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ERRATA SHEET

ADDENDUM

Page	Line	Correction and Reason for Correction
6	14	"outside power" should be "offsite power"
18	3	"implementation and control" should be "instrumentation and control"
21	9	Add the word "it" prior to "an awful lot..."
29	3	Add the word "I" prior to "don't know..."
29	6	Change "enough" to "too much"
33	23	Change to read "The analysis for the design basis events which the ..."
40	21	Add the word "is" prior to "an ATWS..."
41	4	Add the word "in" prior to "or not."
42	17	Change to read "If he shuts the MSIV's he ..."
44	3	Change the word "go" to "going"

Date 9-20-91 Signature /s/

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
INCIDENT INVESTIGATION TEAM

INTERVIEW OF)
)
JARED WERMIEL)
)

Nuclear Regulatory Commission
The Woodmont Building
8120 Woodmont Avenue
Bethesda, Maryland
Friday, August 30, 1991

The above-entitled interview convened, pursuant to notice, in closed session at 12:15 p.m.

PARTICIPANTS:

MICHAEL JORDAN, NRC/IIT TEAM
BILL VATTER, NRC/IIT TEAM
JOSE IBARRA, NRC/IIT TEAM
JOHN KAUFFMAN, NRC/IIT TEAM

PROCEEDINGS

MR. JORDAN: Good morning. This is August 30th at approximately 12:15. We are here talking and having a discussion about an event that happened on August 13th at Nine Mile Unit 2.

Jerry, why don't you go ahead and tell us what your background is, what your experience right now is and what your current position is and the type of activities of and responsibilities of that position.

MR. WERMIEL: Sure. I'm currently the branch chief of the human factors assessment branch in the division of licensee performance and quality evaluation, Office of Nuclear Reactor Regulation.

As such, we are responsible for those regulatory activities that deal with human performance, emergency operating procedures, training, man-machine interface questions, questions of staffing, all issues that relate to proper performance of the operations staff at a nuclear power plant.

I have been in this position now since May of 1990. Prior to that I was in the plant systems area as a section chief and prior to that as a reviewer.

My background is primarily in the support, reactor support systems area and in balance of plant systems area.

I am an engineer. I'm not a psychologist and my

background is primarily in fluid systems.

I joined the NRC in March of 1978 and have been with the agency since that point.

MR. JORDAN: I guess we should at least introduce for the record who we are. My name is Michael Jordan. I'm with the USNRC out of Region 3. I'm a section chief for boiling water reactors and operator licensing.

MR. VATTER: I'm Bill Vatter and I'm on loan to the IIT from INPO.

MR. KAUFFMAN: John Kauffman out of NRC headquarters.

MR. IBARRA: Jose Ibarra from the instrument controls systems branch of NRR.

MR. WERMIEL: Does anybody have a particular question they want to start out with?

MR. IBARRA: Jerry, who reviewed the EOPs in the agency, the EOPs coming out of Three Mile Island, or after Three Mile Island?

MR. WERMIEL: By who you mean what individual?

MR. IBARRA: What branch.

MR. WERMIEL: Programmatic responsibility for the review of the emergency operating procedures is with the human factors assessment branch and that would have been the responsibility that they had. The actual review was conducted as part of the emergency operating procedure

inspection program.

In other words, the region was responsible for conducting an EOP inspection that was supported by headquarters of the procedures at the plant. That review was primarily to confirm implementation of commitments that were made after TMI with regard to incorporation of the new emergency procedure guidelines, the writer's guide, the proper verification and validation of the procedures, all those sorts of things.

That's all included in this emergency operating procedure inspection program. I believe it's Manual Chapter 41500, I think is the actual inspection module that's involved here.

MR. IBARRA: In that review, who would be the technical contact? Who would look at instrumentation and controls and electrical systems?

MR. WERMIEL: There would be members on that team that would have expertise in the technical areas and I believe there should have been some expertise on the team in I&C, although that may not have been a specific area that's called out, and there is also expertise on the team in the human factors area so we have both technical experts and human factors people on those teams.

There isn't, as I recall, a specific requirement that there be an electrical -- a person with electrical

background on that inspection team. There usually is somebody with systems understanding or systems experience, mostly reactor systems experience.

MR. IBARRA: How about as far as computer systems, SPDS and so forth, as they relate to the EOP?

MR. WERMIEL: A human factors person may have some knowledge of SPDS, of the DCRDR review, but the review from the human factors perspective is primarily a verification of the usability of the procedure -- is the procedure laid out in a way that the operator can appropriately implement it, does it have all the information the operator needs to take the actions he needs to take, is it sequenced in a way where if he follows it he'll be doing the right thing, that kind of a look.

We don't do that I'm aware of any kind of a direct check of how the SPDS was incorporated in the procedures or that sort of thing. It's more -- at least from the human factors perspective, it's more a verification that the writers guide which provide guidance on how to make these a user-friendly procedure, has it been implemented properly and are these indeed procedures that the operator if he follows successfully will lead him down the right path, will work right.

MR. IBARRA: If we were looking at the instrumentation that the operator is using to carry out his

task, how do we link up that with the qualification of that instrument being able to know that it does survive under the conditions that he would be using it?

MR. WERMIEL: Okay. That would not be done procedurally, not in the EOP procedure per se. It's the -- I would assume and it is my understanding that the people writing the procedures know what instrumentation is qualified and what can be relied on for the various scenarios so when they develop the procedures they will know that whatever indications or controls that they are asking the operator to utilize to conduct the necessary steps are indeed available -- in other words, they are powered from an available power source if the procedure involves a loss of outside power, they are environmentally qualified if the procedure is steamline break or a LOCA procedure so the operator doesn't have to concern himself with that.

In other words, the basis for the procedure and the equipment that's being called out has already been checked. It's been verified and validated that this is equipment that's available and can be used for the particular accident or transient situation that he's in.

MR. JORDAN: When you say procedure, you're saying the utility's procedure review of it or our guidelines or the industry's guidelines?

MR. WERMIEL: We call for that. It's up to the

utility to make sure that the procedure writer is doing that.

MR. JORDAN: Do we identify what instrumentation we expect to be qualified?

MR. WERMIEL: Sure.

MR. JORDAN: Do we tell them which instrumentation we expect to have on 1-E course of power and --

MR. WERMIEL: As far as I know. I&C isn't my area. I would hope that Scott Newberry could help you out there but it's my understanding is absolutely. Reg Guide 1.97, for example, is a set of instrumentation that's supposed to be available to follow the course of an accident and that instrumentation has certain power supply criteria associated with it.

MR. JORDAN: So your group relies on the I&C's people to identify what instrumentation will be available for use in the EOP?

MR. WERMIEL: Right. That's correct, and then we would assume that once the utility knows what instrumentation they are taking credit for to satisfy the criteria, that the procedure writer then incorporated it in the procedure and doesn't tell the operator to rely on something that isn't appropriately qualified for the event that he's to deal with.

MR. JORDAN: So we leave that up to the utility.

MR. WERMIEL: Right. Sometimes we will identify circumstances where we will question the instrumentation or the -- we don't deal with the word "instrumentation" as much as "indications."

The indications that the operator is to rely on, we may question it. We may say you're telling him to rely on this, is this something that he can rely on, is it going to be available, and even if it is, is it something that's been appropriately qualified.

During the inspection we may catch that. We may ask about that as part of our -- it comes out of the verification and validation work. It may come out of that.

MR. IBARRA: But it is part of the EOP program, right?

MR. WERMIEL: It may, yes, may come out.

MR. IBARRA: Other than the inspection program, do we have other mechanisms within the agency that would look -- other than that inspection?

MR. WERMIEL: We do periodically under certain circumstances look at operating procedures, yes, for other reasons.

The EOP inspection program I'm speaking of is a generic program that went on for several years but on a periodic basis we're asked to look at certain aspects of procedures or procedural steps to verify that they are

appropriate and they'll do what the utility claims they'll do.

We're doing that right now, for example, for Yankee Rowe and this question of the embrittled reactor vessel. The utility was asked to modify their procedures to do some things that would reduce the likelihood of a pressurized thermal shock incident and they made some procedural changes and we are now looking at those changes to confirm that they will indeed -- first of all, that they make sense for the intended purpose and that they can indeed be accomplished the way the utility intends them to be accomplished.

We don't do that very often but we do get requests to do that sort of thing in certain cases.

MR. IBARRA: Do you supply support to the DCRDR audits and the SPDS audits? Is that within your group?

MR. WERMIEL: Absolutely, yes. Yes. That was a big push for quite a few years within this branch that I'm in now.

When I got into the branch, those two programs were nearly complete and since the time I've been there we have completed the DCRDR reviews and the SPDS reviews but that was an ongoing program for many, many years within the human factors assessment branch.

MR. VATTER: Jerry, can you tell us how you go

about doing a human factors inspection for procedures?

MR. WERMIEL: Sure. Typically the region will -- Let me use the last plant as an example.

We just right now as a matter of fact, as we speak they are completing the final inspection of Perry, the last plant that's to undergo the full EOP inspection -- emergency operating procedure inspection.

The region will identify the schedule for completion of those inspections. They will identify the people that they believe they need to accomplish the inspection in accordance with the inspection module that I mentioned.

If they need expertise from headquarters or support they will contact us and we will provide them either contractor technical assistance or somebody from my staff.

In certain cases, people from my staff have actually gone on inspections but generally we'll provide a contractor assistance from one of our contractors.

Then the team goes out and conducts the inspection and in the course of conducting the inspection I'll get feedback or the section chief who works for me will get feedback from the team.

When the inspection is completed and the report is written, we'll get copies of the report and if there's any additional followup, either a followup inspection or

followup of closing out certain open items, we may again be contacted by the region for assistance.

Often on an EOP followup inspection, we will again be asked to provide contractor assistance, not usually for closing out open items but sometimes we are asked to help out for that, too.

MR. VATTER: What sort of techniques do the inspectors use to make sure that the human factors are okay?

MR. WERMIEL: I'm not real familiar with the details because I haven't been involved in an actual inspection and my staff has been doing this for many more years than I've been involved.

Generally, we have guidance. It's in a NUREG and I wish I could think of the number. We have guidance on how to conduct a human factors assessment of EOPs, what to look for in the writers guide, what to look for in a V&V program, what to look for in a walkthrough, what to look for when we ask the utility to simulate the procedures by a simulator scenario evaluation. It's all pretty well spelled out.

MR. VATTER: So you do observe some simulator scenarios --

MR. WERMIEL: Yes, we do.

MR. VATTER: -- and procedures?

MR. WERMIEL: Yes. That's called out in the EOP inspection module that we actually have them exercise the

EOPs in the simulator so that we can get some firsthand knowledge of how the operators do using them.

We usually leave it up to the utility to select what crew or what teams they want to put in the simulator to run it through for us and we often get some pretty substantial feedback from that, some pretty good insights from that.

MR. JORDAN: Do you have any guidance -- You mentioned 1.97 Reg Guide.

MR. WERMIEL: Yes.

MR. JORDAN: Do you have any guidance that says in order to perform the EOPs, in order to get through any particular step in the EOP that you've got to have something that's qualified to 1.97, or is it just --

MR. WERMIEL: I don't know that we get that specific, Mike. I believe it really is more a check on whether or not the utility was aware that they needed to make sure that when they wrote the procedure, as part of that, the person who did it knows that he can't be asking an operator to use equipment that isn't qualified.

If he's writing a LOCA procedure or a LOCA recovery, the equipment has got to be environmentally qualified and he can't be asking the operator to rely on indications that are not because he'll get --

MR. JORDAN: Is that in the guidelines or is that

in -- where have we transmitted that to the utility?

MR. WERMIEL: I don't know that that is specifically spelled out in the guidelines. I would have to go back and look for you. We could do that. I don't know that I've ever seen that.

What I think is called out is a more general statement that the procedure writer as part of his V&V verifies the availability of indications and controls, that kind of thing.

MR. JORDAN: That's in the guidelines?

MR. WERMIEL: I believe it's in the guidelines on V&V, yes.

MR. JORDAN: And the guidelines come from us or from the industry?

MR. WERMIEL: From us.

MR. JORDAN: From us?

MR. WERMIEL: Yes.

MR. JORDAN: Our guidelines to the industry on how to write EOPs?

MR. WERMIEL: That's correct.

MR. JORDAN: And in there you think there's a section that says make sure that they have --

MR. WERMIEL: I sure do think so because I know it's part of what we consider. I just don't know how explicit it is.

MR. IBARRA: The team member on this inspection team, would he be knowledgeable in all the programs to be able to make that assessment?

MR. WERMIEL: He would -- The human factors person may not be but somebody on the team would know what environmental qualification means and ought to be able to judge, yes, that when the utility tells him we are utilizing 1.97 instrumentation that indeed they are using 1.97 instrumentation.

In other words, he would be familiar enough with what that means to at least be able to judge that, yeah, the utility was doing it right. I would think so, yes.

MR. IBARRA: What does the term important to safety as far as EOP tasks are concerned, what does that mean to you? Does that carry any significance whatsoever?

MR. WERMIEL: It certainly did from a hardware perspective in my previous life, but when you deal with people it doesn't mean a thing.

All the old terminology that I'm familiar with -- important to safety, safety-related, safety grade -- doesn't mean a thing when we talk about people. We throw out all that stuff -- single-failure criterion -- doesn't mean a thing.

We basically rely on the operating procedures and the operator's training to ensure that he'll do the right

thing. We don't I guess grade his performance. We just assume he's going to do the right thing if his procedure is okay and his training supports it.

MR. IBARRA: Every time there is a revision to the procedure, how do they take care of it? Do they re-review it?

MR. WERMIEL: Not as a general rule. We do not, no. Once we've confirmed that the writers guide and the program, the V&V program and all that kind of thing, is acceptable, we would assume that any subsequent revisions would be done in accordance with their procedure revision program that we looked at and therefore we would expect that it would be okay.

The questions may come up but again they would be isolated. Unless it was part of an EOP followup, we wouldn't get involved. We wouldn't oversee frequent changes to th emergency operating procedures.

MR. JORDAN: How do vendors propose changes? You're talking about the site changes. What about the --

MR. WERMIEL: If the emergency procedure guidelines are changed, and particularly if there is a substantial change, then I would expect that we would be reviewing that, yes.

MR. IBARRA: Things like three years ago, four years ago, when CE changed their philosophy on the number of

reactor coolant pumps?

MR. WERMIEL: That would be reviewed. No question in my mind those kind of things because they go to the --

MR. JORDAN: Do you review those things?

MR. WERMIEL: Not the thermal hydraulic or the technical adequacy of that but if there is anything that results from that that changes the operator's indications or the actions the operator takes, yes, we might get involved.

From a thermal hydraulic standpoint, though, and the technical adequacy of that, the reactor systems branch would do that.

MR. JORDAN: Do you then look at whether or not performance of the steps and the actions that you would expect from the operators is adequate?

MR. WERMIEL: That's right. We sure would, particularly if there were new indications involved or new actions the operator was to take, then we would probably get involved.

MR. IBARRA: In your normal review, whatever your group function would be as far as procedure is concerned, does the electrical systems branch and the I&C branch, are they all in concurrence on those?

MR. WERMIEL: If -- On almost everything we do that involves EOPs from a technical adequacy standpoint, we get the reactor systems branch involved. I can't think of a

case where we've gotten instrumentation and control or electrical involved and that may be only because the kinds of changes that we're talking about didn't affect the power supply or the instrumentation.

Usually the process works that the request or the need for the change goes through reactor systems branch and they farm it out to us and the other review branches and I'm trying to think whether --

I would assume that if there's a change in instrumentation that would affect them that I&C would be involved or a power supply question that the electrical branch would be involved. I just can't think of an instance where that's happened.

MR. IBARRA: Who makes that determination of who's going to be on concurrence and who will be supporting whom?

MR. WERMIEL: If it's a licensing change, it goes to the project manager and then the project manager would parcel it out to the appropriate technical branches for review.

MR. IBARRA: Okay, and the branches themselves might ask for additional support and then it will be up to them?

MR. WERMIEL: Absolutely, and oftentimes when we get a request, if we're not confident that reactor systems branch has seen it, because they need to, we'll make sure

they do see it.

Those are the examples I can think of. I can't think of cases where implementation and control or electrical were ever involved because we needed them to be involved.

MR. IBARRA: We see that Reg Guide 1.97 is an instrumentation issue but have you all supported -- Did you all have any input whatsoever into --

MR. WERMIEL: The review of Reg Guide 1.97? No. No, we didn't.

MR. IBARRA: How about any other instrumentation dealing with, let's say the tech specs instrumentation that's in there as far as they relate to the procedures, is there a link there somewhere?

MR. WERMIEL: Not that I can think of, no.

MR. IBARRA: When you review SPDS, do you typically ask for I&C support?

MR. WERMIEL: Yes. Typically those reviews had both an I&C input and a human factors input, yes, particularly from the standpoint of isolation of the power supply to the SPDS. Since it was not on a 1-E bus there was some concern about making sure that if SPDS should fail that other instrumentation that the operator would rely on would not fail.

Since a lot of the indications on SPDS are the

same indications that you would rely based on Reg Guide 1.97, a lot of them are the same, whereas the one that's a non qualified component, the other should be.

MR. IBARRA: Would your group be concerned that, for instance, SPDS is not safety-related and it would go down in an emergency?

MR. WERMIEL: We are not concerned so long as we are confident that there's a backup, a reliable backup. We think from a standpoint of the high level display that the SPDS is a real good operator aid and as long as it's available it will probably be easier for him to do a lot of things and get a lot of information from SPDS, but if it goes down we're confident that there are other indications that the operator would have to allow him to get through the EOPs just fine.

MR. IBARRA: Is there a concern when the operators lose annunciators and a lot of the backup instrumentation, not necessarily the safety-related?

MR. WERMIEL: Sure. There is always a concern where -- at least in our minds -- where if the operator has only, say, one indication of something or one channel of indication of something, that he may feel more hesitant to rely on it because he can't verify it by looking at something else.

There is always the desire to be able to confirm

an indication by looking at something else or even inferring that he's doing the right thing by some indication so the more you lose, oh, yes, definitely we would be a little more concerned that the operator may be more apprehensive about what he's doing because he has to rely so much on a single indication or a much smaller set of indications. Sure that's a concern, no question.

MR. JORDAN: SPDS usage, do you expect the operators to use it or is that more of a transition aid for those that are external to the control room to know what's going on?

MR. WERMIEL: We expect the operators to use it.

MR. JORDAN: So the loss of it is more of an operational, control and operational problem than a TSC or offsite management control of the event?

MR. WERMIEL: Yeah, I would say so.

MR. JORDAN: Is that what we would expect?

MR. WERMIEL: That's what I would expect. I would also expect, though, that the training the operator gets would be conducive or he would know what to do if he loses SPDS. I mean he ought to be relying on it. It's there for him.

MR. JORDAN: Do we find in our inspections that most operators rely on SPDS or do they go -- in an event or their training in their scenarios, do the normally go

directly to the indication rather than the SPDS?

MR. WERMIEL: No. Certain plants in particular really do rely on their SPDS. They really like it because they've tailored it the way they want it to be and they really like it the way it is and they want their operators to use it because they've gone out of their way to design it to be a real aid to the operator.

Some of the plants over the years have relied on an awful lot less than we think they ought to. I think in general, and this is based strictly on hearsay that I've heard from other people, I think in general industry is relying on it a lot more than they used to and a lot more than they thought they would originally.

MR. JORDAN: And you're talking about the control room operators, not just external to the control room.

MR. WERMIEL: Control room operators. No, I'm not talking about the guy, the plant superintendent who comes in during the event and wants to get a picture of what's going on and looks at the panel, no. I'm talking about the operating crew.

MR. VATTER: Is there one or more reactor types that are more that way, where the SPDS is used more?

MR. WERMIEL: I don't think it's a function of reactor type so much as it's more utility philosophy.

I got in, remember, on SPDS reviews at the very

end and I wasn't really a large part of a lot of that review effort. There is a person on my staff who was involved intimately with all the SPDS reviews for many, many, many years. That's Dick Eckenrode, one of my two section chiefs. He knows an awful lot about what happened during those inspections.

MR. IBARRA: Would it concern you if a lot of the indications or reliance on indications on instruments that would be off of UPS?

MR. WERMIEL: Nonsafety UPS?

MR. IBARRA: Yes.

MR. WERMIEL: Would it concern me? As long as the reliance was for situations where UPS was available, I wouldn't be overly concerned about it. I would be more concerned if they were relying on it for cases where they couldn't rely on it or they shouldn't be relying on it.

I think in general that's a pretty good system. It's got a lot of information on it that the operator could use.

Once again, it gets back to what I was saying before, as long as we're confident there's a backup and the operator knows what to do for those situations where the guidance tells him he shouldn't be relying on it, I don't know that I'm too worried.

MR. JORDAN: Have we as an agency checked to make

sure there is a backup? For all the parameters that are required either by the EOPs or by the SPDS, that there is some type of 1-E instrumentation that would be available to the operators to rely on?

MR. WERMIEL: It was my understanding that that's what Reg Guide 1.97 was supposed to be doing. It was supposed to be that minimum set that we could be confident would be available for -- I guess I should say it, for design basis events.

I don't know that we really have concentrated much on what to do if you're in a scenario that goes beyond the design basis, but for design basis events, that's what I thought that 1.97 instrumentation was all about.

MR. IBARRA: The work that was done after TMI's CRGR included a task analysis, functional task analysis, where they actually broke down the procedures and the instrumentation that would be used.

MR. WERMIEL: Yes.

MR. IBARRA: A lot of good work went into that. Has the industry kept up with that?

MR. WERMIEL: Yes, they have. As part of the DCRDR reviews that we do, we make sure that there is a program in place for subsequent upgrades to the panels and that kind of thing.

As far as I know, the industry in general is

pretty good about utilizing the same human factors principles when they go in and modify panels after the initial DCRDR review is done.

MR. IBARRA: So you would expect that as they do an EOP revision they would go and look at it?

MR. WERMIEL: Absolutely. Oh, yeah. They would go back and make sure that there is nothing that is missed with regard to changes on the panel and this kind of thing.

One thing I will point out, though. When it comes to modifications to control rooms, many plants are unable to get a lot of the old analog equipment that they had been used to and it had to buy newer digital technology and they are starting to mix some of the digital technology with the old analog equipment.

That has become a bit of a concern to us and we are trying to develop some criteria to deal with that now, but in general I don't know that I see a problem in the way they've been upgrading control rooms. We think in general they've been doing a pretty good job.

MR. VATTER: Jerry, you said something about instrumentation necessary to support the EOPs was supposed to be 1-E.

MR. WERMIEL: No, not necessarily. I think you heard it wrong. Instrumentation to support the EOPs should be geared to the particular scenario that you're in.

The EOPs deal with a spectrum of events. Some are relatively minor and they go all the way to core melt. You can get to core melt in some of the emergency procedure guidance that's out there.

The instrumentation needs to be geared to the particular set of circumstances and the EOP should be -- the guy writing the EOP needs to know that if he's dealing with a set of circumstances that's a result of loss of outside power, the instrumentation he's asking the operator to rely on has to be powered from an onsite source.

So you may start off with a certain set of indications that are powered from offsite sources and then you may end up with having to go back and check or verify plant status with different instrumentation because the symptom-based procedure has progressed to the point where the old stuff is no longer available and the procedure writer needs to know that.

He's telling the operator, hey, when you're verifying pressurizing level and you're using this instrumentation, it's the right stuff, it's powered from an onsite source and you shouldn't care whether or not you've lost outside power or not because I know you have and I've made sure that the instrumentation you're going to rely on is available.

Are you following me?

MR. VATTER: Yes. This time I am.

MR. IBARRA: Would you expect if you went to Newberry's group, the instrument control section, that their knowledge of the EOPs -- how would you characterize it -- good, bad?

MR. WERMIEL: Knowledge of the EOPs themselves?

MR. IBARRA: For instance, a question comes up on the right -- the use of some instrumentation, would they understand what the operator would be using it for? Would they have enough knowledge to understand?

MR. WERMIEL: Yes, sure. In other words, you're asking do they just concern themselves with the fact that there is an instrument and its power supply or what that instrument is used for?

MR. IBARRA: Both.

MR. WERMIEL: I think they do know both. I think they not only know what their criteria are for the qualification of that instrumentation but also what it's to be used for. They understand enough of the thermal hydraulics I believe to know why that instrumentation is important.

MR. IBARRA: What branch within the agency would look after the total integration procedures, qualification, instrumentation, human factors?

MR. WERMIEL: I don't know that there is an

overall integration. We all have our areas of specialty and then we would all write our evaluations based on our areas of expertise and then it would all get folded into one evaluation, usually by the project manager.

MR. IBARRA: If you are reviewing a procedure that unknowingly might call for some electrical expertise or I&C expertise, who would be able to catch that?

MR. WERMIEL: I would expect the human factors people in my branch would know if there was some question about the instrumentation that was being relied on because their experience would tell them that for the particular set of circumstances.

If the operator is being told to rely on something that's unfamiliar to them I think they would question it and then we would maybe ask the I&C people, hey, is this right, is this really, say, Reg Guide 1.97 indication or is it not, is it something that really shouldn't be there.

We have noted situations like that from EOP inspections.

MR. IBARRA: It's a little bit -- It's not heartening to know that sometimes you go into a control room and ask the operator what that label means and they don't understand what it means, especially Reg Guide 1.9.

MR. WERMIEL: Oh, yeah.

MR. IBARRA: Does that concern you?

MR. WERMIEL: It sure does.

MR. IBARRA: Is it typical?

MR. WERMIEL: Is it typical? I don't believe so, no. I believe from what we know of operator training that, particularly the training now being done with the newer certified simulators that the operators are very familiar with what's on the panel and what it means.

I would be very concerned if I was actually talking to a reactor operator and he told me that. I would be very concerned.

MR. IBARRA: The 1-E instruments they know very well and in fact the labeling there, but the Reg Guide 1.97 instruments which is a subset of all this has another label.

Do you find that operators do not understand what that extra label is or what that Reg Guide 1.9 indication means? Would that surprise you for them not to know?

MR. WERMIEL: It would surprise me for them not to know, absolutely. I can't say directly because I haven't asked operators and I really haven't heard any feedback on that. I would be surprised and it would bother my confidence if I heard that. Knowing the importance we placed on Reg Guide 1.97 instrumentation, that would bother me.

MR. IBARRA: Is there too much labeling in the control room?

MR. WERMIEL: As a general rule, no, I don't think so. There may be an isolated case where a utility has gone overboard perhaps but don't know of any. No.

I'm not a human factors person, but from my limited exposure to it, I don't think you can provide the operator with enough information on what things are.

Too often it's not that there's too much but that there is too little. He just doesn't have enough information to tell what him what this particular thing is or isn't.

That was a big part of what the DCRDR review was all about, to make sure that there were appropriate labels and that things were arranged in a kind of systematic way so that he could follow indications and controls in a more concerted manner without having to go over here and go over there and get lost, this kind of thing.

MR. IBARRA: From a human performance issue, is communications in an emergency very important or what is your thoughts on this?

We have situations where people lost communication.

MR. WERMIEL: Communication in an emergency is absolutely essential and I think it's one of the most important areas, if not the most important thing that we do is concern ourselves with crew communication.

MR. IBARRA: What are the regulations and the guidelines for that?

MR. WERMIEL: I don't know that there are any. I'm certainly not aware of any regulations.

The real test of crew communication is during requal examinations when we put the crews in the simulator and we run them through the EOPs, exercise them on the EOPs. That's where we find problems and that's where we deal with those kind of issues.

Inter-crew communication is a major part of what we dod when we conduct requal. It's a large part of it. If they're not communicating, they probably won't get through the scenarios very well and we'll end up with failures as a result.

I don't believe there is any specific regulation or criteria at all on how to communicate or what to communicate.

I know there are techniques that improve communication. My guys tell me all the time about how you can better communicate during emergency situations and the kinds of things that work better when we do run these crews through requal and why certain crews have trouble with communications.

It's a subjective thing and it is extremely important because you've got to be able to tell everybody on

the crew what you know so that they all know.

MR. JORDAN: How about the communications systems, not the ability to communicate but in-plant communication systems?

MR. WERMIEL: In-plant communication systems? I don't know a whole lot about them. They are very important. There is no question about that.

MR. JORDAN: Do we have anything out to the industry as far as the need for them?

MR. WERMIEL: We do. There's an SRP section on communication systems. It's section 9.5.2, I think, something like that, and there is guidance in there on the kind of communications systems that ought to be in the plant.

It's also extremely important because oftentimes when you're in an emergency situation, particularly say if there's a fire or some external threat, you need to have somebody outside the control room communicating with the control room, or when you're going to take a recovery action or take some LOCA actions as called out in your procedures, you've got to be able to communicate effectively with the control room and there is guidance on the design of those systems, power supplies and all that kind of stuff but that's not my area. I'm not real familiar with what that criteria says.

MR. JORDAN: How about some specifics on the EOPs, such as rod position indication particularly for boilers? Do we have any guidance or direction to the utility other than 1.97 that requires them to have any type of a reliability backup on those?

MR. WERMIEL: Not that I'm aware of. Not that I know of.

MR. JORDAN: Loss of rod position indication?

MR. WERMIEL: That should have been accounted for in the emergency procedure guidelines and it should have been factored into the appropriate emergency procedures.

MR. JORDAN: Do you know if it was?

MR. WERMIEL: Not offhand, no, not specifically.

MR. KAUFFMAN: Would you be concerned if there is an event and a loss of RPIS or RSCS and basically no way to tell rod positions other than the APRMs, source range monitors?

MR. WERMIEL: That's right. I wouldn't be concerned about rod position as long as I had some indication of flux within the core.

If I had source range or if I had intermediate range and it was working and I could rely on it, I wouldn't be as concerned. I'm never as concerned if I have a backup indication of some sort that I can rely on.

MR. JORDAN: And those backups, you expect those

backups to be backed up by a class 1-E type of instrumentation?

MR. WERMIEL: I would -- I hope our criteria for those backups counts for that kind of thing and again Reg Guide 1.97 I believe should have some guidance in there which would tell us that, yes, we can -- it's appropriately powered and we can rely on it.

I would have hoped -- I don't know that we thought about these things when we developed the criteria for what the power supply should be for that instrumentation but I would hope we did.

MR. JORDAN: Is that your section that does that, or your branch?

MR. WERMIEL: No.

MR. JORDAN: That's electrical?

MR. WERMIEL: Actually I&C I think, instrumentation and controls systems branch would definitely have looked at that.

MR. JORDAN: You expect them to look at the backup?

MR. WERMIEL: I expect -- maybe I should clarify that.

The analysis for the design basis of that which the reactor systems branch looked at should have identified the kinds of indications that the operator would need to

cope with the event.

Then the instrumentation and controls systems branch should have made judgments in their criteria about, because of the importance in working with reactor systems branch, what should be the backup power supply.

If this is a backup to another indication, then that backup ought to be on a reliable power source and I thought that's how the process worked when Reg Guide 1.97 was developed.

MR. JORDAN: When you defined reliable power source, are you talking about 1-E or are you just talking about UPS in general? What does you group consider are adequate backup power supply?

MR. WERMIEL: It depends but for the most significant evens it should be 1-E. It should be a reliable onsite source 1-E, fully safety-related.

There ought to be -- I ought to make one more statement. There ought to be 1-E indication of a minimum set that reactor systems branch says has got to be there for the operator to deal with that particular scenario, bottom line.

MR. JORDAN: Do we expect them to have indications down to cold shutdown, hot shutdown? Do we establish a position where --

MR. WERMIEL: I'm sure that for hot shutdown we

have established a position that there ought to be 1-E indication of everything that they need.

For cold shutdown, I don't know that I would be quite as concerned because probably I could take some actions, recovery actions, to recover power supplies for cold shutdown instrumentation.

Again, I don't know what the criteria says. I don't know that you need to have 1-E, though, all the way down to cold shutdown necessarily. I don't know what we call for.

MR. JORDAN: You do not know what's called for in the EOPs?

MR. WERMIEL: In the EOPs I don't believe it is called for. I don't know that 1-E indications of cold shutdown are called for.

MR. JORDAN: But for hot shutdown?

MR. WERMIEL: Hot shutdown, I believe so. I think so. That's my recollection, anyway.

MR. IBARRA: The EQ program, environmental qualification program, how did it affect your group as far as procedures are concerned?

MR. WERMIEL: I don't believe it affected -- A lot of that was done before I got to the branch but it shouldn't have had any impact at all.

Once again, back to what I was saying before, if

you're going to rely on instrumentation for an event where you have a harsh environment, the program calls for that instrumentation to be qualified and it was always that way and we would in our audits make sure the plant is not asking the operator to use equipment to cope with a LOCA that's not LOCA qualified.

We would hopefully, if there was a question we would try to pick that thing up. We would try to pick up situations where you can't rely on those indications because they're not LOCA qualified.

MR. IBARRA: Do you think there is adequate integration of all disciplines within the EOP as it stands today within the agency?

MR. WERMIEL: I think so. I think the EOP inspection program was very useful and was very successful. As a matter of fact, we've learned so much from those inspections that we are going to publish a revision to the previous lessons learned document from the EOP inspections and it's going to cover a wide variety of lessons learned, a wide spectrum of things.

We're working on that right now and we've met with the regions to discuss issues and findings from the EOP inspection program. I wish I could think of the reg number of the previous lessons learned document but I can't.

I think it was, as I say, quite a successful

program.

MR. JORDAN: Do you know of any indication or instrumentation or equipment in which we as an agency at the staff level or at your level felt should have been 1-E qualified and the industry took exception to it which then caused some type of interface between the two that said now it's got to be resolved at a higher level than yourself?

MR. WERMIEL: I'm not aware of any, no. It wouldn't surprise me if there were some but I don't know of any circumstances that came up like that because I was never involved in those reviews.

I hope you ask Joe Joyce about some of this because I know he was a big part of Reg Guide 1.97 implementation.

MR. IBARRA: What would be your involvement let's say in the licensing of Nine Mile Point? Can you just tell me typically on opening a new plant what your group would do?

MR. WERMIEL: What we would typically do with any new plant?

MR. IBARRA: Any new plant.

MR. WERMIEL: Sure. We're responsible for two sections of the standard review plan, a large part of Chapter 13.0 of the standard review plan, and Chapter 18 of the standard review plan.

Chapter 13 has in it the review of the applicant's procedures and training, management and organization and staffing questions. Chapter 18 is the review of the man-machine interface, specifically the SPDS and the control room design review.

That would be the bulk of human factors assessment branch review for a new plant. That's the kind of thing we're doing right now in our review of the proposed standard designs, the new standard designs.

MR. JORDAN: When you do your design review, is it strictly just how it's laid out, availability, access to the equipment, instrumentation?

Can you give me an idea of what all you people look at, or do you look in depth and say where the instrumentation is powered from, how many pieces of instruments are powered off of the same, so if you lost one source of power this group of instruments are going to be gone and now they're going to have to rely on something separate from that?

MR. WERMIEL: It's the former, not the latter. We don't get into these questions of backups and power supply availability and that kind of thing. It's what I'll call a classical human factors type review.

We look to see that there are some analyses that have been done to confirm that the indications are in the

right place and that the operator can utilize them and that there is good labeling and good identification of controls and that they are laid out in a systematic way, that kind of thing.

We don't really get into what I would characterize, I guess, as review of the backup capability and backup sources of power, that kind of thing. We don't do that.

MR. IBARRA: In our review of training, do you envision them losing annunciators?

MR. WERMIEL: Oh, yes.

MR. IBARRA: Balance of plant equipment?

MR. WERMIEL: Absolutely. The procedures themselves provide guidance for those kind of situations an the training is supposed to be on those emergency operating procedures so the training should cover those kind of eventualities. Oh, yeah. Sure.

Those are also situations that are easy to simulate in the simulator. You can turn off the annunciators very easily and see how the operator copes with that in the simulator.

MR. KAUFFMAN: I just have one more EOP question. In a BWR if you're in the EOP for pressure control and the operators are running RCIC, would you expect reactor pressure to remain stable there while they're running RCIC

for level control?

My own expectation is that it depends on the decay heat.

MR. WERMIEL: Yeah. If decay heat is going down, sure, then he's going to have to cut back or he's going to over-cool.

You're speaking of initially in the --

MR. KAUFFMAN: Yes.

MR. WERMIEL: Yeah, initially it should stay stable, sure, but as he gets further down he's going to have to cut back on his flow or he's going to over-fill or over-cool.

MR. KAUFFMAN: Okay. If we're in the ATWS mitigation parts of the procedures and are using RCIC to inject and not depressurize until we have rods in, I guess what would you expect the operator to do? Do you expect him to shut down his IVs to keep from cooling down, terminate RCIC injections?

MR. WERMIEL: Oh, no. I expect him to keep RCIC on but he does not have -- He's not confident that he's got the rods in. Are you saying this an ATWS scenario?

MR. KAUFFMAN: Yes.

MR. WERMIEL: He's already initiated standby liquid control.

MR. KAUFFMAN: He has not at that point because he

hasn't reached high suppression pool temperature.

MR. WERMIEL: Okay, so he's not quite there yet and he doesn't know whether he's going to be able to get the rods or not.

MR. KAUFFMAN: Right.

MR. WERMIEL: Okay, so what would I expect him to do?

MR. KAUFFMAN: I guess we're saying what we reviewed when we reviewed this event is we have different steps that basically one is keep water in, the other one is saying don't decompressurize, and I guess our question is which one overrides, which one is most important and should there be contingencies there that tell him what to do.

MR. WERMIEL: I think there should have been some contingencies to tell him what to do. If there aren't, maybe that's something that was missed. Frankly, I would think it would be more important that he continue to maintain flow, RCIC, particularly under those situations if the rods are not in.

If he's not confident the rods are in, then he's still with power so he needs to have the flow. That would be my judgment, although I'm not an operator.

You're saying though that he really wasn't clear what he should be doing, huh? He shouldn't be depressurizing yet?

MR. KAUFFMAN: They had APRM downscaling it and SRMs upscale.

MR. WERMIEL: He was getting conflicting information?

MR. JORDAN: He had no rod indications, none.

MR. WERMIEL: So he didn't know that they were in.

MR. JORDAN: All he had was flux indications.

MR. WERMIEL: And flux was telling him --

MR. KAUFFMAN: Source range monitors were reading. He had maintained level and he uses RCIC. The question is if he loses RCIC he's going to decompressurize, he's going to cool down.

MR. WERMIEL: He's got to right at that point.

MR. KAUFFMAN: If he doesn't use RCIC the options are he closes the MSIVs to stop any type of flow and he's still making cooldown.

MR. WERMIEL: Yeah. If he shuts down his IVs he will collapse the voids.

MR. JORDAN: We don't know if we looked into that area or if the vendor has even looked into that area when they did their EOP design.

MR. WERMIEL: I'm not sure that they did. I don't know. I would be surprised if the emergency procedure guidance didn't account for this kind of a situation. Maybe not --

MR. JORDAN: It's not clear.

MR. WERMIEL: It's not clear that it did.

MR. JORDAN: It's not clear. It may have subtly by the direction that it gave but it's not clear looking at the EOPs that that is there.

MR. WERMIEL: I see.

MR. JORDAN: That if you are now subcritical but if you continue to cool down you may go critical, do you go ahead and continue to cool down if you don't know --

MR. WERMIEL: If you don't know that the rods are in. It strikes me if I didn't know the rods were in, I would want to maintain flow at all costs.

MR. JORDAN: That's the thing. If that's in there, it's in there very subtly.

MR. WERMIEL: I see.

MR. JORDAN: It's not clear that says this is why you want to do this even if you have the ATWS and it's subcritical you may go critical again but go ahead and use RCIC anyway even if you do cool down. That's not clear in the EOPs.

MR. WERMIEL: I see. It should have been.

MR. JORDAN: Using RCIC without sufficient decay heat or without having a critical reactor, you're probably not going to get heat out of it, so therefore the question is with the EOPs would you expect him to go ahead and use

RCIC anyway and continue to cool down and maintain flow?

MR. WERMIEL: I would say so. What would be wrong, even if decay heat is go down, with continuing to use RCIC. So it over-cooled a little bit. What's the --

MR. JORDAN: It's not allowed by the EOPs.

MR. KAUFFMAN: It says don't depressurize until all the rods are in.

MR. WERMIEL: It says make sure rods are in. There is kind of a conflict here so he's in kind of a quandary is what you're saying.

MR. JORDAN: Which is more important -- don't cool down or maintain level?

MR. WERMIEL: Maintain level. I don't know if I would be that concerned about over-cooling a little or over-filling a little. Over-filling, maybe, but not over-cooling. I could still maintain level. I would do that.

MR. KAUFFMAN: There's a concern with over-cooling in that that adds positive reactivity.

MR. WERMIEL: That's true, too, but that's a minor concern, isn't it? I mean that comes farther down. That would be pretty far down in decay heat before that becomes a problem, doesn't it?

MR. JORDAN: I don't know.

MR. WERMIEL: I don't know, either, but I would think so.

MR. JORDAN: Not being a systems engineer, all I know is what the EOPs say.

MR. WERMIEL: I can see where you would be concerned but I think I would be more worried about damaging the fuel. Maintain level is what I would do.

MR. JORDAN: But you don't have any problem where that's been identified before, either?

MR. WERMIEL: Not that I'm aware of, not as a specific technical issue. Somebody from reactor systems branch would be a better person to ask about that, somebody from Bob Jones' shop.

How did they resolve the dilemma, incidentally? They just kept going? Good.

MR. JORDAN: Do you know if the IRM -- maybe you're the person or maybe not -- Do you know if the IRM, the drive mechanisms, are 1-E qualified?

MR. WERMIEL: I don't think so, no. I don't believe they are. Just the -- I don't know for sure but I don't think they are. Somebody else would be a much better source of information on that. I don't think they are.

MR. JORDAN: I think 1.97 qualified I guess is the proper terminology.

MR. WERMIEL: There's a lot of strange terminology in 1.97, this and that.

MR. JORDAN: I don't have any more questions.

Does anybody have any more?

We'll go off the record.

(Whereupon the matter concluded at 1:18 p.m.)

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: IIT Interview of Jared Wermiel

DOCKET NUMBER:

PLACE OF PROCEEDING: Bethesda, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Marilynn Estep

Official Reporter
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ERRATA SHEET

ADDENDUM

Page	Line	Correction and Reason for Correction
6	14	"outside power" should be "offsite power"
18	3	"implementation and control" should be "instrumentation and control"
21	9	Add the word "it" prior to "an awful lot..."
29	3	Add the word "I" prior to "don't know..."
29	6	Change "enough" to "too much"
33	23	Change to read "The analysis for the design basis events which the ..."
40	21	Add the word "is" prior to "an ATWS..."
41	4	Add the word "in" prior to "or not."
42	17	Change to read "If he shuts the MSIV's he ..."
44	3	Change the word "go" to "going"

Date 9-20-91 Signature /s/

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
INCIDENT INVESTIGATION TEAM

INTERVIEW OF)
)
JARED WERMIEL)
)

Nuclear Regulatory Commission
The Woodmont Building
8120 Woodmont Avenue
Bethesda, Maryland
Friday, August 30, 1991

The above-entitled interview convened, pursuant to notice, in closed session at 12:15 p.m.

PARTICIPANTS:

MICHAEL JORDAN, NRC/IIT TEAM
BILL VATTER, NRC/IIT TEAM
JOSE IBARRA, NRC/IIT TEAM
JOHN KAUFFMAN, NRC/IIT TEAM

P R O C E E D I N G S

MR. JORDAN: Good morning. This is August 30th at approximately 12:15. We are here talking and having a discussion about an event that happened on August 13th at Nine Mile Unit 2.

Jerry, why don't you go ahead and tell us what your background is, what your experience right now is and what your current position is and the type of activities of and responsibilities of that position.

MR. WERMIEL: Sure. I'm currently the branch chief of the human factors assessment branch in the division of licensee performance and quality evaluation, Office of Nuclear Reactor Regulation.

As such, we are responsible for those regulatory activities that deal with human performance, emergency operating procedures, training, man-machine interface questions, questions of staffing, all issues that relate to proper performance of the operations staff at a nuclear power plant.

I have been in this position now since May of 1990. Prior to that I was in the plant systems area as a section chief and prior to that as a reviewer.

My background is primarily in the support, reactor support systems area and in balance of plant systems area.

I am an engineer. I'm not a psychologist and my

background is primarily in fluid systems.

I joined the NRC in March of 1978 and have been with the agency since that point.

MR. JORDAN: I guess we should at least introduce for the record who we are. My name is Michael Jordan. I'm with the USNRC out of Region 3. I'm a section chief for boiling water reactors and operator licensing.

MR. VATTER: I'm Bill Vatter and I'm on loan to the IIT from INPO.

MR. KAUFFMAN: John Kauffman out of NRC headquarters.

MR. IBARRA: Jose Ibarra from the instrument controls systems branch of NRR.

MR. WERMIEL: Does anybody have a particular question they want to start out with?

MR. IBARRA: Jerry, who reviewed the EOPs in the agency, the EOPs coming out of Three Mile Island, or after Three Mile Island?

MR. WERMIEL: By who you mean what individual?

MR. IBARRA: What branch.

MR. WERMIEL: Programmatic responsibility for the review of the emergency operating procedures is with the human factors assessment branch and that would have been the responsibility that they had. The actual review was conducted as part of the emergency operating procedure

inspection program.

In other words, the region was responsible for conducting an EOP inspection that was supported by headquarters of the procedures at the plant. That review was primarily to confirm implementation of commitments that were made after TMI with regard to incorporation of the new emergency procedure guidelines, the writer's guide, the proper verification and validation of the procedures, all those sorts of things.

That's all included in this emergency operating procedure inspection program. I believe it's Manual Chapter 41500, I think is the actual inspection module that's involved here.

MR. IBARRA: In that review, who would be the technical contact? Who would look at instrumentation and controls and electrical systems?

MR. WERMIEL: There would be members on that team that would have expertise in the technical areas and I believe there should have been some expertise on the team in I&C, although that may not have been a specific area that's called out, and there is also expertise on the team in the human factors area so we have both technical experts and human factors people on those teams.

There isn't, as I recall, a specific requirement that there be an electrical -- a person with electrical

background on that inspection team. There usually is somebody with systems understanding or systems experience, mostly reactor systems experience.

MR. IBARRA: How about as far as computer systems, SPDS and so forth, as they relate to the EOP?

MR. WERMIEL: A human factors person may have some knowledge of SPDS, of the DCRDR review, but the review from the human factors perspective is primarily a verification of the usability of the procedure -- is the procedure laid out in a way that the operator can appropriately implement it, does it have all the information the operator needs to take the actions he needs to take, is it sequenced in a way where if he follows it he'll be doing the right thing, that kind of a look.

We don't do that I'm aware of any kind of a direct check of how the SPDS was incorporated in the procedures or that sort of thing. It's more -- at least from the human factors perspective, it's more a verification that the writers guide which provide guidance on how to make these a user-friendly procedure, has it been implemented properly and are these indeed procedures that the operator if he follows successfully will lead him down the right path, will work right.

MR. IBARRA: If we were looking at the instrumentation that the operator is using to carry out his

task, how do we link up that with the qualification of that instrument being able to know that it does survive under the conditions that he would be using it?

MR. WERMIEL: Okay. That would not be done procedurally, not in the EOP procedure per se. It's the -- I would assume and it is my understanding that the people writing the procedures know what instrumentation is qualified and what can be relied on for the various scenarios so when they develop the procedures they will know that whatever indications or controls that they are asking the operator to utilize to conduct the necessary steps are indeed available -- in other words, they are powered from an available power source if the procedure involves a loss of outside power, they are environmentally qualified if the procedure is steamline break or a LOCA procedure so the operator doesn't have to concern himself with that.

In other words, the basis for the procedure and the equipment that's being called out has already been checked. It's been verified and validated that this is equipment that's available and can be used for the particular accident or transient situation that he's in.

MR. JORDAN: When you say procedure, you're saying the utility's procedure review of it or our guidelines or the industry's guidelines?

MR. WERMIEL: We call for that. It's up to the

utility to make sure that the procedure writer is doing that.

MR. JORDAN: Do we identify what instrumentation we expect to be qualified?

MR. WERMIEL: Sure.

MR. JORDAN: Do we tell them which instrumentation we expect to have on 1-E course of power and --

MR. WERMIEL: As far as I know. I&C isn't my area. I would hope that Scott Newberry could help you out there but it's my understanding is absolutely. Reg Guide 1.97, for example, is a set of instrumentation that's supposed to be available to follow the course of an accident and that instrumentation has certain power supply criteria associated with it.

MR. JORDAN: So your group relies on the I&C's people to identify what instrumentation will be available for use in the EOP?

MR. WERMIEL: Right. That's correct, and then we would assume that once the utility knows what instrumentation they are taking credit for to satisfy the criteria, that the procedure writer then incorporated it in the procedure and doesn't tell the operator to rely on something that isn't appropriately qualified for the event that he's to deal with.

MR. JORDAN: So we leave that up to the utility.

MR. WERMIEL: Right. Sometimes we will identify circumstances where we will question the instrumentation or the -- we don't deal with the word "instrumentation" as much as "indications."

The indications that the operator is to rely on, we may question it. We may say you're telling him to rely on this, is this something that he can rely on, is it going to be available, and even if it is, is it something that's been appropriately qualified.

During the inspection we may catch that. We may ask about that as part of our -- it comes out of the verification and validation work. It may come out of that.

MR. IBARRA: But it is part of the EOP program, right?

MR. WERMIEL: It may, yes, may come out.

MR. IBARRA: Other than the inspection program, do we have other mechanisms within the agency that would look -- other than that inspection?

MR. WERMIEL: We do periodically under certain circumstances look at operating procedures, yes, for other reasons.

The EOP inspection program I'm speaking of is a generic program that went on for several years but on a periodic basis we're asked to look at certain aspects of procedures or procedural steps to verify that they are

appropriate and they'll do what the utility claims they'll do.

We're doing that right now, for example, for Yankee Rowe and this question of the embrittled reactor vessel. The utility was asked to modify their procedures to do some things that would reduce the likelihood of a pressurized thermal shock incident and they made some procedural changes and we are now looking at those changes to confirm that they will indeed -- first of all, that they make sense for the intended purpose and that they can indeed be accomplished the way the utility intends them to be accomplished.

We don't do that very often but we do get requests to do that sort of thing in certain cases.

MR. IBARRA: Do you supply support to the DCRDR audits and the SPDS audits? Is that within your group?

MR. WERMIEL: Absolutely, yes. Yes. That was a big push for quite a few years within this branch that I'm in now.

When I got into the branch, those two programs were nearly complete and since the time I've been there we have completed the DCRDR reviews and the SPDS reviews but that was an ongoing program for many, many years within the human factors assessment branch.

MR. VATTER: Jerry, can you tell us how you go

about doing a human factors inspection for procedures?

MR. WERMIEL: Sure. Typically the region will -- Let me use the last plant as an example.

We just right now as a matter of fact, as we speak they are completing the final inspection of Perry, the last plant that's to undergo the full EOP inspection -- emergency operating procedure inspection.

The region will identify the schedule for completion of those inspections. They will identify the people that they believe they need to accomplish the inspection in accordance with the inspection module that I mentioned.

If they need expertise from headquarters or support they will contact us and we will provide them either contractor technical assistance or somebody from my staff.

In certain cases, people from my staff have actually gone on inspections but generally we'll provide a contractor assistance from one of our contractors.

Then the team goes out and conducts the inspection and in the course of conducting the inspection I'll get feedback or the section chief who works for me will get feedback from the team.

When the inspection is completed and the report is written, we'll get copies of the report and if there's any additional followup, either a followup inspection or

followup of closing out certain open items, we may again be contacted by the region for assistance.

Often on an EOP followup inspection, we will again be asked to provide contractor assistance, not usually for closing out open items but sometimes we are asked to help out for that, too.

MR. VATTER: What sort of techniques do the inspectors use to make sure that the human factors are okay?

MR. WERMIEL: I'm not real familiar with the details because I haven't been involved in an actual inspection and my staff has been doing this for many more years than I've been involved.

Generally, we have guidance. It's in a NUREG and I wish I could think of the number. We have guidance on how to conduct a human factors assessment of EOPs, what to look for in the writers guide, what to look for in a V&V program, what to look for in a walkthrough, what to look for when we ask the utility to simulate the procedures by a simulator scenario evaluation. It's all pretty well spelled out.

MR. VATTER: So you do observe some simulator scenarios --

MR. WERMIEL: Yes, we do.

MR. VATTER: -- and procedures?

MR. WERMIEL: Yes. That's called out in the EOP inspection module that we actually have them exercise the

EOPs in the simulator so that we can get some firsthand knowledge of how the operators do using them.

We usually leave it up to the utility to select what crew or what teams they want to put in the simulator to run it through for us and we often get some pretty substantial feedback from that, some pretty good insights from that.

MR. JORDAN: Do you have any guidance -- You mentioned 1.97 Reg Guide.

MR. WERMIEL: Yes.

MR. JORDAN: Do you have any guidance that says in order to perform the EOPs, in order to get through any particular step in the EOP that you've got to have something that's qualified to 1.97, or is it just --

MR. WERMIEL: I don't know that we get that specific, Mike. I believe it really is more a check on whether or not the utility was aware that they needed to make sure that when they wrote the procedure, as part of that, the person who did it knows that he can't be asking an operator to use equipment that isn't qualified.

If he's writing a LOCA procedure or a LOCA recovery, the equipment has got to be environmentally qualified and he can't be asking the operator to rely on indications that are not because he'll get --

MR. JORDAN: Is that in the guidelines or is that

in -- where have we transmitted that to the utility?

MR. WERMIEL: I don't know that that is specifically spelled out in the guidelines. I would have to go back and look for you. We could do that. I don't know that I've ever seen that.

What I think is called out is a more general statement that the procedure writer as part of his V&V verifies the availability of indications and controls, that kind of thing.

MR. JORDAN: That's in the guidelines?

MR. WERMIEL: I believe it's in the guidelines on V&V, yes.

MR. JORDAN: And the guidelines come from us or from the industry?

MR. WERMIEL: From us.

MR. JORDAN: From us?

MR. WERMIEL: Yes.

MR. JORDAN: Our guidelines to the industry on how to write EOPs?

MR. WERMIEL: That's correct.

MR. JORDAN: And in there you think there's a section that says make sure that they have --

MR. WERMIEL: I sure do think so because I know it's part of what we consider. I just don't know how explicit it is.

MR. IBARRA: The team member on this inspection team, would he be knowledgeable in all the programs to be able to make that assessment?

MR. WERMIEL: He would -- The human factors person may not be but somebody on the team would know what environmental qualification means and ought to be able to judge, yes, that when the utility tells him we are utilizing 1.97 instrumentation that indeed they are using 1.97 instrumentation.

In other words, he would be familiar enough with what that means to at least be able to judge that, yeah, the utility was doing it right. I would think so, yes.

MR. IBARRA: What does the term important to safety as far as EOP tasks are concerned, what does that mean to you? Does that carry any significance whatsoever?

MR. WERMIEL: It certainly did from a hardware perspective in my previous life, but when you deal with people it doesn't mean a thing.

All the old terminology that I'm familiar with -- important to safety, safety-related, safety grade -- doesn't mean a thing when we talk about people. We throw out all that stuff -- single-failure criterion -- doesn't mean a thing.

We basically rely on the operating procedures and the operator's training to ensure that he'll do the right

thing. We don't I guess grade his performance. We just assume he's going to do the right thing if his procedure is okay and his training supports it.

MR. IBARRA: Every time there is a revision to the procedure, how do they take care of it? Do they re-review it?

MR. WERMIEL: Not as a general rule. We do not, no. Once we've confirmed that the writers guide and the program, the V&V program and all that kind of thing, is acceptable, we would assume that any subsequent revisions would be done in accordance with their procedure revision program that we looked at and therefore we would expect that it would be okay.

The questions may come up but again they would be isolated. Unless it was part of an EOP followup, we wouldn't get involved. We wouldn't oversee frequent changes to th emergency operating procedures.

MR. JORDAN: How do vendors propose changes? You're talking about the site changes. What about the --

MR. WERMIEL: If the emergency procedure guidelines are changed, and particularly if there is a substantial change, then I would expect that we would be reviewing that, yes.

MR. IBARRA: Things like three years ago, four years ago, when CE changed their philosophy on the number of

reactor coolant pumps?

MR. WERMIEL: That would be reviewed. No question in my mind those kind of things because they go to the --

MR. JORDAN: Do you review those things?

MR. WERMIEL: Not the thermal hydraulic or the technical adequacy of that but if there is anything that results from that that changes the operator's indications or the actions the operator takes, yes, we might get involved.

From a thermal hydraulic standpoint, though, and the technical adequacy of that, the reactor systems branch would do that.

MR. JORDAN: Do you then look at whether or not performance of the steps and the actions that you would expect from the operators is adequate?

MR. WERMIEL: That's right. We sure would, particularly if there were new indications involved or new actions the operator was to take, then we would probably get involved.

MR. IBARRA: In your normal review, whatever your group function would be as far as procedure is concerned, does the electrical systems branch and the I&C branch, are they all in concurrence on those?

MR. WERMIEL: If -- On almost everything we do that involves EOPs from a technical adequacy standpoint, we get the reactor systems branch involved. I can't think of a

case where we've gotten instrumentation and control or electrical involved and that may be only because the kinds of changes that we're talking about didn't affect the power supply or the instrumentation.

Usually the process works that the request or the need for the change goes through reactor systems branch and they farm it out to us and the other review branches and I'm trying to think whether --

I would assume that if there's a change in instrumentation that would affect them that I&C would be involved or a power supply question that the electrical branch would be involved. I just can't think of an instance where that's happened.

MR. IBARRA: Who makes that determination of who's going to be on concurrence and who will be supporting whom?

MR. WERMIEL: If it's a licensing change, it goes to the project manager and then the project manager would parcel it out to the appropriate technical branches for review.

MR. IBARRA: Okay, and the branches themselves might ask for additional support and then it will be up to them?

MR. WERMIEL: Absolutely, and oftentimes when we get a request, if we're not confident that reactor systems branch has seen it, because they need to, we'll make sure

they do see it.

Those are the examples I can think of. I can't think of cases where implementation and control or electrical were ever involved because we needed them to be involved.

MR. IBARRA: We see that Reg Guide 1.97 is an instrumentation issue but have you all supported -- Did you all have any input whatsoever into --

MR. WERMIEL: The review of Reg Guide 1.97? No. No, we didn't.

MR. IBARRA: How about any other instrumentation dealing with, let's say the tech specs instrumentation that's in there as far as they relate to the procedures, is there a link there somewhere?

MR. WERMIEL: Not that I can think of, no.

MR. IBARRA: When you review SPDS, do you typically ask for I&C support?

MR. WERMIEL: Yes. Typically those reviews had both an I&C input and a human factors input, yes, particularly from the standpoint of isolation of the power supply to the SPDS. Since it was not on a 1-E bus there was some concern about making sure that if SPDS should fail that other instrumentation that the operator would rely on would not fail.

Since a lot of the indications on SPDS are the

same indications that you would rely based on Reg Guide 1.97, a lot of them are the same, whereas the one that's a non qualified component, the other should be.

MR. IBARRA: Would your group be concerned that, for instance, SPDS is not safety-related and it would go down in an emergency?

MR. WERMIEL: We are not concerned so long as we are confident that there's a backup, a reliable backup. We think from a standpoint of the high level display that the SPDS is a real good operator aid and as long as it's available it will probably be easier for him to do a lot of things and get a lot of information from SPDS, but if it goes down we're confident that there are other indications that the operator would have to allow him to get through the EOPs just fine.

MR. IBARRA: Is there a concern when the operators lose annunciators and a lot of the backup instrumentation, not necessarily the safety-related?

MR. WERMIEL: Sure. There is always a concern where -- at least in our minds -- where if the operator has only, say, one indication of something or one channel of indication of something, that he may feel more hesitant to rely on it because he can't verify it by looking at something else.

There is always the desire to be able to confirm

an indication by looking at something else or even inferring that he's doing the right thing by some indication so the more you lose, oh, yes, definitely we would be a little more concerned that the operator may be more apprehensive about what he's doing because he has to rely so much on a single indication or a much smaller set of indications. Sure that's a concern, no question.

MR. JORDAN: SPDS usage, do you expect the operators to use it or is that more of a transition aid for those that are external to the control room to know what's going on?

MR. WERMIEL: We expect the operators to use it.

MR. JORDAN: So the loss of it is more of an operational, control and operational problem than a TSC or offsite management control of the event?

MR. WERMIEL: Yeah, I would say so.

MR. JORDAN: Is that what we would expect?

MR. WERMIEL: That's what I would expect. I would also expect, though, that the training the operator gets would be conducive or he would know what to do if he loses SPDS. I mean he ought to be relying on it. It's there for him.

MR. JORDAN: Do we find in our inspections that most operators rely on SPDS or do they go -- in an event or their training in their scenarios, do the normally go

directly to the indication rather than the SPDS?

MR. WERMIEL: No. Certain plants in particular really do rely on their SPDS. They really like it because they've tailored it the way they want it to be and they really like it the way it is and they want their operators to use it because they've gone out of their way to design it to be a real aid to the operator.

Some of the plants over the years have relied on an awful lot less than we think they ought to. I think in general, and this is based strictly on hearsay that I've heard from other people, I think in general industry is relying on it a lot more than they used to and a lot more than they thought they would originally.

MR. JORDAN: And you're talking about the control room operators, not just external to the control room.

MR. WERMIEL: Control room operators. No, I'm not talking about the guy, the plant superintendent who comes in during the event and wants to get a picture of what's going on and looks at the panel, no. I'm talking about the operating crew.

MR. VATTER: Is there one or more reactor types that are more that way, where the SPDS is used more?

MR. WERMIEL: I don't think it's a function of reactor type so much as it's more utility philosophy.

I got in, remember, on SPDS reviews at the very

end and I wasn't really a large part of a lot of that review effort. There is a person on my staff who was involved intimately with all the SPDS reviews for many, many, many years. That's Dick Eckenrode, one of my two section chiefs. He knows an awful lot about what happened during those inspections.

MR. IBARRA: Would it concern you if a lot of the indications or reliance on indications on instruments that would be off of UPS?

MR. WERMIEL: Nonsafety UPS?

MR. IBARRA: Yes.

MR. WERMIEL: Would it concern me? As long as the reliance was for situations where UPS was available, I wouldn't be overly concerned about it. I would be more concerned if they were relying on it for cases where they couldn't rely on it or they shouldn't be relying on it.

I think in general that's a pretty good system. It's got a lot of information on it that the operator could use.

Once again, it gets back to what I was saying before, as long as we're confident there's a backup and the operator knows what to do for those situations where the guidance tells him he shouldn't be relying on it, I don't know that I'm too worried.

MR. JORDAN: Have we as an agency checked to make

sure there is a backup? For all the parameters that are required either by the EOPs or by the SPDS, that there is some type of 1-E instrumentation that would be available to the operators to rely on?

MR. WERMIEL: It was my understanding that that's what Reg Guide 1.97 was supposed to be doing. It was supposed to be that minimum set that we could be confident would be available for -- I guess I should say it, for design basis events.

I don't know that we really have concentrated much on what to do if you're in a scenario that goes beyond the design basis, but for design basis events, that's what I thought that 1.97 instrumentation was all about.

MR. IBARRA: The work that was done after TMI's CRGR included a task analysis, functional task analysis, where they actually broke down the procedures and the instrumentation that would be used.

MR. WERMIEL: Yes.

MR. IBARRA: A lot of good work went into that. Has the industry kept up with that?

MR. WERMIEL: Yes, they have. As part of the DCRDR reviews that we do, we make sure that there is a program in place for subsequent upgrades to the panels and that kind of thing.

As far as I know, the industry in general is

pretty good about utilizing the same human factors principles when they go in and modify panels after the initial DCRDR review is done.

MR. IBARRA: So you would expect that as they do an EOP revision they would go and look at it?

MR. WERMIEL: Absolutely. Oh, yeah. They would go back and make sure that there is nothing that is missed with regard to changes on the panel and this kind of thing.

One thing I will point out, though. When it comes to modifications to control rooms, many plants are unable to get a lot of the old analog equipment that they had been used to and it had to buy newer digital technology and they are starting to mix some of the digital technology with the old analog equipment.

That has become a bit of a concern to us and we are trying to develop some criteria to deal with that now, but in general I don't know that I see a problem in the way they've been upgrading control rooms. We think in general they've been doing a pretty good job.

MR. VATTER: Jerry, you said something about instrumentation necessary to support the EOPs was supposed to be 1-E.

MR. WERMIEL: No, not necessarily. I think you heard it wrong. Instrumentation to support the EOPs should be geared to the particular scenario that you're in.

The EOPs deal with a spectrum of events. Some are relatively minor and they go all the way to core melt. You can get to core melt in some of the emergency procedure guidance that's out there.

The instrumentation needs to be geared to the particular set of circumstances and the EOP should be -- the guy writing the EOP needs to know that if he's dealing with a set of circumstances that's a result of loss of outside power, the instrumentation he's asking the operator to rely on has to be powered from an onsite source.

So you may start off with a certain set of indications that are powered from offsite sources and then you may end up with having to go back and check or verify plant status with different instrumentation because the symptom-based procedure has progressed to the point where the old stuff is no longer available and the procedure writer needs to know that.

He's telling the operator, hey, when you're verifying pressurizing level and you're using this instrumentation, it's the right stuff, it's powered from an onsite source and you shouldn't care whether or not you've lost outside power or not because I know you have and I've made sure that the instrumentation you're going to rely on is available.

Are you following me?

MR. VATTER: Yes. This time I am.

MR. IBARRA: Would you expect if you went to Newberry's group, the instrument control section, that their knowledge of the EOPs -- how would you characterize it -- good, bad?

MR. WERMIEL: Knowledge of the EOPs themselves?

MR. IBARRA: For instance, a question comes up on the right -- the use of some instrumentation, would they understand what the operator would be using it for? Would they have enough knowledge to understand?

MR. WERMIEL: Yes, sure. In other words, you're asking do they just concern themselves with the fact that there is an instrument and its power supply or what that instrument is used for?

MR. IBARRA: Both.

MR. WERMIEL: I think they do know both. I think they not only know what their criteria are for the qualification of that instrumentation but also what it's to be used for. They understand enough of the thermal hydraulics I believe to know why that instrumentation is important.

MR. IBARRA: What branch within the agency would look after the total integration procedures, qualification, instrumentation, human factors?

MR. WERMIEL: I don't know that there is an

overall integration. We all have our areas of specialty and then we would all write our evaluations based on our areas of expertise and then it would all get folded into one evaluation, usually by the project manager.

MR. IBARRA: If you are reviewing a procedure that unknowingly might call for some electrical expertise or I&C expertise, who would be able to catch that?

MR. WERMIEL: I would expect the human factors people in my branch would know if there was some question about the instrumentation that was being relied on because their experience would tell them that for the particular set of circumstances.

If the operator is being told to rely on something that's unfamiliar to them I think they would question it and then we would maybe ask the I&C people, hey, is this right, is this really, say, Reg Guide 1.97 indication or is it not, is it something that really shouldn't be there.

We have noted situations like that from EOP inspections.

MR. IBARRA: It's a little bit -- It's not heartening to know that sometimes you go into a control room and ask the operator what that label means and they don't understand what it means, especially Reg Guide 1.9.

MR. WERMIEL: Oh, yeah.

MR. IBARRA: Does that concern you?

MR. WERMIEL: It sure does.

MR. IBARRA: Is it typical?

MR. WERMIEL: Is it typical? I don't believe so, no. I believe from what we know of operator training that, particularly the training now being done with the newer certified simulators that the operators are very familiar with what's on the panel and what it means.

I would be very concerned if I was actually talking to a reactor operator and he told me that. I would be very concerned.

MR. IBARRA: The 1-E instruments they know very well and in fact the labeling there, but the Reg Guide 1.97 instruments which is a subset of all this has another label.

Do you find that operators do not understand what that extra label is or what that Reg Guide 1.9 indication means? Would that surprise you for them not to know?

MR. WERMIEL: It would surprise me for them not to know, absolutely. I can't say directly because I haven't asked operators and I really haven't heard any feedback on that. I would be surprised and it would bother my confidence if I heard that. Knowing the importance we placed on Reg Guide 1.97 instrumentation, that would bother me.

MR. IBARRA: Is there too much labeling in the control room?

MR. WERMIEL: As a general rule, no, I don't think so. There may be an isolated case where a utility has gone overboard perhaps but don't know of any. No.

I'm not a human factors person, but from my limited exposure to it, I don't think you can provide the operator with enough information on what things are.

Too often it's not that there's too much but that there is too little. He just doesn't have enough information to tell what him what this particular thing is or isn't.

That was a big part of what the DCRDR review was all about, to make sure that there were appropriate labels and that things were arranged in a kind of systematic way so that he could follow indications and controls in a more concerted manner without having to go over here and go over there and get lost, this kind of thing.

MR. IBARRA: From a human performance issue, is communications in an emergency very important or what is your thoughts on this?

We have situations where people lost communication.

MR. WERMIEL: Communication in an emergency is absolutely essential and I think it's one of the most important areas, if not the most important thing that we do is concern ourselves with crew communication.

MR. IBARRA: What are the regulations and the guidelines for that?

MR. WERMIEL: I don't know that there are any. I'm certainly not aware of any regulations.

The real test of crew communication is during requal examinations when we put the crews in the simulator and we run them through the EOPs, exercise them on the EOPs. That's where we find problems and that's where we deal with those kind of issues.

Inter-crew communication is a major part of what we dod when we conduct requal. It's a large part of it. If they're not communicating, they probably won't get through the scenarios very well and we'll end up with failures as a result.

I don't believe there is any specific regulation or criteria at all on how to communicate or what to communicate.

I know there are techniques that improve communication. My guys tell me all the time about how you can better communicate during emergency situations and the kinds of things that work better when we do run these crews through requal and why certain crews have trouble with communications.

It's a subjective thing and it is extremely important because you've got to be able to tell everybody on

the crew what you know so that they all know.

MR. JORDAN: How about the communications systems, not the ability to communicate but in-plant communication systems?

MR. WERMIEL: In-plant communication systems? I don't know a whole lot about them. They are very important. There is no question about that.

MR. JORDAN: Do we have anything out to the industry as far as the need for them?

MR. WERMIEL: We do. There's an SRP section on communication systems. It's section 9.5.2, I think, something like that, and there is guidance in there on the kind of communications systems that ought to be in the plant.

It's also extremely important because oftentimes when you're in an emergency situation, particularly say if there's a fire or some external threat, you need to have somebody outside the control room communicating with the control room, or when you're going to take a recovery action or take some LOCA actions as called out in your procedures, you've got to be able to communicate effectively with the control room and there is guidance on the design of those systems, power supplies and all that kind of stuff but that's not my area. I'm not real familiar with what that criteria says.

MR. JORDAN: How about some specifics on the EOPs, such as rod position indication particularly for boilers? Do we have any guidance or direction to the utility other than 1.97 that requires them to have any type of a reliability backup on those?

MR. WERMIEL: Not that I'm aware of. Not that I know of.

MR. JORDAN: Loss of rod position indication?

MR. WERMIEL: That should have been accounted for in the emergency procedure guidelines and it should have been factored into the appropriate emergency procedures.

MR. JORDAN: Do you know if it was?

MR. WERMIEL: Not offhand, no, not specifically.

MR. KAUFFMAN: Would you be concerned if there is an event and a loss of RPIS or RSCS and basically no way to tell rod positions other than the APRMs, source range monitors?

MR. WERMIEL: That's right. I wouldn't be concerned about rod position as long as I had some indication of flux within the core.

If I had source range or if I had intermediate range and it was working and I could rely on it, I wouldn't be as concerned. I'm never as concerned if I have a backup indication of some sort that I can rely on.

MR. JORDAN: And those backups, you expect those

backups to be backed up by a class 1-E type of instrumentation?

MR. WERMIEL: I would -- I hope our criteria for those backups counts for that kind of thing and again Reg Guide 1.97 I believe should have some guidance in there which would tell us that, yes, we can -- it's appropriately powered and we can rely on it.

I would have hoped -- I don't know that we thought about these things when we developed the criteria for what the power supply should be for that instrumentation but I would hope we did.

MR. JORDAN: Is that your section that does that, or your branch?

MR. WERMIEL: No.

MR. JORDAN: That's electrical?

MR. WERMIEL: Actually I&C I think, instrumentation and controls systems branch would definitely have looked at that.

MR. JORDAN: You expect them to look at the backup?

MR. WERMIEL: I expect -- maybe I should clarify that.

The analysis for the design basis of that which the reactor systems branch looked at should have identified the kinds of indications that the operator would need to

cope with the event.

Then the instrumentation and controls systems branch should have made judgments in their criteria about, because of the importance in working with reactor systems branch, what should be the backup power supply.

If this is a backup to another indication, then that backup ought to be on a reliable power source and I thought that's how the process worked when Reg Guide 1.97 was developed.

MR. JORDAN: When you defined reliable power source, are you talking about 1-E or are you just talking about UPS in general? What does you group consider are adequate backup power supply?

MR. WERMIEL: It depends but for the most significant evens it should be 1-E. It should be a reliable onsite source 1-E, fully safety-related.

There ought to be -- I ought to make one more statement. There ought to be 1-E indication of a minimum set that reactor systems branch says has got to be there for the operator to deal with that particular scenario, bottom line.

MR. JORDAN: Do we expect them to have indications down to cold shutdown, hot shutdown? Do we establish a position where --

MR. WERMIEL: I'm sure that for hot shutdown we

have established a position that there ought to be 1-E indication of everything that they need.

For cold shutdown, I don't know that I would be quite as concerned because probably I could take some actions, recovery actions, to recover power supplies for cold shutdown instrumentation.

Again, I don't know what the criteria says. I don't know that you need to have 1-E, though, all the way down to cold shutdown necessarily. I don't know what we call for.

MR. JORDAN: You do not know what's called for in the EOPs?

MR. WERMIEL: In the EOPs I don't believe it is called for. I don't know that 1-E indications of cold shutdown are called for.

MR. JORDAN: But for hot shutdown?

MR. WERMIEL: Hot shutdown, I believe so. I think so. That's my recollection, anyway.

MR. IBARRA: The EQ program, environmental qualification program, how did it affect your group as far as procedures are concerned?

MR. WERMIEL: I don't believe it affected -- A lot of that was done before I got to the branch but it shouldn't have had any impact at all.

Once again, back to what I was saying before, if

you're going to rely on instrumentation for an event where you have a harsh environment, the program calls for that instrumentation to be qualified and it was always that way and we would in our audits make sure the plant is not asking the operator to use equipment to cope with a LOCA that's not LOCA qualified.

We would hopefully, if there was a question we would try to pick that thing up. We would try to pick up situations where you can't rely on those indications because they're not LOCA qualified.

MR. IBARRA: Do you think there is adequate integration of all disciplines within the EOP as it stands today within the agency?

MR. WERMIEL: I think so. I think the EOP inspection program was very useful and was very successful. As a matter of fact, we've learned so much from those inspections that we are going to publish a revision to the previous lessons learned document from the EOP inspections and it's going to cover a wide variety of lessons learned, a wide spectrum of things.

We're working on that right now and we've met with the regions to discuss issues and findings from the EOP inspection program. I wish I could think of the reg number of the previous lessons learned document but I can't.

I think it was, as I say, quite a successful

program.

MR. JORDAN: Do you know of any indication or instrumentation or equipment in which we as an agency at the staff level or at your level felt should have been 1-E qualified and the industry took exception to it which then caused some type of interface between the two that said now it's got to be resolved at a higher level than yourself?

MR. WERMIEL: I'm not aware of any, no. It wouldn't surprise me if there were some but I don't know of any circumstances that came up like that because I was never involved in those reviews.

I hope you ask Joe Joyce about some of this because I know he was a big part of Reg Guide 1.97 implementation.

MR. IBARRA: What would be your involvement let's say in the licensing of Nine Mile Point? Can you just tell me typically on opening a new plant what your group would do?

MR. WERMIEL: What we would typically do with any new plant?

MR. IBARRA: Any new plant.

MR. WERMIEL: Sure. We're responsible for two sections of the standard review plan, a large part of Chapter 13.0 of the standard review plan, and Chapter 18 of the standard review plan.

Chapter 13 has in it the review of the applicant's procedures and training, management and organization and staffing questions. Chapter 18 is the review of the man-machine interface, specifically the SPDS and the control room design review.

That would be the bulk of human factors assessment branch review for a new plant. That's the kind of thing we're doing right now in our review of the proposed standard designs, the new standard designs.

MR. JORDAN: When you do your design review, is it strictly just how it's laid out, availability, access to the equipment, instrumentation?

Can you give me an idea of what all you people look at, or do you look in depth and say where the instrumentation is powered from, how many pieces of instruments are powered off of the same, so if you lost one source of power this group of instruments are going to be gone and now they're going to have to rely on something separate from that?

MR. WERMIEL: It's the former, not the latter. We don't get into these questions of backups and power supply availability and that kind of thing. It's what I'll call a classical human factors type review.

We look to see that there are some analyses that have been done to confirm that the indications are in the

right place and that the operator can utilize them and that there is good labeling and good identification of controls and that they are laid out in a systematic way, that kind of thing.

We don't really get into what I would characterize, I guess, as review of the backup capability and backup sources of power, that kind of thing. We don't do that.

MR. IBARRA: In our review of training, do you envision them losing annunciators?

MR. WERMIEL: Oh, yes.

MR. IBARRA: Balance of plant equipment?

MR. WERMIEL: Absolutely. The procedures themselves provide guidance for those kind of situations an the training is supposed to be on those emergency operating procedures so the training should cover those kind of eventualities. Oh, yeah. Sure.

Those are also situations that are easy to simulate in the simulator. You can turn off the annunciators very easily and see how the operator copes with that in the simulator.

MR. KAUFFMAN: I just have one more EOP question. In a BWR if you're in the EOP for pressure control and the operators are running RCIC, would you expect reactor pressure to remain stable there while they're running RCIC

for level control?

My own expectation is that it depends on the decay heat.

MR. WERMIEL: Yeah. If decay heat is going down, sure, then he's going to have to cut back or he's going to over-cool.

You're speaking of initially in the --

MR. KAUFFMAN: Yes.

MR. WERMIEL: Yeah, initially it should stay stable, sure, but as he gets further down he's going to have to cut back on his flow or he's going to over-fill or over-cool.

MR. KAUFFMAN: Okay. If we're in the ATWS mitigation parts of the procedures and are using RCIC to inject and not depressurize until we have rods in, I guess what would you expect the operator to do? Do you expect him to shut down his IVs to keep from cooling down, terminate RCIC injections?

MR. WERMIEL: Oh, no. I expect him to keep RCIC on but he does not have -- He's not confident that he's got the rods in. Are you saying this an ATWS scenario?

MR. KAUFFMAN: Yes.

MR. WERMIEL: He's already initiated standby liquid control.

MR. KAUFFMAN: He has not at that point because he

hasn't reached high suppression pool temperature.

MR. WERMIEL: Okay, so he's not quite there yet and he doesn't know whether he's going to be able to get the rods or not.

MR. KAUFFMAN: Right.

MR. WERMIEL: Okay, so what would I expect him to do?

MR. KAUFFMAN: I guess we're saying what we reviewed when we reviewed this event is we have different steps that basically one is keep water in, the other one is saying don't decompressurize, and I guess our question is which one overrides, which one is most important and should there be contingencies there that tell him what to do.

MR. WERMIEL: I think there should have been some contingencies to tell him what to do. If there aren't, maybe that's something that was missed. Frankly, I would think it would be more important that he continue to maintain flow, RCIC, particularly under those situations if the rods are not in.

If he's not confident the rods are in, then he's still with power so he needs to have the flow. That would be my judgment, although I'm not an operator.

You're saying though that he really wasn't clear what he should be doing, huh? He shouldn't be depressurizing yet?

MR. KAUFFMAN: They had APRM downscaling it and SRMs upscale.

MR. WERMIEL: He was getting conflicting information?

MR. JORDAN: He had no rod indications, none.

MR. WERMIEL: So he didn't know that they were in.

MR. JORDAN: All he had was flux indications.

MR. WERMIEL: And flux was telling him --

MR. KAUFFMAN: Source range monitors were reading. He had maintained level and he uses RCIC. The question is if he loses RCIC he's going to decompressurize, he's going to cool down.

MR. WERMIEL: He's got to right at that point.

MR. KAUFFMAN: If he doesn't use RCIC the options are he closes the MSIVs to stop any type of flow and he's still making cooldown.

MR. WERMIEL: Yeah. If he shuts down his IVs he will collapse the voids.

MR. JORDAN: We don't know if we looked into that area or if the vendor has even looked into that area when they did their EOP design.

MR. WERMIEL: I'm not sure that they did. I don't know. I would be surprised if the emergency procedure guidance didn't account for this kind of a situation. Maybe not --

MR. JORDAN: It's not clear.

MR. WERMIEL: It's not clear that it did.

MR. JORDAN: It's not clear. It may have subtly by the direction that it gave but it's not clear looking at the EOPs that that is there.

MR. WERMIEL: I see.

MR. JORDAN: That if you are now subcritical but if you continue to cool down you may go critical, do you go ahead and continue to cool down if you don't know --

MR. WERMIEL: If you don't know that the rods are in. It strikes me if I didn't know the rods were in, I would want to maintain flow at all costs.

MR. JORDAN: That's the thing. If that's in there, it's in there very subtly.

MR. WERMIEL: I see.

MR. JORDAN: It's not clear that says this is why you want to do this even if you have the ATWS and it's subcritical you may go critical again but go ahead and use RCIC anyway even if you do cool down. That's not clear in the EOPs.

MR. WERMIEL: I see. It should have been.

MR. JORDAN: Using RCIC without sufficient decay heat or without having a critical reactor, you're probably not going to get heat out of it, so therefore the question is with the EOPs would you expect him to go ahead and use

RCIC anyway and continue to cool down and maintain flow?

MR. WERMIEL: I would say so. What would be wrong, even if decay heat is go down, with continuing to use RCIC. So it over-cooled a little bit. What's the --

MR. JORDAN: It's not allowed by the EOPs.

MR. KAUFFMAN: It says don't depressurize until all the rods are in.

MR. WERMIEL: It says make sure rods are in. There is kind of a conflict here so he's in kind of a quandary is what you're saying.

MR. JORDAN: Which is more important -- don't cool down or maintain level?

MR. WERMIEL: Maintain level. I don't know if I would be that concerned about over-cooling a little or over-filling a little. Over-filling, maybe, but not over-cooling. I could still maintain level. I would do that.

MR. KAUFFMAN: There's a concern with over-cooling in that that adds positive reactivity.

MR. WERMIEL: That's true, too, but that's a minor concern, isn't it? I mean that comes farther down. That would be pretty far down in decay heat before that becomes a problem, doesn't it?

MR. JORDAN: I don't know.

MR. WERMIEL: I don't know, either, but I would think so.

MR. JORDAN: Not being a systems engineer, all I know is what the EOPs say.

MR. WERMIEL: I can see where you would be concerned but I think I would be more worried about damaging the fuel. Maintain level is what I would do.

MR. JORDAN: But you don't have any problem where that's been identified before, either?

MR. WERMIEL: Not that I'm aware of, not as a specific technical issue. Somebody from reactor systems branch would be a better person to ask about that, somebody from Bob Jones' shop.

How did they resolve the dilemma, incidentally? They just kept going? Good.

MR. JORDAN: Do you know if the IRM -- maybe you're the person or maybe not -- Do you know if the IRM, the drive mechanisms, are 1-E qualified?

MR. WERMIEL: I don't think so, no. I don't believe they are. Just the -- I don't know for sure but I don't think they are. Somebody else would be a much better source of information on that. I don't think they are.

MR. JORDAN: I think 1.97 qualified I guess is the proper terminology.

MR. WERMIEL: There's a lot of strange terminology in 1.97, this and that.

MR. JORDAN: I don't have any more questions.

Does anybody have any more?

We'll go off the record.

(Whereupon the matter concluded at 1:18 p.m.)

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

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DOCKET NUMBER:

PLACE OF PROCEEDING: Bethesda, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Marilynn Estep

Official Reporter
Ann Riley & Associates, Ltd.