challenged RCS pressure boundary through multiple operations of pressurizer PORVs**
- **Operator errors occurred which complicated the event**

- **Management allowed equipment problems to exist that made operations difficult for plant operators**
- **Some equipment was degraded by the event, but overall, the plant performed as designed**
- **Operator use of emergency operating procedures was good**
- **Licensee investigations and troubleshooting efforts were good**

REMAINING ACTIVITIES

- **Licensee confirms restart readiness**
- **NRC releases from CAL**
- **NRC augmented start up coverage**
- **Issue ALT inspection report**
- **Determine and direct followup activities**