though the base procedure for performing analysis was still there, the procedures that fed into that were no longer as explicit as they used to be. The older procedures gave examples on when you would go into safety analysis review. They didn't always give you a list. They just gave you the types of situations you might be in where you want to go verify that your design analysis is still adequate, that you are not giving someone an answer that's contrary to your design basis. And in the later years the procedures became less explicit, didn't have examples, didn't have discussion on when you would go out into the safety analysis base. And then, interestingly enough, those other procedures also had less review and approval signatures associated with their processes. So less people had the chance to be another barrier and ask folks to go off and do more thorough analysis. So there definitely were examples where the station understood what was going on in the industry, they were very active and interfacing with the owners group associated with the concerns with both

primary water stress corrosion cracking and the
boric acid corrosion. However, when it came time
to analyze their own problems, that's when they
fell short.
MR. MYERS: Haven't we also found some cases
where -- At our Davis-Besse plant don't we have
some guidelines that are different than our other
plants?
MR. LOEHLEIN: There's an implementation guide
for that kind of a process, right. Bobby can
probably answer that more specifically coming from
Davis-Besse. But it's the guidelines talking about
implementing the corrective action program.
MR. VILLINES: Right. We do have a guideline
which implements the FENOC common process in
general, general portions of that. We're taking
some of the industry guidance and expanding upon
what's in the guideline to a large degree.
MR. LOEHLEIN: I think that's where we had the
concern about the categorization levels and so
forth. Particularly, I think, in effectiveness
reviews and in the equipment trending is where we

had issues with the guidance.

MR. VILLINES: Yes.

MR. MYERS: So we see issues that we think we'd classify as more significant at our other plants that were classified as conditions not adverse to quality at our Davis-Besse plant.

CHAIRMAN GROBE: I am still struggling with the connection between the safety evaluation process and the 50.59, what you said, Lew, a few minutes ago; and that is routine day-to-day decisionmaking and how you approached that. Could you help me understand the connection between 50.59 and decisionmaking on a day-to-day basis?

MR. DeSTEFANO: Well, you're going through the same struggle that we did applying the MORT process. Since the MORT process is very rigorous, we really wanted to use its rigor to help us analyze as many of these situations as we could. So the hazards analysis branch of MORT was the closest technique that we could find to really pushing the safety review portion of this. And that's why, as Jim pointed out, the terminology is a little rough.

But we're basically using some of the terminology from MORT; however, rather than its original intention which appears to me to be if you had an industry accident, you are trying to figure out what is the hazard. Maybe it's an oxygen deficient atmosphere. The MORT wording fits perfectly to that. In our case, though, the questions were perfect for taking us down the road of safety evaluation. So we utilized that branch of the system. So that's why we're calling it hazard analysis synonymous with safety analysis in 50.59.

MR. DYER: I guess in the way I understand it, the way you are saying that it sounds to me like this is understanding and using your licensing and safety basis for your plant.

MR. MYERS: Yes.

MR. LOEHLEIN: Yes.

MR. DeSTEFANO: That's it.

MR. MYERS: That's it.

MR. DYER: The age old question we wrestled with in the '90s was do licensees fully understand what the licensing basis is for their plant.

MR. MYERS: What you see is we spent a great deal of time where it appeared we really understood that and you can see it in the quality of documents that you reviewed. And then in the mid-'90s the quality of those documents go from let's do a safety evaluation to see if this is a problem to justifying why the thing is operable. So you see it's a very significant change in the level of detail and understanding and your decisionmaking process to get there.

MR. DeSTEFANO: I guess one of the most direct examples is the -- I am trying to get my timing correct here. I believe it was after Bulletin 97-01 when the -- No, it was earlier than that. I can't remember the date. However, there was a safety evaluation presented to the Commission on behalf of the B&W owners group that the station adopted. And basically it said in that safety evaluation that the issue of cracking is not a short-term issue and the visual inspection that is required by Bulletin 88-05 would identify a cracking if it did occur. Then when the station found leakage and had boric acid on the vessel head, a condition report response justified operating with boric acid on the head and acid on the head without performing an examination of surfaces below it. That was obviously contrary to the safety evaluation that had been submitted previously. And no analysis or justification was performed in the 50.59 space. It was just a discussion in the condition report response that said because of the high temperature it's okay to leave the boric acid there. So that's an example.

MR. JACOBSON: This was a 1993 safety evaluation, B&W?

MR. DeSTEFANO: I believe so. I think it was early '90s.

MR. LOEHLEIN: And I think the condition report you're referring to is a '96 timeframe.

MR. DeSTEFANO: Correct. 551, yes.

MR. JACOBSON: I think I heard you say that you found a deterioration of your 50.59 process in the mid-'90s. Did I hear you say that?

MR. LOEHLEIN: Not the process itself.

MR. DeSTEFANO: No, it was the procedures -- say the condition reporting procedures that would tell you to go perform a 50.59 review. The deterioration was in the condition reporting procedure.

MR. LOEHLEIN: The entry dates to the process that you rely on to apply. Once you were in the process that was not really the problem.

MR. DYER: I guess following that same line of reasoning I had a question regarding the overlap if you would between handling the technical infor- mation and then the hazard assessment process as it would relate, say, to the 50.59 issue. And the question I have is -- one is are you also saying that you aren't -- that once you make a response to, say, a piece of technical information or evaluate a generic letter or an info notice or bulletin or some sort of generic industry communication that you don't keep track of it as to what you said originally or whether or not you later on crossed the threshold of the area of concern that's raised in that technical information?

MR. DeSTEFANO: We found both cases. Obviously the station has a tracking system for commitments, and it's used. But we found some cases where commitments were not entered into that system after responding to bulletins. So yes, the information that was documented previously was not bounced off of what the current line of thinking would be.

MR. MYERS: We have a document we use at two of our other plants called Tech 19. When we get into if we classify a CR correctly to high level, we go through a decisionmaking process that kicks us out all these issues. The same document was not used at Davis-Besse. And it drove us into doing a more stringent safety analysis when we found this problem. First, we would have had to classify it properly. Second, we would have had to go through the right questions and answers. It's just a check sheet we use to make sure we go down the right path, you know. We went just the opposite here.

CHAIRMAN GROBE: So you are not actually talking about formally entering 50.59. What you're talking about is in making decisions and evaluating hazards, considering the types of issues that 50.59 would require of you?

MR. MYERS: Right.

MR. LOEHLEIN: That's it.

MR. MYERS: That's it.

CHAIRMAN GROBE: On all of these CRs or most of them I would think the answers to the screening questions for 50.59 would be no and that you wouldn't do a safety evaluation.

MR. LOEHLEIN: Right.

CHAIRMAN GROBE: What you are saying is using those concepts, whether or not the staff uses those concepts in decisionmaking.

MR. MYERS: Right.

MR. LOEHLEIN: That's correct.

MS. LIPA: I guess I was thinking of it differently. For that one example, the '96 CR, are you saying that that B&W owners group became part of your licensing basis and you later had a condition that was different; it may have really needed 50.59?

MR. DeSTEFANO: Well, let's see. It was not directly referenced in the safety analysis report, that response. It also wasn't placed in the commitment tracking system. So it would not have been considered design or licensing basis by the reviewer. What we're saying is it certainly should take the person down the path of evaluating what the previous stance on these items are.

MS. LIPA: Okay. Thank you.

MR. LOEHLEIN: Okay? Now, Jack, I don't know what you and your staff had in mind in terms of potential break. But my sense is from putting this together that going through the management oversight and risk assessment part of this is going to take a little bit of time. I would say my guess is twenty minutes or so. And so if you want to take a break, this might be the time if that's the kind of timeframe we're talking about.

CHAIRMAN GROBE: Okay. Let's do that. Let's take a break. Let's make it very short. Five minutes?

(Following an interruption the meeting was continued as follows:)

CHAIRMAN GROBE: Why don't we get started. Okay, Steve, go ahead.

MR. LOEHLEIN: For everybody's interest we're on slide 25. And we'll talk about data analysis. We will take a minute to express the process we used to ultimately understand the reason for the errors in management oversight. And the way we began our understanding of evaluating or under- standing this started from the technical root cause report. And that report identified plant conditions that should have been signed as potential larger problems. We have got them listed there. In that original or technical root cause report -- it was figure 26 -- it talked about reactor coolant system unidentified leak rate, containment radiation monitor filter plugging, frequency of containment air cooler cleanings, and boric acid accumulations on the head. And it showed in the timeline which went from about 1995 to 2002 how those things were going on. And what we did from that initial understanding, we saw some patterns and we decided to look at along with other things the pressurizer spray valve we talked about, how that was handled by the station prior to the time that the corrosion of the fasteners was found and turned into an event. We examined these issues as missed opportunities from the perspective that they were performance -- human performance errors but at the management level. We first started to examine these as task performance errors.

Slide 26. Originally I put this slide in ahead of the figure that was next. And having thought about it, I really think it would be better if we look at this after we look at the figure which is on sheet number 27. In the room here we have a large poster-sized hard copy of this. The staff has 11 x 17s, and I think there were probably some extra copies available to those in the room. This will appear as part of the report on a small sheet on 8 1/2 x 11. What I am going to do with this, I am going to take a little bit of time and describe to everyone how this is laid out. It's a variation of that figure 26 that was in the technical root cause report but in this case provides some differences in information.

I would like to start with -- I have got a pointer here. You won't be able to see it real well on the overhead it looks like. But what this is here for those that are looking at the camera -- because I don't think we can see this paper in the corner here -- this is the timeline. These blue lines come from the refueling or the operating cycles at the bottom. At the top we have these kind of blue-colored or turquoise-colored bars. That is the time period. And then going back here, this is about 1995 where it starts. And those are quarters you see, you know, three months to a quarter type of thing. And they're showing you the RCS unidentified leak rate right there over that time period. And you will see right here in the 1998 timeframe there was an increasing rate of the unidentified leak rate. At that time -- you can't read it there too well -- but there was a pressurizer code safety valve that had a seat leak. And we'll talk about what happened with that. The plant took a midcycle out of its year, and thereafter the unidentified leak rate did reduce significantly but, as you can see, did not diminish to the point of the low levels that were seen prior to that. As we know now from the technical root cause, it was in this timeframe that we now understand the significant corrosion of the head was starting which would have been consistent with an increasing leak rate as well.

As you proceed down here these blocks present information on how the station was dealing with the unidentified leak rate. The yellow bands there represent information that's again repeated from a technical root cause. It talks about how frequently we were changing the filters on the radiation monitors to deal with the plugging from boric acid and iron oxide. Below it right here are blocks to describe what the station was doing in response to it. Down here is the frequency of containment air cooler cleanings that was occurring mostly in 1999 and since. One of the patterns you can pick up here is the frequency tends to just disappear toward the end of the fuel cycle when boric acid in the system is significantly diminishing in concentration. And here's the blocks that provide information on that. The green down here did not in any way appear this way on the technical root cause analysis of cause. It describes the station's response to the pressurizer spray valve problems. And then in these blocks here there's a description of what was found on the reactor head in each of the refueling nozzles. I will try to add some understanding to this. These colored bars down here, you will see the blocks up here for the rad water filters have red bands around them, and then the containment air coolers have blue or purple. I don't know how you see it where you are looking. And then the green down here, that shows the time period over which the station was dealing with these. And from this or this kind of combination, this timeline, the thing that really becomes clear is in this timeframe, the 1998, '99, 2000 timeframe, the unidentified leak rate was really unexplainably high. We had these other three things happening at the same time, and we had

12RFO, we had the significant buildup of boric acid on the head that was inconsistent with the amount of flange leakage that was experienced at the plant. The CRDM flange leakage that was reported was very minor, yet the amount of boric acid on the head was significant. So it was at this point in this evaluation that the team decided that evaluating this as a task performance error on the part of the organization was not going to be fruitful by itself. Because really the question to be asked here is in light of all of these concur- rent circumstances, why didn't the organization recognize the significance.

And now if we can back up just a minute to slide 26, the thing we picked up from this pattern-wise is now we listed twenty-two condition reports. But it was twenty-two just from boric acid on the head, containment air coolers and rad monitor filters, just from those three things. We actually had added to those the unidentified leak rate issue and the RC 2 pressurizer spray valve. In all of those this pattern is repeated. It's the same one that we talked about in the corrective action program. Operability and operational impacts were underestimated, the categorization of the condition reports was low, there were no root causes really called for to be performed on these issues and no collective significance recognized. Some of the corrective actions were deferred or they just treated the symptoms. And except for the unidentified leak rate, there was no visible senior management sponsorship of resolving it here. So where this really sent us, what we said that we really need to evaluate here is not peoples' errors in performing tasks. This is really a question of -- and now we will go to slide 28 -- it's a question of risk management. This is a case where the organization did not recognize the significance of the plant condition.

So the concern here was why didn't we recognize it. And the way we approached that is we took the conclusions from the other sections that you have heard about today, the technical information, the way we used 50.59, corrective action program and all those, fed that information into this, added to it some additional MORT analysis that we did in assessing management policies and incentives and numerous interview insights that we got. We put that all together and evaluated it under the MORT section that's called risk assessment and formed the following conclusions: At the beginning of the mid-1990s the management focus became one of production concerns. What we found was there was a -- First of all, it was a single unit utility. There was a belief that it was fighting for its survival. Cost control became a big concern. At this same time the rigor in assessing issues for their potential impact on nuclear safety diminished. There was a management team -- senior management team in place at the time which developed a philosophy that compliance meant safety. Head issues, for example, were never resolved because they were interpreted as not to be compliance issues. Containment air coolers, the rad monitor filters, the pressurizer spray valve, these equipment problems were all managed rather than resolved because requirements for operation could be met by managing them rather than resolving them. We had a management style in place that was less directly involved and really relied on subordinates to escalate concerns.

I guess I would like to take some time now and describe some contrasts. In 1992 -- we talked about this briefly earlier -- containment air coolers were flooding. At that time one of the issues that was identified was a leak on a head vent line. There was extensive root cause done on that, a good one. There were engineering reviews done at the time that the containment air coolers were flooding that went into significant detail about the current conditions of lake temperature and all the factors important for operations to understand how to ensure that that system was operable, how to keep it operable, and how to deal with the situation so it could be fixed. When the containment air cooler plugging situation occurred in 1998, six years later, there was no new engineering work applied to that. In fact, a criteria that talked about what plenum pressure would keep the system operable was just directly applied with no question as to its applicability. We also had interview information that told us how differently the situation was handled in terms of the approach to issues. We got a lot of anecdotal stories from people saying that senior management at the time in the early '90s if they heard about boric acid on the head wouldn't talk about it, just insisted it be cleaned off and done so immediately. Contrast that to how this station dealt with it in the late '90s. There was a question about dose and how does dose factor into this. What we found was this dose -- and I will ask for help from my colleagues here if I don't recall this correctly -- but the real -- the thing that was unique about how dose, dose almost became a production-related type of thing. Dose was viewed as owned by the health physics department. Health physics would allocate the amount of time to do a certain job based on the goals for dose. And it ended up being a situation where dose was another indicator being managed. In fact, the containment air coolers and the fact that they were plugging were treated as an issue for this station from the health physics perspective because the containment entries and the cleaning was causing people to take dose. And that was, we could tell, the most important concern. We had to clean the coolers so much so that the equipment was bought that would allow them to clean it more quickly. I don't know if that answers your questions about dose, but dose itself was not -- beyond that kind of understanding was not a player in the root cause for this event. I forget who on the NRC -- Jack, you had a question about dose?

MR. GROBE: Yes.

MR. LOEHLEIN: That was a perspective on dose. You want us to comment beyond that?

CHAIRMAN GROBE: Let me just ask a question. You indicated that dose became somewhat of a production -- became a production-oriented concept.

MR. LOEHLEIN: For the people involved it was their performance indicator. Mario says he can help me out on that too.

MR. DeSTEFANO: That was definitely another performance indicator. So that was our correlation to production. The folks during an outage had a goal, incentive goal that was associated with minimizing their dose. So the RP tech in the field can control the dose of the station by how much time they allowed a person to be on the job. And interviews that were conducted asked okay, if there wasn't enough dose allowable to perform a function, what happened next? Did the workers leave the area, go and set up a recovery plan and reenter with a new plan? And the answer that we received was no, RP didn't hear about it. Nothing was escalated through their chain of command to help resolve any issues between what work had to get done and how much dose was going to be -- how much dose it would take to perform those functions. So unfortunately control of dose became simply associated with meeting a goal rather than performing in the ALARA fashion to accomplish performing a task that had to get done.

CHAIRMAN GROBE: So, in fact, dose became a criteria for not completing a job.

MR. DeSTEFANO: Exactly.

MR. LOEHLEIN: It became a force where workers needed to overcome it. Like in 12RFO, ultimately a significant amount of dose was used in attempts to clean the head. I think it was 1600 milligram was the number and 280 or so man-hours involved in attempting to clean the head. So when ultimately the decision was made to do all that could be done, dose was expended. But whoever had that job had to overcome that barrier. What we saw was there wasn't -- managing dose didn't appear to be a team effort in trying to get the job done and minimize dose at the same time. It was more a case where dose was kind of a more direct goal and could to some jobs represent a restriction to getting it done. Is that clear?

MR. DeSTEFANO: A fair characterization.

MR. MYERS: At our other plants, you know, the two I have been at, if you look at our dose during an outage, we all have dose goals. But when we get to 9% of, say, an estimated goal, we'll stop and figure out if we didn't improve the dose some way or reallocate dose somewhat, let's not do the job. That's a little different mentality.

MR. DYER: Did you have the same mentality also, say, with the outage schedule? If you had a job that said clean the vessel head and it was allotted, I don't know, 48 hours in the slot, at the end of 48 hours if it wasn't done, was it --

MR. DeSTEFANO: We found that specific case in one outage. And that was the outage where the attempts were being made to clean the vessel head. However, one of the major factors was it was time to reinstall the vessel head, and also the folks involved with the activity believed that they could not successfully accomplish it with the equipment they had on hand and had done enough for that particular time period.

MR. LOEHLEIN: Yes. I really think that it was two-fold.

MR. DeSTEFANO: It was a combination.

MR. LOEHLEIN: It wasn't just simply the dose aspect. If you talk to people you will find there was really no way else to do it at this point to make it any better anyway. So in terms of their preparation -- Some of these issues of outage pressure may reflect more on outage preparation, were the right contingencies in place to have taken care of it rather than just at the time say well, I am not getting enough time. So that type of issue came up. People felt it from time to time. But in terms of a direct impact, we found as much infor- mation that told us that what preparations we made and the tools that we had had been used to the extent they could be, and so that was as far as it went, that outage.

MR. MYERS: What we did find in the situation at the beginning was we found the boron, went to clean the head, we gave them some extra dose and some extra time.

MR. LOEHLEIN: It was certainly in 12RFO. It happened a number of times in 12.

MR. DYER: When a decision is made to leave work undone -- this goes back to your hazard analysis -- are the potential consequences of the as-left condition evaluated whether or not it's acceptable?

MR. LOEHLEIN: That was not done in this case. No, that was not done.

MR. MYERS: That was not done.

MR. LOEHLEIN: The other thing we did in evaluating this conclusion here was we took a look at the management team in place at the time in the late '90s and patterns in their beliefs about what represented safety. And that's where we got a clear message that things like the head issue would have been dealt with from a mod perspective and so forth had it been identified as a compliance issue. And we see that pattern in the belief structure of the management team that, you know, compliance equals safety. And it was compliance as they understood it. And that's part of the loss of safety focus. Nuclear safety goes beyond just what the picture is of compliance. I think all of us in the industry know that.

MR. MYERS: We have some fans. They are for containment. They didn't work. So we did an engineering evaluation to find out why we didn't need it rather than repair it, you know? So you're just eating up your margin. We repair it today and put a new motor on them and put them back in service. It was like can we justify we don't need them. And the analysis, we do an analysis, that's fine. So we lost margin there. We met the requirements.

MR. LOEHLEIN: So the results of this pattern or this change in focus show on slide 30. We found cases where the plant was restarted to run for extended periods with some degraded components. The ones that are obvious are the pressurizer spray valve RC 2 which the plant decided to run it, manage that leak, do a little repair. Then the containment air coolers were plugging. That was tolerated until they had been cleaned seventeen times at the same time that a high unidentified leak rate was tolerated and turned out to be near the tech spec limit, .8 gallons per minute. So plant behaviors represent this production focus and this loss of safety focus.

We also found through a lot of interviews that personnel performed with the philosophy that issues were not considered serious unless they were proven to be serious. That really wasn't the standard for getting a high category assigned to a condition report. Just the concern alone was not enough to get a high category. People felt that you had to demonstrate a direct impact to plant safety, and this contributed to the low categorization.

And finally while this was going on -- And the rigor I have described earlier, rigor in some of the important processes was declining at the same time. While all this was going on the threat of a crack, a nozzle leak and potential for corrosion to the reactor head itself was increasing. The plant was aging, the nozzles were becoming from a probability standpoint more and more likely to have this problem. So those things crossed in time. We see the end result is the corrosion to the reactor head.

So that really completes the data analysis and the conclusions from the data that I was to present today. What I was going to move on to now, Jack, is the actual root cause and contributing cause statements that we developed.

MR. DYER: Steve, I guess that last bullet that you talked about, rigor in processes decline at the same time that the threat of head damage increased, are you referring to the -- I mean physically the age of the plant was getting worse. Also there's becoming a greater and greater body of industry information that's saying it's a problem.

MR. LOEHLEIN: That's true. But as we pointed out, the failings here were that information was selectively interpreted. So the threats were not incorporated in a way that the organization was able to use them. The rigor in processes declined we talked about were varying types. In some cases we talked about recognizing the entry in the processes that are to evaluate nuclear safety declined. But it was also true that the plant's own rigor in implementing processes was declining, weaknesses in following processes as they were written was declining. And it came back to the station taking on a less than adequate focus on nuclear safety and doing what's necessary apparently to run the plant.

MR. MYERS: So the piece of equipment was degraded. As long as it met the minimum operability requirements and didn't affect production, it was okay. Is that fair?

MR. LOEHLEIN: I am sorry?

MR. MYERS: The piece of equipment was degraded. As long as it met the operability requirement we could justify that and didn't affect production.

MR. LOEHLEIN: If it could be kept operable within how compliance was interpreted and it could be managed from a maintenance standpoint, it was accepted. That's the fact here.

CHAIRMAN GROBE: Back on slide 29 you have a comment rigor in assessing issues for their potential impact on nuclear safety diminished and then taking minimum actions to meet regulatory requirements was interpreted to be adequate for nuclear safety. But you said earlier that had you implemented -- even though the boric acid corrosion control procedure could have been better, had you implemented it the way it was written, it would have been sufficient.

MR. LOEHLEIN: Right.

CHAIRMAN GROBE: So you didn't comply with the regulatory requirements to implement your procedures. I think I heard, Lew, you just said that you were taking the minimum actions to meet operability requirements.

MR. MYERS: Right.

CHAIRMAN GROBE: But that didn't include necessarily complying with your station procedures.

MR. MYERS: All of these are true.

MR. LOEHLEIN: Right. And taking the minimum actions -- and I think I used the words earlier -- as that was believed or interpreted. For example, it was believed that boric acid on the head was not a compliance issue. Yet if you look at the actual process that was in place, it required that boric acid be removed and understanding the source of leakage had to be determined. So once again it wasn't viewed as a compliance issue, but certainly compliance with the process should have been an issue.

CHAIRMAN GROBE: And why wasn't it viewed as a compliance issue?

MR. LOEHLEIN: Focus was wrong is what we concluded. In other words, they did not recognize it because their focus was on compliance just meant that it was operable because we understand why it's not a threat. So there's a real loss in understanding how to apply those processes that are designed to keep you on the straight and narrow.

MR. MYERS: For example, we documented that the boron on the head since it was not -- it was dry, it wouldn't deteriorate the head was not a nonconformance.

MR. LOEHLEIN: Correct.

MR. MYERS: It was not a nonconformance. Clearly if you go back and look at 97-01, you haven't met the requirements.

MR. LOEHLEIN: That was the misstep. The

misstep is we stated it was not a nonconforming issue, yet it was not recognized as that and it was accepted. The condition should have been supported by an evaluation as to why that still met the requirements, and it wasn't done. And that goes back to what I said earlier. We found we really couldn't evaluate task performance errors because it wasn't so much people were doing tasks wrong as they weren't recognizing what was in front of them. They weren't recognizing the risk. It goes back to the focus, the loss of a safety focus. And we did find that as evidenced by the site participating in the corrective action program that that pattern, that lack of recognition extended to all levels of the organization. So it was a site approach thing.

MS. LIPA: I have a question on that. I was thinking about if there was less emphasis on repair- ing items if you could justify operability. I would think this might show up in this increasing maintenance backlog or closing CRs too early. Did you see any trends there?

MR. LOEHLEIN: Well, you know, this was a pretty big investigation. Some of the trails we couldn't expand on maybe to the extent that you're questioning. But we did see some of that. We saw cases where condition reports were counting on other condition reports to answer a piece of the puzzle. But when we went there, the other condition report really wasn't covering that issue. So some deadends there. So going back to cause analysis, there were things, sometimes just facts stated that there must be a leak in containment somewhere and that's the cause for this, and then that's all that was said about it. So we did see cases of superficial review. As far as backlogs go and the impact to backlogs, we didn't attempt to assess that.

MR. DYER: Let me ask on page 29 and on page 30 also in connecting the dots if you would or the bullets. In particular it talks about -- the one subbullet where it talks about taking minimum actions to meet regulatory requirements was determined to be adequate for nuclear safety adding that at that time -- second bullet -- where personnel performed with a philosophy that issues were not serious unless they were proven to be. If I connect the dots on that I come up with a solution or a conclusion that says that your safety threshold was geared towards unless the NRC drives the issue, it's not going to be addressed by the plant. I would like a comment on that.

MR. LOEHLEIN: Well, I would say that there were a few times -- in the information we have a few times where that perspective was seen by certain people is that that's the way they looked at it in some cases. They didn't believe that it was a real technical issue. Their understanding of it was flawed. Their opinion was well, if it becomes regulatory driven we'll have to deal with it, otherwise we won't. There was some of that. But the real issue in terms of the philosophy of proving the category was this became important even from a standpoint of the performance indicators for the station that looks at the effectiveness of the corrective action program.

The corrective action program performance indicators look at a couple things. One is it looks at initiation. And it found, I think, the same thing we found. Despite what some people think about initiation, we saw plenty of condition reports initiated. So we didn't see problems with the organization identifying the issue. But the rest of the things are looked at and the indicators rely on the categorization being correct. Because it talks about looking at the upper level condition reports and seeing that they're handled properly. So if they're categorized too low, the performance indicator won't see them. And that's one of the things we're recommending come out of this, that the performance indicators, the things we measure need to look at that to be able to tell whether the organization is properly interpreting the potential for a nuclear safety issue, not just a proven nuclear safety issue.

CHAIRMAN GROBE: Okay.

MR. LOEHLEIN: So slide 31 is a restatement of the management oversight root cause statement made at the beginning when we talked about less than adequate nuclear safety focus. The important thing here is this combination of it wasn't just the production focus. Production we understand. If anything is assumed in the power business is people would like to produce power. So the desire to produce power is not an issue by itself. What is important is combined with trying to meet minimum actions for nuclear safety is a root cause here.

The root cause under the corrective action program has a number of subbullets. The overall root cause is that there was inadequate implementation of the corrective action program. The corrective action program required higher categorization in some of these cases because they were repeat events and so forth and that did not happen, and some of the other things that are listed there, addressing symptoms rather than causes, categorization we talked about, we had less than adequate cause determinations, less than adequate corrective actions and poor equipment trending.

Under technical rigor -- And, by the

way, these are under the four areas we mentioned at the very beginning.

CHAIRMAN GROBE: Steve, part of the corrective action program is identifying issues.

MR. LOEHLEIN: Right.

CHAIRMAN GROBE: After the 2000 outage, was it identified that there were corrosion products in a CR flowing out of the weep holes?

MR. LOEHLEIN: When you say after --

CHAIRMAN GROBE: During the outage?

MR. MUGGE: Yes.

MR. LOEHLEIN: Yes, there were condition reports.

MR. MUGGE: 00-1037 documented that.

MR. LOEHLEIN: What didn't happen with that is there was no evaluation or any follow-up evaluation saying anything about the acceptability of that or resolving it. I think the only plant response, Bill, was that, right?

MR. MUGGE: Right.

MR. LOEHLEIN: It was identified on a condition report.

MR. MYERS: As a matter of fact, there it is.

MR. LOEHLEIN: It's even on this chart here if you go back to whatever figure that was. What sheet is it?

MR. DeSTEFANO: 27.

MR. LOEHLEIN: 27? In this light I can't see it on this small one.

MR. MYERS: It's this one here.

MR. LOEHLEIN: CR 00-1037.

CHAIRMAN GROBE: Okay.

MR. LOEHLEIN: We're on slide 33, root cause, technical rigor. Here the root cause was failure to integrate and apply key industry information specifically as it relates to the boric acid corrosion control program and to compare new information to baseline information that came in. This is a reference to examples like Generic Letter 97-01.

The root cause under program compliance, some steps in the boric acid corrosion control procedure were not followed. Some specific important examples were that we did not remove the boric acid from the head. The station did not inspect the areas under the boric acid and did not perform technical analysis or safety evaluations to support decisions to leave boric acid on the head.

We had two contributing causes that we show on slide 35. Some decisions were made without considering the need for a safety analysis. Really throughout the development of the conditions as we talked about them there were no safety evaluations conducted or even considered necessary except there were those done for the temporary modifications that were done in supporting treating symptoms that appear on sheet 27. That's when we brought high efficiency air filters in the containment. That was an attempt to deal with the iron oxide in the atmosphere. That temporary modification is also the one that bypassed the iodine cartridges because of the problems with boric acid containment in the atmosphere. Those both did receive treatment under the 50.59 process.

The other contributing cause is the corrective action program, we stated here, was not state of the art. It really doesn't meet, in our minds, industry standards particularly on the back end in terms of equipment trending or repeat equipment problems.

MS. LIPA: I have a question for you. You will probably get into this later in corrective actions. If your corrective action program is common for all three plants, have you done an assessment of the Davis-Besse implementation?

MR. LOEHLEIN: Yes, there is a nuclear operating procedure FENOC-level procedure that requires effectiveness in that area. It does right now provide a lot of leeway for each individual site to decide how it's going to do that. And at Davis-Besse it does appear as though it's largely nonexistent. Right, Bobby, the equipment trending?

MR. VILLINES: Yes.

MR. LOEHLEIN: And that's not the case at the other stations. But yes, we are as part of this considering under all common processes those things that may affect the other stations. You want to comment on that?

MR. DeSTEFANO: As part of the program evaluations that are occurring right now the corrective action program evaluation was performed by all three stations at the same time. So the knowledge level, the current status of the program and where it should be has already been obtained by all three stations.

MR. MYERS: Let me tell you this too: I believe as I sit here today there's going to be some enhancements that we will make to the function of that process at all three sites. We already are using that model. You have probably seen that before at two of our sites. We will start using it at Davis-Besse as well. But in our corrective action process we will probably go back and do enhancements to our programs.

CHAIRMAN GROBE: I think, Steve, at this point that you have got some other key observations you're going to go into. But you have summarized the process that you have gone through, the conclusions in each of the areas that you came to, and then on pages 31 through 35 summarized what you believe are the root causes and contributing causes. Quite frankly, you have presented an extraordinary amount of information. And I am sitting here in my mind trying to walk through all of the various performance deficiencies that I am aware of and trying to see where they fit into these root causes and whether this is complete. And that's the kind of analysis we're not going to be able to do today but we're going to have to do over the next several weeks to be able to evaluate this and conclude, in fact, that your root cause is comprehensive and adequate.

MR. LOEHLEIN: And in the report we do the best job we could at trying to lay this picture out so that it can be interpreted in exactly the way you're stating, Jack, so that there are a lot more of the facts presented. And we try to do it in such a way that the conclusions can be followed clearly. And we do expect that's exactly what you will do is you will examine this.

CHAIRMAN GROBE: Has this report been submitted on the docket?

MR. LOEHLEIN: It's approved on site.

MR. MYERS: It's approved on site, but we sent it to you by letter.

MR. LOEHLEIN: Yesterday we were preparing the letter.

CHAIRMAN GROBE: So we can expect that next week?

MR. MYERS: Right. We can give you a copy of it today if you want it.

CHAIRMAN GROBE: That would be great. Okay. Any other questions on the root cause or contributing cause before Steve goes on to other key observations?

MR. LOEHLEIN: The next two slides provide observations. Observations are things that we felt were important to mention in the report, but they did not tie directly to the damage occurring to the head and it going unnoticed.

There are some design aspects. Certainly alloy 600 is something that deserves mention. And the gasket design in the CRDM flanges which has been a problem for this plant historically now has apparently been resolved. One of the items was training was not provided to individuals performing inspections for boric acid. It was not considered a contributing cause because, once again, the knowledge of the personnel involved in our judgment was adequate to recognize the significance of the boric acid that was found. Another observation was inspection activities and corrective actions were not coordinated through the boric acid corrosion control coordinator. This was really just another failing of the process, was not critical in the outcome but is an observation. The boric acid corrosion control procedure did not specifically reference the nozzles as one of the probable locations of leakage. And that has been captured as part of our response to the Generic Letter 97-01.

Slide 37. The condition reports associated with the boric acid issue tended to stay unresolved until significant degradation occurred. That's the pattern that was observed with the pressurizer spray valve and again with the head.

The next bullet mentions we found there was little evidence of quality assurance's involvement and that their documented findings were mixed quality. What happened here is that the company decided a while back now to do a separate root cause investigation of quality assurance's lack of effective impact on the outcome. And that root cause is ongoing right now. I think it is nearing completion.

The next two bullets talk about things we found in terms of the monetary incentive program and the way it rewards senior levels and written policies and their treatment of safety. We really didn't find a tie-in with these to the way and the reasons why people made decisions. Particularly in the monetary incentive program the changes to that had been pretty recent. But in order for the plant to move toward a proper safety focus, we felt the need to point these out because they need to deliver the right safety message both in terms of incentive and in terms of policy. So we put them in the report as something that needs to be looked at.

CHAIRMAN GROBE: Steve, when you say fairly recent, what timeframe are you talking about?

MR. LOEHLEIN: In the mid-'90s the incentive program was -- A consistent level of safety got treatment that was pretty consistent through the organization up in terms of management. And then as we went to the late '90s two shifts occurred. Top level management started to get rewarded more for production. And not only that but that became more askew with lower levels. I believe even to this day for the lower levels of the organization the majority of the incentive still is based on safety but not at the top level of the organization. So that disconnect there does not support good alignment in the organization going forward. So the report recommends that the company look at that.

MR. MYERS: And that was not, you know, a deliberate management change. What happened is the companies changed during that time. And when the companies change, incentive programs change, right?

I mean it's just a different incentive program than we used to have. I don't think it changed my behavior whatsoever. But the factors are a little different. They're very strong at the bottom, probably not as strong at the top. That's something we will go look at. But, you know, I have been involved in that program now for several years, and I don't think it's had anything to do with my decisionmaking. But you contend -- you think it's okay at the the bottom levels, though, right?

MR. LOEHLEIN: Right.

MR. DYER: At what time did this change? When it was turned over to FENOC or when FENOC was formed?

MR. MYERS: We went to FirstEnergy probably in '97. The incentive programs are a little different. Never really thought much about it to be real honest with you. So, you know, I don't think it's a contributor, but it might be something that we can do to help. We're going to go back and look at that.

CHAIRMAN GROBE: The top level management

incentive programs are consistent across the three
sites?
MR. MYERS: Yes.
MR. LOEHLEIN: Yes, they are.
Another thing that struck the team as we went through this was that operations had minimal involvement in resolution of these issues. Their participation is pretty much evident on the condition report process when they do an assessment on the impact to the station, and then pretty much we didn't find them visible. There is a condition report that is separately considering this as a root cause being done on that particular thing in the station as well, the lack of operations' involvement.
And finally in terms of observations we had management had minimal entries into the containment. We looked at 1998, the 11RFO. It had improved some in 2000, 12RFO. But we do believe that the management involvement in the containment during outages is something that should be improved.
CHAIRMAN GROBE: Within this context you use

the word management. Are you referring to first line supervisors?

MR. LOEHLEIN: We're talking really managers and above.

CHAIRMAN GROBE: So that would be director level in your organization?

MR. LOEHLEIN: We have managers and directors and VP. I mean I work for Lew at Beaver Valley, and I can tell you what the expectation has been there. As manager over there I am in containment several times at least myself. And our job is to force standards and to make sure that we don't have people unaware of where they are in containment and a whole host of other things that we do.

MR. MYERS: I just believe that if we would have had a little bit more management involvement, if we would have seen the pictures of the head that you showed a while ago or reviewed the videotapes, that our decisions would have been the same as they were in many cases on these corrective actions.

MR. DYER: I would like to go back to slide 37. You kind of brushed over the QA role in this.