

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
- - -
BRIEFING ON STAFF RESPONSE TO
ARTHUR ANDERSEN STUDY RECOMMENDATIONS
- - -
PUBLIC MEETING

Room 1F16
11555 Rockville Pike
Rockville, Maryland

Thursday, April 24, 1997

The Commission met, pursuant to notice, at 1:33 p.m., Shirley A. Jackson, Chairman, presiding.

BEFORE:

- SHIRLEY A. JACKSON, Chairman
- GRETA J. DICUS, Commissioner
- KENNETH C. ROGERS, Commissioner
- NILS J. DIAZ, Commissioner
- EDWARD McGAFFIGAN, JR., Commissioner

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

- KARYN D. CYR, General Counsel
- ANNETTE VIETTI-COOK, Assistant Secretary
- LEONARD JOSEPH CALLAN, EDO
- DENWOOD ROSS, Director, AEOD
- EDWARD JORDAN, Deputy, EDO
- FRANK MIRAGLIA, Deputy Director, NRR

P R O C E E D I N G S

[1:33 p.m.]

CHAIRMAN JACKSON: Well, good afternoon, ladies and gentlemen.

I am pleased to welcome members of the NRC staff to brief the Commission on proposed improvements to the senior management meeting process.

As part of this improvement process, the staff contracted with Arthur Andersen Consultants to ascertain how the senior managers can improve the timeliness and thoroughness of plant safety assessments. The contractor's study report was issued on December 30, 1996, and the staff briefed the Commission on the report findings on February 18 of this year.

The report contained a number of interesting observations and recommendations relating to the information base and the senior management meeting process. Since issuance of the report, the staff has examined the recommendations and will discuss proposed staff responses to those recommendations.

As I have stated previously, the Commission continues to believe that there is room for improvement in

the senior management meeting decisionmaking process. These improvements relate to making the process more scrutable and using objective data as much as possible with well defined

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decision criteria. The objective should be to obtain a clear, coherent picture of performance at operating reactor facilities.

I understand that copies of the slide presentation are available at the entrance to the meeting room.

And so, unless my fellow commissioners have any introductory comments, Mr. Callan, please proceed.

MR. CALLAN: Good afternoon, Chairman, Commissioners.

With me at the table are Ed Jordan, the deputy EDO for regulatory effectiveness, program oversight investigations and enforcement, Frank Miraglia, the deputy director of the office of NRR and Dr. Denny Ross the director of the office of AEOD.

As you said, Chairman, in your opening remarks, we are following up our February Commission briefing at which time we presented the contractor's report. This time, we are going to present our response to that report.

The briefing will be conducted jointly by both NRR and AEOD. We will begin with some opening comments by Ed Jordan and I will turn the discussion over to Ed.

MR. JORDAN: Okay, thank you.

The March 14 Commission directive that was issued following the February 18 meeting included the need for the staff to make the connection between performance information

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and the ensuing decisions. At this point, we are further along in revising the senior management meeting process and in use of a performance template for qualitative and quantitative information than we are in the adoption of objective performance trend chart or algorithm that was proposed by the Arthur Andersen study.

Although correlations of the Arthur Andersen performance trend model and criteria are positive with respect to past years of plant performance and with respect to NRC decisions, a number of anomalies were identified, such as among multiple units at the same site and both the presence of a number of over-calls and under-calls with respect to that methodology.

The Arthur Andersen concept of a performance trend chart and action steps algorithm is a useful model. Insufficient time was available under the contract to perform sensitivity analysis, validation or peer review. This empirical model currently has the following limitations, which are under review before implementation. These limitations are mentioned in the April 2 commission paper.

There is multiple counting among some measures. The measures are counted equally, there is not a weighting scheme applied. The time lapse for action criteria is rather long. There is a paucity of data that results in

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statistical noise from six-month period to six-month period. Perhaps the worst problem is the data is normalized to average performance, which results in either a rising standard or declining standard; it is with respect to an average rather than some constant measure. The performance trend is not applicable to extended shutdown conditions.

So the staff plans to perform a validation and to provide opportunity for peer review before adoption of the

performance trend chart or algorithm.

With that explanation, then I will turn it to Denny Ross to begin his presentation.

DR. ROSS: Next slide, please.

We transmitted SECY 97-72, a Commission memorandum, on April 2 to describe our response to the Arthur Andersen report. We will follow the outline on this slide today in highlighting the more significant aspects of our response. We will discuss our plan, some improvements already made and some milestones and schedules.

We do plan to implement improvements in an incremental manner and we plan for extensive external review. This would include the ACRS, public, regulated industry, prior to any significant shift in policy. Of course, we would expect to interact with the Commission throughout this development and implementation process.

We are aware that this effort will be difficult

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and challenging and, from time to time, it will also be controversial.

Next slide.

Some brief background, which has been discussed so I won't go into this in any detail. We started a little bit less than a year ago when we had a requirements memorandum from the Commission examining the use of objective indicators whereupon Chairman Jackson suggested use of an independent contractor whose work you have already been briefed on.

Just two months ago, in March, we had another requirements memo on responding to report recommendations and some other issues, which is in the Commission paper, 97-72. So today we will describe our plans.

Next slide.

If you look at what you might -- what we would call our short-term implementation plan, meaning what we plan to do over the next 14 months, the end of which would be the June 1998 senior management meeting. It will take some extensive staff effort and some program support or contractor support as well.

Part of the plan, and some of this was mentioned at the previous Commission meeting, is to see if we can develop leading indicators of performance. I wanted to define that.

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Leading and lagging sometimes are used as adjectives to characterize performance indicators and, as you might expect, the leading indicator is one that would give earlier warning of an impending decline in performance or perhaps an impending increase as well.

The Arthur Andersen study had two suggestions in the categories in the management and in the operational area and both of these were discussed somewhat extensively at the last Commission briefing.

There is some chance that we can in fact develop these into leading indicators but we have tried this sort of thing in the past without any notable success. By contrast, the current NRC performance indicators are lagging in that they characterize past performance. For the most part, the Arthur Andersen trend plot scheme would also be lagging.

In some cases over the next 14 months, we will have to develop, collect and analyze information that we don't normally collect so we will have to develop those sources of information.

CHAIRMAN JACKSON: Now, from where would we be -- what are those information sources?

DR. ROSS: We plan to go, send NRC staff directly to the plants and explore in the management and operational area some things that we don't ordinarily collect so it will be -- in the beginning, it will be somewhat labor intensive.

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If it proves worthwhile, we would have to systemize it in some fashion.

On the ACRS review, we have had one discussion with a subcommittee and we would expect to have a continuing dialogue with the ACRS this year and next year.

CHAIRMAN JACKSON: To what extent has the ACRS actually reviewed the Arthur Andersen report?

DR. ROSS: They have been briefed but I would not call it a review.

CHAIRMAN JACKSON: Do they intend to do that, do you know?

DR. ROSS: We have asked them and so far the subcommittees have been very favorable.

CHAIRMAN JACKSON: Okay.

DR. ROSS: Of course, the Commission itself could have the ACRS do whatever review also but we are certainly going to get the dialogue started.

CHAIRMAN JACKSON: Let me just ask you a couple questions, two other questions, about this particular slide.

You mention in your third bullet validation of all new products by correlation with past results.

DR. ROSS: Yes.

CHAIRMAN JACKSON: Now, does this assume that we have -- that there has been a correct identification of all past watch list plants in a timely manner?

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DR. ROSS: Well, in the first instance, we are going to start out by correlating with past senior management decisions, which we know, I think, for the most part are correct and I think that Arthur Andersen said also. But there would be some instances in some years where probably we didn't identify every plant or didn't identify it as soon as we wanted to or should have. But that is what we meant by past results.

CHAIRMAN JACKSON: You talk about on the last bullet phased implementation to assure continued soundness of the decision process and you talked about doing it incrementally and with lots of peer review and public comment.

DR. ROSS: Yes.

CHAIRMAN JACKSON: What of the Arthur Andersen recommendations will be in place for the upcoming senior management meeting?

DR. ROSS: Mr. Miraglia --

MR. MIRAGLIA: I will comment on that, Madam Chairman.

CHAIRMAN JACKSON: You are going to talk about that in your presentation? Okay. So we will wait then.

COMMISSIONER MCGAFFIGAN: I was going to comment on the same validation point. I think it is very dangerous for us to be validating the new model based on assuming the

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past decisions were correct. I mean, I think, the fundamental thrust of the Arthur Andersen study in the three cases that they cite, I think there was one where we took somebody off, their performance got worse than it ever was when they were on and we never even discussed them again.

Another was a plant that was discussed, perhaps late, and action was taken very late and so to assume that the past senior management meeting decisions were all perfect and to -- I mean, if there is any hint that we are searching for a model that will fit the data, it would be very bad.

MR. JORDAN: I would be glad to try that one.

COMMISSIONER McGAFFIGAN: Okay, go ahead.

MR. JORDAN: The validation that we are anticipating is against history as opposed to the previous determinations on the part of the senior management meeting. We have made some calls that, in an historical way, we say were not timely or were not the right action with respect to our subsequent understanding. So it really is with respect to history that we are making the validation.

MR. CALLAN: It is with 20/20 hindsight, to the extent that we have 20/20 hindsight. Knowing what we know now, would the model fit?

MR. MIRAGLIA: The other observation I would make, Commissioner McGaffigan, is that there have been some

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certain shortcomings recognized in Arthur Andersen's model. In fact, Arthur Andersen indicated it was more of a methodology that they were presenting, two times industry average, were they the right indicators.

COMMISSIONER McGAFFIGAN: I agree.

MR. MIRAGLIA: And these others. So to assume that the algorithm that they did use to present their methodology is correct to say whether those decisions are right or wrong is also prejudging.

COMMISSIONER McGAFFIGAN: I understand.

MR. MIRAGLIA: So what we are saying is we are going to try and validate the methodology, the criteria and the algorithm and compare it. I think we recognize both ends are not quite perfect and I think we fully recognize those limitations.

MR. CALLAN: I don't want to belabor this point but it is an important perspective, I think, Commissioner. In the ideal instance, the indicators would allow us to identify declining trends and engage utilities early enough and hopefully turn around performance before a performance profile would be generated that would warrant senior management meeting action. And so that makes, in my view it makes this task even more challenging.

The whole notion is to engage declining performance before we have a real problem.

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COMMISSIONER McGAFFIGAN: I would agree the ideal would be zero plants on the watch list and catching everything at the discussion phase and just the very fact that somebody gets discussed means they take whatever action we wanted and we never -- zero is an ideal number on a watch list.

MR. CALLAN: We are realistic in terms of our aspirations but that is our vision.

CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: At this point, I would just like to follow up and indicate where we are in the process, the current status of the process and some of the enhancements we have made.

May I have pictorial number five, please?

This is basically a flow diagram of the decisionmaking process that has essentially been documented

in the management directive 8.14. The two new pieces in terms of this diagram, this is the process that is used, there are indicators, measures that are discussed in the context of a template that is described in the 8.14 management directive. It is used to support the screening meetings and the senior management meetings and the public record is the minutes and the public discussion we have with the Commission.

Arthur Andersen addressed, a number of their

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recommendations addressed improvements in a number of these processes. What we have been talking about is developing the algorithm and the criteria to make the measures fit within that performance template more objective, more quantitative and perhaps even specify action levels and that is the goal with the implementation of the future work with Arthur Andersen.

CHAIRMAN JACKSON: Let me make sure I understand this process diagram. Is this meant to imply that the indicators, measures and algorithms will not be used directly in the senior management meeting itself?

MR. MIRAGLIA: In terms of the algorithms to date have not been, in terms of the Arthur Andersen, have only been used at the screening meeting, this present screening meeting. Our intent was not to use them in the forthcoming meeting.

I am going to get into more detail in the following diagram.

CHAIRMAN JACKSON: Let me just ask you though a couple more questions.

Is there a relationship or is there overlap between the indicators, measures and algorithms and the plant performance template or any criteria?

MR. MIRAGLIA: In terms of the plant performance template, and I am going to talk to some of the elements of

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that, it provides a structure in terms of self-assessment being an area and then we ask questions within that. Within that context, some of the self-assessment questions have measures and we either use licensee measures to look at trends and those kinds of things.

So in terms of this diagram, it is used in a very, very broad kind of sense that we do have measures and indicators that are presented within the context of a template that provides a framework. The algorithm and the criteria are trying to try to get a more objective way of manipulating or handling that information so it can be presented in an even-handed kind of manner. That is the objective of the algorithm.

CHAIRMAN JACKSON: Is it more challenging to identify discussion plants from the overall universe of plants or to identify watch list plants from the universe of discussion plants?

MR. MIRAGLIA: I think in terms of past history and the practice, the discussion plant, we have a very low threshold for a discussion plant. If anyone expresses a concern that there are some things that we don't understand and we feel we want to bring that to the senior management. And so the threshold is lower, in my estimation and experience and participation in that process than might have been suggested by the methodology that is being proposed by

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Arthur Andersen.

That is my view.

MR. CALLAN: Right, I agree with Frank, Chairman. Certainly, historically, we have been -- when in doubt, we would pass the plant on to the senior management meeting. I suspect, though, with introduction of phasing in of quantitative measures, that will change, that dynamic will change. Because it is my sense that the stakes will become higher at the senior management meeting for all discussion plants. That once the plant passes the screening meeting and goes to the senior management meeting, that that will be a more meaningful step than it has been in the past. So that may change.

CHAIRMAN JACKSON: Do we have safety groupings of plants coming out of the screening meetings?

MR. MIRAGLIA: Safety groupings in terms of --

CHAIRMAN JACKSON: In terms of some broad-based --

MR. MIRAGLIA: I don't think -- I think in the broad context, in terms of level of concern of where we have higher concern, I think for a Category 2 plant in terms of safety issues, they are dealt with in the context of the normal type processes. We are trying to be ahead.

CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: So that nexus is perhaps a little harder to make.

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CHAIRMAN JACKSON: Commissioner Dicus had a question, and Commissioner Diaz.

COMMISSIONER DICUS: This question perhaps comes a little bit out of my ignorance of the process, at least on these screening meetings. But how much effect or how much can a resident inspector's comments influence whether or not plant even is brought up for discussion in a screening meeting? How much effect does that have?

You would probably know that more.

MR. CALLAN: Right. I think, actually, Commissioner, the influence of the senior resident on that process probably varies to a degree from region to region. But, really, the influence comes from the division of DRP and it comes from the branch chief, the project engineer and the resident team collectively and then their perspective, that perspective that is formed within that unit, that organizational unit, that branch unit then goes to the division director and then from that point it pretty much becomes the regional perspective. Unless -- rarely would the regional administrator make a radical change to that.

Of course, that is an underlying theme of the Arthur Andersen study, which is that the undue influence of a small group of people on the outcome. The algorithm approach is intended to lessen that influence by making the process more scrutable and more objective.

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CHAIRMAN JACKSON: Commissioner Diaz.

COMMISSIONER DIAZ: Yes, going back to the issue of objectivity and who gets into the screening meeting and why, I hope that what we are saying is every plant, all plants will go through the same screening.

MR. MIRAGLIA: Absolutely. Every plant is discussed at the screening meeting.

COMMISSIONER DIAZ: And that is one of the main mechanisms in establishing some objectivity in the entire process, not already saying selectively we are going to capture this plant or this plant but actually look at all of them.

The other thing is, in this diagram on page 5, I

am trying to understand it. I understand that the plant performance template is going to have the plant information matrix and is going to have either the PPRs or the IPEs or a combination of both of those things. Now, integrated into a more let's use the word wholesome template that would actually be reflecting all of the things.

And to go to that information, you are going to apply this indicator measures or an algorithm. Is that the way you interpret it? In other words, I am trying to see who confers the --

MR. CALLAN: The template comes first and the algorithm, the quantification of that that goes into the

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algorithm will be based on that structure, those attributes. Those attributes may change, depending, as we get smarter and learn more, they may change. Because they are based on a management directive, 8.14, and we haven't changed them in the last several months.

But just to pick an example, one of the attributes is engineering and design basis. I suspect had we written that management directive five years ago, that would not have been an attribute perhaps. I don't know.

COMMISSIONER DIAZ: So, actually, there should be a box before this that tells you what your source of information is which really needs to be clearly defined which information you are going to apply this indicator and measures and algorithms to obtain the plant performance.

MR. MIRAGLIA: I think if you look at the management directive, Commissioner Diaz, it talks about LERs, performance indicators. There is a plethora of information sources that are utilized.

COMMISSIONER DIAZ: We are going to be selective on those. We are not going to take all -- okay.

MR. CALLAN: I need to clarify something. I don't want to leave you, Commissioner Diaz, with a wrong impression on something. There actually is a degree of thinning or screening before the screening meeting. The region and NRR get together and they decide, they arrive at . 20

the discussion order of the plants.

Now, for a large region, we are talking 26 units, perhaps, 15 to 20 sites, with the intent of discussing them all within six hours or so. So the order of discussion is usually in inverse order of performance and so that is an interesting issue.

I don't think that will change. There is no intention to change that process. So that does, to a degree, prejudice the screening meeting, to a degree, because you spend, obviously, more time on the plants that have already been determined to be the plants of most concern, less time on the good performers.

I think the algorithm will help with that, help normalize that somewhat.

COMMISSIONER DIAZ: That becomes a critical point.

MR. CALLAN: It does, yes.

CHAIRMAN JACKSON: But in the end, you do want how you discuss the plants to be derivative of all your regulatory processes leading up to that point. Otherwise, there is no point in having them, right?

MR. MIRAGLIA: I was going to indicate, it is a continuum process. The senior resident has large impact because a substantive amount of findings within the record with respect to the plant related to performance, positive, negative observations, comes from the senior resident and

residents plus the regional. And so you have that.

Then we have the PPR process which is done within the context of regional management, again in concert with the NRR at the PD and project director and the project management to look at how do we see this plant and what our concerns are relative to that plant. That is put into the context of regional management perspective and that is sort of rolled up in the context of coming to some logical presentation of the screening meeting in terms of where do we see these plants across the regions and that comes into headquarters and it is at higher levels of regional management and headquarters management and senior management at headquarters and then that information is rolled up even higher and to a broader base of management.

So I think the Chairman is right, it is a continuum and it is all coming from the same basic information and data being looked at at different levels in different organizations at different points in time.

CHAIRMAN JACKSON: Commissioner McGaffigan.

COMMISSIONER MCGAFFIGAN: I would like to ask, in Management Directive 8.14, there is also the good performer. I asked this at the original watch list. But it is pretty thin. It is lots and lots of pages about how you find -- put somebody on the watch list. And my recollection for the good performers is that they are supposed to be straight

SALP 1 and nothing has gone wrong since they were straight SALP 1 in layman's terms.

How much attention -- is that a diversion from this? How much attention do you give it? I mean, it is disappointing when there are only two. I think last time it was only Turkey Point and Harris. People have told me the reason it is only two is industry doesn't want it to be a long list for fear that dropping off the good performer list is -- would be a bad thing in the financial markets.

But if it is a diversion and it doesn't really take much and no one really wants us to do it, then we maybe want to drop it. Or if it really is something we should be giving equal weight to, maybe we need to expand the list, despite what industry thinks, and have a longer list of good performers.

What thoughts do you have about that part of --

MR. CALLAN: Commissioner, first of all, I don't think it is a diversion the way it is being done now. It essentially isn't a factor in the screening meeting. The last few plants that are discussed before the end of the day -- it is an all-day screening meeting -- are the good, the better performers and not necessarily good performers as defined by the management directive.

But there is no decision at the screening meeting regarding who qualifies for good performers, typically.

That is usually done by the staff. They -- it is done very clinically.

Then the output is essentially put up for an affirmation kind of reaction by the senior managers at the senior management meeting.

CHAIRMAN JACKSON: I need to have a better understanding of the interplay between the indicators, measures and algorithms and the plant performance template and criteria that are attached.

MR. MIRAGLIA: I will try to do that as I -- I

think I have some slides that --

CHAIRMAN JACKSON: All right, we will await that.

Okay.

MR. MIRAGLIA: We will discuss those.

Slide 6, please.

As indicated by you, Madam Chairman, and also by Mr. Callan, the Commission has asked for improvements within the senior management process even prior to the start and initiation of Arthur Andersen. So we have had a number of improvements under way. In fact, 8.14, that management directive, was in response to some of those early initiatives that the process needs to be documented, publicly available so everyone can understand the process and how it is being used and being implemented.

So, in concert and in response to those

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improvements, we have initiated that directive and that has been out since last year. Within the context of that directive, there is a template and we will talk a little bit more in the next slides to try to at least identify what are the attributes and information sources that are used to look at those attributes.

In the management directive, we have tried to standardize what material and inputs come to the screening meetings. That resulted in the implementation of the plant issues matrix. This is one, another process to be used in a way to again normalize information and to present information in an objective kind of way at the screening meetings and also at the senior management meetings.

We have tried to provide a standard format for the material that goes into the books that are presented and prepared for the senior management meeting. Again, Arthur Andersen indicated there is lots of materials so we have tried to put it in a way that focuses certain material on certain areas. That was ongoing.

The template that is in management directive 8.14 describes -- slide 7, please -- defines the attributes of plant performance. It is based on factors some of which are important to risk. Operational performance, frequency of arrival of events is a consideration and one factor and attribute that is looked at. There is an attribute relative

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to human performance, human error rates. Material condition has attributes that would point to measures and indications of reliability and availability of equipment.

The template was to promote an objective and balanced discussion of the information in a way within that type of framework and to facilitate the communication of the basis of the decisions. It would be discussed in the context and the framework of the template at the screening meetings and the senior management meetings and to form the basis of the discussions and the decisions.

The next slide, slide 8 --

CHAIRMAN JACKSON: Before you go, I will let her go first.

COMMISSIONER DICUS: Regarding these factors, some of which, quote, unquote, are important to risk and you mentioned a few of them, but are the factors themselves or are they evaluated, may be a more correct question, quantitatively or qualitatively?

MR. MIRAGLIA: I think right now in terms of the directive that they are more qualitative. Although, within the context of those, there are some quantitative measures that one could look at and point to.

If you go to management directive 8.14, there is the broad headings and then there's questions. What are the trends in terms of equipment performance, what are the human

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error rate trends. And so it is asking those questions to elicit -- to say it is quantitative, it is semi-quantitative, to indicate relative to that plant and the performance at that plant, what information do we have that would be indicative of a performance trend. So it is more a form of questions.

I think more of what we are looking toward in this area now is to try to develop criteria that perhaps quantifies some of those answers and then have an algorithm that operates to make it more predictable and more objective, that kind of thing. I would say it is more qualitative at this point.

COMMISSIONER DICUS: Heading in the other direction?

MR. MIRAGLIA: In response to the Commission's direction, to make it more objective, yes, ma'am.

CHAIRMAN JACKSON: It seems to be, as already brought out in response to Commissioner Dicus' questions, that there are these parallels between the template approach and approaches used to assess human performance. Do you plan to pursue the human performance approaches as such?

My understanding is the human performance approaches use performance shaping factors and that these factors are weighted. And the template uses attributes and that these attributes can be assigned a risk significance

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weight?

MR. MIRAGLIA: I think, as a goal and objective, that is the direction one wants to head and I think everyone has indicated that it is going to be a long and a challenging task and how fast can we get there and how can we get agreement on what the right factors and how to operate on them are.

But in terms of a vision, to use Mr. Callan's words, yes, it has all of those attributes and I think that is part of what Dr. Ross is going to talk about, our approaches to look at those kind of things to see what can be developed in those kinds of things.

CHAIRMAN JACKSON: Let me just lay this on the table so that when you come to talk about it, I guess I am interested in if the template defines attributes of plant performance and these attributes can be assigned a risk significance weight, should these risk-weighted, risk significance weighted attributes, be reflected in some kind of modified Arthur Andersen algorithm and are we planning to migrate to that?

So I just want you to keep that in mind. But I want -- would like you, Mr. Miraglia, to talk us through a little bit more of these bullets. I think you were planning to flip the page and I didn't want you to flip the page.

MR. MIRAGLIA: Okay.

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In terms of the attributes of plant performance, the next slide does give you the broad categories of those attributes. If I could have slide 8, it talks in terms of the effectiveness of licensee assessment. That is a broad category of area.

If one looks within the context of the management directive itself, there are a number of questions, further

attributes within that. Does the licensee perform self

assessments?

MR. CALLAN: Chairman, I would like to comment on the fourth bullet on slide 7, the one that starts, Promotes and objective and balanced discussion.

I mean, that is certainly the goal of the template but going back to the original Arthur Andersen report, that was one of the insights he provided was that, human nature being what it is, the regional administrator would take an advocacy position and argue that position using the template. But it -- I would be hard pressed to say that all the discussions were balanced because of that.

And so one of the geneses of the algorithm concept is to mitigate that tendency.

You are going to get into that. But I think with the advent of the templates, what, a year-and-a-half ago, there was I think a distinct improvement in the quality of the discussions but we still weren't where we needed to be.

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CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: I think it is goals that we are heading toward to get there but we are not there in all areas to the same degree of effectiveness, I would agree.

CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: In terms of -- slide 8 is the broad factors and these -- this, again, adds the structure and the issues that are examined and the information is presented in these broad contexts and framework within the discussion of the senior management meeting as well as at the screening meetings.

CHAIRMAN JACKSON: Let me ask you a question.

How much objective data are available to characterize each of these attributes?

MR. MIRAGLIA: I think in some areas we have our own performance indicators. In other areas, it can be discussed in terms of licensees' own indicators. They track maintenance, outstanding maintenance requests, control room deficiencies, operator work-arounds. And so there is data out there. It is perhaps different basis at different plants. But in terms of a plant, you can talk in terms of objective trends in terms of they have improved operator work-arounds or they have gone up or there have been procedural upgrades, there is tracking of human performance data and there are many of our licensees that have

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indicators far more numerous than the seven that we have.

I think INPO has about 30 that they have approved and I think if you go to each licensee they have indicators and subindicators. So there is objective evidence and, to the extent that our inspection processes have looked behind them and validated and verified that those are reasonable kinds of things, that is objective evidence that can be used and discussed in the context of the template.

CHAIRMAN JACKSON: So you might imagine using hybrid data provided the data isn't part of what we explicitly collect, if it has been validated by our inspection?

MR. MIRAGLIA: I think we have done that over time, perhaps not in a conscious or a disciplined way in the framework, in terms of that information was there, we talk in terms of that at various levels in the organization and Arthur Andersen was not at a senior management meeting but in terms that they did attend I guess one screening meeting.

In the context of that, they didn't hear that kind of objective data in the discussions. But in the presentation of the information it is there. What they did indicate, it is voluminous material and would be very difficult for senior managers to absorb and I would agree with that.

When we first started this process back in 1986,

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we would carry two to three three-inch binders which would have inspection reports and data and we've got it down to a reasonable size notebook now and a framework and a structure so I mean it is a valid criticism.

We have come a long way from where we were in '86 and hearing the Chairman's admonition, there is room to improve even more, we would agree and that is what our goal and objective is.

CHAIRMAN JACKSON: Do you anticipate proposing any additional categories for the plant performance template?

MR. MIRAGLIA: I think we are right now, and Dr. Ross will speak to that. The template right now seems to provide a very good starting basis to work from and move there and, as Mr. Callan indicated, with time as we look at things that may suggest those kinds of changes and then the process would have to be conformed with the outcome of those processes.

COMMISSIONER DIAZ: It appears that human performance factors would have a larger uncertainty than any of the others as far as --

MR. MIRAGLIA: That is a very difficult area. It is a difficult area to deal with and in terms of coming up with a model that everyone would agree on and how do you count in the factors, yes. But that is not to say we couldn't take incremental steps and look at an indicator

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here or there.

COMMISSIONER DIAZ: But it would be hard to put a number on it.

CHAIRMAN JACKSON: But, in fact, isn't it true that our research organization has done a lot of work in the whole human performance area? And I must say that, to that extent, I am somewhat surprised and disappointed that they are not either at the table or in obvious attendance because I am very interested in how what they have been doing can inform this process and address some of the issues of uncertainty, et cetera, that Commissioner Diaz is talking about.

So I guess this is more an admonition that all sectors and all parts of your organization, Mr. Jordan, that have things to bring to bear in this process should be brought to bear.

MR. JORDAN: I would comment that they are. In the human performance area, we are developing a performance plan and program that we are going to bring to the Commission. It is premature for us at this point to bring it to you.

CHAIRMAN JACKSON: All right.

And you are going to be drawing on the work that research --

MR. JORDAN: Absolutely.

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CHAIRMAN JACKSON: -- has been doing? All right.

MR. JORDAN: It is combining the work that NRR has done, DOD has done and research and pooling this so we are

then providing an agency plan much like we did for PRA.

COMMISSIONER DIAZ: And where is that in time?

MR. JORDAN: We have a date committed and I would have to --

MR. MIRAGLIA: There is a plan and there is a date to bring it to the Commission but I don't recall what it is.

CHAIRMAN JACKSON: Okay, but you can provide that to us?

MR. JORDAN: Yes.

CHAIRMAN JACKSON: Very good.

MR. MIRAGLIA: In terms of where we are in the process right now with respect to enhancements, we focused on several of the Arthur Andersen recommendations.

If we can go to slide 9, please?

As we discussed with the Commission after the January senior management meeting, we did look at -- the Arthur Andersen report came out just prior to that meeting and we did look at that and say, what could we do to be responsive to some of the concerns that were raised within the context of that report. Some of those were discussed with the Commission last January and we focused in the current screening meeting and in the upcoming senior

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management meeting to look at the recommendations saying a better balance to try to address the concern of regional administrators dominating the process.

Can we come up with a better way to have a more structured manner for presenting the information and then also examining ways of enhancing the minutes and the public meeting discussion with the Commission to again make the process more scrutable and open.

So looking at those, the next slide --

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: On the first bullet, I think in SECY paper in response to the recommendations in the Arthur Andersen, one of the recommendations, I think, in Arthur Andersen had to do with using a facilitator for the meetings and you have indicated in the SECY paper that you have decided not to use a facilitator. I want to know what went into that decision or who made the decision or why you think a facilitator would not be useful.

MR. MIRAGLIA: We looked at that and I think one of the processes is we looked at several options in doing -- in answering that question. One of the options was to have the executive director -- one was using the facilitator from the outside. The other was to have the executive director of operations act as the facilitator and the other was to utilize the director of NRR as more of a facilitator or

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moderator of the meeting to get measured kind of responses to that.

Since the EDO was the ultimate -- signs out the letters, we thought that to make him the facilitator may lie more toward domination kind of category. So we backed off to the director of NRR performing that kind of role.

Some of that is due to the point of where we are trying to implement enhancements in time for our screening meeting and in time for the senior management meeting. That is the approach. We didn't think starting with outside contractor or facilitator, I don't think, based on my experience, that there is a need for that kind of facilitation, that kind of conflict.

MR. CALLAN: My perspective, I think if we had no other changes then I think there would be some compelling

arguments for a facilitator. But with the other proposed changes, I think an outside facilitator would almost be rendered redundant.

CHAIRMAN JACKSON: Okay. Would you go on?

MR. MIRAGLIA: The use of the trend charts were limited to the screening meeting. They were used in the context of the screening meetings and presented in the context of the discussions for each of the plants.

The first three bullets are enhancements that we have utilized in the context of the screening meetings.

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We have increased the senior management participation during both the screening meetings and the senior management meeting. In January, we indicated that there was -- did the pro/con discussion and everyone had an opportunity to speak and bring issues to the table and so that was done.

In the context of the screening meeting, we specifically took steps. The director of office of enforcement usually attended screening meetings in the past. This time we specifically indicated that we wanted the director of office -- to attend them all. The director of the office of investigation was at all of the screening meetings. That was an addition for the screening meeting. We may have had representatives from the office in the past but the director himself attended all of the screening meetings.

The conduct of the screening meeting was such that the regional administrators discussed each plant's performance in the context of the template. Subsequent to that, the review of the project's organization in NRR was sought. The director of AEOD brought performance indicator, some preliminary economic data and information to the table as well as the Arthur Andersen trend plots.

Office of enforcement and investigation, each participated. So there was a -- the director of NRR acted

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as a moderator in that kind of context, making sure that each of the organizations that had issues raised them to the table. That process, again, will be repeated at the senior management meeting as well.

Again, we used the pro/con discussions, as we indicated to the Commission in January. That was an eleventh hour attempt last time because the report just came out and we have taken a little bit more focus on that issue, have provided a format for the discussion of those pro/con charts, again using the performance template headings and given some guidance to each of the regions to present that pro/con discussion in that kind of format. That was passed out at the screening meetings and that will be utilized again at the senior management meeting in June.

We are looking at ways of enhancing the meetings and the documentation of the discussions at the senior management meeting in terms of the minutes, pro/con charts and the information provided to the Commission. And then at the public meeting and those will be further tested and enhanced at the June meeting and, hopefully, the Commission can see some results for those efforts later in June.

CHAIRMAN JACKSON: So documentation improvements and enhancements to the pro/con charts, the amount and how information is presented to the Commission and in the public meetings, those are the further incremental changes that you

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perceive for this upcoming senior management meeting?

MR. CALLAN: I would hope that you notice improvement after the January -- I mean, there was a substantial change.

CHAIRMAN JACKSON: Exactly.

MR. CALLAN: We weren't where we wanted to be but there was a substantial improvement, I think, in those areas.

CHAIRMAN JACKSON: And so you are moving along that path. Okay.

COMMISSIONER MCGAFFIGAN: Can I get a question in on this?

CHAIRMAN JACKSON: Sure. Fine.

COMMISSIONER MCGAFFIGAN: The use of the trend charts limited to the screening meeting, are those the Arthur Andersen charts without -- when Mr. Jordan spoke at the outset, he identified the various problems with those charts, multiple counting, weighting them all equally, normalized average performance, not applicable to extended outages, et cetera.

Has there been any attempt to fix some of those problems in using the trend charts?

MR. MIRAGLIA: the trend charts were used to use the -- Dr. Ross can even amplify. They used the nine indicators that Arthur Andersen had indicated and to talk . 39

and discuss the trends as a function of time into over -- above an industry average.

COMMISSIONER MCGAFFIGAN: Is it double the average or did you use a different --

DR. ROSS: Let me explain. In about two weeks, we expect to have a contract in place to study and perhaps fix the known deficiencies of which we just spoke. In April, June, July -- about five months, about a five-month study. We hope to have some results back from that along the lines of what we previously described.

COMMISSIONER MCGAFFIGAN: I understand the role of a contractor in getting us -- I think the Arthur Andersen study, you know, is really good in getting us to think in different directions. But do we have to contract for something like that? It would strike me this is something a federal employee could possibly do.

DR. ROSS: It was expedient because of the database. We probably would have lost six months trying to recreate the database. It is plural contractors who are using a separate statistical consultant. So I think this is the most efficient way to get to the bottom.

I think it would be a substantial amount of staff time as well.

CHAIRMAN JACKSON: Let me ask you one last question. Have we compared the performance of recent watch . 40

list plants with the -- you know, what they looked like, the industry average, in the mid-1980s in an effort to examine the issue of rising standards?

MR. MIRAGLIA: To the best of my knowledge, we have not.

MR. JORDAN: We have from the standpoint of performance indicators. We have been using principally the same set of indicators since 1986, with some backfitting even further.

Those counts, in terms of frequency of arrival of transients and safety system actuations that are a part of this Arthur Andersen scheme, it is an order of -- almost an

order of magnitude fewer now than then. So since there is double counting among those, that average would obviously be much higher.

CHAIRMAN JACKSON: I guess I am really asking a question of would watch list plants today have been watch list plants in the 1980s, or is that even a relevant comparison to make because we know more?

MR. MIRAGLIA: I'll give you a perspective but I don't know if I have firm data.

I think if one looks in the context of the early watch list plants, they were there after significant either programmatic issues had been raised or significant events. My own perspective and experience would indicate that the

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plants that are there, we are trying to identify earlier, before they become and have that significant event.

That is a context and I think that is consistent with --

CHAIRMAN JACKSON: And that is to be leading and not lagging.

MR. MIRAGLIA: Yes. Are we leading enough? You know, I think conventional wisdom would say that we even need to do better.

CHAIRMAN JACKSON: So the Arthur Andersen criticism was that our assessments in the past have been event driven at any rate, is that the point?

MR. MIRAGLIA: That's right.

CHAIRMAN JACKSON: And so part of what we are trying to do is to get beyond that?

MR. MIRAGLIA: Right.

COMMISSIONER DIAZ: So maybe we are calling the watch list something that is no longer the watch list?

MR. MIRAGLIA: The goal and objective as we said, Commissioner, is to have no plants on the watch list.

MR. CALLAN: One aspect of the watch list that has remained constant is the correlation between a plant being on the watch list and the inspection hours dedicated, the agency attention and resources. That really ultimately is the reason that there is a watch list, to make sure that

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agency resources are prioritized and focused appropriately and that hasn't, to my knowledge, has not changed since the middle '80s. We are just hopefully learning from past mistakes and getting smarter and relying less and less on external stimuli to identify plants.

COMMISSIONER DIAZ: I agree. But the connotation appears to have changed. Is that correct?

I mean, what it means to us is that we are getting more and more on leading indicators wherein we used to be event driven. And therefore, as we portray them to the public on the watch list, the meanings have changed and we are trying to do it better and we have better indicators and we are preventing them from getting to a mode, but they are certainly not the same type of plants on the watch list as there were 10 years ago; is that correct?

MR. CALLAN: It is difficult to compare, Commissioner. But I think I generally agree with the thrust of what you are saying. There are probably some differences and I think that observation is consistent with the data that we are all familiar with that, in fact, we showed it at the reg information conference two weeks ago showing declining trip rates amongst plants and declining forced outage rates and that sort of thing.

So that is just another manifestation of what you are saying and I would agree.

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COMMISSIONER DIAZ: Right.

MR. JORDAN: In putting it as close to risk terms as I can without taking a risk, perhaps, myself, the accident sequence precursor data, we had more in the way of events that had a condition of core damage probability on the order of ten to the minus three or less than we do now and that is a clear indication of a change.

COMMISSIONER DIAZ: Major change.

MR. JORDAN: Yes.

CHAIRMAN JACKSON: But properly stated and communicated, one could argue that what you are trying to get to, which we should remind ourselves the Commission asked you to get to, is in some sense -- would in some sense be an improvement because you are ahead of the curve as opposed to behind the curve.

MR. JORDAN: Quite so.

CHAIRMAN JACKSON: But properly communicated.
Yes.

COMMISSIONER DICUS: This is more of a comment, probably, a concern that I will raise at this point. But in the screening meeting, you did use the trend charts which we have all agreed are flawed. They have some problems with them. We have been discussing those. Together with the fact that there are indicators that are not validated yet by us or by someone, contractor or however this is going to

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fall out.

My concern is that, obviously, we are already using something that we are agreeing doesn't meet muster. I would just be careful with this. Let's not keep going down this road and keep using something that is not ready to be used in the context that we are using it. And I would question whether or not it was really that valuable a tool and I need you to assure me it was a valuable tool in the screening meeting.

MR. MIRAGLIA: It is a very, very fair question. I think it was used and presented as information. I think the processes we used were pretty much what we had done before but looking at the Arthur Andersen, is there things that it would suggest doing, do we understand what it is saying and where are we coming out. So it was more -- it was not a dispositive determination in any way in terms of action in that context. I think that assurance that you are seeking is there.

MR. CALLAN: Also, Commissioner, for the very reasons that you describe, we are waiting until probably June of '98 before we introduce anything approaching a trend chart to the actual senior management meeting and we are going to do that very, very gingerly and cautiously, make sure that we have plenty of peer review and validation before we actually introduce it into the final

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decisionmaking process.

COMMISSIONER MCGAFFIGAN: I'm going back to the question about the contractor. Some of these issues, I think, lend themselves to a contractor. But how do you work with the contractor on something like the proper weighting to give to one of these indicators?

I mean, that is a judgment for the senior managers on that side of the table at the moment, as to what the weighting should be and so you -- how do you interact with

the contractor?

I understand them having a database but there is judgment that I feel uncomfortable a contractor making.

MR. JORDAN: The contractor would not make the judgment. What we are asking the contractor to do is to do the analytical work, that is, to do sensitivity analysis. There is a huge quantity of data to look over among this because we are going back over a period of maybe 10 years and then trying different schemes. It is an empirical relation so we will be trying different schemes to find which schemes give us the most statistical correlation with what we believe historically has actually occurred. So one gets there by doing rather laborious calculations.

COMMISSIONER MCGAFFIGAN: Is all this data -- I mean, we own it, right?

MR. JORDAN: We own -- clearly, we own data that

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are among the set of nine measures that were used by Arthur Andersen. But we are also looking at expanding to use other measures. So there may be some data that is desirable that we don't yet compile that we validate for a relatively limited period of time, we show that it is a theoretically appropriate measure and then apply it long enough to validate.

COMMISSIONER MCGAFFIGAN: I am just showing one of my biases but if you guys can run thermal hydraulic codes and all that sort of thing all over the various buildings, the codes that are being run for sensitivity analyses on data are certainly no more complex, are a lot less complex. So I urge you to think about getting some of this stuff in house at some point.

DR. ROSS: We will, yes. That's part of the plan.

CHAIRMAN JACKSON: Let's let them talk about their plan.

DR. ROSS: Okay. If we go to the next slide, the title of which is Criteria, on the first bullet here I've got a number of notes and questions that were mentioned before. This is a good spot to answer them all, I think.

First, as far as working on criteria or the template, it is a joint project between AEOD and NRR. NRR is, of course, the prime owner of the template and they are part and parcel of the work.

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There was a question about folding in the work of Arthur Andersen. The Arthur Andersen report produced what they call an evaluation sheet template. For example, under management they had five categories and under operations they had five categories.

In looking under operations, for example, personnel performance, what I see happening is under the five performance template categories a development of some subcategories. This is where I would expect some, perhaps all, I'm not sure, of the management and operation measures to be included, more or less as a title for a subcategory.

When you look at the management directory in 8.14, there would be a number of things that would fit under the subcoded area personnel performance. So I think it is a good system of order and we will get out of that what we think is appropriate.

We have also talked a little bit about using the term Arthur Andersen indicators and Arthur Andersen performance trend plots. It is our hope through the contract, such as Commissioner McGaffigan was talking about,

that the next time we discuss these, they are the NRC trend plots. The concept of ownership is something we have to assume and fairly soon. So we would name them after ourselves and defend them accordingly.

COMMISSIONER ROGERS: Before or after fixing them?

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[Laughter.]

DR. ROSS: Certainly after and perhaps during.

If you look at the words criterion, I suppose, in terms of the meaning of the word and look at part of the existing template, there are questions in there that can be answered with a number. How many reportable events occurred in the last year? Well, obviously, that will be zero or some number. So it is self-quantifying.

When you see some more qualitative questions that are answered with text that is prepared for the meetings, to what extent have human performance problems contributed to reportable events? Obviously, that can't be answered with a number; it is answered with text. Maybe whatever it takes. In many cases, you get more information from an inspection report and in many cases you get information from a licensee event report.

When reading the text, you would have -- thus far, you don't have anything that resembles a number. One possibility that can be explored and we will explore it is, can these responses to these questions be put in bins? If they could be, then you would have something resembling a criterion for that element. I don't think it is practical for all 50 questions in here to be quantified, I don't think it is necessary. Obviously, some I might mention are self-quantifying.

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CHAIRMAN JACKSON: What role again will risk play in establishing the criteria or the subcriteria?

DR. ROSS: Well, categories 2, 3 and 4 are all inputs to things like a risk assessment. If you look at things like human performance, and we do this also in the accident precursor work. We have quantitative numbers for operators following a procedure, even restoring the trip on a turbine-driven feedwater pump. There is a number you can put on there.

We don't intend to crank these through a level one core outage frequency. That wouldn't be -- well, it would be possible. It wouldn't be practical for all the plants.

So to that extent, we won't be doing risk assessment type studies and we had something about performance and safety factors. You know, there are stress numbers to quantify human performance that, if you have 20 minutes to do an action, you've been trained on it through the simulator and you have a procedure, risk assessments give a quantified number and it is usually pretty high if you have enough time, training and procedure. But that is not part of this work.

COMMISSIONER ROGERS: If I could just say something on that?

There are other interpretations of risk informed besides PRA.

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DR. ROSS: Sure.

COMMISSIONER ROGERS: And they are used very successfully in other areas, particularly in the materials area where one makes up a risk matrix but it is not quantified. It is ranked, it is scaled but it is not quantified in the same form as a PRA.

So I think that one could still introduce the concept of risk here in that way without trying to go to a specific PRA number.

DR. ROSS: I agree. And, for example, if you look -- I think it would almost certainly be a subcategory procedural discipline. And the text that we read now has information along that line. And the LERs, if they didn't follow procedure, would say so and that is an important element of risk.

If we bend it into -- well, it is almost like Goldilocks binning the oatmeal, you know, three categories. Maybe you would have some sense of the risk rise and fall of this plant. But if this is successful, I think that would be pretty crude, pretty broad binning. But they would -- in doing so, you would have criteria.

MR. CALLAN: Also, just implicit in the intention to double weigh or look at weighting factors implicit in that concept is some -- is a risk-informed approach.

DR. ROSS: Okay, there was a question about

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additional categories beyond the management directive. I don't think so. I think what we need can be in this five.

We have talked about validation and introduction. On the third bullet, I wanted to point out --

CHAIRMAN JACKSON: Before you talk about the third bullet, let's talk about validation. You know, you talk about correlation with past performance. Is it appropriate to assess the template approach through, say, its detection capability or false positives or false negatives as a function of various decision criteria?

DR. ROSS: No. We talked a bit about correlation. You realize we are not very far along. But I think a lot of the correlation will have to be by reading the material that was prepared and for the senior management screening meetings mostly and to a degree the SMM itself.

Eventually, we will have to get opinions principally from the project manager and the resident, senior resident. For a given instance, was human performance as discussed here, a reporting period, exemplary, mediocre, pretty bad? Those will be to a degree subjective value statements but I don't think they are all that subjective because in most cases there are adequate reports to back it up.

We will have to look backwards for plants in seeing in this subcategory what would have been appropriate

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from the data. As I say, this work is just getting started.

MR. CALLAN: Chairman, I think your point of the potential for false positives and false negatives is real. I think there will always be, even as we refine the approach, there will be that potential. And, you know, a classic example, what I worry about, I'll just give you one example. Engineering.

A classic indicator of engineering performance is number of LERs submitted over a year period that relate to design basis or engineering issues. Now, the average site probably issues somewhere around 15 LERs a year, roughly.

In a given year, let's say plant X issues 30 LERs, of which 20 relate to engineering issues. Now, that could be very, very bad news, it could be an indictment of the engineering organization, or it could be very good news. It could be a sign it is a very robust engineering organization doing a very good job. They are scrubbing their systems and

it could go from one end of the spectrum to the other, same data.

That sort of subjective interpretation of the data could exist for most of the data that we -- not all, but a large portion of the data that we deal with. That is always going -- which is an argument, incidentally, I think, for always having the algorithm and the template.

CHAIRMAN JACKSON: Also, LERs are only as good as

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the root cause analysis that goes into them.

DR. ROSS: Along that line, Mr. Callan mentioned engineering. The second question area in the template --

CHAIRMAN JACKSON: Excuse me a second, Dr. Ross. I think Mr. Miraglia --

MR. MIRAGLIA: Well, the EDO mentioned earlier that we looked at the improvements and where we are going and you have to look at them in an aggregate kind of way. I think the false positives and false negatives need to be examined.

What is the information telling us? We can't just crank it out of a model and we need to understand and, as Joe just indicated, it could be good news or bad news in terms -- they should be getting high marks in self-assessment if they are going out and finding their -- so it has to be put in that kind of context. We have to look at the data and say what do we understand is happening at that plant and how representative is the contemporaneous performance of the facility.

CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: I think it has to be looked at in that kind of package.

CHAIRMAN JACKSON: Dr. Ross.

DR. ROSS: I was going to say, the second category or bullet under engineering and design of the template is

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how effectively does the engineering support, plant reliability, op safety and how well are PRA vulnerabilities factored into these activities. Now, I didn't mention that category one or five, five being engineering, was direct in risk. But certainly you can see where it has a major role, although it might not be that quantifiable.

One last point on this slide has to do with introduction of whatever we come up with. What we -- of course, we have talked a bit about the internal and external review. What we would like to do is, before these get formally introduced, is to have briefings with the senior management in the direction we are headed and get some internal comment. Not that these would be used in the screening or the senior management but I think the primary users, which is the senior managers, views are important and so we have to make sure anything new is as scrutable as what we now have.

If we could go to slide 11, we have talked a little bit about these indicators, measures and algorithms.

CHAIRMAN JACKSON: Slide 12?

DR. ROSS: Okay, sorry about that. Yes.

I wanted to make sure we talk a little bit more about the second bullet, leading and lagging information.

The Arthur Andersen report on page 35 talked about tools such as the performance indicators, that's the NRC

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performance indicators, or derivatives such as the trend plot that they produced are not predictive. That is, they look at past performance and so the indicator lags the

actual performance and it is a lagging indicator. This is not a negative and lagging indicators are still useful.

MR. CALLAN: Excuse me, would you put the next slide up, please? Slide 12.

DR. ROSS: Then, by contrast, and this is in their report on pages 19 and 20, they said a leading indicator is a forward looking tool. And in their words, if we devoted more resources to proactive analysis that we could significantly, we might significantly reduce the risk by communicating issues of concern early enough to let the licensee have time to reverse an adverse trend. Obviously, that is an extremely desirable thing to be able to do. And that would be an early warning signal.

A lot of what we are going to try to do over the next year is to identify possible early warning indicators. However, we have to reward ourselves and notify the Commission that we have tried to do this in the past without success. So we think it is a very challenging task. We have a little bit of indication from Arthur Andersen some paths to go down and we will explore those.

CHAIRMAN JACKSON: Go on.

COMMISSIONER DICUS: He is going to another slide.

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I have some questions on this one, if you are going on to another slide.

Two questions and this is directed to AEOD and you referenced it a little bit but I want to pursue it. In a December 1986, going back 10 years, 11 years now, SRM, the Commission indicated that the staff should continue to explore the development of performance indicators beyond those now included in the program. That was 10 years, 11 years ago. Yet, in the past 10 years, from our researching the entire issue, it seems as though, from an organizational standpoint, your staff that was frankly dedicated to performance indicator issues has virtually disappeared. I think it is one of the things you were talking about in terms of going to such contractor support.

My question is, and I am bringing it up at this point, is how did we get into this situation and where do we go from here and how, when we have these kinds of situations where we have indicated in the past to do something and we simply did not do it, we have other indications of this as well but we have lost a core, apparently, we have lost a core capability of the staff, and I think this addresses to a certain extent Commissioner McGaffigan's issue and question. So I would appreciate your response to that.

MR. JORDAN: Yes. It seems fair that I answer that, since I was here in 1986 and I am still here in

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another role.

CHAIRMAN JACKSON: Are you going to be here in 2006?

MR. JORDAN: Perhaps.

[Laughter.]

MR. JORDAN: Threat or a promise?

I guess there were, I would say, two things that were in conflict. One was we should seek out new and better indicators and the staff has developed a plan for getting to risk-based indicators and that was communicated to the Commission I guess about a year or two ago. But along the way from 1986 to then, the Commission cut budget and excised the staff that were dedicated to performance indicators. So the work that was done was largely under contract and we in

fact converted to a program which I think is appropriate direction to use risk-based measures. That is, to fit all of the performance indicators into a risk model.

So it was an economic work load issue. The resources were no longer available and so the staff did not have the capability of doing much more than production of the existing set of indicators.

DR. ROSS: Can I follow up on that, because this has to do with people? In the risk-based performance indicator development, there are about eight items that we need.

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Various system studies or system reliability studies, say the emergency diesel generators, turbine-driven aux feed pumps, high-pressure injection and so on, we have done about half of those and the rest will be done near the end of this year, early next year.

We need a common cause failure database and we are working on that. We need various improvements in accident sequence precursor area and we are working on that. We are looking at component studies, getting below the system, below the train, down to the component. We are reviewing and rebaselining initiating events such as transients and loss of power. We are doing loss of off-site power database. I mentioned yesterday we are updating that.

And then we need to --

CHAIRMAN JACKSON: So what is the net message here?

DR. ROSS: The point is, we have four or five people working on these risk and reliability areas as a prelude to performance indicators. So we are pointing and building the foundation for indicators well beyond anything we have talked about today.

COMMISSIONER DICUS: Do you need more people? Do you have the resources?

You always need more people. Let me rephrase that. But are you being negatively impacted in getting the job done by the resources you have available to you?

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DR. ROSS: We have a qualified no on the negative impact. We need one or two additional senior risk people and we are in the process of getting them. The EDO has approved recruitment for one and we are going to proceed from that. It takes time to get these people up to speed, sure.

COMMISSIONER ROGERS: I would like to say a little something on this, too, because I can remember some of this period. I do remember that there was a great deal of effort going into a leading indicator. Remember that?

MR. JORDAN: Yes.

COMMISSIONER ROGERS: It looked very promising and a considerable amount of effort went in. And then it turned out that it just didn't really pan out. But there was a considerable effort in AEOD to develop a leading indicator. I don't remember exactly what the basis was of it and it doesn't really matter right now but I know it looked quite promising for some period of time there and then it turned out not to not really prove out when you started applying it.

MR. JORDAN: It wouldn't validate. That's correct.

COMMISSIONER ROGERS: Well, it did on a limited number of plants, that's the trouble. And then when you

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started to expand the number of plants, it fell apart. But I think that is just the cost of doing business, you know. I think that that is not something to criticize AEOD for. I think that was an effort, an honest effort to really find something the Commission very much wanted. We are still talking about it. And it just didn't work. And I think, you know, I don't think you should be criticized for having put an honest effort into something that looked promising but, when subject to very rigorous testing just ultimately didn't pan out.

Nobody else has come up with a leading indicator, either. You know, the industry hasn't come forward with one either. So it is a tough problem and I just think that we should keep that in mind.

COMMISSIONER DICUS: I didn't mean for this to come across as a criticism but I think it comes across as a concern in the broader issue of keeping core capability in the agency.

MR. JORDAN: It is a matter of how much then must be done under contract versus in house because we would like for the staff in house to be the thinkers and planners and provide contract analysis of data.

CHAIRMAN JACKSON: I think we need to go on. But I think the point to be made, particularly since you have been addressing this question, is that it is, in fact, your

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organization that has been tasked with looking at the whole issue of knowledge, skills and abilities of NRC staff, you know, what is needed, balance in-house, out-of-house, coming out of strategic assessment. So this is an opportunity to look at it --

MR. JORDAN: I see it that way.

CHAIRMAN JACKSON: -- and decide going forward if there is something more that needs to be done.

Now, do you have a question?

COMMISSIONER MCGAFFIGAN: And it is on a different avenue.

CHAIRMAN JACKSON: Okay.

COMMISSIONER MCGAFFIGAN: You mentioned earlier that there is 30 or so INPO approved performance indicators. Does INPO track those and is there going to be a proprietary problem in getting that, if you decide one of those indicators is useful, whether it is leading, lagging, concurrent or whatever, that that is a useful indicator? How do you go about bringing it into our relatively public or totally public database?

Do you foresee any problems or am I premature in even asking the question?

MR. JORDAN: No. I think very quickly I can answer that.

INPO developed a set of performance indicators and
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set industry goals that the industry subscribed to. They are a parallel set of indicators, for the most part, to those we use. We currently get some of our data from INPO through memorandum agreement which allows us, for instance, to get in a more timely fashion radiation exposures, man rem per plant per year.

So we are working cooperatively in obtaining that and, as you are aware, we have revised the MOU to obtain equipment reliability data. That is, safety system data. We will be coming to the Commission with a recommendation on the proposed rulemaking soon.

So we are working, I would say, in a cooperative fashion. We have agreement to obtain and use some of the data. The INPO set of indicators are much less than 30.

COMMISSIONER MCGAFFIGAN: They are less than 30?

MR. JORDAN: Yes.

MR. MIRAGLIA: That was my number. It was substantially than our seven.

CHAIRMAN JACKSON: Whatever that is.

MR. MIRAGLIA: I correct it on the record.

COMMISSIONER DIAZ: Just a quick thing, now that I hear we are working on all these sorts of things, is it possible to get a list with a small sentence of all the things that we are working on, because that certainly would be appropriate for us to know.

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CHAIRMAN JACKSON: Well, there is a rulemaking plan that the Commission gets.

COMMISSIONER DIAZ: I know, but --

CHAIRMAN JACKSON: On a regular basis that has all of this laid out in it.

COMMISSIONER DIAZ: It does?

CHAIRMAN JACKSON: Yes.

DR. ROSS: If the Commission pleases, we can skip slide 13, I think we have talked about it. It deals mostly with information sources and I think we have discussed all of the points on this chart already.

So I would suggest going on to milestones and schedules, slide 14. Mr. Miraglia has discussed what is going to happen in June.

At the April meetings, we did inspect the existing Arthur Andersen trend plots and we had economic indicator information for all -- five indicators for each of the 109 plants that were considered.

What we expect to do in the fall, that is in the October screening meetings leading to the January '98 meeting, is to have additional economic indicator information and it will have maybe more, at least a bond rating and also we hope to have more interpretative information on how to use the economic information.

CHAIRMAN JACKSON: How do you intend to validate

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the economic indicators?

DR. ROSS: Well, I think inherently it is not validatable if you mean with respect to plant performance. Many people have taken this position. We have seen -- I know INPO has data on things like efficiency, cost per megawatt hour, kilowatt hour, whatever, versus good plants. And quite frequently the best plants, you know, run with relatively low cost. But you can have a good plant that has a very high debt to equity. So I am not sure, but we will look at various schemes but I am not sure validation is the right word.

It is for the beauty therein. I think we will have to try to interpret it. One problem might be in terms of capital investment. We will have to see if it is high last year, low this year, we might say why, what happened. That would be information.

MR. JORDAN: I have a simple answer for it. What we were looking for and what we are still looking for is signs of economic stress. And then safety strain. Stress, in some cases, may be very positive and result in safety improvements with better management based on being under economic stress. But if there is a safety strain that appears, we want to be sensitive that, given the presence of

economic stress, that we are able to watch for the strain side.

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In terms of correlation, the stress side will not correlate in a statistically very strong fashion with poor performance, I don't believe, in the long term.

DR. ROSS: In the last bullet, if we have some modicum of success we should, in June '98, start introducing some of the procedures for trial use.

The last dash on this bullet, I would like to say, we will probably explore the rebuttable resumption concept for the first time at the June '98 meeting.

MS. CYR: I would like to object to the use of that concept in this context.

[Laughter.]

CHAIRMAN JACKSON: Work with the lawyers. That will be in the SRM to come up with a better term.

DR. ROSS: Okay.

Do you want to hear any more than you have already heard, then?

CHAIRMAN JACKSON: You could call it XX concept.

DR. ROSS: Okay.

Moving right along, the last slide, summary and conclusions, slide 15, we have described our work in process. Mr. Miraglia has talked about improvements and further enhancements will get review by the internal senior management, the ACRS, public, industry. We do envision having some sort of workshop or specialist meeting.

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Certainly will be public meetings or opportunity to comment. And then, gradually, phasing in and implementing our improvements.

The bottom line is what we have talked about in the beginning, more objectivity, consistency and timely decisions.

CHAIRMAN JACKSON: Let me just ask you a question on your first bullet up there. Are there contractor recommendations that the staff does not plan to implement?

DR. ROSS: We talked about the facilitator as such and we talked about the transcript. I think we talked a little bit about the volume of data. I think those are the three that come out.

MR. CALLAN: Also an area of interest to me is exactly how do we obtain the sense of the group? Arthur Andersen proposed a spectrum of ways, including a vote, an outright vote, capturing on a transcript, capturing people's opinions.

In the past, we have done it by consensus. My intention, at least for the near term, is to continue with the consensus process but to use these other mechanisms that we have been talking about this afternoon to establish the kind of robust discussion that would involve all the senior managers so that the consensus is a valid consensus, it is a credible consensus.

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CHAIRMAN JACKSON: Let me ask you a couple of quick follow-on questions. You know, there was a question with respect to unequal time periods, you know, for instance that a reactor may be shut down during a quarter that occurred from one senior management meeting to the next. Could that at all be addressed or have you thought about addressing that by using trending rates as opposed to trying to trend actual account data?

DR. ROSS: I understand the question. It is possible, we will be glad to look into it. The slope of the curve as well as the --

CHAIRMAN JACKSON: Right, the derivative, basically.

DR. ROSS: It is possible.

CHAIRMAN JACKSON: And then the question is, should more recent data be weighted than data that is closer to a year old or more?

MR. JORDAN: Among the -- I think that is another good question.

DR. ROSS: We are looking at that. I was asking Mr. Jordan. I think to a certain degree SALP considers more recent information as being more relevant.

MR. MIRAGLIA: In the context of the meeting itself, we do try to update from where we are. Sometimes, events or information is available to us because of real .

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time happenings and that is brought to the table.

MR. CALLAN: As a practical matter, the last six months' performance is heavily weighed and the reason it is is because the SALP process, as Dr. Ross said, specifically says weigh the last six months more heavily.

But more than that, the screening meeting is linked to the SPPR process, the semi-annual plant performance, which is a regional activity which focuses largely on the last six months. So that is the focus of the screening meetings and, inevitably, will be the focus of the senior management meeting.

CHAIRMAN JACKSON: How current is the indicator data at the time of the senior management meeting?

MR. CALLAN: Well, that is the question, to make sure that the algorithm data that goes also reflects more recent information.

MR. JORDAN: It's just a quarter behind, at very best.

CHAIRMAN JACKSON: Is there any value in having different sets of data, of indicators, rather, for the screening meetings versus the senior management meetings?

MR. JORDAN: We do generally update the -- get an update of performance indicators for the senior management meeting.

CHAIRMAN JACKSON: But they are the same set?

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MR. JORDAN: No, I am saying another quarter comes in.

CHAIRMAN JACKSON: No, but they are the same indicators?

MR. MIRAGLIA: The same indicators.

MR. JORDAN: Yes.

CHAIRMAN JACKSON: Just a question.

MR. JORDAN: Perhaps. Perhaps. I mean it's one I haven't thought of.

CHAIRMAN JACKSON: Okay, you can think about it.

And then the last question I have is how is random variation accounted for in the Arthur Andersen context?

MR. JORDAN: That was, in fact, one of the limitations that I had. Because of the paucity of data, you know, the science of small numbers, there is a random shift that can be a false positive.

CHAIRMAN JACKSON: Right.

Commissioner Rogers?

COMMISSIONER ROGERS: Yes, well, I have a couple of things I would like to say because I probably won't have

much chance to say them on this subject much longer. So, if I can be permitted, I will try not to take too long.

Some general observations. One is it seems to me that one way to look at this senior management process, decisionmaking process is that you are going to try to

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find -- to place a plant on -- in your mind's eye on a chart of what its margin is to where you become really concerned about it. How far away from that is it? If it is close to the margin of where you are really concerned, then trends are extremely important. Is it going down or up is a very important question.

If it is very far away from the critical position, then the trend is not so important, particularly if it is small. So, you know, it is a derivative concept. So that somehow what one is trying to do is to analyze the status of the plant in margin space where it has an ample safety margin but it is either staying there or getting better or getting worse. The concern should be when its margin is eroding down or has eroded down and it is going negative and the derivative is going negative.

So these are the things it seems to me are really important in how we pay attention to a plant. The fact that it is sort of mediocre and staying there, if it has a reasonable margin away from a concern limit, then that's the way it is, you know. I think that that should be acceptable, provided one has some comfort that the derivative is in fact essentially zero.

So that that is one way of looking at this ultimate decision and I think that if you start to think about it that way, you have some answers for questions that

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come up with well the plant is getting worse and why didn't you do something about it. It is a question of what the margin is, the safety margin is. So I think that one way to think about this system is -- should be guided a little bit, I think, from the basic concepts of control theory.

You need an error signal to tell you what is happening. You have to have an error signal to provide a corrective action, feedback action. So you don't want to look for things that don't give you a constant error signal. You want some -- you want a constant flow of error signal. Call it what you want but whether that is going up or down or getting bigger or not is the critical thing. So you want to stay away from measures that don't give you any information.

You know, something bad never happened so we are all -- so we are very happy. Well, we don't know anything. We don't know anything about derivatives.

So the very -- the indicators that provide you with very infrequent pieces of information I don't think are of much use at all and that they don't tell you enough. So that you want to look at things that give you a constant flow of information on a steady basis that they are small errors, they are small errors, but that they provide a measure of what is happening in that plant. Those, you start to work your corrective actions on.

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So that there is some need for that, that constant error rate, whatever it is. So, you know, the ideal is not zero, it is a small, measurable quantity of things that may in fact be false and small errors of various kinds tell you they are always going to be there but are they getting worse

or not, are they getting -- you know, and what is the rate at which they are changing.

So derivatives are terribly important here, it seems to me. In fact, that is everything really. So I just urge you to think in those terms.

The other one is I think one has to look for integral effects indicators. You know, we talk about integral effect experiments, you know. There are integral effects here that are important.

For example, it seems to me that the rate of man rem exposure in the plant is not only a measure of health safety, it is a measure of management. It is one of the best measures that you have, indirect measures that you have, of management performance. Is that going up or down?

Now obviously you have outages when things fluctuate but there is a very sensitive integral effect, integrates over the whole plant, tells you that people are doing their jobs with great care and understanding or they are not, what that number is and what is happening to it.

So I would urge you to think not just to try to go

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directly to a measure of what you want to know an answer on but to look at integral effects that might serve as surrogates for those. So I think this is a very important activity and I do think that, you know, folding risk into it is important but don't get hung up on the notion that risk has to come out of a PRA. There are lots of other valuable aspects of a risk, of a binned approach to risk analysis where you can't put very hard numbers on but you know you have something in mind there with respect to risky or not risky. Those are important.

CHAIRMAN JACKSON: That is why I think risk informed as opposed to risk based.

Commissioner Dicus? Commissioner Diaz?

COMMISSIONER DIAZ: I do have a couple of things.

CHAIRMAN JACKSON: Let's try not to have treatises.

COMMISSIONER DIAZ: No. They are small things, 16 or 17, I think.

CHAIRMAN JACKSON: Make it 16.

[Laughter.]

COMMISSIONER DIAZ: I just have a couple of notes in here and I think it is I guess we give this process very important time and feature of the Commission. I think, you know, we need to realize that senior management meeting is a critical element on how we deal with nuclear power plants.

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In fact, it might be the most critical element. I can see a very important process and therefore we are all very concerned about how it is done and this is why we are here.

A couple of things, the issue of due process came about a minute ago and a reputable presumption and I think that also has an aspect that is important when we look at due process and accountability. It is an issue that I raised some concerns before on and I think it needs to be addressed. And that is, how does the Commission participate at the end of this process. I think that needs to be considered, not in between, not in the beginning but at the end of the process. Is that a necessary component? Because of the importance of it, should it be considered? And I think we need to look at that.

As I look at the methodology and I listened very attentively to Commissioner Rogers, I find that there is someone or something that I have not seen in our thought

processes and that is what I call the sampling frequency. That is a very important aspect of how you take information and analyze it and process it.

As Commissioner Rogers surely implied in his comments --

COMMISSIONER ROGERS: Of course.

[Laughter.]

COMMISSIONER DIAZ: You can actually sample at the

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wrong times and never see a trend. Statistically, we are very well developed on how we should sample.

If you look at the sampling frequency and you look at your diagram five and you look at what is in it, there are some things that are very important. First is the sampling frequency of the resident inspector. That is really, you know, number one key. The second one is a sampling frequency of the branch chief in the region and that becomes the number two. They together become a principal input.

How they actually feed back into each other is a critical part of that process. How they go from the branch chief into the region becomes a third sampling process. Once you go into the PIM is another frequency process. How are you going to the PPR and how you are going into the template and you go into the senior management meeting.

If you look at the process, it is practically impossible to have a timely decisionmaking and time processes of sampling in a six-month period. They are practically out of sequence. If you look at the -- you know, a standard sampling frequency technique, you will see that the minimum rate at which they should be sampled at the senior management meeting to get precise information that at least has two cycles in the PPR is yearly. I think it is a very important consideration when you are trying to, you

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know, improve this process is what is the sampling frequency and where do you get the best information. How you differentiate your indicators and how you integrate them.

When you look at the process, it is obvious that improvements can be done in the sampling frequency and I would strongly recommend that the staff looks at that aspect of it and reports back to the Commission.

The issue of indicators, I think, Commissioner Rogers told my thing on that. I think it is very important to realize that not all indicators, even sometimes when they are persistent, they don't really mean the same thing. For example, when we look at nuclear power plants many years ago we learned to read the random noise from the channels rather than reading the DC signal and the random noise was a better indicator of power. I think we have the knowledge to do that and go forward.

My last point, Madam Chairman, and I am sorry I have been long-winded this afternoon, is when we look at these processes and we look at the end point, I think that timeliness is more important than perfection. We cannot get to a perfect resolution of this issue because of the complexity. But I think that the fact that the senior management meeting has such an impact on the industry, that there is such a superior look at it, once you look at frequency and the time that it takes the senior management

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to put this process through and once you look at the results, that we should put timeliness of getting this

process completed rather than make it perfect. We can always change it.

Thank you.

CHAIRMAN JACKSON: Commissioner McGaffigan?

COMMISSIONER MCGAFFIGAN: I will just comment that I think this has been a very good meeting. I have come away better understanding the constraints in which you guys are trying to do a very difficult job.

I would put one more plug in for thinking about the good performer part of this because, if I interpret the EDO's response to my earlier question, it basically is at the end of the day in the screening meetings by the book they do something and then that is presented to the senior managers and they ratify it by the book and it seems sort of an afterthought in our current process. My thought is either we do it well and more systematically or we don't do it because, at the moment I think the signal when we have only two good performers and we have a lot more SALP 1 plants than that is sort of a funny signal to be sending out. And at the moment we are by the book and I made a mistake at the previous meeting. Those letters don't go out for two weeks after the watch list letters and there is no press release on those, unless I put my foot in my mouth .

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again.

CHAIRMAN JACKSON: Well, I'm not going to say that but, to some extent, the staff's sensitivity on the public notification has to do with pressures either on them directly or that have come to the previous commissions from the industry itself, in terms of what it wants advertised.

COMMISSIONER MCGAFFIGAN: I understand.

CHAIRMAN JACKSON: So historical perspectives are always instructive.

COMMISSIONER MCGAFFIGAN: I think over the years the subject of the good performers has been actually ironically more controversial than the subject of the watch list and we probably have greater swings back and forth because of different Commission views on that subject.

CHAIRMAN JACKSON: Exactly.

COMMISSIONER MCGAFFIGAN: That's interesting.

CHAIRMAN JACKSON: So let me thank the staff for a very informative briefing. I believe you are on the right track in spite of the various comments you have heard. But I don't think anyone would argue that you're not.

The Arthur Andersen study proposed a methodology for categorizing plants that I suppose is intended to be consistent with the Commission's desire for objective, consistent and timely process. So the contribution of that work then lies not so much in the specific methodology. I .

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mean, lies in the overarching approach as opposed to the specifics of the methodology or in the detailed criteria and numbers and so forth.

So I am pleased to see that the staff has made progress in responding to these recommendations. But there is work to be done, as you have heard. I am not going to try to summarize everything but there are implementation issues. There is the question of rising standards, the adequacy of existing indicators, economic and management indicators as well as the process oriented ones.

I think you need to move on along with the process improvements you have already outlined with respect to the meeting formats, documentation, et cetera. I think the use of risk-informed criteria in the broad sense in which it has

been discussed in the plant performance template and its use in or connection to any algorithms used at whatever decision point is appropriate.

I think you have to look and involve research a little more robustly in the issue of human performance evaluations and I think you need to think about your time frame. There is a tradeoff between wanting to have the evaluations and obviously needing the public input versus Commissioner Diaz spoke about timeliness but I think sometimes when you unduly delay the improvements that you are going to put into place, that tends to temper the beauty . 80
of what you ultimately do.

I think the issue, as you are looking at frequency sampling and issues along that line, that you have to ensure that there is a consistent tie-in to the other evaluative mechanisms and the time frames on which, you know, they operate. So the Commission wants to be, obviously, kept well informed. We will probably schedule another briefing at an appropriate point once you are further along in the process. But it will undoubtedly be this year.

So unless there are further comments --

MR. CALLAN: I normally wouldn't ask for a comment, Chairman, but to be clear, we plan plenty of interaction with the Commission as we go forward.

CHAIRMAN JACKSON: Right.

MR. CALLAN: If we have any breakthrough thinking, I mean if we come up with a good idea, we are not going to wait.

CHAIRMAN JACKSON: Good.

MR. CALLAN: Those milestones reflect reasonable projections but, believe me, we have every interest in January or even this June if we come up with better ideas.

CHAIRMAN JACKSON: And we will probably just have a formalized meeting in maybe six to eight months' time just to see where we are.

Thank you.

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[Whereupon, at 3:23 p.m., the briefing was concluded.]