NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

PUBLIC MEETING

BRIEFING BY NRR ON ORDER IN POINT BEACH
STEAM GENERATOR TUBE DEGRADATION

- - -

Place - Washington, D. C.

Date - Wednesday, 2 January 1980 Pages 1-23

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

PUBLIC MEETING

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STEAM GENERATOR TUBE DEGRADATION

- - -

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

Wednesday, 2 January 1980

The Commission met, pursuant to notice, at 11:30 a.m.

BEFORE:

JOHN F. AHEARNE, Chairman

RICHARD T. KENNEDY, Commissioner

JOSEPH M. HENDRIE, Commissioner

PRESENT:

Messrs. Eisenhut, Noonan, Shapar, Gossick, Trammell, Bickwit, Denton, and Hanrahan.

* * *

CHAIRMAN AHEARNE: Before we get started, the Commission first must vote to hold a briefing on an order on Point Beach, vote to hold on less than one week's notice.

(A chorus of ayes.)

CHAIRMAN AHEARNE: Lee, before I turn to you to get started, I have asked the general counsel to briefly review, for my benefit and perhaps the other Commissioners' benefits, if there are any ground rules on this morning's discussion.

MR. BICKWIT: The ground rules stem from the fact that an order is out at this point and a hearing has been requested on that order. Under the language of 2.780, the ex parte bar is thereby triggered. The line of cases, however, to the effect that the Commission must be able to continue to perform its investigatory functions or the functions associated with it, and because of that line of cases it is possible for staff to communicate with the Commission in order for the Commission to perform those functions.

In the case of this briefing, what the Commission is being briefed on is what action to take with respect to the issuance of an order involving pressure levels, as I understand it. So long as the discussion remains on that matter and any matter relevant thereto, even if in order to be relevant thereto you must seep over into discussion of matters which are before the Commission in adjudication, that discussion may take place.

As a matter of discretion, I would suggest that the Commission make available to other parties to the proceeding that is now in progress a copy of the transcript of this meeting and allow them to respond to any representations made by the staff in this briefing prior to any Commission action in the adjudication.

CHAIRMAN AHEARNE: Joe, do you see any problems?

COMMISSIONER HENDRIE: No.

CHAIRMAN AHEARNE: Fine. Let's then make sure we do that. And I assume that you will leap in verbally if there is a point where you believe things are going beyond the line which you believe ought to be drawn.

MR. BICKWIT: Yes.

CHAIRMAN AHEARNE: Shielded, then, by the general counsel, Lee?

MR. GOSSICK: Mr. Denton will introduce the discussion.

MR. DENTON: We last met with you on November 28th, and I won't go into that any more than to say that what we'd like to cover today is some new information that's been available since the last order was issued, and also discuss with you an additional order that we've proposed about primary system pressure and an attempt to operate within the guidelines.

Mr. Trammell is the project manager who will address it.

MR. TRAMMELL: When we had that prior discussion on Point Beach on November 28th, there was one item for which in the licensee's corrective in his program, that he wanted to do, which required an amendment to his license. That was his proposal to reduce pressure to 2,000 psia from his currently licensed pressure of 2250 psia. At the time that we had our discussion on November 28th, we had not completed our review of this aspect of it.

It was an item that required a little digging, because it went back some years in time to when the licensee had done it before, and the information that was furnished was basically -- appears before you in the references, and we wanted to do it again. It took a little time to dig through the references.

We have finished our review now of his proposal to reduce primary system pressure. We find it an acceptable proposal. Basically, the history of it is that pressure was reduced in 1975 or thereabouts as a result of the fuel densification problem; and it was raised again some years after that because of a different fuel problem.

COMMISSIONER KENNEDY: Could you tell us what year?

MR. TRAMMELL: That year was -- just a second.

(Pause.)

It was issued as an amendment to the license on May 23rd, 1974.

COMMISSIONER KENNEDY: As an amendment?

MR. TRAMMELL: As an amendment.

COMMISSIONER KENNEDY: 1974?

MR. TRAMMELL: May 23rd, 1974. That was for Unit 1. The same amendment or the same action was taken on Unit 2 on September 30, 1974.

CHAIRMAN AHEARNE: What was the total coverage of the amenmdent?

MR. TRAMMELL: Reducing primary system pressure.

CHAIRMAN AHEARNE: That was the only thing?

MR. TRAMMELL: Yes, sir.

Now, the main aspect of doing something like that, when the licensee then requested to raise his primary system pressure back to 2250 about two years later -- I don't have that date -- in effect, he did not take credit in his protective equations for the increased margin that he would derive from raising the pressure margin with respect to boiling transfer.

So, now that he's requesting permission to reduce pressure back to 2,000, essentially his margins with respect to departure from nuclear boiling are what they were in previous years. So it's not a significant change.

CHAIRMAN AHEARNE: You're saying that the calculations that were used to support the licensing after that amendment were then done on the basis of 2,000?

MR. TRAMMELL: Yes, that's right.

COMMISSIONER AHEARNE: And were never changed.

MR. TRAMMELL: He could have taken extra credit for this and have the recent operating margin. But this was never requested. So essentially back today where we were previously, 2,000 pounds per square inch.

COMMISSIONER KENNEDY: You say there is not a significant change in the margin of safety?

MR. TRAMMELL: There's not a significant change in the margin of safety, that's correct, from the licensing standpoint. It's obvious, though, that when you go from 2250 down to 2,000, in fact, there is a change in margin. But with respect to this license margin, there has been very minor change.

COMMISSIONER KENNEDY: What is the actual difference?

MR. TRAMMELL: I'd have to ask somebody else. We did run some numbers on that to see.

COMMISSIONER KENNEDY: Could you tell us what the numbers are?

MR. TRAMMELL: Do you have any idea in what units it would be meaningful?

MR. LOBEL: For the LOCA analysis, the peak clad temperature went up 9 degrees. The metal-water reaction number was really an insignificant change. I think it went from like 5.1, 5.3 down to 5.1 percent metal-water reaction.

In terms of subcooling, to get an idea of the margin to subcooling, I suppose you could just use the fact that the pressure corresponding to the saturation pressure, corresponding to the hot leg temperature, would be around between 1500 and 1600. I'm just guessing. And they're operating at 2,000 if this order goes through. So that gives you the margin.

COMMISSIONER KENNEDY: Thank you.

CHAIRMAN AHEARNE: Could you explain why, since they proposed this before, why you didn't incorporate it in the previous order?

MR. TRAMMELL: I guess the simple answer is we hadn't finished our review. Licensing gave us a letter saying basically: we would like to reduce pressure to 2,000 psia. We did it before. Here are the references. And that required digging out references back to 1974, some Westinghouse technical publications. It goes back to June '73. It takes a little while to sort it out. The plant has changed in that period of time. We wanted to be sure that the picture that was accurate in 1974 -- there hasn't been some new problem introduced in that intervening period of time that would cause this to be a different problem.

CHAIRMAN AHEARNE: For the purpose of the transcript, will you identify yourself.

MR. LOBEL: My name is Richard Lobel. I'm in the

Division of Operating Reactors. I'd like to enlarge just a little bit on what Charlie was saying. What they did was redo their analysis in a way to maintain the same margin. But they did go back -- this is the licensee -- they did go back and review all his postulated accidents and transients, and recalculate those that weren't bounded by the previous results. So he went through each one in his FSAR and looked to see if they were still bounded by the previous analysis. Where they weren't, he redid the analysis, and LOCA is one of the calculations that he redid.

So there were new calculations to be reviewed in addition to reviewing what was done in the past.

MR. DENTON: A change in pressure is such a fundamental change, it affects all your transient calculations. And this requires an across-the-board look. There are some other parameters we can review. So we looked at it to be sure that it didn't introduce any strongly negative statement. It does have some positive advantages. Maybe that's what you can turn to next, Charlie.

MR. TRAMMELL: The positive advantages do relate to their current difficulties with the steam generators. As you will recall, one of the proposals that they had or one of the items that they wanted to do to try to alleviate the problem was to reduce primary temperatures that they had seen or they believed that a correlation existed between the

temperature of the steam generator and the rate of corrosion. And so they decided they would operate the plant. They reduced the hot leg temperature down from 597 down to 557 or thereabouts, because they'd seen no tube problems in the cold leg, which operates a little colder than that, but it's in that ballpark.

But in doing the reductions in primary system temperature, they actually aggravated the problems associated with differential pressure across the tubes, because in lowering the average temperature of the reactor, he lowered the steam pressure. At the same primary pressure, he lowers the steam pressure about 200 psi. So instead of business as usual at 1400 psi differential or thereabouts, he actually increased this to 1600 psi. So the reduction in pressure is really a necessary part of the package, because just taking reduced temperatures by themselves, you increase the stress across the tubes by about 15 percent.

CHAIRMAN AHEARNE: So this is really an attempt to restore and go back to the previous differential pressure?

MR. TRAMMELL: Yes, it just takes them back to normal differential pressure.

MR. EISENHUT: The licensee had requested the flexibility to operate in either one of these modes. We believe that it's important, as our memo of Monday stated, that it's no longer desirable, and we think it's necessary

and prudent that that margin be restored back to the conditions where in fact we have some operating experience on this plant to know how it has been behaving, that is, with respect to steam generators. And everything I'm saying is directed towards the steam generators. This is back in the framework of where at least we have now a couple of data points on steam generator tube inspections that shows what has been happening.

CHAIRMAN AHEARNE: Let me try, though, to make sure I understand that previous point that Mr. Trammell was just making. The 2250 to 2,000 isn't so much to get a substantial reduction of differential in pressure from previous operating modes; it's to get back towards more the differential pressure that was existing before the more recent change?

MR. TRAMMELL: That's right. It appears to be a reduction -- this would help, in fact, because of the reduced T-average. What he's really doing is going back to about business as usual with respect to differential pressure across the tubes.

MR. EISENHUT: In other words, we had a family of parameters, the package that we discussed in late November. We approved by confirmatory order all but one. We couldn't approve that one at the time because the staff hadn't completed its accident analysis.

That basically summarizes what we were proposing saying about the primary system pressure reduction. If

there's no other questions on that, we'd like to discuss from a safety significance standpoint --

CHAIRMAN AHEARNE: Let me first find out whether there are any questions.

COMMISSIONER HENDRIE: As a matter of curiosity, what's that 40-degree drop on the hot leg worth in power?

MR. TRAMMELL: The licensee is operating at about 80 percent. It costs him about 20 percent power, the reason being that he is steam flow-limited. I gather turbine valves are just about wide-open at that point, and that's the limitation.

MR. EISENHUT: As of this morning I believe it was, what, 76 percent? I think we called this morning. It was 76, 76-1/2 percent.

CHAIRMAN AHEARNE: Any other questions?

(No response.)

COMMISSIONER HENDRIE: It's a straightforward matter.

CHAIRMAN AHEARNE: Go ahead.

MR. EISENHUT: We'd like to discuss also the safety significance of five additional defects that were recently reported and what they mean to our evaluation and how they fit into this overall package, just briefly this morning. And Vince Noonan, who is the branch chief of the Engineering Branch in Operating Reactors, will be discussing that.

MR. NOONAN: My name is Vince Noonan, chief of the

Engineering Branch, Division of Operating Reactors. What we did is, when we discovered the five tubes that had defects at the tube sheet or slightly above the tube sheet, the engineering staff took a look at this data and basically did another safety-type evaluation, what we would have done in our original, on November 30.

The basic conclusion was that the evaluation would have changed the margin that we had addressed these tubes and what the impact of these tubes had and what actions we might take as far as further investigating the cause of this problem. The conclusions of our November 30th SCR would not have changed. We do not feel that this is a new safety problem. We think the problem has basically been one of the problem that's identified in the '72-'75 era, when you had thinning and cracking. In our presentation we showed on one of the viewgraphs -- in November 28th, we showed in that area, before you made the conversion to ABT, they had substantial numbers of thinning and cracking tubes.

It's the licensee's contention that these five tubes have always been there, they did recognize them back in that era; they never were reportable because they were never identified as more than 20 percent loss of wall. They weren't reportable.

COMMISSIONER KENNEDY: Excuse me, Vince. You're saying that the licensee is saying that those five tubes in

fact are not new problems.

MR. NOONAN: That's right, sir.

COMMISSIONER KENNEDY: They have been problems ever since the '72-'75 time frame.

MR. NOONAN: That's right. Their indication is that they were never serious enough to cause the tube to fail.

The October outage had all known defects. These five tubes were then bought.

CHAIRMAN AHEARNE: When was the previous time that those tubes would have been measured?

MR. NOONAN: The earliest date that I know of that they show any indication is in 1975.

CHAIRMAN AHEARNE: No. What was the latest before October?

MR. NOONAN: They were noted, evidently, in all inspections after that time.

CHAIRMAN AHEARNE: I'm not so much concerned about the noting. What's concerning me is that in this, when it's described as a percentage defect, what does that mean? Does that mean how much the wall has been thinned?

MR. NOONAN: How much the wall has been thinned, right.

CHAIRMAN AHEARNE: One of these is an 80 percent defect.

MR. NOONAN: Yes, sir.

CHAIRMAN AHEARNE: Which is greater than the 20 percent. So I'm really wondering when it goes back to.

MR. NOONAN: In the October inspection, these tubes were inspected using new techniques that I think we discussed before. Number one, they had a multi-frequency type of program. In addition, they did one other thing. On the trip that we took up to Point Beach on December 16th, myself and Mr. Swencer and Mr. Herman from my staff, they explained to us that they did actuall two things. One was this new probe. Secondly, they had moved all the instrumentation outside and they had put a preamplifier on the system. This amplifier helped them enlarge the signal and get better discrimination on the signal. It's a definite improvement over the old system.

These tubes now could be better defined. And using these techniques instead of, as reported, using the old technique, when he said he had less than 20 percent wall thinning, the numbers now appear to be much greater.

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CHAIRMAN AHEARNE: Are you saying that the equipment change led them to shift from a number of less than 20 percent to 30 percent?

MR. NOONAN: Yes, sir.

CHAIRMAN AHEARNE: Did they redo all the tubes with the new equipment?

MR. NOONAN: 100 percent inspection was done in the October inspection.

CHAIRMAN AHEARNE: So that as far as the measurements of the new equipment are concenrned, other than the previously reported tubes, these are the only five in addition that showed greater than 20 percent?

MR. NOONAN: Yes, sir. Since they had the other leakage in December, you came down and did another 1900 tube inspections, both 950 in each generator, which was not required by the staff but which was done strictly at their own initiative, and they did look at the tube sheet area. In fact they looked above the tube sheet. I don't know the exact number, but significantly above the tube sheet. They reported no defects whatsoever.

The new criteria now on plugging is zero defects.

CHAIRMAN AHEARNE: Now, what is your basis. Does the staff agree with the licensee's claim that this is a 72-75 problem?

MR. NOONAN: To the best of our knowledge at this

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point in time, we have no reason to doubt that --

CHAIRMAN AHEARNE: Could you explain why?

MR. NOONAN: Because, as reported by the licensee, they saw no significant change in these single frequency indications. There was no change at all from the 1975 period, we think, at least on one tube, very definitely they would have noticed the change with the single frequency probe, because once you get down to that interface there, the single frequency is a pretty good measurement of wall thinning.

COMMISSIONER KENNEDY: You're saying the eddy current probe would not necessarily have revealed an increase in blockage between 20 percent and 80 percent?

MR. NOONAN: I'm saying with the single frequency, they did not notice any change in the signal whatsoever since 1975. While there's some question, not only amongst the staff but among other people as to the effectiveness of single frequency eddy current testing right at the surface, the one tube that they reported that's a half inch above the surface of the tube sheet would definitely have been within the capabilities of the single frequency probe. That did not show any changes.

CHAIRMAN AHEARNE: You're saying that over the last four years or so, they have identified that tube has having some thinning, but they have never gotten it above the

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the 20 percent?

MR. NOONAN: That's right, sir.

MR. DENTON: Let me try to say it another, Vince. All indications are that these five were relating to that previous wastage problem and are not a part of other granular corrosion that's rapidly affecting tubes.

CHAIRMAN AHEARNE: Now on a physical examination of that tube, you ought to be able to tell the difference, shouldn't you?

MR. NOONAN: Yes, sir.

CHAIRMAN AHEARNE: Do you intend some time in the future to have physical examination of the tubes?

MR. NOONAN: Sir, we're going to be discussing that with the licensee. In fact, we have met already on the night of the 21st. We had a preliminary talk with Mr. Bernstein and talked about making these types of inspections.

CHAIRMAN AHEARNE: I'm not sure I understand. Are you saying you're going to be discussing whether or discussing when?

MR. NOONAN: I think we'll be discussing how many.

(Laughter.)

CHAIRMAN AHEARNE: As long as it's not zero.

MR. EISENHUT: I think it's our position that we'd like to see some of the tubes removed for examination. When

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and how many is the real issue that we're discussing right now.

I think that the answer to when, unless there's a strong justification not to, is going to be at the end of the 60 day effective full power outage.

CHAIRMAN AHEARNE: But ca' you assure us that at least some of these particular tubes will be examined.

MR. DENTON: I think -- I had not planned to try to cover that in the scope of the order we're discussing today, but if it turns out that we're unable to resolve to the staff's satisfaction, we'll be back with further information.

MR. EISENHUT: I think that summarizes the two areas we wanted to address today -- both the five tubes and the confirmatory order.

MR. DENTON: One other point. I understand that the language of the order has been resolved to the satisfaction of both OGC --

CHAIRMAN AHEARNE: Well, before you get to that, can I ask a question. Can you say a few words about the last session we had? One of the significant issues which was raised, and then the staff indicated the resolution of it, or answer the question of where those cracks might be, and in fact, if the cracks occurred in the crevices, that that would constrain the loss rate.

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Now here you have five cracks which are not in the crevices. Can you make any comments about whether that adjusts your conclusion as far as the safety significance of the situation?

MR. DENTON: It would change the probability, in that cracks above the tube sheet obviously are not physically restrained as ones that are in the tube sheet, and the purpose of the wastage criteria are to assure that tubes didn't grow between inspections to the failure point.

So with the inspection schedule, you can find cracks that were above the tube sheet and have adequate time to plug them so they wouldn't fail. I the cracks, these five, are due to these other phenomena, that would change the probability of steam generator tube rupture.

So obviously the intent of the specification is to prohibit operation that would get you into failures on those tubes above the tube sheets.

CHAIRMAN AHEARNE: But my question, I think, is that last time one of the issues was whether the plant should be allowed to continue to operate based on this, and the argument presented was that because of the cracks in the crevices, that there was not a significant danger of allowing the plant to continue operating.

We now have five cracks that are not in the crevices. Does that adjust your conclusion as far as the

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recommendation as to whether or not the plant should be allowed to continue to operate.

MR. DENTON: No, it doesn't, because it's our view that these five cracks were old cracks related to problems that had occurred in the past. And it's not an ongoing problem above the tube sheet. We have very tight specifications on this plant.

If between now and the 60 days we find out that cracking is really occurring above the tube sheet, it would change our views, but as the moment we see these five as not changing our previous views on the cracking problem in the tube sheet itself.

MR. NOONAN: If I could, sir, please, I'd just like to slightly correct the record. Right now the five tubes have been reported as defects. To the best of our knowledge, we do not know that these are cracks.

CHAIRMAN AHEARNE: Right. Thin walls.

MR. NOONAN: Wall thinning. They're reported in the chart as thinning or cracking. We are not sure at this point in time. We do note that they're recorded as defects, not as cracks.

I'd also like to point out that since that time now, we have done two tests -- a static hydrotest on the primary side of 2000 psi and 800 psi on the secondary side, both in October, and in the latest outage, and there are --

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MR. EISENHUT: The other piece to go with that is we think the rate of degradation, based on history in the past -- the rate of degradation is sufficiently slow so as not to be a concern during this period of the rest of the 60 effective full power days.

CHAIRMAN AHEARNE: Before the General Counsel talks, Joe, do you have any further comments?

COMMISSIONER HENDRIE: No. I don't have any problem with it. The tube sheet steam generator tube cracks, and once in awhile ruptures have occurred. They certainly are a burden on the plant operator to take care of them, but in the context of reactor safety in the broad sense, I don't find it a major problem. The staff appears to me to have it well in hand.

MR. BICKWIT: I just was about to say that we can't say we're in agreement with the language because we haven't yet seen the language, but judging from our discussions on the phone, I suspect that once we see it we will be in agreement.

MR. DENTON: I guess I said that orally. My understanding is that we're writing the order to conform to the telephone conversation.

MR. BICKWIT: I think we'll be okay.

MR. SHAPAR: I'm not sure, but I hope so.

MR. BICKWIT: I'm never sure.

(Laughter.)

COMMISSIONER KENNEDY: Even after they're issued.

CHAIRMAN AHEARNE: So I guess, would it be correct to say that assuming the General Counsel does not find any difficulties, we are in agreement?

COMMISSIONER HENDRIE: True.

CHAIRMAN AHEARNE: All right. Anything else?

MR. DENTON: No. That's it.

CHAIRMAN AHEARNE: Thank you.

(Whereupon, at 12:05 p.m., the hearing was adjourned.)