TRANSMITTAL TO: X Document Control Desk, 016 Phillips

ADVANCED COPY TO: _____ The Public Document Room

DATE: 12/18/92

FROM: SECY Correspondence & Records Branch

Attached are copies of a Commission meeting transcript and related meeting document(s). They are being forwarded for entry on the Daily Accession List and placement in the Public Document Room. No other distribution is requested or required.

Meeting Title: Briefing on Role of AEOD in Oversight of Operating Reactors

Meeting Date: 12/17/92 Open X Closed _____

Item Description*:	Copies Advanced to PDR	DCS Copy
1. TRANSCRIPT w/viewgraphs	1	1
2. Secy-92-407	2	1
3.		
4.		
5.		
6. 230007		

* PDR is advanced one copy of each document, two of each SECY paper. C&R Branch files the original transcript, with attachments, without SECY papers.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON ROLE OF AEOD IN OVERSIGHT OF OPERATING REACTORS

Location: ROCKVILLE, MARYLAND

Date: DECEMBER 17, 1992

Pages: 63 PAGES

NEAL R. GROSS AND CO., INC.

COURT REPORTERS AND TRANSCRIBERS
1323 Rhode Island Avenue, Northwest
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

This is an unofficial transcript of a meeting of the United States Nuclear Regulatory Commission held on December 17, 1992 in the Commission's office at One White Flint North, Rockville, Maryland. The meeting was open to public attendance and observation. This transcript has not been reviewed, corrected or edited, and it may contain inaccuracies.

The transcript is intended solely for general informational purposes. As provided by 10 CFR 9.103, it is not part of the formal or informal record of decision of the matters discussed. Expressions of opinion in this transcript do not necessarily reflect final determination or beliefs. No pleading or other paper may be filed with the Commission in any proceeding as the result of, or addressed to, any statement or argument contained herein, except as the Commission may authorize.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

* * *

BRIEFING ON ROLE OF AEOD

IN OVERSIGHT OF OPERATING REACTORS

* * *

PUBLIC MEETING

* * *

Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

Thursday

December 17, 1992

The Commission met in open session, pursuant to notice, at 10:00 a.m., the Honorable IVAN SELIN, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission

KENNETH C. ROGERS, Member of the Commission

FORREST J. REMICK, Member of the Commissio.

E. GAIL de PLANQUE, Member of the Commissio

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

JAMES TAYLOR, Executive Director for Operations

EDWARD JORDAN, Director, AEOD

R. LEE SPESSARD, Director, Division of Operational Assessment, AEOD

JACK ROSENTHAL, Chief, Reactor Operations Analysis Branch, AEOD

PATRICK BARANOWSKY, Chief, Trends & Patterns Analysis Branch, AEOD

PROCEEDINGS

(10:06 a.m.)

CHAIRMAN SELIN: Good morning, ladies and gentlemen. This morning, the Commission will hear a briefing by representatives of the Office for Analysis and Evaluation of Operational Data concerning their role in providing oversight of operating experience and independent assessment of operational events and incidents.

AEOD was established in 1979, to analyze operational experience independently both for reactor and for nonreactor facilities that the NRC licenses. It's responsibilities were expanded in 1985, to include incident investigations and, again, in 1987, to include the independent diagnostic evaluations of operational performance.

We're looking forward to hearing about these programs, their effectiveness in providing NRC with the capability to perform independent reviews and assessments of the safety performance of NRC license facilities, and there are likely to be some speculative questions about what other ways we might use AEOD and, Mr. Jordan, what lessons you can draw from your experience as the, if you will, investigative or independent evaluation mission has grown somewhat over time.

Commissioners, do you have any comments?

COMMISSIONER ROGERS: No.

COMMISSIONER REMICK: No.

COMMISSIONER de PLANQUE: No.

CHAIRMAN SELIN: Mr. Taylor?

MR. TAYLOR: Good morning. With me at the table from AEOD are Jack Rosenthal, Ed Jordan, Lee Spessard, and Pat Baranowsky.

Today's briefing will concentrate on AEOD's independent role and its assessment and investigation of operational experience.

Mr. Chairman, you've outlined some key historical points in the development of the office's role. In my discussions with AEOD, I keep emphasizing their specific role in reporting to me as providing a separate and independent safety conscience for overviewing what happens in both the reactor and other technology fields for which we have responsibility.

I will now ask Ed Jordan to continue.

MR. JORDAN: Okay. Thank you, Mr. Taylor.

I've been fortunate to have participated in essentially all phases of events assessment investigations and feedback of operational experience from a regional perspective, from the Office of Inspection Enforcement, through CRGR reviews of proposed generic communications,

and to implementation of the current AEOD programs.

From that vantage point, I've seen the evolution of both the nature of the problems and NRC's programs to extract and feedback experience.

AEOD's role, as I see it, I believe, as the Chairman and Jim Taylor have identified, is tied to the AEOD and the Commission and the public, added insurance that important lessons are learned and retained.

The origin of the office recognized that this necessitated AEOD provide through its reviews both redundancy and diversity of reviews by the Program Office and by the regions.

Our presentation this past September emphasized products rather than process. This presentation necessarily will discuss process, and we will use current examples of products in order to provide that perspective.

AEOD's organizational feature is one of reporting directly to the Executive Director for Operations, of not being responsible for day-to-day inspection or regulation of licensees, yet maintaining a close coordination with the Program Office activities in order to utilize scarce resources as effectively as possible. In this way, AEOD provides a quality assurance and an oversight function. I plan to illustrate that point during discussions of event assessment.

In addition to describing past activities, we will also talk about changes underway particularly in the trends and patterns area, Pat Baranowsky's area.

Could I have the first slide, please? (Slide)

In my discussion, I plan to cover AEOD's activities associated with operational experience assessment, feedback of experience, incident investigation, diagnostic evaluation, and follow-up of recommendations, and that will be the order of presentation. I'll also have a summary at the end.

I don't plan to discuss incident response, technical training, or operation center activities, since they do not directly contribute to AEOD's role in independent oversight of operating reactors.

Next slide, please. (Slide)

The original focus of the office was operational experience assessment. The current components of that assessment can be broken into six topics managed by two branches. Jack Rosenthal and his Reactor Operations Analysis Branch have oversight over events analysis, accident sequence precursors, and human performance activities. Pat Baranowsky's Trends and Patterns Branch has oversight over the activity of trends and patterns which includes performance indicators, abnormal occurrences. And now I'd like to discuss each of those

components.

Could I have the next slide, please. (Slide)

I'd like to explain how Dr. Rosenthal and his staff provide the redundancy and diversity in an independent perspective yet complement activities of NRR and the regions, in events analysis, and to do so I need to go through the sequence of their activities.

Each day begins with a conference call between the Operations Center, the Reactor Operations Analysis Branch, and NRR, in order to screen operational events that have occurred since the previous discussion -- and that is, from workday-to-workday, and then, of course, some accumulation over a weekend.

This is a value-added type discussion interactive between the individuals, and it quickly identifies short-term actions. AEOD often self-starts based on a new event added to existing concerns or work in progress.

Where a real-time human performance assessment is warranted, the action is proposed to AEOD management based on that morning call, and may be part of an augmented inspection team as an alternative.

The next major AEOD step is classification of significance from detailed review of LERs, the License Event Report, after 30 days. This identifies the level of

subsequent review and may be the basis for further engineering study, a case study technical review. And the last sequential activity is a quantification of risk through the accident sequence precursor methodology, for the more significant events.

And, finally, although this sequence is complete, each license event report, each entry, remains in a database, and subsequent analysis may come back through that particular issue, combine it with another complementary report, and identify a new lesson to dig into.

I'd like to use a current example to show how this morning call causes the staff to look again at an issue. Recently, we had an event at the Salem plant, this was December 13th, regarding an annunciator failure. We've had a number of annunciator failures in the past year and, over the years, annunciator failures have been of concern to us.

I'd like to have back-up slide number 1, please.

(Slide)

The frequency of annunciator failures is of the order of ten a year, and this is either computer or the actual visual display of windows. And, so, across our plants, that would give the likelihood at a given plant of the order of 10^{-1} per year. And if one looks then at the

loss of both the annunciator, the window, and the process computer that provides a printout of alarms -- and could I have the next back-up slide, please -- (Slide) -- those are less than one per year across the set of plants, and so this would be of the order of a 10^{-2} frequency.

Neither the annunciators nor alarm computers are safety-related. They are not required for continued operation, however, their unavailability does necessitate compensatory action by plant operators. It's a challenge to them. And a simultaneous transient, while the total annunciator system, the visual and the printout, were unavailable, would make the operators' work much more difficult.

So, based on these recurring events, the staff is looking more deeply into does something more need to be done with regard to annunciators. And, so, that's an example of how we continue to accumulate information and that one is work in-progress. So, I can't give you the outcome at this time.

Could I have the next slide, please? (Slide)

COMMISSIONER REMICK: And I assume when they look at it, they'll look at the probability of having the process computer out, losing the annunciator panels, and the transient. That probability is probably pretty small.

MR. JORDAN: Yes.

COMMISSIONER REMICK: I would think so.

MR. JORDAN: Depending on how long, and whether or not the operator is aware of it -- I guess a key point I did not bring up with regards to the Salem event and the Calloway event was, in those cases, the operators were not immediately aware they didn't have the annunciators. And, so, they were even further handicapped.

COMMISSIONER REMICK: Yes.

MR. JORDAN: And in some cases, the annunciators have been difficult to get back on. An event at Palo Verdi a year ago, it was several days in order to recover the annunciator system. And, so, certainly, it's an interesting area. It's one that is related to the human performance, the additional challenge to the operator, and we're really prepared for it.

CHAIRMAN SELIN: In the spirit of trying to concentrate more on procedural and substantive questions in an issue like this, specifically the annunciators, do you have access to, and do you go into PRAs, to see if we can calculate a difference in operator performance with and without annunciators available, or is that beyond your --

MR. JORDAN: That's an attempt we'll make, and I'll ask Jack Rosenthal to respond.

MR. ROSENTHAL: That's it, we'll make an

attempt. I'll use the accident sequence precursor program myself, and I've already spoken to RES, and they're going to try something by using NUREG 11-50 models, since they're higher, so we'll work together.

CHAIRMAN SELIN: I would hope you would get beyond these labels, which you know I'm not very fond of -- safety required, safety related, et cetera -- and try to get directly to the probabilities, and see what we know about people's performance with and without annunciators, specifically when they don't have annunciators but they don't know that they don't have annunciators, as Commissioner Remick said, there is a sequence of events, not all of which are moderately unlikely but, nevertheless, the idea that AEOD won't be misled by some label and take a look and say, you know, we are not comfortable that this is well within the envelope of a plant, is very attractive.

MR. TAYLOR: Yes, sir. I initiated a call when I saw the last Salem event, keeping in mind the previous occurrences, and that they are not all identical, but that it was an appropriate situation to take a look at. I don't know exactly what will come out of it, but it appears to need some attention not only by us, but perhaps by industry, to look for what's causing the failures, any common features.

MR. JORDAN: And my comments about not being safety-related and not being relied upon, is not an indication that we don't examine it. I mean, that's simply the classification that has occurred traditionally. And, so, we begin to say, now, based on this experience compiled, is there not a problem.

COMMISSIONER REMICK: The thing that surprised me was an annunciator going off and not knowing it. As long as the process computer is working, chances are they are going to hear the click, click, click of the process computer to know that they're --

MR. JORDAN: Yes, right.

COMMISSIONER REMICK: -- and cause them to look up. But if you lose the annunciators, don't know you've lost it, and then lose the process computer, then I think you are kind of like in the position of not knowing things are happening.

MR. JORDAN: That's a very awkward position, yes.

MR. ROSENTHAL: Again, almost belaboring the point, technically, I'm interested in those situations, and we do have them, in which there's an electronic pinch point, so that although the computer is up and running and executing the program, in fact, there's no information to the computer at the very same time that the annunciator

has failed. From the human factor standpoint, we like to use the term "alertment". Once -- I didn't make it up -- "alertment".

MR. JORDAN: Is that a word?

MR. ROSENTHAL: Alertment.

CHAIRMAN SELIN: Whatever happened to English.

(Laughter.)

MR. JORDAN: Will my SpellCheck pull that up?

MR. ROSENTHAL: And that is, I think your observation is very correct, and that is, once they are aware that something's wrong, you can double crew, you're at heightened level of awareness, et cetera, and you can go. And, so, one of the concerns is, what happens when you think things are okay, and you're more relaxed and, in fact, you've lost one or more information systems and don't know it.

CHAIRMAN SELIN: Right. Commissioner Remick's "observements" are always right -- right on the money.

(Laughter.)

MR. JORDAN: Could I have the next slide, please? (Slide)

We discussed the accident sequence precursor discussion at the September meeting. And, previously, Dr. Murley and myself had briefed the Commission about a year ago, on our uses of this tool jointly between NRR and

AEOD. The tool remains a very important element, and we're investing even further in it in order to improve the timeliness of information to reduce modeling weaknesses, and to fill in the missing data for 1983 through 1984.

This past July, the accident sequence precursor output successfully identified the Shearon Harris safety injection problem of 1991, as the largest contributor to risk for the year. This was a value of the order of 6 x 10^{-3} in terms of its core damage probability.

CHAIRMAN SELIN: Contingent core damage probability.

MR. JORDAN: Yes, conditional core damage probability.

CHAIRMAN SELIN: Are you involved, Mr. Jordan, in an attempt to try to take this sequence of individual precursors and put them together and get some kind of indicators about looking back over the year at each event at its most risky point, if you could somehow aggregate over these events --

MR. JORDAN: Indeed.

CHAIRMAN SELIN: -- what the risk indicator risk was for the year, whether it's a sum of contingent probabilities, or a post-year probability, or just some kind of replicable indicator?

MR. ROSENTHAL: The staff is working on it.

RES, Eric Becktro has the lead. I attended a meeting, actually last week, with three statisticians and Ali Modaras from University of Maryland, and it was your idea, let's put this on a firm footing and to get something published that the outside community would agree to, and that is proceeding.

CHAIRMAN SELIN: I think that -- I mean, I don't want to mislead you. The most useful thing that happens out of these are the individual pieces of engineering. This is, in effect, our practical, actual experience, and models are not what we can learn from what really almost happened or did happen is the most valuable thing, but some of these aggregated looks as well, to look at, saying that is our empirical experience, what is the sort of sum of how close we got to different accidents, what's the trend, and what are the effects would be useful, not as a replacement for the detailed analysis that you do, but in addition to that analysis.

MR. JORDAN: I think it would be a beneficial output of some that would have more value. The example of use of the Shearon Harris event being highlighted in its significance by the accident sequence precursor is both gratifying and frustrating. And Dr. Murley and I have spent some time arguing and discussing the issue.

In this case, the tool did what it was designed

to do, but our analysis was untimely, and we are all disappointed -- I think Jack Posenthal, that his people didn't find through the normal deterministic reviews, the true significance of the event. It was identified as being "significant" by our classification, but not "really significant" as the ASP did.

So, we are actively reducing this lag time, and both AEOD and NRR are examining our own processes, to try to make sure that conditions like existed at Shearon Harris are treated in the same fashion as events in terms of their risk significance and their interest to the staff.

Could I have the next slide, please. (Slide)

The Human Performance Case Study was published earlier this month, and the important element here is to be able to communicate back to industry as much as practical of what we learned, in a timely fashion. This case study did not, in fact, come up with recommendations, and so the discussions that we have had internally and with Tom Murley have identified that the best thing we can do is to package the case study, transmit it to utilities with a personal letter from Tom and myself indicating "it's available for your use", and not cause licensees to respond to it directly, or to direct them to take actions.

We recognize the complex nature of the interaction between procedures, training, organizational factors and, from the 16 events that we've examined, we're most cautious about specific recommendations. These combinations are different at different plants, and we really want to only convey our experience that utilities may use as appropriate.

It does certainly identify the need for the agency to be able to collect more information in order to come to views about the shift technical advisors, about the level of staffing, about the level of detail and procedures. I think there are certainly some principles that can be extracted and fed back a little more strongly.

The work by the Office of Research led to our using this protocol, and there has been a protocol provided to NRR that's in now the Human Performance Procedure for inspectors to apply in order to attempt to extract more lessons.

So, we're working with them in order to try to collect information in a little more efficient way, and establish a database that would be able to be used to search and pull up useful lessons.

Could I have the next --

COMMISSIONER REMICK: Before leaving that, I was a little surprised at your raising the issue of the dual

role again, although you certainly should if there is a question, but there certainly has been a difference of opinion on that forever.

Do you happen to know what the current distribution might be amongst the plants, of stand-alone STA versus the dual role, how that stands?

MR. JORDAN: That information was just compiled. Do we have an answer?

MR. ROSENTHAL: We'll get that for you, sir.

MR. JORDAN: NRR did a survey of all plants to get a clear understanding of how they were apportioned.

COMMISSIONER REMICK: I was one who felt the Commission did the right thing by going to dual role, so that in contrast to the cases -- I don't know if they still exist -- where there was a young buck engineer brought in, put in a trailer 24 hours a day, and if something happened, he was called to the control room and, if he ran, he could make it within the ten minutes, I guess, that we required, and so forth. But I always questioned how much help he was really going to be to the operators, and how much confidence --

MR. JORDAN: I agree.

COMMISSIONER REMICK: -- and to that extreme. And I always thought, well, gee, having this person on-shift where he's accepted, he knows what the plant is, but

I realize that they could have difficulty in standing back. So, I don't know what the optimum is, but I hope when you're looking at it, you look at those two extremes, if they exist.

MR. JORDAN: Exactly. And that's the problem we have, is that the information is sparse in the way we are collecting it now. So, we are unable to give any advice as to what generally works better and, you know, people have opinions, but they're not really based on enough experience to be able to convey.

COMMISSIONER REMICK: Yes.

MR. JORDAN: And we're very interested in being able to collect more than sparse information.

Could I have the next slide, please.

COMMISSIONER REMICK: Oh, I'm sorry. I blinked on your slide number 5. I had a question there. You point out that there are failures, not always in PRAs, and I guess I'm not surprised at that. What would be more of interest to me in the failures that have been identified that were not considered in PRAs, what was their, using your words, "real significance" from a risk standpoint?

MR. ROSENTHAL: Let me give you an example. One of the top events was at Fitzpatrick, where we discovered that the low pressure safety injection valves wouldn't operate given a large break LOCA. Now, for a normal PRA

modeler, you're not going to pay that much attention to large-break LOCA, and you'll put more effort in the detailed modeling of loss of off-site power, and certain transients, and odd small break LOCA. Okay.

So, even in the Fitz PRA where they had modeled the low-pressure injection system and they modeled the pumps, and they didn't even model the injection valves. And that was the proper thing for the analyst to do, as long as he thought that the injection valve failure rate was -3, that the pump failure rate was -2, and he's talking about a -4 sequence in the first place.

The day you discover that you think that the failure rate of those valves given conditional on large-break LOCA is closer to 1, then that becomes the dominant part of that train and, in fact, becomes an important overall sequence because you perceive the system then reliability low. So, that was something where until the operating experience revealed it, it was just absolutely neglected.

MR. JORDAN: That's a good example.

COMMISSIONER REMICK: From what you said, I didn't get the impression it was neglected, but perhaps the wrong conclusion had been drawn that it was the pumps that were more important than the valves, and that's why the valves were left out.

MR. ROSENTHAL: But if you use generic failure data, then that is the right conclusion. Another one, again, discovered by operating experience, the electrical cabinets for the diesel controls at a plant were not ventilated. And through normal situations, you have room cooling, and so that the system would run on test just fine. And then it was recognized that if you, in fact, had a loss of off-site power, you would lose that -- the normal room cooling, and then the electrical cabinets could overheat and, in turn, the very diesels that you're relying on would fail.

And, so, you're picking up operating experience insights that way that just aren't in the PRA. That's one of the terrific uses.

COMMISSIONER REMICK: I can understand that's valuable. Two questions, follow-on questions, on that. Of those two events, what was the ultimate risk significance? Was it carried out, putting that in?

MR. ROSENTHAL: Yes, these were -4 type scenarios -- I mean, one of the top ten type events.

COMMISSIONER REMICK: Okay. When you say -4, -4 core damage frequency, or --

MR. ROSENTHAL: No, no. I'm sorry. These are all -- I mean, all the numbers that we're citing are conditional probabilities and, in fact, I can see where

this becomes the issue of how do you relate that to the PRA which is a frequency of core damage.

That was a -- the electrical cabinet problem that I described and the valve problem I described were both conditions, and you multiply that by the likelihood of the initiator event over the exposure period in order to come up with a measure of the risk significance.

COMMISSIONER REMICK: Right, right. And I didn't know if that had been done or not.

MR. ROSENTHAL: Yes.

COMMISSIONER REMICK: I'm not belittling the fact that this information is extremely valuable. I'm just wondering, though, from the standpoint of either core damage frequency or public risk, were these significant findings or not? And I assume you don't have the answer. That's okay.

The next question is, suppose that we do find them to be significant, how do we then convey that out to the people who will be doing PRAs next year, or three years down the line, that they think about that failure? Do we have a mechanism in those cases that you just mentioned, of getting that out? Let's assume that they were --

MR. ROSENTHAL: You'll hear about the valves in a little while.

COMMISSIONER REMICK: Okay.

MR. ROSENTHAL: And generically, Ed?

COMMISSIONER REMICK: Same valves?

MR. ROSENTHAL: It's through just general communication. I don't have a specific targeted program.

MR. JORDAN: So, if a particular -- let's say the cabinet was, in fact, a significant contributor to risk, then we would recommend an action to communicate it through, at the very least, an information notice.

COMMISSIONER REMICK: Information notice, something like that, yeah. Okay.

MR. JORDAN: And I think that is a key we need to keep in mind, that having information is useless. To learn a lesson, you have to convey it to the industry or to the regulator in the right place.

COMMISSIONER REMICK: That's right.

MR. JORDAN: So, we're intent on that.

Could I have the next slide, please -- Human Performance. (Slide) Okay, we're done with that.

Trends and Patterns then. I'm sorry. (Slide)

The principal activities of trends and patterns in the past, were aimed at identification of issues such as to seek learning curve of new plants in the early 1980s. The development of performance indicators and reporting of abnormal occurrences flowed from activities

associated with developing, maintaining and using events databases.

Today, more analysis is being done with the data in terms of statistical significance and risk perspective. Emphasis includes conditions in addition to events. Dr. Baranowsky's branch is actively developing tools to help determine when a previously learned lesson was ineffective or has worn off. Use of these tools include hardware items, human performance, regulatory and safety issues, and industry initiatives.

And, so, I think we're going to find that the events analysis side is more in the mode of finding, let's say, new sequences or new problems, whereas the trends and patterns is going to be refining or identifying cases where previously learned, or previously communicated, issues have resurfaced. And certainly a clincher now in order to have a response and a recognition of significance is a meaningful assessment of the risk associated with a particular issue.

And, Pat, since you've recently provided me with a program plan, would you like to elaborate on this?

MR. BARANOWSKY: Okay. Basically, what we're talking about doing is looking at, say, an issue, whether it's a hardware or human performance issue, and identifying what level of risk was associated with it, or

performance of a component, and then we initiate some sort of regulatory activity, like a rule or a bulletin, or maybe there's an industry initiative, and then tracking performance subsequent to that, and identifying whether or not there actually has been an improvement in performance, whether or not the types of events that occur subsequent to the implementation at whatever activity occurred, are consistent with the lessons that we had learned the first time around when we came up with the fix, and then, given whatever level of performance we identify, trying to be able to put that into some kind of a risk context.

In this case, what we'd be doing is using things like the NUREG 11-50 PRA models and other PRA models, to put things like equipment failure rates, or human performance estimates in, that would be based on the most current understanding that we have, based on recent data that we can get from LERs or other sources. It doesn't just have to be LERs.

And we're going to spend a fair amount of time trying to develop a capability of doing common cause failure analysis in a rigorous way, as opposed to saying in our judgment it has a certain value, which is one of the weaknesses that we've seen in some of the PRAs that were done in the past.

We're trying to set up a database and an

analysis scheme that makes use of the methods that were developed by the NRC and EPRI. We've got the method. We think we know how to do it. We just need to put them in practice, and that requires setting up the data properly and having the calculational capability in a software package that we can use. And, so, we're working in AEOD and with RES to set these types of things up.

MR. JORDAN: Okay. Can I have the next slide, please? (Slide)

I'm not going to spend much time on performance indicators. Because they do play an important role and are an objective measure of licensee safety performance, I wanted to bring them up. They allow us to trend individual plant performance, and they also give us some insights about industry performance. Since we've been using the same indicators extracted in the same method for some time, they are comparable.

CHAIRMAN SELIN: That's very good, but I wanted to ask you if you've ever tried to systematically relate these indicators to anything that's more directly concerned with risk. I mean, can we correlate risks with emergency system activations? Is there any difference between automatic scrams and manually-induced scrams, et cetera? In other words, have we carried the evaluation a step further?

MR. JORDAN: Yes. In fact, the origin of the indicators was based on selecting indicators that were related to the frequency of arrival of transients and the availability of the safety systems, and then trying to look at organizational and human performance. The last piece we still don't have a good handle on. It becomes an outcome. So, some of the indicators that we use do, in fact, relate to frequency of transients and safety system reliability.

CHAIRMAN SELIN: That's all fine, but that has more to do with you have plausible things to look at, but my question is, have you gone the next step in evaluating your own evaluators to go back over sometime and say, we've been tracking these indicators, and we've been doing some -- whether it's your accident sequence or some other calculations that are more empirical -- and it does, in fact, look as if there is a pretty high correlation, or not much of a correlation, between risks or performance versus these performance indicators, or is that a meaningless question, the answer is so tight you don't have to evaluate it.

MR. JORDAN: Not a meaningless question. Our problem is, I think, insufficient data. The accident sequence precursor is not dense enough in terms of data on a plant basis and, by rolling it up over time, the plant

performance changes --

CHAIRMAN SELIN: I wasn't thinking of plant, I was thinking of the indus*try performance trend is where you're basically averaging over the -- or aggregating over the plants to be looking for overall trends.

MR. JORDAN: Oh. We have a pretty much coincidence in terms of what we see of the aggregated trends of performance indicators and what we see with the roll-up of the conditional core damage probabilities across plants. So, where we were seeing steep improvement in that conditional core damage probability, we saw steep improvement in the performance indicators as I've said.

CHAIRMAN SELIN: Have we published this at some point?

MR. JORDAN: Sir?

CHAIRMAN SELIN: Have we published this at some point?

MR. JORDAN: We convey it in a package fashion and, for instance, at the last briefing we gave, we displayed essentially without units, the set of performance indicators, showing generally the improvements from the early '80s into 1990, and then a plateau. And we can see from the accident sequence precursor data, the same kind of a slope during the same time.

MR. ROSENTHAL: The same correlation.

MR. JORDAN: Yes.

MR. ROSENTHAL: If you're looking for quantitative statistical correlation, for example, you can take the ASP results, national average, and you know how much of that is contributed by transients, you can calculate trips as a function of time, and then you can just do a correlation analysis and say, what's the coefficient, and does it correlate and, in fact, it correlated with a very high confidence limit.

CHAIRMAN SELIN: We've done this? You've done that calculation?

MR. ROSENTHAL: Yes.

MR. JORDAN: And similarly, in fact, in the origin of the performance indicators, we were using SALP as the benchmark, that if we could see trends in plant performance from year-to-year that were comparable with trends in SALP, and show statistically a correlation, then that was our validity check, and that was quite successful.

COMMISSIONER ROGERS: But I wonder if that really is valid. I mean, in the sense that when the people are doing SALP evaluations, they have these indicators as part of their information base.

MR. JORDAN: They didn't, at the time we were creating the performance indicators.

COMMISSIONER ROGERS: Well, they do now.

MR. JORDAN: They do now.

COMMISSIONER ROGERS: And, so --

MR. JORDAN: So, it could be a self-fulfilling prophesy.

COMMISSIONER ROGERS: Well, yeah. I mean, it's hard to consider those as totally independent variables --

MR. JORDAN: We need another independent set of something.

COMMISSIONER ROGERS: -- yeah, or assessments, that if you're making a SALP assessment with this kind of information in front of you, you know, you're going to integrate those in your head, to some extent, and I don't know that you can make that kind of a statement that one validates the other, or vice-versa.

MR. JORDAN: Right, but the point I was making was that at the origin of the performance indicators, we'll use the existing SALP and backdate it in terms of the events --

COMMISSIONER ROGERS: Yeah, from the very beginning.

MR. JORDAN: -- and that was a very strong correlation.

CHAIRMAN SELIN: I'd like to make this quickly -- I'm not being critical of what we're doing, and I'm

certainly not being critical of these indicators as being very plausible based on the information available, I'm just saying in the spirit of evaluation, I'd like to see some net evaluation, and Dr. Rosenthal has indicated more of this has happened than I was aware of, where we look not only at the plants, but we look at our methods and see do these -- some of them are easily measurable, but they're not directly related to end points. Others are directly related to end points, but it's hard to measure them and get the quantity -- I mean, you can't look at the core damage probability meter in a plant and say what is it today.

MR. JORDAN: No.

CHAIRMAN SELIN: But it is important to continue to do the evaluation or your evaluation tools, to see if the surrogates are, in fact, as closely related to what we're really interested in, as they appeared to be when they were first defined when you used the SALP scores, et cetera. And this is just more of a -- as we go on, this is something I'd be interested in as opposed to something, gee, it's terrible that you're not doing this, or that there's reason to doubt that these performance indicators are pretty good, they probably are really quite good.

MR. JORDAN: And to be fair and direct, we have reduced the developmental type effort in performance

indicators. We say we have a set, they work reasonably well. We have recently proposed peer groups and, in fact, have now a view from the staff that a peer group breakout in terms of three-loop Westinghouse plants, four-loop Westinghouse plants, as peer groups, and CE plants and so on, is a very beneficial cut, and gives us a little more insight about the set of plants within that group, and also cut by fuel cycle, that if we're looking at performance during operation --

CHAIRMAN SELIN: All I'm saying is that, on the one hand, the more detail you get, the more insight you get into specific events, but the more you lose track of whether overall safety is improving or not because -- for the same reason, you're looking at smaller, smaller sets, in more, more detail.

MR. JORDAN: Yes.

CHAIRMAN SELIN: When you look for these aggregate indicators about, you know, how are we doing -- we're spending $500 million a year of eventually the taxpayer and the ratepayer's money -- how are we doing? Those get to be simple answers. And the more you try to answer those, the more you lose the detail, and I just want to make sure we're doing a little bit of both, that eventually we should be able -- have to come up with a relatively simple indicator of just overall performance,

even though that obviously integrates over lots and lots of very interesting parameters.

MR. JORDAN: Yes.

CHAIRMAN SELIN: And I'm somewhat reassured that we're doing more of that than I'm aware of, but --

MR. JORDAN: We will convey more of it, yes, sir.

COMMISSIONER REMICK: One other question on performance indicators, and I can see how it can be extremely valuable to AEOD, as I understand how you're using it, but just as a matter of curiosity, what indications do you have that other offices or regions utilize the performance indicators? Do you have evidence of strong use? Do you get calls from regions that say "we haven't gotten the most recent one, we need it"?

MR. JORDAN: I think the larger use is in preparation for the semi-annual Reactor Safety meetings, and so they are an input. They help select which plants get a full discussion, and help identify anomalies in terms of here's a plant in performance indicator space that looks strange, and we didn't have it on the list to talk about. It's that kind of a check.

We, of course, condition performance indicators so that the inspector wouldn't go beat up on a particular plant with respect to his outage indicator declining. So,

we purposefully direct the individual inspectors not to apply it directly. It's like the managers do, and we do get comments from them in terms of its value.

COMMISSIONER REMICK: That reminds me, if I recall, back at the time the PIs were being developed, the Commission directed that no other performance indicator should be used by the staff, they shouldn't have their own set. Is there any indication that that's being fulfilled?

MR. JORDAN: Yes. We've had some occasions along the way, and they have stopped those.

MR. TAYLOR: Yes, there were some homemade sets that have disappeared by this time.

CHAIRMAN SELIN: I realize that I've asked most of the questions, but I'd like you to try to finish by about 20 after because I've got about ten minutes of related topic I'd like to ask you to speculate about when we're done.

MR. TAYLOR: That's fine, Commissioner.

MR. JORDAN: Yes, sir. Okay. In abnormal occurrences, the next slide -- (Slide) -- I think the only thing I would say there is, this is a method for the agency to communicate with Congress about the very worst reactor events. And over the years, since 1987, those events per year from reactors have declined to zeroes and ones, from fours and fives.

Feedback of experience I'd like to spend just a little bit of time on because that, I believe, is the heart of our activity. That's slide number 10, please. (Slide)

And this is a listing of what I think are very important feedback that the AEOD office was instrumental in through case studies aand having generated generic letters, bulletins, and so on. And I would identify air systems as being a nonsafety system that the staff identified as being a significant contributor, and I think that has been a great benefit.

I'd like to then jump all the way down to the last one on the list, for which no action yet has been taken because we have only this month published our report, and this is pressure locking of gate valves.

This is a recurring, continuing problem, "a problem that hasn't been fixed" is the best way to describe it, and so I think first I need to explain what the safety issue is. These double-disk wedging gate valves have the capability of a common-mode failure because of a pressure locking of this wedging gate into the valve body. The phenomenon is that the valve operator cannot overcome these very high loads of the friction forces and the actual direct force of this pressure.

Could I have the backup slide number 3, please.

(Slide)

A schematic of a gate valve, and the issue is that from the reactor side, which is not the flow side, pressure over time and through a leaking check valve, normally, causes a buildup in this valve bonnet, and it's labeled excess pressure. It would be building up to the same as reactor system pressure approaching it. Given a depressurization incident, then this pressure that has built up in the bonnet does not leak off in the time frame that one needs to open this valve in order to inject low-pressure injection RHR, or whatever the safety function is, and this is a nonsurveillance disclosed type event because you don't do surveillance of that kind of valve while you're pressurized, nor do you do a surveillance in the fashion that would catch the kind of problem you have.

So, the instances that have been identified over the years have been somewhat serendipity in terms of identifying the problem. A simple solution exists, and there is a drilled hole indicated on that particular diagram that would vent then the flow side to the bonnet. Another fix is a leak-off line from the bonnet to the flow side of the valve, and there are other possibilities. But I think my main point here is that this is a relatively low likelihood event, but one that is a common mode, if it exists in one of the two trains, it likely exists in the

second train,, and certainly the plant condition that would get you there would be existent in the other system. And, so, it's one that over years the NRC has communicated to the industry.

The staff has done a survey -- and could I have slide 12, please -- (Slide) -- at six plants and, in this case, the pressure locking at those plants generally remained a credible problem. And in talking to the engineering staff at the plant, they say, "Well, we've never experienced a problem", and when knowledgeable NRC staff explained in detail the sequence in which one could get into the problem, then the utility people say, "Okay, yeah, that could be an issue", and then they go look.

So, I think the real problem is that we haven't communicated it adequately, properly. Tom Murley and I have spent some time discussing this issue and how we might properly communicate it in a way that will get the desired action.

We are proposing a bulletin or generic letter, and we are planning a workshop with industry in one regional area so that our best engineers who are vitally convinced of the significance of the problem, can communicate with plant engineers in that region, from the utilities, and exchange their understanding with the experience of the utility people in order to come up with

the proper fix.

Now, on slide 13, there is a list of communications, starting from 1977, a circular, a Westinghouse service letter, a previous AEOD study in 1984, an industry piece of feedback, and even a current information notice.

CHAIRMAN SELIN: All of which suggests the problem continues to exist.

MR. JORDAN: It continues to exist. The frequency of occurrence of finding the problem, even though it is, as I say, kind of a serendipity to find it, has, in the last three years, been greater than previous years. So, it still exists out there. And, so, I think that identifies one of the roles of AEOD very clearly, to continue to seek areas in which lessons simply haven't yet been learned, or fully utilized.

COMMISSIONER ROGERS: Well, I'd certainly agree with that bu', you know, it really strikes me as bizarre that such a problem of this has existed for so long. I mean, these valves have been used in industry for years and years, and it's got to be something that has been experienced in many other contexts, and why on earth, you know, it's still a problem, is beyond me.

MR. JORDAN: I wouldn't want to spend much more time on it, but there are some interesting --

COMMISSIONER ROGERS: No, no, I think what you're doing is absolutely the right thing.

MR. JORDAN: No, I mean, in discussion. But there are some interesting features. The upstream check valve has to be assumed to be absolutely perfect, and the gate valve has to be assumed to leak a little bit in order not to have the problem. And the nature of things is that the upstream check valve is going to leak, and we've worked very hard on gate valves and leaks, and they seal very well now.

CHAIRMAN SELIN: Congratulations.

(Laughter.)

MR. TAYLOR: So much for diligence.

COMMISSIONER REMICK: Again, a point of clarification. You said something to the effect that more recently you've found more of these. Now, is this found that valves did not open when called upon, or found that people were not aware of the problem to fix, or --

MR. JORDAN: No, these are actual cases where the valve did not operate.

COMMISSIONER REMICK: Okay.

MR. JORDAN: And then the study, the review at six plants identified that those six plants had done very little, if anything, about this kind of an issue. And this was a nonregulatory type review -- you know, what is

your experience? What do you do about this?

COMMISSIONER REMICK: Okay.

MR. JORDAN: Okay. Next is slide 14 -- (Slide) -- the incident investigation program. We have discussed that program extensively with the Commission.

And I think I would make the point in terms of our role -- slide 15 -- (Slide) -- we are managing this program for the Executive Director for Operations. We maintain documentation. We provide training for a cadre of people that are ready to do incident investigation, and we provide administrative support, review the report for completeness, and then -- I think the point I would want to make then is, we continue to follow up on the recommendations from the incident investigation program, from the diagnostic evaluation program, and from review of case studies, so that we are keeping track of those recommendations issued under the EDO's signature, verifying closure of those items, and looking at -- and this is more recently -- looking at the adequacy of those reviews.

COMMISSIONER REMICK: How many IIT so far, including the current one? Is it seven or eight now?

MR. TAYLOR: The current one will make it eight.

COMMISSIONER REMICK: Okay.

MR. JORDAN: Right.

COMMISSIONER de PLANQUE: In the paper, you talked about the option of using that in a manner where you report directly to the Commission. How do you envision this?

MR. JORDAN: Okay. That's a new paper that's on its way.

MR. TAYLOR: It's signed.

MR. JORDAN: It's signed. Okay.

COMMISSIONER de PLANQUE: Okay. It's coming.

MR. TAYLOR: Right. It's in the mail.

(Laughter.)

COMMISSIONER de PLANQUE: It's in the mail. Okay.

MR. SPESSARD: We had anticipated that one would arrive before the other one.

COMMISSIONER de PLANQUE: Okay.

CHAIRMAN SELIN: Another example of excessive diligence, obviously.

(Laughter.)

MR. JORDAN: I can talk about it --

CHAIRMAN SELIN: It's okay. No. We'd rather have the paper in front of us before we get into a discussion on it.

MR. JORDAN: Okay. I'm going to Lee, and I'm going to hurt your feelings badly, skip over the

diagnostic evaluations.

COMMISSIONER REMICK: I have a couple of questions in that area, but --

MR. JORDAN: All right, sir, why don't I respond to your questions then.

COMMISSIONER REMICK: Okay.

MR. JORDAN: Or maybe Lee should respond to your questions.

COMMISSIONER REMICK: One -- and I must admit, this goes back a few years ago -- I had some personal concerns about parts of the diagnostic evaluation, in the human factors area, questions that were suggested where people quiz supervisors, what do they think of their supervisor, and so forth. I had concerns about that, those still continue. But some of the things that I have heard about diagnostic evaluation -- and I'm not criticizing the concept -- where there are indications that a plant might be heading for trouble, and the EDO approves a diagnostic evaluation to try to get at the root cause and get a better understanding, that concept is good.

Some of the things I hear from people, though, that have had them, are concerns about whether the findings and recommendations and the conclusions and recommendations relate to safety, or are they just

individual inspector's preferences.

Let me give you an example -- it's not an actual example, but it comes close to one that was related to me. I'm on a diagnostic evaluation. The inspector is talking to somebody -- one of the trainers in the training group, and he notes that they had intended to conduct some courses by the end of March, and they weren't conducted until the first week of April. And the guy says, "Yeah, yeah, we had really hoped to do that, but we had a whole group of new initial training candidates, and we have a shortage of classrooms around here, so we had to delay it about a week to get it done".

The inspector follows up with a training manager or vice president and says, "I understand that you don't enough classrooms to conduct your training". And the guy says, "Yeah, yeah, but we did get money for capital improvements, it's now out with the architect, and we expect in 18 months to two years, that we'll have an addition to our training center and have the classrooms".

The inspector goes back and indicates that he had found that there was an inadequate number of classrooms. No mention that this had been identified to him. No mention of the fact that there was a program under review. So, the finding comes out, inadequate classroom. Conclusion: Management not paying proper

attention to the operational needs of the plant, something to that effect.

So, that goes out. The licensee then has to spend some resources in responding to that, basically, saying what was told to the inspector, and it has to go through the review in their organization, through many favored channels, making sure that the answer is correct. Comes to the NRC, we go through the same process, and it ends up the NRC says closed out, so no harm.

But when you take this, one, I think the fact that it was not mentioned -- would have not been mentioned that this was identified by the licensee and there was a program under review or underway -- professionally and ethically, I question. It might make the inspector look like he did a good job, he uncovered something, and so forth.

But if you add all these up, and then the question of -- and I'm not questioning this and whether it's related to safety -- but that there are a number of things that people say "we can't find how it relates to our regulations, and we can't see how it really directly affects public health and safety", you add these up, people responding. and then the NRC saying, well, closed out, they are satisfied with the answer, is just expenditure of effort.

My question to you is, what do you do to make sure that these findings and recommendations do relate to regulatory requirements, are professionally presented -- in other words, giving credit where they were told these things, identify programs under review, and so forth, and that they do have some bearing on public health and safety rather than an observation. It might even be a good recommendation. In fact, I think in every case that people have made these comments, they say "we welcome good recommendations from anywhere", but when we have to respond on things that we already told the people when they were here, and we don't see the direct relationship to health and safety, why do we have to spend all this time answering these things, then the NRC reviewing them and saying, well, closed out.

So, my question, what do we do in the diagnostic evaluation, to make sure that we're on target with our mission?

MR. JORDAN: Okay. The example you gave as an illustrative example would bother me a great deal because that's exactly what we don't want to do. We don't encumber the utility with nits and trivia. And, so, the whole purpose of the diagnostic is to get an understanding of what the actual safety performance at a particular plant is, and do it independently of the normal program.

We find out what the region has done. We find out what NRR has done. And the team is composed of people that have not previously reviewed that site, been directly involved with the regulation of that site, not from the region, in fact, and so are there to get an understanding of that plant's status.

And the first thing that the team is directed to do is to understand what the utility's plans are, and most of these plants, as you indicate, have a corrective action, a get-well plan, already structured and perhaps ongoing. And we don't want to interrupt that, we want to take advantage of it. But we do want to understand whether or not it's the right plan, whether it does have the right elements in it.

And, so, we're trying to get a much bigger picture than that. We want to know fundamentally why things aren't going well or, if they are going well, why they are. And, so, the example would be foreign to what I expect. We do use senior managers from the staff, the regional division director level, as team leaders. Lee Spessard has led some of those teams. And maybe he's the one that had the detailed findings.

MR. SPESSARD: I doubt it.

COMMISSIONER REMICK: Are you saying that there are not findings and recommendations that can relate back

to our regulatory requirements?

MR. JORDAN: Let me get to what may be the problem. Up until, I guess, about two or three years ago, the diagnostics carried forward all of the findings. The individuals wrote everything they found, and then in the summary and in the issues, only those higher level issues were then conveyed to the utility.

What we didn't realize was that the utility was then individually keeping book on those lower level findings as well, and the region was in their follow-up. And, so, we had burdened both the region and the utility with nits that didn't really affect safety.

COMMISSIONER REMICK: That was another point I've heard, it needs to track all these things which were uncovered.

MR. SPESSARD: We stopped that.

MR. JORDAN: Right. We stopped that.

COMMISSIONER REMICK: How recently?

MR. SPESSARD: Palo Verde was the last large size report that was issued, and from Zion forward we've had a shorter version.

MR. TAYLOR: Rightfully so, I think the licensee told us about it, and we tried to fix that. That was a useless exercise in some of the trivia that came out in the report.

MR. SPESSARD: Can I just add something?

MR. JORDAN: Yes. We thought we had burdened the region with follow-up that we didn't intend even.

MR. SPESSARD: I'd like to add that every team that goes out is trained before they go, what the expectations are of that team. They get a lecture from me, and Ed Jordan as well. We emphasize strengths and weaknesses when we see them. If the licensee has programs in place, the instructions given is, you'll assess that program and give them credit where credit is due. It's intended to be an objective evaluation -- in other words, it's balanced. It's not skewed one way or the other. But you report what you find and, if it's mostly negative, then the report is going to be negative. So, we have made some adjustments. But I will be honest, our evaluation is intended to be performance-based. It's intended to look at performance as it relates to safety, not necessarily regulations, and that has some licensees upset, but we're strictly interested in performance as it relates to safety.

COMMISSIONER REMICK: Is it easier to relate it to "safety" than it is regulatory requirements because, of course, almost anything one does in a plant, one could say somehow affects safety, but how significant is it?

MR. SPESSARD: The difference --

MR. JORDAN: I can respond and say what we were trying to do was to avoid making diagnostic a civil penalty hunt --

MR. SPESSARD: Or to read like an inspection report.

COMMISSIONER REMICK: Yes, I understand.

MR. JORDAN: So that it doesn't have the list of "contrary to's" and that kind of a regulatory form.

COMMISSIONER REMICK: That makes sense. Yeah. Well, I urge that you look very closely at those. It appears that you are reducing some of that trivia that I've heard comments about, and the extensive effort it takes then to close out things that should not have been necessary to close out, that they were basically closed out when the discussion -- I realize there could be differences there, but I'd urge you to continue to look very closely at those.

MR. JORDAN: Thank you.

MR. SPESSARD: If you used a real example, I'm totally unfamiliar with it.

COMMISSIONER REMICK: No, it was not a real example.

MR. TAYLOR: But there was some of them that we had that problem.

MR. JORDAN: We had that problem, I agree.

I think the last thing I would like to talk about is the follow-up of recommendations, and could I have slide 22, please. (Slide)

And I'll use that as a typical of what we do for both incident investigations diagnostics and case studies. Where we compile and maintain a status of the recommendations, and these are recommendations that were transmitted from the EDO's office to the Program Office or, in the case of case studies, recommendations I made to the Program Office, that we track and verify on an annual basis that we maintain the status.

Thus far, there have been something like 32 case studies conducted, that had 120 recommendations, and there are of the order of 15 remaining. Some of these have been partially closed out since these numbers were generated.

And, so, once again, from my perspective, we haven't accomplished anything until we have conveyed a lesson and, in fact, the lesson has taken. And I think one of the things we've learned over the last few years is that it is becoming more important for us to look harder at how well those lessons have taken because some of them are a fraction, that some utilities did it, some didn't, some utilities did better than others and, of course, even within the NRC, we ourselves learn lessons that don't stick, and we have to just keep working at them.

Could I have the last slide, please. (Slide)

In summary, our role is to provide the independent review and assessment of licensee safety performance and, in doing so, we expect to reduce the likelihood that a safety lesson will remain unlearned, or that a safety lesson would become unraveled.

We provide some redundancy, diversity, and a Q-A role -- and I left off of my summary slide -- we provide appropriate feedback of experience both to the agency and to the industry.

Our reviews complement the assessments done by the Program Offices. We try not to duplicate -- I mean, if the Program Office is doing a particular activity, we don't replicate that activity. We are responsible for closing out our recommendations and, once again, to make the last point, we have to continually review the corrective actions, to assure that the lessons have a permanence or, if the lesson is changed slightly, that it be re-established. That's all I had prepared.

CHAIRMAN SELIN: Mr. Jordan, as you well know, I'm very pleased in general with the operation of the office, and even more so with the concept that having a group that's relatively independent, that can look at the empirical results without being so wrapped up with the arguments about why we did this or that in the first

place, is invaluable. And I'm struck, even though occasionally we do need the help of outsiders to point out questions such as the thermal-add question, or the boiling water reactor level indicator question that perhaps hasn't gotten as much attention within the agency, nevertheless, it is impressive to me, given how complex reactors are and just how much engineering there is, that so many of these problems are found by our own efforts and, in large part, by your office's efforts.

I'm equally impressed, but in a negative sense rather than positive sense, on the material side, such as the medical side, how often evidence shows up that we just don't know ourselves, that comes -- and, you know, a couple of reporters, in a few weeks, can find dozens of cases of incidents that we really are not aware of, as an institution, ourselves. And bearing in mind that the relative effort in reactors versus, say, materials is quite different, I think that's appropriate.

Do you see a potential role for -- I don't want to call it the "incident investigation", or the "independent investigation", it's not that formal -- but a role that you think your organization could play in providing a certain amount of evaluation so that the Commission isn't so dependent upon the regulators, to tell us how they are doing, and would have an independent

source of empirical information on some of the material side? In this case, I'm obviously very much concerned about the medical side, but I wouldn't limit it to that question. This is the speculative question I've been threatening you with for an hour --

MR. JORDAN: Yes, sir, I was afraid --

CHAIRMAN SELIN: -- in case you hadn't noticed.

MR. JORDAN: You're correct, we do a very small effort in this area. We spend the order of two dedicated individuals --

CHAIRMAN SELIN: Out of how many?

MR. JORDAN: Out of 116, sir. We, in fact, have just made a recent selection, so that those two people, one will look at the medical side and the other at the nonmedical side of the entire materials program. And in that way, they can only look at the tip of the iceberg. They can only survey some of the statistical information, and cannot provide true independent review.

We are managing for Jim Taylor, the incident investigation into the oncology services incident, and --

CHAIRMAN SELIN: Is this the first medical IIT that we've done?

MR. JORDAN: It's the first medical. We did a materials, the Amersham lost source event as an incident investigation, and each of those has identified a large

number of lessons. So, I am uncomfortable. I think I would have to have a discussion with Jim Taylor, and come back to you as to what we would want to propose.

CHAIRMAN SELIN: When you have the discussion, one other thing I'd like you to think about is -- again, I realize that performance indicators are based on a huge basis of corporate experience that we have. We have a lot of data, we have a lot of people who know a lot of things. You have SALP scores, you have all kinds of things you can refer to and say it is plausible. But it seems to me that, particularly in the medical area, that we sorely need some kind of overall performance indicators to really say, you know, how's the industry doing? How are we doing? Are we spending all this time worrying about the one event in a million that is bound to slip through where humans are practicing medicine, or do we have a serious problem that we've been sort of overlooking in a lot of quality assurance data?

So, it's not just whether we can do the specifics, which I think is the more important of the two, but whether we can have some way of measuring relatively objectively, how are we doing? How are our programs doing? How are the people we regulate doing? Are they getting better? Are they getting worse? Is the risk involving nuclear medicine comparable with the risks that

are involved in other ways of practicing medicine at such a high level? Is there -- particularly, I'm interested in is there a big disparity with what happens in the devices we don't license, like accelerators and x-rays, compared to the ones that we do license? Are people avoiding using medical byproducts just because we cause them more trouble, good or bad, than going to electrical sources of radiation? There are all kinds of questions that are really evaluation questions, and I know it's a lot to ask, but I wonder if there's a role for AEOD and the kind of evaluations you do, at least getting a little bit of a start on these very troublesome questions.

MR. TAYLOR: Mr. Chairman, I'd like to come back to you. There are a couple of sets of information, those are in states in which we have jurisdiction and those in the agreement states, where -- the division of the 29 agreement states where they oversee the medical aspects. So, there are several different sets of data and information, but to your broader question, I think we need to -- Jordan and I need a little time to work through that and see how much effort we're able to do within the current resources, but the absence of the information is very evident.

CHAIRMAN SELIN: It may be quite premature, but this approach of looking at the data and not getting

involved in what was it we were trying to do in all the defense of this stuff is so powerful, and you've really done it very well.

Commissioner de Planque, you haven't had a chance --

COMMISSIONER de PLANQUE: Just one more comment along those lines, it always strikes me as interesting that in the report we send to Congress, there's a fair number of nonreactor incidents that go in there. And if you look at the balance in that report, reactor versus nonreactor, then you have to wonder about is the balance here consistent with that?

MR. JORDAN: Yes.

MR. TAYLOR: That's right.

COMMISSIONER de PLANQUE: And in view of the fact that it's not, what's wrong? Which one is out of balance?

MR. TAYLOR: Reasonable question, it's been asked a number of times through the years. It's a reasonable question.

COMMISSIONER de PLANQUE: Yes. A couple of questions. We haven't touched at all on what goes on in a similar way in the international arena. Are we getting events reports from the international community, and how helpful are they in your efforts?

MR. JORDAN: Yes, and, Jack, why don't you answer that with the IRS.

MR. ROSENTHAL: Well, we formally reviewed the International Reporting System reports, and incorporate them into our own products. We have a lot of data ourselves, so you have to question how useful they are. But we are also involved in rare event analysis. An example, on the slide there was power oscillation at a boiling water reactor. And at the time, we knew of only one in the United States, but there were two other events that had been reported internationally, and that was a deciding factor in whether to go forward or not, and we had written it up in the report.

So, although it's far less data, it's usually at a higher threshold than the 2,000 LERs a year that we get. So, we do find i_ a valuable source.

COMMISSIONER de PLANQUE: Okay. Also, in the international arena, do regulatory bodies in other countries have a group similar to yours and, if so, anything to learn from that?

MR. ROSENTHAL: Yes, but different. My equivalent in Germany is GRS, who really are not feds. France has a very similar group.

COMMISSIONER de PLANQUE: Is there much interaction?

MR. ROSENTHAL: Yes. Yes.

COMMISSIONER de PLANQUE: Okay. Based on your independent experience, would you like to offer some comments on SALP, whether you think there should be any changes?

MR. JORDAN: I think SALP is a very valuable, beneficial tool, and the early correlations we made in validating performance indicators reinforced that view. So, I'm a supporter of SALP.

COMMISSIONER de PLANQUE: As it's currently structured?

MR. JORDAN: Yes.

COMMISSIONER de PLANQUE: Okay. In the diagnostic evaluation areas, I had the impression that this often confirms the notion of poor performance. There are exceptions, of course. Is there any way to better use this -- and you were touching upon this, too -- in more of a predictive mode?

MR. JORDAN: It's expensive. We spend two to two and a half full-term equivalents in doing a diagnostic. And we did one at a plant that was not a serious question, as a calibration early on, and we have gotten some good news from diagnostics.

COMMISSIONER de PLANQUE: Yes, I know.

MR. TAYLOR: We've found it's better than we

really might have thought, when we've done them, which is also good. That is, we came out with --

CHAIRMAN SELIN: If I might just break in on --

COMMISSIONER de PLANQUE: Go ahead.

CHAIRMAN SELIN: What I would hope you would do, when you do this overall regulatory review that you've proposed, that you take a look at how the resources that we apply to plants is correlated with the perceived performance of the plants -- obviously, the DETs as well as the team inspections -- would be very high up on the list of where do these go. I mean, the idea of doing a two-stage process where you first sort of look for what a lawyer would call "probable cause", and then put the resources in where there is rather than just randomly, is clearly an interesting prospect to look at, and I would hope you would include the DETs as well as the team inspections as being the very large discretionary activities that we do.

COMMISSIONER de PLANQUE: That's all I have. Thank you.

CHAIRMAN SELIN: Commissioner Roberts?

COMMISSIONER ROGERS: Yeah. Well, just while we're on the performance indicator question, and somewhat along the lines of Commissioner de Planque's question, a couple of years ago, you were attempting to develop a

leading indicator, and I know that that looked promising for a while, and there were some enthusiastic reports to us, and then it just sort of petered away and we haven't heard anything more about it. And have you totally abandoned that approach, or that attempt to find a leading indicator, something that tells you in advance that the plant is going to get into some trouble?

MR. JORDAN: Yes. I give up.

COMMISSIONER ROGERS: Give up.

(Laughter.)

CHAIRMAN SELIN: As Yogi Berra likes to say, "It's hard to make predictions, especially of the future".

COMMISSIONER ROGERS: Right.

MR. JORDAN: No. Being maybe a little more direct --

COMMISSIONER ROGERS: I think that was very direct.

(Laughter.)

MR. JORDAN: Well, it's not --

COMMISSIONER ROGERS: It couldn't be much more.

MR. JORDAN: We certainly see the trends in various information, as being perhaps predictive that things are getting worse, but in finding some unique feature of the plant that we can measure that predicts plants are going to get worse, I don't -- I give up.

COMMISSIONER ROGERS: Well, it seems as if it's a quest for something that's very difficult to find.

MR. JORDAN: Yes.

COMMISSIONER ROGERS: Yes. I noticed in your discussion you mentioned that you have a daily interaction with NRR. No mention of any periodic interaction with NMSS, certainly not daily, maybe not weekly, maybe not monthly, but I suspect that seems to be on an ad hoc basis, when you get to NMSS. And my observation relates somewhat to this question of how we're following the incidents in the medical area -- we're hearing so much about that right now, just currently -- and whether we're following up medical misadministrations in the same way we would follow up some kind of a problem that's been discovered in a nuclear power plant.

MR. JORDAN: Right. Resource-wise, we clearly are not. We do have a coordination meeting with NMSS on occasion, not as often as a periodic one with NRR. When there is an event call related to materials, we do share and participate in the call with NMSS. The frequency of their events that make a telephone notification is much, much lower than reactors, so they are not a part of a morning call. They do receive, of course, the daily report information, but I think a good point has been raised. They are treated differently. The nonreactor and

reactor areas are getting a different ratio of effort.

Now, I'd like to correct maybe a number I gave you of 2 to 116 as being more like 2 to the order of 50, since another part of our office is training and operations center, and so that wasn't really a fair ratio, but it's still obviously a large difference.

COMMISSIONER ROGERS: Well, it just seems to me that maybe the general question of how we're following through longitudinally on the areas of medical and materials problems maybe is something that merits more attention.

CHAIRMAN SELIN: Anything, Commissioner?

COMMISSIONER de PLANQUE: No.

CHAIRMAN SELIN: Commissioner Remick?

COMMISSIONER REMICK: No further questions, but I would say that I think it was a good decision some years ago to set AEOD up in a semi-independent role. I personally take a lot of comfort from the fact that you are out there doing the job that you are, and it's been a pleasure for me to observe the last decade, a little bit more, what I see not only as an improvement, but a better job all around, really knowing now what you are about and so forth. So, I think the AEOD has come a long way from those very early days when it was trying to find itself in the organization, and I think you're making a real

contribution.

MR. JORDAN: Thank you.

CHAIRMAN SELIN: I like your Dragnet phrase, "Just the facts, man, just the facts". I mean, the fact that you're so far from the policy and you're really just looking at what's really happening is a great source of comfort. Thank you very much.

MR. JORDAN: We'll be pleased when we are next door to you.

CHAIRMAN SELIN: Yes.

(Whereupon, at 11:30 a.m., the meeting was adjourned.)

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON ROLE OF AEOD IN OVERSIGHT OF OPERATING REACTORS

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: DECEMBER 17, 1992

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

Phyllis Young

Reporter's name: PHYLLIS YOUNG

INDEPENDENT ROLE OF AEOD

COMMISSION PRESENTATION

DECEMBER 17, 1992

Edward L. Jordan

Contacts:
Thomas M. Novak, 492-4484
R. Lee Spessard, 492-8577

OUTLINE

Operational Experience Assessment

Feedback of Experience

Incident Investigation

Diagnostic Evaluation

Followup of Recommendations

Summary

OPERATIONAL EXPERIENCE ASSESSMENT

- Events Analysis
- Accident Sequence Precursors
- Human Performance
- Trends and Patterns
- Performance Indicators
- Abnormal Occurrences

EVENTS ANALYSIS

- Event Report Screening
- Daily Events Conference Call
- Classify LER Significance
- Initiate Engineering Study
- Initiate Human Performance Study
- Perform ASP Analysis

ACCIDENT SEQUENCE PRECURSOR PROGRAM

- Systematic Risk-Based Evaluation
- Estimates Conditional Core Damage Probability
- Discovers Plant Vulnerabilities
- Failures Not Always In PRAs
- Identifies Important Events

HUMAN PERFORMANCE STUDIES

- Case Study AEOD/C92-01, "Human Performance in Operating Events"
- Information Provided
  - Control Room Staffing, Organization
  - "Dual Role" Shift Technical Advisor
  - Shift Resources, Crew Teamwork
  - Task Awareness, Use Of Procedures
  - Human-Machine Interface

TRENDS AND PATTERNS

- Analysis of Operational Events & Conditions
- Development of Tools and Procedures
- Develop Trends for
  - Hardware-Related Items
  - Human Performance
  - Regulatory & Safety Issues
  - Industry Initiatives
- Assess Risk Significance of Trends

PERFORMANCE INDICATORS

- One of Several NRC Management Tools
- Plant Performance Analysis
  - Identify Performance Trends
  - Identify Performance Strengths/Weaknesses
- Industry Performance Trends

ABNORMAL OCCURRENCE REPORT

- Identification of Proposed Abnormal Occurrences
- Coordinate with Program Offices and Regions
- Quarterly Issuance
- Develop Criteria and Prepare Guidance

FEEDBACK OF EXPERIENCE

- Air Systems - Generic Letter 88-14
- BWR Power Oscillation - Bulletin 88-07
- Service Water - Generic Letter 89-13
- Motor-Operated Valves - Generic Letter 89-10
- Solenoid Operated Valves - Generic Letter 91-15
- Pressure Locking of Gate Valves

PRESSURE LOCKING OF GATE VALVES

- Safety Issue: Potential Common Mode Failure to Open Important Valves
- Phenomena: Valve Motor Operator Cannot Overcome High Loads
- Cause: Bonnet Pressurization Locks Gate Valve Closed

PRESSURE LOCKING OF GATE VALVES

- AEOD May 1992 Site Survey Results
- Pressure Locking a Credible Problem
- Plant-Specific Failure Experience Lacking
- Engineering Analyses of Phenomena Not Conservative or Complete
- Most Licensees Have Not Implemented Recommended Valve Modifications

PRESSURE LOCKING OF GATE VALVES

- NRC Circular 77-05, 1977
- W Service Letter, 1977
- AEOD Pressure Locking Study, 1984
- Industry Feedback, 1984
- Recent LERs Show Problem Continues to Exist
- NRC Information Notice 92-26, 1992
- AEOD Special Study, December 1992

INCIDENT INVESTIGATION PROGRAM

PURPOSE OF IIP

- Investigate Serious Operational Events
- Full Understanding of the Issues
- Increase Effectiveness of NRC Programs

INCIDENT INVESTIGATION PROGRAM

AEOD'S ROLE

- Maintain Documentation and Provide Training
- Evaluate and Recommend Events for IITs
- Propose IIT Charter and Members
- Provide IIT Administrative Support
- Review Draft IIT Report for Completeness
- Propose NRC Actions and Monitor Status
- Document Action Closeout in Annual Report

INCIDENT INVESTIGATION PROGRAM

EXAMPLES OF TECHNICAL LESSONS

- Shutdown Risk Management Issues
- AFW Turbine Overspeed Trip Deficiencies
- MOV Switch Setpoint Problems
- Check Valve Reliability Issues
- Fuel Facility Criticality Safety Control Issues

INCIDENT INVESTIGATION PROGRAM

EXAMPLES OF REGULATORY LESSONS

- MOV Testing and Surveillance Requirements
- Event Classification and Reporting Requirements for Loss of Criticality Safety Controls
- Shutdown Risk Management Requirements
- Emergency Plan Initiating Event Guidance
- NRC IN/Bulletin Content Guidance

DIAGNOSTIC EVALUATION PROGRAM

PURPOSE OF DEP

- Independent Assessment of Performance
- Augment SALP and PI Information
- Determine Root-Causes for Problems

DIAGNOSTIC EVALUATIONS

AEOD'S ROLE

- Maintain Program Documents
- Evaluate Performance and Recommend DEs
- Provide DET Core Members
- Prepare DE Plan and Provide Admin Support
- Provide Oversight to DET Manager
- Propose NRC Actions and Monitor Status
- Generic Action Closeout in Annual Report

DIAGNOSTIC EVALUATION PROGRAM

COMPLETED DET'S

Dresden - Nov 1987

McGuire - Mar 1988

Turkey Point - Jun 1988

Fermi - Nov 1988

Perry - May 1989

Brunswick - Jul 1989

Arkansas - Dec 1989

Palo Verde - Mar 1990

Zion - Sep 1990

Oyster Creek - Feb 1991

FitzPatrick - Dec 1991

DIAGNOSTIC EVALUATIONS

EXAMPLES OF DET LESSONS

- Senior Manager Perspectives on Performance Changed
- Service Water and MOV Deficiencies Identified
- Licensee Improvement Plans Revised
- NRC Staff Reviews of IST Programs Accelerated

FOLLOWUP OF RECOMMENDATIONS

AEOD CASE STUDIES

YEAR	STUDY	REMAINING
1980	Vital Instrument Bus Tie Breaker	1
1981	St. Lucie Natural Circulation Cooldown	1
1985	Pressurized Gas Storage	1
1985	ECCS Overpressurization	4
1987	Air Systems	1
1988	BWR Power Oscillation	1
1990	SOV Problems	6

FOLLOWUP OF RECOMMENDATIONS

INCIDENT INVESTIGATIONS

YEAR	IIT	REMAINING
1985	Davis-Besse	0
	San Onofre	1
	Rancho Seco	0
1990	Amersham	2
	Vogtle	6
1991	GE Fuels	15
	Nine Mile Point	12
1992	Oncology Services	--
		36

FOLLOWUP OF RECOMMENDATIONS

DIAGNOSTIC EVALUATIONS

Year	DET	REMAINING
1990	Zion	1
1991	Oyster Creek	1
1991	FitzPatrick	2

SUMMARY OF AEOD ROLE

- Independently Review and Assess Licensee's Safety Performance
- Reduce the Likelihood that a Safety Lesson Will Remain Unlearned
- Reviews Complement Assessments Conducted by Other Program Offices
- Formally Closeout AEOD Recommendations
- Evaluate Adequacy of NRC/Industry Corrective Actions