NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

STATUS OF MAY 2 EVENT AT OYSTER CREEK

Place - Washington, D. C.

Date - Wednesday, May 30, 1979 Pages 1 - 32

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

STATUS OF MAY 2 EVENT AT OYSTER CREEK

Room 1130
1717 H Street, N.W.
Washington, D. C.

Wednesday, May 30, 1979

The Commission met, pursuant to notice, at 2:15 p.m.

BEFORE:

DR. JOSEPH M. HENDRIE, Chairman

VICTOR GILINSKY, Commissioner

RICHARD T. KENNEDY, Commissioner

PETER A. BRADFORD, Commissioner

ALSO PRESENT:

H. Denton

D. Eisenhut

L. Gossick

E. Jordan

J. Davis

Mr. Moseley

Mr. Check

CHAIRMAN HENDRIE: Now let's see. If the staff members will come up to the table. I invite others to come, go and stretch, or whatever suits.

MR. DENTON: We have a two-part presentation planned on the abnormal occurrence at Oyster Creek on May 2nd. We talked to Commissioner Gilinsky about this several days ago. The first part will be by I&E, who will discuss those aspects related to the response of the applicant to the NRC's official notification. We'll discuss the technical evaluation of the occurrence itself, the tech spec changes we have required as a result of the occurrence and procedure changes in the operator training aspects.

Based on our technical review, we conclude that it is safe to permit the licensee to resume operation.

Let me turn it over to John.

MR. DAVIS: Ed Jordan, who discussed this originally down here on May 3, will be our principal spokesman. It's like going to the Hill. You bring 100 copies with you.

(Laughter.)

MR. JORDAN: Could I have the Slide IE-2, please?

(Slide.)

Great.

The facts of the May 2nd event were established by an inter-office team assembled at the site on May 3rd. The team consisted of 11 NRC employees, the Region 1 regional

director, three reactor inspectors, health physicists, a radiation environmental specialist, four NRR specialists and a public affairs representative.

The inspection consisted of reviews of the circumstances surrounding the event, a review of the procedures used by the licensee, and interviews with the operating staff. Based on the results of this review, the inspectors concluded that the procedures did not give sufficient specific caution on recirculation loop isolation to the operators, and that the operator training had not been sufficient to ensure the proper awareness of instrument sensing locations and the potential for level difference indication between the core and the annulus regions.

The two major contributors to this event appear to be the failure to modify a procedure following the plant modification, and the failure to follow a procedure which prohibited closure of the pump suction and discharge valves of all recirculation loops simultaneous.

COMMISSIONER GILINSKY: Are you going to explain that?

MR. JORDAN: I can. But I'll wait and follow through the sequence of events in detail for you. In fact, this is a good time to break to that.

CHAIRMAN HENDRIE: I'd just as soon have a laying out of the event for those--if there are any in the audience who are puzzled, I will remark that on May 2nd Oyster Creek went through a series of water level matters in the vessel.

And I look forward with great interest to seeing what we think happened and why this stuff sloshed around the way it did.

MR. DENTON: DarrellEisenhut and Paul Check will discuss that.

MR. CHECK: I'm Paul Check, Reactor Safety Branch, Director of Operating Reactors. With me today are members of the branch, also the Plant Systems Branch, the DOR, as well as the DOR project manager and his chief.

Mr. Chairman, I had planned on introducing remarks describing the event with a little description of the plant. We could skip that, if you wish, and go right to the event.

CHAIRMAN HENDRIE: I think some brief comment about the plant is likely to be useful to all assembled.

MR. CHECK: Let me focus us in Slide 1, then, on the purpose of our portion of the presentation.

(Slide.)

Which is to describe the plant, the event at the plant, on May 2nd, discuss the safety considerations related thereto, and describe the actions taken as a result.

As a brief bit of background on Slide 2, we show something of the bibliography of Oyster Creek.

(Slide.)

The plant is owned and operated by Jersey Central Power & Light Company, a subsidiary of the General Public Utilities. It's located in New Jersey approximately 35 miles

north of Atlantic City.

The reactor is a General Electric BWR 2. It's one of 11 plants under review in the systematic evaluation program. The plant went into power operation in mid-'69. Currently, it is loaded with fuel manufactured by Exxon. Over the past several years, it's had an availability of about 75 percent.

(Slide.)

Although this gets a little bit ahead of the story, I want to distinguish at this point between Oyster Creek and plants like it, for which this event has implications, and the reason for doing this is, I think, going to become apparent quickly. The purpose is to allow us to proceed as efficiently as possible in taking whatever prompt regulatory actions are required.

Okay, on Slide 4 --

(Slide.)

-- we show a typical boiling water reactor, a GE direct cycle 1930-megawatt boiling water reactor, which Oyster Creek is. During operation, steam is produced in the reactor, flows to the steam lines. It expands to the turbine, which drives the generator.

Spent steam is then condensed in the main condenser, returned through the reactor feedwater system.

The containment you see there includes the drywell which houses the reactor, and the suppression chamber torus.

Steam released in the drywell is vented to the torus and condensed as the torus water.

Slide 5, we get a little closer now to what this reactor looks like.

(Slide.)

The steam supply system. The reactor, with five recirculation loops. Only one is shown explicitly here. It's typical, of course. There are four others. There is main steam piping and there is feedwater piping.

The system is also equipped with an isolation cooling system, consisting of circulation piping and condensers, designed to provide for heat removal from the reactor via natural circulation. The main steam piping is equipped with relief valves inside the drywell. It can be operated either automatically or manually to relieve excess pressure and to depressurize the system.

Each of the two steam lines is also equipped with an isolation valve to isolate the pressure vessel either automatically or manually. The feedwater piping delivers water to the annular region or downcomer of the reactor. The feedwater mixes in this annular region with recirculation water and is then routed to the core through the recirculation loops.

The variable speed recirculation pumps take suction from the annular region of the pressure vessel between the

vessel wall and the core shroud, through a normally open suction valve and discharge water through a discharge valve equipped with a two-inch bypass line, into the bottom of the pressure vessel. There are five such recirculation loops, as I said before, for Oyster Creek. And all suction, discharge and bypass valves are normally open during operation.

At the time of the May 2nd event, one of these recirculation loops, Loop D, was out of service awaiting replacement parts for a pump seal. Two of the recirculation loops, A and E, have ten-inch connections on the suction side of the recirculation pump, upstream of the isolation valve. These connections are the return lines from the isolation condensers.

There are two isolation condensers. These are connected to the reactor vessel steam region on the suction side of the recirculation loops, A and E, as I mentioned a moment ago. These isolation condensers provide a loop for natural circulation through the reactor core.

When operating, the system receives steam from the reactor vessel, the steam is condensed and returns as water to the recirculation loop. The system is actuated automatically on detection of a persistent signal by either high reactor pressure or low low reactor water level. The system may also be actuated manually be the operator.

Slide 6, please.

(Slide.)

As I said earlier, steam from the reactor drives the main turbine generator. It's then condensed and returned to the reactor via one-third capacity condensate pumps and three one-third capacity feed pumps. The condensate feedwater and recirculation pumps are powered normally in operation from the station and nonvital 4160 Volt buses A, 1A and 1B of electricity, as conveniently shown in red. During normal operation, these buses receive power from the auxiliary transformer, connected directly to the generator.

Start-up transformers SA and SB provide power to buses 1A and 1B during plant shutdown. Condensate pump 1A, feed pump 1A, recirculation pumps A, C and E all receive power from nonvital bus 1A. Condensate pumps 1B and C, feedwater pumps 1B and C, and recirculation pumps B and D receive power from bus 1B.

The point here is that at the time of the May 2nd event, start-up transformer SB was out of service, as permitted by technical specifications, to perform a routine inspection of its associated 4160 Volt cabling. This point may have been the subject of some confusion at the previous briefing. I want to make the point here that that transformer was out per technical specifications, for routine surveillance. It had been out for approximately two hours before the event.

COMMISSIONER KENNEDY: Two hours?

MR. CHECK: Two hours, yes, sir. It is permitted to be out of service for seven days.

Also, all the feedwater pumps were in service. That was another point. It wasn't clear, at least initially, in the earlier briefing. All feedwater pumps were in service.

Back to Slide 5, now, Frank, I think.

We want to point out that in order to monitor system performance, instrumentation is provided to sense reactor water level, reactor pressure, valve position, recirculation flow rate and other system parameters. Reactor water level is monitored by three different types of level measuring devices. These instruments sense low level and low low level in the annular region of the pressure vessel, and low low low or triple low level inside the shroud above the core.

As I said earlier, on May 2nd all plant systems were in normal lineup, with the exception of the start-up transformer SB and the recirculation loop D. Start-up transformer was removed from service for maintenance. Recirculation pump D had been removed about two months earlier from the system, due to a seal leak.

The discharge valve was closed, the suction valve open, the discharge bypass valve open, and a plate was discharged over the opening in the pump housing, so there was continuity in the loop.

Okay. Now, getting to the event. In your handouts

you have a figure which is perhaps unnumbered. Let's show the figure that shows the sequence. Slide 7, it is. And that's what you're looking for.

(Slide.)

We can't keep it up there all the time, but it would be handy to refer to. We're going to show you the reactor and what's going on.

We'll go back to 5, Frank, and state that at the time of the event, which was 1:51 p.m., the reactor was at 98 percent power.

COMMISSIONER KENNEDY: 1:51?

MR. CHECK: The afternoon of the 2nd of May. The reactor was at 98 percent power and the water level was at 13 feet, 4 inches, above the core. Feedwater flow and recirculation flow are normal.

What I'm going to present now is a summary of the important elements of the transient. One thing -- the initiating event. While conducting routine tests in the isolation condenser actuation system, an instrument technician caused the hydraulic disturbance in the instrument line that was sensed by the reactor protection system as a high reactor pressure condition.

The reactor protection system scrammed the reactor and tripped the recirculation pumps. This reactor recirculation pump trip, it is interesting to note, is what we call an

ATWS pump trip. It is something that was installed in the fall of last year, more or less at our urging, as a product of our ATWS review.

Okay. Immediately then, the reactor water level began decreasing due to collapse of steam bubbles in the core. What Frank is going to show here is -- it should be in two colors, but it isn't. It would be too apparent. We're going to try to show the level within the shroud area that is directly above the core and that in the annulus.

Okay. Immediately the reactor water level began decreasing due to collapse of steam bubbles in the core, also the continuing flow of feedwater. But the feedwater pumps were on. The continued flow of feedwater to the annulus cooled and shrunk the water in the downcomer, this annulus region.

At 13 seconds, the turbine generator trips. Automatic transfer of loads -- Frank, perhaps if we went back to 6 for a minute, it would be useful to look at this diagram again.

Automatic transfer of loads from the auxiliary transformer to the start-up transformers was successful for start-up transformer SA, but failed, of course, for SB, because it was out of service. This left feed and condensate pumps 1B and 1C without power, and they tripped temporarily.

Condensate pump 1A alone could not meet the suction

pressure requirements of feedwater pump 1A. So feedwater pump 1A tripped. This is a known characteristic of the feedwater system.

We now have a loss of feedwater transient.

Perhaps we can go back to 5.

The operator at this point makes an unsuccessful attempt to restart feedwater pump 1A. This was due, we learned later, to a lack of a permissive signal from the lubrication system. Oil pumps provide lubrication to feedwater pumps. There was a lack of a permissive signal which indicated that the feedwater pump was being adequately lubricated. So he couldn't start up the feedwater pump.

At this point --

COMMISSIONER BRADFORD: What is the line below the water level?

MR. CHECK: That's a mistake. This is an artist's conception of Oyster Creek.

COMMISSIONER BRADFORD: Yeah, you know them artists.

MR. CHECK: We didn't QA the slides sufficiently.

COMMISSIONER KENNEDY: You say there was not a signal? This is just a failure of signal or an actual failure?

MR. CHECK: I don't want to get into too much detail. We can if you wish. But functionally, a signal or a condition which would allow the feedwater pumpt to start up

didn't exist.

COMMISSIONER KENNEDY: Was that because of a failure?

MR. CHECK: A breaker failed to close or open.

COMMISSIONER KENNEDY: It's not the question of the whole loop?

MR. CHECK: No. It's a minor electromechanical problem.

e-8

Okay. We're still at 13 seconds, and counting.

At about this time, then, the water level decreases to the low-level SCRAM set point. Had the plant not SCRAM'd now, it would upon reaching the 11'5" set point above the core.

At 43 seconds, when the water level was 8'8" above the core, the operator initiated the closure of the main steam isolation valve to conserve inventory.

I will try to back up a little bit in the talk.

Inventory is, of course, important here. The feedwater pumps were on until about 30 seconds ago; that is, until the turbine generator tripped. So supply was continuing to the reactor. That's fine. At the same time, of course, the steam lines were open, and water in the form of steam was leaving the vessel, but this was balanced. Feedwater pumps had tripped at 13 seconds; and now 30 seconds later, because the operator knows he wants to conserve inventory, he isolates the reactor by closing the main steam isolation valves, so now he has a closed system and one of constant inventory.

This action would have happened automatically 30-odd seconds later, we calculate, on the basis of a knowledge of how rapidly the water level was running in the annulus. When the water level reaches a low-low set point -- 7'2" above the core -- a signal is generated to isolate the reactor, close the main steam isolation valves.

That, of course, did not happen here, because the

operator interrupted -- properly -- the sequence of events.

At a minute and a quarter into the event, the operator put an isolation condenser into service and began a controlled cooldown program of intermittent isolation condenser operation. This was carried out over the next half-hour.

Now, here is an important point: The procedures governing isolation condenser operation instruct the operator to close the discharge valves on recirculation loops A and B, the two loops to which the isolation condensers are connected. This is to protect against an excessive flow condition in the condenser piping that would actuate the break-sensing automatic isolation provisions of the isolation condenser. High-flow conditions in the isolation condenser are sensed automatically as a break in that system, and automatically then the reactor takes steps to isolate itself to isolate the break.

This system, this break-sensing system, was especially sensitive during the time when recirculation pumps continued to run. They pulled water down from the isolation condensers. But as I mentioned earlier, these recirc pumps were tripped on the event or shortly thereafter because of the ATWS pump trip.

Here, perhaps, is where a procedure hasn't caught up with the actual modification of the plant. At this same time, the operator apparently closed the discharge valves in recirculation loops B and C, as well, most probably in preparation for restarting those pumps. Closing the discharge valves is required

by procedure for restarting pumps.

So, he's got two procedures together: One of them was perhaps out of date. The other one, he maybe shouldn't have been looking at quite so quickly.

But at any rate, he prepared to start the recirc pumps by closing the discharge valves, but he didn't carry through on the action.

In a minute and a half, then, we have not an isolation condition, but certainly a choked-flow condition. It's not true of isolation. A choked-flow condition between the annulus and the core, the only path being through the bypass lines around each of the discharge valves and each of the five loops.

In a minute and a half after the event --

COMMISSIONER KENNEDY: Five loops or four loops?

MR. CHECK: Five. There are five, although one was out of service. It has the same bypass capacity.

COMMISSIONER KENNEDY: The bypass was open? Okay.

MR. CHECK: Yes.

At a minute and a half, then, the low-level alarm cleared as water was added to the annulus from the isolation condenser. The inventory in isolation condenser just sort of whooshed in, and the level, at about three minutes into the event, the low-low-low or triple-low condition inside the shroud was alarmed. This corresponds to 5'6" above the core.

The operator continued controlling reactor cooldown

with an isolation condenser flow.

We now skip to about a half-hour after the SCRAM, but observe that it was during this period -- that is, from three -- actually, from seven minutes to 32 minutes -- that the minimum water level has been calculated to occur. The minimum calculated levels ranged from one foot to 3-1/2 feet above the core; under the alarm point, but above the core.

MR. EISENHUT: Somewhere in that hatched area.

MR. CHECK: Right.

MR. EISENHUT: Depending on different assumptions in the calculations.

MR. CHECK: We'll talk about the calculations in a little bit.

At 32 minutes, then, the operator restarted recirculation pump C, but upon learning that the water level in the annulus had dropped three feet in less than two minutes, he shut down the pump and isolated it to investigate it.

At this time, the low-low-low level alarm apparently cleared. At 39 minutes, the operator placed recirculation pump A in service. This removed the disparity in water level between the annulus and the core, the resultant level being 11'4" above the core. It equilibrated at that point.

At one hour, the startup transformer that had been out of service for the surveillance was returned to service. And in nine hours, the reactor reached a cold shutdown -- eight or

nine, in that area.

Okay, now, we get to our safety review.

As we undertook to review the May 2 event, it was our purpose first to establish that the plant was in a safe, stable condition; second, to determine what, if any, prompt regulatory actions were required for other plants; third, to assess systematically the condition of the reactor and its readiness to start up again.

To get firsthand information regarding the event, the condition of the plant, we sent a factfinding team to the site that worked with the I&E team already there. On the basis of their telephone report back to us on the afternoon of the 3rd, we were able to confirm our earlier reports from the licensee, and I&E, that the plant was in a safe, stable condition.

We were also able to make a preliminary finding that the principal factor contributing to the severity of the event was the interruption of the good hydraulic communication between the annulus and the core region of the reactor. With this latter information, we knew we could confine our immediate attention for other reactors to non-jet pump BWRs, because on a jet pump plant there is no way to isolate the core from the annulus. As luck would have it, on May 3 no non-jet pump BWRs were operating.

So, with Oyster Creek determined safe and no prompt regulatory action apparently needed for other plants, we continued with our systematic review. Before permitting Oyster

Creek to start up, we needed to find that the core was not damaged, that the event would not reoccur. Also, we had to examine whether any other actions needed to be taken -- for example, by Inspection and Enforcement -- to the condition of the core question, to determine that the core was undamaged.

Calculations of minimum water level were performed by Exxon, General Electric on behalf of the licensee, and by us. Throughout the event, the rate at which the water-steam mixture in the reactor could accept heat exceeded the rate at which heat was transferred from the fuel to the water. Thus, it would be sufficient to show that the core remained covered.

All calculations indicated that the core did not uncover.

To support the conclusion of no core damage, the licensee and we examined plant records for radiological evidence of core uncovery.

(Commissioner Bradford leaves the room at 2:48.)

MR. CHECK: We found that the reactor coolant sample analyses from before and several days after the event showed no unusual increases in concentrations of radionuclides.

Also, the continuously recorded signals from the plant stack and the steam air ejector monitors showed no unusual increases of airborne radioactivity.

We have concluded from all of this that the core was not damaged.

Safety analyses of a spectrum of postulated transients and analyses are performed for each plant. The response of the plant is shown generally by calculation to be acceptable: that is, to meet specified acceptance criteria. These acceptance criteria, or simulations of postulated events, take explicit credit for certain equipment and design features in the plant; where this is done, and to assure that things will go as analyzed, technical specifications are established to assure the availability and correct operation of the essential equipment.

But, again, on May 2, the loss-of-feedwater transient did not proceed as expected, because essential equipment was not operated as assumed; specifically, the discharge valves and the recirculation loops were closed.

The licensee has now performed and we have reviewed a suitably bounding analysis for events of this type. Further, the licensee has proposed, and we have accepted, technical specification changes which will assure that the plant matches the assumptions of the safety analysis. Specifically, these tech spec changes require that the suction and discharge valves on each of two recirculation loops remain open to guarantee easy hydraulic communication between the annulus and the core. Also, the low-low water level signal that has been assumed in the analysis to actuate the isolation condensers would be added as a limiting safety system setting.

Finally, to emphasize its importance and to remove

any ambiguity, the low-low-low water level has been established as a safety limit for all modes of reactor operation.

With these technical specification changes, we have completed our technical review of the May 2 event at Oyster Creek and are reasonably assured that it won't reoccur.

In connection with one other thing, I&E has been looking at certain things. One thing that remains before recommending that the Oyster Creek plant be permitted to resume operation is a finding by I&E that the licensee has attended to those matters within the scope of that office -- for example, that needed procedure revisions and indicated operator training have been satisfactorily accomplished. And I look --

COMMISSIONER GILINSKY: Could you just return to the point about the procedures being out of date? I didn't fully understand that.

MR. JORDAN: I will pick up on that in just a moment.

An inspection of the licensee's corrective actions was conducted on May 7 through 11, and on May 14, in conjunction with the detailed inspection of Bulletin 7908. As you recall, Bulletin 7908 was a bulletin sent to all boiling water reactors based on the Three Mile Island accident, for them to take actions in response to the problems that were found at Three Mile Island.

The procedure changes were initiated by the licensee to assure that at least two recirculation loops discharge valves are open at all times.

(Commissioner Bradford returned to the room at 2:52.)

MR. JORDAN: Training sessions had been verified and conducted by the licensee on the May 2 event. The training program was revised to include in-depth review and procedure changes to include conditions which may arise from multiple or coincidental failures. The inspectors verified that a startup program has been developed in compliance with the conditions of the safety analysis review.

Could I have slide IE-4, please.

(Slide.)

The inspections of the licensee's action in response to Bulletin 7908 included review of operator training, which was a discussion with two operators per shift. During those discussions, the discussions with regard to the May 2 event at this facility were also discussed.

The inspector verified the operability of 10 engineere safety feature systems. This is making a hand-over-hand walkdown of each of the systems, reviewing the valve lineups physically against the PNIDs, and verifying that the licensee's lineup procedure was correct.

Through that review, only one instance was identified in which there was a deficiency. This was a case in which three valves, which were identified as being locked in an open position, were in the correct position but they were not locked. And so noncompliance consideration is being given with regard to

that item.

All of the safety systems were verified to be properly aligned both electrically and mechanically for automatic actuation.

The procedure changes with respect to both Three Mile Island-type event and this May 2 event at Oyster Creek were found to have been implemented.

The licensee has established two dedicated phone lines for NRC use and has promulgated a memo to operating personnel concerning prompt notification of events.

The inspector also identified instances in which the small instrument valves were not identified or were not shown on the piping instrumentation drawings. The licensee is committed to correct this problem in a timely fashion.

Now, so far as the procedures, your question is: How did this procedure omission occur; specifically, what it was.

There were two procedures that were involved. One procedure was a standing order which required tripping of A&E recirc pumps and opening the two-inch bypass valves, closing the discharge valves. This particular procedure should have been changed when a modification was made in August of '78 which caused the pumps to trip when there was a reactor trip. This is the ATWS modification. That modification was not done to the procedures.

COMMISSIONER GILINSKY: You said "should have been

made." Is this something they should have figured out, something that we asked them to do and they did not do?

MR. JORDAN: No. Anytime a modification is performed, the licensee is obligated to review his procedures to see how the modification affects his procedures and then train his personnel so they can respond to that physical plant change.

COMMISSIONER BRADFORD: Now, with all the bulletins that have come out after Three Mile Island, the B&W plants, will they have gone through that cycle as well and reviewed all of their procedures to be sure that they're consistent with the bulletins?

MR. JORDAN: The procedure review, they are being requested to do according to the bulletin does not specifically address design changes. That's another little nuance. If that answers your question.

COMMISSIONER BRADFORD: It would help if you would start by saying "Yes" or "No" at the beginning of that paragraph.

MR. MOSELEY: Excuse me. I think the answer to your question is: They are already required to do this. This is a part of the administrative controls in the QA program. This was just a glitch, in this particular case, that happened at Oyster Creek. So there was no new requirement. I believe that answers your question.

COMMISSIONER BRADFORD: But do we know, for example, that we have now required that a reactor trip instantly upon a

turbine trip? Are there any reviews of procedures?

MR. JORDAN: Those modifications that have been required by the bulletin and by the order are being reviewed specifically by the inspectors at the site, and they're being verified as those changes have been incorporated in the procedures.

COMMISSIONER BRADFORD: I am sorry. Not just now, but are there also operating procedures -- in this case, apparently -- that effectively would improve the system, but didn't give the operator the right procedures to cope with the improved system? They've now improved the system in the B&W plants as well; does the operator have the corresponding procedures?

MR. JORDAN: Yes, sir.

MR. DENTON: In the B&W plants, part of our review was procedures that implemented the new design changes. So we would say "Yes" for the B&W changes.

MR. JORDAN: And for the changes with respect to the bulletin. That's with respect to the order. With respect to the bulletin, those are being reviewed by inspection procedures for each of the Westinghouse and GE plants where there are procedure changes or modifications of the facility as a result of that bulletin.

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We do have that assurance. Were there further questions about the procedures?

COMMISIONER GILINSKY: No.

CHAIRMAN HENDRIE: Please go ahead.

MR. JORDAN: Could I have slide five, please?

(Slide.)

In general the notifications by the licensee and within NRC did not proceed as rapidly as desired. Based on the potential seriousness of this event, offsetting this statement, it should be noted that at the time the NRC was notified that the reactor was in a safe shutdown condition with no abnormalities in plant parameters or radioactivity levels, the licensee was committed to remain in shutdown until the event was thoroughly reviewed.

COMMISSIONER GILINSKY: Now what is it that triggered the notification to the NRC?

MR. JORDAN: On the part of the licensee?

COMMISSIONER GILINSKY: Yes.

MR. JORDAN: His concern that he may have exceeded the safety limit.

COMMISSIONER GILINSKY: The triple low signal?

MR. JORDAN: Yes, and that procedure had been modified as a result of the I & E Bulletin 79-08 that he had placed in it. If the safety limit is exceeded you would notify the NRC within this one hour period. This notification was

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done an hour and half after the onset of the event.

COMMISSIONER GILINSKY: And when would you expect them to notify you?

MR. JORDAN: Within an hour of the event. Within three minutes, we received the triple low level, so we're talking about 30 minutes of delay, if you will.

The subsequent notification was discussions by Region One inspectors and a section chief within our armed personnel. These were licensing projects people, and with the information they had, the concerns they had for this particular event were elevated. And I say that with the information we had, we feel that the internal notification was hampered by incomplete information. An inspector, based on this raising of our interest in this matter, an inspector was dispatched to the site that night from another site.

COMMISSIONER KENNEDY: In what respect was it incomplete?

MR. JORDAN: We had the information that there may have been the triple low level received, and we didn't have the full description of the plant parameters. So there was some question -- in fact there was some question on our part the following morning as to whether that had or had not been the triple low level received.

So there was a question of whether its instrumentation or whether it was -- a physical inspector was

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on site at 3:30 a.m. to review the incident. He established to his satisfaction that the plant was in a safe shutdown condition at that point.

COMMISSIONER KENNEDY: What time was he directed to go?

MR. JORDAN: He was directed about 1:00 a.m., I believe. He was at another site, Salem.

MR. MOSELEY: He was at another site.

(At 3:05 p.m., Commissioner Bradford left the room.)

COMMISSIONER GILINSKY: I'm not sure I understand what you mean by NRC internal notification hampered. By incomplete information.

MR. JORDAN: Okay. The notification process is based on the severity of the incident.

COMMISSIONER GILINSKY: I see. Not having full information, the severity --

MR. JORDAN: It was not clear.

COMMISSIONER GILINSKY: Have we got that cleared up?

MR. JORDAN: Yes, we have. May I have the next slide, please?

(Slide.)

COMMISSIONER KENNEDY: How do you clear that up? That's a function of the information we have available.

MR. JORDAN: We've taken measures to help clear that up.

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MR. MOSELEY: We also think, Commissioner, that maybe we didn't ask enough questions at the initial time.

MR. JORDAN: Okay. The actions that we've taken to try to clear that up include first of all emphasizing to all utilities — this was through a telephone call from the regional director to the top executive in that particular utility — emphasizing the importance of prompt reporting.

The second item was reviewing with each of the operating reactor branch chiefs in the regions their responsibilities and the importance once again of prompt reporting, and their passing forward and obtaining complete information.

Thirdly, we are developing — revising, I'll say — our internal instructions to emphasize promptness in internal reporting. We're also in the process of developing more definitive criteria for issuance of binding requirements to licensees, through either regulations or technical specifications or Regulatory Guide 1.16 -- the mechanism, estimate, and criteria are being developed.

We have verified that Oyster Creek has modified their reporting procedures since the event, so that they would now be more conservative in their reporting.

COMMISSIONER GILINSKY: I assume that when you give them an hour, you also expect them to notify the NRC as soon as possible, before an hour is up.

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MR. JORDAN: We're not asking them to say, "At one hour, call us."

COMMISSIONER KENNEDY: The words are "within."

MR. JORDAN: Yes.

COMMISSIONER KENNEDY: That's just giving them enough flexibility so they can take care of the incident.

COMMISSIONER GILINSKY: Right. If they can do it earlier -- I would expect them to do it earlier.

MR. JORDAN: And one of the mechanisms to do it earlier is the installation of dedicated telephone lines at each of these facilities. The next presentation will discuss that area.

May I have the next slide, please?

(Slide.)

COMMISSIONER KENNEDY: Let me just note that given the experience of Three Mile Island, which was recently fresh in everyone's mind, and particularly in this region, Region One, I have to say I find it extraordinary that we have to reemphasize to the I & E reactor branch chiefs the necessity of prompt notification and of getting better information.

MR. MOSELEY: But we don't want to make excuses for this.

COMMISSIONER KENNEDY: I'm not asking. I'm just commenting.

MR. MOSELEY: It was a function of the people who were available at that time, the people who were handling these

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things, were not normally assigned to operating reactors. All the operating inspectors were out inspecting, and so these were people who were filling in for others, and they, perhaps, were not as well in tune as we would have liked them to have been.

COMMISSIONER KENNEDY: Okay.

MR. JORDAN: Okay. The last item is the fact that information on this event has been disseminated to all licensees. There will be an I & E Information Notice 79-13, a copy of which has been provided to you.

Discussions -- and I might add as a last thing to this — discussions of this particular event with the Nine Mile Point licensee have identified a similar procedural weakness regarding control of the recirculation process, so that there is obvious value in disseminating the information and discussing it quickly with the licensee.

Would you like to make a summary statement?

MR. MOSELEY: I'll make the summary I & E statement. It is our assessment based upon the reviews of Region One and the I & E headquarters staff that the licensee has accomplished the needed actions and has demonstrated that he's capable of operating this facility within the conditions of his license with due regard to the safety implications of both the low water level event at Oyster Creek and the recent Three Mile Island event.

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So, we see no reason why they should not go back into operation.

MR. EISENHUT: Along that same line I should probably point out that this same general kind of approach requiring a safety limit on keeping the loops open and the triple low being the safety limit, it's our intent that for the other similar plants that are shut down right now, we are going to require the same kind of changes in the other three or four affected plants before they are going to be allowed to return to power also. This goes across the rest of the affected plants.

Then, to conclude, we propose to let the plant resume operation.

CHAIRMAN HENDRIE: Okay. Everything from your standpoint, I & E has signed off on everything, and from your standpoint is in place?

MR. DENTON: Ours is in place. I don't know if there are any loose items or other matters that I & E considers.

MR. MOSELEY: We have no outstanding items. We have some things that need follow up.

CHAIRMAN HENDRIE: That sounds reasonable.

Thank you. Good.

(Whereupon, at 3:10 p.m., Wednesday, May 30, 1979, the meeting was adjourned.)

Staff Evaluation of May 2, 1979 Event at Oyster Creek Nuclear Generating Station

PURPOSE

Describe Event

Discuss Safety Considerations

Actions

OYSTER CREEK NUCLEAR GENERATING STATION

GENERAL ELECTRIC BWR/2

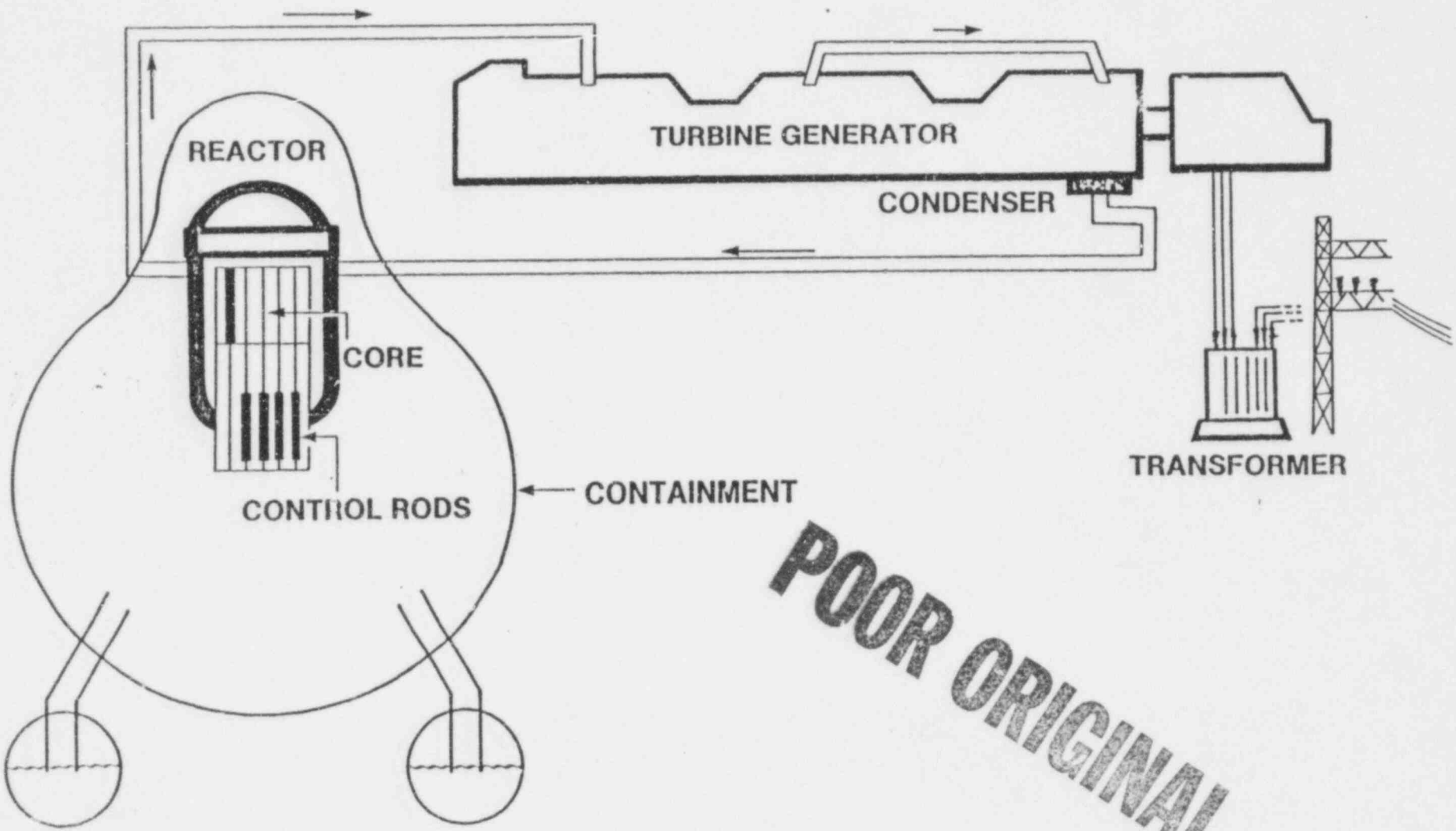
LICENSED 1969

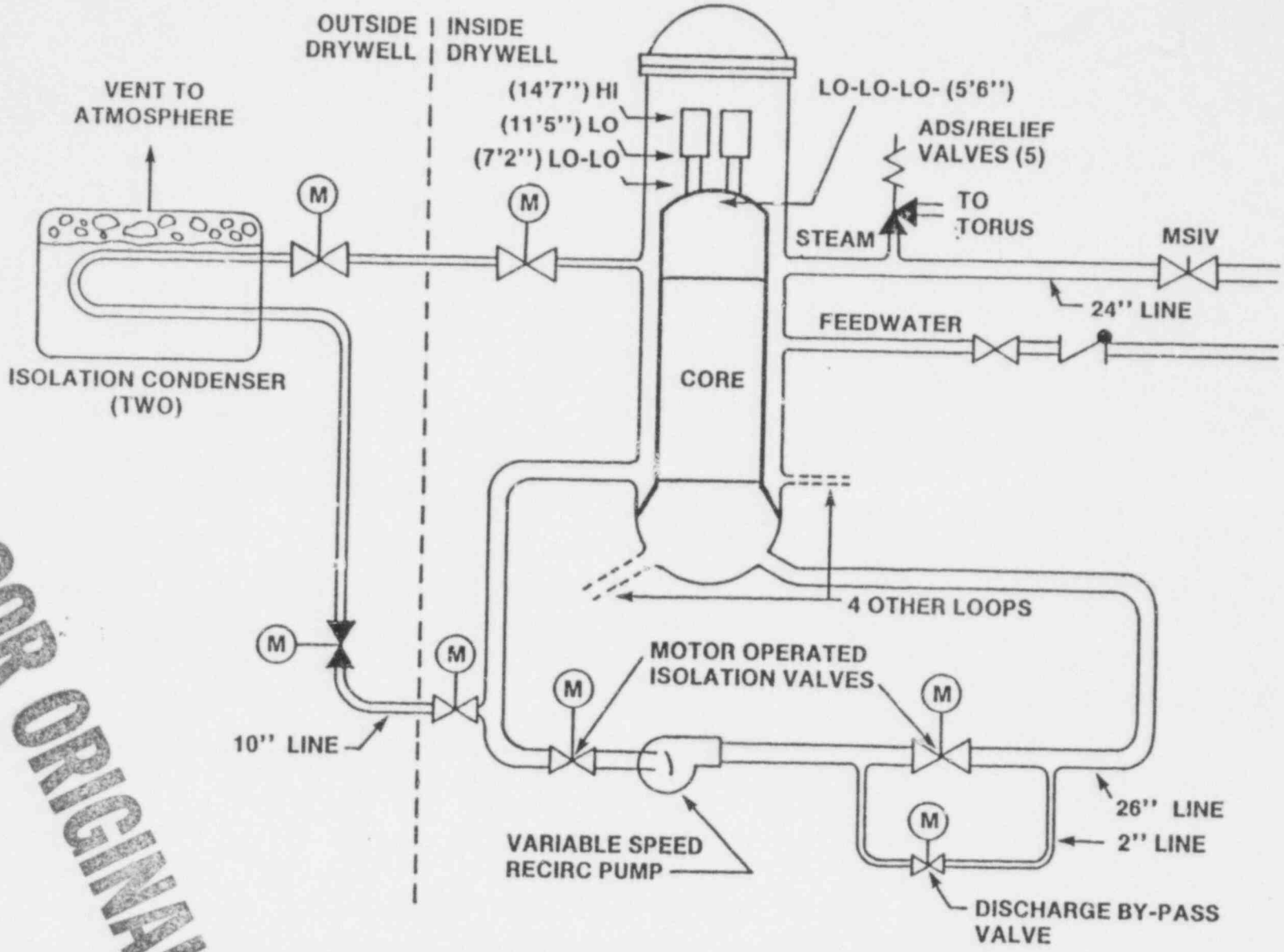
IN SEP

EXXON FUEL

Directly Affected	Not Directly Affected
Oyster Creek	
Nine Mile Point	All other
LaCrosse	operating
Dresden 1	BWRs
Big Rock Point	

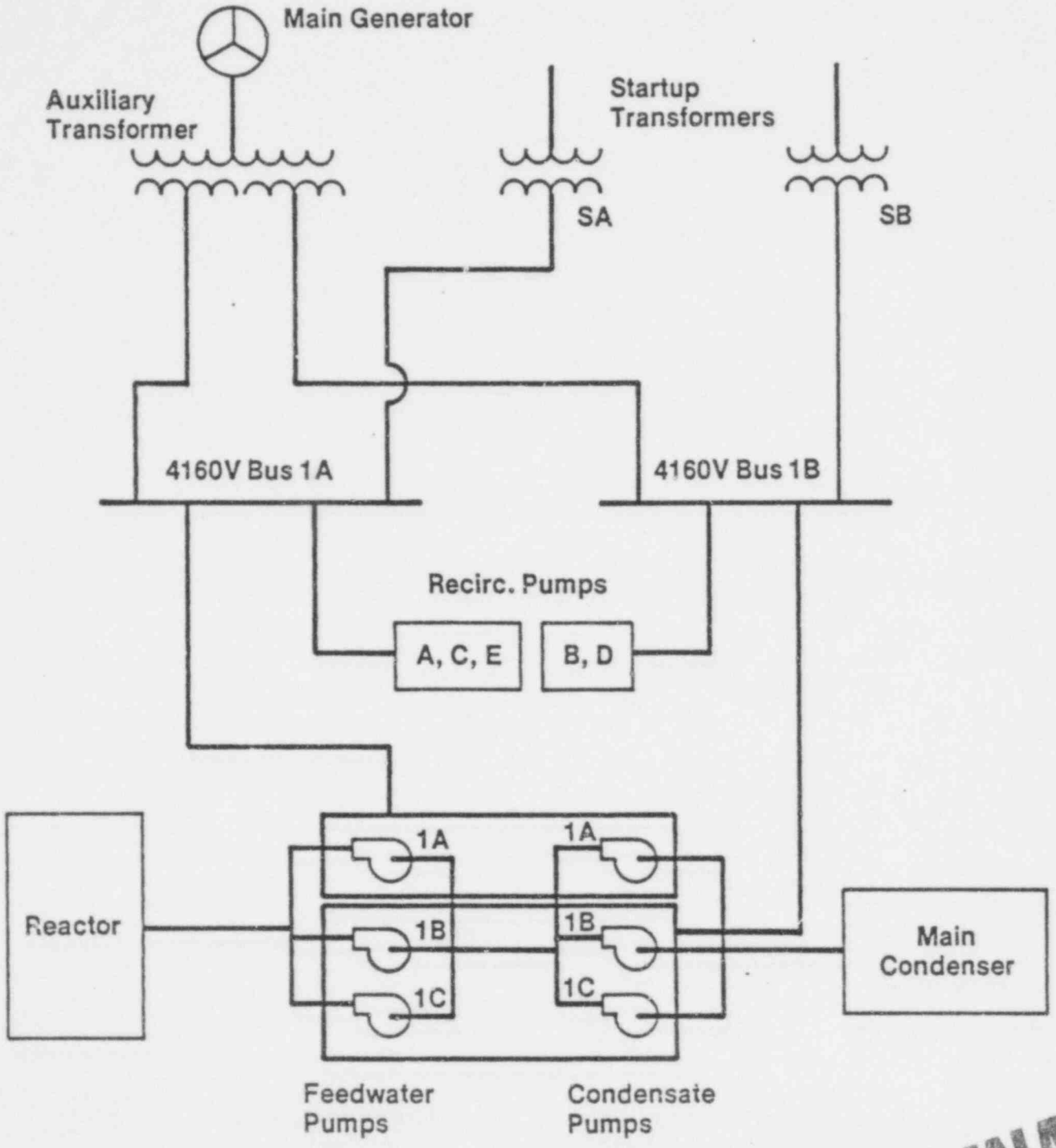
BOILING-WATER REACTOR POWER PLANT





OYSTER CREEK RECIRCULATION, STEAM AND ISOLATION CONDENSER SCHEMATIC

Feedwater & Electrical Supply Systems



SEQUENCE OF EVENTS

0	REACTOR SCRAM, RECIRC PUMPS TRIP
13 SEC	TURBINE GENERATOR TRIPS, FEEDWATER SYSTEM TRIPS, LOW LEVEL SIGNAL
43 SEC	CLOSE MSIVs
49 SEC	REACTOR ISOLATED
1 1/4 MIN	CLOSE "A" AND "E" LOOP VALVES, PROBABLY "B" AND "C", COMMENCE INTERMITTENT ISOLATION CONDENSER OPERATION
1 1/2 MIN	LOW-LEVEL CLEARS
3 MIN	LOW-LOW-LOW SIGNAL
32 MIN	RESTART "A" RECIRC PUMP, LEVEL DROPS, SECURE PUMP, LOW-LOW-LOW CLEARS
39 MIN	PLACE "A" RECIRC PUMP IN SERVICE, LEVELS IN CORE AND ANNULUS EQUILIBRATE
1 HR	SB TRANSFORMER RETURNED TO SERVICE
8 HR	COLD SHUTDOWN

CONCLUSION

CORE UNDAMAGED

RECURRENCE UNLIKELY

- TECH SPEC CHANGES
- PROCEDURE REVISIONS
- OPERATOR TRAINING

RESUME POWER OPERATION

CONCLUSION

CORE UNDAMAGED

RECURRENCE UNLIKELY

- TECH SPEC CHANGES
- PROCEDURE REVISIONS
- OPERATOR TRAINING

RESUME POWER OPERATION

NRC ACTIONS SUBSEQUENT TO OYSTER CREEK EVENT OF
MAY 2, 1979

- COMPLETE INSPECTION OF EVENT
- PERFORM SAFETY EVALUATION
- INSPECT LICENSEE CORRECTIVE ACTIONS
- REVIEW NOTIFICATION PRACTICES
- DISSEMINATE INFORMATION TO ALL LICENSEES

INSPECTION OF EVENT MAY 3-4, 1979

- NRC TEAM:

  REGIONAL DIRECTOR
  REACTOR INSPECTORS (3)
  HEALTH PHYSICIST
  ENVIRONMENTAL
  NRR (4)
  PUBLIC AFFAIRS

- ESTABLISHED FACTS OF EVENT BY REVIEW OF LOGS AND RECORDS AND INTERVIEWS WITH PERSONNEL

INSPECTION OF LICENSEE CORRECTIVE ACTIONS
MAY 7-11, 14, 1979

- REVISE PROCEDURES

- TRAINING SESSIONS ON MAY 2 EVENT AND PROCEDURE REVISIONS

- STARTUP PROGRAM DEVELOPED
  - CRD INTERFERENCE CHECKS
  - CRD SCRAM TEST 25%
  - REACTOR COOLANT ANALYSIS
  - OFFGAS ANALYSIS
  - ACTION LEVELS FOR RADIOACTIVITY

INSPECTION OF IE BULLETIN 79-08

- OPERATOR TRAINING
- OPERABILITY OF ENGINEERED SAFETY FEATURES
- ASSESSMENT OF OPERATING PROCEDURES
- EVALUATION OF LICENSEE RESPONSE

NOTIFICATIONS

- EVENT INITIATED 1:50 PM, 5/2/79
- LICENSEE NOTIFICATION AT 3:20 PM
  DID NOT MEET INTENT OF IEB 79-08
- REGION I DISCUSSIONS WITH NRR ELEVATED
  CONCERNS
- NRC INTERNAL NOTIFICATION HAMPERED BY
  INCOMPLETE INFORMATION
- INSPECTOR ON SITE BY 3:30 AM, 5/3/79
- NRC TEAM ON SITE BY 3:00 PM, 5/3/79

ACTIONS ON NOTIFICATION

- IMPORTANCE OF PROMPT REPORTING EMPHASIZED TO ALL UTILITIES
- RESPONSIBILITIES OF REPORTING EMPHASIZED TO ALL IE OPERATING REACTOR BRANCH CHIEFS, 5/4/79
- INSTRUCTION BEING REVISED TO EMPHASIZE PROMPTNESS IN INTERNAL REPORTING
- DEFINITIVE CRITERIA BEING DEVELOPED FOR ISSUANCE AS BINDING REQUIREMENTS TO LICENSEES
- OYSTER CREEK MODIFIED REPORTING PROCEDURES
- STEPS UNDERWAY TO INSTALL DEDICATED TELEPHONE CONNECTIONS

DISSEMINATE INFORMATION TO ALL LICENSEES

- INFORMATION NOTICE ISSUED 5/29/79

  PROVIDES DETAILS OF THE OCCURRENCE FOR INFORMATION PURPOSES DISPATCHED TO ALL HOLDERS OF OPERATING LICENSES AND CONSTRUCTION PERMITS. NO SPECIFIC ACTION OR RESPONSE IS REQUIRED.