Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

DISCUSSION OF GRAND GULF

DIESEL GENERATOR INSPECTION ORDER

PUBLIC MEETING

Thursday, May 25,]984

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

DISCUSSION OF GRAND GULF DIESEL GENERATOR INSPECTION ORDER

PUBLIC MEETING

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

Thursday, May 24, 1984

The Commission convened in open session at 10:05 o'clock, a.m.

COMMISSIONERS PRESENT

NUNZIO PALLADINO, Chairman of the Commission
THOMAS ROBERTS, Commissioner
JAMES ASSELSTINE, Commissioner
FREDERICK BERNTHAL, Commissioner

STAFF AND PRESENTERES SEATED AT COMMISSION TABLE:

S. CHILK
H. PLAINE
W. DIRCKS
H. DENTON
D. EISENHUT
G. CUNNINGHAM
J. ZERBE

AUDIENCE SPEAKERS:

M. HODGES
T. NOVAK
M. SRINIVASAN
G. WHITE

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P R O C E E D I N G S

CHAIRMAN PALLADINO: Good morning, ladies and gentlemen. Before we hold this meeting this morning, we need to vote to hold it on short notice and the meeting has to do with discussion of a diesel generator order issued by the staff on Grand Gulf. May I have a vote to hold this meeting on less than one week's notice?

COMMISSIONER ASSELSTINE: Aye.

CHAIRMAN PALLADINO: Aye.

COMMISSIONER BERNTHAL: Aye.

COMMISSIONER ROBERTS: No.

CHAIRMAN PALLADINO: Okay. We have three votes saying "aye."

The purpose of today's meeting is to discuss with the staff the rationale for the order issued on May 22, 1984, regarding diesel generator inspection at the Grand Gulf plant.

Specifically, I believe the Commission is interested in understanding the basis for allowing the plant to continue operation at power levels up to five percent while one diesel generator is undergoing inspection and, therefore, is inoperable.

I recognize the meeting was called on short notice. This was as a result of conversation late yesterday afternoon between me and other Commissioners. While the staff has not had a chance to prepare formal written material, perhaps they

could address the subject verbally for us.

I was interested in OGC being here because our discussion might touch on other cases, although Grand Gulf is uncontested, and I wanted OGC to monitor our discussions and read the transcript to see if any action is needed.

COMMISSIONER ASSELSTINE: Herzel is right behind you.

CHAIRMAN PALLADINO: Herzel, I was just getting to the point where I was saying that, while Grand Gulf is uncontested, our discussion might touch on other cases and I would like you to monitor the discussions, read the transcript, and advise the Commission if any action is needed on other cases.

Are there any other opening remarks by members of the Commission?

COMMISSIONER ASSELSTINE: I guess I have two questions based on a fairly quick reading of the information that we had available and the first is I have a question or concern about whether, in issuing the order that it did, the staff, in essence, has prejudged the question that will have to be considered as part of the review of any exemption request for the plant, without having either an exemption request from the licensee or without having a safety analysis from the licensee or without having a complete safety analysis by the staff. That is my first area where I have a question about what has been done.

The second area has to do with the relaxation of the limiting conditions for operation of the plant by means of this order. It is not clear to me what the public health, safety, or interest benefit is of relaxing the limiting conditions of operation and I also have a question about relaxing those conditions by order rather than by requiring the licensee to submit a license amendment and reviewing that in accordance with our regulations governing license amendments, which would include an analysis of whether those amendments, in themselves, involve significant hazards considerations. I guess I question the propriety of that approach by the staff as well.

Those are the two areas of questions that I have identified based on a fairly quick reading of the material.

CHAIRMAN PALLADINO: I think there is a related question and that has to do with what the procedural options the staff has with regard to an operating plant as opposed to one that doesn't have a license, and I guess -- well, maybe that's far enough for the question. Other questions or comments?

(No response.)

CHAIRMAN PALLADINO: All right. Can I turn the meeting over to Mr. Denton.

MR. DENTON: Let me just summarize the staff's activities on this application during the past month and I

will try to answer Commissioner Asselstine's questions and, if not, we have OELD here and the technical staff that can do so.

Our activities have been driven by the need to protect public health and safety. I would like to start with calling your attention to an order I issued on April 18. I would like the Secretary to just pass these out.

This was an order that amended immediately their low power license.

CHAIRMAN PALLADINO: This is an order dated when?

MR. DENTON: April 18. It is restricted conditions for operation.

As we have discussed with the Commission on many occasions, we found errors in the licensee's tech specs and we have a program underway to identify those. When we had identified those that I thought were required to make the low power license whole, I issued this order on April 18, to be effective immediately, and said the plant shall not operate unless this operation is conformance with required tech specs.

All these changes were to make the license more restrictive and they were intended to correct the inadequacies that had found to be in the license. I say that just by way of background to get into the issue.

Now, while we were reviewing the tech specs and even before that, the staff had concerns about the Transamerica Delaval diesels and we had had dealings with the industry. We

have indicated that our confidence in those was not as high as was required and we were reviewing the total owners' group program. We had a number of meetings with the Grand Gulf people on their diesel, we had our consultants from Battelle Northwest and their consultants meeting meeting with Mississippi Power and Light over the adequacy of their diesels and, on April 25, we sent the company a staff evaluation of the TDI diesel generator reliability for power operation at Grand Gulf. That package has been passed out.

In there, this says, "As previously discussed at the April 13 meeting and in several previous discussions, the staff has been unable to conclude that the proposed MP&L program for ensuring adequate diesel generator reliability is sufficient to support operation of Grand Gulf at power levels in excess of five percent power. We have concluded that your submittals to date do not adequately address existing technical concerns without further inspection for defective components in at least one diesel engine," and so forth.

So, when I sent that letter, I had already received the views of the Division of Safety Integration that operation at low power did not pose an unduel health and safety risk. We had looked at, from the moment the diesel concern had arisen, whether or not we should allow Grand Gulf to continue operation with these questions about their diesels and I had a written analysis from that group saying that there was no

unreasonable health and safety risk associated with operation at low power without reliance on these diesels. That was based on a preliminary look at the specific design of the plant and what was required at low power by the various accidents that could happen.

COMMISSIONER ASSELSTINE: Harold, that was the April 12 analysis from Roger Mattson to Darrell?

MR. DENTON: Yes.

COMMISSIONER ASSELSTINE: Okay.

MR. DENTON: The Company, in response to our April 25 memo, came back in several weeks later, still objecting to the staff's view. They had, in their response, said that the diesel is reliable to the first fuel cycle, that they should be allowed to operate at 100 percent power, that the first inspection could be deferred until the end of the first refueling cycle, and, if we were still concerned, they would make the alternative that they might do this inspection and repair somewhere in the start-up program.

We had their answer to our April 25 submittal reviewed by the staff and by our consultants. We disagreed with their view and we told them, in a meeting on May 18, the following: that our view was still the same; that these diesels must be inspected prior to exceeding five percent power; that their submittal did not demonstrate adequate reliability to meet General Design Criteria No. 17; nor

justify operation above five percent power.

We told them, at that meeting, that we had determined that the plant was safe for operation up to five percent power for some period but that period at five percent, that we were relying on the turbine generators and on the offsite power, not on the diesels and that the issue of the diesels needed to be resolved promptly.

This company keeps talking about meeting with the Commission for full power in the near future and I felt the need to resolve this diesel concern. I told them, one time, that it required an inspection and disassembly. They disagreed with me. I told that, consistent with the Shoreham decision, an exemption was required to be submitted. They indicated that they would submit an exemption request for operation at low power within about a week.

Because the Commission has always taken the view that a violation of a regulation does not, in and of itself, impose a requirement that the license be suspended, and since I had an analysis that indicated that safety of operation at low power and the risk to public health was not a question here, I thought that I could give them the time to request an exemption. So, on the 22nd, I issued an order that required them to inspect and repair one diesel generator and ordered compensatory actions on the remaining onsite and offsite power sources.

I did this to assure that we could resolve this question promptly about the reliability of the diesel generators. So, I think, with regard to having prejudged the exemption request, we had an opinion on this matter at the time I sent the April 25 letter. We will have to look at their exemption request because there is more to an exemption request than just the safety analysis part. It has other requirements to be looked at and we have not prejudged those. I thought I was being consistent with the Shoreham decision in telling them that they needed to request an exemption for continued operation but I thought it was in the best interest to the public, and health and safety, to get an immediate inspection of these diesels before time -- in other words, if we had had an inspection of this when the staff first raised it, it might be behind us, and I thought this licensee did not agree with the staff and an order was required to provide us a sufficient confidence in these generators.

The way I chose to do that was by order which did relax one LCO, because the LCO -- the license normally required two diesel generators and if either one is out of service longer than 72 hours, the plant would have to shut down. That was a requirement that is standard for full power but, based on what I knew about this, I felt it was more in the public interest to require one be taken down to resolve this uncertainty while I imposed additional requirements on

the other.

In a nutshell, that is the history of the staff's activities.

CHAIRMAN PALLADINO: Harold, I think you still say -- if I understand this order correctly -- two separate and independent diesel generators have got to be available or operable.

MR. DENTON: Before I would recommend the Commission vote on this plant for full power, I would expect to have this issue fully resolved.

CHAIRMAN PALLADINO: But what I don't understand is you said there are some conditions for operating during this period of time and maybe you should refer me to them, because I thought they were included in Attachment 3, I believe it is.

MR. DENTON: They are a little bit different than the Shoreham situation in that they have two TDI diesels and one non-TDI diesel. So, in this license, we only permit one of the TDI diesels out of service and require that the non-TDI diesel be available as well as the TDI.

The period of time required for this inspection is arguably between two weeks and nine weeks. The staff thinks it can be done very promptly, the licensee thinks it will take a longer period of time. So that's the period of time that we think is required to execute this. We would plan to have our consultants there during the tear-down and the license also

has requirements for watching for tornadoes during this period and other external hazards that might affect the availability of offsite power sources.

CHAIRMAN PALLADINO: I still don't know what the conditions is with regard to diesel generators.

MR. DENTON: Let me ask Darrell to explain the specifics.

MR. EISENHUT: Mr. Chairman, I think you are referring to one of the tech specs that is attached --

CHAIRMAN PALLADINO: 348-1 -- 3/48-1.

MR. EISENHUT: There is a limited condition of operation Item B which states, now, in the new tech specs, that two separate, independent diesel generators shall be operable, etc. It used to say three. This plant, remember, has two TDI diesels and one other diesel, not by Transamerica Delaval.

The tech specs used to be three and it has been changed to two. So that is the basis of the two here,now. It is one TDI and one non-TDI.

COMMISSIONER ASSELSTINE: The non-TDI is just hooked to the high pressure core spray?

MR. EISENHUT: That is correct.

CHAIRMAN PALLADINO: And it is going to remain that way?

MR. EISENHUT: It would remain this way during the

period of time for the inspection of the one TDI.

CHAIRMAN PALLADINO: But it would remain tied to the high pressure core spray.

MR. EISENHUT: One would remain tied to the high pressure core spray. The one TDI must be operable and, elsewhere in this package, it requires that there be an onsite gas turbine that now has conditions put on it to declare it operable and I told that that gas turbine, as of today or yesterday, was declared operable by the utility, and I am told that, in accordance with this condition, the one TDI diesel, they are now in the process of draining the diesel and will be starting disassembly today.

So this would be the condition that would remain in effect through the inspection period for one TDI diesel.

CHAIRMAN PALLADINO: This gas turbine, is that an approved gas turbine or does it --

MR. DENTON: No, it is not an approved gas turbine.

CHAIRMAN PALLADINO: Well, actually, General Design Criteria 17 doesn't say it has to be approved. It says you have got to have onsite and offsite power to meet certain conditions but then, of course, if you had GDC-1, then it speaks to quality.

MR. DENTON: It doesn't necessarily have protection against tornadoes and earthquakes to the same quality that the diesels would have. So that's why we laid on some additional

requirements to watch for these external phenomenon.

CHAIRMAN PALLADINO: Why did you say GDC-17 isn't complied with?

MR. DENTON: Because they rely on these two TDI diesels to fully meet the Commission's criteria and we don't think they have been demonstrated to be sufficiently reliable to do that.

The gas turbine is not a reviewed, claimed source of onsite power. It's an extra that they happened to have -- I think they brought it in during the dispute over the TDI diesels to augment their onsite power capability.

CHAIRMAN PALLADINO: I don't want to get involved in words, but the General Design Criteria for design and they designed it right, that's why I kept coming back, because I think we need operating criteria as well.

MR. EISENHUT: That is certainly a point the staff considered and looked at and there was that debate whether it was a design criteria or an operating criteria. I think we tried to take a simple interpretation that I can understand, and that was that this plant came in with an application that assumed two diesels with a certain level of reliability to meet the onsite requirements of GDC-17. That clearly, by application, was two Transamerica Delaval diesels which were pedigreed, which were reliable, which were environmentally qualified.

Now that they fall below that threshold, we took the view, we thought consistent with the Commission's order, that you have to declare that they don't meet GDC-17 in the letter of what they applied for.

We, on the other hand, however, took the view, as Harold said, that we believed that the plant was safe. We believed the plant was adequately safe because, in the bottom line, you really, from a systems standpoint, don't need any kind of diesels for five percent power. You don't need any power source for a long period of time following all events at five percent power.

So it put us in this situation where -- I think there is another important ingredient. Even up to the May 6 submittal and the May 18 meeting with MP&L, MP&L really believes the diesels, today, are qualified. They believe the diesels adequately satisfy GDC-17. We had considerable debate, last week, with our consultants, coming to the bottom line that, in the staff's view, we didn't have enough confidence in the reliability of the diesels.

So we, in effect, on last Friday, took the view with the utility that, notwithstanding the fact that they have submitted evaluations arguing they are reliable, notwithstanding that they have done inspections, notwithstanding that the industry has done inspections at Catawba and argued that the Catawba inspections are applicable to Grand Gulf, we took

the view that we just aren't quite there in terms of reliability. So, therefore, we will, for the sake of going forth in the discussion, assume that the diesels are not what they were originally meant be in terms of reliability to go forth. So we, in effect, declared them not to meet present requirements.

COMMISSIONER BERNTHAL: Darrell, you say they are not what you would like them to be in terms of reliability. You really mean in being able to -- what you are talking about is quality assurance in a sense. You don't know that they aren't reliable. You're just not sure that there isn't something wrong with them.

MR. EISENHUT: I think that is an important point and I keep reminding everyone, on my staff, too, that is not that we have concluded that they are unreliable. It is just that it has not been demonstrated that they are reliable.

MR. DENTON: We want to be sure that some of these critical components, which have been found to be broken and cracked in other examinations, are not actually present here. We have found at least one similar diesel that we were very pleased with at Catawba, but the conditions under which that diesel was manufactured and the quality assurance is quite different than at Grand Gulf.

So we think the only way to get that level of confidence at Grand Gulf is to examine these components with

experts and we have spelled out in this order the type of examination and components we think need to be looked at.

COMMISSIONER BERNTHAL: But I wanted to make clear that, at this point, you are looking for a problem. You haven't found a problem, yet.

MR. DENTON: Right.

COMMISSIONER ASSELSTINE: At this plant.

COMMISSIONER BERNTHAL: At this plant, that's right.

MR. EISENHUT: And even in the area that Harold pointed out, we don't know that the components on Catawba were manufactured differently than at Grand Gulf. All we know is that, because of the problem with QA records, et cetera, you can't demonstrate that the Catawba experience is applicable to what you would expect at Grand Gulf.

CHAIRMAN PALLADINO: Is there not another point that this diesels are different from the ones in which they had at least the major flaws?

MR. DENTON: They are a different design than the one at Shoreham, that's right. They are more like the one at Catawba.

CHAIRMAN PALLADINO: Have there been flaws found in diesels of this kind?

MR. EISENHUT: I think so, yes, on some of the principal components.

MR. DENTON: The Comanche Peak turbine is torn down

this week and is being examined and, if you read the attachments to the letter of April 25, it has our consultant reports and they spell out, in those reports, their views on certain components in the diesel and why they think it needs to be looked at.

COMMISSIONER ASSELSTINE: Has the staff basically endorsed the owners' group program, at this point, and it is only a question of doing an inspection to make sure that the owners' group program is met, or are there still fundamental questions about the adequacy of the owners' group program, itself?

MR. DENTON: We have not formally endorsed the owners' group program, yet. I think we have in hand, now, our consultants views on the program and we hope to have a staff position on that very shortly.

COMMISSIONER ASSELSTINE: I read the P&L letter and it seemed to raise both kinds of questions. Clearly, it said that, for this particular plant, in their view, an inspection was essential. But it also seemed to raise some questions that went broader than that, that went to some of the elements in the owners' group program itself. Is that a fair characterization?

MR. EISENHUT: I think time has overtaken a little bit the April 22 letter.

COMMISSIONER ASSELSTINE: I was talking about the

May 21 letter.

MR. EISENHUT: The most recent?

COMMISSIONER ASSELSTINE: Yes.

MR. NOVAK: This is Tom Novak. I think the way I would characterize it, I think our consultants believe that we are not convinced that the arguments the owners' group are proposing are necessarily convincing to resolve the problem.

COMMISSIONER ASSELSTINE: The one that stuck out in my mind were cracks in the block, for instance.

MR. NOVAK: Right.

MR. DENTON: We have to taken a position on that. All of our experts in this area are being deposed, today, and those that aren't are off on the road.

COMMISSIONER ASSELSTINE: The only question I had about the inspection program, and let me say right up front that as far as that part of the order was concerned, I think you are right. I don't have any major problem with that part in terms of providing some enhanced assurance of reliability at low power and also the kinds of things that we would be looking for before any full power decision.

The only question I had, though, was, by pushing them to do the inspection right now, in essence, are you locking yourself in in terms of the owners' group program, because there are some elements of the inspection that seem to go towards, well, you inspect, if you find certain things, you

have to repair them and, by implication, if you do that, that's going to satisfy us.

To what extent do you think you are hemming yourself in by ordering them to do an inspection along these lines, now, in terms of your reviewability, your flexibility, along with the advice of your consultants, in reviewing the owners' view program and the results that are submitted by --

MR. DENTON: It would be preferable to have the program clearly reviewed and resolved before you went to individual plants. I think the original owners' group program intended to do that. But they fell behind schedule. So what we have got, now, are one or two utilities who are trying to get out in front of the total program and our protection in that area is that review of the program is being done by the same people who are doing the review of the individual diesels.

So, we have not taken a position on the adequacy of the program but we are willing to review diesels which are torn down, like Comanche Peak's is down and they are carrying out the owners' group program.

COMMISSIONER ASSELSTINE: Except they are doing -- I gather they are doing much more. At least, that's what I was told when I was at Comanche Peak. They said, "Well, you know, we are going beyond the owners' group. Anytime there is any question at all, we're putting in new material. We have independent people redesign components and we are doing a lot

more than they are doing at other plants, but this one.

MR. DENTON: So they are taking some risk that we may not approve exactly what they find but they are doing it under their own and I think, here, we are trying to treat this plant as a specific plant, while still looking at the total owners' group program.

MR. EISENHUT: Also, we face this question with the consultants and I think another bottom line was we think that we will have a position on the overall program while the diesel is torn down. We have looked at the window of time. You have to remember this is the second time Grand Gulf has gone through a diesel inspection, also.

MR. DENTON: We told the owners' group that within thirty days or so after their last report to us, we would have a position on their program and they had a program in which they were going to submit like, 16, separate reports and I think at last count --

COMMISSIONER ASSELSTINE: Only about half of those are in, aren't they, or something like that?

MR. DENTON: They have been coming in here of late but I think there may still be one or two outstand.

CHAIRMAN PALLADINO: Can I ask you a different question. While this inspection is going on, why did you feel that they could continue operation up to five percent power?

MR. DENTON: Because the analysis that is attached

to the order that we had looked at the types of accidents that present a risk at low power and looked at the need for electrical power during that period and came to the conclusion that you do not need to rely on diesels at these power levels.

COMMISSIONER BERNTHAL: I think it would be useful if you -- I know you have done this before, it seems to me, in another meeting not so long ago, but it would be useful, for me, at least, if you would go through and summarize -- and I think the public needs to have a good summary as well.

As I understand the way you have represented things now, Harold, we would have one TDI generator that is not torn down while this one is being torn down.

COMMISSIONER ASSELSTINE: Of questionable reliability.

COMMISSIONER BERNTHAL: Of questionable reliability. We do have another diesel generator.

COMMISSIONER ROBERTS: Of unknown reliability.

COMMISSIONER BERNTHAL: Let's spare the editorials for a moment, here.

CHAIRMAN PALLADINO: Well, no. The editorial was inserted and I think it should --

COMMISSIONER ASSELSTINE: I will accept "unknown."

COMMISSIONER BERNTHAL: Let me start over. We have one diesel generator not torn down. We have another one of a different brand, if you wish, that is available and we have

some other onsite gas turbine power generators, and I would like to hear how those fit into your overall calculations, if at all. I think it would be useful to give us a summary of the kind of logic that you used to determine that the safety hazard to the public is minimal.

MR. DENTON: Let me ask Mr. Hodges of the Reactor Safety Branch to describe how we approach that question and how we answer it for ourselves.

MR. HODGES: I am Wayne Hodges in the Reactor Systems Branch. There are several things to bear in mind. One is, at the low power level -- five percent power level -- the heat flux from the fuel is low enough that you don't worry about possibilities like critical power ratio. You are well removed from a problem in that. You don't worry about over-pressurization transients because, again, the energy input compared to relieving capabilities is very low. So the normal Chapter 15-type of transients that you would look at would become insignificant at five percent power level.

So, now, you look at what are the real safety concerns and that is, if you had no TDI diesels available at all, either one of them, and you lost all your offsite power, you had no power at all, what could happen. For Grand Gulf, you can go through a transient. You have isolation. You can get into a situation where you are boiling the water level down in the core and you say, "How long does it take to expose

the core?" Obviously, one you scram the reactor and the fuel is covered with water and you had no problems due to boiling transition or critical power ratio or overpressurization during the initial part of the transient, the only thing that you really have to worry about is the fuel heating up and, as long as it is covered with water, that won't happen.

For Grand Gulf, it takes on the order of two or more days just to get down to the top of the core with boil off.

COMMISSIONER BERNTHAL: What if you have a loss of coolant --

MR. HODGES: I will get to that. I'm am trying to go for the non-LOCAs first, to cover the full spectrum.

So you have on the order of two days to get down just to the top of the fuel. You started no heat up. The water and the fuel are essential at saturated conditions at this point -- less than 600 degrees. So no problem.

Even beyond that point, you could boil well down into the core region before you started to get significant heat up. So there is lots of time available to restore power for the non-loss of coolant accident situation.

For the loss of coolant accident, the one that gets to be a problem is the large grade LOCA, just as we talked about for Shoreham a few weeks ago. Grand Gulf is a little different from Shoreham in that they have a high pressure core spray system that is driven by a separate diesel. It does not

rely upon steam power as the high pressure injection system does at Shoreham. If that operates, then there is no question that you could sit there indefinitely or for a very long period of time without restoring other sources of AC power.

If that fails to operate, then the kinds of numbers we talked about at Shoreham, which says you have got on the order of an hour to an hour-and-a-half, using evaluation-type analysis, or three hours, if you use realistic analysis, in order to restore power if there is a problem. So, from a safety standpoint, there is lots of time available to get alternate AC power sources going.

COMMISSIONER BERNTHAL: Are these onsite gas turbines designed to be hooked into that core spray system, then, assuming the dedicated diesel didn't work under those circumstances.

MR. HODGES: The answer is, yes.

CHAIRMAN PALLADINO: Can we get an oral answer to that, because the record won't show nodding heads.

MR. DENTON: I think the onsite diesel would supply AC power and, therefore, would restore power to all the safety systems if they operate.

MR. HODGES: Mr. Srinivasan from the Power Systems Branch tells me that it could, plus they can also be hooked into the other core spray system and the low pressure coolant injection systems, all of the other ECC systems that are

there.

COMMISSIONER BERNTHAL: These are these extra gas turbines that they brought in onsite?

MR. HODGES: Yes.

MR. DENTON: Let me ask Mr. Srinivasan, Chief of the Power Branch, if he would like to elaborate.

MR. SRINIVASAN: Srinivasan, from the Power Systems Branch. Grand Gulf has three onsite gas turbine generators. They operate in parallel. They could provide power to any one of the class 1-e buses. There is a flexibility, the way they are arranged. So, in the event you lose any one of the qualified onsite power supplies, these gas turbines could supply power.

It has to be started manually. It doesn't start automatically. It takes about -- the analysis indicated it would take about 25 minutes or so to establish power to the buses. We have a particular specification laid on these gas turbines to be tested periodically the same way we would test the TDI diesels -- once in every 31 days.

CHAIRMAN PALLADINO: Other points?

COMMISSIONER ASSELSTINE: I had one other question on the analysis that was done. There is Mr. Hodges, there. When I was looking through the analysis, it seemed to be in two parts. The first part was an analysis of LaSalle, which is, as I understand it, a BWR/5 Mark II and you said, in your

analysis, and I quote, "It is very important to recognize that this report is based on some very rough estimates. A detailed review of each event tree was not possible in the time allotted. Also, computer analyses of the important events (ATWS and LOCA) were not possible. Therefore only estimates and inferences from previous work were used. For these reasons, the risk reduction numbers have larger uncertainties than they otherwise might."

Now, as I understand what you have done, you have taken that rough analysis for LaSalle. You have looked at it in terms of Grand Gulf, which is a different plant -- there is not another one in this country -- and, third, you have, in essence, a new licensee and a licensee who has not, so far, demonstrated a high degree of performance.

I guess my question is, to what extent do those three levels add significant uncertainties to the analysis that you have done.

MR. DENTON: Let me give you my perception and then ask Wayne to elaborate. We have not approached this on the basis of risk reduction. I have quoted numbers to the Commission, on many occasions, as to what the relative risk is and there is a lot of uncertainty when you get to PRA and risk, but the kinds of numbers and details that you have heard, today, are deterministic calculations of how long it takes water to boil off and how long you can go before various

things would occur. They are not PRA estimates. Wayne, maybe you would like to elaborate.

MR. HODGES: Well, we have done two different types of analyses. The memorandum that is attached to the order -- that's the one you are reading from?

COMMISSIONER ASSELSTINE: Yes.

MR. HODGES: We have done an additional analysis, since that time, that looked at the deterministic approach, and that is what I've talked about today. So we have got two separate analyses. One that says the probability you are going to have this situation is very low and then, the risk or the consequences, once you get there, are very minimal. So that combines the low number. And then I've talked a little bit this morning about the deterministic analysis that you could use to show, yes, indeed, the consequences are low.

MR. DENTON: I thought the question, this morning, would be, why didn't we suspend the license in view of the Commission's action on Shoreham.

CHAIRMAN PALLADINO: Suspend the license?

MR. DENTON: Yes, in view of your decision on Shoreham and after consulting with OELD and others, and the fact that we had a view about the adequate safety of operation, and the fact that the Commission's practice and decisions over the years have not required automatic suspension when you find a GDC is not but rather look to see what the

safe limitations are, that's why I decided that I could let them continue to operate, require that they request an exemption to square with your decision, and, at the same time, order this examination in order to put this issue to bed, because I think the licensee was trying to defer consideration of an inspection and then try to push through a full power license without this issue being adequately addressed.

COMMISSIONER ASSELSTINE: I guess I would agree with you up to one point, Harold, and that is the question of relaxing the tech spec -- the LCO. I don't see anything improper with issuing them an order saying you have to do this inspection program. But it seems to me, then, the burden is on the licensee to come back, if it wants a relaxation of the tech spec limitation, and submit a license amendment, and the burden is on them to justify approving that -- provide the justification for approving that relaxation of the tech spec limit.

It is not a question of issuing an immediately effective show cause order to revoke or suspend the license. I think it is a question of whether the licensee can provide the justification for showing that he ought to be able to operate the plant with only one diesel generator of unknown reliability as opposed to the tech spec requirements for having at least two diesel generators available.

MR. DENTON: I think, by requiring compensatory

measures for the other things, that we have not changed the level of safety. In other words, I have substituted one diesel being out for these compensatory measures on the other things. So it is not, while we have relaxed -- I think, if you look at the license as a package, safety is at least where it was before. I will ask OELD to comment.

MR. CUNNINGHAM: I understand the argument you are making that, while it was appropriate possibly, in your view, for us to order the inspection, the burden should be on the licensee to ask for relaxation of the tech spec. But the way we approached it was we couldn't order the inspection, which would fly in the face of the tech spec, without simultaneously addressing the tech spec question. We saw it all as part of the same package.

COMMISSIONER ASSELSTINE: I can understand the public health, safety, and interest in requiring the immediate inspection. I guess I don't see, anywhere in your package, the analysis of what I view as a separate question. That is, the relaxation of the tech spec limit. In fact, what it appears to me is this is a way to get around the requirement to review license amendments from an applicant.

MR. CUNNINGHAM: Well, you asked a question at the beginning of the meeting as to why we didn't require the applicant to submit a request for an amendment. The answer, I think, is clear from what Harold said this morning. They

disagreed with us on the need for this approach.

If we had just said, "Give us an amendment asking for relaxation and permission to do an inspection," they would have said, "We don't want that amendment."

COMMISSIONER ASSELSTINE: Well, but you could have ordered the inspection and simply be silent on the tech specs, and then the burden is on the applicant, if it wants to continue operation, to come in and say, "Well, all right, you have ordered us to do the inspection. Here is our justification for why we should be allowed to operate this plant in violation of the current tech specs for the plant."

MR. CUNNINGHAM: I think you are right. It could have been done that way. I think it would have been incumbent upon us, at a minimum, for us to address the question of whether or not they have to shut down.

To simply order an inspection when we knew that they couldn't do that without shutting down, I think we would have to say, either shut down or tell us why you are not going to shut down.

We chose, instead, to put it as a package to do the inspection that we wanted done and authorize the relaxations with compensating measures, as Harold has described, which we thought were appropriate.

To put it another way, our think our view of the public interest here, underlying this order, was that the

public interest is not served by ordering the shutdown of a reactor when your own analysis shows there is no safety reason to do that.

MR. EISENHUT: And we didn't want to rely on our analysis too long and that's why we asked the utility to come in and address -- submit an exemption request, provide a justification for staying at five percent power, safety bases, and address the other aspects of the Commission's Shoreham order. We asked him how soon he could do that and he said in about seven days. So we looked at it as our bases we were riding on was not a -- I mean, it is going to be documented in more thorough detail from the licensee, put the burden on the licensee in sort order.

MR. DENTON: I think rather than argue, all we can do is describe what we did and our rationale for it and, if that's not the objective the Commission desires, now is the time to let us know and we will remedy it.

COMMISSIONER ASSELSTINE: As I understand it, you had basically told the licensee that they weren't to restart for a period of time, right?

MR. DENTON: (Nodding.)

COMMISSIONER ASSELSTINE: Was that based only on the tech spec problem? Was it based on the combination of the tech spec problem and the diesel problems and how was that handled? Was that just an oral agreement by the licensee that

they wouldn't operate or was it a direction from you or what was that?

MR. DENTON: We didn't have a formal hold on them. I think I mentioned that to the Commission at the time. In my view, I didn't want them to resume operation until I at least knew that the tech specs that applied to low power were the correct set and so I deliberately resisted their efforts to get us to approve restart until I had, from my own staff, an analysis of all the potential problems in the tech specs. Which ones should we have in place more restrictive at low power and that's why, as I mentioned earlier, it was only after our issuing this April 18 order that immediately modified the tech specs and made it more restrictive did we permit the licensee to resume low power operation.

CHAIRMAN PALLADINO: Let me rephrase some of these same questions a little differently. Why should not the plant remain shut down until the exemption is received and acted upon?

MR. DENTON: Only because your own orders and policies for 20 years have said that it is not required unless it has a public safety implication.

CHAIRMAN PALLADINO: But you directed them to commence with their exemption request.

MR. DENTON: Yes.

CHAIRMAN PALLADINO: And I am not sure I capture all

the implications of that.

MR. DENTON: Because, in the Shoreham decision, you said that exemptions were required. We have required that they come in here -- I don't want to appear argumentative, Mr. Chairman, all I can say is that is my rationale and if, in the Shoreham order, you intended us to suspend the license, I didn't read that in Shoreham.

But you can go back and I have, here, a Commission decision of 1978 which says the Commission agrees with the staff that a violation of a regulation does not, in and of itself, result in a requirement that a license be suspended. It goes on to say that, if health and safety is threatened as a result of the violation, proper remedial action must be taken.

Well, here, public health and safety is not threatened, in the staff's eyes, by this violation, and that was the rationale.

CHAIRMAN PALLADINO: The reason I asked the question is I believe there is a difference between an operating plant and one which has not yet received a license.

MR. DIRCKS: But this has received a license.

CHAIRMAN PALLADINO: I say there is a difference between an operating plant, one that has a license, from a plant that doesn't have a license yet, so far as your procedural options are concerned.

MR. CUNNINGHAM: In fact, I think it is important to point out that it is at least questionable whether we could have made a finding that the public health, safety, or interest requires an immediate shutdown. Once they have the license, the presumption is they are entitled to operate it.

Our analysis shows there was no safety problem with continuing to operate here, so it would have been hard to justify a shutdown order.

CHAIRMAN PALLADINO: Let me ask you, is there a new proposal on the part of any Commissioner to do something or just --

COMMISSIONER ASSELSTINE: I had a couple of more questions, first. Let me ask a couple more first.

The accident assumptions that were made in the analysis, did those take into account the kinds of different valve line-ups and things that might exist either at low power levels or in hot shutdown conditions for the plant and what the impact of loss of offsite power would be in terms of changing valve line-ups and positions? Is that something that you all looked at?

I guess what I am wondering is, is the loss of offsite power and the loss of onsite power the kind of accident situation that the staff has really looked at in great detail. For example, how would you compare it to the kinds of analyses that you did on the pipe crack issues where it

appeared to me you were talking about the kinds of accident situations that have been much more the routine kinds analyzed in our safety evaluations.

MR. HODGES: Well, we looked at each Chapter 15 transient accident and tried to say, with no AC power available, is there a problem. As far as valve line-ups -- the major thing concerned here, when you are starting from a five percent power case is you don't have the turbine on line, you may not have the feedwater system running. You may be using, for example, a control rod drive system in order to provide the make-up rather than the feedwater system. Or, if you have got the feedwater system on, it is just operating at a very low capacity and you don't have feedwater heating.

Those types of considerations were put in there but, as far as emergency equipment, we didn't consider any changes. What we are saying is, for those long periods of times, you don't even need it.

MR. DENTON: I think we are assuming that the plant was operating within the limiting conditions of a low power license.

MR. HODGES: Yes.

MR. DENTON: That's where we started from. Basically, we don't see, as we have discussed before, that low power has the same kinds of risk for this accident for not having diesels because you have very few fission products generated,

the fission products tend to still be in the uranium oxide pellet matrix, they have not migrated to the space between the pellet and cladding, there is less potential to get out. So it's all those kinds of arguments that just lead us in general that they are a very low risk to begin with and, even if you go and begin to heat up the fuel, the amount of fission products that are actually available for release are nowhere like they are at high power.

COMMISSIONER BERNTHAL: Jim, if I could just pick up on your question, though, maybe I am not understanding but, when we spoke earlier of the large great loss-of-coolant scenario, I assumed that we were covering the worst case scenario. Are you suggesting that there is another case scenario that could be worse or -- I mean, I can't see, from my limited perspective, what is worse than essentially than immediately losing water on the core and then you are in a situation where you have got somewhere between one and three hours --

COMMISSIONER ASSELSTINE: I guess what I am talking about is that situation and what I am wondering is, do we really have a good understanding of how the operator's ability to deal with that situation is affected by what would happen to instrumentation and equipment in the plant if you lose all your power. I mean

valves and switches and instruments are going to do different

things, I think, if you lose all your power than would normally be the case in that accident situation.

What I am trying to understand is to what extent do we really understand that complicating factor. If you lose all the power, what happens to your instruments in the control room when the power comes right back on or if you get power back on. What kinds of changes occur and what does that do to the operator's ability to deal with the worse case kind of accident.

MR. DENTON: I think pushed to the extreme, we are in the severe accident space but to start with the idea it is unlikely to lose offsite power because of conditions we put on -- you have got gas turbines that supply the equipment and then you've got at least one diesel there that may or may not work but, once you degrade down to that, let me ask Wayne to see of he could, or Srinivasan who might like to answer it, how we approach that, but that's a problem in all plants, including ones that we are letting operate at full power today, if they suddenly lose offsite power and lose onsite power. We worry with that problem as a USI for plants at full power.

MR. HODGES: Mr. Srinivasan will talk about the power, to some extent, but mostly the instrumentation is coming off of batteries -- the vital instrumentations.

MR. SRINIVASAN: When you lose all AC power, both

offsite and onsite, you are getting into an event that is beyond the design basis normally analyzed by the staff. The very point of it is a safety issue, station blackout, USI-44.

With regard to the availability of critical instruments in the plant, when you lose all AC power, the instrument buses will be automatically fed from the station batteries, the Class 1-E batteries. So, normally you will have a random chain of information in the plant coming from different batteries. So, even if you have a single failure on top of all the failures you had in the plant, you allow one set of critical instruments available to know where the plant is and certain critical components, like aux feedwater system, usually mean one chain of the system is made AC independent, so you allow DC power available for them, like turbines to run the FW system.

What we have done now, in the current licensing review, is to make sure there are adequate procedures in the plant to cope with this station blackout event, even though such an event is going to be low probability event for the majority of the plants.

COMMISSIONER ASSELSTINE: Let me ask you two other questions. How reliable is the offsite power supply at Grand Gulf as compared to other plants -- about in the middle, very reliable grid, less reliable?

MR. SRINIVASAN: I would say it is an above average

plant.

CHAIRMAN PALLADINO: It is what?

MR. SRINIVASAN: Above average. As we stated before, most of the loss of offsite power is not because of the grid disturbance but it is plant center in the switch yard

COMMISSIONER ASSELSTINE: To what extent is that dependent, then, upon the capability and experience and performance of the utility and its personnel?

ME. SRINIVASAN: In this situation, I want to bring out a unique design we have seen, the Grand Gulf design. In a very traditional electrical system design, all the house loads, including the safety system loads, are normally fed from the main generator through the aux transformer.

In the Grand Gulf design, they have eliminated that and they take the power directly from the offsite. So, should we have a transient in the plant which results in the turbine trip and generator trip out, you would still maintain a continuous source of power to the critical components to safety set on the plant. That's the one plus for this design.

Looking at the operational experience of the MP&L grid, we don't believe we have any big problem because the calculated risk is above average.

COMMISSIONER ASSELSTINE: For the extra diesel, is that in anyway connected or dependent upon systems that are

related to the TDI diesels?

MR. SRINIVASAN: No.

COMMISSIONER ASSELSTINE: Totally independent?

MR. SRINIVASAN: They are totally independent. They have their own batteries and they have their own offsite power line coming in.

CHAIRMAN PALLADINO: What is the size or the capacity of that extra diesel -- the non-TDI diesel?

MR. SRINIVASAN: The non-TDI -- or the gas turbines?

COMMISSIONER ASSELSTINE: The non-TDI normal diesel.

CHAIRMAN PALLADINO: The non-TDI diesel.

MR. SRINIVASAN: Generally, it's about 3,000 kilowatts, but I'm not sure what the range is on this plant.

MR. DENTON: He said he thought it was about 3,000 kilowatts. We have a representative in the audience from Mississippi Power and Light, if you would like to ask them that question. I don't think we know the precise answer to that.

CHAIRMAN PALLADINO: Maybe I will come back to the question. To handle accident compensatory equipment or accident mitigating equipment, what sort of power level do you need?

MR. SRINIVASAN: For a non-LOCA transient-initiated shutdown, it is about 4,000 kilowatts we need.

CHAIRMAN PALLADINO: How much -- 4 --

MR. SRINIVASAN: Four thousand. And, if it's a LOCA situation, it's slightly about 4,700 kilowatts.

CHAIRMAN PALLADINO: How much?

MR. SRINIVASAN: Forty-seven hundred -- four-seven-zero-zero.

CHAIRMAN PALLADINO: Could we ask the Mississippi Power and Light representative if he knows what the capacity of the non-TDI diesel is?

MR. WHITE: If you are talking to me, I am the vice president of Public Affairs and lobbyist. I don't think I am qualified --

(Laughter.)

MR. WHITE: -- to answer that question right now, but I will find out for you.

COMMISSIONER BERNTHAL: Sounds like a wise move.

CHAIRMAN PALLADINO: I didn't mean to put you on the spot. I was just asking. Do you have more?

(No response.)

CHAIRMAN PALLADINO: Is there any proposal by any member of the Commission?

COMMISSIONER BERNTHAL: Let me ask a question or two here before we get to proposals, if I may, Mr. Chairman. Again, by way of clarifying things, not only for the Commission here, but for the record, I would like to have an opinion from the Counsel's office and perhaps from you, Guy, as well,

on what we are really talking about, here, in terms of our regulations.

In other words, you are coming before us and we can sit here and try and make a best engineering judgment or instinctive judgment, even for those of us who aren't engineers, on adequacy of protection of public health and safety, but what kind of finding are we required to make or expected to make in this circumstance that would justify the staff action consistent with our regulations? Is there a pitfall here that I am not aware of or where are we?

In other words, what are we required to find in these circumstances in order to justify or not justify the staff actions.

MR. CUNNINGHAM: The Commission doesn't have to make any finding at all, now, unless it chooses to review the action of Harold Denton. He made the required finding which is that the public health, safety, or interest requires that the order he issued be immediately effective.

In this case, I think it was primarily public interest, although the order does point out that it is in the interest of public health and safety, as well, to get an earlier rather than a later resolution of the adequacy of the TDI diesels.

COMMISSIONER BERNTHAL: Let me phrase the question another way. So is the relevant point, here, that having

heard what has been said about the margin of protection for public health and safety and, presumably, attaching some significance to whether you buy the one-hour scenario for the worst case or the three hours for the worst realistic case, that that's the key judgment that is at stake here? Is that the key judgment the staff makes or what is the key judgment, if I am missing the point, here?

MR. DENTON: Basically, we were at an impasse with the licensee over what was required to qualify or requalify the diesels and we gave him a view, he gave us a view, we couldn't resolve it, and we made a decision that it was required.

COMMISSIONER BERNTHAL: I understand. But the standard somehow ultimately has to be the protection of public health and safety and we focused, for some length of time here, on that particular issue, and the question is, I guess, the adequacy of the standard and the information that we have heard here, today. Is that the thing that we need to focus on.

MR. CUNNINGHAM: Well, it depends on a standard for what. If you are looking at the standard for whether the action should be required, that is probably public health and safety. If you are looking at whether it is immediately required, which is the way the order was drafted, then the statute says public health, safety, or interest, and Harold's

order is a combination of the public interest, as he saw it, in not shutting down a reactor where there was no public health or safety need to do so in order to get something accomplished which he did feel was necessary.

That is why there was a public health and safety benefit in getting that done earlier rather than later.

COMMISSIONER BERNTHAL: Maybe I need to turn the question around. I am still feeling a bit ill at ease, here. Is there any judgment on the part of counsel, here, or perhaps the only member of the Commission with legal training that, in some sense, we are violating our regulations by this action?

MR. CUNNINGHAM: If you are asking me, we supported the issuance of the order. We gave legal counsel on the drafting of the order.

COMMISSIONER BERNTHAL: All right, you don't have to comment.

COMMISSIONER ROBERTS: Let me give you a short answer. This is a "non-event," this whole meeting.

COMMISSIONER BERNTHAL: You may very well be right but sometimes I worry about what is a practical non-event turning into a legal event. I guess that's the bottom line of my concern.

MR. PLAINE: Well, this thing came up suddenly. I hadn't even seen the order. Offhand, it sounds to me like Guy's analysis appears in order but, if you want us to study

this further, I will be happy to do it.

COMMISSIONER BERNTHAL: Jim, do you want to comment?

COMMISSIONER ASSELSTINE: My view is they stepped over the bounds in directing the tech spec change.

CHAIRMAN PALLADINO: What bound did they step over?

COMMISSIONER ASSELSTINE: I think what they have done is they have undercut the normal requirement in our regulations that licensee submit applications for amendments to their technical specifications or any other provisions of the licenses and those applications be handled in a certain manner.

In essence, what this does is bypass that whole process and the staff, on its own, has issued an order that, on its own, relaxes the technical specifications for the plant and, in essence, amends the license to relax the tech specs on the plant.

CHAIRMAN PALLADINO: They haven't admitted to the word "relax."

COMMISSIONER ASSELSTINE: All right. It is a relaxation of the previous tech specs in terms of requirements for onsite power supplies.

MR. DENTON: I think the safety of the plant is at the same level as it was before.

COMMISSIONER ASSELSTINE: Is it a requirement, now, that you only have to have two diesels as opposed to three?

MR. DENTON: That's correct. It is also a requirement that you have to have other things that were not in the previous license.

MR. EISENHUT: I wouldn't agree that by taking the one tech spec and relaxing it -- you have got to look at the whole set of tech specs for emergency power and you can take out one diesel requirement but, in lieu of that, we also put in requirements for the gas turbine.

Now, I think it probably came out about equal. In fact, there is a condition for external events and so while it is certainly true, if you look at whatever 4.8.111 -- whatever is the right number -- it clearly is a relaxation of that particular one, but there others that trade off.

MR. DENTON: We could have done it the way Guy said. We could have issued an order to inspect and then they would have been back, beating on our door, saying, "How can we inspect? You've got your own license that says you have got to have two diesels operable." And then they would have come in through the process.

Since we were already at an impasse over that and I didn't want that argument to be an excuse as to why they didn't carry out the inspection, I decided to deal with the whole issue as a package.

COMMISSIONER ASSELSTINE: At the May 18 meeting, did the licensee express any views on the order? Did they

indicate whether they wanted the order, they supported the order?

MR. EISENHUT: I think, all the way up to the conclusion of the meeting, the utility was still argue his position and that was they think the diesels were reliable for the first refueling cycle, they felt that they could ascend to power, the could operate all the way to 100 percent and perform the diesel inspection at the first refueling outage.

They felt they had done the inspection before. It was an adequate inspection. They knew, from meetings with our consultants and their consultants, it was a very close call. They even had an alternate proposal and that alternate proposal was that, if we conclude, as we did on the diesel, then they want to perform diesel inspection during start-up of the plant. They felt it was adequately safe.

I think it was more, after a staff causus with all of the appropriate staff, where we came down was just one way to resolve this was just to say that, from this day forth, we don't have enough confidence in the diesels. It hasn't been demonstrated to us. So I think, to this day, they really believe they have adequate, reliable diesels.

MR. DIRCKS: What is confusing is I think, when we talked about this, I thought the staff was acting in a very stern, regulatory mode, there. We were tired of arguing and an order was issued. Now, the order said, stop arguing about

this. Tear down the diesels, inspect them, and get them in shape. I think, at the same time, the staff didn't go to the extent of ordering to completely shut down the plant.

It is a strange position to be in, today, because here we thought, if anything, we were acting in a very stringent and stern regulatory mode and all of a sudden, now, we are getting the feeling that we are being relatively soft on the utility.

COMMISSIONER ASSELSTINE: Since I am the only one who has expressed any disagreement with what you have done, let me say that, as far as all other aspects of the order and the action, I don't have any problem with it. I agree with you. I think in terms of ordering the inspection right away, I would agree with your characterization.

I still have the concern about whether you are boxing yourself in having now ordered the licensee to do this inspection. If they do this inspection, I question how much flexibility you are then going to have to say, "Wait a minute. That really isn't good enough and now we want something more than that down the road. But, apart from that concern, I don't have any problem.

MR. DIRCKS: We have already been accused of that. In this particular case, I think the diesels have been torn down before. There was a good deal of argument that we were being arbitrary in this matter. We were just demanding too

much since they had already torn them down once and here we were asking them to tear them down again.

COMMISSIONER BERNTHAL: I must say that it should be pointed out that tearing down these diesels -- and I was down there, as we all have, I guess, and looked at these things and that's not without its own hazard. There is a certain built in risk every time you tear apart a piece like that.

MR. DIRCKS: But to answer your point, I don't think we have ever been bound by that boundary where we have asked for something and they do it and we say that we are still not satisfied. In fact, the complaint that you probably here is that we do it too often. We demand things, and they do things, and then we ask them to do them all over again. I don't think that precedent --

COMMISSIONER BERNTHAL: Is the suggestion that the better path would have been, Jim, for them to do nothing until the task force completed its work or what are you suggesting?

COMMISSIONER ASSELSTINE: No. I think what the staff did was the right thing in terms of ordering the inspection. All I'm doing is saying we are, to a certain extent, vulnerable then to the argument later on that, in essence, you have bought off on it. But as long as it is clear from the staff's side that they have not bought off on the owners' group program, that that is still open until the detailed submissions are made and the staff reaches its final

judgment, then I think the better course was to do just what the staff did.

The only area where I have a reservation is on the question of continued operation of the plant and the manner in which that was accomplished, in this case, by issuing an order that had the effect of at least relaxing that one portion of the technical specifications rather than requiring that the licensee submit its justification for allowing continued operation of the plant by modifying the conditions of the license.

COMMISSIONER BERNTHAL: But you don't have a problem with the issue of adequacy of protection of public health and safety given the presentations that have been made here, today?

COMMISSIONER ASSELSTINE: I still have some questions about the adequacy of the staff's review, quite frankly. It does seem to me that maybe it's more than the back of the envelope evaluation, but I do have some questions about how thorough and detailed an evaluation really has been done, and I've got some questions about allowing operation of a plant with only one diesel generator of unknown reliability as opposed to two.

CHAIRMAN PALLADINO: Plus another one.

COMMISSIONER ASSELSTINE: Plus this extra --

CHAIRMAN PALLADINO: But it was pointed out that

that diesel alone, with the core spray, can handle the accidents. So we are not pulling, apparently, on the one of unknown quality.

COMMISSIONER BERNTHAL: I will be quiet, now, but I just want to say it seems like the question of public health and safety is adequately addressed. Whatever questions might remain, it seems to me the worst case scenario, here, I believe we've heard, we've heard before, and that seems to be covered and I agree with staff's judgment on that.

I am still a little concerned about what I always try to keep as a separate issue and not hearing many protestations from our legal people around here, I guess I will trust their judgment, at this point, that we are not somehow getting ourselves into another legal morass, and I am open to suggestions on how we should proceed.

COMMISSIONER ROBERTS: I've got a suggestion. Let's adjourn.

(Laughter.)

CHAIRMAN PALLADINO: We are going to try to do that in about five minutes.

COMMISSIONER ROBERTS: What are we going to accomplish?

CHAIRMAN PALLADINO: I had -- now, let's be frank. One of the problems I had was I wanted to discuss with the staff what was going on. The legal advice I got was that,

since they were relating it to Shoreham, I was going to get into some trouble. The only way I knew to get this aired was to have a public meeting and hear what the staff has to say.

I think it has been very valuable and I suggest, if somebody wants to take action, they propose it.

Now, I did have a telephone call from Commissioner Gilinsky who couldn't be here. His feeling was that we should shut it down and not let it start up until the Commission has acted. If any one of the Commissioners here entertains such a thought, propose a motion, and then we will vote on it. If there are other thoughts the Commission has that they would like to propose, we will hear them, and we will vote on them.

Now, so far, I haven't heard any suggestion that we take any action and, lacking such, I would propose we not take any action. We would let the staff go forward.

COMMISSIONER ASSELSTINE: I'll propose an action and then we can probably adjourn fairly quickly. Before I say that, though, let me say, Joe, I certainly agree with you. I think this was a useful meeting. I think it was important that the Commission had this meeting. It is a significant matter, there is not question about it, and I think it was useful to do this and I think it was a necessary step.

My proposal is very simple. I would propose that we revoke that portion of the staff's order that orders the tech spec modifications for the plant.

CHAIRMAN PALLADINO: All right. And your rationale?

COMMISSIONER ASSELSTINE: My rationale is that I don't think that's the way that the modifications to the license should have been handled. I think the burden should be on the licensee to come forward with its rationale for why the plant should be allowed to operate while this inspection program is being done with less than the full compliment of diesels that is required by the tech specs, now.

I think, by requiring a license amendment to do that, we would assure that we would get the kind of full and careful analysis of the question that I think needs to be made, and I think that's the way that license amendments of that type should be handled under our regulations. That is basically it.

CHAIRMAN PALLADINO: You are implying, though, that the method that was used was wrong?

COMMISSIONER ASSELSTINE: That's right. But, whether it is wrong or not, I still think that that's a preferable way to go.

CHAIRMAN PALLADINO: Do you want to speak to that?

(No response.)

CHAIRMAN PALLADINO: Can you tell us what happens if that action is taken -- either you or the staff?

COMMISSIONER ASSELSTINE: I think the practical effect is they would have to shut the plant down within, what,

two or three days -- something like that -- until the amendment was approved.

MR. CUNNINGHAM: I think the order would have to be rewritten because I don't think it presently contains a basis for immediately effective shutdown.

COMMISSIONER ASSELSTINE: I don't think you have -- well, okay. My view is that I don't think you would have to provide that basis. What you would say is, there is a public health and safety justification for requiring immediate inspection. A consequence of that is that, under the existing technical specifications, the plant will have to be shut down within a certain period of time. If the applicant believes there is a justification for continued operation during the inspection program, it is free to submit an application for amendment to the license.

MR. CUNNINGHAM: I am not trying to argue with the merits of the proposal but I just point out that there should be some additional wording changes in the order along the lines you just stated.

CHAIRMAN PALLADINO: But what would happen if that were done?

COMMISSIONER ROBERTS: The plant would be shut down is what would happen.

COMMISSIONER ASSELSTINE: That's right.

CHAIRMAN PALLADINO: For how long and under what

conditions? Until they came back with --

MR. CUNNINGHAM: The licensee might come in very quickly with a request for an amendment. Then you get into your Sholly questions. Does that involve significant hazards considerations.

COMMISSIONER ASSELSTINE: That's right.

CHAIRMAN PALLADINO: What strikes me is this is an operating plant, it is a plant that has a license, and it has a right to maintain that license unless there is a health and safety issue that the staff determines needs to be addressed, and thereby lead to a shut down.

I am quite confidence on the staff's analysis on the health and safety question, not only these particular evaluations that have been made recently, but the whole host of evaluations that have gone over a number of years on low power questions. I don't see the basis for calling for a shutdown of this plant based on health and safety issues and, from what the staff has said, neither do they. None has been presented. That would be my position.

COMMISSIONER BERNTHAL: Let me ask two questions here, as is my want in these circumstances. I gather that we have resolved the question. Jim, I think, has some reservations of public health and safety as an issue. It is my judgment, at least, that public health and safety is not the issue, here.

Then the next question is, is there some legal or regulatory requirement that prohibits the course that we followed here and that then would argue that Commissioner Asselstine's legal analysis or analysis of what our regulations require is the correct alternative analysis. Is there a prohibition within our regulations and/or the law that is inconsistent with what I think the underlying issue here, and that is the adequacy of protection of the public health and safety?

MR. CUNNINGHAM: Well, you have heard one view from Commissioner Asselstine and you have heard one view from me. I think the staff order was properly issued. The legal requirements have been met.

COMMISSIONER BERNTHAL: And the General Counsel agrees?

MR. PLAINE: At the moment I do. I don't want to give you a definite answer at this moment. I haven't looked into it, but my present inclination is that, if the public health and safety is justified, has been justified, that you ought to be very slow to cause a disruption of the operation.

COMMISSIONER BERNTHAL: Well, Mr. Chairman, on that basis, assuming we are not running into a legal morass here, I am prepared to, I guess, continue on the course that we are on here and would support the staff action.

CHAIRMAN PALLADINO: Well, with regard to the motion

made by Commissioner Asselstine, I presume you are voting against it?

COMMISSIONER BERNTHAL: Yes, that's right.

COMMISSIONER ROBERTS: I would vote against it.

CHAIRMAN PALLADINO: I would vote against it and I presume you would --

COMMISSIONER ASSELSTINE: I would vote for it.

COMMISSIONER BERNTHAL: Do you have a proxy, too?

COMMISSIONER ASSELSTINE: I don't have one. We don't vote by proxy. That's the other end of the street.

(Laughter.)

CHAIRMAN PALLADINO: So we have voted and there are three against that motion and one for it. Is there any other item?

COMMISSIONER ASSELSTINE: No.

CHAIRMAN PALLADINO: I must make a correction in my opening remarks. I was told that there is a pending hearing on a previous Grand Gulf license amendment. We cannot determine what the issues in that hearing are and whether they bear any relationship to the issue being discussed today.

So I should amend my opening statement to reflect that there is a pending proceeding and want to restate my view that OGC should review the transcript for the need to serve it on the Grand Gulf parties as well as interested persons in all licensing cases.

COMMISSIONER BERNTHAL: Mr. Chairman, I would like to make one further request and that is that General Counsel be directed, as I assume he would do anyway in this circumstance, to take a careful look at what the regulatory and legal requirements are in this circumstance and report back immediately to the Commission with that.

CHAIRMAN PALLADINO: With regard to whether or not the staff had the authority to do what it did?

COMMISSIONER BERNTHAL: That's right.

CHAIRMAN PALLADINO: I so direct.

MR. PLAINE: Thank you.

CHAIRMAN PALLADINO: Anything more to come before us on this matter?

(No response.)

CHAIRMAN PALLADINO: Thank you. We will stand adjourned.

(Whereupon, the foregoing meeting was concluded at 11:25 o'clock, a.m.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the Commission in the matter of: Discussion of Grand Gulf Diesel Generator Inspection Order, held on Thursday, May 24, 1984, at 1717 H Street, N. W., Washington, D. C., were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Elizabeth Ann Tipton
Official Reporter (typed)

Elizabeth Ann Tipton
Official Reporter (Signature)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 18 1984

Docket No. 50-416

Mr. J. P. McGaughy
Vice President, Nuclear Production
Mississippi Power & Light Company
P.O. Box 1640
Jackson, Mississippi 39205

Dear Mr. McGaughy:

Subject: Issuance of Order Restricting Conditions for Operation (Effective Immediately)

The Commission has issued the enclosed Order Restricting Conditions for Operation (Effective Immediately) related to the Grand Gulf Nuclear Plant, Unit 1, Facility Operating License No. NPF-13. Mississippi Power & Light Company (MP&L) shall not operate the plant unless such operation is in conformance with the revised Technical Specifications appended to the Order and MP&L, prior to entry into mode 2, certifies to the Regional Administrator, Region II, that MP&L's procedures have been modified and training conducted to reflect the revised Technical Specifications.

A copy of the Order has been filed with the Office of the Federal Register for publication.

Sincerely,

Elinor G. Adensam

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosure:
Order

cc: See next page

GRAND GULF

APR

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President
Claiborne County Board of Supervisors
Port Gibson, Mississippi 39150

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

U.S. Environmental Protection Agency
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Atlanta, Georgia 30309

Dr. Alton B. Cobb
State Board of Health
P.O. Box 1700
Jackson, Mississippi 39205

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
MISSISSIPPI POWER & LIGHT COMPANY	)	Docket No. 50-416
MIDDLE SOUTH ENERGY, INC., AND	)	
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION	)	
(Grand Gulf Nuclear Station)	)	

ORDER RESTRICTING CONDITIONS FOR OPERATION
(EFFECTIVE IMMEDIATELY)

I.

Mississippi Power & Light Company (MP&L), Middle South Energy, Inc., and South Mississippi Electric Power Association (the licensees) are the holders of Facility Operating License No. NPF-13, which authorizes the operation of the Grand Gulf Nuclear Station, Unit 1 (the facility) at steady state reactor power levels not in excess of 191 megawatts thermal. The facility consists of a boiling water reactor (BWR/6) with a Mark III containment located in Claiborne County, Mississippi.

II.

On June 16, 1982, a low power license was issued for the Grand Gulf Nuclear Station, Unit 1. Inspections by Region II in regard to compliance of surveillance procedures with the Technical Specifications were performed from June 16, 1982, to October 8, 1982, and discrepancies in the surveillance procedures and Technical Specifications were identified. Based on these inspections, a Confirmation of Action (COA) letter was issued to restrict the next criticality (plant then in shutdown for other reasons) until the identified discrepancies were resolved. At the conclusion of this phase of MP&L's review,

in late August 1983, another inspection was held to discuss the reasons for the discrepancies and to determine whether changes required for operation through the first fuel cycle had been submitted. The plant returned to criticality on September 25, 1983, and low power tests were conducted until November 8, 1983. The plant was shut down after testing and remained shutdown while undertaking an extensive licensed operator recertification program (another problem identified by Region II in early November 1983). During this shutdown, MP&L and the staff reviewed again the Technical Specifications as issued through Amendment No. 12 to the Operating License. Again, each review party found further problem areas, thus necessitating a complete, high quality review of the Technical Specifications by MP&L. A review program was initiated by MP&L on March 2, 1984, which involved approximately 150 personnel from MP&L, General Electric and Bechtel. From previous reviews and inspections and the program reviews, approximately 350 Technical Specification problem areas were identified.

III.

As a result of the above reviews and inspections, it was found that certain Technical Specifications are (1) inconsistent with the as-built plant and may thereby create unnecessary confusion to the plant operating staff or otherwise increase the risk of human error, and/or (2) inconsistent with the safety analyses associated with the basis for the plant design such that compliance with those Technical Specifications would permit operation under unanalyzed conditions with reduced margins of safety.

Consequently, the uncertainties raised by these inconsistencies require changes to the Technical Specifications to prevent the potential for undue

risk to the public from operation of the facility up to power levels currently authorized. While all of the problems with the Technical Specifications will need to be resolved, operation at a power level of up to 5% does not require all such problems to be resolved at this time. A safety evaluation is attached as Attachment 1 which describes the changes required for 5% power operation and the reasons for each change. Therefore, I have determined that the public health, safety and interest require that, effective immediately, the licensees' current authorization under the license be restricted in accordance with this Order.

IV.

Accordingly, pursuant to sections 103, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, it is hereby ordered, effective immediately, that:

> MP&L shall not operate the Grand Gulf plant under the terms of License No. NPF-13 unless such operation is in conformance with the revised Technical Specifications appended to this Order and MP&L, prior to entry into mode 2, certifies to the Regional Administrator, Region II, that MP&L's procedures have been modified and training conducted to reflect the revised Technical Specifications.

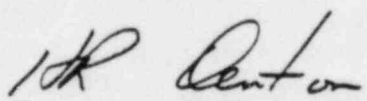
V.

Within 20 days of the date of this Order, the licensees may show cause why the actions described in Section IV should not have been ordered by filing a

written answer under oath or affirmation that sets forth the matters of fact and law on which the licensees rely. As provided in 10 CFR 2.202(d), the licensees may answer by consenting to the Order set forth in Section IV of this Order to show cause. Alternatively, the licensees may request a hearing on this Order. Any request for a hearing on this Order or answer to the Order must be filed within 20 days of the date of this Order with the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. A copy of the request shall also be sent to the Executive Legal Director at the same address. A request for a hearing shall not stay the immediate effectiveness of Section IV of this Order.

If the licensees request a hearing on this Order, the Commission will issue an order designating the time and place of hearing. If a hearing is held, the issue to be considered at such a hearing shall be whether the Order should be sustained.

FOR THE NUCLEAR REGULATORY COMMISSION



Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Attachments:
(1) Safety Evaluation
(2) Revised Technical Specifications

Dated at Bethesda, Maryland
this 18th day of April 1984

SAFETY EVALUATION OF GRAND GULF UNIT 1 TECHNICAL SPECIFICATIONS FOR LOW-POWER OPERATION

The staff has reviewed the Grand Gulf Technical Specifications (TS) to determine whether changes should be made to the TS for operation under the existing low-power (5%) license.

In the past 9 months, the licensee has been reviewing the Technical Specifications. In March 1984, the licensee initiated a comprehensive review of TS by comparing the TS with the Grand Gulf Final Safety Analysis Report (FSAR) requirements, the NRC staff's Safety Evaluation Report (SER) for Grand Gulf, the as-built design, and the staff's draft BWR/6 Standard Technical Specifications. As a result, the licensee has identified 357 problem areas which may result in requests for changes to the TS. Each area is assigned a problem sheet number which will be used to track the resolution of the problem either by obtaining a change to the TS or to otherwise resolve it. Based on its review, the licensee has requested TS changes for 23 problem areas; 14 were requested for restart and operation under the present low-power license, and 9 for power escalation tests. All of these were selected for resolution because these Technical Specifications were found by the licensee to be nonconservative with respect to the FSAR safety analyses and the SER.

The NRC staff and its consultant, Idaho National Engineering Laboratory (INEL), also reviewed the TS to determine any nonconservative specifications relative to the FSAR or SER. Most of the staff recommendations and comments regarding changes to the TS have been considered by Mississippi Power and Light (MP&L) and included in their identified 357 problem areas. For operation under the low-power license (5% power), the staff has not found any specifications that need to be changed in addition to the problem areas identified by MP&L. For operation above 5% power, the staff has identified several problem areas that will be resolved with the license in addition to those identified by the licensee. A safety evaluation for Technical Specification changes needed for power escalation above 5% power will be issued with the issuance of the full-power license amendment.

Table 1 lists the Technical Specification changes identified by the licensee as being needed prior to operation up to 5% power and above 5% power. Based on its review of these 23 nonconservative problem areas and related requests for Technical Specification changes identified by MP&L, the NRC staff finds that for 22 of the problem areas, the change will be in the direction of increased safety. However, the change requested for the standby gas treatment system (Problem Sheet No. 262) to allow bypassing of the radiation monitor during tests is not acceptable because it could result in unmonitored release of radioactive gaseous effluent. Therefore, the change identified by Problem Sheet No. 262 is not acceptabled based on the information provided in the request letter and will not be made in this Order.

The staff's safety evaluation of each of the 23 problem areas is provided below. Attachment 2 provides the Grand Gulf Technical Specification page changes implemented by this Order.

The NRC staff concludes that, with the changes implemented by this Order, the Technical Specifications required for operation under the current license, which is limited to 5% power, is in accordance with the FSAR, SER, and applicable regulatory requirements.

Table 1

23 Technical Specification Changes Requested by MP&L

Problem Sheet No.	Item	Licensee Letter Date
001	Number of Automatic Depressurization System Valves	03/20/84
005	Reactor Water Cleanup System Isolation Instrumentation	03/20/84
015	Drywell and Containment Pressure Setpoints	04/07/84
016	Containment High Pressure Setpoints	04/07/84
021 & 139	Listing of Safety-Related Mechanical Snubbers	03/29/84 & 10/07/83
033	Containment Spray System Timer Setpoints	04/07/84
037	Calibration Frequency of Rosemont and Riley Instruments	12/14/83
038	Radiation Monitor Calibration Frequency	04/07/84
054	Containment Spray Actuation Instrumentation	03/29/84
076	Emergency Core Cooling System Response Times	Item 6, 09/09/83
078	Reactor Core Isolation Cooling System Initiation Instruments	10/11/83
103	Main Steam Flow Instrumentation	04/07/84
198	Radiation Monitor Instrumentation	03/29/84
213	Automatic Depressurization System Instrumentation	03/29/84
233	Containment Spray Flow Conditions	04/07/84
262	Standby Gas Treatment System Radioactivity Monitor	04/07/84
285	Chlorine Detector Calibration Frequency	03/29/84
292 & 293	Containment and Drywell Air Locks Test Pressure	04/07/84
306	Listing of Drywell Isolation Valves	04/07/84
308	Room Air Temperature Trip Setpoints	04/10/84
329	Accident Monitoring Instrumentation	04/10/84

Problem Sheet No. 001, Number of Automatic Depressurization System Valves

(1) Technical Specification

Section 3.5.1, ECCS - Operating, Limiting Condition for Operation (LCO), page 3/4 5-1; Bases 3/4.5.1 and 3/4.5.2, ECCS - Operating and Shutdown, pages B 3/4 5-1 and B 3/4 5-2.

(2) Change

Changed LCO to require "eight" operable ADS valves instead of "At least 7."

Changed Bases to indicate that the ADS controls "eight" selected valves instead of "seven," and that the safety analyses take credit for "seven" of these valves instead of "six."

(3) Reason for Change

Restore operating safety margins to those associated with initial conditions used in the safety analyses.

(4) Evaluation

The requested change would require that eight valves in the automatic depressurization system (ADS) be operable rather than the currently specified seven valves. The FSAR safety analyses are based on the use of eight valves for depressurization following an accident. In addition, the bases would be changed to allow operation with seven valves for 14 days if one valve is inoperable.

In a letter dated March 20, 1984, the licensee also provided the results of small-break loss-of-coolant-accident (LOCA) analyses that indicate that credit for only seven valves is needed to satisfy 10 CFR 50.46 acceptance criteria. The NRC staff has reviewed the results of the analyses and concludes that it is acceptable to allow one of the eight valves to be inoperable for up to 14 days. The LOCA analyses were performed using emergency core cooling system (ECCS) evaluation models which have been previously approved by the staff.

The changes are necessary and sufficient to correct deficiencies in the present specifications for ADS valves.

Problem Sheet No. 005, Reactor Water Cleanup System Isolation Instrumentation

(1) Technical Specification

Table 3.3.2-1, Isolation Actuation Instrumentation, page 3/4 3-12.

(2) Change

Changed to indicate "1" minimum operable channel per trip system, instead of "NA," for the standby liquid control system (SLCS) initiation of RWCU isolation function.

Changed applicable operational condition to "5" instead of "3," and added footnote "##" to require the SLCS initiation of RWCU isolation function to be operable in Operational Condition 5 only when control rods are withdrawn, but not if removed per Technical Specification 3.9.10.1 or 3.9.10.2.

Replaced present ACTION 27 for the SLCS initiation RWCU isolation function with new ACTION 30 on Table 3.3.2-1, which requires the affected SLCS pump to be declared inoperable whenever the associated SLCS initiation instrumentation is inoperable.

(3) Reason for Change

Reflect actual design of the SLCS initiation of RWCU isolation function which consists of 1 channel per trip system.

Provide clarity, completeness, and prevent unnecessary isolation of an unrelated system.

(4) Evaluation

The reactor water cleanup system is isolated automatically upon standby liquid control system initiation. Each of the two isolation trip systems receive signals from the SLCS. Each isolation trip systems' SLCS inputs are arranged in a one-out-of-one logic for isolation valve actuation. The "A" trip system initiates closure of valve G33-F004 and the "B" trip system initiates closure of valves G33-F001 and G33-F251.

In the issued version of the Grand Gulf Unit 1 Technical Specifications, the MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM column of Table 3.3.2-1 incorrectly includes NA for the SLCS initiation for RWCU isolation. If the RWCU is not isolated, some of the sodium pentaborate injected into the reactor to shut it down could be taken out of the reactor. Therefore, the effective Technical Specification is nonconservative with respect to system design and anticipated system performance. The licensee's proposed change corrects this deficiency in the Technical Specifications and is, therefore, necessary and sufficient.

Operational Condition 5 is the reactor refueling condition. The NRC staff finds this change to be necessary. It is acceptable in that maintenance on the SLCS would be performed in the refueling condition with all control rods inserted.

The staff has reviewed the requested change in the action statements for the operability requirements of the SLCS initiating instrumentation. The applicant has proposed a new ACTION statement that would declare the SLCS pump with the inoperable initiation instrumentation to be inoperable. The staff concludes that this Technical Specification change is acceptable because it is consistent with approved technical specification philosophy.

Problem Sheet No. 015, Drywell and Containment Pressure Setpoints

(1) Technical Specification

Tables 2.2.1-1, Reactor Protection System Instrumentation Setpoints, page 2-4; 3.3.2-2, Isolation Actuation Instrumentation Setpoints, pages 3/4 3-15, 3/4 3-16, 3/4 3-17a; 3.3.3-2, Emergency Core Cooling System Actuation Instrumentation Setpoints, page 3/4 3-28; and 3.3.8-2, Plant Systems Actuation Instrumentation Setpoints, page 3/4 3-99.

Bases 2.2.1, Reactor Protection System Instrumentation Setpoints, page B 2-8; 3/4.3.2, Isolation Actuation Instrumentation, page B 3/4 3-1; 3/4.3.3, Emergency Core Cooling System Actuation Instrumentation, page B 3/4 3-2; and 3/4.3.8, Plant Systems Actuation Instrumentation, page B 3/4 3-6.

(2) Change

Revised the drywell and containment pressure instrument setpoints and allowable values to account for the effect of worst case negative barometric pressure changes.

The Bases sections are supplemented to reflect that negative barometric pressure fluctuations are accounted for in the trip setpoints and allowable values specified for drywell and containment pressure-high.

(3) Reason for Change

Revise setpoints and allowable values because the drywell and containment pressure instrumentation do not automatically compensate for changes in barometric pressure, and which, if omitted, could contribute to delayed safety system initiation.

(4) Evaluation

For the Grand Gulf 1 design, both the drywell and containment pressure instrumentation provide trip signals that are necessary to ensure the capability to prevent or mitigate the consequences of postulated accidents. In addition, the drywell pressure instrumentation also provides trip signals required for achieving safe shutdown.

The licensee has stated that historical weather information for the plant locale indicates that the largest negative barometric deviation from standard pressure expected is 0.50 psi. The NRC staff has independently reviewed severe weather data including data for hurricanes and confirmed that 0.50 psi bounds expected pressure decreases. To ensure that the instrument trip setpoints set during normal weather conditions are not exceeded during storm conditions, the licensee has proposed to reduce the setpoints and allowable values by 0.50 psi.

The changes to the Bases sections identify which setpoints are affected by barometric pressure changes.

The changes to the drywell and containment pressure instrumentation setpoints and allowable values are necessary to bring limiting initial containment and drywell initial pressures into agreement with initial containment and drywell pressures assumed in FSAR safety analyses. An analysis is in progress to justify higher values; however, as an interim measure, the licensee has proposed these more conservative values.

The licensee has stated that the proposed changes are necessary and sufficient to bring the setpoints into agreement with FSAR safety analyses.

In response to a request from the NRC staff, the licensee is participating in a BWR Owners' Group effort to provide more detailed information on their setpoint methodology. The staff concludes that there is reasonable assurance, based on staff participation in meetings with the BWR Owners' Group working group on setpoint methodology, that the forthcoming more detailed information on setpoints and setpoint methodology being developed by this group will verify the acceptability of the proposed setpoints. In the interim, the staff finds that the change is in the conservative direction and is acceptable.

Problem Sheet No. 016, Containment High Pressure Setpoints

(1) Technical Specification

Table 3.3.8-2, Plant Systems Actuation Instrumentation Setpoints, page 3/4 3-99.

(2) Change

Containment high-pressure trip setpoint is changed to "7.84 psig" instead of "9 psig," and the corresponding allowable value is changed to "8.34 psig" instead of "9.2 psig."

(3) Reason for Change

Restore safety margins to those associated with the safety analyses.

(4) Evaluation

In response to a recommendation from the nuclear steam supply system (NSSS) vendor (General Electric), the licensee is proposing to revise the containment spray initiation instrumentation trip setpoint and allowable value. The licensee has stated that this change is necessary to correct an error by the NSSS vendor.

The licensee has stated that this change is necessary and sufficient to bring the Technical Specification trip setpoint and allowable value to values consistent with the assumptions of the safety analyses.

In response to a request from the NRC staff, the licensee is participating in a BWR Owners' Group effort to provide more detailed information on their setpoint methodology. The staff concludes that there is reasonable assurance, based on staff participation in meetings with the BWR Owners' Group working group on setpoint methodology, that the forthcoming more-detailed information on setpoints and setpoint methodology being developed by this group will verify the acceptability of the proposed setpoints. In the interim, the staff finds that the change is in the conservative direction and is acceptable.

Problem Sheet Nos. 021 and 139, Listing of Safety-Related Mechanical Snubbers

(1) Technical Specification

Table 3.7.4-2, Safety Related Mechanical Snubbers, page 3/4 7-16.

(2) Change

Changed the list of snubbers.

(3) Reason for Change

The snubber list changes are needed to make the list consistent with the as-built plant.

(4) Evaluation

Snubber operability is determined by an inspection defined in the surveillance requirements. A footnote to Table 3.7.4-2 allows the licensee to add snubbers to the list when they are found to be needed provided a revision to the table is included with the next license amendment request. The requirement in the footnote to include changes in the next license amendment allows the NRC staff to review the changes in a timely manner.

Technical Specification Section 3.7.4 requires that snubbers on systems required to be operable in operational condition 4 (cold shutdown with average reactor coolant temperature less than or equal to 200°F) and operational condition 5 (refueling) must themselves also be operable in operational conditions 4 and 5. Since the reactor is in operational condition 4, this Technical Specification change is necessary.

Problem Sheet No. 033, Containment Spray System Timer Setpoints

(1) Technical Specification

Table 3.3.8-2, Plant Systems Actuation Instrumentation Setpoints, page 3/4 3-99; and Bases 3/4.3.8, Plant Systems Actuation Instrumentation, page B 3/4 3-6.

(2) Change

Revised trip setpoints and allowable values in both containment spray system timers.

Revised Bases to refer to the analyzed minimum and maximum time delays between the initiation of the accident and containment spray initiation, which are 10 minutes and 13 minutes, respectively.

(3) Reason for Change

Restore margins assumed in safety analyses. Present timer settings permit analytical limits for containment spray initiation to be exceeded and possible delayed safety system initiation.

Avoid operation which could lead to unanalyzed conditions.

(4) Evaluation

The low-pressure coolant injection system and the containment spray system are subsystems of the residual heat removal (RHR) system. Two of three RHR trains automatically divert low-pressure coolant injection flow from the core to the containment spray provided certain conditions are sensed by the containment spray initiation logic. Timers are provided within this logic to ensure that injection flow is directed to the core for at least 10 minutes and that containment spray will be initiated no later than 13 minutes following a LOCA. These values were used in the safety analyses for core cooling and initiation of containment spray following a LOCA. In reviewing the setpoint calculations, the licensee determined that there is a nonconservative error in the setpoint resulting from a mistake in determining the total loop accuracy. In addition, the licensee discovered that the additional 90-second time delay in the initiation of Train B was not considered in the FSAR safety analyses. Accordingly, the licensee has proposed trip setpoints and allowable values to correct the deficiency in summing the instrument loop inaccuracy and to remove the time delay in Train B initiation. A footnote is proposed to be added to Table 3.3.8-2 to clarify the new trip setpoint for the System B timers. This footnote will specify that the present 90-second delay is to be set at a value not to exceed 10 seconds. A change to the bases has been proposed to address the upper and lower analytical time limits associated with containment spray initiation.

The licensee has stated that this change to the Technical Specifications is necessary and sufficient to correct the nonconservative errors in the setpoints and allowable values.

In response to a request from the NRC staff, the licensee is participating in a BWR Owners' Group effort to provide more detailed information on their setpoint methodology. The staff concludes that there is reasonable assurance, based on staff participation in meetings with the BWR Owners' Group working group on setpoint methodology, that the forthcoming more-detailed information on setpoints and setpoint methodology being developed by this group will verify the acceptability of the proposed setpoints. In the interim, the staff finds that the change is in the conservative direction and is acceptable.

Problem Sheet No. 037, Calibration Frequency of Rosemont and Riley Instruments

(1) Technical Specification

Table 4.3.2.1-1, Isolation Actuation Instrumentation Surveillance Requirements, pages 3/4 3-20 through 3/4 3-23a.

(2) Change

Changed to add footnote (c) requiring trip unit calibration at least once per 31 days to all Rosemont trip units.

Changed the channel calibration frequency for Riley temperature switches from 18 months to annual.

(3) Reason for Change

Ensure consistency within Technical Specifications for trip unit calibration frequency and thereby avoid operator confusion and minimize the potential for human error.

Restore design margin by changing to manufacturer's recommended calibration frequency.

(4) Evaluation

Footnote (c) which states "Calibrate trip unit at least once per 31 days" is applied to certain Rosemont trip units associated with the isolation actuation instrumentation channels delineated in Table 4.3.2.1-1 of the Technical Specifications. By letter dated September 9, 1983, from A. Schwencer (NRC) to J. P. McGaughy (MP&L), the NRC staff requested that the licensee provide the rationale for calibrating certain Rosemont trip units at 18-month intervals and other Rosemont trip units at 31-day intervals. In response to the staff's request, by letter dated October 14, 1983, from L. F. Dale (MP&L) to H. Denton (NRC), the licensee stated that the Rosemont trip unit for each channel delineated in Table 4.3.2.1-1 (isolation actuation instrumentation) was being calibrated monthly, and changes would be proposed to the Technical Specifications to require this surveillance frequency on all Rosemont trip units.

Through its review of the isolation actuation instrumentation surveillance requirements, the licensee determined another case where the surveillance testing interval for Riley temperature switches required by the Technical Specifications was greater than that recommended by the manufacturer. Temperature-monitoring instrument channels are currently being calibrated yearly to satisfy manufacturer's recommendations. To resolve this deficiency, Technical Specification requirements for the temperature-monitoring instruments are being changed to be consistent with the component manufacturer's recommendations.

On the basis of its review, the staff finds that the Technical Specification changes are necessary to provide surveillance requirements consistent

with the manufacturers' recommendations. Therefore, the staff finds the Technical Specification changes acceptable.

Problem Sheet No. 038, Radiation Monitor Calibration Frequency

(1) Technical Specification

Tables 4.3.2.1-1, Isolation Actuation Instrumentation Surveillance Requirements, page 3/4 3-20; 4.3.7.1-1, Radiation Monitoring Instrumentation Surveillance Requirements, page 3/4 3-59; 4.3.7.5-1, Accident Monitoring Instrumentation Surveillance Requirements, page 3/4 3-72; and 4.3.7.12-1, Radioactive Gaseous Effluent Monitoring Instrumentation Surveillance Requirements, page 3/4 3-92.

(2) Change

Changed the channel calibration frequency for accessible and continuous radiation monitors from 18 months to 12 months.

(3) Reason for Change

Recommended by vendor and stated in FSAR.

(4) Evaluation

From a review of the FSAR and the Technical Specifications, the licensee has found a discrepancy between the commitments contained in the FSAR and the requirements of the Technical Specifications. The FSAR states that continuous radiation monitoring instruments that are accessible during normal operation and airborne radiation monitors will be calibrated annually based on the vendor's recommendations.

The staff finds these changes are necessary to provide surveillance requirements consistent with vendor's recommendations, and are therefore acceptable.

Problem Sheet No. 054, Containment Spray Actuation Instrumentation

(1) Technical Specification

Section 3.3.8, Plant Systems Actuation Instrumentation; Table 3.3.8-1, Plant Systems Actuation Instrumentation, pages 3/4 3-96 through 3/4 3-98a.

(2) Change

Revised to require that, with nonconservative setpoints, the channel is declared inoperable and action is taken as required by Table 3.3.8-1.

Revised to require that with inoperable channels, the action required by Table 3.3.8-1 is to be taken.

Revised to transfer existing requirements to Table 3.3.8-1.

Revised to require two operable drywell pressure-high and reactor vessel water level (level 1) channels for each containment spray trip system. Also revised to indicate the Action Statement corresponding to each of the actuation instruments.

(3) Reason for Change

Reflect actual system design and avoid operation with conditions leading to unanalyzed events. (Existing Technical Specification permits the timers, if inoperable, to be placed in a tripped condition that could lead to premature LPCI flow diversion to the containment spray header.)

Reflect actual system design (presently indicates there are two, rather than one, trip systems per containment spray system) which, if uncorrected, could confuse operators and contribute to potential for human error.

Revise to implement Action Statements 3.3.8.a, 3.3.8.b, and 3.3.8.c in a consistent manner so as to avoid operator confusion and minimize potential for human error.

(4) Evaluation

Coolant flow for the containment spray system is provided by the residual heat removal pumps, which also provide flow for low-pressure coolant injection for the first 10 minutes following a LOCA. The design includes two containment spray trains (A and B). Each containment spray train is initiated by its associated instrument trip system. Each trip system consists of the following channels:

(1) two drywell pressure-high
(2) two containment pressure-high
(3) two reactor vessel water level-low (level 1)
(4) one 10-minute timer (system B has an additional timer to provide a delay of up to 90 seconds after the system A trip)

Upon sensing a LOCA condition via the drywell pressure-high and/or vessel water level-low instrumentation, the spray actuation instrumentation starts its timers. If at the end of the timer cycle (10 minutes) a containment high-pressure signal exists, the low-pressure coolant injection train A flow will be automatically diverted from coolant injection into the core to the containment spray function. Simultaneously, at the end of its timers' cycles, low-pressure coolant injection system B flow to the core will be automatically diverted to containment spray provided a containment high-pressure condition is sensed. To meet FSAR analyses of a LOCA, the coolant flow to the core must continue for at least 10 minutes and spray flow must begin prior to 13 minutes after the LOCA.

In order to ensure the operability of the containment spray function given a single failure, the minimum number of required operable channels is proposed to be changed from one per trip system to two per trip system for the drywell pressure-high and the reactor vessel low-level 1 instruments.

Changes to the Action Statements in Technical Specification 3.3.8 are required to be consistent with the system design. In the issued version of the Technical Specifications, Action Statements a and b.1 incorrectly require that inoperable timers be placed in the tripped condition. Placing a timer in the tripped condition could result in premature diversion of low-pressure coolant injection flow to the containment sprays. The correct action is to declare the associated trip system inoperable when a timer is inoperable and then take the action required by Technical Specification 3.6.3.2.

In the issued version of the Grand Gulf Technical Specifications, Action Statement 2.b indicated that there are two, rather than one, trip system for each spray system. Corrections to indicate the installed number of trip systems are proposed, and appear in Action 130b on Table 3.3.8-1. Other changes are proposed to reformat the required actions when instrument channels are determined to be inoperable.

Based on its review, the staff finds that the proposed changes improve system reliability and provide a sufficiently conservative set of requirements should one or more channels become inoperable. These changes are in accordance with the regulatory guidelines of the Standard Technical Specifications for General Electric Boiling Water Reactors and are necessary to correct a deficiency in the Grand Gulf Technical Specifications.

Problem Sheet No. 076, Emergency Core Cooling System Response Times

(1) Technical Specification

Table 3.3.3-3, Emergency Core Cooling System Response Times (Seconds), page 3/4 3-30.

(2) Change

Revised to change response time of LPCI pumps for the injection mode of RHR system to "≤40" seconds.

(3) Reason for Change

Restore margin to that assumed in safety analyses. If uncorrected, could permit operation leading to unanalyzed events. (Existing pump response time of 45 seconds for pumps A and B is inconsistent with the response time of 40 seconds used in safety analysis providing basis for plant design.)

(4) Evaluation

The change requires a faster response of the low-pressure coolant injection (LPCI) system following receipt of an emergency core cooling system (ECCS) actuation signal. The response time of less than or equal to 40 seconds is consistent with the analyses assumptions used for ECCS evaluation in Section 6.3 of the Grand Gulf Final Safety Analysis Report (FSAR).

The change is necessary to make the Technical Specifications consistent with accident analyses, and is acceptable.

Problem Sheet No. 078, Reactor Core Isolation Cooling System Initiation

(1) Technical Specification

Table 3.3.5-1, Reactor Core Isolation Cooling System Actuation Instrumentation, pages 3/4 3-45 and 3/4 3-46.

(2) Change

Minimum OPERABLE channels per trip system for Reactor Vessel Water Level-Low, Level 2 is changed from "2" to "4." Present ACTION 50 is changed to reflect only one trip system rather than two.

(3) Reason for Change

Reflect actual system design and provide a conservative set of requirements should one or more channels become inoperable.

(4) Evaluation

The reactor core isolation cooling system initiates on low reactor water level. The initiation logic is arranged as one trip system with four water level signals feeding a one-out-of-two-twice logic. The present requirement of 2 minimum OPERABLE channels per trip system would not result in RCIC initiation unless the correct 2 channels are operable. To assure that RCIC initiation is available given a single failure, the minimum OPERABLE channels per trip system should be revised from 2 to 4 channels. In addition, the proposed change to ACTION 50 is needed. The proposed ACTION statement addresses the one trip system design of the Grand Gulf RCIC system and replaces an ACTION statement intended for a 2-trip system design.

On the basis of its review, the staff finds that the changes enhance system reliability and provide a sufficiently conservative set of requirements should one or more channels become inoperable. These changes are in accordance with the regulatory guidelines of the Standard Technical Specifications for General Electric Boiling Water Reactors and are necessary to correct a deficiency in the Grand Gulf Technical Specifications.

Problem Sheet No. 103, Main Steam Flow Instrumentation

(1) Technical Specification

Table 3.3.2-1, Isolation Actuation Instrumentation, pages 3/4 3-10, 3/4 3-14a.

(2) Change

The number of main steam line flow channels required to be operable in each trip system is revised from "2" to "8," and note (g) is deleted.

(3) Reason for Change

Reflect actual plant trip logic design and provide Technical Specification requirements consistent with the single-failure criteria assumed in safety analyses.

(4) Evaluation

For the Grand Gulf design, one of the signals that initiates main steam line (MSL) isolation is high steam line flow. Sixteen main steam line flow instrument channels are arranged into two trip systems, each trip system containing two channels per steam line for a total of eight channels per trip system. To assure initiation of MSL isolation, postulating a single failure in the instrumentation system, all eight MSL flow channels in each trip system should be operable. Therefore, the licensee has proposed to revise the minimum channels operable requirements of the Technical Specifications from two per trip system to eight per trip system. With the change from 2 to 8 channels per trip, footnote g is not required.

Based on its review, the staff finds that the changes improve system reliability and provide a sufficiently conservative set of requirements should one or more channels become inoperable. These changes are in accordance with the regulatory guidelines of the Standard Technical Specifications for General Electric Boiling Water Reactors and are necessary to correct a deficiency in the Grand Gulf Technical Specifications.

Problem Sheet No. 198, Radiation Monitor Instrumentation

(1) Technical Specification

Table 3.3.7.1-1, Radiation Monitoring Instrumentation, pages 3/4 3-56 and 3/4 3-58.

(2) Change

Changed required minimum operable channels from 3 to 2 per trip system for items 7, 8, and 9 of the table.

Added note (h) to item 6 of Table.

Revised action statements 74 and 75 to reflect trip system logic.

(3) Reason for Change

Reflect plant design and safety analysis, thereby restoring safety margin assumed in the analysis.

Clarify system design and thereby avoid possible operator confusion and minimize the potential for human error.

Reflect plant design better and provide consistency within the Technical Specifications.

(4) Evaluation

The containment and drywell exhaust radiation monitoring subsystem, the fuel-handling area ventilation exhaust radiation monitoring subsystem, the fuel-handling area pool sump exhaust radiation monitoring subsystem and the control room ventilation radiation monitoring subsystem, each include four monitors, with each monitor assigned to a subsystem actuation channel. The channels are grouped in pairs and each pair makes a trip system. Both channels in one trip system are required to trip for the associated alarm/isolation function to occur. The effective Technical Specifications require three monitor channels to be operable in each subsystem. Such requirements do not assure actuation for the two-out-of-two logic configuration when a single failure is postulated in one of the three required instrument channels. Accordingly, to provide Technical Specification requirements which are consistent with the plant design, the licensee has proposed to revise the MINIMUM CHANNELS OPERABLE column of Table 3.3.7.1-1 from 3 to 2 per trip system. To provide ACTION statement requirements consistent with the design, the licensee has proposed to insert the phrase "in a trip system" between the words "monitors" and "inoperable" in ACTION 74 and ACTION 75. In addition, the licensee has proposed to add note "h" to item 6, the control room ventilation radiation monitoring subsystem. This note describes the logic for system initiation and does not change the requirements of the Technical Specifications.

On the basis of its review, the staff finds that the changes enhance system reliability and provide a sufficiently conservative set of requirements should one or more channels become inoperable. These changes are in accordance with the regulatory guidelines of the Standard Technical Specifications for General Electric Boiling Water Reactors and are necessary to correct a deficiency in the Grand Gulf Technical Specifications.

Problem Sheet No. 213, Automatic Depressurization System Instrumentation

(1) Technical Specification

Table 3.3.3-1, Emergency Core Cooling System Actuation Instrumentation, pages 3/4 3-25 and 3/4 3-27.

(2) Change

Changed the minimum operable channels for the ADS trip system manual initiation function from 1 per valve to to 2 per system.

Changed Action Statement 32 so that with less than the required minimum operable channels per trip function, the associated ADS trip system was declared inoperable instead of the associated ADS valve.

(3) Reason for Change

Place limiting conditions for operation and surveillance requirements on systems level ADS initiation circuits.

(4) Evaluation

The automatic depressurization system (ADS) consists of eight safety/relief valves and associated actuation instrumentation. The actuation instrumentation consists of two trip systems, either of which will actuate all eight ADS valves. Each ADS trip system includes two manual hand switches. Operation of both hand switches will produce an ADS trip system actuation signal. Table 3.3.3-1 of the effective Technical Specifications requires 1 per valve as the minimum operable channels for manual initiation. The 1 per valve refers to the hand switches used to actuate individual safety/relief valves, and not to the two hand switches per trip system used to actuate the ADS trip system. Accordingly, to provide Technical Specification requirements consistent with the design configuration for ADS initiation, the licensee has proposed to revise the "minimum operable channels per trip function" column of Table 3.3.3-1 from 1 per valve to 2 per system, and to replace the word "valve" in ACTION 32 with "trip system."

On the basis of its review, the staff finds that the change makes the Technical Specification consistent with the as-built ADS by placing limiting conditions for operation and surveillance requirements on the system level ADS manual initiation circuits. Therefore, the staff finds that the change is necessary and acceptable.

Problem Sheet No. 233, Containment Spray Flow Conditions

(1) Technical Specification

Section 4.5.1.b, Emergency Core Cooling Systems, Surveillance Requirements, page 3/4 5-4.

(2) Change

Revised to increase total developed head values for the emergency core cooling system pumps as follows:

	New Head (psid)	Previous Head (psid)
LPCS pump	≥290	≥261
LPCI pumps		
A, B, & C	≥125	≥89
HPCS pump	≥445	≥182

Revised to add "Flow and total developed head values for surveillance testing include system losses to ensure design requirements are met."

(3) Reason for Change

Reflect system design (injection) requirements. (Inservice testing of pumps to existing Specification 4.0.5 is not conservative relative to system requirements.)

Provide information for Specification 4.5.1.b to avoid personnel confusion and minimize potential for human error.

(4) Evaluation

The effective Technical Specification requires a developed head for each emergency core cooling system (ECCS) pump based on manufacturer's data. This does not include pressure losses in the system piping that occur in the as-built plant configuration. For consistency with FSAR analyses assumptions, the specification is revised to include the effect of these system losses.

The staff has compared the proposed specification with the flow-versus-head assumptions used in the emergency core cooling system analyses. The specification requires a reasonably higher developed head at the pump than assumed at the vessel in the LOCA analyses. This indicates that system losses and ECCS injection requirements have been accounted for in the proposed specification.

The staff therefore finds the change is necessary to correct a deficiency in the Technical Specifications, and is acceptable.

Problem Sheet No. 262, Standby Gas Treatment System Radioactivity Monitor

(1) Technical Specification

Tables 3.3.7.12-1, Radioactive Gaseous Effluent Monitoring Instrumentation, pages 3/4 3-90, 3/4 3-91; 4.3.7.12-1, Radioactive Gaseous Effluent Monitoring Instrumentation Surveillance Requirements, page 3/4 3-94; and 4.11.2.1.2-1, Radioactive Gaseous Waste Sampling and Analysis Program, page 3/4 11-9.

(2) Change

Added the standby gas treatment system to the Technical Specification tables for radioactive gaseous effluent monitoring.

Added the standby gas treatment system to Technical Specification Table 4.11.2.1.2-1 to provide for inclusion of measureable SGTS exhaust contributions in the dose rate calculations, if the SGTS has been run.

(3) Reason for Change

Reflect plant design and ensure consistency with the intent of 10 CFR 50 Appendix A, Criterion 64.

(4) Evaluation

The purpose of the standby gas treatment system (SGTS) radiation monitors is to measure radioactive gaseous effluent releases to the environment during and following a design-basis accident (DBA) and these radiation monitors are included in Table 4.3.7.5-1, Accident Monitoring Instrumentation. The current design meets General Design Criterion (GDC) 64 of 10 CFR 50 without changing Technical Specifications as requested. Furthermore, the radiation monitors in Table 4.11.2.1.2-1 are for the gaseous effluent monitors for normal plant operation, including anticipated operational occurrences.

The requested change could allow SGTS operation for surveillance demonstration testing without radiation monitors in service as long as grab samples are taken at least every 8 hours and analyzed for gross activity within 24 hours. A radiation monitor should be operable whenever the SGTS is in a testing mode. Testing should not start unless the respective radiation monitors are operable, and should be terminated in the event of failure of a radiation monitor. Therefore, the staff finds this request unacceptable, and this change is not included in this Order.

Problem Sheet No. 285, Chlorine Detector Calibration Frequency

(1) Technical Specification

Section 4.3.7.8, Chlorine Detection System, Surveillance Requirements, page 3/4 3-75.

(2) Change

Changed the channel calibration frequency of the chlorine detection system from 18 months to 6 months.

(3) Reason for Change

Ensure the safety margin of the design committed to in the FSAR.

(4) Evaluation

The licensee has proposed a chlorine detection instrument channel calibration frequency once per 6 months instead of once per 18 months as in the effective Technical Specifications. Regulatory Guide 1.95, Rev. 1, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," January 1977, recommends a calibration frequency of once per 6 months.

The staff finds that the change provides for surveillance requirements that are consistent with manufacturer's recommendations and regulatory guidelines. Therefore, the staff finds that the change is necessary and acceptable.

Problem Sheet No. 292 and 293, Containment and Drywell Air Locks Test Pressure

(1) Technical Specification

Sections 4.6.1.3, Containment Air Locks, Surveillance Requirements, and 4.6.2.3, Drywell Air Locks, Surveillance Requirements, pages 3/4 6-6 and 3/4 6-16.

(2) Change

Revised to require verification that the seal air flask pressure for the containment and drywell air locks is greater than or equal to "90" psig rather than "60" psig.

Changed to include the 30-day leakage criteria in the minimum required seal air flask pressure for the drywell air lock door inflatable seal system.

(3) Reason for Change

Restore margin needed for actual air lock system design. (Existing allowable seal air flask pressure is not conservative since it did provide for a 30-day leakage criteria after loss of air supply.)

Reflect system design requirements and safety analysis by ensuring drywell air lock inflatable seal integrity for 30 days upon loss of seal air supply.

(4) Evaluation

The basis for the change is that the current Technical Specification 4.6.1.3.d.2/4.6.2.3.d.2 requires verifying seal air flask pressure to be greater than or equal to 60 psig. Technical Specification 4.6.1.3.d.3/ 4.6.2.3.d.3, however, requires verifying that the system pressure does not decay more than 2 psig from 90 psig within 48 hours. Based on this allowable pressure decay rate, the air flask pressure should be changed from 60 psig to 90 psig. This will ensure that the minimum inflatable seal pressure of 60 psig will be maintained for at least 30 days assuming no active air supply. The staff finds the change to the Technical Specifications necessary and acceptable.

Problem Sheet No. 306, Listing of Drywell Isolation Valves

(1) Technical Specification

Table 3.6.4-1, "Containment and Drywell Isolation Valves," page 3/4 6-41.

(2) Change

Added 5 valves to the Technical Specification Table for "Containment and Drywell Isolation Valves."

(3) Reason for Change

Reflect plant design and thereby prevent possible operator error.

(4) Evaluation

Four check valves in the combustible gas control system are to be added to Table 3.6.4-1. In addition, a normally locked closed refueling pool drain system valve is to be added.

Two of these check valves, E61-F002A and B, are located on the drywell purge compressor lines (one per line). The remaining check valves, E61-F004A and B, are located on the post-LOCA drywell vacuum breaker line. In light of the fact that there are no inboard isolation valves provided for these lines, these check valves perform isolation functions as backups to the outboard isolation valves presently existing in those lines. Inclusion of these check valves in Table 3.6.4-1 because of their backup isolation functions is, therefore, considered by the licensee to be appropriate.

A normally locked closed drain valve, G41-F265, is also added to the table. This valve is an upper containment pool drain system valve that is only opened during a refueling outage. Because this valve is on a line that penetrates the drywell, inclusion of this valve in the table is considered by the licensee to be appropriate.

The changes correct the Technical Specifications to reflect the plant design configuration and are, therefore, acceptable.

Problem Sheet No. 308, Room Air Temperature Trip Setpoints

(1) Technical Specification

Table 3.3.2-2, Isolation Actuation Instrumentation Setpoints, pages 3/4 3-16, 3/4 3-17, 3/4 3-17a.

(2) Change

Decreased the trip setpoints and allowable values for the temperature-high functions for RWCU, RCIC, and RHR system leakage detection instrumentation.

(3) Reason for Change

Reflect plant design to ensure proper leakage detection, thereby ensuring safety margins.

(4) Evaluation

The licensee has reviewed the calculations used to establish trip setpoints and allowable values for the temperature sensing instrument channels that provide input to the leak detection isolation features. From this review, the licensee has determined that the values are too high to ensure prompt isolation. Using the current Technical Specification values may result in delayed detection or in some cases no detection of a 25 gpm leak.

In response to a request from the NRC staff, the licensee is participating in a BWR Owners' Group effort to provide more detailed information on their setpoint methodology. The staff concludes that there is reasonable assurance, based on staff participation in meetings with the BWR Owners' Group working group on setpoint methodology, that the forthcoming more-detailed information on setpoints and setpoint methodology being developed by this group will verify the acceptability of the proposed setpoints. In the interim, the staff finds that the proposed change is in the conservative direction and is acceptable.

Problem Sheet No. 329, Accident Monitoring Instrumentation

(1) Technical Specification

Table 3.3.7.5-1, Accident Monitoring Instrumentation, page 3/4 3-70.

(2) Change

Transferred and increased the operational conditions applicable to each accident monitoring instrument from Table 3.3.7.5-1.

Changed titles of Items 13 through 18 to indicate the specific monitor type.

For item 2, changed from Action Statement 80 to new Action Statement 82.

(3) Reason for Change

Reflect plant design requirements thereby ensuring safety margins.

Avoid possible operator error.

Reflect plant design thereby ensuring proper operator action.

(4) Evaluation

The present applicability is for operational conditions 1 and 2 for all instrumentation. The change extends applicability to other conditions (3, 4 and 5) on an instrument specific basis, as a result of licensee's review based on FSAR Appendix 15A, entitled "Plant Nuclear Safety Operational Analysis." Because the change expands the applicability of the current specification, it is considered conservative and, therefore, acceptable.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 25 1984

Docket No. 50-416

Mr. J. P. McGaughy
Vice President
Nuclear Production
Mississippi Power and Light Company
Post Office Box 1640
Jackson, Mississippi 39205

Dear Mr. McGaughy:

SUBJECT: NRC STAFF EVALUATION OF THE TDI DIESEL GENERATOR RELIABILITY FOR POWER OPERATION AT GRAND GULF NUCLEAR STATION, UNIT 1

As a basis for operation of Grand Gulf Unit 1 at full power, Mississippi Power & Light (MP&L) submitted reports dated February 20 and April 17, 1984, concerning the MP&L program to verify and enhance the reliability of the TDI diesel generators at Grand Gulf Unit 1. These submittals were in response to the NRC questions on the TDI issue and are supplemental to other MP&L responses to the NRC requests contained in letters to J. P. McGaughy dated October 31, 1983 and December 27, 1983. Additional actions taken by MP&L to verify and enhance the reliability of onsite/offsite AC power systems were documented by letter dated February 26, 1984.

MP&L met with the NRC staff and its consultants from Pacific Northwest Laboratory (PNL) on April 13, 1984, and again with the NRC staff on April 18, 1984, to discuss TDI diesel generator reliability issues, including issues raised earlier by the staff and its PNL consultants in a letter dated April 11, 1984 (E. Adensam to J. P. McGaughy). In addition, at the meeting on April 13, 1984, the staff had its expert diesel consultants available to discuss their detailed views concerning further efforts to ensure reliability of the TDI diesels.

As we previously discussed at the April 13, 1984 meeting, and in several subsequent discussions based on a review of the information provided by MP&L, the NRC staff has been unable to conclude that the proposed MP&L program for ensuring adequate diesel generator reliability is sufficient to support operation of Grand Gulf Unit 1 at power levels in excess of 5% of full power. We have concluded that your submittals to date do not adequately address existing technical concerns without further inspection for defective components in at least one diesel engine, additional preoperational testing, and establishment of enhanced maintenance, inspection, and surveillance plans.

Our detailed findings are attached as Enclosure 1. In addition, several background documents from our consultants at PNL are attached (Enclosures 2, 3, and 4) for reference.

If you have questions or alternative proposals, we are prepared to discuss them with you at your convenience. The staff will need to review your response to this position, or receive an adequate alternate proposal from MP&L, prior to authorizing plant operation in excess of 5% of full power.

We look forward to your prompt reply to this request.

Sincerely,

Original Signed By:

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
See next page

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ADDITIONAL ACTIONS TO ENSURE ADEQUATE RELIABILITY OF TDI DIESEL ENGINES AT GRAND GULF NUCLEAR STATION, UNIT 1

1.0 Introduction

The proposed MP&L program to ensure adequate reliability of the TDI diesel generators at Grand Gulf Unit 1 has been provided to the staff in references 1 through 5. Based on a review of the Mississippi Power & Light (MP&L) program, the NRC staff and its consultants from Pacific Northwest Laboratory (PNL) have been unable to conclude that the MP&L program is sufficient to support operation of Grand Gulf Unit 1 at power levels in excess of 5% of full power. One acceptable basis to support full power operation of Grand Gulf Unit 1 is discussed herein and involves additional actions addressing the following areas.

- Engine disassembly and inspection
- Pre-operational testing following engine disassembly and inspection
- Engine maintenance, inspection and surveillance.

2.0 Assumptions

The staff's position that the additional actions described herein will be sufficient to support full power operation at Grand Gulf Unit 1 is subject to the following assumptions:

a) Findings stemming from the staff review of the TDI Owners Group resolution of TDI engine issues will be satisfactorily implemented at Grand Gulf Unit 1 prior to restart from the first refueling outage.

b) Implementation of an acceptable onsite/offsite AC power enhancement and verification program. The proposed MP&L program (Reference 2 is under review by the NRC staff.

c) Appropriate actions will be taken as necessary in response to new or unexpected occurrences affecting the Grand Gulf Unit 1 or other similar TDI engines and findings from the Owners Group program which are of an urgent nature.

d) Engines will not be operated in excess of ESF maximum loads (~70% of full rated power).

3.0 Additional Actions to Ensure TDI Diesel Engine Reliability

3.1 Engine Disassembly and Inspection

The Division I engine (which has accumulated the most operating hours to date) should be disassembled for inspection of key components (identified below).

Action to be taken on the Division II engine would be contingent upon the results of the inspections conducted on the Division I engine. If no defective parts are found on the Division I engine, disassembly and inspection of the Division I engine would not be necessary provided MP&L can demonstrate through a review of the manufacturer's QA records that the two engines are essentially identical. This would involve verifying that the key engine components have been fabricated and installed to the same material (including heat treatment) and manufacturing specifications and similarly inspected and installed (including same bolt torques).

If inspection of the Division I engine reveals defective parts, or if the two engines contain dissimilarities, these would need to be evaluated as a basis for establishing inspection requirements for the Division II engine.

All defective parts found should be replaced. Possibly, the block and engine base could be excepted if cracking is not severe or in critical areas.

The types of inspections to be performed should be similar to those conducted at Shoreham and Catawba (e.g., dye penetrant, eddy current, ultrasonic, radiography, etc.) as appropriate for each component based on the kinds of problems (e.g., cracks, abnormal wear or other distress, inadequate assembly or torquing) which have previously been experienced on these components at Grand Gulf Unit 1 or other TDI engines.

Components to be inspected should include all (100%) of the following:

- Piston skirts, crowns and fasteners
- Cylinder heads
- Connecting rods. Connecting rod fasteners should be checked for torque
- Connecting rod bearings per criteria in Owners Group report on this component. Bearings should also be evaluated for abnormal wear patterns which may be indicative of crankshaft misalignment
- Wrist pin bushings

- Push rods - main and connecting
- Crankshaft (including hot and cold deflection test)
- Cylinder liners
- Crankcase capscrews for torque
- Cylinder block
- Engine base
- Head studs for torque
- Air start valve capscrews
- Rocker arm capscrews per Owners Group findings
- Turbocharger mountings, including all bolts and welds

A description of the inspections performed and the results should be submitted for NRC staff review prior to plant operation above 5% power. This report should address all indications found and the engineering basis for acceptance or rejection of the subject components.

3.2 Preoperational Testing Subsequent to Engine Disassembly and Inspection

Preoperational testing must be performed on the Division I engine following its disassembly, inspection and reassembly. In addition to adhering to the manufacturer's preoperational test recommendations, this phase of testing should include the elements listed below. If the manufacturer's recommendations already include these elements, it is not necessary to repeat them.

- 10 modified starts to 40% load
- 2 fast starts to 70% load
- 1 24-hour run at 70% load

A modified start is defined as a start including a prelube period as recommended by the manufacturer and a 3 to 5 minute loading to the specified load level and run for a minimum of one hour. The fast starts are "black starts" conducted from the control room on simulation of an ESF signal with the engine on ready standby status. The engine should be loaded to 70% and run for 4 hours at this load on each fast start test. The 24-hour performance run is suggested to detect abnormal temperatures and/or temperature excursions that might indicate engine distress. Either a modified or fast start may be utilized.

These 13 tests must be performed satisfactorily at the first attempt, i.e., the 10 modified starts should be performed successively with no failure. A failure is defined as an inability of the engine to start, or an abnormal condition during the respective run which would ultimately preclude the engine from continuing to operate. If the preoperational tests are not satisfactorily completed in the first attempt, the NRC staff will review the need for additional testing requirements.

3.3 Maintenance, Inspection and Surveillance

Detailed maintenance, inspection, and surveillance requirements should be established in conjunction with the engine manufacturer's recommendations and should include all maintenance, inspection, and surveillance identified by MP&L in References 4, 5, and 6. In addition, special attention should be given to selected components as described below. If defects are noted, the parts should be replaced. The nature of the defect will determine if this is all that is required.

A. Cylinder heads - Following engine shutdown, the engine should be rolled over with air pressure after four hours (during cooldown) with the indicator cocks open. Subsequent to cooldown, engines should be air rolled every 24 hours. Any cylinder heads discovered leaking must be replaced. MP&L should confirm that the written procedures are adequate to ensure that the cocks are closed following each air roll.

B. Engine block and base - Inspect the engine block and base every month or 24 hours of operation, whichever comes first. The inspection should be an external visual inspection requiring no disassembly. No other special maintenance is required if any defects found are "non-critical." Non-critical indications are defined as not causing oil or water leakage; not propagating; and not adversely affecting cylinder liners or stud holes.

C. Connecting rods - After each interval of 25 starts, 50 hours of operation or 6 months, whichever occurs first, all connecting rods should be visually inspected and all connecting rod bolts should be retorqued and the results recorded.

D. Lube oil checks - The lube oil should be checked for water following preoperational testing and then weekly and after each 24 hours of operation, whichever comes first. It should also be checked on a monthly basis for particulates and chemical contaminants associated with wear of bushings and bearings. Also at intervals of one month, a sample should be collected from the bottom of the sump to check for water. All filters and strainers should also be checked monthly.

E. Cylinder head studs, rocker arm capscrews, air start valve capscrews - Each month 25% of the capscrews should be spot checked for torque.

F. Push rods - Following preoperational testing and then subsequently after each 24 hours of operation, cams, tappets, push rods, etc. should be visually checked. This can be done one at a time with the engine shutdown but without affecting its availability for service.

Items A through F above apply to both engines. For the engine(s) which are disassembled and inspected in accordance with Section 3.1 above, the starting point for implementing items A through F should be upon engine reassembly; therefore, subsequent pre-operational testing should be included in the appropriate maintenance, inspection, and surveillance intervals above. Should it not be necessary to disassemble and inspect the Division II engine in accordance with Section 3.1, items A through F above should be implemented. One hour of engine operation at any load is considered to be one hour of engine operation in determining inspection intervals.

3.4 Additional Surveillance

During standby, the lube oil filter pressure drop should be checked daily rather than monthly as suggested by MP&L. Hot and cold deflection tests of the crankshaft should be performed every 6 months with the hot deflection test performed within 15 minutes of engine shutdown.

During engine operation, the exhaust temperature for each cylinder should be monitored continuously by the operator and recorded on a log at hourly intervals, as should the temperatures entering and exiting the turbocharger. Other temperature and pressure readings for which the engine is instrumented should also be monitored continuously, and recorded hourly, or more frequently if specified by the manufacturer. These should at least include lube oil, jacket water, intercooler temperature, and air pressure. If the engine is equipped with an accelerometer on the main bearings and turbocharger, these should also be monitored continuously and recorded at hourly intervals. If the engine is not equipped with an accelerometer at these points, main bearing oil temperature should be monitored continuously and recorded hourly. Also, lube oil filter pressure should be monitored daily during engine operation.

References

1. MP&L letter dated February 20, 1984, "Diesel Generators, Comprehensive Reliability Report."

2. MP&L letter dated February 26, 1984, "Onsite/Offsite AC Power Reliability."

3. MP&L letter dated April 17, 1984, "Updated Report, Diesel Generators."

4. MP&L letter dated April 17, 1984, "TDI Diesel Engine, Supplemental Information."

5. Meeting Passout, April 13, 1984, "GGNS Maintenance/Testing Program."

6. Meeting Passout, April 18, 1984, "GGNS D-G Maintenance Testing Program."

ENCLOSURE 2 1714

Battelle
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Telephone (509) 375-2780
Telex 15-2874

March 30, 1984

Mr. Carl Berlinger
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Berlinger:

SUBJECT: GRAND GULF NUCLEAR STATION STANOBY DIESEL GENERATORS: RELIABILITY REPORT SUBMITTED TO NRC BY MISSISSIPPI POWER AND LIGHT COMPANY LETTER DATED FEBRUARY 20, 1984

In response to your request of Friday, March 23, PNL reviewed the subject report and discussed it with you by telephone on Thursday, March 29. Those who participated in the review are identified in the enclosed summary of our comments and conclusions. Four of the reviewers participated in the telephone conversation: D. A. Dingee, A. G. Henriksen (consultant), B. J. Kirkwood (consultant), and myself.

You asked during the above-mentioned telephone conversation for our comments on the issues of engine start and engine operability. Our comments are as follows:

- Engine start - On the basis of tests at Grand Gulf (summarized in Table 1-2 of the subject report) and at the Shoreham Nuclear Power Station, the Transamerica Delaval, Inc. (TDI) diesel engines start with a high degree of reliability. We have seen no evidence to suggest that there is any problem peculiar to TDI engines in starting them within required time constraints.

- Engine operability - The information available for our review is not sufficient to provide a basis for predicting engine operability. In particular, unresolved issues that pertain to key components (e.g., connecting rods and cylinder heads) need to be addressed before engine operability can be predicted with reasonable certainty. Additional comments on this issue are included in Section II of the enclosed summary.

Battelle

Please don't hesistate to call me if you have any questions on the comments contained in this letter or in the enclosure.

Sincerely,

Walter W. Laity
PNL Project Manager

WWL:fo

Enclosure

cc: M. Plahuta, DOE-RL

ATTACHMENT

Review of Mississippi Power & Light

Submittal Providing the NRC with

TDI Engine Status Report

Dated February 20, 1984

I. Basis of Review

This review incorporates the comments and discussions of the following staff after approximately a one-day reading and a one-day working session:

PNL Core Team(*)
Ricardo Engineering (J. V. Webber, et. al.)(**)
S. H. Bush, consultant(**)
B. J. Kirkwood, consultant
A. Henriksen, consultant

This review focussed on an evaluation of the current reliability and operability of the MP&L TDI engines to meet the requirements to serve as backup power at the Grand Gulf nuclear plant operating at full power. This review dealt with the information provided in the MP&L letter to Mr. Harold Denton, dated February 20, 1984.

The review addressed the 16 generic issues identified by the TDI Owners' Group that were addressed in the MP&L submittal. Additional considerations are also noted.

The presentation generally follows the order of issues addressed in the MP&L submittal; the review of items where MP&L has effected repairs or modifications is provided first. A summary position follows as section II. This is followed by a review of the MP&L response to concerns for other issues raised at the January 26, 1984 Owners' Group meeting at Shoreham. Finally a review of the MP&L Testing and Maintenance Program is provided.

(*)W. W. Laity, D. A. Dingee, S. D. Dahlgren, M. Clement, J. R. Nesbitt, J. Alzheimer

(**)Ricardo Engineering provided comments by telephone on the basis of a review done at their facilities in the U.K. No Ricardo representatives were available to participate in the meeting at PNL on March 28, or to review the comments and conclusions documented in the report. Likewise, S. H. Bush was not available for review and comment on the conclusions.

II. Summary of Conclusions and Observations

The information available for our review is not sufficient to provide a basis for determining whether or not TDI engines at Grand Gulf can meet requirements for emergency service. Major unresolved issues (addressed later in this review) include:

- o connecting rods
- o wrist pin bushings
- o cylinder heads
- o turbocharger
- o connecting rod bearings
- o testing/maintenance plans

The reviewers note that action taken during implementation of the Owners' Group Program Plan may reveal issues that have not been addressed in the MP&L report of February 20, 1984. These issues may bear on the operability and reliability of the TDI engines at Grand Gulf. Accordingly, the issues addressed in the MP&L report are not necessarily the only issues that will need to be addressed for these engines.

An appropriate surveillance and maintenance program might provide a basis for engine operation during the period when the Owners' Group Program Plan is being implemented. We cannot predict at this time whether or not the surveillance and maintenance program would be sufficient to ensure that the diesels could be expected to meet all of the emergency power requirements described in the Grand Gulf FSAR. This tentative conclusion is subject to the following:

- o Identification of the root causes of unresolved problems (e.g., rejectable indications in cylinder heads), and appropriate corrective action.

- o Verification through inspections currently underway at Grand Gulf that engine components are exhibiting only normal wear in the operating experience accumulated to date.

III. Review Results - Grand Gulf Engine Repairs and Modifications (MP&L Report Sections 2 through 9)

A. Pistons

1. Considerations:

- o Because the peak pressure in the TDI engine at Kodiak is about 3/4 the peak pressure in the Grand Gulf engine at full power, the operating time at Kodiak is not of as much value as the

lesser operating time in the TDI R5 engine, which operates at a higher peak pressure. Further, the R-5 tests will only be relevant to the AE piston skirts used in the Grand Gulf engines if it can be demonstrated that the AE piston skirts used in the former are the same as those used in the latter.

- Our tentative conclusion concerning the suitability of the AE piston skirts is contingent upon finding no rejectable indications in them following the recently completed 600 hour test at Grand Gulf.

2. Conclusion

- Subject to the above considerations, the evidence available to the reviewers suggests that the AE piston skirts are suitable for Grand Gulf operation.

B. Cylinder Heads

1. Considerations

- Crack propagation in a cylinder head during operation may lead to serious damage to the engine and/or turbocharger, possibly resulting in sudden engine shutdown.

- The MP&L report of 25% of the heads with rejectable indications is very high. The cause of the rejectable indications has not been identified.

- An analysis of failure rates of cylinder heads of this type operated at comparable loads may be instructive for establishing confidence in the suitability of these heads for engines in nuclear service.

- It would be of interest to know whether the heads operating in the R-5 engine are of the same design and whether they are performing without development of rejectable indications.

2. Conclusion

- The cause of the rejectable indications has not been identified. Accordingly, there is insufficient evidence to say that the heads will perform reliably.

C. Connecting Rod Bearings

1. Considerations and Conclusion

The evidence available to the reviewers is insufficient to conclude whether the problems identified at Shoreham are applicable to Grand Gulf. Pertinent information for establishing bearing suitability includes the following:

- Radiographic inspection of all bearings to acceptance criteria established by the Owners' Group in a recently issued bearing shell report.

- Inspection and documentation of wear patterns of all bearings at Grand Gulf to verify absence of abnormal conditions, such as end loading.

D. Push Rods

1. Considerations

- A push rod failure will ultimately lead to shutdown of a cylinder and will require early shutdown of the engines.

- The MP&L submittal addresses corrective action for the connector push rods but does not address the 2% failure of the main rods.

- There is no evidence that the new design has been proven to be reliable.

2. Conclusion

- Adequacy of the modifications should be verified through 100% inspection of the push rods to establish that no cracks developed during recent testing at Grand Gulf which included 600 hours at full power.

E. Crankshaft

1. Considerations

- Results in the MP&L report of analyses performed independently by TDI and Bechtel suggest that the stresses in the crankshaft used in the TDI engines at Grand Gulf are acceptable.

- Incipient problems would be indicated by wear patterns on the bearing. Likewise, hot* and cold shaft deflection readings

reveal alignment problems that could lead to difficulties with shaft, bearings, bearing supports and base.

- The reviewers feel that TDI statistics concerning shaft problems would be pertinent to establish confidence in the Grand Gulf designs.

2. Conclusion

- The Grand Gulf crankshaft designs appear to be satisfactory. This is contingent upon MP&L determination that other crankshafts of this design in similar service have not failed due to design deficiencies, an examination of bearing wear patterns, and hot and cold crankshaft deflection readings.

F. L.P. Fuel Line Failure

1. Considerations and Conclusion

- The problem appears to be an isolated one, not generic.

- The problem definition and solution are deemed to be acceptable. MP&L should determine that no new vibration response problems have been introduced by their solution.

G. H.P. Fuel Line Failure

1. Considerations

- The problem appears to be related to manufacturing rather than design.

- MP&L did not indicate how (or whether) the new lines were inspected to verify absence of the drawseam.

- The line pressure cycles are severe; ranging from near atmospheric to about 5,000 psi and cycling at the rate of 1/2 the engine speed (i.e., 225 rpm).

---

*Hot deflection readings should be completed within 15 minutes of engine shutdown to be valid.

2. Conclusion

- The problem appears to be adequately understood and the solution is acceptable. MP&L should verify through inspection that the new lines are not defective.

H. Crankcase Capscrew

1. Considerations and Conclusion

- Failure of crankcase door capscrews is relatively common due to difficulty in obtaining even loading at the capscrew panel interface. The reported consequence, namely a piece of the bolt entering the generators, is unusual. The solution (protecting the generator) is acceptable.

IV. Review Results - Grand Gulf Responses to Other Owners' Group Generic Problems (MP&L Report Attachment 1)

A. Cylinder Liners

1. Considerations and Conclusion

- The method of examination of the damaged liner was not stated. The reviewers agree with the probable cause of the grooving observed in that liner.

- The corrective action (replacing the damaged liner) is judged to be acceptable.

B. Cylinder Block

1. Considerations and Conclusion

- The MP&L report does not address whether cylinder block cracks of the type noted at another nuclear installation are present in the Grand Gulf engines. If such cracks are present, the issue needs to be addressed. We have no basis at this time to comment on the Grand Gulf cylinder blocks.

C. Engine Base

1. Considerations and Conclusion

- The information presented suggests that the problem stems from a failure in maintenance to apply proper bolt torque. The corrective action (verification of correct preload values in main bearing studs) appears adequate, subject to verification by

MP&L with TDI of historical data to confirm that the problem does not involve other than maintenance considerations in installations similar to Grand Gulf.

D. Head Studs

1. Considerations and Conclusion

- There is no basis in the MP&L report to comment on this problem.

E. Rocker Arm Capscrews

1. Considerations and Conclusion

- A recent report issued by the Owners' Group on this topic addresses: (1) design, (2) materials, and (3) retorquing.
- MP&L should implement the Owners' Group recommendations.

F. Turbocharger

1. Considerations

- The MP&L statements on misalignment as the cause does not provide a convincing argument.
- It is considered unlikely that vibration generated internal to the turbocharger could be the cause. Such imbalance would rapidly lead to destruction of the bearings and rotor.
- It is considered more likely that vibration is caused by engine vibration transmitted inappropriately through turbocharger supports and/or piping.
- MP&L should verify that appropriate consideration has been given to exhaust pipe residual loads on the turbocharger. These loads contribute to the loads on turbocharger mounting bolts, and may contribute to excitation of turbocharge mounting vibration.

2. Conclusion

- There is insufficient evidence to accept the MP&L problem resolution.

3. Observation

- With regard to the turbocharger thrust bearing failure that has been experienced at Shoreham, we concur that the Grand Gulf

diesel engines appear to be adequately protected with an electrically-operated prelube system for normal startup. In the event of a "black start" (i.e., no electrical power), however, there appears to be no protection.

G. Connecting Rods

1. Considerations

- Consequences of connecting rod failure include immediate shutdown of the engine, possibly catastrophic damage, and a potentially severe hazard to operating personnel in the vicinity of the engine.

- The reference to marine experience is not necessarily applicable because of differences in engine loading.

- Evidence presented suggests that a reduction in frequency of failures may have been achieved but not necessarily a solution to the problem.

- The 10^4 hour figure is given as the average hours of operation between occurrences. It is not accompanied by a time distribution of failures which may be an important consideration.

2. Conclusion

- The evidence presented does not provide a sufficient basis for conclusions regarding the adequacy of the connecting rods for the intended service. Because of the potentially serious consequences of connecting rod failure, a conservative approach to establishing connecting rod adequacy is called for. This approach should take into consideration such factors as the root cause of connecting rod cracking, appropriate tests to verify corrective action, probable minimum time between failure under worst-case conditions that may be imposed on Grand Gulf engines, and appropriate ongoing surveillance to ensure that the connecting rods remain sound in service.

H. Jacket Water Pumps

1. Considerations and Conclusion

- The problem appears to be adequately understood and the solution is acceptable.

2. Observation

- It is common practice in non-nuclear installations to have an electrically driven standby jacket water pump.

I. Air Start Valve Capscrews

1. Considerations and Conclusion

- The problem appears to be adequately understood and the solution is acceptable.

V. Wrist Pin Bushing (a new problem area not addressed by the TDI Owners' Group at this time)

1. Considerations and Conclusion

- Failure of wrist pin bushings may have serious consequences, comparable or worse than failure of the connecting rod bearings.

- Unit loadings on wrist pin bushings are larger than on connecting rod bearings.

- All eight wrist pin bushings removed from the 101 engine at Shoreham during the week of March 19 were dye checked and found to be cracked. No pattern of cracking was evident. It was also reported, but not verified, that new bushings received at Shoreham from TDI but not installed, are also cracked. This suggests that the cracking is a manufacturing problem, and if so, it may be present in the wrist pin bushings in the TDI engines at Grand Gulf. Accordingly, we believe that all wrist pin bushings should be dye checked and those found to have cracks should be replaced with bushings that are not cracked.

- This problem needs to be addressed immediately because of the seriousness of the consequences.

VI. Comments on the MP&L Qualification/Reliability Demonstration Testing (MP&L Report Section 11.0)

- The test program to demonstrate the adequacy of the TDI engines should be related to the demands that may be placed on the engines under emergency conditions as described in the Grand Gulf FSAR.

- The test program followed after replacement of the piston skirts as described in section 11.3 of the MP&L report appears to meet standard industry practice. However, the summary of testing presented in Table 11-1 suggests that the AE piston skirts were not

installed in the Grand Gulf engines during "Tech Spec Testing." This issue should be addressed in the overall test program for the TDI engines.

- The brief description (provided in the MP&L submittal) of the maintenance program and reliability enhancement testing is not convincing to the reviewers that there will be adequate surveillance of physical conditions and monitoring of operating parameters to assure continuous availability and operability of the engines.

VII. Consultant Concurrance

B. J. Kirkwood
Covenant Engineering

Adam Henriksen

ENCLOSURE 3

Battelle
Pacific Northwest Laboratories
Richland, Washington
Telephone 375-2780
Telex 15-2874

April 16, 1984

Mr. Carl Berlinger
Division of Licensing
Office of Nuclear Regulatory Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Berlinger:

In response to your request of Monday, April 16, PNL has reviewed the questions you raised on the subject of diesel generators. These questions were discussed by Dave Dingee and Walt Laity with the following diesel engine consultants who, as subcontractors to PNL, participated in a meeting on this subject at NRC on April 13: Adam Hendriksen, B.J. Kirkwood, and Arthur Sarstan. Summarized in the enclosure to this letter are the assumed operating requirements for the diesel engines, followed by our comments on each of the questions.

Please do not hesitate to call if you have any questions on the enclosure.

Sincerely,

Walter W. Laity
PNL Plant Manager

WWL:f1
Enclosure
cc: M. Planuta, DOE-RL

GRAND GULF NUCLEAR POWER STATION STANDBY DIESEL GENERATORS - PNL RESPONSES TO NRC QUESTIONS OF APRIL 16, 1984.

1. Must MP&L conduct an engine tear-down and inspection? If so, must this be both engines?

The consultants had a range of opinions about the necessity for complete engine tear-down of both engines. All agreed that at least one enginemust be completely torn down. Action on the second engine would be contingent on findings. If no problem is noted with the first engine, then the second engine can be accepted without tear-down if MP&L can demonstrate through a review of the manufacturers' QA program that these two engines are essentially identical. If the QA program review does not give this assurance the opinion of the consultants varied, depending on the level of assurance. Action throught to be appropriate ranged from a "sampling" inspection of readily accessible items to a tear-down to inspect the critical components (e.g., wrist pin bushings, conrod bearings, and conrods).

2. Assuming the one-engine tear-down discloses defects, what must MP&L do immediately, and later?

The inspection of the torn-down engine might reveal information that would suggest a meeting between NRC and MP&L. However, even if the inspection reveals no new information,* all defective parts should be replaced. Possibly the block and engine base could be excepted if cracking is not severe or in critical areas. However, if more recent history and analyses confirm the cracks to be serious, these parts also must be replaced. Again, action on the second engine would be contingent on findings. If the inspection of the first engine reveals serious defects, these need to be evaluated as a basis for establishing inspection requirements for the second engine.

In the long term, MP&L must be bound to implement an enhanced surveillance and maintenance program (see below) and implement the Owners' Group recommendations (currently being formulated) on both engines at the first refueling shutdown.

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* Progress by the Owners' Group on generic issues can affect the status of understanding at the time of MP&L licensing.

3. Assuming Grand Gulf goes into operation, what maintenance and inspection requirements must be imposed?

There will be an inspection frequency in the Owners' Group plan calling for a complete tear-down. This should be implemented at Grand Gulf. Subject to that determination, special attention should be given to selected components as described below. If defects are noted, the parts should be replaced. The nature of the defect will determine if this is all that is required. The Owners' Group maintenance program recommendations or experience may be used to establish relaxed (or tightened) inspection frequencies.

Detailed inspection and maintenance requirements should be established in conjunction with the engine manufacturer. This should also include all maintenance/inspection identified by MP&L at the April 13 meeting.

Cylinder Heads: After engine shutdown the engine should be rolled over with air pressure once each hour for four hours (during cooldown) with the indicator cocks open. Engines not in operation should be rolled over once a day. Any heads found leaking must be replaced.

Engine Block and Base: Inspect once a month or after 24 hours operation for any cracks. No other special maintenance required if any defects found are "noncritical".

Connecting Rods: After each 25 starts or 50 hours of operation or 6 months, all bolts on conrods should be retorqued and theseresults recorded.

Lube Oil Checks: Weekly (or after each 24 hours operation) for water and monthly for particulates and chemical contaminants associated with wear of bushings and bearings. Also collect sample from bottom of sump and check for water. The filters should also be checked (no time interval given).

Capscrews: Monthly spot check (25%) of all capscrews in question.

Other: If per question 1 an engine is not torn down, each 6 months a 25% random check of piston crowns, liner walls, heads, upper block at studs, head bolts, areas around head bolts, and push rods (bothmain and connecting). Also on this engine, a 12 1/2% check of bearings and wrist pin bushings should be done.

Push Rods: After 24 hours operation, cams, tappets, push rods, etc., should be checked. This can be done one at a time with the engine shutdown but without affecting its availability for service.

4. Regarding the surveillance program, what data recording should be taken in engine standby and operating conditions?

To accommodate standby monitoring, the daily, weekly, and monthly actions should be accomplished as identified in the MP&L D/G Maintenance/Testing Program (received on 4/13/84) except that the oil pressure filter drop should be monitored daily instead of monthly. One additional standby monitoring requirement is a shaft deflection measurement every six months.

The engine operating surveillance program should include the following. If alarm levels are reached on any of these, this indicates the need to switch engines.

- o exhaust temperature monitor and alarm for each cylinder (continuous)
- o temperature recording before and after turbo-charger (continuous)
- o hourly readings on standard temperature and pressures for such items as lube oil, jacket water, intercooler, air pressure, etc.
- o accelerometer monitoring (continuous) on all main bearings and the turbo-charger
- o monitor daily the lube oil filter pressure drop

5. What preoperational testing would we be required following assembly of the inspected engine(s)?

The manufacturers' standard preoperational testing should be done. In addition:

- o run 10 modified starts (defined as prelube and 3-minute loading to 40% load)
- o conduct two quick-starts to 70% load and hold for four hours duration
- o conduct one 24 hour run at 70% load (to look for excursions in temperature).

ENCLOSURE 4

Battelle
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April 17, 1984

Mr. Carl Berlinger
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Berlinger:

SUBJECT: GRAND GULF NUCLEAR POWER STATION STANDBY DIESEL GENERATORS

This letter is in response to your request for clarification of several issues addressed in PNL's letter of April 16, same subject.

1. Question: What is the rationale for rolling over the engine once per hour (with the indicator cocks open) during the first four hours after shutdown? Would it be acceptable to roll the engine after four-to-eight hours, and then once a day?

   Response: Rolling the engine once per hour in the first four hours after shutdown would provide additional assurance that the engine is ready for an emergency start. If a crack formed in a cylinder head during engine operation and provided a path for water to enter a cylinder after shutdown, that water could damage the engine in an emergency start (and possibly prevent the engine from starting). It would be desirable to detect such leakage early.

   As an engine cools down and metal contracts in the vicinity of a flaw, the likelihood of water leaking through the flaw increases. It is acceptable from the standpoint of the engine to roll it over four-to-eight hours after shutdown to detect leakage, followed by a rollover once per day. The increased frequency during the first four hours is a suggestion only, to provide the additional assurance referred to above.

2. Question: What is the basis for the comment (in response to question 3 of the enclosure to the PNL letter of April 16) that random checks be performed of certain components?

   Answer: Our response regarding random checks assumes that no engine is completely disassembled and inspected. It is not the recommended approach. Our consultants agree unanimously that one engine should be completely torn down and inspected. Action on the second would be contingent on findings in the first.

   Engine Recommended for Teardown: In our letter of April 16, we overlooked

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documenting our recommendation that the complete disassembly and inspection be performed on the engine that has been operated the most hours.

3. Question: Are the instrumentation, monitors, and alarms listed in response to question 4 (PNL letter of April 16) in place in nuclear plants, and if not are they absolutely necessary?

   Response: The time in which we have prepared this response has not permitted us to determine the instrumentation actually in place for these engines. However, it is customary for engines of this size in non-nuclear applications to be instrumented and monitored for the pressures and temperatures discussed in our letter of April 16. Automatic monitoring accompanied by appropriate alarms will notify the operator of engine distress, so that timely action can be taken to shut down the engine during a test or transfer its load to another standby engine during an emergency.

   Accelerometers might not be installed on main bearings, for bearing temperature rather than bearing vibration is normally monitored in large diesel engines. The accelerometers are not considered to be a necessity. If they are installed, they should be monitored.

   We believe that surveillance of the type we have suggested is necessary, but details of how this surveillance can best be accomplished in a nuclear power plant are negotiable.

4. Question: What is the rationale for the additional preoperational tests outlined in response to question 5 (PNL letter of April 16)?

   Response: The twelve starts (10 "modified" starts plus two "quick" starts), and the 24-hour run, are suggested as one way to provide confidence that an engine will perform its mission following reassembly. The start tests are suggested in the light of the emphasis placed on engines in nuclear service to start reliably. A continuous run for some appropriate time is necessary to detect abnormal temperatures and/or temperature excursions that might indicate engine distress. If the post-assembly tests recommended by the manufacturer provide appropriate coverage of these considerations, they should take precedence.

5. Question: Is the assumption of operating with emergency loads only (approximately 68% of full load) during the period to first refueling an important consideration in the comments provided by PNL? (Would these comments change if the engine were allowed to operate with additional, non-essential loads that would increase overall engine load toward 100%?)

   Response: There are several key components in question that are s

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to stresses in direct proportion to engine load. Accordingly, restricting the engines to emergency loads only provides greater confidence that the engines will meet emergency requirements. We believe it would be prudent to invoke this restriction.

Please do not hesitate to call if you have any questions on this letter.

Sincarely,

Walter W. Laity
PNL Project Manager

WWL:wl

cc: M. Plahuta, DOE-RL

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 22 1984

Docket No. 50-416

Mr. J. P. McGaughy
Vice President, Nuclear Production
Mississippi Power & Light Company
P.O. Box 1640
Jackson, Mississippi 39205

Dear Mr. McGaughy:

Subject: Issuance of Order Requiring Diesel Generator Inspection (Effective Immediately)

The Commission has issued the enclosed Order Requiring Diesel Generator Inspection (Effective Immediately) related to the Grand Gulf Nuclear Station, Unit 1, Facility Operating License No. NPF-13. Mississippi Power & Light Company (MP&L) shall not operate the plant unless such operation is in conformance with the revised interim Technical Specifications appended to the Order.

A copy of the Order has been filed with the Office of the Federal Register for publication.

Sincerely,

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosure:
Order

cc: See next page

GRAND GULF

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Vice President
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James P. O'Reilly, Regional Administrator
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President
Claiborne County Board of Supervisors
Port Gibson, Mississippi 39150

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

U.S. Environmental Protection Agency
Attn: EIS Coordinator
Region IV Office
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dr. Alton B. Cobb
State Board of Health
P.O. Box 1700
Jackson, Mississippi 39205

7590-01

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
MISSISSIPPI POWER & LIGHT COMPANY	)	Docket No. 50-416
MIDDLE SOUTH ENERGY, INC., AND	)	
SOUTH MISSISSIPPI ELECTRIC POWER	)	
ASSOCIATION	)	
(Grand Gulf Nuclear Station)	)	

ORDER REQUIRING DIESEL GENERATOR INSPECTION (EFFECTIVE IMMEDIATELY)

I.

Mississippi Power & Light Company, Middle South Energy, Inc., and South Mississippi Electric Power Association (the licensees) are the holders of Facility Operating License No. NPF-13, which authorizes the operation of the Grand Gulf Nuclear Station, Unit 1 (the facility) at steady-state reactor power levels not in excess of 191 megawatts thermal. The facility consists of a boiling water reactor (BWR/6) with a Mark III containment located in Claiborne County, Mississippi.

II.

On August 12, 1983, the main crankshaft on one of the three emergency diesel generators (EDGs) at the Shoreham Nuclear Power Station, which were manufactured by Transamerica Delaval, Inc. (TDI), broke into two pieces during a load test. During the course of the evaluation of the failure, information related to the operating history of TDI engines has been identified which calls into question the reliability of all TDI diesels. The operational problems associated with TDI diesels have significantly reduced the staff's level of confidence in the reliability of all TDI diesel generators.

III.

As a result of the above, there is a question concerning the reliability of the TDI diesel generators installed at the Grand Gulf facility. Staff analysis (Attachment 1) indicates that the total loss of diesels at 5% power would not significantly increase the risk of low-power operation. Nevertheless, one of the contributors to that risk is some very low probability environmental events. That risk is reduced if the reliability of the TDI diesel generator is enhanced. Consequently, it is appropriate to have increased assurance as to reliable onsite power. Moreover, for full-power operation, a high degree of reliability is required for the diesel generators. The most appropriate method to obtain information about the specific conditions of the diesel generators at Grand Gulf is to disassemble and inspect the diesel generator which has been operating the longest. The public interest requires that the questions about the reliability of the Grand Gulf diesel generators be resolved promptly. While these questions are being resolved, there is a need to enhance the availability of other sources of power supplied to the facility.

Therefore, the public health, safety and interest require that the diesel generator with the most hours of operation be inspected prior to proceeding above 5% power and that while this diesel is disassembled, the licensees provide additional power supplies and compensatory actions set forth in this order. Attachment 4 is the staff's safety evaluation for operation under the present low power license with one diesel generator undergoing inspection.

IV.

Accordingly, pursuant to sections 103, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations

in 10 CFR Parts 2 and 50, it is hereby ordered, effective immediately, that:

A. 1. The Division 1 TDI diesel generator shall be disassembled for inspection within 10 days of the date of this Order in accordance with Attachment 2 which describes the components to be inspected and the inspections to be performed.

2. All defective parts found shall be replaced prior to declaring the engine operable. The engine block and engine base may be excepted if indications are non-critical. Non-critical indications are defined as not causing oil or water leakage, not propagating, or not adversely affecting cylinder liners or stud holes.

3. Preoperational testing must be performed on the inspected engine prior to declaring it operable. This phase of testing shall include the manufacturer's preoperational test recommendations and the following elements, if they are not already included in the manufacturer's recommendations, unless they would not be recommended by the manufacturer in order to satisfy operability requirements.

- 10 modified starts to 40% load
- 2 fast starts to 70% load
- 1 24-hour run at 70% load

A modified start is defined as a start including a prelube period as recommended by the manufacturer and a 3 to 5 minute loading to the specified load level and run for a minimum of one hour. The fast starts are "black starts" conducted from the control room on simulation of an ESF signal with the engine on ready standby status. The engine shall be loaded to 70% and run for 4 hours at this load on each fast start

test. The 24-hour performance run is required to detect abnormal temperatures and/or temperature excursions that might indicate abnormal engine behavior. Either a modified or quick start may be utilized.

Should these tests not be performed satisfactorily at the first attempt, i.e., the 10 modified starts shall be performed successively with no failure, the NRC shall be notified within 24 hours. A failure is defined as an inability of the engine to start, or an abnormal condition during the respective run which would ultimately preclude the engine from continuing to operate.

B. The licensees shall not operate the Grand Gulf facility under the terms of License No. NPF-13 unless such operation is in conformance with the revised interim technical specifications appended to this Order. (Attachment 3)

C. The Director, Division of Licensing may terminate in writing any of the preceding conditions for good cause.

V.

Within 20 days of the date of this Order, the licensees may request a hearing on this Order. Any request for a hearing on this Order must be filed within 20 days of the date of the Order with the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555. A copy of the request shall also be sent to the Executive Legal Director at the same address. A request for a hearing shall not stay the immediate effectiveness of Section IV of this Order.

If the licensees request a hearing on this Order, the Commission will issue an order designating the time and place of hearing. If a hearing is held, the issue to be considered at such a hearing shall be whether this Order should be sustained.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Attachments:
(1) Staff Analysis
(2) Inspection Description
(3) Interim Technical Specifications
(4) Safety Evaluation

Dated at Bethesda, Maryland
this 22nd day of May, 1984.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Attachment 1

APR 1 2 1984

MEMORANDUM FOR: Darrell G. Eisenhut, Director
Division of Licensing

FROM: Roger J. Mattson, Director
Division of Systems Integration

SUBJECT: RISK OF 5% POWER OPERATION AT GRAND GULF CONSIDERING FAILED DELAVAL DIESEL GENERATORS

Reference: Memo from R. J. Mattson to H. R. Denton "Transmittal of Report on Reduction in Risk Associated with Proposed Low Power Testing Program at LaSalle," dated February 18, 1982 (copy attached)

Per your request, we have, with RRAB support, evaluated the effect of failed Delaval diesel generators on the risk for 5% power operation at Grand Gulf. The basis for the review was the work done in the referenced memo. That is, since we demonstrated in the referenced memo that there was insignificant risk at LaSalle at 5% power, we started with that baseline and asked how the result would change if we completely disregarded Delaval diesels at Grand Gulf. The design differences between the two plants were considered in our analysis.

There were four categories of internally initiated events considered in the referenced memo. There were:

1. events which fail to remove decay heat from containment
2. non-LOCA, non-ATWS events with failure to inject water into the reactor vessel
3. LOCA with failure of required ECCS
4. ATWS.

The risk at low power for events in the first two categories would not be affected by loss of diesel generators, since AC power is not required for these events to prevent core melt at 5% power. For category 3 events the effect of losing diesel power is very small. This is because at 5% power there is virtually no grid disturbance due to reactor shutdown, and the probability of retaining offsite power remains high. Also, the high pressure core spray system (HPCS) at Grand Gulf has its own dedicated diesel generator not manufactured by Delaval. Thus for any LOCA at 5% power, failure of a Delaval diesel would not measurably affect the risk. It is estimated that the change in risk due to Delaval diesel unavailability is negligible and the previous estimates in the referenced memo would apply to Grand Gulf.

CONTACT: N. Lauben, X27579

ATWS events initiated by loss of offsite power (LOOP) would have consequential failure of the Standby Liquid Control (SLC) System if the diesels were unavailable. For this evaluation, it was assumed that all ATWS events initiated by LOOP for more than 2 hours resulted in core melt. Loss of offsite power for more than two hours is estimated to be about 2 to 8 percent of all ATWS initiators. Therefore, the estimated reduction in risk to the public from ATWS events at 5 percent power, compared to 100% power, is on the order of 300 to 2000 which is a smaller reduction than previously estimated for situations with the diesels available at LaSalle. (Ref.) The staff believes that this estimate is conservative because it gives no credit for the diesels and no credit for the operator manually inserting control rods one by one. Taking these conservatisms into account, the new estimate is well within the uncertainty of the previous estimate and is, therefore, not significant.

We, therefore, conclude that total failure of the Delaval diesels at Grand Gulf would not significantly increase the risk of low power operation and that the risk of low power operation is acceptably small.

Roger J. Mattson

Roger J. Mattson, Director
Division of Systems Integration

cc: R. Rowsome
D. Houston
T. Speis
T. Novak
A. Schwencer

FEB 18 1982

MEMORANDUM FOR: H. R. Denton, Director, NRR

FROM: R. J. Mattson, Director, DSI

SUBJECT: TRANSMITTAL OF REPORT ON REDUCTION IN RISK ASSOCIATED WITH THE PROPOSED LOW POWER TESTING PROGRAM AT LASALLE.

At your request we have prepared the enclosed report on low power risk reduction at LaSalle. The principal contributors were Norm Lauben, Tim Collins, Chuck Graves, Wayne Hodges, from RSB and Pat O'Reilly and Ashok Thadani from RRAB. The report concludes that the risk reduction for low power of this BWR is similar to the risk reduction previously estimated for various PWRs.

Original Signed by:
Roger J. Mattson

Roger J. Mattson, Director
Division of Systems Integration
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: N. Lauben
T. Collins
C. Graves
P. O'Reilly
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Distribution:
Docket File
RSB R/F
RSB Plant File
N. Lauben
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R. Mattson

ENCLOSURE

REDUCTION IN RISK ASSOCIATED WITH THE PROPOSED
LOW POWER TESTING PROGRAM AT LA SALLE

SUMMARY:

The applicant, Commonwealth Edison, has requested a license to operate the La Salle County Station Unit 1 up to 5% of rated power during its low power testing program. The applicant has stated that the planned period of time at or near 5% power would be about 14 days. We have examined the reduction in risk associated with this proposed testing program compared to long-term full power operation. The assessment was similar to that conducted for several PWR's during the past 2 years. There are three major factors which contribute to a substantial reduction in risk for low power testing as compared to equilibrium full power operation. First, there is additional time available for the operators to correct the loss of important safety systems needed to mitigate relatively high risk events, or to take alternate courses of action. Second, the fission product inventory during this time would be very much less than during full power operation. Third, there is a reduction in required capacity for mitigating systems at low power. From an examination of these factors we believe that the reduction in instantaneous risk to the public is on the order of 2,000 to 200,000 if La Salle is operated at 5% power from initial startup for 14 days compared to equilibrium full power operation.

DISCUSSION:

Since the publication of the Reactor Safety Study (WASH-1400), the NRC staff and the industry have continued to study the risk to the public from potential severe accidents at nuclear power plants. This effort has confirmed that the event scenarios dominating accident risks are generally the same for different classes of BWRs. Although a risk assessment study has not been performed for a BWR-5 (the

La Salle class of plants), studies do exist for a BWR-4 (Limerick) and a BWR-6 (Grand Gulf). The appropriate similarities and differences were considered in evaluating the relative low power risk for La Salle.

It was determined for this assessment that theevents which dominate risk for a BWR could be placed in four categories:

1. Events (both LOCA and non-LOCA) which include reactor scram but failure to remove heat from the containment.
2. Non-LOCA events which include reactor scram but failure to inject water into the reactor vessel.
3. LOCA's with failure of the required ECCS.
4. ATWS events.

The events in these 4 categories were examined to estimate the reduction in the probability of the event because of the additional time available during low power operation for the reactor operators to correct the loss of important safety systems or to take alternate courses of action. Similarly, we have calculated the reduced fission product inventory for operation of an initially unirradiated core at 5% power for 14 days and have determined the reduction in potential public exposure via reduction in potential release magnitudes. Risk is roughly proportional to the probability of severe accidents (in which the heat sink is lost) and to the fission product inventory in the core. From these factors we believe that the overall reduction in instantaneous risk to the public is on the order of 2,000 - 200,000 if LaSalle is operated at 5% power from initial startup for 14 days compared to continuous full power operation.

It is very important to recognize that this report is based on some very rough estimates. A detailed review of each event tree was not possible in the time alloted. Also computer analyses of the important events (ATWS and LOCA) were not possible. Therefore only estimates and inferences from previous work were used. For these reasons the risk reduction numbers have larger uncertainites than they otherwise might.

Category 1 Events

Following operation at full power, category 1 events will result in suppression pool heatup and boiling. Suppression pool boiling can overpressurize the containment or result in a reduction in pool level such that net positive suction head (NPSH) to the ECCS pumps is lost. Either containment overpressurization or loss of NPSH defeats the role of the suppression pool as the medium for post accident heat removal.

Following operation at 5% power for two weeks, failure to remove heat from the suppression pool results in a very slow increase in pool temperature due to decay heat. The capacity of the suppression pool is very large ($\sim$1 million gallons) and is considered to have an allowable temperature rise of about 110°F. For those events resulting in transfer of primary system stored energy to the pool, the initial increase in pool temperature is about 50°F. The decay heat load for the next three days would increase the pool temperature by about another 20°F. A 70°F increase in pool temperature poses no threat to containment or the ECCS pump NPSH requirements. Because of the time available, there is a high probability that the operator can take corrective actions to restore pool cooling. For this reason and the low fission product inventory, we believe that the risk due to events in category 1 is reduced by at least a factor of 40,000.

Category 2 Events

Following full power operation, category two events would result in reactor coolant boiloff, fuel heatup, and finally fuel melting. Following 5% power operation for two weeks, the decay heat rate is so low that, even if passive systems heat losses are neglected, several days would be needed to reduce vessel water level to the top of the active fuel region. At this time, decay heat rate is far below normal passive heat losses to the drywell. Hence, drywell cooler operation could stop boiloff. Because of time available, there is a high probability that the operator can take action to correct ECCS malfunctions or use other systems to restore vessel inventory. For these reasons, we believe that the risk due to category 2 events that result in excessive fuel damage and significant radiological release is reduced by at least a factor of 40,000.

Category 3 Events

The most significant events in this category are the transient induced LOCAs in which a safety relief valve sticks open. Because of the reduced system pressure and temperature in this class of events, passive system heat losses are substantially less than categories 1 and 2. Therefore boiloff could continue to eventual core melt at 5% power if some minimal core cooling is not established. For these events, several hours would elapse before core uncovery would begin and several more hours before uncovery of higher powered center core regions would uncover and core damage would occur. Because of the time available, the operator has a high probability of correcting ECCS malfunctions or cooling with alternate systems. For LaSalle only one control rod drive pump would be more than sufficient to remove decay heat. The RCIC system would be available for a while. BWR emergency procedures instruct the operator to use other backup systems as well. For these reasons we believe that the risk due to events in category 3 resulting in excessive fuel damage and significant radiological release is reduced by factors on the order of 1000 to 100,000.

Category 4 Events

For ATWS events, the low initial power results in a slower rate of heatup of the suppression pool and a large decrease in the amount of sodium pentaborate required to take the reactor to a subcritical condition relative to the full power case. It is estimated that about 2 hours operation at 5 percent power would be required to raise the suppression pool bulk temperature to 200°F assuming operation of both RHR heat exchangers. However, less than about 15 minutes operation of the Standby Liquid Control System (SBLCS) would be needed to reach a subcritical, hot standby condition. Because of the additional time available to the operators to act to mitigate ATWS events, and the lower fission product inventory resulting from low power operation, we believe that the risk reduction from category four events is on the order of 1,000 - 100,000.

CONCLUSIONS:

The above discussion indicates a significant risk reduction during low power testing for each event category. Combining the factors for each category, we estimate that the overall reduction in instantaneous risk to the public should be on the order of 2,000 to 200,000, if La Salle is operated at 5% power from initial startup for 14 days compared to equilibrium full power operation. This reduction is similar to that previously estimated for several PWRs.

ATTACHMENT 2

Inspection Plan for Division I Diesel Generator

TABLE 1

PROPOSED GGNS INSPECTION PLAN, DIV 1 D/G (See Note 1)

TDI Comp. #	Part Name	Part Number	Drawing Number	Item #	Task Descriptions	Inspection Type: Visual	Dmsn	NDE	Hdns	Torque Comp.	Notes
02-360A	Cylinder Heads	03-360-03-0F	03-360-04		Inspect Valve Seating Surfaces and Fire Deck	X		UT* LP** MT***			* Fire Deck & Nozzel Cavity Wall Thickness ** Valve Seats & *** Fire Deck Area
02-305A	Engine Base Assembly	02-305-05-AA			LP Main Bearing Saddle Area and Visually Inspect Mating Surfaces	X		LP			Assemble Documentation, See Note 1
02-390G	Rocker Arm Capscrews	02-390-01-0B	02-390-04	3	Verify Torque M.T. Capscrews & Verify Material			M.T.	X	365 ft-lbs X	
02-315A	Cylinder Block	02-315-03-AE	02-315-5001	1	Visual NDE Map for Baseline	X		LP*			* Cylinder Block Mating Surface Bolt Hole Area, See note 1
02-315E	Cylinder Head Studs	03-315-01-0A	02-315-5001	8	Visually Inspect Head Studs, Material Hardness & Torque Verification on Studs	X			X*	3600 ft/lbs X**	* One Stud ** Four Studs
02-315C	Cylinder Liners	02-315-02-0G	02-315-5001	4	Visually Inspect Dimensional Material Verification	X*	X*		X*	X*	* Cylinder Liners, See note 1
	Landing Area					X**	X**	LP**			** Landing Area

TABLE 1

PROPOSED GGNS INSPECTION PLAN, DIV I D/G (See Note 1)

TDI Comp. #	Part Name	Part Number	Drawing Number	Item #	Task Descriptions	Inspection Type: Visual	Dmsn	NDE	Hdns	Torque	Comp.	Notes
02-475C	Turbocharger Welds		02-475-22		Visual	X						Assemble Documentation
	Bracket-Bolting See note 1	GB-001-143 GB-001-117	02-475-22	3 13	Verify Torque Material	X				X	X	Assemble Documentation, See note 1
02-340A	Connecting Rod Boxes	02-340-05-AG	02-340-4780	19	Rod Box (out-of-engine)	X	X	MT	X		X	* Female Threads in Rod Box & External Machined Surface, See note 1
		02-340-04-AB		5	Rod Box Bolts (out-of-engine)			MT**		2600*** ft/lbs		** Conn Rod Bolts *** At Disassembly & Reassembly
02-340A	Connecting Rod Bushing (Wrist Pin)	R-3195	02-340-4780	10	NDE & Material Verification		X	LP			X	
02-340B	Connecting Rod Bearing Shells	02-340-04-AG	02-340-05	3	RT Shells, Visual Inspection, & Dimensional Check	X	X	RT		2600* ft/lbs		RT to ASTM Standards * At Disassembly & Reassembly
02-340C	Pistons Crowns Studs	03-341-04-AE 03-340-04-AE 03-341-04-AB	03-341-7319	10	MT Skirts, Crowns & Studs		X	MT				
02-310A	Crankshaft	1A-5445	02-310-09	1	Torsiograph Deflection Test		X					Torsiograph
02-386B	Crankcase Covers: Gaskets & Bolting		02-386-01		Visual Inspect Verify Torque	X				X		

TABLE 1

PROPOSED GGNS INSPECTION PLAN, DIV I D/G (See note 1)

TDI Comp. #	Part Name	Part Number	Drawing Number	Item #	Task Descriptions	Inspection Type						Notes
						Visual	Dmsn	NDE	Hdns	Torque	Comp.	
02-365C	Fuel Oil Injection Tube	1A-2600	02-365-01	4	Visual Inspection for Leaks	X						Assemble Documentation
02-390C	Intake Exhaust Push Rods	02-390-06-AB	02-390-04	4	Visual	X						Friction Weld Assemble Documentation
02-390D	Connector Push Rods	02-390-07-AG	02-390-04	5	Visual	X						Fricition Weld Assemble Documentation
02-359	Air Start Valve Capscrews	GB-032-114	02-359-03	19	Visual		X					Assemble Documentation, See note 1

Note: 1. The NRC requires additional inspections for these components as identified in Table 2.

TABLE 2

Additional Inspections Required by NRC

	Additional Inspection Required
Engine Base Assembly	Fastener torques should also be checked.
Cylinder Block	Visual and LP Inspection should also include liner lands of engine block.
Cylinder Liners	LP inspection should also be performed. In addition, lightly hone any glazed areas of liners in accordance with the manufacturers recommendations.
Turbocharger Thrust Bearings	Inspect for wear, check motor assembly axial clearances, check bearing oil flow rates per criteria employed by TDI Owners Group.
Air Start Valve Capscrews	Torques should also be checked.

ATTACHMENT 3 TO ORDER REQUIRING DIESEL GENERATOR INSPECTION
FACILITY OPERATING LICENSE NO. NPF-13
Docket No. 50-416

Replace the following pages of the appendix A Technical Specifications with the enclosed pages. The revised pages are identified by date of Order and contain a vertical line indicating the area of change. The corresponding reverse pages are also provided to maintain document completeness.

Amended Page	Reverse Page
3/4 8-1	
3/4 8-2	
3/4 8-2a	
3/4 8-3	
3/4 8-4	
3/4 8-5	
3/4 8-6	
3/4 8-7	
3/4 8-7a (new page)	3/4 8-8
3/4 8-9	
3/4 8-9a	
B3/4 8-1	B3/4 8-2

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

A.C. SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Three physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and

b. Two separate and independent diesel generators, each with:

1. Separate day fuel tanks containing a minimum of 220 gallons of fuel.

2. A separate fuel storage system containing a minimum of:

a) 48,000 gallons of fuel for diesel generator 12, and

b) 39,000 gallons of fuel for diesel generator 13.

3. A separate fuel transfer pump.

c. The 6200 kW gas turbine generator system consisting of 3 gas turbines, with:

1. A separate day fuel tank containing a minimum of 300 gallons of fuel for each gas turbine, and

2. A fuel storage system consisting of:

a) A makeup fuel tank containing a minimum of 300 gallons of fuel, and

b) A fuel storage tank containing a minimum of 52,000 gallons of fuel, and

c) A fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With one offsite circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a within two hours and 4.8.1.1.2 a.4, for one diesel generator at a time, within two hours and at least once per 8 hours thereafter, and 4.8.1.1.4.b.1 within two hours and at least once per 8 hours thereafter; restore all three offsite circuits to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued)

b. With diesel generator 12 of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a within one hour and 4.8.1.1.2.a.4, for one diesel generator at a time, within two hours and at least once per 8 hours thereafter and 4.8.1.1.4.b.1 within 2 hours and at least once per 8 hours thereafter; restore diesel generator 12 to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

c. With either diesel generator 12 or the gas turbine generator system of the above required A.C. electrical power sources inoperable, in addition to ACTION b or d, above as applicable, verify within 2 hours that all required systems, subsystems, trains, components and devices that depend on diesel generator 12 or the gas turbine generator system as a source of emergency power are also OPERABLE; otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

d. With the gas turbine generator system of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a and 4.8.1.1.2.a.4 within two hours and at least once per 8 hours thereafter; restore the gas turbine generator system to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

e. With diesel generator 13 of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirements 4.8.1.1.1.a within one hour and 4.8.1.1.2.a.4, for diesel generator 12, within two hours and at least once per 8 hours thereafter and 4.8.1.1.4.b.1 for the gas turbine generator system within two hours and at least once per 8 hours thereafter; restore the inoperable diesel generator 13 to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by Specification 3.5.1.

f. With a tornado or hurricane warning in effect:

1. Diesel generator 13 shall be demonstrated to be OPERABLE per Specification 4.8.1.1.2.a.4 within two hours and at least once per eight hours thereafter until the adverse weather condition warning has cleared.

ACTION (Continued)

2. Diesel generator 12 shall be started, brought to operating voltage and speed, and maintained running until the adverse weather condition warning has cleared.

3. All three gas turbine generators shall be started, brought to rated voltage and speed, and maintained running until the adverse weather condition warning has cleared.

g. With a tornado or hurricane watch in effect:

1. Diesel generator 13 shall be demonstrated to be OPERABLE per Specification 4.8.1.1.2.a.4 within two hours and at least once per eight hours thereafter until the adverse weather condition watch has cleared.

2. Diesel generator 12 shall be demonstrated to be OPERABLE per Specification 4.8.1.1.2.a.4 within two hours and at least once per eight hours thereafter until the adverse weather condition watch has cleared.

3. All three gas turbine generators shall be demonstrated to be OPERABLE per Specification 4.8.1.1.4.b.1 within two hours and at least once per 8 hours thereafter until the adverse weather condition watch has cleared.

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments and indicated power availability, and

b. Demonstrated OPERABLE at least once per 18 months during shutdown by manually transferring unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each of the above required diesel generators shall be demonstrated OPERABLE:

a. In accordance with the frequency specified in Table 4.8.1.1.2-1 on a STAGGERED TEST BASIS by:

1. Verifying the fuel level in the day tank.

2. Verifying the fuel level in the fuel storage tank.

3. Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day tank.

4. Verifying the diesel starts from ambient condition and accelerates to at least 441 rpm for diesel generator 12 and 882 rpm for diesel generator 13 in less than or equal to 10 seconds. The generator voltage and frequency shall be 4160 ± 416 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The diesel generator shall be started for this test by using one of the following signals:

a) Manual.

b) Simulated loss of offsite power by itself.

c) Simulated loss of offsite power in conjunction with an ESF actuation test signal.

d) An ESF actuation test signal by itself.

5. Verifying the diesel generator is synchronized, loaded to greater than or equal to 7000 kW for diesel generator 12 and 3300 kW for diesel generator 13 in less than or equal to 60 seconds, and operates with these loads for at least 60 minutes.

6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.

7. Verifying the pressure in all diesel generator air start receivers to be greater than or equal to:

a) 160 psig for diesel generator 12, and

b) 175 psig for diesel generator 13.

b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day fuel tanks.

c. At least once per 92 days and from new oil prior to addition to the storage tanks by verifying that a sample obtained in accordance with ASTM-D270-1975 has a water and sediment content of less than or equal to .05 volume percent and a kinematic viscosity @ 40°C of greater than or equal to 1.9 but less than or equal to 4.1 when tested in accordance with ASTM-D975-77, and an impurity level of less than 2 mg. of insolubles per 100 ml. when tested in accordance with ASTM-D2274-70, except that the test of new fuel for impurity level shall be performed within 7 days after addition of the new fuel to the storage tank.

d. At least once per 18 months, during shutdown, by:

1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service.

2. Verifying the diesel generator capability to reject a load of greater than or equal to 550 kW (RHR B/C Pump) for diesel generator 12, and greater than or equal to 2180 kW (HPCS Pump) for diesel generator 13 while maintaining less than or equal to 75% of the difference between nominal speed and the overspeed trip setpoint, or 15% above nominal, whichever is less.

3. Verifying the diesel generator capability to reject a load of 7000 kW for diesel generator 12 and 3300 kW for diesel generator 13 without tripping. The generator voltage shall not exceed 5000 volts during and following the load rejection.

4. Simulating a loss of offsite power by itself, and:

a) For Division 2:

1) Verifying deenergization of the emergency busses and load shedding from the emergency busses.

2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at 4160 ± 416 volts and 60 ± 1.2 Hz during this test.

b) For Division 3:

1) Verifying de-energization of the emergency bus.

2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with the loads within 10 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at 4160 ± 416 volts and 60 ± 1.2 Hz during this test.

SURVEILLANCE REQUIREMENTS (Continued)

5. Verifying that on an ECCS actuation test signal, without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be 4160 ± 416 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.

6. Verifying that on a simulated loss of the diesel generator, with offsite power not available:

   a. For Division 2:

      1. The loads are shed from emergency busses associated with Diesel Generator 12.

      2. Subsequent loading of the diesel generators is in accordance with design requirements.

   b. For Division 3:

      1. The associated output breaker for Diesel Generator 13 opens automatically.

      2. Subseqent loading of the diesel generator is in accordance with design requirements.

7. Simulating a loss of offsite power in conjunction with an ECCS actuation test signal, and:

   a) For Division 2:

      1) Verifying deenergization of the emergency busses and load shedding from the emergency busses.

      2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency busses shall be maintained at 4160 ± 416 volts and 60 ± 1.2 Hz during this test.

   b) For Division 3:

      1) Verifying de-energization of the emergency bus.

      2) Verifying the diesel generator starts on the auto-start signal, energizes the emergency bus with the permanently connected loads within 10 seconds and the autoconnected emergency loads within 20 seconds and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady state voltage and frequency of the emergency bus shall be maintained at 4160 ± 416 volts and 60 ± 1.2 Hz during this test.

8. Verifying that all automatic diesel generator trips are automatically bypassed upon an ECCS actuation signal except:

   a) For Division 2, engine overspeed, generator differential current, low lube oil pressure, and generator ground overcurrent.

   b) For Division 3, engine overspeed and generator differential current.

9. Verifying the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded to greater than or equal to 7700 kW for diesel generator 12 and 3630 kW for diesel generator 13 and during the remaining 22 hours of this test, the diesel generator shall be loaded to 7000 kW for diesel generator 12 and 3300 kW for diesel generator 13. The generator voltage and frequency shall be 4160 ± 416 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2 d.7.a).2) and b).2)*.

10. Verifying that the auto-connected loads to each diesel generator do not exceed the continuous rating of 7000 kW for diesel generator 12 and 3300 kW for diesel generator 13.

11. Verifying the diesel generator's capability to:

    a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,

    b) Transfer its loads to the offsite power source, and

    c) Be restored to its standby status.

12. Verifying that with the diesel generator operating in a test mode and connected to its bus that a simulated ECCS actuation signal:

    a) For Division 2, overrides the test mode by returning the diesel generator to standby operation.

    b) For Division 3, overrides the test mode by bypassing the diesel generator automatic trips per Surveillance Requirement 4.8.1.1.2.d.8.b).

13. Verifying that with all diesel generator air start receivers pressurized to less than or equal to 256 psig and the compressors secured, the diesel generator starts at least 5 times from ambient conditions and accelerates to at least 441 rpm for diesel generator 12 and 882 rpm for diesel generator 13 in less than or equal to 10 seconds.

*If Surveillance Requirement 4.8.1.1.2.d.4.a)2) or b)2) are not satisfactorily completed, it is not necessary to repeat the preceding 24 hour test. Instead, the diesel generator may be operated at rated load for one hour or until operating temperatures have stabilized.

14. Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed lines.

15. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within ± 10% of its design interval for diesel generator 12.

16. Verifying that the following diesel generator lockout features prevent diesel generator starting and/or trip the diesel generator only when required:

    a) Generator loss of excitation.
    b) Generator reverse power.
    c) High jacket water temperature.
    d) Generator overcurrent with voltage restraint.
    e) Bus underfrequency (12 only).
    f) Engine bearing temperature high (12 only).
    g) Low turbo charger oil pressure (12 only).
    h) High vibration (12 only).
    i) High lube oil temperature (12 only).
    j) Low lube oil pressure (13 only).
    k) High crankcase pressure.

e. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting all three diesel generators simultaneously, during shutdown, and verifying that the three diesel generators accelerate to at least 441 rpm for diesel generator 12 and 882 rpm for diesel generator 13 in less than or equal to 10 seconds.

f. At least once per 10 years by:

1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite or equivalent solution, and

2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code in accordance with ASME Code Section 11, Article IWD-5000.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests, on a per nuclear unit basis, is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.4 The gas turbine generator system shall be demonstrated OPERABLE:

a. At least once per 15 days by verifying that all three gas turbine generators start and attain rated speed and voltage in less than or equal to 25 minutes and can be run for at least 60 minutes.

b. At least once per 31 days by verifying:

1. that all three gas turbine generators start and attain rated speed and voltage in less than or equal to 25 minutes, and

2. that the gas turbine system can be synchronized and loaded to greater than or equal to 4700 kW and can operate with this load for at least 60 minutes.

c. At least once per 31 days by verifying:

1. the fuel level in each of the three gas turbine generator day tanks,

2. the fuel level in the fuel storage tank supplying make-up to the gas turbine generator system, and

3. the OPERABILITY of the fuel transfer pump between the gas turbine generator system make-up tank and the fuel storage tank supplying make-up to the gas turbine generator system.

d. At least once every 60 days and prior to the addition of fuel to the fuel storage tank supplying make-up to the gas turbine generator system, fuel oil samples shall be drawn from the fuel storage tank supplying make-up to the gas turbine generator system and analyzed to verify that the makeup fuel oil meets the standards set forth in Specification 4.8.1.1.2.c.

TABLE 4.8.1.1.2-1

DIESEL GENERATOR TEST SCHEDULE

Number of Failures in Last 100 Valid Tests*	Test Frequency
$\leq$ 1	At least once per 31 days
2	At least once per 14 days
3	At least once per 7 days
$\geq$ 4	At least once per 3 days

*Criteria for determining number of failures and number of valid test shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, where the last 100 tests are determined on a per nuclear unit basis. For the purposes of this test schedule, only valid tests conducted after the OL issuance date shall be included in the computation of the "last 100 valid tests." Entry into this test schedule shall be made at the 31 day test frequency.

ELECTRICAL POWER SYSTEMS

A.C. SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and

b. Diesel generator 12, and diesel generator 13 when the HPCS system is required to be OPERABLE, with each diesel generator having:

1. A day tank containing a minimum of 220 gallons of fuel.

2. A fuel storage system containing a minimum of:

a) 48,000 gallons of fuel each for diesel generator 12.

b) 39,000 gallons of fuel for diesel generator 13.

3. A fuel transfer pump.

c. The 6200 kW gas turbine generator system consisting of 3 gas turbines, with:

1. A separate day fuel tank containing a minimum of 300 gallons of fuel for each gas turbine, and

2. A fuel storage system consisting of:

a) A makeup fuel tank containing a minimum of 300 gallons of fuel, and

b) A fuel storage tank containing a minimum of 52,000 gallons of fuel, and

c) a fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 4, 5 and *.

ACTION:

a. With all offsite circuits inoperable and/or with diesel generator 12 or the gas turbine generator system of the above required A.C. electrical power sources inoperable, suspend CORE ALTERATIONS, handling of irradiated fuel in the primary or secondary containment, operations with a potential for draining the reactor vessel and crane operations over the spent fuel storage pool when fuel assemblies are stored therein. In addition, when in OPERATIONAL CONDITION 5 with the water level less than 23 feet above the reactor pressure vessel flange, immediately initiate corrective action to restore the required power sources to OPERABLE status as soon as practical.

b. With diesel generator 13 of the above required A.C. electrical power sources inoperable, restore the inoperable diesel generator 13 to OPERABLE status within 72 hours or declare the HPCS system inoperable and take the ACTION required by Specification 3.5.2 and 3.5.3.

c. The provisions of Specification 3.0.3 are not applicable.

*When handling irradiated fuel in the primary or secondary containment.

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.2 At least the above required A.C. electrical power sources shall be demonstrated OPERABLE per Surveillance Requirements 4.8.1.1.1, 4.8.1.1.2, 4.8.1.1.3 and 4.8.1.1.4, except for the requirement of 4.8.1.1.2.a.5.

3/4.8.1, 3/4.8.2 and 3/4.8.3 A.C. SOURCES, D.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS

(The following bases are developed for low power operation while diesel generator 11 is out of service for disassembly and inspection.)

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy these systems requirements for capacity, capability, and redundancy needed for safe plant shutdown.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least Division 2 of the onsite A.C. or the gas turbine generator system and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. Division 3 supplies the high pressure core spray (HPCS) system only.

The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources", December 1974. When diesel generator 12 or gas turbine generator system is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator 12 or gas turbine generator system as a source of emergency power, are also OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period diesel generator 12 or gas turbine generator system is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies", March 10, 1971, Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants", Revision 1, August 1977 and Regulatory Guide 1.137" Fuel-Oil Systems for Standby Diesel Generators", Revision 1, October 1979.

A.C. SOURCES, D.C. SOURCES and ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

The surveillance requirements for demonstrating the OPERABILITY of the unit batteries are in accordance with the recommendations of Regulatory Guide 1.129 "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations.".

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8.2.1-1 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8.2.1-1 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

SAFETY EVALUATION REPORT RELATED TO ORDER REQUIRING DIESEL GENERATOR INSPECTION

GRAND GULF UNIT 1

1.0 Introduction

As a basis for operation of Grand Gulf Unit 1 at full power, Mississippi Power & Light (MP&L) submitted reports dated February 20 and April 17, 1984, concerning the MP&L program to verify and enhance the reliability of the TDI diesel generators at Grand Gulf Unit 1. These submittals were in response to the NRC questions on the TDI issue and are supplemental to other MP&L responses to the NRC requests contained in letters to J. P. McGaughy dated October 31, 1983 and December 27, 1983. Additional actions taken by MP&L to verify and enhance the reliability of onsite/offsite AC power systems were documented by letter dated February 26, 1984.

Based on a review of this information and additional information provided during meetings between the NRC staff and MP&L, the staff informed MP&L by letter dated April 25, 1984, that the staff was unable to conclude that the proposed MP&L program for ensuring adequate TDI diesel engine reliability would be sufficient to support operation of Grand Gulf Unit 1 at power levels in excess of 5% of full power. The staff proposed additional actions to ensure adequate reliability of the TDI diesels including disassembly and inspection of at least one TDI diesel, subsequent preoperational testing of that engine, and additional maintenance and surveillance actions pertaining to the TDI diesels.

By letter dated May 6, 1984, MP&L submitted additional information to support its conclusions that there is little if any justification to require a disassembly inspection of a TDI diesel engine prior to the first refueling outage, and that adequate basis exists to support 100% power operation of Grand Gulf Unit 1 until the first refueling outage. The MP&L submittal also included an alternative proposal to disassemble and inspect the Division 1 TDI diesel generator in parallel with the conduct of the plant's power ascension program.

In their submittal of February 26, 1984, the licensee proposed to use gas turbines as supplemental AC sources to the onsite distribution systems. Therefore, during the period of time when one TDI diesel generator (Division 1) is unavailable due to disassembly and inspection of diesel engine components, the available AC power sources will be the offsite systems (115 KV and 500 KV networks), one TDI diesel generator (Division 2) and the gas turbine generators. Although the Division 2 TDI diesel generator will be maintained with current Technical Specifications, our review conservatively assumed both TDI diesel generators were not available.

This safety evaluation is based on the assumption that the reactor thermal power level will not exceed 5% power while one TDI diesel generator is unavailable.

2.0 Engine Disassembly, Inspection and Pre-Operational Testing

2.1 Discussion

Concerns regarding the reliability of large bore, medium speed diesel generators of the type supplied by TDI at Grand Gulf Unit 1 and 15 other domestic nuclear plants were first prompted by a crank shaft failure at Shoreham on September 1983. However, a broad pattern of deficiencies in critical engine components have since become evident at Shoreham, Grand Gulf Unit 1, and at other nuclear and non-nuclear facilities employing TDI diesel generators. These deficiencies stem from inadequacies in design, manufacture and QA/QC by TDI.

In response to these problems, eleven U.S. nuclear utility owners, including MP&L, formed a TDI diesel generator owners group to address operational and regulatory issues relative to diesel generator sets used for standby emergency power. The Owners Group program, which was initiated in October 1983, embodies three major efforts.

1) Resolution of 16 known generic problem areas (Phase I program) intended by the Owners Group to serve as an interim basis for the licensing of plants

2) Design review of important engine components and quality revalidation of important attributes for selected engine components (Phase II program)

3) Expanded engine testing and inspection

Pending the completion of the Owners Group program, MP&L has submitted a description of its program to enhance the reliability and performance of the two TDI diesel generators. This includes engineering evaluations, testing, and corrective actions taken in response to problems experienced during the startup testing phase of the plant, and other potential generic problems identified by the TDI Owners Group (i.e., the 16 known problem areas).

2.2 Evaluation

Problems to date with TDI diesel generators stem from a broad pattern of design, manufacturing, and QA/QC inadequacies by TDI. For this reason the staff believes that the comprehensive approach of the Owners Group program to go beyond problems known to exist and to include a systematic review of critical engine components is essential for purposes of reestablishing full confidence in the reliability of the diesel engines.

Pending completion of the TDI Owners Group program, and the staff's review of the recommendations stemming from this program, the staff concludes that additional information is needed regarding the present condition of critical engine components to support interim operation of Grand Gulf Unit 1 at power levels in excess of 5% power. An engine disassembly and inspection in accordance with Section 2.2.1 below is needed to obtain the required information, and subsequent preoperational testing in accordance with Section 2.2.2 below is needed to verify that the engine has been properly reassembled. The staff's findings regarding the need for these actions are generally based on the following:

1) Phase I of the Owners Group program which addresses the 16 known problems has not been completed. To date, the Owners Group has submitted reports addressing 8 of these potential problem areas for DSRV-16 engines. However, the staff review of the available Owners Group Reports has not yet been completed, and therefore the staff is unable to conclude that a final resolution to these potential problem areas is available. In addition, some of the Owners Group reports call for NDE inspections of components which have not yet been performed for GGNS (See Item 4 below).

2) Owners Group Phase I reports still outstanding on the DSRV engines include reports on the connecting rods and the cylinder block. Little information has been provided to date regarding the specific causes of failures and/or cracks of these components.

3) The Owners Group has not completed Phase II of its program consisting of a comprehensive design review and quality reverification of important engine components.

4) Verification (post-operational) NDE inspections have not been performed on a number of critical components originally included in the list of 16 known potential problems. These include:

   - pistons
   - connecting rod bearings
   - connecting rods
   - wrist pin bushing
   - engine block
   - turbocharger thrust bearing

   To date, these and other important engine components have experienced between 200 and 800 hours of service (for Div. 1 engine). Confirmation that these components are presently in an acceptable condition will provide needed confidence that these components will not cause an engine failure during the next 50 to 200 hours of anticipated engine running time before the first refueling outage. (It is anticipated that the Owners Group program and the staff findings stemming from its review of the program results will be complete by that time.)

5) Because of QA/QC deficiencies at TDI, the staff believes there may be significant differences in the "as manufactured" quality of engine components between the TDI engines at Grand Gulf and those of other plants with similarly designed engines. Therefore, it is difficult to draw conclusion relative to the Grand Gulf engines based on inspection results from other plants (e.g., Catawba).

2.2.1 Engine Disassembly and Inspection

The Division 1 engine (which has accumulated the most operating hours to date) should be disassembled for inspection of key components (identified below), prior to plant operation above 5% power. Action to be taken on the Division 2 engine would be contingent upon the results of the inspections conducted on the Division 1 engine and MP&L's ability to demonstrate, through a review of the manufacturer's QA records, that the two engines have similar "as-manufactured" quality.

The types of inspections to be performed should be similar to those conducted at Shoreham and Catawba (e.g., dye penetrant, eddy current, ultrasonic, radiography, etc.) as appropriate for each component based on the kinds of problems (e.g., cracks, abnormal wear or other distress, inadequate assembly or torquing) which have previously been experienced on these components at Grand Gulf Unit 1, Shoreham or other TDI engines. The staff concludes that the type and scope of inspections proposed by MP&L in their May 6, 1984 submittal (Table 1 of Attachment 2 to the Order) would be acceptable subject to the changes in Table 2 of Attachment 2 to the Order. All defective parts found shall be replaced prior to declaring the engine operable. The engine block and engine base may be excepted if indications are non-critical. Non-critical indications are defined as not causing oil or water leakage, not propagating, or not adversely affecting cylinder liners or stud holes.

A description of the inspections performed and the results should be submitted for NRC staff review prior to plant operation above 5% power. This report should address all indications found and the engineering basis for acceptance or rejection of the subject components.

2.2.2 Preoperational Testing Subsequent to Engine Disassembly and Inspection

Preoperational testing must be performed on the Division 1 engine following its disassembly, inspection and reassembly. In addition to adhering to the manufacturer's preoperational test recommendations, this phase of testing should include the elements listed below, if they are not already included in the manufacturer's recommendations, unless they would not be recommended by the manufacturer in order to satisfy operability requirements.

- 10 modified starts to 40% load
- 2 fast starts to 70% load
- 1 24-hour run at 70% load

A modified start is defined as a start including a prelube period as recommended by the manufacturer and a 3 to 5 minute loading to the specified load level and run for a minimum of one hour. The fast starts are "black starts" conducted from the control room on simulation of an ESF signal with the engine on ready standby status. The engine should be loaded to 70% and run for 4 hours at this load on each fast start test. The 24-hour performance run is suggested to detect abnormal temperatures and/or temperature excursions that might indicate engine distress. Either a modified or fast start may be utilized.

Should these tests not be performed satisfactorily at the first attempt, i.e., the 10 modified starts should be performed with no failure, the NRC staff will review the need for additional testing requirements. A failure is defined as an inability of the engine to start, or an abnormal condition during the respective run which would ultimately preclude the engine from continuing to operate.

2.2.3 Engine Maintenance and Surveillance Program

The staff will review MP&L's proposed maintenance, surveillance and inspection program as identified in MP&L's May 6, 1984 submittal prior to the issuance of a license for plant operation in excess of 5% power.

2.3 Conclusion

Pending the completion of the TDI Owners Group Program and the staff review of recommendations stemming from this program as they apply to Grand Gulf Unit 1, the staff concludes that a TDI diesel generator disassembly and inspection in accordance with Section 2.2.1 of this SER and subsequent pre-operational testing of the affected engine(s) in accordance with Section 2.2.2 of this SER is needed to support operation of Grand Gulf Unit 1 at power levels in excess of 5% of full power. The staff will review MP&L's proposed maintenance, surveillance and inspection program and any needed license conditions prior to issuance of a full power license.

3.0 Interim Technical Specifications for AC Power Systems

3.1 Review Scope

We have reviewed the description of the 500 KV and 115 KV transmission lines, and the gas turbine generator set connected to the offsite system and evaluated their capacity, capability, reliability and redundancy. We have also reviewed the proposed technical specifications for AC power systems.

3.2 Offsite Power

The offsite power system has previously been reviewed in the Safety Evaluation Report of the FSAR and was found to satisfy the capacity, capability, reliability and redundancy requirements and, therefore, is acceptable.

3.3 Gas Turbine Generator

The gas turbine generators (GTG) are presently installed at Grand Gulf near the Unit 2 diesel fuel oil storage tanks. This location will provide an advantageous electrical connection to the non-Class 1E portion of the Unit 1 plant distribution system. The three units are connected in parallel through their associated circuit breaker to the non-Class 1E 4160-volt distribution system which in turn feeds the Class 1E 4160-volt buses. In view of the physical location of the gas turbines surrounded by large substantial structures it is highly unlikely that a tornado would damage the gas turbine simultaneously with both the 115 KV and the 500 KV offsite power sources. Therefore the gas turbine power source is expected to be available to the onsite distribution system to provide power to the safe shutdown loads for a tornado event which may damage the offsite power sources. Also, the location will prevent unavailability of the gas turbines due to flooding and normal standing water conditions.

The gas turbine generator set consists of three units. Two units have a capacity of 2000 KW each and third unit has a capacity of 2200 KW. Our review found that, of the three units, the combined two units, aggregate rating of 4000 KW, are sufficient to provide power to safe shutdown divisional loads of 3200 KW for long term cooling.

Each gas turbine has a separate auxiliary power unit (APU) for starting. A single APU can be used to start any one of the gas turbines. The gas turbine is designed for manual dead-line starting capability: i.e., the gas turbine is capable of starting and accelerating to rated speed and voltage by using an APU. After bringing all three units up to rated speed and voltage, the first unit's circuit breaker closes to a dead bus and the second and third units are synchronized in sequence to the first unit and thus become ready to provide power to the bus.

To demonstrate this capacity and starting capability following initial testing, the licensee will perform periodic tests which require that (1) at least once every 15 days, each GTG will be started, brought to rated speed and voltage, and run for at least 60 minutes; (2) at least once every 31 days, two of the GTG will be started, synchronized and loaded to 4700 KW in less than or equal to 25 minutes and operated with a load greater than or equal to 4700 KW for at least 60 minutes. The periodic tests and the interim surveillance requirement for the gas turbine generator in the proposed technical specification are equivalent to those for the emergency standby power supplies. We believe that these surveillance requirements on the gas turbine power supply are adequate for the period of time when one of TDI diesel generators is being inspected.

3.4 Technical Specifications

i) The current surveillance requirements and limiting conditions for operation (LCOs) for the offsite power sources and diesel generator No. 12 (DG #12) and diesel generator No. 13 (DG#13) remain the same.

ii) Surveillance requirements as stated in Section 3.3 of this evaluation and LCOs for the gas turbine generators are included in the interim technical specifications. (Attachment 3 to this Order)

iii) Additional operability requirements for DGs #12, #13, and GTGs during tornado warning and watch conditions are also included in the interim technical specifications.

4.0 Overall Conclusion

The NRC staff, in attachment 1 to this Order, had concluded that total failure of the TDI diesels at Grand Gulf would not significantly increase the risk of the low power operation and that the risk is acceptably small. Nevertheless, the licensee has provided gas turbine generators to substitute for the out-of-service diesel generator during the period of inspection and subsequent preoperational testing.

Based on our evaluation of the available power sources and in view of the minimum power needs for low power operation, the staff finds that these sources (offsite, one TDI diesel and gas turbine generators) together with the specified surveillance requirements, represent a power system which has the capacity, capability, reliability, and redundancy for this low power level and that the health and safety of the public will not be endangered by implementation of this Order.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 24 1984

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MEMORANDUM FOR: Chairman Palladino
Commissioner Gilinsky
Commissioner Roberts
Commissioner Asselstine
Commissioner Bernthal

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: GRAND GULF ELECTRICAL POWER SUPPLIES

In a memorandum dated May 18, 1984, Commissioner Gilinsky requested information concerning whether the electrical supply systems at Grand Gulf meet General Design Criterion 17. Following the Commission's guidance in the Shoreham proceeding, CLI-84-8 (May 16, 1984), the staff has concluded, on the basis of the problems associated with TDI diesel engines, that the onsite electrical supply systems at Grand Gulf do not meet GDC 17. Accordingly, Mississippi Power and Light had a meeting with staff on May 18, 1984 and was directed to submit a request for an exemption to GDC 17 for operation at power levels up to 5% full power, or at any higher power level it thought could be justified under Commission Shoreham decision of May 16, 1984. The Company responded that such a request would be submitted in about one week. The staff has had concerns about the reliability of the TDI diesel engines for some time, but has not taken action to suspend low-power operation at Grand Gulf because our safety evaluation has shown that the risk of such low-power operation is exceptionally small, and that the risk is not significantly increased by the total loss of the TDI diesel.

The current onsite power supply system at Grand Gulf in addition to two TDI diesels includes one EMD diesel dedicated to the high pressure core spray system and three gas turbines capable of producing a total of 6200 KW. The offsite power supply system consists of two 500 KV lines and one 115 KV line.

Prior to supporting plant operation above 5% of full power, the staff will require the TDI diesel generator issue to be appropriately addressed.

William J. Dircks
Executive Director for Operations

cc: SECY
OPE
OGC

Contact:
DHouston, NRR
49-28358

3/84

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C&R (Natalie)

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Meeting Title: Discussion of Grand Gulf Diesel Generator Inspection Order

Meeting Date: 5/24/84 Open ✓ Closed ___

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3. Letter to J. P. McGaughy from D. Eisenhut w/ attachments - 4/25/84	___	*	___	___
4. Letter to J. P. McGaughy from E. Rdensam w/ att. dated 5/22/84	___	*	___	___
5. Memo from W. Dircks to Commissioners dated 5/24/84	___	*	___	___

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