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UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the matter of:

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MEETING OF THE ADVISORY COMMITTEE ON

REACTOR SAFEGUARDS,

SUBCOMMITTEE ON THREE-MILE ISLAND, UNIT 1

NUCLEAR POWER PLANT

Place: Middletown, Pennsylvania

Date: January 31, 1980 **Pages:** 1 - 282

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UNITED STATES

NUCLEAR REGULATORY COMMISSION

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American Legion Hall
137 East High Street
Middletown, Pennsylvania

Thursday, January 31, 1980

The Committee on Reactor Safeguards, Subcommittee on Three-Mile Island, Unit 1, Nuclear Power Plant, convened at 8:30 a.m., in Middletown, Pennsylvania, Harold Etherington (Chairman of the Subcommittee), presiding.

PRESENT:

Dr. Stephen Lawroski

Mr. Jesse Ebersole

Mr. William Mathis

P R O C E E D I N G S

MR. ETHERINGTON: The meeting will now come to order.

This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Three Mile Island-1.

I am Harold Etherington.

The other ACRS Members present today are; Dr. Stephen Lawroski, Mr. Jesse Ebersole, Mr. William Mathis; and the ACRS Consultants are : Dr. Lipinski, Dr. Catton, Dr. Foster, and Dr. Dillon.

The purpose of this meeting is to discuss the NRC Staff Status Report on the Evaluation of Metropolitan Edison Company Compliance with the NRC Order dated August 9, 1979, and other matters connected with the restart of Three Mile Island Nuclear Station Unit 1.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act and the Government in the Sunshine Act. Mr. Ragnwald Muller is the Designated Federal Employee for the meeting. Also present from the ACRS Staff is Mr. Peter Tam.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register.

A transcript of the meeting is being kept, and it is requested that each speaker first identify himself and speak with sufficient clarity and volume that he can be readily heard.

We have received no requests for oral statements from members of the public. We have received no written statements from members of the public.

The Subcommittee will now have a brief open session following which we will begin the Staff presentation as scheduled on the agenda. The Open Executive Session will be recorded.

A number of our Members and Consultants had an opportunity to visit the Three Mile Island site yesterday and I would like at this time to poll the Committee to see if there are any things they would like to have added to the agenda as a result of what they saw.

I think we might just defer that until we've looked at the agenda and I'll raise the question again later.

I'll state very briefly the purpose of the meeting in more detail then was covered by the notice.

Following the Unit 2 accident, Unit 1 was kept in the shutdown condition and on July the 2nd, the Commission issued a formal order that the Unit remain shutdown until further orders. On August 9, the Commission issued a follow-up order giving reasons for its July the 2nd order and specifying requirements to be met as a condition for consideration of approval of continued operation.

The second order requires a hearing by an Atomic

Safety and Licensing Board and this implies a review by the ACRS, this being a Subcommittee preliminary to that meeting.

The technical and administrative requirements imposed by the order of August 9, include the post Three Mile Island 2 accident short term and long term items applicable to all nuclear power reactors. Those applicable only to B&W reactors and those unique to Three Mile Island 1 because of the proximity of Three Mile Island 2 during cleanup.

The Subcommittee has the Met Ed report on the status of the restart requirements with amendments through ten. It also has the Regulatory Staff Safety Evaluation Report dated January 11, covering amendments through eight, as well as many earlier documents that we've been receiving over the past year, including B&W analyses.

I understand the NRC Staff and Met Ed wish to make a presentation to the ACRS in its February meeting next week. The Subcommittee will have to decide whether to recommend that course to the Full Committee. The Regulatory Staff's SER, Safety Evaluation Report, shows that many of the ordered items had not been implemented to the satisfaction of the Staff at the time the report was written. And, that other items are still under review by the Staff.

Unless most of these items have subsequently been cleaned up, it appears that a review by the Full Committee could be premature. I think the Subcommittee would like to have a schedule and a prognosis for the full assurance of conformance with all of the requirements of the order.

The Met Ed and ACRS reports and the agenda for this meeting address the specific items of the order for continued shutdown. It's possible, however, that the ACRS will want to discuss and make recommendations on matters outside the scope of the NRC order particularly concerning generic matters. These are not addressed in the SER, appropriately; there's no reason for them to be addressed, but I think the Sub-committee probably should decide what other items it wishes to hear at this meeting or to prepare the licensee for the future meeting with the Full Committee.

Now, we have the agenda prepared by Mr. Muller. I think we've all seen it. We might take a moment to look it over and decide whether we wish to have other things added to the items listed. I might say that tomorrow's meeting will stop promptly at 12 o'clock because of travel plans, so any additional items we will add to today's agenda.

I might ask, Steve, do you have anything that you feel can be added?

DR. LAWROSKI: Perhaps it's been covered -- I wondered if we could get a short presentation on what has been done with respect to better sampling capabilities in the event of problems.

MR. ETHERINGTON: Now, can that be covered in any of these items or is that a separate item, Steve?

DR. LAWROSKI: Well, it could be covered under some of these; I'm not sure that they will be.

MR. ETHERINGTON: Well, to the extent that it can be, let's just alert Met Ed to the fact that we would like to hear on those items.

Is there any other -- Jesse?

MR. EBERSOLE: No, I have none.

MR. ETHERINGTON: The Consultants, Ivan, is there anything that is not covered or that we'd like to alert the licensee to?

DR. CATTON: There are some things that I can't really find; that doesn't mean that they are not being covered, maybe I should just mention them.

MR. ETHERINGTON: Yes, just mention them.

DR. CATTON: The first is pressurizer and I think Walt probably described that better than I. The hydrogen recombiners -- I'd like to hear something about the incontainment recirculation and how they're going to avoid buildup above the air conditioner intakes.

MR. ETHERINGTON: Yes, I would imagine questions like that can be answered without preparation when we come to it.

DR. CATTON: I would think so. The system is designed and they already know where they're going to hook it in. I'd like to hear a little bit about how they are going to meet Re guide 197. Also, a description of the control room data retrieval system; we heard a little bit about that yesterday during our tour and one thing that came out of reading some of the reports; I'd like to know what the minimum steam generator level at which circulation can occur.

DR. LIPINSKI: Most of the items of interest that we tried to examine on the tour were not yet installed, for example, the Controlatron Corporation flow meters; they're not in place yet, but there is a description of the material in the TMI 1 report by Met Ed.

We did look at the question of steamline break and its influence on the electrically driven aux feed pumps. I don't know that anymore needs to be discussed in that area.

The subcooling meter for determining the condition of the core was discussed. This meter's being provided by another vender other then B&W and the question came up whether it should indicate superheat as well. This has been discussed at other meetings of the ACRS Subcommittee meetings by one of the Members of that Committee.

We did find out that fluffing valves are not in place at Unit 1 as they are in 2 because of the difference in handling the water clean up system, but we did find out that the instruments there in service are interconnected and there is some question to the desirability of maintaining such interconnection. Perhaps the Applicant would like to discuss the benefits of maintaining this cross-connection.

We did see the Highpoint vents and the Candycanes; those are physically present, but motor operators are yet to be installed and that's indicated as an item still open requiring completion.

MR. ETHERINGTON: I think some of these questions -

DR. LIPINSKI: They can be covered in the course of the --

MR. ETHERINGTON: -- can be covered within questions -

DR. LIPINSKI: Right. We did examine the heater wiring because the current recommendation to place a minimum amount of heaters on emergency power such that the system pressure can be maintained. The susceptibility of the wiring to conditions within containment is of question. On Unit 2, these heaters were not necessarily available with reliability and it appears that the incontainment conditions were responsible with respect to the heaters being able to function. Provisions are being made to provide the electrical power to heaters from the diesels,but the question remains as to the suitability of the wiring within containment as to even though if they had emergency power available whether those heaters will operate under accident conditions and I think some discussion along that line is warranted.

I think that covers the points that I have.

MR. ETHERINGTON: Thank you, Walt.

Mr. Mathis?

MR. MATHIS: There is just one thing that I think we need a little bit more elaboration on: we discussed, somewhat, yesterday on our tour the change that was being made in procedures and we just covered it very superficially. I think we would like to know more about the overall status of the procedural write-up changes.

That's all I have to say.

DR. FOSTER: My questions are going to be focused mainly on the emergency preparedness. Since there's heavy State involvement there, I'm wondering whether there will be anyone here from the State of Pennsylvania.

MR. DORNSIFE: I'm from DER.

DR. FOSTER: Thank you.

MR. DORNSIFE: I'm Bill Dornsife.

DR. FOSTER: Very good, thank you.

There are a couple of other things relative to those plans; one of them is a little discussion on the capability of rapidly estimating releases to the environment which might trigger action plans. Another aspect which I've seen little of so far is emergency plans which relate to downstream water users.

That's all I have.

DR. DILLON: I share a little of Dr. Lawroski's concern about the post accident sampling capability. I would like to hear something about that, particularly the objectives. And, I noticed in reference to an augmented materials technology capability in the new organization; I would like to know whether that includes any significant way to prove analytical capability, anything to do with augmented water chemistry monitoring.

That's all I have.

MR. ETHERINGTON: Yes?

MR. ARNOLD: Robert Arnold, with Metropolitan Edison Company and GPU Service Corporation.

I wonder if we could have some clarification to be sure that we're covering all of these items, Mr. Chairman. We do have the reactor coolant sampling listed under agenda item number 9 and we would expect to cover at that point those items that relate to sampling of the primary coolant system.

Is there other sampling that is desired that we be prepared to discuss outside of that?

DR. LAWROSKI: Yes, sampling of, for example, the containment from the standpoint of you having a better value of a source term should a problem arise than might otherwise be the case if there were no good provisions for a good representative sample or samples of that.

MR. ARNOLD: Then I believe there was a very brief reference to the pressurizer and it wasn't clear to me if there's additional information anticipated there or not. I wasn't sure what the issue was that was being identified.

DR. CATTON: I think it was concerned about its being able to survive or rather what environment.

MR. ARNOLD: The pressurizer heaters.

DR. CATTON: Heaters.

MR. ARNOLD: Now, prior to the discussion on the heaters, there was a very -- kind of a passing reference almost to a pressurizer and then I think the comment that, perhaps, that that was going to be covered already. I don't want to raise an issue if there's not one there.

DR. CATTON: I commented on the pressurizers and turned it over to Walt Lipinski.

DR. LIPINSKI: For the details.

DR. CATTON: For the details.

MR. ETHERINGTON: I think if there should be any question that you're not quite prepared with, we'll give an opportunity tomorrow to clean it up.

MR. ARNOLD: I think that if we can be sure of the people that we have lined up for tomorrow, though, we can expedite the proceedings, sir.

MR. ERTHERINGTON: Yes.

DR. LIPINSKI: Mr. Chairman, I have two other points I would like to add.

We did examine the hydrogen recombiner that was already in place waiting to be connected. But, the report references a second hydrogen recombiner that's to be obtained and stored in a seismic location and pulled into place and connected if needed.

The question is: is this a dedicated hydrogen recombiner to Unit 1 and if it is, why isn't it pulled into place to begin with and connected? Why the intermediate requirement for storage?

MR. ARNOLD: We'll be prepared to answer that question.

DR. LIPINSKI: Okay. The other one is that the security system, in getting through the various doors in the plant, when your computer goes down, key cards do not allow anyone to pass through those doors. Your guards are required to appear with a key --

MR. MULLER: I think that's a security question and that it should be handled in a closed meeting.

DR. LIPINSKI: Okay, but this is with respect to the emergency plan; let me point at what the thing is that's bothering me and then you can decide whether it should be closed or not. But, under emergency conditions, the operators have to gain access through the various parts of the plant and your security computer is down, they then have to wait for the guard to appear with a key and the question is: should there be a quicker method for the operators to be able to move through that plant in the event that the card computer is not working.

MR. ARNOLD: I would suggest that that is a topic for a closed session and I think we could address that in a closed session at this meeting.

DR. LIPINSKI: Okay.

MR. ETHERINGTON: I think probably we'd better proceed with the agenda now and if difficult questions come up for today, we can take care of them tomorrow.

MR. ARNOLD: Excuse me, Mr. Chairman, I did have two other items that I'd like clarification on, if I may.

One is: Is there additional information desired on the flow meter or is the information that was in the report sufficient at this point?

DR. CATTON: I believe that we heard about the flow meter at a meeting a week or so ago. I personally would like some of the details and so forth, but I don't think that this meeting is the place for it. If you could direct me to a report that describes it.

DR. LIPINSKI: It's right here.

DR. CATTON: Oh, it's already here; I just missed it. Thank you.

MR. ARNOLD: Mr. Dornsife is here from the State Department of Environmental Resources and they are the ones that we interface directly with in the event of emergency but the Pennsylvania Emergency Management Agency has overall responsibility for emergency planning within the State and if the Subcommittee wanted someone from that agency here tomorrow, I would think we'd want to make arrangements for it today.

MR. ETHERINGTON: Is there any further pre-meeting --

DR. FOSTER: Perhaps I could respond to that. If Mr. Dornsife could, perhaps, respond to some of the questions relative to evacuation plans and capabilities, why that, perhaps, would take care of my special questions.

MR. ARNOLD: The last item I have, Mr. Chairman, is the -- we'd like to change the sequence, if you could indulge us, to move agenda item 9 up to follow agenda item 2, on the discussion of plant changes for this afternoon.

MR. ETHERINGTON: Agenda item 9 to item 2; all right. That's this afternoon; is that right?

MR. ARNOLD: Yes, sir.

MR. ETHERINGTON: That's Arabic 2, not Roman 2.

MR. ARNOLD: Excuse me, sir. We would like to move it up to the following, Arabic 2, yes. We would like to treat -- to deal with that immediately after the separation of Unit 1 and Unit 2 since some of the same people will be involved.

MR. ETHERINGTON: Yes?

MR. DORNSIFE: Mr. Chairman, Bill Dornsife from Pennsylvania DOE.

May I please ask a question about the emergency planning aspects? If you would like to ask about emergency plans, evacuation plan in particular, our agency would not be the one who would be the experts in that area. We interface only with the emergency, the radiological aspects of the implementation of the plan. We are not familiar with the evacuation set-ups, so if your questions are concerning evacuation primarily, it would be appropriate to have someone from the Pennsylvania Emergency Management --

MR. ETHERINGTON: I think, perhaps, we might wait to see what the questions are and whether they can be adequately answered by Met Ed and their own Staff.

Are there any further comments on the agenda?

DR. LAWROSKI: With respect to the samplings, I also had in mind that there would be provisions made for sampling either liquid or gaseous materials in all the places that one might postulate the stuff might get to, not just where it normally should be.

MR. ARNOLD: Yes, sir, I think we understand the question.

MR. ETHERINGTON: Well, the first item on the agenda is an introduction by Mr. Vollmer for the NRC Staff.

MR. VOLLMER: Thank you, Mr. Chairman.

We appreciate the opportunity to discuss with the Subcommittee our evaluations, to date, on the TMI 1 restart.

First of all, I would like to introduce the Staff Members that we have here who have participated in this review. Going down the line: John Vogelwede, Jerry Mazetis, Harley Silver, who is the project manager for this effort; continuing on down this table: Jerry Wermeil, John Nehemias, Doug Collins, Lee Bettenhausen, Don Haverkamp; then on the back row here: Jay Lee, Scott Newbērry, and Bruce Boger.

We brought, generally, most of the people who have been involved in this review because we realize that the restart SER was not as complete as we would have liked. We have been fighting a battle of trying to be expeditious in the plan to the Commission order, but on the other hand, being as technical and complete as possible. And, again, we have a number, as you indicated, a number of open items in the report which are yet to be addressed.

Harley Silver will try to give you a full status report on where those items stand and when we expect to have complete information and complete review by the Staff on them. I might indicate that the large number of open items is partly a reflection to the fact that we are doing a more detailed review of many of these issues than we normally do, particularly to the extent that we are looking at detailed procedures and test plans and implementation whereas normally, in many cases, the Staff does not review that type of topic.

Finally, we will be prepared to give you a full status report on how the generic items are being handled as well as all of the licensing backlog issues are also being handled. I include in those all of the issues that have been requested of operating reactors since TMI 1 has been shut down through the IE Bulletins, through requests from DOR as well as all the pending license amendments and changes that occur, that were since it was backlogged at the time of shutdown.

MR. ETHERINGTON: When will this supplementary material be available, Mr. Vollmer?

MR. VOLLMER: Okay, well, today we will address precisely what we are doing, or tomorrow, what we are doing with the backlog issues and the generic issues and we have not included those in the restart report, but we would intend to get them in either through supplements or testimony. As you indicated, at this point in time, we essentially address only the issues covered by the Commission order.

DR. LAWROSKI: Could you give us an estimate of about where you think you are? Half-way, two thirds?

MR. VOLLMER: Maybe Mr. Silver could cover that.

MR. SILVER: Well, I can cover it -- Harley Silver. I can cover it briefly. I gave your Staff people a single copy as of now of the status report of these additional items. The front page of which summarized the number of these items which would probably be completed by the time of restart. I don't have a copy with me; I think Rags has it over there.

I'm not knowledgeable in detail on this material. The person who is had planned to be here tomorrow to present this to you.

DR. LAWROSKI: You wouldn't happen to guess whether it's a half --

MR. SILVER: It's significantly more than half, if I recall. Mr. Etherington is apparently looking at it right now.

DR. LAWROSKI: Oh, just percentages?

MR. VOLLMER: Let me say that the philosophy that's been approached on this recognizing that many of the generic issues -- we don't have the specific generic resolution in criteria to many of the DOR backlog issues that you will -- and those issues that are being dealt across the board on operating reactors do not have specific criteria. But, as a policy, if you will, or an objective, we have -- it's been indicated by -- in our management that we would, prior to restart, try to settle all of those that we had established criteria on. And, therefore, to clean up all the backlog and everything except the generic issues that we don't really have a resolution on.

So, it's our intent to clean that up and it is an ongoing thing and there was a fair amount of backlog to be addressed.

MR. ETHERINGTON: This document is going to be discussed then this morning, is it?

MR. VOLLMER: Tomorrow.

MR. ETHERINGTON: Tomorrow, all right, yes.

MR. VOLLMER: Okay, well, I'd like to turn the meeting over to Harley Silver then who will bring you a status report on the Staff review.

MR. SILVER: As Mr. Etherington noted, the safety evaluation that we have prepared covered the restart report through Amendment A. It was also noted there are many items that are, indeed, opened. I attempted in the evaluation to list and categorize these in Section B of the report, but since the time the safety evaluation was prepared, Amendment 9 and 10 have been received.

We have also received a schedule, a verbal schedule, from the licensee as to when most of the missing information will be submitted.

In addition, I have picked up some errors in that summary table of open items. What I have done, was to mark up by hand a copy of this summary table to kind of give a pictorial feeling for the status of these things, and the expectant status.

I have copies of this here and I have some supplies which may or may not be useful but we will try.

I would like to point out one statement that applies to almost all of the items. We have not attempted yet to verify the installation of any of the hardware, as of yet. We are still essentially operating on a design basis. We will, of course, do this and report it in the supplement.

The legend that I used on this markup is quite simple, the heavier the picture, the closer to resolution the items are. Where I have shown a solid block around the item, that is resolved as of today, a dash line is the item expected to be resolved by the time of the Full Committee meeting next week. The dotted enclosure indicates that we would expect it to be resolved by the first supplement to the evaluation, which is scheduled for Mid March.

Where a date appears it indicates that the information is scheduled to be received by that date, if no date we either have the material in hand, in which case, it would immediately be some indication of this sort, or we do not have a schedule for it, which is the case in some items.

I think these things are really self explanatory and I -- unless the Committee wishes, I would not propose to go through with each item, but would simply let the picture speak for itself.

There are some changes even in the couple of days since this was prepared, and I can point those out rather than change them. For example, as of yesterday we did review some procedures on which we have had previous discussions with the licensee, and indicated what changes we felt needed to be made. In some cases, these have already been made and we have examined the procedure and are prepared to state that the procedures are acceptable.

We also would like to point out, in that connection, however, that we have not witnessed any actual performance of the operations covered by the procedures and,of course, in some cases, existing procedures already accepted, may be affected by changes in other procedures which have not yet been accomplished. So, an acceptance or a write off at this point, may not necessarily be forever.

So, that this item and this item, as of this time, are accepted with the caveat I just mentioned in addition to what is on here. In other words, it should be a solid box, if you will.

Of course, where there are no other items across, for example, on this item the acceptance of these procedures essentially means that the licensee is in compliance with that particular item.

So, in some cases, where that has been known, at the time I prepared the chart, that does appear in writing. In other words, where the changes made yesterday does not yet. So, there should be a box, and this should say compliance, and, I guess, as well on this item.

DR. LAWROSKI: Where it says the design, am I to take it that means the "as built" design drawing -- detail design?

MR. SILVER: No, again, in many cases, the installation is not complete and there may well be changes in the detail design, when the modification is completed.

We have not -- that has not been done, I would say, in most cases. We have essentially a proposed design from which the installation will be made and presumably any necessary "as built" changes will be made in the future.

DR. LAWROSKI: Has there been much emphasis on trying to get as much of so called "as built" drawings rather than is often the case where such drawings are really not available?

MR. SILVER: During the lessons learned after the subject of available "as built" drawings, of course, was considered and one of the items does cover certain classes of "as built" drawings, and I must admit that I don't know at this moment the status of the whole collection of "as built" drawings that is available.

DR. LAWROSKI: Well, I was thinking about the problem that ensues and you have difficulties when you have not -- you do not have "as built" drawings, then, somebody has to guess, really, is it like the drawing says it is, or isn't it?

MR. SILVER: I agree. That is a problem.

MR. ETHERINGTON: I think I understood that Met Ed had a contract with an architect engineer to keep their drawings up to date. Perhaps Mr. Arnold will address this later.

MR. ARNOLD: Yes, sir. We will discuss drawing staffs.

MR. SILVER: Is the Committee clear on what the categorization of the open items is? The SER does identify that.

Is there some problem?

MR. ETHERINGTON: I would comment that the number of items which are not completed now, will be completed at the Committee meetings. I guess you are going to have a busy weekend.

MR. SILVER: I have had one or two busy weekends in the last few weeks.

On the second page, the one change is this procedure item here which has now been completed. I wish you would bring this item into compliance.

In addition, there are the changes indicated where there was essentially an item which should have been on the list, but it wasn't.

I added an emergency preparedness. As far as the order is concerned, this is not an open item, I don't believe, but we did indicate in the SER that we would require that the emergency plans be brought into conformance with the proposed rule and we do not specify any time frame but that is still our intent. There has been no active effort on our part to get this started yet. I am not sure whether the licensee has done anything in this frame or not. Plus, the rule has only been on the street in proposed form for a short time.

There are no additional changes on this page. Again, there was an omission of an item that should have been on the table.

We did receive the QA program several days ago, I believe it was on the 25th of January and that has been in review between our own QA group and licensees. At present, our clients are to visit with the licensee several days before the ACRS meeting, I believe it is Tuesday and Wednesday of next week, and we do indeed expect that we will be in agreement on the QA program by the actual ACRS meeting. That will not yet be documented but we can presumably or hopefully be prepared to state that is the case.

On this page, there are also no additional changes. This procedure review, I might mention, is, of course, an ongoing thing. There are many, many procedures and we are reviewing these continuously and are in close contact with the licencee's people who are doing this, so that, in fact, we do expect the changes or the completion of these items by next week.

There are some items, if you notice, where there are no dates or indication of completion and, again, generally, that reflects the lack of information from the licensee. There are some cases where the licensee has submitted information, which I presume he believed would satisfy our requirements of what recently, which in fact did not, and, for example, we have sample lined this as one of these, and we have not yet, in fact, communicated back with the licensee and indicate that is the case. We will, of course, do that. So, I don't have a schedule, for example, for completion of that particular item.

The next page contains some items which perhaps were miscategorized and these two things ought to be covered by the procedures and should have appeared in the group D column. In fact, both of those have been reviewed and are acceptable as of this time. That is this item and this item. They should appear over here with a solid box around them so that both of these items, shift supervisor responsibilities and shift turnover, are, in fact, in compliance.

Now, there were some additional items which perhaps probably should have been included in the table which were not. These are additional items in Order Item 1A, which are in the text of the safety evaluation, they are not, strictly speaking, part of the order, but they are requirements that really have been imposed on other plants, in this connection. They should, in fact, be represented in some way. The status of them is as shown in the table.

These conditions in the letter to SMUD, a branch of SECO, I believe have been incorporated into the questions submitted to the licensee but the provisions remain the same.

That essentially completes what I think is a reasonable picture of the status of the open items, obviously, this is an abbreviation. I have not listed numbers and percentages of completion and so forth, but I believe this presents a picture of the present status and of the status that we may expect in the near future.

Again, we are planning to have a supplement issued in Mid March.

MR. ETHERINGTON: Thank you, Mr. Silver.

Are there any questions that would not be better deferred to later?

I would like to ask, in proposing a hearing before the Full Committee next week, were you expecting that there would be a follow up meeting later, or hoping that there would not be one, or maybe both?

MR. SILVER: Obviously, when the meetings were scheduled, we had hoped the safety evaluation would be more complete than it was.

I think I would have to throw this question, I think, on the mercy of the Committee.

It is certainly not as complete as a regular case SER would be at the time of its presentation to the Committee.

We took into account the Commission's directive to attempt to expedite the proceedings and, again, I think their decision is yours rather than ours.

MR. ETHERINGTON: Well, of course, an alternative would be to defer the Full Committee meeting until later.

MR. SILVER: I believe there is a great deal which can be discussed. I would like to point out that even if the item is open, there are certainly a single line, let us say in the chart is in fact open, this may be because of one single sub-item within that general subject. There may well be dozens of other requirements in that item that have, in fact, been met.

We have not written off on a single item, until each facet or every facet of it is covered -- is written off, so, any one item might be 90, or 95, or 99% complete, or 50%, in some cases, I guess. But, because it is not fully completed, we have not indicated compliance. So, in every one of these there is a great deal, I believe, which can be discussed and examined by the Committee.

MR. ETHERINGTON: Okay, thank you.

I think it is Mr. Arnold next.

Are we suppose to have a break, are we? Let's move on.

Mr. Arnold.

MR. ARNOLD: Thank you, Mr. Chairman.

My name is Robert C. Arnold. I am a Senior Vice President of Metropolitan Edison Company and a Vice President of GPU Service Corporation.

I head up a organizational entity within the GPU system that is titled the "Three Mile Island Generation Group" and which is composed of technical and management personnel, who are on either the Metropolitan Edison Company payroll or are employees of GPU Service Corporation.

The details of the organizational structure we will address in the first agenda item scheduled for tomorrow morning. In the course of this presentation today, there will be status and questions answered by people from both companies, but we are an integrated organization within the GPU System.

I would like to first of all introduce some of the people that we have with us. I will defer to the time of their presentation, the introduction of some of the other people who will be involved in later agenda items.

Immediately to my right is Mr. Philip Clark, and Mr. Clark is a Vice President of GPU Service Corporation and will have a leadership role in the "Three Mile Island Generation Group Organization" and its successor's steps which I will be describing tomorrow.

To his right, is Mr. John Herbein, Vice President of Metropolitan Edison Company, and is the Director of "Three Mile Island Unit Number 1".

To his right, is Mr. David Slear. Mr. Slear is the Engineering Project Manager for the "Three Mile Island Generation Group" and is the manager of the technical efforts involved with the restart of Unit 1, in particular, the plant modifications that are being undertaken.

Across from him, is Mr. Charlie Hartman, who is the lead Electrical Engineer at "Three Mile Island Unit 1".

Mr. Cortney Smythe, Licensing Engineer from the licensing section of GPU Service Corporation.

To Mr. Smythe's left, is Mr. John Thorpe, who is our Director of Environmental Health and Safety and includes within that group the licensing section which is headed up by Mr. Edward Wallace to Mr. Thorpe's left. Excuse me, to Mr. Thorpe's right. I couldn't handle the mirror image there.

The way that we would like to approach our presentation today, is to have Mr. Slear spend a few minutes discussing the items which -- for which modifications are being made to the plant and are not specific agenda items later on. So, that we attempt in the course of the Subcommittee's meeting to provide a complete coverage of all the modifications but we will do that in a relatively abbreviated form for those which detailed questions have not been indicated by the Subcommittee.

I would also like to comment at this time on the question that was asked of Mr. Silver, if I may, with regard to the feasibility of a Full Committee meeting next week.

It is my understanding that many of these items that are open at this time, are open because of the approach that was described by Mr. Vollmer at the beginning of his remarks. That is, that in the course of the Staff's review for the startup of Unit 1, they have been going into much greater detail, they have been looking at completed work and there has been an effort that goes beyond what is their normal licensing approach, which is to make the evaluations based upon the commitments on the part of the applicant as to the criteria which will be fulfilled and that the licensing process proceeds, which obviously includes the verification that those criteria are in fact satisfied. The judgment as to the acceptability of the effort is preliminarily made, and I believe, reviewed with the ACRS Full Committee, based upon that level of effort by the Staff.

So, I think in terms of the understanding of what the licensee, in this case, is going to do to satisfy those items, that there are very few open issues. I think that most of the open issues relate to the degree of the implementation of that, the degree of completeness of the description on paper, the details of the design, the specific procedure having been prepared, and those things. I would suggest that it would be very productive to have a Full Committee meeting next week, that the majority of the issues could be reviewed, we could identify to the Committee how we intend to address all the items that have been raised in the course of restart,and we can give the status on our implementation of our actions on those items.

I would request that the Committee consider that in deciding whether or not to have next week's meeting.

With that, I could ask Mr. Slear to proceed with his presentation.

R ____ O ____

MR. SLEAR: As Bob indicated, I am David Slear and I am the Project Engineering Manager with responsibility for implementing modifications that are being completed at Three Mile Island Unit 1.

The handout that you have covers three separate presentations. The first two pages of that handout are what I intended to talk about during this particular presentation of the modifications.

I would suggest as I proceed through each topic, if you will, each modification, that as you have questions, you raise them at that time.

I have additional information with me which will allow me, perhaps, to address some questions that you may have and for others, I may not know the answer, but we can certainly get the answer.

I basically made the presentation and put it in the order of the presentation that is in the order itself, if you will.

The first requirement has to do with auxiliary repeat water, as I indicated, we have a separate half hour presentation on the modifications of the repeat water system. I would suggest we defer the discussion and the questions in that area until I -- until this afternoon sometime.

The second topic is the anticipatory reactor trip.

We have installed an anticipatory reactor trip or are proceeding to install an anticipatory reactor trip. The signals that would be sensed to trip the reactor is loss of both MFP or turbine. We sense that through the control oil pressure to the inlet valves of that particular equipment.

The trip itself is, in fact, safety grade. There is an automatic bypass at preselected power levels. My recollection is, it is 20% for the turbine trip and 10% for MFP trip, but I am not absolutely sure, I might have that in reverse.

The intent, obviously, is that poor feedwater transients that will, in fact, result in loss of heat steam instead of allowing the reactor to trip on high pressure, we would anticipate that transient and trip the reactor on the signals that indicate throughout the secondary system, that, in fact, we are proceeding into a loss of heat steam effect.

That was the extent of what I wanted to say about it. Are there any specific questions that I might be able to address?

If not, let's go to the second item. It is entitled small break response. We had in house some modification that was proceeding to reduce the operator action, if you will, that was required in order to respond to small breaks.

Specifically, what we have done is we have inside containment cross connected to high pressure injection lines, such that A and C loop lines are cross connected and the B and the D loop lines are cross connected. Meaning that if one high pressure injection pump does not, in fact, start, the remaining high pressure injection pump will feed all four reactor coolant loops.

The need is to get the appropriate flow split so that you are sure that you get adequate for coolant. I believe you only get 70% of the high pressure injection flow to the core but you are allowed 30% to go out of the leak itself.

In addition, we have added cavitating venturis inside containments in the high pressure injection lines. These cavitating venturis are sized such that they limit the flow out of the break to insure that you get the appropriate flow split.

In addition, if one pump is operating in the past, it may have been at runout without operator action to problemsome valves and this cavitating venturis also limit the flow when one makeup pump is running, such that the pump is not a runout.

So, basically, in the past we had the operator had to assess the situation, perhaps make some decisions on where he thought the leak was, and perhaps, throttle some flow back which might have tended to go against his intuition, if you will, because obviously, he wanted to provide flow to the reactor.

In this case, we think we made the system relatively insensitive to operator action, and in fact, he just has to stand back and let it work.

Are there any questions with regard to those cross connects cavitating venturis? I have a picture that would show the system itself, if that would be helpful.

MR. EBERSOLE: You do have a picture?

MR. SLEAR: Yes, I do have the picture.

MR. EBERSOLE: I wish you would throw it up there.

MR. SLEAR: I would be glad to.

MR. EBERSOLE: Basically, I am just trying to get at whether the cross connects implied a new point of vulnerability and necessitated the cavitating venturis or whether it was never around?

MR. SLEAR: I guess -- I am not sure. Let me explain the picture, to begin with, and I don't know what came first or if they both came together. Basically, the three makeup pumps cross connect downstream to lock post valves. Two separate paths going toward the reactor coolant system, four separate reactor coolant loops and therefore, once inside containment four separate paths for injecting water. The addition is what I've indicated in red.

So we have cross connected the A and the C loop with a two and a half inch cross connect. The B and the D loop with a two and half inch cross connect.

Basically meaning, that this pump doesn't start, this pump provides flow with closings to these two loops and by cross connector also getting together.

My recollection of the cavitating venturis is minimum. Basically, it precludes the need for the operator to assess the flow of the individual line to make decisions on which of these valves, perhaps, need to be shut.

So the system before and with the cross connects require an assessment such that if the break was here, for example, I think we would have to isolate that line within something like 20 minutes, to assure adequate core cooling.

Now, with the cavitating venturis installed right here, that limits the break -- some of the break is downstream and we saw how the reactor coolant loop such that the system as designed, without operator action, to flaw the flow, will, in fact, provide sufficient cooling to the core, i. e., 7030 close board I described, and secondly, if only on^ pump starts, and is providing flow to all four of these loops, the pump will not be running.

MR. ARNOLD: Dave, it might be worth clarifying also, I believe there is check valves that are downstream of where are shown the entry points into each of the loops.

MR. SLEAR: You may be right.

MR. ARNOLD: I think there are some downstream to the right of the drawing, as it were.

MR. EBERSOLE: Could you comment on the break between the cavitating venturis and the check valves of the system performance?

MR. SLEAR: Are you talking about a break --

MR. ARNOLD: Say in the cross connector.

MR. EBERSOLE: In the region in between the check valve and the cavitating venturis.

MR. SLEAR: I know I have heard discussions abo!!t a break there, unfortunately, I don't have the details of how the system performs with the break there.

MR. ARNOLD: We will pick that up later, please.

MR. SLEAR: A break there has been considered, I guess the bottom line is that you get adequate flow to the core and I believe we did the analysis of B & W reviews or visa versa.

MR. EBERSOLE: Mainly, I am only getting to the point, that an additional new cross connect complies a new point of runout, as well as a new point of supply. I want us to look at both sides.

MR. ARNOLD: I am sure the analysis has looked at both sides and will address it later.

DR. CATTON: Before you go on, you can take that off. How quickly will you trip the reactor cooling pumps forestalling a small break and possible accident?

MR. SLEAR: I might have to defer to Jack Herbein or someone from operation.

I know we certainly have in place operating procedures where a certain set of conditions require their pumps to be tripped but I don't know what --

MR. HERBEIN: An initiation of high pressure injectors.

DR. CATTON: Have you fully assessed the impact if it is an overcooling accident rather than a small break?

MR. HERBEIN: I believe we have, and the action is the same in either case. It prevents voiding in the core and enables the maintenance of a 50° slow cooling margin. Jack Herbein, Vice President Met Ed.

MR. ARNOLD: If we would like a more structured discussion on it, why don't we give us a chance to perhaps put it together for later.

MR. EBERSOLE: Before we leave this topic of small break, will there be a discussion which pretty much is against the model of TMI 2, the accident, in aspect to your knowledge of inventory in the primary loop? Whether it referred to vessel level or saturation meters or whatever device you know you have to ascertain that you have adequate inventory.

MR. SLEAR: We have a discussion on adequate core coolings.

MR. EBERSOLE: Is it contained in that?

MR. SLEAR: Yes.

MR. EBERSOLE: Thank you.

MR. SLEAR: The next item is the diverse containment isolation modifications. The essence of the modification is as follows.

There are selected valves which will be isolated on either reactor trip or four pounds in containment. There are selected valves that will be isolated on only four pounds in containment. There is another group of selected valves that would be isolated on thirty pounds.

The reactor trip isolation and the pressure isolation are safety grade installations. In addition, to those specific isolation signals that are safety grade, we are installing control grade containment isolation in selected process lines. By that I mean we have radiation detectors, attached to lines that could contain radioactive fluid leaving containment. In some cases, those lines are automatically shut based on a high reading on the radiation detectors. In other cases, those lines are merely alarmed.

I guess that the fundamental criteria or at least one of the fundamental criteria for this containment isolation, is that we want to maintain in service those supplies to the reactor fluent pumps which would leave them operational, and those supplies to containment cooling such that we have a high probability to the pumps assuming that we continue to have power to the pumps, etcetera, will, in fact, be available. In addition, we are providing cooling to the coolers inside containment.

I believe there was a question on the sump drain line with regard to does it isolate on high level in the sump?

The answer is no. The sump drain line is the gravity drain, it drains to the auxiliary building sump, that valve is normally shut. That valve is controlled in the control room and opened to gravity drain to sump and then reshut. The isolation signal for that valve is it goes shut on any reactor trip and it goes shut four PSIG.

In addition, we have a radiation detector on that line which will shut that valve if there is high radiation effect.

Are there any other questions on containment isolation that I can answer?

DR. LIPINSKI: I have a question.

In connection with the Four PSI containment pressure, if your perch valves are open, it will take a terrific amount of flow to develop Four PSI.

Under what conditions and what fraction of the time do you run with the perch valves open?

MR. SLEAR: It is my understanding that we are limited to running with the perch valves 90 open hours a year. I would point out that those perch valves are also shut on reactor trips.

DR. LIPINSKI: I understand that, but when you say they will shut with Four PSI, where the words currently appear in the report, this takes a terrific amount of flow when you are open to say that they are going to close in Four PSI.

MR. SLEAR: Your talking valve reliability as opposed to --

DR. LIPINSKI: No, I am talking about developing a pressure in the containment when I have got two 48-inch holes open, and I must flow through those holes to get a differential pressure.

MR. SLEAR: You heard me say that there is diversity in the isolation signal for those valves and that it closes on both reactor trip and Four PSI, and in addition, we have a high radiation deductors.

DR. LIPINSKI: But, if I don't have a reactor trip, my next indication is Four PSI signal, and with the valves open the Four PSI signal will not close those valves.

MR. SLEAR: Because you won't reach four pounds, correct?

DR. LIPINSKI: That is correct. The velocities of air steamed through those 48-inch openings are going to have to be terrific to get all the Four PSI within containment.'

So that where you see these words, saying you are going to close the valves on Four PSI, I question how much flow is involved, in order to develop the Four PSI.

MR. SLEAR: I guess I don't -- does anyone know if we have done analysis with the valves open in containment for pressure? I don't know the answer.

He is questioning the fact that we have a diverse isolation, one of those signals was four pounds and if the valves are open and they needed to go shut, would you develop four pounds in the building?

MR. ARNOLD: Perhaps a pertinent data point, at least, on that issue, is that with the PORV failure, we didn't begin to get close to four pounds but we did get low pressure reactor trip point reached quickly.

DR. LIPINSKI: That is not the point. The issue is to state that the valves will close with Four PSI if they are open. I am saying that is a condition that does not allow you to develop Four PSI to close the valves.

The fact that you have other redundant signals is fine.

MR. ARNOLD: Are you suggesting that we remove that signal from the closure valve logic?

DR. LIPINSKI: No, but you qualify it, okay? Unless you have got an analysis to state under what conditions you are going to develop Four PSI as to what the flow rates are through two 48-inch holes that will develop Four PSI and then allow those valves to close.

But, to arbitrarily say, those valves will close on Four PSI when they are open is not a compatable statement.

MR. EBERSOLE: Here is another part of that question, even if you are able to develop the Four PSI, some PSI differential, probably those valves won't close anyway no matter how many signals you put into it. I wonder if you could tell us at what pressure they cease to close? Is it because they overloaded into the dynamic context?

MR. ARNOLD: I am not sure that we have the analysis on that. We did do the analysis on Unit 2, but those valves are a different size, so we would like to defer on that for now.

MR. EBERSOLE: Do you happen to know what basis four pounds is selected?

MR. SLEAR: I think perhaps we should probably come back to this question. It is certainly a valid question and needs to be answered.

MR. HARRIS: I would like to indicate that this is one of the few generic issues that are being covered and our requirements for all operating reactors are first involved in the demonstrated capability of closing those valves into whatever condition they may be opened under of those mechanical capabilities in addition to the requirement that we maintain a maximum of capability for 90 hours a year.

I am not sure we will be able to address tomorrow, the specific information that they have provided us in this regard, I just want to lay out what our requirements for the operating reactor are.

MR. ETHERINGTON: Did the Four PSI originate with NRC or with Met Ed?

MR. VOLLMER: No, what I said was, we required that the valves have demonstrated capability, mechanical capability in closing under whatever the actuation signals are.

They arranged scenarios under which it would have to close and we would have to see if they could have mechanical capability in closing under those conditions. If they don't, the valves that have to be closed during operation or block 2A position, whereby they still would be able to be mechanically still.

I think you are probably aware that some of our operating plants do have these valves blocked, partially closed so that they would have capability of closing in the actuation signal three's. These criteria will be required in detail to be closed.

MR. SLEAR: I guess that I would like to point out that this Four PSI and these valves did not change with the way it was in the past, and perhaps why we are having a little with -- to some extent, asking for past history. Why was four pounds chosen six years ago?

I am not sure we assess four pounds other than it already has four pounds -- we were looking for diversity and headed toward reactor trip as a selection of the diverse signal and we are going to have to recreate past history to some extent to answer your question.

MR. ARNOLD: Well, if I could summarize what the recollection is of the people that are here, the history on that is that it was a level that was selected somewhat on a judgment basis in terms of the reliability of instrumentation, as far as how low you could set that signal without getting spurious isolations, and that there was discussions between the Staff and the Babcock and Wilcox people as to the appropriate level to select for isolation, and that that is a set point that is common with the B and W design.

MR. EBERSOLE: I think that it is probably fair to say that signal was probably set by somebody who didn't know these 48-inch valves were in there open.

MR. ARNOLD: I can't address that, sir.

MR. SLEAR: Are there any other specific questions?

DR. LAWROSKI: Yes. You mentioned that there were certain selected process lines which are provided with sensors to isolate containment on high radiation.

MR. SLEAR: Yes, sir.

DR. LAWROSKI: Could you identify it for us?

MR. SLEAR: Well, with Charlie Hartman's help, I probably can.

What I have is a slide that shows which valves are containment isolation valves, and also identifies which ones have a high radiation signal. Unfortunately, I may not know enough of the nomenclature of the plant to understand for sure what these valves -- what system these valves refer to.

What is CAB?

MR. HARTMAN: Steam generator sample valves.

MR. SLEAR: Steam generator sample valves or reactor fluent system sample valve?

MR. HARTMAN: Steam generator sample valve.

MR. SLEAR: These are CAB valves once again. Steam generator sampling valves.

I think these are -- is that the drain from the south and the reactor fluent drain tank perhaps, WDLZ, 303, and 534?

MR. HARTMAN: Some of the valves.

MR. SLEAR: What about WDLZ-303?

MR. ARNOLD: Let me suggest, that maybe we will give you a copy of this slide with some noun description of the valves.

MR. SLEAR: From an overview point of view you will see on this slide, the alarming dictation means that it doesn't automatically shut, rather than get an alarm in the control room, and on the second slide the same thing once again.

These valves are awful extreme, but in any case, on the second slide it indicates which one you are alarming on.

We can get copies of these made, get them so that you understand what systems were affected, if that is acceptable?

DR. LAWROSKI: Please, that would be fine.

MR. EBERSOLE: If I may refer to that list, in reference to our discussion just now on the containment vent valves, are any of those valves susceptible to the pressure increase and any effect on their closure? By and large, I realize a modest increase in pressure. Most of these valves won't affect their closure at all.

But, there may be some which are normally low pressure systems by drain valves or what not that may see some transient flows which are not normally expected until you develop containment pressure. Are any of those susceptible to the same phenomena that the containment vent valves are susceptible to?

Is my question clear?

MR. ARNOLD: I think we understand your question, and let us answer that along with the anotated copy of the slide.

MR. SLEAR: The next topic I think is really cut and dried. We have been directed and we have changed the PORV setpoint and raised to 2450 PSIG automatically.

We have reduced the reactor at high pressure trip setpoint to 2300 PSIG.

The last item automatic reactor coolant pump trip, we are proceeding with the design which would automatically trip the reactor coolant pumps on a coincidence logic.

The low reactor coolant system pressure and low reactor coolant pump power coincident of logic.

We are working with the B and W Owner's Group and B and W, to determine what analyses that has not yet been done, perhaps needs to proceed in order to select a setpoints, I mentioned HPI and perhaps that is the appopriate pressure. I think that probably is. I guess the real question revolves around reactor fluent pump power. What is the appropriate setpoint on which the trip reactor fluent pumps and I guess I don't really have much more to say other than this is intended to replace the current procedure which would have the operators manually tripping these reactor fluent pipes for which HBI initiates.

The fact that it is coincident logic, low reactor coolant pump power is an indication that the reactor coolant pumps are no longer pumping fluid but are pumping some fluid and void fraction.

I think on 1/20 of the 1/5 model scale test, has proved that there is a trend of -- as you pump voids lower reactor fuel pump power, the question is, what is the setpoint?

This would mean not only had you had high pressure injection but for some reason the accident was proceeding in an adverse manner and you were starting a void in the system which was not normally expected to happen.

Do you have any questions?

MR. EBERSOLE: That is a sort of an anti-cavitation trip, isn't it?

I mean you are cavitating, that is what changes the power.

Does it leave any bias on pressure or temperature, or is that all you need?

MR. SLEAR: I have not heard discussions on the need for bias on pressure or temperature.

Is there any one here from B & W who knows more than I do about what is proceeding?

MR. TAYLOR: Jim Taylor from B & W. I doubt if I know more than Mr. Slear about this, but let me make a comment, Mr. Ebersole.

I don't think it really would be accurate to say this is an anti-cavitation trip, really. Because, as soon as you have saturated conditions or a little before, you are going to be cavitating on the propeller but this is a very long term effect.

I think the point is to try and get the trip as soon as you have something less dense than the normal primary coolant system. So, it is really not an anti-cavitation trip, per se.

There is something in the sense that you have got less than the normal density included.

MR. ETHERINGTON. I think that it is time that we might take a break when you find you have come to a convenient stopping point.

MR. SLEAR: This is as convenient as any. The first line is finished.

MR. ETHERINGTON: Then, we will follow the agenda with a 15 minute break.

(Whereupon a 15 minute recess was taken.)

MR. SLEAR: Before I proceed to the next topic, it has been pointed out to me that this drawing is not in fact correct and we're going to have to correct it before we give it to you, but, there are check valves there that we have discussed.

It is left out of this particular drawing, and we will correct this and make it right and then perhaps that would satisfy your concern.

DR. LAWROSKI: But as built. those check valves are there?

MR. SLEAR: Yes, that is something we added in addition to that.

The next topic is pressurizer heaters emergency power supply. We are providing the capability to manually transfer two groups of pressurizer heaters to the diesel generator. That means a total of 252 kilowatts, the pressurizer heaters can be placed on the diesels. We have calculated and we need about 107 kilowatts to maintain pressure. The fundamental driving force for this particular modification is to consider loss of offsite power and the benefit of being able to maintain pressure for natural circulation with the pressurizer heaters has an optimum capability to have. The transfer, as I indicated - is manual and I don't think that I want to dwell too long on this drawing but basically there are -- the normal power supply is from control center 1B. Using these t's, you're able to remove this element which has a Tab A on it. That element only fits over here and allows you to remove the P3 and therefore, get you the ability manually to close this breaker and provide power from the Red diesel to this group of pressurized heaters.

This breaker is tripped open on either undervoltage on this box, or any ES actuation would physically trip open this breaker and you would have to walk down and reclose the breaker once, in fact, you've convinced yourself that there was adequate room on this bus to handle the load.

DR. LIPINSKI: I have a question on the element that you're talking about that has to be manually transfered.

MR. SLEAR: Yes, sir.

DR. LIPINSKI: How big is this and what happens if it gets dropped in the process of being moved from one location to the next?

MR. SLEAR: I don't know how big it is. Charlie, do you have any idea what these elements are like?

MR. HARTMAN: No, I don't.

MR. SLEAR: I guess I don't know.

MR. ETHERINGTON: I would suggest that whenever there's a question that can't be answered today that you have an answer ready for the -- if you can have it for tomorrow, that's good; otherwise, for the Full Committee.

MR. SLEAR: Yes, sir, we'll do that.

MR. EBERSOLE: Before you leave that idea -- present in that idea of connecting the heaters to the diesel is the thesis that you're going to use these for small break accidents, were you?

Unfortunately, the pressurizer heaters, in general, have never been qualified for the hostile environment that it would be in the containment. And, I expect a creation of shorts and other electrical difficulities.

Are we going to let that be a long --

MR. SLEAR: Let me describe that we're proceeding with; the containment boundary is essentially here on this drawing. As you can see, there are small circuit breakers inside the containment much like your house circuit breakers. These are being removed so that they are outside of any adverse environments.

That's why we are filing Phase 2 of this evolution.

MR. EBERSOLE: And the timing for that?

MR. SLEAR: The timing is -- I guess I don't have the update on that yet. It's not necessarily a committment to do prior to restart. We are looking for equipment and trying to get the appropriate cabling and what have you. I don't know the in date of that particular modification, but we're treating basically Phase 1 which is a prior restart effort as the emergency power supply. Phase 2 is removing the breakers so that they're out of the adverse environment and Phase 3 is to replace the cables inside containment to these two groups of pressurizer heaters with cables that are today's quality as opposed to late 1960 quality. Not to say that what's in there is a quality that won't necessarily survive because we think that we can provide better cables although in starting to try to step up and spec out those cables and purchase them, I guess we are having trouble identifying cables that we --

MR. EBERSOLE: Well, isn't it the terminal point at which you attach the cables to the heaters that you have a vulnerable place?

MR. SLEAR: I guess that does not come up as a vulnerable place and perhaps it has been overlooked.

MR. EBERSOLE: Well in the interim, then, are we going to argue that we can get along without pressurizers if we get in trouble?

MR. SLEAR: As I indicated, this is -- having the heaters available to maintain natural circulation is optimum because you certainly have the capability to take the thrust of the system solid, I presume, as a means of pressure control.

MR. EBERSOLE: Thank you.

DR. CATTON: I would just like to comment on what we observed as the existing state of the cables.

Apparently they're used as a ladder and --

DR. LIPINSKI: Walked on.

DR. CATTON: Walked on and the surface seems all chewed up and the first layers of this plastic type material is worn through already.

So, I think your comment about -- as far as you know that the quality is okay now and you should take a look at that, it was our feeling that they were not. And that you would have to do something to improve them to survive the hostile environment.

MR. SLEAR: My comment was based on, basically, an engineer assessing what was what and its qualifications not on a physical inspection of the cables.

MR. ARNOLD: We will review that issue and we appreciate you pointing it out to us.

DR. CATTON: And another aspect is the box that's down on the side of the shield wall where the, I guess, the power's brought in from outside and then hooked to the cables that go up to the heaters. They're fairly low down and they don't look very waterproof to me.

MR. SLEAR: These -- once these breakers are moved, that will be a butt splice -- instead of a terminal -- if it is now a terminal block, it will not be a terminal block in the future, I don't believe. It will be a butt splice with each shrink tubing. So, I'm not sure that the box needs to be watertight when you've made that kind of joint on an electrical connection.

DR. CATTON: I'm not an electrical engineer, so I don't know.

MR. EBERSOLE: Concerning the electrical penetration by the way, are they in two classes, one of which is 1E, an aspect in maintaining continuity of service inside and the other not 1E, or are they all 1E in this aspect? Are they all alike?

MR. SLEAR: Refer to the experts; I don't know.

MR. EBERSOLE: I'm really only pointing to the penetration, now.

MR. HARTMAN: From the standpoint of containment pressure, they are all assigned alike. From the standpoint of separation, there are Class 1E and there are Non 1E. 1E has separation criteria that Non 1E does not.

MR. EBERSOLE: Right, well, does this mean that the terminals on the containment side are susceptable to short circuits in the presence of moisture on the Non 1E's and they are not on the 1E's.

MR. HARTMAN: On the Class 1E equipment, we have removed the wires from the terminal blocks and installed heat treated tubing. On the Non 1E's, we have not done that.

MR. EBERSOLE: Well, then, this would be another point where one might have to improve the design to maintain it against the hostile environment at penetration, as well as the cables.

MR. HARTMAN: It's my understanding that when the breakers are removed to outside the building, the cable runs will come directly from the connections on the pressurizers to the penetrations and the connections there would, I believe, be heat treated to that.

MR. EBERSOLE: Yes, thank you.

DR. LIPINSKI: That's not the total issue because it's also a physical separation and when the cables appear at the pressurizer, they're in an intimate configuration. The physical location where the pressurizer heaters enter the pressurizer are such that you have an intimate mix of the cabling itself. Class 1E requires that these be physically separated for the fire protection criteria. So, in this particular case, you have a special problem.

MR. HARTMAN: That's correct. I think that on connections on these heater bundles we do not get physical separation; I don't know if the design includes any provisions for another type of ar.

DR. DILLON: Do you have any idea what your design exposure on the insulation on that cable ought to be? What are you shooting to?

MR. HARTMAN: I've not been involved in specifications for the cable; I'm not familiar with that.

MR. SLEAR: I don't know the number, but I know we have a criteria for the cable or a specification, if you want to call it that. It would be easy to get that. I just don't have the number on the tip of my tongue.

The next item is the position indication for the power operator relief valve and the two safety valves on top of the pressurizer.

We are proceeding with diverse indication of the position of those valves that I can describe as follows: I guess our first line of defense, so to speak, is the elbow tap differential pressure cells that we are putting on downstream of each individual valve. The question has been asked, physically where: I don't know the answer to that. Those lines from those valves called the tail pipes, proceed for many feet as separate independent lines until they finally combine before they go into the drain tank.

So, my guess would be that 20 to 40 feet away -- we're going to have to ask someone to get us a specific answer to the physical location of the DP cells.

But, I think the key I wanted to point out was they are three independent lines for a fair distance until they combine into one large line.

There was a question concerning the indication being provided to the operators where it was going to be.

It's basically called flow indications. It's going to be hard to see this and I think that if I just walk over here -- it's on the panel directly adjacent to the existing indication that the Celluloid in fact, does or doesn't have power. This is what we're now calling a demand indication as opposed to an actual indication. In fact, we've added a nameplate here to remind the operator that that position indication for the PORV is demand indication action. It merely indicates that the Celluloid has been energized and that the valve is mechanically sounded to the shut.

Right above that, will be flow meters indicating inches of water from the different pressure cells and the elbow taps downstream of these valves. The name plates indicating RCRV 1A discharge flow, et cetera. In addition, as pre-selected set points, there will be an enunciation that there is flow downstream of the PORV's to provide the operator not only a meter indicating that he has flow, but an alarm enunciating that he has flow down to the PORV's.

The criterias that we can detect at least down to 10 percent flow through those valves and we are currently finishing the calculations to confirm that, you know, we can in fact detect a flow that low. I think it can even detect flows of even less than 10 percent. The fundamental criteria was DP cells must be able to detect down to 10 percent flow. To some extent, it's a go-no go; we're not intending that this provides the operator the ability to deduce that the valve is 52 percent open. We merely want to alert the operator to the fact that the valve is not closed when it needs to be closed because of the presense of flow.

MR. EBERSOLE: In view of the presence of the block valve, can't you manipulate the block valve and detect differences and ascertain that the valve is shut or not shut?

MR. SLEAR: Detect differences in what, the flow --

MR. EBERSOLE: In flow or temperature or whatever.

MR. SLEAR: I guess -- there's only a block valve downstream --

MR. EBERSOLE: Is the block valve downstream?

MR. SLEAR: Downstream of the PORV, I believe -- it's upstream of the PORV, I'm sorry.

MR. EBERSOLE: Because you can use it for maintenance, I believe. But, certainly the presence of the block valve implies an ability to close and you can have any number of block valves to quarantee closure and the of any closure is simply to challenge the safeties, correct?

MR. SLEAR: Well, you increase the probability of --

MR. EBERSOLE: Of a safety variety. So, it would seem that as an opportunity here to use the block valves, an aspect to check into the function of a PORV itself, which has not been exercised.

MR. SLEAR: I guess the action that I perceived was that the operator be given the intelligence that the PORV is malfunctioning, i.e. is stuck open, and would then shut the block valve as his corrective action, if you will.

MR. ARNOLD: I'm not sure that we're understanding your point, Mr. Ebersole.

MR. EBERSOLE: I'm merely saying that the closure of the block valve implies a rising challenge to open the safeties and that's the only price you pay. But, it would appear to me to be a convenient way to ascertain that the PORV's are open or closed, especially if the block valves are downstream, because then you would have a means of checking the rise in pressure.

MR. ARNOLD: But, I think the lack of being ble to close the PORV and getting a unambiguous identificat on of whether or not you've got leakage or flow through one of the three streams in a very short timeframe is the reason that these individual flow meters provide us with a lot more intelligence as to the conditions.

I don't think that it's to necessarily identify this as a basis for closing the block valve as much as to gain that intelligence and obviously. if you know you have flow through the PORV, closing the block valves is the appropriate thing to do.

MR. EBERSOLE: I see, yes, thank you.

MR. SLEAR: What parameters were you looking at to assess the block valve, I guess that -- were you thinking of the temperature detectors downstream and their response to this --

MR. EBERSOLE: Yes.

MR. SLEAR: Okay, I guess -- and that's what I thought you might be thinking of. We have the temperature detectors listed as a diverse means to give the operator intelligence that, in fact, the PORV is open and hasn't shut.

But, I think it's -- we are putting together calculations and plots that basically show the response of that detector versus time for various initiating transients in this case, it's normal operating pressure and temperature PORV opens and then closes at this time and how that temperature responds.

I think you can see that it responds within a matter of 20 seconds to a peak of, you know, 425 degrees. But, this is going to be on some decay ramp and as the valve goes shut. And if, in fact, the valve is not shut, you know, it perhaps could be on a different decay ramp or maintaining a hot temperature.

But, it takes time to assess it; it takes seconds to assess what's going on.

MR. EBERSOLE: I would think that a relatively minor leak would create a horizontal line out there.

MR. SLEAR: It may. I guess that I don't have all those calculations finished yet, so I don't know the answer.

But, it still takes a period of at least maybe a minute to assess what's really happening as opposed to just walking over, perhaps, in a matter of a few seconds and deducing that he has --

MR. ETHERINGTON: Is the tail pipe insulated in the region of the pickup?

MR. SLEAR: The pickup is on the wall of the tail pipe and I don't know if the tail pipe is insulated.

MR. ARNOLD: The tail pipe is not insulated on the PORV from the isolation valve to that point.

DR. CATTON: In the questions and answers to the NRC, there were questions about this flow meter. And it was indicated that the answers could be found in Appendix A and I cannot find Appendix A.

Could you tell me when and how and where it will be available?

MR. SMYTHE: Cortney Smythe from GPU.

I believe that you're referring to the question that where the NRC asked for flow calculations and test data?

DR. CATTON: That's correct.

MR. SMYTHE: Okay, the question refers you to Appendix 2A which currently does not exist. There's a fly page there that says, to be supplied and the information should be available by mid-February.

DR. CATTON: Thank you.

MR. ETHERINGTON: Along with your curve for temperature decay, have you drawn curve for, well, have you calculated the temperature for an acceptable leak rate through the PORV's?

MR. SLEAR: I don't believe that that was one of the curves that we had planned to --

MR. ARNOLD: Mr. Chairman, the -- currently, the acceptable leak rate is in terms of the technical specifications for identified and unidentified leakage. PORV leakage would be identifiable. We have not looked at whether at this point, and Bob, you can verify this for me, we have not looked at this point as to whether 10 GPM identifiable leakage or which is our limit from the PORV alone is unacceptable leakage through the PORV for other reasons.

MR. ETHERINGTON: My question was -- let's assume that your 10 GPM is acceptable. I would expect that to raise the temperature of your tail pipe probably as high as a fully opened valve -- no, probably not as high, but --

MR. ARNOLD: We are currently doing some analyses on leakage or let me restate it, on tail pipe temperature as a function of leakage but we have not completed those.

MR. ETHERINGTON: That was my question, okay.

MR. EBERSOLE: Well, this is why I was asking about that check, you know, in using the isolation potential of the block valves to force the deviation of the temperature and determine whether you had a similar condition or significantly different or whatever.

MR. ARNOLD: We recognize that if we suspect leakage as opposed to a failed valve, that isolation of the block valve or by isolation by use of the block valve, should isolate the leakage and be reflected in the tail pipe temperature.

MR. EBERSOLE: I wonder if you could comment on the price you pay for closing the block valve. Now, as I see it, it is the incipient opening of the safety valve which you would rather avoid, at which you have time before that occurs and there's a minimum time, I guess , arguing whether or not you have secondary cooling, but there must be some workable time in there before you lift the safeties; during which the operator has some manipulation opportunities.

Is that time in just the order of a few minutes or is it more comfortable than that? I don't see what price you pay other than the challenge to the safeties.

MR. ARNOLD: I think the major factor is the challenging of the safeties, but, it also, I think, needs to be recognized that if that block valve is shut, you do introduce, also, some possibility that it will not be able to be reopened and your exposure to challenging the safeties may be greater than --

MR. EBERSOLE: It's permanent then.

MR. ARNOLD: Yes.

MR. EBERSOLE: Do the safeties dump directly to the containment atmosphere or do they go to a quench tank?

MR. ARNOLD: They go to the same quench tank through, eventually, common piping with the PORV discharge

MR. EBERSOLE: Thank you.

MR. SLEAR: Okay, the next topic I've lumped under this particular section of NUREG 0578 is called inadequate core cooling and fundamentally that has to do with instrumentation changes to improve our capability to assess that we do have inadequate poor cooling.

And we have, in fact, taken the all incore thermocouples terminated them inside containment and they are available in the computer. We have added, or are adding I should say, a reactor coolant system saturation margin monitor which will look at reactor coolant system pressure and hot leg temperature and give an indication of the margin for saturation in either degrees Fahrenheit or PSIG, depending on the position of the selector switch, which is spring returned for temperature margin. And, will also alarm when the margin, temperature margin to saturation goes below a pre-selected value.

Are there any questions?

MR. EBERSOLE: Yes. Could you comment on that ancient topic of whether we're going to have level indication for the primary vessel and what you're doing about that sort of thing.

MR. SLEAR: I guess we currently have no plans for level indication in the reactor --

MR. EBERSOLE: I believe that's implied in the long range action plan that you have such.

MR. KEATEN: I'm Bob Keaten from GPU.

We have been in the process of evaluating the need for level instrumentation and we've also been working with the vender on this subject. I believe that the long term lessons learned simply requires that that be considered and it does not take a definite position on it.

And, our current position, I believe, is that we feel that the instrumentation which is shown on the slide there is a more direct measure of what we're concerned with: namely, whether the core is being cooled or not, then would level measurement.

MR. EBERSOLE: However, doesn't this information require that you operate blind in aspect to the pressurizer level under certain circumstances which you might otherwise not need to operate?

In other words, you're going to have to drive through the den to the point where you go to water solid conditions where you would really rather not.

MR. ARNOLD: Could I comment on that?

As I understand what you're suggesting, is that if we had water level indication for the reactor vessel and did not have pressurizer level, we would be willing to operate the system blind as far as water level in the total reactor coolant system goes, relying upon reactor vessel level.

I guess it's not clear to me that that would be an acceptable approach.

MR. EBERSOLE: I believe B&W has indicated that they have a capability of feed-and-bleed, even if you lose all secondary side. I think it's implicit in the feed-and-bleed mode that you have a primary vessel level of indication. Otherwise, you're going to be forced into a holding mode, with a water-steam interface and you won't know where you are.

MR. HALLMAN: Don Hallman from B&W.

Are you questioning that this is the impression where you would be able to determine the presence or absence of

MR. EBERSOLE: I'm saying if you invoke the thesis, you can invoke feed-and-bleed without secondary cooling?

MR. HALLMAN: That's correct.

MR. EBERSOLE: Is it implicit in that claim that you can do that and need to know the primary coolant level?

MR. HALLMAN: No, it's the need to know --

MR. ETHERINGTON: Would you come up to the microphone, please?

MR. HALLMAN: It's the need to know the degree of subcooling that you have in the system. If you have subcooling, then the water is existing in a solid state.

If you do not have subcooling, the in-core thermocouples give you a direct readout of the temperature conditions at the top of the core; which is going more toward the problem that we're trying to solve which is protection of overheating in the core.

So our belief is that the use of the in-core thermocouples is a very direct reading of the exact conditions you have.

MR. EBERSOLE: Yes, well, those thermocouples are within the core itself and they indicate that the core is marginally covered without any margin whatsoever, or not covered.

It gives you no marginal information as to how much margin that you have.

MR. HALLMAN: No.

MR. EBERSOLE: This tells you that you are or you are not.

MR. HALLMAN: Well, it triggers certain actions depending on whether the thermocouples are in a saturated condition or not.

MR. EBERSOLE: Well, thank you. I can only stop the question at this point.

MR. HALLMAN: Okay.

MR. EBERSOLE: Thank you.

MR. SLEAR: The last thing to mention is that we have expanded the range of the hot leg temperature detector from 120 to 920 degrees,current. The new range will be 120 to 920 degrees Fahrenheit. And that is the input temperature to the reactor coolant system saturation margin line.

Next is the topic of hydrogen control, post accident.

DR. CATTON: Before you leave inadequate core cooling, are you responsive to Reg guide 197?

MR. SLEAR: I think --

MR. ARNOLD: I think what we'd like to do --

MR. SLEAR: Which revision --

DR. CATTON: The current revision 2 that's up for comment.

MR. ARNOLD: We would like to take advantage of the suggestion of the Chairman and defer our response to that to the Full Committee meeting. We would like to do some additional work.

DR. CATTON: That's fine. The only reason I mentioned it is because it's the next step beyond Mr. Ebersole's question -- line of questioning in that he was asking about water in the core.

MR. ARNOLD: Yes, sir.

MR. EBERSOLE: I might comment that, the main thrust of my question to you, is that your instruments will tell whether or not you have saturation cooling or not. But, they have no margin of information as to how much coolant is in there. Before you get into this state, it's kind of an idiot gauge -- it tells you that you're already in trouble, not that you're about to get there.

MR. ARNOLD: Well, I think our understanding of the way in which we would approach that problem at this time is that if we did not have pressurizer level indication, we would not hesitate to take the plant solid, regardless of the mode of cooling that we want to then enter into.

MR. EBERSOLE: Right, thank you.

MR. SLEAR: The next topic is hydrogen control. We are proceeding to install a hydrogen recombiner at Three Mile Island Unit 1 with the capability to install a backup. The backup recombiner will be available on site; it is essentially TMI 2's recombiner, which is either being decontaminated or has been decontaminated and will be available for installation.

It's my understanding that the timeframe for installation under, at least, the current guidelines, would allow approximately seven days to have a recombiner operation. And, with one installed and the ability to test it and deduce that it is not, in fact, operational for whatever reasoning and either fix it or get the backup one available, we feel that's an adequate approach to hyrodgen recombination under the criteria that exists today.

In addition, there were some discussions about the ability to sweep containment, if you will. My understanding of the design is that it is in using the existing ventilation ducting that teminates high in the containment building so that the dome or that high area would, in fact. be swept and then discharges at a separate location lower in the building for hydrogen removal.

But, it's our plan to have this installed prior to restart.

DR. CATTON: In going through the plant, I noticed that at the top of the cylindrical section of the containment there's a ring that has the intakes. And, this is signficantly below the top of the dome.

Has any assessment been made of the circulation patterns one would expect inside the containment to assure themselves that you're going to sweep up hydrogen?

It seems to me that normal flow rates are not too high; you're going to have a separator built into your containment and if your recombiner is taken out of your normal circulation system, you're not going to pick that up.

I have a few more comments. There are quite a few rooms when you walk around in the containment where you have the air conditioning intake ducting, or whatever, in doorways. So that there's lots of places that you can collect hydrogen within the system.

I couldn't tell because of the equipment whether these all had holes in the roof or not.

There's another part to this and maybe you can answer it all at once. There's the capacity of your units; the person who was taking us through on the tour didn't know, I'm wondering if, in deciding that you would have two combiners instead of one, if this is a rate kind of thing. Have you assured yourself that, indeed, if you could collect all the hydrogen you could handle it with your recombiners at a rate maybe picked TMI 2.

MR. SLEAR: I think first of all with regard to the rate, the hydrogen recombiner flow rate------

MR. ETHERINGTON: Let's hear first of all from Met Ed, shall we?

MR. SLEAR: Pardon?

MR. SILVER: I would just like to state for the record, Harley Silver, NRC, that the order does not require the installation of recombiners, and we have so noted in the safety evaluation.

However, your question, of course, is still -- again the order does not require it to be installed prior to re-start.

MR. ARNOLD: It was a decision on the part of the company that we would install a hydrogen recombiner prior to start up. That was an internal decision. The one recombiner has sufficient capacity to handle the design basis accident and specific flow rate they can identify.

It is -- our conclusion based upon work that was done for us subsequent to the TMI 2 accident, I think, individuals who would be recognized as experts in the behavior of hydrogen that there is not a tendency for the hydrogen to pocket or to separate within the containment building; that it does diffuse so that the issue of taking suction in the area of the containment building below the dome does not lead, in our opinion, to a susceptibility of hydrogen collecting in the top of the dome in a way that gives you a non-uniformed distribution.

I think there is a need to have the ventilation system running to be completely confident that we would not get pocketing in an individual closed area within the building if the hydrogen was being released in that area. But, in the post TMI 2 review, as we looked at that building structure that was not a concern to us then. I do not know that we have looked at specifically for other release points for the hydrogen with regard to Unit 1 at this time.

DR. CATTON: Well, it's standard practice with facilities that have a lot of hydrogen around that your pick up point to the highest point within any given room or building or whatever. My observation of inside the containment is that this is not the case. And, I recommend that you get a hold of the NASA handbook on hydrogen hazards .

MR. ARNOLD: It was a NASA hydrogen expert that we worked with subsequent to the accident; we would be glad to review the --

DR. CATTON: Well, it's our feeling that there must be, I don't know the height of the top of the dome above the ring of intake; I thought it was at least 20 or 30 feet.

MR. ARNOLD: I'm sure it's on that order.

DR. CATTON: And, I think that you have to couple it with the circulation patterns you might find inside the containment to make the decision.

See, this is not really -- it should be pursued somewhere else.

MR. ETHERINGTON: I'd like to ask the Staff whether they've made any studies of hydrogen concentration by gravity, either in still space or in containment.

MR. SILVER: I'm not aware of any, sir. I will check to see if there's any generic studies on going.

MR. ETHERINGTON: Thank you.

DR. CATTON: One last part, you're venting the top of the Candycane; it wasn't clear what you were going to do with what you took out of the vent.

Are you going to stick it right into the air vessel or have a line running right to the hydrogen recombiner or what are you going to do with it?

MR. SLEAR: I think the answer is that we haven't decided yet exactly what we're going to do with it. We're still working on the criteria for where that discharge should go and what analysis needs to be done in order to deduce how to use that vent.

DR. CATTON: If you'd point it straight up, you'd have a jet and if it was hydrogen, the jet would be pointed well above that ring, I believe, of intakes.

DR. LAWORSKI: Isn't it true that, in the record, that this hydrogen recombiner is not meant to deal with the kind of releases that occurred of hydrogen in the accident.

MR. SLEAR: That's correct. It meets today's criteria, which I think is hydrogen --

DR. LAWORSKI: Right, and it's important to make that distinction. That's an entirely differnt kind of volume rate -- rate of volume of hydrogen removal that's to be dealt with.

DR. CATTON: We've handled just one part of the question; one had to do with the collection and where the intakes were. And the other was with respect to the capacity.

MR. SLEAR: The next topic is high range effluent monitors. We really have two phases to our ability to monitor the effluent for radiation.

The interim phase involves strap on Geiger-Mueller probes for the reactor building purge, condenser off-gas, and main steam. In addition, we are extending the range of the existing auxiliary building and field handling building radiation monitors and we are moving the stack monitor up one level to get it away from, I believe, it's the KE pipes that pass close to it now and would, in fact, result given the source terms of the Unit 2 type accident in high background radiation.

Our solution to that is to move the monitor itself to an area of lower background radiation.

Are there any questions on the effluent monitors?

Yes, sir.

DR. FOSTER: Are you making any study on the design of that that would indicate that it is, in fact, providing a reasonable sample of the total volume of gas material which has gone up the stack? Or is it just an open pipe sticking into the side of the stack?

MR. SLEAR: I guess I'd better to defer to -- I don't have the answer to that.

MR. ARNOLD: We'll address that question after we check on it.

MR. SLEAR: And, the last item has to do with the failure modes and effect analysis that was completed with the integrated control system. That analysis identified the potential weak point in the reliability, if you will, of the integrated control system in that it's power supply is fed from two different sources through a common of automatic buzz transfer switch and we are proceeding with a modification that if, in fact, that buzz transfer switch malfunctions and does not provide a backup source of power to the integrated control system, the operator in the control room will have the ability to manually transfer via a second transfer switch that he has control of the power to the ICS, to a back-up protected power supply.

MR. EBERSOLE: You imply that in doing this there is a substantial increase in the reliability to the ICS.

MR. SLEAR: Well, I don't know the numbers .

MR. EBERSOLE: Okay.

MR. SLEAR: I'm sure that numbers could be prepared. Basically the failure modes and effects analysis was done by Babcock and Wilcox and I'm not sure if it identified the reliability in improvement quantitatively.

MR. EBERSOLE: Well, I suspect that the lack of reliability is intrinsic to the ICS system rather than just a source of power supply; am I correct?

MR. SLEAR: I guess I don't -- I certainly wouldn't want to --

MR. EBERSOLE: So, its power supply is a substantial part of this unreliability; is that right?

MR. SLEAR: Well, I guess I'm not even sure that you'd -- I wouldn't want to say the ICS is unreliable.

MR. EBERSOLE: Well, it's just a bad word.

MR. TAYLOR: Mr. Ebersole, ICS failure modes and effects analysis identified the power supplies as the principal source of unreliability and that the power supplies are not a part of the ICS, per se.

MR. EBERSOLE: Yes.

MR. TAYLOR: They are -- and as a result of that, they are plant specific to a very large extent. But, it did identify that as the principle source.

MR. EBERSOLE: So, this then is a substantial contributor to increasing reliability.

MR. TAYLOR: Yes.

MR. EBERSOLE: Thank you.

MR. SLEAR: That concludes the presentation that

I had on modifications that we are proceeding with on a prior to restart type basis in addressing the order.

There are other things, as you may or may not be aware, that the company is doing on its own and is permitted to, but this closes, if you will, my discussion of the order items with the exception of the longer term items, the catagory B NUREG items which I'll discuss at a later time and in addition, the auxiliary feed water modifications which is a separate topic.

MR. ARNOLD: Before we proceed with that, Mr. Chairman, Mr. Keaten would be prepared to discuss data gathering and display in the control room in response to a question that, in addition to the agenda item, and this would be a convenient time tc do that.

MR. ETHERINGTON: Go ahead.

MR. KEATEN: Was there a specific question that I can address with respect to the computer?

MR. ARNOLD: Mr. Keaten wasn't here at the time that the question was initially asked.

MR. EBERSOLE: Describe it.

MR. KEATEN: We have two computer systems for Unit 1. The one system is the one that was originially supplied with the plant and it is analogous to the system which we had in Unit 2.

The second system is a very much expanded computer system which -- work had started on this system, in fact, prior to the TMI accident. It uses a Mod Comp 4 machine which is a larger computer than the original one and has approximately, I think, something over 2,000 inputs to the computer. The hardware, we have basically, I believe, in what would be its final form. The software programs are not, at the present, in their final form.

The computer system as it presently exists to date has the capability of monitoring the input signals and providing output signals at any of the output devices. It does not have the capability of constructing some of the types of sophisticated displays that we would eventially expect to do in the system.

The computer has a capability that we refer to as the transient monitor to storing information from about 112 analog and 112 digital signals which can be recorded at rates in excess of one cycle per second. And, storing this information up to 24 hours on the discs that are a part of the computer system and then the information is subsequently transferred to magnetic tape for permanent storage.

So, this provides us with the capability of monitoring these critical signals in retrospect if the plant undergoes a transient, we can call this data back and analyze what happened.

On a longer term basis, we eventually expect to have the capability to do a similar type of data storage and retrieval for all of the signals going into the computer, although they would not all be monitored at that very high scan rate.

DR. CATTON: That's a part of the interest.

The second part is what are you going to do in the control room? Right now, as far as I can tell, you have the same system that you had in Unit 2, except with maybe an extra typewriter: namely, very slow output, 12 seconds per line on the typewriter and 3 seconds per line on the CRT.

And, it's my recollection that this was the big problem in TMI 2; what are your plans for doing something about that, and what are your dates or what is your schedule for getting it done?

MR. KEATEN: Yes, sir. I can answer your questions.

Let me first answer it by saying that our evaluation has not shown that the computer system was a big problem as far as the TMI 2 accident causes were concerned.

The operator had the information available to him that he would be normally expected to use. The operators have not made a habit of using the existing computer system to help them during transient conditions. It has been relied on primarily during steady state operations for certain types of monitoring.

DR. CATTON: Let's see; I wasn't prepared for that type of an answer. What I had heard earlier was quite different. I'm going to have to review what I heard earlier before I want to agree with what you're saying.

MR. KEATEN: Yes, sir. Let me also add something --

DR. CATTON: Part of the testimony of the operators.

MR. KEATEN: Yes, sir. Let me also address the second part of your question.

We have installed faster printers in the existing computer system -- the original computer system, because it is true that the original printers did create a situation where there could be a backlog of --

DR. CATTON: They're not installed yet. At least they weren't yesterday.

MR. KEATEN: That's true. When I say installed, I mean that we have committed to have them installed prior to the time of the plant restart.

DR. CATTON: Could you give me the specs? Not details, just signals and the rate that you can receive them.

MR. HARRIS: Wayne Harris, GPU.

We have presently the old selectric typewriters that were on there and are capable of about 12½ characters per second, proof that they're very unreliable mechanically.

The printers that we're replacing them with is part of restart modification seven, RM7, are Texas Instrument's 820 type printers which are capable of 280 lines per minute. They'll be run at, I think it's 12 hundred characters or 120 characters per second. The computer itself is not capable of generating the alarms that fast. The cycle time between alarms, between discrete alarm messages on Unit 1 computers is 3 seconds; it can't generate an alarm and print it out in less than 3 seconds.

DR. CATTON: Where is the problem then? Is it the CRT system, the computer, or what?

MR. HARRIS: It's the computer itself. The computer that we have in Unit 1 is an older model of the one in Unit 2. It is a Bailey 55G and the cycle time on it is about 2 microseconds, between 2 and 2½ microseconds. It's a sinc-jam type computer in that there are five functional computers and each one gets a certain timeslice of the 12½ millisecond period.

The operator communications system, which is functional computer C, I'm not sure what the exact percentage of that 12½ millisecond timeslice that it gets, but it must share with the other computers, with the data acquisition computer and the NSS computer, the balance of plant computer; it must share its time with those.

There is a method which is used in Unit 2 for controlling through software what those percentages of that timeslice are. It's not used in Unit 1. That's on a hardware basis; it's a hardware option to change the percentage rates of each of those functions that the computer gets to fill the time slots.

DR. CATTON: Do you plan to upgrade the computer in Unit 1, and if so, when?

MR. KEATEN: Yes, sir. As I said, we have to date in a room adjacent to the control room, a new computer which is very much faster and we have the specifications on it if you would like to have them.

But, we have not taken the position that this was an activity that had to be completed prior to restart. It was, as I said, something that we had started, in fact, before the TMI accident and we are in the position today to make some use of that computer system. But, we expect some of the software developments to continue on past the timeframe of the restart.

DR. CATTON: Let me see if I understand.

What you're telling me is that in TMI 2, the data retrieval rate in no way directed the course of actions, the course of action that took place. Therefore, you conclude that really no changes are needed, but you're going to make some anyway.

Is that a correct interpretation of what you're saying?

MR. ARNOLD: I don't think it is and I'll let Bob speak for himself. But, as far as, you know, what he said earlier.

Let me point out that the computer modification, the installation of Mod Comp 4 which Mr. Keaten described, was initiated as an engineering and procurement action in 1975. The computer was installed in '76 and we had that computer capability upgrade as a three phase activity, the first phase was the installation of the first computer with the type of software capability that Bob indicated that we have there now Phase two was the development of software and installation of additional hardware which increased the man-machine interface capability and made the computer more u able as a monitoring and a data display tool for the operators. The software development on that has been underway since, I guess, the middle of 1976, at least, and it has been a very extensive effort, it has been a very difficult one to develop the necessary software. And that effort, though, is still being pursued. It is seen as, obviously, a signficant improvement in the information available to the operator and his ability to assess what's going on.

Now, I'll let Bob clarify or comment on his interpretation or his understanding of the contribution of the lack of that capability in the Unit 2 accident.

DR. CATTON: I'm surprised that it has taken four years to develop the software. It must be a fairly low-level effort.

MR. ARNOLD: Not at all, sir. We've also been very surprised, but it has been a very high priority effort within the GPU throughout that time period. It is, I think, one of the misunderstanding or misconception within the industry that this kind of software is commonly in place.

It is not, to your knowledge and we --

DR. CATTON: Well, I would agree with that and I understand that you have to develop the software and you first have to decide what you want before you can develop it.

But, four years seems an awful long time from the point that you decided that you were going to start the change.

MR. ARNOLD: I agree with you and I think it's indicative of the state of the art on the software development for this type of process monitoring.

We have --

DR. CATTON: Within the nuclear industry, I would agree with you. As far as other industries are concerned, that's not the case.

DR. LIPINSKI: I'd like to go back to TMI 2.

The operators had testified that they were not pressing the enunciator button for fear of clearing some of the alarms because they wanted to have knowledge on which alarms had come up. Consequently, the enunciator horn was blowing in their ears for some unspecified amount of time.

The status of the quench tank pressure and temperature were not recorded; they were only indicated. The alarms on that tank went into the plant computer, but in the first interval, there was something like 1½ hours' backlog of data on point status in the computer that did not get recorded for the operators to observe. And they reset that memory and then built up another backlog of about another hour of data in the plant computer, because it was not printing out fast enough.

I consequently can't agree with you that the plant computer did not play an important part in helping the operators with TMI 2.

Now, in observing Unit 1, there are some variables that are recorded and they are the key variables. But, a majority of the variables are only indicated and their alarm status is going to appear through your plant computer and the time of occurrence and value are going to appear in the plant computer, because you will not get them off the control panels if they are not recorded.

MR. KEATEN: I did not mean to imply from my earlier statement that I could stand here and say that the computer, or that the computer capability had zero impact. But, I personally have spent a great deal of time talking to the operators who were in the control room during the critical period of the accident; and without exception, to the best of my knowledge, they have told me that they did not feel that the computer contributed and that they were not normally using the computer during this kind of a timeframe where they were in a transient situation. They just relied on their normal panel instrumentation.

I agree with Mr. Lipinski that there are things that could have been different such as a good record of the parameters in the reactor coolant drain tank that could have been useful to the operators. But, in fact, when the operators wanted the information on the reactor coolant drain tank parameters, what they did was to go to the normal indicators which were located on the back panel of the control room.

And, as you've pointed out, they were simply indicators that were not recorded.

DR. LIPINSKI: The disc had ruptured and reset to zero.

MR. KEATEN: Exactly.

We have recognized for some time, as Mr. Arnold said, that it would be a desirable thing to have an upgraded computer system in both Unit 1 and Unit 2 as a matter of fact, and we have been working in that direction and are continuing to work in that direction at a very high priority fashion. And, as I indicated earlier, the new computer system as it exists today and even more so as the condition that it will be in at the time that we restart the Unit will be able to provide the operators information in a better fashion and a more complete fashion than they had available previously.

So, I do not mean to imply that we place no importance on that, but in addressing specifically the issues that arose from the TMI accident, it was not our conclusion that it was necessary for the operators to have to rely on a plant computer in order to be able to correctly respond to those kinds of transients.

DR. LIPINSKI: That quench tank was one of the most important parameters in determining what was going on in terms of the closure of that PORV. That information was lost in that plant computer.

MR. ARNOLD: But, I think that what we would conclude from that experience is that we should have had a recording device on the direct indicator because that's where the operator normally would go to as opposed to only--

DR. LIPINSKI: Correct, given that as a postulate, but not having had that information, the information that was available was lost in the plant computer because the alarm was generated, if I recall, and the disc ruptured in about 15 minutes and the fact that the alarms had been reached were lost in the computer backlogs.

MR. KEATEN: That's a true statement.

I think that part of our response, though, is simply that the real issue was the fact that the operator did not have any direct method of knowing the the PORV was open and therefore, was forced to rely on indirect indications such as the reactor coolant drain tank parameters.

And, our response to that is simply to give him a direct indication of whether there's flow in that line so that he doesn't have to rely on any indirect indications.

DR. LIPINSKI: Again, we're only using this as a prime example where we've got something concrete to show. But, if you look again at your control room in Unit 1 and the variables that are recorded, and then ask yourself, how many variables have I only indicated that will be important to me under a different set of circumstances and when they do alarm, what the values are when they alarm will only be coming through your plant computer.

So, take a close look at your control room, see what you are not recording, and then you will conclude what information will pass through the plant computer that is important, under a different scenario.

MR. ETHERINGTON: I think there's a gentlemen who wishes to say something.

MR. HARRIS: In reference to what you're talking about, the quench tank, had we been able to output the alarms at the frequency that they were coming in, the points that were actually being sampled, had we had fast enough output devices to do that, I think the operator, I think you would find that the operator would be so inundated with information that it would be very difficult for him to pick that specific alarm out of the printout that was coming out.

DR. CATTON: But, he ought to have the option to say, hey, I would like to check that. And, he didn't.

MR. HARRIS: Okay, toward that end, on the new system that we're presently developing there has been specified a priority organization of the alarms where you can specify work -- the points that are marked by the plant, what the priority of the alarm, should that point exceed its operatin limits.

DR. CATTON: The setting of priorities will be a difficult task. You're going to have to postulate all possible scenarios in order that you can do it.

And, I think that we're a little concerned that you won't be able to.

MR. KEATEN: And, we agree with you very much as far as the difficulty of that task is concerned. And, our approach is going to be, on the new computer system now, will have high speed line printers, which will, in fact, print out all of the alarms.

And, then through some other output device, we hope to be able to develop eventually some sort of a scheme for prioritizing the alarms. But, we do not underestimate the difficulty of doing that.

In any event, we would always maintain the capability for the operator to go and look at a complete list.

DR. CATTON: I think that 280 lines a minute is a significant improvement over what we had before.

But, I still, a personal feeling, that when you start piling up that paper on the floor and you get a bunch of people scrambling around looking for a signal that was 600 lines back, I would rather, personally, have a CRT.

MR. KEATEN: Yes, sir. And we do, in fact, in the new computer system have CRT's.

MR. ARNOLD: I think that, well maybe it's not directly germane to the computer capability, it seems to me the philosophy of operations here is germane and I think that if the company learned anything out of the accident, it was that the major contributor, in our opinion, to having had the accident was the lack of preparation of the operators for the conditions that he was faced with.

And, that that's still where we should be focusing our first line of defense is on the training of the operators in the procedures that are provided for him to deal with in plant situations; the pre-thinking and pre-planning that goes into that as opposed to a heavy reliance upon him being able to assimilate a lot of information and digest it in a way that lets him diagnose what's developing.

DR. CATTON: That presupposes that you know what's going to happen and I would agree that when you do know what's going to happen the operator should be trained and proper procedures should be put together for him to handle this.

I think, though, that what we're trying to put across is that there are going to be things that happen that you don't anticipate and he's going to have to have information to act properly. If he doesn't have the proper information, then the amount of training doesn't matter.

MR. ARNOLD: And, I think our approach to that issue which, you know, we don't disagree with, is that there are certain basic plant parameters and basic indicators of plant conditions upon which he should focus and insure that he retains those within acceptable envelopes and not orient him towards very subtle analyses that he may be encouraged to do on the spot, so to speak, that the protection of the core is where his focus has to be and I don't think that it requires a large number of data points for him to have available to him to insure that he is protecting the core.

MR. ETHERINGTON: In that sort of context, I think it's clear to all of us, and I can't help but think of the CE system 80, where great difficulty was found in introducing computers into the safety complex; this is the automated aspect.

Here, I think, TMI dramatically illustrated that the operator plays a very vital in the safety feature and therefore, you feed him information which is going to necessitate the computer processing which then implies a kind of 1E reliability on the computer output to him; which goes beyond just increasing its speed or its amount of recording capability. It may, in fact, go the other way that you should trim-down how much information a computer group ought to have and call it a safety class computer which will provide that critical but not superfluous information for him to say, please shut the plant down.

I'm a little bit concerned about the intermixing of the safety/nonsafety aspects of computer systems here.

And I'm wishing, perhaps, that we could trim and lean down those aspects of the computer systems that are fairly critically safety oriented and avoid flooding his mind with superfluous information, even though it's coming from a computer, and even from a CRT.

In short, I think we're entering an era where we have safety grade 1E type computers, which we don't have yet. But, we are going to have to admit that they have to be considered as such.

DR. LAWROSKI: I believe that it's in the long term lessons learned where the so-called definition of plant safety factor is yet to be defined and the NRC has this as one of their tasks to be undertaken.

Implicit in that will be the reliability of the information if this is going to be grouped as key information to be presented to the operator, the reliability in the information will be part of that assessment.

MR. ARNOLD: I might just point out that since we have wandered somewhat astray; there is a recognition within GPU of the points you make and we are looking at the possibility of undertaking, in conjunction with others, what amounts to a research development effort for identifying the kind of equipment that would be appropriate for something like Three Mile Island Unit 1 to give the segregation of information that is really critical to understanding plant safety.

MR. EBERSOLE: Thank you.

MR. ETHERINGTON: I think that's probably as much as we want to say on the subject now.

MR. ARNOLD: All right, sir, if we could pick up the agenda again and ask Mr. Slear to proceed with section 4, Roman numeral 4, item 1.

MR. SLEAR: This is the time to discuss emergency feed water and the modifications that we're making as a separate issue.

First, I wanted to briefly describe the fundamentals of our emergency feed water system so that we're all at least playing the same ball game, so to speak. We have three emergency feed water pumps, two motor driven pumps, one steam driven pump; those pumps can all take the common suction on either condensate storage tank, the hot well, or in cases where there's no water there, from the river itself. They discharge into a cross-connective header and provide emergency feed water to both steam generators.

You will hear me discussing failure mode modifications to the throttle valves or the block valve, I guess you would call them, EFE30A and EFE30B have received some modifications and you will hear me discuss the addition of some flow instruments; those flow instruments are two safety grade flow instruments downstream of this cross-connect line, two for steam generator A and two for steam generator B.

So now we're at least talking the system and I can throw that up again if there are any questions about, as I go through the specifics of the modifications that we've made.

DR. LAWORSKI: Excuse me. You said that you were under Roman number 4? I've got a 4 but it's in a different place.

MR. ARNOLD: It is still under Roman numeral 3, it is item number 1 that was scheduled to start at 1 o'clock this afternoon on emergency feed water changes.

MR. SLEAR: Are we all together? Good.

Emergency feed water changes: Change number 1, we have a automatic pump start. Signals that we sense automatically start the emergency feed water pumps are currently, we have a control grade installed which senses loss of core reactor coolant pumps or loss of too many feed pumps. The engineering is scheduled to be complete the end of this month for a safety grade emergency feed water automatic pump start initiating signals for the safety grade pump start or once again, loss of core reactor coolant pumps, loss of automatic feed pumps, or the feed steam delta feed, which is a feature we have taken from Unit 2.

The second modification: emergency feed water pump power. We are, in addition to automatically starting the motor driven pumps, we are loading them on the diesel based on block five loading with the red pump obviously on the red diesel and the green pump automatically loaded on the green diesel.

With regard to flow indication, we have added sonic flow detectors between the cross over and the individual steam generators two sonic flow detectors in each line going to each steam generator for a total of four flow indicators. These devices indicate in the control room up to 15 hundred gallons per minute. We are enunciating in the control room for all of these auto start conditions to provide the operator with an alert that we have called for emergency feed water so that he can, in fact, confirm emergency feed water flow to the steam generator if the system is functioning as it's supposed to and providing heat samples to the reactor coolant system.

I mention the 30 valves, the emergency feed water control valve; we have modified the valve itself, it is an air operated valve, we have modified it such that on loss of instrument air, or really loss of air supply to it, it will, in fact, fail open. In order to reduce the potential for loss of air, IE improve the reliability of continuing to maintain remote control of that valve from the control room we've added two additional backup air compressors and they provide backup instrument air to not only these valves but selected other valves in the plant. We have an air resevoir dedicated to each of these valves which will in fact require air pressure to operate them and as long as all else fails, there is still a resevoir of pressurized air to allow you some more time before you have to take manual control of the valves.

And in addition the current control for those valves from the standpoint of remote control in the control room is either through the ICS or through a manual loading station as we call it, which has a power supply coupled with the ICS. And in order to, once again improve the reliability of that manual loading station, we have added a redundant manual loading station, what I refer to here as a new manual control station; its power supply is controlled separate from the ICS. All of this to improve the reliability of these two control valves and to insure the ability to provide cooling water to the steam generators.

The last thing we have done is, as I indicated, these emergency feed water pumps will take a suction on both condensate storage tanks and it takes hours if not days to finally drain those tanks; but because it is a long time and into some sort of a transient when you might be taking a suction on those tanks, perceive the need to provide a low level alarm to alert the operator that he had run out of that water supply and it was time to find another one.

Any questions that I might be able to answer?

MR. EBERSOLE: Is all this to say that instrument air is now regarded as exercising a safety function and you're making the appropriate modifications to qualify it that way?

MR. SLEAR: I guess I don't have a good answer to that; I don't think so. It certainly made modifications to improve its reliability.

MR. EBERSOLE: Yes, it's kind of in a hazy state somewhere in between and I --

MR. ARNOLD: I don't think that we have taken the position that instrument air should be designed to safety grade equipment, but we recognize the contribution to the reliability of operation that that system has by operating its functions.

MR. EBERSOLE: Let me mention --

MR. SLEAR: To give you a feel for where we're headed, please recognize that what I have shown you is what we are proceeding to do prior to restart; that we have also taken a look at, I guess you could call it, making the emergency feed water system single failure proof. And, in the longer term of what modifications are required, my recollection is that includes backup valves to these valves which are motor operated.

MR. EBERSOLE: Well, we are rapidly approaching the aspect of making these things safety grade.

You know, that includes seismic and part supplies and the whole bit. And it includes, then, considerations which are not currently being taken up. I just mention two in -- what are really concerns of a colleague of mine, Mr. Michaels, and I guess you know that he's mentioned to me from time to time that to make these standing leaks in an instrument air system which are easily overridden by the decompressor, you simply don't know that they are there because the capacity blinds you to the fact the they're there. Such leaks would be large enough to prevent the operation successfully of smaller compressors if you fell back to those small cnmpressors. So, suggest a periodic inventory of the leak rate which is occurring as well as a comsumption rate of the instruments.

Another aspect is the desicants in the systems have, to my knowledge, never been proven capable of sustaining advisal followed by physical upset, like in seismic shelf shock or something like that without the potential of entraining the desicants into the systems and commonly then affecting instrument devices that use air.

I'm merely saying that if you're going to go the whole way, that some more needs to be done in modifying these safety grade systems. I see you're going part way, but I guess I don't know where we're headed.

DR. LIPINSKI: I think questions have been raised with respect to emergency feed water system to tanks, connecting pipes, all the way to the steam generators, but, now you've raised the question of the qualification of the air supplies that go to operate these valves. The fact that the rest of the system is seismically qualified doesn't help you to balance the system does it?

It was pointed out that you have an interconnection between your instrument air and your plant service air. In the case of Unit 2, this connection existed and the explanation was given at that time, that one of the systems was under supply and that connection was put in as a method of fixing, I forget which one It was where the instrument air was short and the service air was short. Now, I found out this condition exists on Unit 1. Is there a good reason as to why it exists on Unit 1?

MR. ARNOLD: We are going to try and address that a little later with a different person than Mr. Slear.

Could I go back, I think to your comment earlier because I wasn't sure -- they said yes to some questions but these valves can be operated manually, locally. They can also be operated in the control room in a manual mode.

We are not taking the approach, at this point, and don't believe that it is necessary in terms of the overall plant design and criteria that apply that these systems have to fulfill safety rate system design criteria.

We are doing those things that make sense to improve the reliability operation of these, because obviously they are very useful and important in plant upsets and mitigating the deterioration of the situation.

DR. LIPINSKI: I have one further question. I think it was March 27 of last year that an LER was written on the closure of the steam belt and the steam driven emergency feedwater pump. The handbelt had been wound down and the condition was such that a LER had to be written. The maintenance had been done and the belt was left in the block condition.

What is it that you are doing now that prevents the reoccurrence of a similar event because the position of that handwheel is not indicated although the valve position supposedly is indicated in the control room?

MR. ARNOLD: The event was a result of a breakdown in the administrative cont ls for valve lineups, prior to startup.

The plant was coming back from refueling outage in Mid March and as part of the prestart up preparation, a valve lineup was initiated.

There was a delay in the schedule for return of the plant to service and that delay was taken advantage of by the maintenance people to do some maintenance on the feed pump which involved closure of that valve.

On completion of the maintenance work, in removing the tags the shift foreman did not direct the valve lineup to return to normal relying instead upon utilizing the valve lineup check that would be done for the preparation for startup for returning all the valves to their normal position for operation.

When they continued or the valve lineup is a very extensive one, it would normally take a couple of days to complete, that is required prior to startup, and the one that was initiated earlier was picked up at the point that it had been left off with. It had already gone pass those particular valves.

We would not permit if we had changed our administrative controls, as to not permit that type of picking up of the valve lineup th·t is required prior to startup, so that we are primarily addressing that issue with the administration of the valve lineup check off prior to startup and also the routine shift-to-shift valve lineups. I am not aware whether Dave can clarify that we have added any indication of the position of the manual override for the valve to the control room.

MR. SLEAR: There is no modification like that that I am aware of.

DR. LIPINSKI: I believe it is Reg guide 147 that is to be made effective February 1980, that is to cover the status of systems and based on the configuration this handwheel override, I am not sure whether the Reg guide covers that point. I am going to have to read the fine print carefully.

The purpose of the Reg guide is to be able to determine the status of all the valves that are important to safety from the control room. These handwheel overrides are not indicated in the control room.

MR. ARNOLD: That is correct, and we have modified our routine valve lineup checks that are carried on on a shift-to-shift basis to substantially increase the frequency of local visual verification of those positions.

MR. SLEAR: That was the extent of the presentation I had on emergency feedwater.

MR. ARNOLD: If I could add one other point to that?

Those types of operators are also included under our lock valve controls.

MR. EBERSOLE: I believe your logic on your instrument air you open valves to insure water flow, is that right?

MR. SLEAR: That is correct.

MR. EBERSOLE: Now, this means that there is some potential for all three responding full open to fill the boilers.

MR. SLEAR: That is correct.

That also then brings up the question of what happens if you put too much in?

MR. SLEAR: We have looked at the amount of time, and I had somewhere between 10 and 15 minutes --

MR. EBERSOLE: He has time to respond to that.

MR. SLEAR: -- get to the valve and close the valve. He also has got the ability from the control room to just stop the pump.

MR. EBERSOLE: He can stop the pump.

Is the level indication by any chance dependent on the air supply? It is not, is it?

MR. SLEAR: Not that I am aware of.

MR. EBERSOLE: It is an electrical system?

MR. SLEAR: Yes.

MR. EBERSOLE: Thank you.

MR. SLEAR: You are welcome.

MR. ETHERINGTON: We will break for lunch now.

(Whereupon the meeting broke for lunch at 12:00.)

(Whereupon, the proceeding continued at 1:25)

MR. SILVER: Just a clarifying remark. Earlier, I indicated I had no comment on the Emergency Feed Water Items and that's quite true, but I would like to explain that.

The SCR, of course, does make comment on the various items that we discussed and the status report does indicate our--the status of our review. I did not mean to reply when I said, "no comment" that there is any change in those items. We have stated our position in the status report and the safety evaluation and these things are still in effect. But, the meaning of my statement, was that we have nothing additional to offer at this state based on the presentation as given.

MR. ETHERINGTON: I think that was understood.

Let us see, is it Mr. Elam, next?

MR. ARNOLD: Yes. Mr. Chairman, I would like to introduce Branch Elam. He is currently the manager of plant engineering assigned to Unit 2, but has been taking the lead in the design work for the separation of Unit 1 and Unit 2.

MR. ELAM: Our objective in the area of separation between the two units, as related to the Unit 1 restart, is to implement separation of systems to facilities to the extent that the plant operations on the Unit 2 recovery will not affect safety operations at Unit 1.

The Unit 2 recovery operations in progress or plan include continued orderly KE removal from the reactor this is on Unit 2 side, reactor coolant pressure and chemistry control, clean up of contaminated waste water from the auxiliary building and reactor building, clean up courage of the reactor building atmosphere, decontamination of the auxiliary building and reactor building and ultimately reactor core disposition.

In consideration of this objective and the plant operations at Unit 2, we've identifed the following systems and facilities where specific design modifications or procedural actions are required.

Liquid RAD waste treatment system, the nuclear sampling system, and a fuel handling building, and associated ventilation systems.

First, addressing the liquid RAD waster system. At the time of the accident, there were five piping interconnections between Unit 1 and Unit 2 which permitted the movement of contaminated water, or potential contaminated water between units. These interconnections were installed to transfer reactor coolant, miscellaneous waste, concentrated waste, evaporative compensate, and spent resin from unit to unit.

As a result of our separation objective, each of these interconnections will be positively isolated, in a manner that will provide at least two closed valves isolating processed components in the two units. The details of how we are going to do this will be covered in a later presentation on the waste treatment system.

Second system are requiring action, nuclear sampling system. The original station design at TMI for neclear sampling for Unit 2 basically utilized the sample sink installed in Unit 1 with piping from Unit 2 into Unit 1 and use of the TMI high chemistry lab for sample preparation of counting. Return lines were also installed for establishing research paths--path back to Unit 2 for purging lines. The sample lines from Unit 2 are not shielded in the TMI 1 portion of fule handling building to the extent that after the accident, we experienced high radiation fields around the piping.

In access to the fuel handling and auxiliary buildings to be limited because of the need to take periodic let down samples at radiation levels, piping might still cause certain kind of difficulty in taking the samples.

To resolve this area we designed and currently installing a new sampling sink in Unit No. 2; we call it the temporary sampling system. All Unit 2 samples will be routed to this facility, with the exception of the samples that have been taken from other facilities that are not piped into the systems, such ar hard processes from depth core two and future systems that will be installed. The pipe samples that now go to Unit 1 will go to a temporary sink in Unit 2.

This system consists of the tubing valves and the necessary equipment to perform the sampling. The sources of water that go to the system are the reactor coolant bleed tanks, the reactor coolant system, miscellaneous waste holdup tanks, the new mini decay heat system that we are currently installing, the pressurized re-stage space and water space, and the fuel cooler waste--waste storage.

The entire new sink will be shielded and enclosed with its own independent ventilation system and will exhaust into the Unit 2 aux building ventilation system. The sink is located in the Unit 2 auxiliary building adjacent to the model room.

The third system that I mentioned requiring the significant action is the fuel handling building. Basically, presently the Units 1 and 2 share a common fuel handling building. There is no physical barrier existing to divide the air space between the two units.

Conceivably, the release of radioactive gases, in particular, from either unit, could possibly migrate to the other unit.

In consideration with this, we intend to modify the building layout and to install physical barriers to the extent that we positively isolate the building volumes below the operating deck level, 348 foot elevation; above the operating deck level there will remain a common air space.

Additionally we would modify the Unit 1 fuel handling building vent system to prevent potential leak paths to the auxiliary building by adding appropriate dampers, they close on the radiation signal in the exhaust from the auxiliary building on the Unit 1 side.

Additionaly we address the other changes to the fuel handling building to accommodate a potential fuel drop accident.

MR. ARNOLD: Go ahead and clarify that.

MR. ELAM: Okay.

To address the impact of a potential fuel drop on the Unit 1 side, we are attempting to install an independent issue and safety function grade ventilation system in Unit 1 fuel handling building. The actual implementation of this would involve some dampers and it would involve an up filter system on the discharge in the fuel handling building

The corresponding sytem--ventilation system on Unit 2 fuel handling building will remain unchanged. Of these three systems are the ones that most interest that have the most significant actions associated with them. In addition, we reviewed all other systems and facilities and activities that can be considered to have the interface between the two units, and I'll go through those.

The solid waste disposal system. Prior to the accident, basically the solid waste process system was a shared system located in Unit 1. Again, as a result of our separation objective, we intend to separate it, this function from Unit 2. But, considering the various types of solid wastes, firstly, the compact waste and LSA box, lower level types of solid waste, Unit 1 and Unit 2 now employ their own separate compacting machine. Interstorage on sight is separate, once the waste is either in a 50 gallon drum or in a LSA box. The shipments are separate, however, the Unit 2 organization manages all the shipments.

But, considering other solid waste, the nature of solidification systems, Unit 1 will eventually have its own separate permit system. Unit 2 also had separate facilities for solid waste, Mr. Horne. The nature of what these will be is somewhat in the planning stage, but the one clear identified system is the--is the one that will support submerge ventilizer system, but will be installed in Unit 2, sir.

Regarding the upper core two, the processing system is presently in operation in Unit 2. We are investigating what is the best way to handle the solid--resin solidification in that system.

There is a small protable solidification system in place in Unit 2 now, which is processing decontamination solutions. There is no exchange of use between the units of these facilities.

The last item on solid waste, as I mentioned is the epicore one system, which is physically located in Unit 1. The resin line from that system are being stored on the Unit 2 side, in Unit 2 storage. However, they are clearly identified and they are, in fact, treated and shipped as Unit 2 waste.

Liquid effluent monitoring, there is a common discharge piping on liquid effluent monitoring from the two units, however there are separate monitors monitoring the waste from the two units. The waste does join in a common piping system before it goes overboard.

Auxiliary steam presently on the Unit 2 side together with auxiliary steam from oil fired boilers located on the Unit 1 side by an intercom. We also have a backup from an oil fired package boiler located physically on the Unit 2 side.

Our present needs for Unit 2 steam are for turbine sealing maintaining connective vaccuum to allow the natural circulation of the reactor core, as our present mode of cooling.

Future needs for steam on the Unit 2 side would be most likely for a waste evaporator system and for general decontamination units. The demineralized water storage tank an in balance storage tank, is a common facility between the two units, upon both units. Domestic water supply is a common unit--common facility; likewise, hydrogen and CO_2 supply.

The fire protection system including the fire water supply, pumps and piping, and the site organization is by necessity a common facility system.

Industrial waste treatment, presently processes a non-radioactive waste from both units. Typical sources on the Unit 2 side are the degenerative building sump, turbine building sump, the tendenaccess (?) gallery sump, Unit 1 auxiliary boiler blow down, Unit 1 and Unit 2 pretreatment system and Unit 1 condensate back wash.

Again, we don't believe specific action when separation was required due to the normally non-radioactive wastes treated by the system, as well as procedural requirements for sampling the waste, that is just before it is routed to the system in every case.

MR. ETHERINGTON: This is going into a little more detail than we had scheduled time for. Do you have much more?

MR. ELAM: No, I am near the end.

Sanitary drains are common; the fuel handling building, the crane is a common machine; make-up work treatment, basically we rely on the Unit 1 system to supply Unit 2. Condensate system has an inter-tie which basically returns the condensate to the auxiliary boiler back to Unit 1. River water chlorination is common, lubrication of storage is common. There is a common machine shop that this will be separated as part of the restart.

MR. ETHERINGTON: Questions?

DR. FOSTER: Is the Rad waste to the river separated now?

ME. ELAM: There is a common place but there is separate monitoring.

DR. FOSTER: How do you do that?

MR. ELAM: We have a monitoring branch from Unit 2 and a monitoring branch from Unit 1.

MR. ARNOLD: The confusion on the--perhaps, on the answer is where the discharge actually goes into the river, it's common at that point. But a matter of feet upstream from that, the Unit 1 and Unit 2 discharges go in separately, but they don't go into the river at different points on the riverbank.

DR. FOSTER: Thank you.

DR. DILLON: You described your hot sample locations in the two reactors, do you have a staff that divides its time between both units, or how do you do the analytical work that is associated with the samples?

MR. ELAM: Separate staff.

MR. ETHERINGTON: What use will be made of the Unit 2 pool, the spent fuel pool?

MR. ELAM: One use would be the installation of the SDS's submerged demineralization system that will be located in the feed spent fuel pool.

MR. ARNOLD: Do you want to explain the purpose of it?

MR. ELAM: The purpose--the mission of the submerged mineralizer system is treatment of high activity waste. First from the reactor building sump and then, second, from the reactor building system.

MR. ETHERINGTON: It is no intention ever to unload the fuel from Unit 2 into the pool, is there?

MR. ELAM: I think there could be. That's an open area as part as our recovery studies.

MR. ARNOLD: There is two sections to the fuel pool and there is two pools.

MR. ETHERINGTON: Yes, sir, I understand that.

MR. ARNOLD: Okay. And one of them we currently have 110 thousand gallons of capacity for storage of contaminated water, the other will be used for the submerged demineralizer system installation. It is one possibility or one scenario we're looking that would involve removing the tanks that were temporarily installed and which would not be needed at the at the point that we are ready to bring fuel out of the reactor containment building and use that fuel pool in conjunction with the off loading of fuel from the reactor vessel; but, those plans are not yet firm.

MR. ETHERINGTON: I'm sure that will be a question for future review, then, wouldn't it?

MR. ARNOLD: I would anticipate it so, sir.

DR. LAWROSKI: I understand it from the standpoint of reducing exposure to the sampling points having been provided with adequate shielding, or there will be. And so that aspect of the problem has been reviewed by yourselves and NRC. What about the quality of the samples themselves. Has somebody reviewed those to ensure themselves that they indeed will be representative of what you hope this--

MR. ELAM: From the Unit 2 side?

DR. LAWROSKI: Well, Unit 1.

MR. ELAM: I think there will be a presentation on Unit 1, sir, later.

DR. LAWROSKI: Oh, okay. I'll defer that.

MR. ETHERINGTON: Thank you, Mr. Elam.

Does the staff have any comments on this item?

MR. SILVER: Yes, one item. On Page C47 of the SER, we noted the implementations situation as it existed as of Amendment 8 and stated that the proposed installations modifications will be completed prior to restart which was our understanding of Met Ed's Amendment at that time. In Amendment 9, and this does not change the open item status as recently mentioned earlier, in Amendment 9 the licensee informed us that we--ESF a filter system for fuel handling floor area will not be installed until the first reload after the restart. We have examined this and have concluded this would be acceptable since the fuel would not be handled in the Unit 1 fuel handling building until that reload in any event. On that basis we will accept that implementation date and words obviously in the safety evaluation will be changed ourselves.

MR. ETHERINGTON: Who will review any possible use of Unit 2 pool activities that might affect Unit 1?

MR. SILVER: Insofar as any handling of Unit 2--

MR. ETHERINGTON: Yes.

MR. SILVER: --core, the staff will also do that I'm sure at that time; when there is some understanding of what it is that has to be done.

MR. ARNOLD: Mr. Chairman, right now our technical specifications for Unit 2 require that procedures for performing that type of evolution be specifically approved by the NRC on an individual procedure basis.

MR. ETHERINGTON: Yes, okay, thank you.

Let's see, I think Unit--Section--Item 9 comes next; isn't it, Mr. Arnold?

MR. ARNOLD: Yes. I would like to introduce Mr. Ed Fuhrer. Mr. Fuhrer is the supervisor of Radioactive Waste Operations for Unit 1.

MR. FUHRER: Good afternoon. I would first like to give you a short presentation on the compenents that comprise Unit 1 liquid Rad waste system by way of going over the plot diagram.

The system is divided into three general catagories or parts. The first part deals with reactor cooling clean up, the second part deals with miscellaneous waste processing, and the third part deals with the treating of solid wastes, such as resins or wet solid wastes.

The reactor coolant core to the system starts with three reactor coolant bleed tanks in which reactor coolant water or borated water of varying concentrations is maintained for the feed and bleed activity. Reactor coolant is collected in one of the bleed tanks and it maybe processed in a number of different ways. It can either be cleaned up by going through three coat filters which would take out solids, suspended solids, or it could go through what we term the demineralizers. Actually, we have filled them with mixed resins. Or we can run the reactor coolant through both of those processees in series and resert that material back to either the same bleed tank or another bleed tank.

Another alternative to that would be to process reactor coolant to concentrate it to retain the boric acid for use in another fuel site. And, in that process we either use the same--we use the same clean up capability or if based on sampling, the reactor coolant was of a sufficiently high quality that you would want to save that boric acid you would process the material through the reactor coolant evaporator and retain the boric acid in solution in the retained boric acid tank.

This ends up with concentrated boric acid in these tanks and it also ends up with distilled condensate coming off the evaporator and being stored in the condensate storage tanks for ultimate release to the enviroment.

In this area there are three inter-ties with Unit 2 to provide addtional flexibility and the processing of station wide waste prior to the accident. The reactor coolant could either be transported via pipe from Unit 2 to the reactor coolant evaporator or it could be transported from the bleed tank over to Unit 2 to their reactor coolant evaporator in order to take--make the best possible use of safety equipment. Condensate could either be sent to the Unit 1 condensate storage tanks or the Unit 2 condensate test tanks where it would be tested prior to release to the enviroment.

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Reclaimed boric acid, likewise, can either be transferred to Unit 2 or from Unit 2 to make the best possible use of storage space.

The second portion of the system is the miscellaneous waste portion of the system and that collects non-reactor coolant grade water from a variety of sources. The auxiliary building sump collects four grades and other sump waters, specifically that from the reactor building or from the fuel handling building.

Other sumps neutralize waste which would be say, reboric--regenerate solutions from the deborating demineralizers or water that had Ph greater than, say nine or less than five would be safe--would be collected in neutralizers waste tanks, would be neutralized through, essentially, a neutral Ph and would then be transferred to miscellaneous waste storage tank along with auxiliary building sump water.

Miscellaneous waste storage tank is the central, sort of focal point for the miscellaneous system. Virtually, all the water that has to be processed through this system must be collected in that tank and from there the water will be either processed directly through the miscellaneous waste evaporator or could be transferred through a precoat filter, it would be this line, to the miscellaneous waste evaporator in order to a preliminary clean-up step prior to evaporation.

There are two evaporators in Unit 1, the miscellaneous waste evaporator and the RC evaporator and they are l cated and their piping is such that either evaporator could be used for miscellaneous waste or reactor coolant, depending upon the availability of those pieces of equipment.

The bottoms from the miscellaneous waste evaporator will be collected in the condensate waste storage tank for ultimate solidification.

Boric acid is found to be off spec, it cannot be reused but also be solidified. The distillate or condensate from both RC evaporator and the miscellaneous waste evaporator is processed through a final clean-up step through a demineralizer and then stored in condensate storage tanks where they are recirculated, tested, and then released to the environment through radiation and low monitor.

DR. FOSTER: Question.

MR. FUHRER: Yes, sir.

DR. FOSTER: I presume your condensate storage is sampled before you dump it into the river?

MR. FUHRER: Yes, sir.

DR. FOSTER: What if it's off spec, then what do you do with it?

MR. FUHRER: If it is off spec, the piping exists, and I haven't shown it to make the drawing a little bit simpler. To either send it back to miscella eous waste evaporator for another clean up or to be dumped into the four drains and then go back to the auxiliary building sump and miscellaneous waste storage tanks.

As with the RC portion of the system, there are inter-ties that connect to miscellaneous waste systems in the two units. Raw miscellaneous waste can either be sent to Unit 2 for storage or it can be returned to Unit 2 for processing. Unit 2 does not have or did not have a capability of processing its own miscellaneous liguid waste, as before the condensate can be sent to either Unit 1 or Unit 2 for storage and then dumped into the enviroment.

Concentrated waste resulting from the evaporator bottom can be stored in either unit. Solidification is only available, or was only available to Unit 1 and solidification capability would be retained from Unit 1 although it would be replaced by No.2.

DR. LAWROSKI: Does that include being able to handle the discarded resin?

MR. FUHRER: Yes, sir.

The third portion of that liquid waste system is the resin, and use three precoat parts of the system. The precoat filter is a filter that removes particular matter and originally was designed to use diatomaceous earth or some other inter-earth filter aide. We currently use powder resin on the precoat filter--filter, itself and that material is transferred to the precoat storage tank, resins from the various demineralizers are transferred into this kind of resin tank. The liquid that is used as the transfer medium is decanted through a series of pipe that come off the side of the tank and that decant would then be transferred to the miscellaneous waste storage tank for future evaporation.

The solid resins and precoats are transferred to solidification on --

MR. ETHERINGTON: When you use a precoat resin, do you change the resin when it is chemically exhausted or when it is physically fouled out?

MR. FUHRE : Well, that would depend on the prior sampling and what we intended to do with that particular process. There are times when you are looking for removal of ionic material and then based on sampling you take it out of service at the end of then it has reach its break. There are other times when you are only looking for particular removal and then you do it based on Delta pressure across the precoat filter.

MR. EBERSOLE: Question.

MR. FUHRER: Yes, sir.

MR. EBERSOLE: When you do such things as this, do you any longer use the air system to process the demineralizer resins at the risk of having the incident that started the TMI sequence?

MR. ARNOLD: We are talking about two different kinds of systems here and I'll have to rely on Ed. I don't believe that there is any fluffing arrangement with any of the radioactive waste processing.

MR. EBERSOLE: Well, have you denied a fluffing arrangement that started TMI series of events? Do you do that any more? Remember that was a case where there was a resin bypass or water backed up into the air.

MR. ARNOLD: The condensate pollishing system on Unit 1 does not involve a fluffing arrangement. We have not yet addressed the issue of what we will do with the Unit 2 condensate clean-up system when it gets to that point.

MR. EBERSOLE: So you don't have that kind of operation in Unit 1?

MR. ARNOLD: That's correct.

MR. FUHRER: That is correct; and in the area of a primary plant with mineralizers that are noted here, only that deep water demineralizer is regenerated, the other three are throw away resins and use them once and you are done. The deep water deminerializer doesn't use an air fluff step.

DR. LAWROSKI: Well, if it doesn't--one uses the fluffing step and you use the tube?

MR. FUHRER: Pardon.

MR. ARNOLD: Unit No. 1 has a precoat filter type of arrangement and not deep bed demineralizers.

MR. FUHRER: This is in the condensate polishing out in the secondary point.

DR. LAWROSKI: This was a choice of the AE that resulted in the difference, or what?

MR. ARNOLD: There was a combination of decision between the architect and the engineer and GPU. I might -- pursuing that just a little bit, because I think it is probably of interest to the subcommittee. In the time frame of the design of TMI 1 and TMI 2, there was considerable discussion within the industry as to whether the deep bed demineralizers or the polishers were the best approach. Since we had both at Three Mile Island, we did take part in a kind of a research or testing program with the industry to attempt to make some quantitative judgments as to the preferred system, when you had the same set of operators who were caring for both of them. I think the subject may have been commented by some others here that memories may be better on it, but I think the decision was generally the Unit 1 type of installation was preferrable.

MR. FUHRER: As with the other two portions of the system, the spent resin from Unit 2 would normally be transferred to Unit 1 for the solidification module for ultimate disposal. That capability exists to go back the other way, but good old value served, they didn't have solidification system here.

Branch indicated that I would discuss isolation of the various RAD waste systems. The isolation of the two liquid waste disposals systems was required by the NRC Order and essentially as Branch had said, we are relying on double valve isolation rather than a physical cutting of pipe. And, I'm not sure that you wanted me to go through each individual valve. I think that's just a matter of showing the origin of the valve installation.

Any questions?

MR. ARNOLD: Are you prepared to discuss the samples for upset conditions? Why don't you just get--

MR. ETHERINGTON: I guess there are not questions.

MR. ARNOLD: Let me suggest that we ask Richard Dubiel, he's the supervisor of radiation engineering at the plant and has been involved with chemistry and radiological controls of the plant for many years, address the sampling both the normal sampling and off normal sampling, I think.

We also have the supervising chemist here and hopefully between the three of those fellows, we can cover the items that are of interest here.

MR. DUBIEL: I would like to give you just a brief of our plans on the post accident sampling to the reactor cooling system. Our new REG 578 and lessons learned from TMI 2 incident, requires the capability to sample the RCS system reactor coolant system following an accident, must be analyzed for radioactivity of isotopic analysis, chlorides and borons. To comply with the requirements the following factors are being incorporated into the RCS sampling program for post accident sampling.

First, the existing sampling system installed in Unit 1 will be used. Second, the procedures for sampling are being revised to incorporate, first of all, the radiological concerns of the post accident sampling. The procedures are going to be based on first of all, the initial sampling technique that was used following the Unit 2 accident; secondly, the sampling procedures that were developed within the weeks following the accident, were sampling of the Unit 2 reactor coolant system. And, incorporated to those two procedures or combinations of those two procedures, some of the lessons that we have learned. Specifically, in the area adding long handled--the use of long handled tools, gloves with shielding in the gloves for handling of the samples, specific shielding in the sampling room and particular sampling of the sample coolers, which is the single largest source of reactor coolant within the room, and of course, the use of a portable lead-glass shield.

The analytical procedures are not going to vary in technique from the standard methods that are normally employed. Specific radiological concerns for each of the sampling, the analytical techniques however are going to be incorporated into the procedures.

Long term basis we expect to incorporate the use of an on-line boronometer,for RCS boron analysis, and to review the existing sampling system to determine if additional modifications can be made to further improve our capabilities.

That's all the prepared remarks that I have; are there any questions in this area?

DR. DILLON: Yes, I've got a couple things that I wanted to discuss briefly. In the first place, the precise objectives of the post accident sampling are mildly obscure at this point. You people better than anybody else in the world, I guess, have a pretty good idea of what you really got a value to see from. I would like to have some comments about where you got most of the information from these post accident sampling processes and then anything that that might relate to in terms of your sampling capability or modifications you recommend on that.

MR. DUBIEL: I am not sure that I understand what--

DR. DILLON: Well, tell me first what you got out of the sampling program that is of greatest value to you in estimating the condition of the plant.

MR. DUBIEL: In other words, the value came from reactor--

MR. DILLON: Yes.

MR. DUBIEL: Of course, from the immediate response I think, the most important factor was the boron. To determine the status of the--what the reactor of the core was or could become critical, in other words, shutdown margin.

I think from the activity standpoint, the important factor there is not the activity that is in the coolant system, but rather that activity which is escaping, so I think I would probably put the reactor coolant system activity as a lower priority to the monitoring of that activity which escaping or leaving the center.

MR. DILLON: Volatile, primarily, is what you are talking about?

MR DUBIEL: Correct. And, as far as the--any additional factors--well, in reference to our specific sampling capability after the Unit 2 accident, we did not work for chlorides. I think, we--I would personally question the value of the chloride analyses to the immediate period after an accident, specifically what one would do with the information if one were to obtain it for values and obviously would be valuable from a long range standpoint.

MR. ARNOLD: Let me ask for Mr. Keaton to comment on that also.

MR. KEATON: One other thing that we were very concerned with in the early days, was the results of the uranium analysis of the sampling, because we were trying to get information of whether the fuel likely had remained . within the reactor vessel or whether there was a possibility was uranium distributed to the primary system.

DR. DILLON: One other thing. I probably should know this, but since I don't, what kind of specific activities were you dealing with early in the--

MR. DUBIEL: The early samples range from approximately 100 microcuries per millimeter. That is the total activity in a cooled sample, depressurized sample. To approximately 1,000 microteries per mil in the three to four hour period and then in the following day, I think, we are up a couple orders of magnitude.

MR. KEATON: I think we had at least one that was up in the order.

MR. DILLON: And you really think you got enough protection to do the job with long-handled tools and shielding. Do you need, essentially, a cage to deal with this?

MR. DUBIEL: Looking back at the techniques that were employed following the accident, we did end up with one whole body over exposure and several extremities over exposures. In each case, the over exposures were not by orders of magnitude, but rather by a small factor.

I personally feel looking at the radiation levels that with the techniques that can be incorporated with, first of all, long-handled tools and shielded gloves, and for the whole body case, shie'ding the sample core, because we do believe that was a major external whole body source, that we could stay within the limitations; the extremity and the whole body limits.

DR. LAWROSKI: What has been your experiences as to the introducability content of two consecutive samples, which are not in the RCS; what set-up do you have?

MR. DUBIEL: During normal operations?

DR. LAWROSKI: No, after the accident.

MR. DUBIEL: Well, of course, the reproducability, I think, is not easy to define because we could not, during immediate period take two samples in a period of time that one would expect us to find some of these results. From a normal operations standpoint, I would say that the producability is very good. We have fairly good confidence in our system to accurately portray the system.

DR. DILLON: Is there any value --

DR. LAWROSKI: Has this been recorded anywhere?

DR. DILLON: Excuse me. Is this information available in any of your reports that would indicate the reproducability --

MR. ARNOLD: All analysis' results are available. I think they are probably a part of the public record at this point.

But, certainly any of them, in fact, I am sure we have submitted all of them to the NRC.

DR. DILLON: Is the information you have representative of the entire liquid inventory that you are really interested in, or are you sampling only one portion of the primary system in such a way as to not give you a knowledge of what is a sump and all that sort of thing.?

MR. DUBIEL: Of course, the sampling I am addressing is strictly reactor coolant system. And that includes the RCS system proper and the pressurized. It does not address the reactor building sump.

DR. DILLON: Now, did you need that? Would that information be worth the problem of advising sampling systems that would accommodate them.

MR. ARNOLD: The reactor coolant sample--

DR. DILLON: In the sumps, anything that escaped the various parts of the containment system. I want to know if we have--is one sample sufficient to deal with the inventory of activity that you may need to have information about.

MR. ARNOLD: As I understand your question, it relates to the typicalness of the containment building sump sample, if what we are doing is obtain a sump--a sample from a sump area and the building in general was flooded to some depth. I don't think there is any argument that the exact sample has less reliability to it in terms of representing average conditions. We have in the way of a data point on that that a sample taken at three different elevations at one particular location--

MR. MULLER: Can we stop it for just a second, so that she may change the tape?

MR. ARNOLD: The one data point we have on uniformity is at a particular location in the building, but at different elevations at that cross-section of the building through about 6 feet of flooding. And, there's very little difference in analysis results at those three different elevations.

There is some question among us as to whether we're looking for consistency of the analyses of the sump water to the reactor coolant system, a correlation there, or if we're just looking for the desirability of knowing what the average analytical result is throughout the building's flood area.

Maybe you can clarify that for us, please.

DR. DILLON: I'm not sure that I can either. This is partly fishing rather than anything else.

I wanted to ask a little bit about the sampling system itself. Do you have some sort of a pump or something that was available to take samples from the containment system?

MR. ARNOLD: No, we had to modify a spare penetration so that we could go in and obtain the sample that I referred to. We are, as one of the long term items, modifying the sump piping system so that we can take a sample from the reactor building sump. But, it would be a specific location within the building and I guess I'm not prepared at this time to address how much less desirable it is to have that one point than to have maybe four points or five points around the building.

DR. DILLON: I appreciate that.

One other comment or question: what about solids in this material? Was there any evidence of solid material like fragments of paint, something of this sort, that might have complicated the sampling process under different conditions?

MR. ARNOLD: The samples that we took were centrifuged for solid material and let me check our record -- common recollection on how much there was.

We'll get that data for you for tomorrow.

DR. DILLON: All right, sir.

May I ask another question while we're at it: will this discussion treat gaseous samples or will we treat that specifically somewhere else?

MR. ARNOLD: Can you address that?

MR. DUB.EL: I can address that -- referring to containment atmospheres. Let me address that separately -- I did not prepare specifically for that area, but the plans in that particular area -- our sampling system in Unit 2 proved to be quite valuable. We were able to take what we believe to be very representative samples and get accurate hydrogen concentrations.

The system in Unit 1 is extremely similar; they were built by the same manufacturer. The sample panels for each of the containment monitors were both designed by Met Ed and they're patterned after one another.

We feel right now that the sampling capability exists to obtain containment air samples and to perform the hydrogen analysis. The only major concern is the radiological concerns in drawing the sample. We don't believe that the concern would be to be able to get the sample without overexposing anyone since we are able to do it in Unit 2 in just that manner. But, rather just to reduce the exposure to as low as possible.

DR. DILLON: Is this design something that is fairly common in the industry or is it something unique?

MR. DUBIEL: I believe it's very common in the industry to sample-tap off the normal building ventilation system.

DR. FOSTER: Along that line, could you give us a feeling for the length of the sampling line and how long the sample takes to get from the point of pickup to the point of analysis and the material that that line is made of?

MR. DUBIEL: You're referring to the containment --

DR. FOSTER: In this case, yes.

In other words, the basis of the question is how much are you losing by play out in the sampling line from the time between where you took the sample and when you ended up analyzing it?

MR. DUBIEL: I believe the sample lines are stainless steel, but I can't be positive on that. The length of line, let me approximate it, is relatively short. The sample tap is right at the outer wall of the containment building and I would estimate that a sample runs from the containment to the monitor of approximately 40 feet, and I think I'm being on the conservative side taking into account the bends and elbows.

DR. DILLON: Now, is this under normal circumstances from the circulating line that you tap off of?

MR. DUBIEL: Yes, it is.

DR. DILLON: And what about during the accident situation?

MR. DUBIEL: During the accident, of course, the monitoring system is isolated. We would have to bypass the isolation valves to continue -- the normal building cooling system, of course, would have to be in operation and the sample line is into the return duct to the normal building coolers.

DR. DILLON: Let me apply the same question to the liquid sample; is it also a recirculating line under --

MR. DUBIEL: Yes, it is.

DR. DILLON: And was it circulating during the accident condition, too?

MR. ARNOLD: This is the sample from which post accident?

DR. DILLON: The core.

MR. DUBIEL: Specific to the Unit 2 incident, the sample line normally is not under resurp. The resurp is established prior to drawing the sample. We have a specified resurp time before obtaining the sample.

Following the reactor trip, we have a test spec that requires us to take an ACRS sample within four hours and it was our resurp at the time of the increased activity.

If there are no other questions, then thank you.

MR. ETHERINGTON: Does the Staff have any comments?

MR. SILVER: Only that we hear some of this for the first time ourselves. There has been no formal submittal from the licensee in this area as of yet that the SER reflects. And I believe that some date in February has been promised, mid-February. We as yet have not received any submittal.

MR. ETHERINGTON: Mr. Arnold?

MR. ARNOLD: Yes, sir. I think we are now on agenda item 3 for operating procedures and I'm sorry, I just dispatched him to the telephone. But, Mr. Herbein will be back very shortly and will pick up --

MR. ETHERINGTON: Would you like to pick up a later item?

MR. ARNOLD: Yes, I would be happy for us to pick up item number 6 at this point, if we could, Mr. Etherington. Mr. Lawrence Lawyer who is the manager trainee at Three Mile Island will make this presentation.

MR. LAWYER: Good afternoon. I'm Sandy Lawyer. The subject is training.

I'll briefly describe for you seven of the training programs which we're developing and conducting. Some of these represent extensive changes to the previous programs while others are totally new programs planned in response to the TMI 2 accident.

First of the programs is the license operator training program. To further enhance the TMI 1 reactor operator and senior reactor operator performance, TMI committed in Section 6 of the restart reports to conduct an accelerated operator retraining program. This I'll refer to as the OARP, Operator Accelerated Retraining Program.

The major objectives of the OARP include an improvement of operator performance during small break LOCA's; assurance that the operator can recognize and respond to conditions of inadequate core cooling; assurance that the TMI 1 operators have an indepth understanding of the TMI 2 accident and the associated lessons learned; assurance that the operators are provided with an indepth understanding of the methods required to establish and maintain natural circulation --

DR. CATTON: Excuse me. Are you going to give us a little bit of a discussion of how you're going to assure these things, such as the indepth understanding of the accident?

MR. LAWYER: Yes, I can. In answer to that question in particular, these are the objectives of the training programs. These objectives are then incorporated into individual training lessons and then we make measures to assure that we have met the objectives.

Does that answer your question?

DR. CATTON: No. One of the things that I was interested in knowing is how you have changed your past program to this assurance?

For example; are you giving more attention to the actual physical processes that go on or are you just giving more training?

I am trying to contrast training with education.

MR. LAWYER: Yes, okay.

For the transmission of the knowledge of the operator into the plant, several things have been done; and I don't have these well-thought out, so I will stumble a little.

One piece of it which we had not previously done or had not overtly previously done was to take the student group into the control room so that after some of the present-

Mr. Chairman?

MR. ETHERINGTON: Yes, continue.

MR. LAWYER: Thank you.

As I was beginning to say, there are two external committees which we utilize: One is a group of professorial people from Penn State headed by Dr. Warren Witsig (?) and those are all Penn State people on the staff at Penn State.

The second group is more of a mixed group, and in their academic expertise or their areas of expertise, and in their geographical location. I don't know quite why I mentioned that to you, but I do. That second group has on it, on that, and we have them as a committee, a human factors engineer, a psychologist, a dean of a school of engineering, a person who is now the vice-president of research for a utility who was previously the dean of a school of engineering, and a person somewhat like myself in the manager capacity in training at a utility.

Those two groups in their feedback to us on whether we have met the objectives for the course and for the individual lessons will give me the confidence that we have achieved the objectives.

I have no idea whether I have satisfied your question now.

DR. CATTON: Well, that is a distinct improvement.

MR. LAWYER: Certainly, I would hope so.

ations, the group went into the control room, talked about the physical locations of the various instruments and controls. That was a translation into the plan.

What immediately occurs to me primary or major enhancement to the program or at least in my comfort with the program, is that whereas previously the experienced reactor operators and people with experience in training had been presenting the courses. We beefed this up with, in each case -- in case of each lesson, we had both a primary instructor and a backup instructor, so that we made liberal use of venders who were from B&W, for example. Also the other kind was people from the training -- community training centers.

In addition to that, and probably my greatest assurance, c es from two committees that we utilize. These were, in each case, people external to the GPU system which were formulated. One of these consists of a purely -- let me start, restate that -- consists of people who are --

MR. ARNOLD: Mr. Lawyer: I would like to ask for a short recess for a minute to dis something with you, Mr. Etherington?

MR. ETHERINGTON: For the record, the little private conversation that we have had, Mr. Arnold has had a personal misfortune and is excusing himself from the meeting.

MR. LAWYER: Is it appropriate that I continue, DR. CATTON: I would like to know, however, if you could contrast for me the amount of time that would be spent on basic subjects such as fuel mechanics, aerodynamics, ample feed flow through your system, and so forth, before and now: energy transferred. Is it twice, three times, or what?

MR. LAWYER: What immediately occurs to me is a ratio of now to just prior, and I cannot give you the entire history, but that ratio just from now to just prior cannot be obtained; that is an indefinite number because the just prior was very nearly zero.

It is -- one-sixth of this program concerns itself with things like thermodynamics and heat transfers and fluid flow. That is the first module of the program which --

DR. CATTON: So the ratio is a large number?

MR. LAWYER: Yes.

DR. CATTON: Thank you.

MR. LAWYER: A very distinctive improvement in that area.

DR. CATTON: That is what I was driving at. Thank you.

MR. EBERSOLE: Before you go on, I guess I was impressed by the absence of, say, a B&W system's engineer and architect engineer -- a system's engineer in making these assessments of adequate audit operator training.

Do you not have any representatives from these people?

MR. LAWYER: We had participation from those -- not the architect, the engineer. We had participation in the individual program, but not on the two committees that I spoke of.

MR. EBERSOLE: Not to do the check work, but you had involvement by the AE and the vendor system's engineers in the formation of the program; is that right?

MR. LAWYER. I cannot answer your question about the AE; I can about the vendors.

MR. EBERSOLE: You understand that I am trying to get some sense of integral systems analysis into this training program.

MR. LAWYER: A couple of the engineers were involved in the AE capacity. I think that is safe to say.

MR. HERBEIN: Just to make a point, with regard to the architect engineers, you know now that we have merged Met Ed and the service company capabilities. The service company engineers, in many cases, do the function that typically in the past Met Ed relied on the architect engineer to do. And I think that is typical in the training areas. There have been interactions with our engineering home office force and the training department. And I think they have played a rather strong role in putting together portions of the training program.

MR. EBERSOLE: Then the check group really were checking against some pre-established instructions.

In other words, you are checking function against training. They had considerable literature and documentation against which to perform their checking function.

MR. LAWYER: Yes.

MR. EBERSOLE: Thank you.

MR. LAWYER: At the point that I am here is part-way through the objectives that we laid out for the course and those objectives have guided the instructor and the back up instructor in the preparation of their materials.

DR. LAWROSKI: Does this added training and education, if I may put it that way, apply also to the maintenance people or just to the operating personnel?

DR. LAWYER: Yes, it did also apply to maintenance people or just to the operating personnel?

MR. LAWYER: Yes, it did also apply to maintenance people.

DR. LAWROSKI: They too are given enough educational material to better appreciate the importance of some of the things that they are doing in the reliability of that plant?

MR. LAWYER: Yes, the importance of the system and the importance of returning that system to operation, the importance of isolation and that sort of thing.

MR. HERBEIN: Mr. Laworski, we are also upgrading our maintenance training programs significantly from what we had prior to the accident.

I would, however, point out the content of the maintenance traning programs is not the same as the six module program that Mr. Lawyer described for the operator retraining.

DR. LAWROSKI: Yes, I appreciate that.

I was curious as to how much upgrading in the maintenance people who have a great deal to do.

MR. LAWYER: The maintenance people we have -- we have an organized program which was started, well, within its entirety will be a two-year program, the second six months of that program is devoted to systems training, the sections we were discussing. That began, I think, the first of November of last year.

DR. LAWROSKI: But, it was frequently the case, but maybe not in your utility but in others, that people who were going to be on the -- were expected to be coming out as operators, started off in some aspect of maintenance, or well, operations -- portions of the plant that had -- did not relate to the reactor itself.

Is this still the case?

MR. LAWYER: I do not refute that. My experience is not broad enought to support it. Basically, my experience --

DR. LAWROSKI: You know what I'm driving at. I have read where people say that --

MR. HERBEIN: Mr. Lawroski, I think I can address that.

DR. LAWROSKI: The first place that somebody is assigned as the beginning point for his future as a reactor operator was to deal with the rest of the demineralizer operations.

MR. HERBEIN: Sir, our operations personnel come into an entry level auxiliary operator position, train there for a year, take an examination, progress to the next level and then the next over a two-year period. And, then they become eligible for control room operator consideration.

So they all have at least two and a half years of operations experience out in the plant before they progress to the control room operator position.

MR. LAWYER: I had not referred to those as maintenance; I misunderstood.

DR. LAWROSKI: Well, I guess it wouldn't have been correct. It is more than maintenance, because it is the auxiliary operators, too, that form another group of people.

MR. LAWYER: That is one of the seven programs.

DR. CATTON: In your response to NRC, supplement 1, part 2, there is some fairly elementary kinds of questions. One has to do with to estimate conservative steam generator fill times for TMI 1 due to the uncontrolled condition of auxiliary feed water to one steam generator.

When you complete your training program, your modified training program, are your operators going to be able to address questions like that?

Another one might be, I think it is question 4; the formula development examining calculated heat rates from primary to secondary for a given cool down rate. Are your operators going to be able to do those? These just require simple algrebra and an understanding of heat balances.

MR. HERBEIN: I'm not sure that our operators would be able to do that.

We will have, on each shift, a shift technical advisor, advising each shift supervisor and he certainly, when we have completed all our training for him, would be able to perform those kinds of calculations.

DR. CATTON: My interpretation of your answer is that your operators are then going to be further trained, that you are going to supplement your operator with somebody who has a little more education; is that a correct interpretation?

MR. HERBEIN: That is correct. We do have six shift technical advisors who, in fact, are all degreed engineers assigned to each of our six shifts.

They do not report directly to the shift supervisor as far as operations; they report to our engineering manager. However, they are available as an advisory group to the shift supervisor on each shift, with the primary emphasis on operating experience assessment and accident assessment functions.

DR. CATTON: Thank you.

MR. LAWYER: I am not quite sure if I am done or if I have just begun.

I am sorry; some of this is going to be redundant, now, and I will not be able to control it very well. I am into the objectives of the OARP, the Operator Accelerated Retraining Program.

The next one is assurance that the operators are provided with the review of major administrative normal, abnormal, and emergency procedures. And lastly, assurance that the TMI 1 operators receive training on the B&W simulator covering the TMI 2 accident.

The OARP included material that was beyond the scope of the various parts of the order dealing with operator training. This material includes training in heat transfer fluid dynamics, plant transient response, and plant safety analysis, and therefore, provided operators --

DR. CATTON: Yes, but I do not understand. You just said that your operators were going to be trained in heat transfer and so forth?

MR. LAWYER: Yes, sir.

DR. CATTON: Maybe we are missing the point here. The questions that were addressed that I just referred to in my mind are extremely simplictic heat transfers.

And, if you have given them any heat transfer, I would think your operators could address those questions; or are we again missing the boat and I am misinterpretating what you are saying.

MR. LAWYER: It is not what I have said that you have misinterpretated. We do not --

DR. CATTON: Then what Mr. Herbein said.

MR. LAWYER: Yes. We have not prepared an answer on it. That is a matter of judgment as to whether in the long term those calculations can be performed by the operator. That is my view. Mr. Herbein is saying that is that what is certainly true s they have been trained in that, but Mr. Herbein said that irrespective of whether they have the retaintivity and can perform this at some time you specify in the future prior to their retraining, we have a person on the shift certainly who can and in more detail probably than what you are asking here.

MR. HERBEIN: Sir, we do expect our operators to be able to make primary heat balance calculations, secondary heat transfer calculations, the UA delta T kinds of things and that was addressed in the module that Sandy discussed on heat transfer and fluid flow thermodynamics.

MR. LAWYER: Continuing, this training also exceeds the firm NRC recall training requirements.

DR. CATTON: One more question: is it possible for us to see those modules?

MR. HERBEIN: Certainly, sir, that is possible.

MR. LAWYER: By module, you mean --

DR. CATTON: I am not sure what I mean. I am assuming that that would be an outline that would tell me the number of hours and so on and so forth.

MR. HERBEIN: A good bit of that information is available in the restart report in the chapter that relates to training.

If you would like to see the lesson plans and the detailed information that went into each module, that is certainly available. It is rather voluminous, though.

MR. LAWYER: Listed in that restart report is basically the title of each of about one hour --

DR. CATTON: Let me take a look at the restart report and I will let you know tomorrow morning whether I want the volumes.

MR. HERBEIN: All right, sir, fine.

MR. LAWYER: Section six.

DR. CATTON: Section six then it is.

MR. LAWYER: The OARP was scheduled in six modules conducted at the site and one module conducted at the B&W simulator in Lynchburg, Virginia.

The program incorporated a system of evaluation to insure that the objectives were met and provided for a company administered audit exam conducted by an independent group; that is, independent of the GPU system, an outside group.

The OARP scheduled for the seven modules has been completed. The audit examination is scheduled in April and May of this year. The time period between completion of the OARP and the NRC exams has been scheduled to repeat those lectures which were judged to have not fully met their objectives, and to provide additional safety analysis training and to review the modified systems and procedures prior to restart of Unit 1.

The program for licensed operators will have met the letter and intent of the order by June 1, 1980.

The second program which I would like to address is the auxiliary operator training, or what we discussed as maintenance people before. The order does not specifically mention the non-licensed auxiliary operator training. However, as much as these operators have a responsibility for operations in the plant, a retraining program with the following objectives will be conducted.

One, to indoctrinate the auxiliary operator in newly modified systems and procedures; and secondly, to provide refresher training for the auxiliary operator prior to Unit 1 restart.

The third area is senior reactor operators. And this is -- senior reactor operators also participate in the OARP. Senior reactor operators -- to emphasize and reinforce the responsibility for safe operations in the management function of assuring safe operations, a senior reactor operator's precision analysis course was formulated with objectives in two areas: the areas are decision analysis and shift supervisors command role.

The objectives in the decision analysis were to improve the performance in dealing with situations that have not previously been encountered and for which written procedures do not exist. Secondly, to assure a good understanding of how to use basic decision analysis techniques including the handling of uncertainities.

The second area in the senior reactor operator decision course, as I mentioned, was the shift supervisor's command role. The objectives of that portion are to assure that the shift supervisor maintains a broad overview of his command at all times and makes decisions and gives directions as required to assure safe and reliable operations. So, the second one is to assure that the shift supervisor has a thorough knowledge of physical and personnel resources available to him from within and without the company; ones that could be utilized and in addition, to assure that he has the knowledge of when and how to obtain these resources.

The third objective of that portion is to assure that proficiency of the shift supervisors at oral and written communications for issuing clear and concise directions and for giving effective status reports to their management.

The fourth and last: to assure the shift supervisor has sufficient command and company perspective to effectively carry out the emergency directors' responsibilities until properly relieved of those responsibilities.

This program is scheduled to be conducted during the weeks of February 25, March 3, and 17th. The initial program will be conducted by an outside contractor. The program will be evaluated on a short term and long term basis to determine if the objectives were met.

In order to provide for replacement SRO's and to maintain the ability of existing SRO's, a permanent program is being developed and initiated.

The fourth major area: shift technical advisor, to which we referred a few minutes ago. The shift technical advisor postions have been established in the operating organization and the billets have been filled with personnel having bachelors' degrees in a scientific or engineering discipline.

To qualify the personnel for the position, a generic training program was established; that is, generic to all of those six people. The six engineers assigned were then interviewed and a program specific to each one was established.

These personnel are currently pursuing that program.

The fifth area is emergency plan training. The view on emergency plan has been revised to reflect recommendations from various regulatory documents and reports. A training program to support the implementation of the plan has been established. It consists of three phases: phase one is basic indoctrination into planning. Phase two is instructions in the implementing procedures; and phase three is the emergency plan drills. The training program is currently being conducted. All personnel who support the plan have received or are scheduled to complete the basic indoctrination in February.

After plant operation review committee approval of the implementing procedures, a schedule for phase two and phase three will be promulgated. We expect phase three, the emergency drill, to be conducted in March.

The general employee training program is also being revised to reflect this new plan.

The sixth area is management training. A requirement for a training program for management personnel has been identified. The program is currently under development and the course content will include, but not be limited, to test specs, the Kemeny Commission report, the operational quality assurance plan, the TMI emergency plan, health physics, decay heat removal and heat transfer mechanisms including core decay heat generation, and lastly, safety analysis.

Management personnel are currently involved in some of the training that I have just discussed and a formalized program is in the process of being developed.

The last area of the seven is health physics. Health physics technician training program has been revised to make the training more comprehensive. The areas of concern for accurately measuring the iodine concentration throughout the plant under accident conditions will be addressed in that program. The technicians will receive training on their equipment and procedures. Those were the two areas of concern expressed.

Now, questions?

MR. ETHERINGTON: Does the Staff have any comment?

MR. LAWYER: I apoligize for the redundant sections.

DR. CATTON: Just that -- would it be possible if we finish at 12 o'clock tomorrow maybe to go out and take a look at some of these and not have to carry all the volumes?

MR. LAWYER: The materials?

DR. CATTON: Yes. Where are the located?

MR. HERBEIN: They are at the plant, sir. We had planned to bring some of the volumes here to let you look at tomorrow morning and if after we are finished with our session tomorrow you would like to see more than the two or three --

DR. CATTON: I would just as soon look at them here.

MR. HERBEIN: We will bring them out here for you tomorrow morning.

DR. CATTON: Okay, thank you very much.

MR. ETHERINGTON: Mr. Herbein, we missed your item 3 on operating procedures, I think.

MR. HERBEIN: I understand, sir, and I am ready to proceed with that.

MR. HERBEIN: I had some general remarks that I would like to make to update the Committee on our procedural effort to date. Following that I think we could go down the agenda items,if that would be acceptable?

The Group 1 emergency operating and surveillance, as well as, administrative procedures which we committed to revise, prior to TMI startup, are listed in chapter 3 of the restart report.

These revised procedures will incorporate the lessons learned, the requirements of the I and E bulletins, 7905 A,B,and C, and the TMI 1 shut down order notice of hearing requirements.

All of the Group 1 procedures have been through the review, revision, and approval process at least once.

With regard to emergency procedures, they had been revised to incorporate an objective statement that will focus operator attention on the key requirement to keep the care properly cooled.

For example, the objective statement in the small break LOCA procedure, outlines the procedure objective to trip the reactor, determine whether a LOCA or over cooling event has occurred, establish natural circulation, conserve RCS inventory, keep the core covered and cooled by maintaining 50° subcooling.

Remove heat through the steam generator, and achieve a cold shutdown condition while minimizing radioactive release to the environment. Emergency procedure follow-up actions require the reverification of key manual actions steps using available redundant instrument indications.

These reverification steps cover automatic start of HPI pumps, verification of automatic feed pump start, with feed pressure greater than a thousand pounds, feed-water emergency valves 30 A and B open, increasing emergency feed flow and steam generator level increasing to 50% or 30 inches with reactor coolant pumps off or on, respectively.

Follow up action steps in the emergency procedures must be initialed by the operator to verify completion. For example, initials are required after each of the listed 23 reactor building isolation valves which automatically close on reactor trip.

All emergency procedure notes and cautions will be blocked to insure that they are fully marked and stand out to the operator using the procedure.

In the process of our procedure review and revision, we divided our original loss of coolant procedure into three procedures.

These procedures basically address small, intermediate, and large reactor coolant system breaks.

We have incorporated B&W's revision of guidelines that came out November 5, 1979 for small breaks into our loss of coolant procedures.

Additionally, we have prepared a new procedure entitled, Inadequate Core Cooling. This procedure also incorporates B&W's guidance which came out in November of 1979.

Surveillance and maintenance procedures are being reviewed and revised as necessary to insure the redundant safety system train is operable prior to removal of any safety related systems from service for maintenance.

Additionally, that no more than one safety system is defeated at a time and finally, that safety systems are checked for operability prior to return to service following maintenance or surveillance testing.

Surveillance procedures are being prepared to insure the added safety feature modification, such as emergency feed pump, auto start, manual control of feed valves, reactor building isolation on reactor trip and high radiation, as well as emergency power to pressurizer heaters maintain a continued state of reliability by periodic surveillance testing

Operating procedures are being revised to incorporate the bulletins, NUREG, and shutdown order requirements, as well as the safety feature system modifications currently in progress.

Additionally, a procedure titled, Reactor Coolant System Natural Circulation Cooling, has been prepared.

Administrative procedures are being revised to require operator completion of an independent check list encompassing valve and breaker lineups within maintenance work boundaries in order to return either an ESFAS or an EFW system to operational status following maintenance.

This checklist will receive two independent review and signature verifications for correctness before it is actually used in the field to align the system following maintenance.

Additionally, independent second operator, valve alignment verification for ESFAS and EFW systems will be accomplished according to check lists following maintenance, surveillance testing, and operations governed by special operating procedures.

In the area of watch relief and turnover procedures, these have been developed and incorporate both ESFAS and EFW system valve and switch position, alignment check lists, which are signed by both the oncoming and offgoing control room operators.

Additionally, inplant log sheets indicating both the required and as found EFW and ESFAS valve positions are completed by auxiliary operators.

These log sheets insure that these valve positions and major system flow pass that do not have control room position indications will be verified and recorded on log sheets at least once per day.

To insure that the specific requirements of the bulletins, shutdown order, and NUREG are incorporated into all of our procedures, we have assembled a matrix which documents the various requirements and the procedures in which these requirements must be stated.

This will insure that items such as the need for verifying 50° subcooling prior to overriding high pressure injection, the new power operated relief valve and high pressure trip set points and the immediate manual trip of reactor coolant pumps on automatic initiation of high pressure injection, are appropriately incorporated into the operating emergency surveillance and administrative procedures.

In addition to incorporating the guidance specified in the documents mentioned, we are going to insure that our operators are thoroughly trained in all new procedures and procedure revisions. During future annual operator simulator training, the actual plant emergency procedures will be utilized by our operations personnel. When applicable, changes will be made to emergency procedures based on this experience.

Additionally, we expect to incorporate B and W's recommended abnormal transient operating guidelines into our emergency procedures.

These guidelines are currently under preparation and are expected to be available in draft form in the near future.

Now, that concludes the general remarks. I would be glad to answer any questions at this point.

MR. MATHIS: Mr. Herbein, I gather from what you just said, that you use a simulator then as a test on how well or how thorough your procedures are.

MR. HERBEIN: We did use our procedures at simulator, I guess, about a month and a half after the accident. That was done to test our procedures at that time.

We intend to take the procedures that we have developed and use them on the simulator in the future, as a part of the ongoing review of the procedures which I think we recognize now, post accident, are in the dynamic state and will continue to be for some time.

So there is the need to exercise our operators on the simulator in the use of those procedures and incorporate any lessons that they have learned as a result of that experience into the procedures on an ongoing basis.

MR. MATHIS: Thank you.

DR. CATTON: Will the people at the simulator be specifically looking for improvements in your procedures and trying to figure out what kind of things the operators can do wrong?

I think it is different if the operator comes home and says, hey, let's change the procedure because, then if, the people who are observing him, also. I think it would add to it if they also were looking for improvement.

MR. HERBEIN: I feel that that is a part of the simulator objectives that we rely on B&W to perform for us in the way of crew evaluation.

This is something that Babcock and Wilcox started post TMI 2, where the performance of an integral crew in their approach and handling of a casualty is evaluated. Naturally, if the operators are using our procedures, their performance will be a direct product of how firm the guidelines are in our procedures that they are using at the time they exercise on a particular casualty.

DR. CATTON: I think you have to make a deliberate attempt to sort -- to determine where the problem is if there is a problem.

If your operators perform poorly, it is a package that is performing poorly. Which piece of the package is in trouble, is it the way the procedures were written or is it just because you happen to have poor operators at that time, or is it the operator's training?

I think that you have to have a deliberate intent to sort those things out.

MR. HERBEIN: I think that attempt is made at the simulator both by our shift crew leader and the training instructors on the similator.

DR. CATTON: If that is the case, that is good. It was not in the past.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: May I ask a general question?

In my view of reading procedures, there were statements to the effect of intertransient to verify this or confirm that or ascertain that such and such has occurred, well, this is the end product of the industry having ridden on the single failure criterion for a long time. That is really a ritual you go through and behind it is an assumption that when you ascertain it, it in fact, that system will work, that it is there.

Everytime I come to those words, it says verify that, I look for a parenthetic note that follows that. When you verified it, you found that it was not there. Now, what do I do? Then, beyond that, how long do I have to do it before I go to the next step?

Do you follow me?

MR. HERBEIN: Yes, sir. I do.

I would state that we have made an effort in all of our follow up actions to provide guidance to the operator to look and reverify certain key manual and automatic actions by, whenever possible, redundant instruments. To verify that what he thought he saw, as he executed the immediate manual actions, was, in fact, the case, and has been verified by an additional indication.

MR. EBERSOLE: You are talking about verifying the quality of the information at that step, I am talking about verifying the function having occurred there, and found out that it has not. Now he has to have a bypass to go fix it and make the function occur.

Do you follow me?

Every where there is a word, verify or ascertain or confirm, it is implicit in that action that you may find, in fact, that it hasn't occurred.

Now, what do you do?

MR. HARTMAN: Charles Hartman. Mr. Ebersole, I would like to address that question.

We have gone through a process in the past six to eight months of going through the procedures at certain times, that is one of the things that we have looked for.

Our first step, in that regard, was to put in the body of the procedure. For example, if it says verify emergency feedwater is available, we put an instruction in the body of the procedure in regard to what we do if it is not available.

We found that part of the review process this would make the procedure difficult to follow. So, what we have done in that regard, in many cases, is make an attachment and simply refer to the attachment.

That is part of our program.

MR. EBERSOLE: So, you now have another volume, so to speak, to where you go for the verification process in case that --

MR. HERBEIN: An example of that, sir, would be in the case of the small break procedure we have as an attachment to that the inadequate core cooling guidelines, so that if you don't somehow execute the sequential steps required to recover from a small break, and it is not happening, now you go to the inadequate core cooling guideline procedure which is an attachment.

DR. LIPINSKI: Let's take the reactor trip procedure as a good example.

The operator verifies that rod bottom lights are up and they are not up, so he hits the red scram button as his immediate action and the rod bottom lights don't come up.

How do you handle that in your procedures?

MR. HARTMAN: We have stepped in the procedure where it verifies reactor power steam does not meet the criteria in the procedure we commenced, emergency correlation.

DR. LIPINSKI: Is this now part of the immediate action step or does he got somewhere later in the procedure and he is not aware of the fact that time is of essence?

MR. HARTMAN: That was to be performed within one minute.

MR. LIPINSKI: Okay. So, that is part of his immediate actions and this is something he has to have committed to memory?

MR. HARTMAN: Yes, sir.

MR. LIPINSKI: Okay.

DR. LAWROSKI: Could I ask to what extent has EPRI or one of the subgroups has been formed under EPRI, assisted in this matter of getting ready for TMI 2 -- TMI 1?

You must have instances where you and your

Staff don't agree, do you always cave in or do you check back with other people -- other owners give their viewpoint so that you can bring not just the talent existent in your own organization plus that which NRC has brought to bear on it, but also that which may exist more industry wide, and, of course, B&W? I know you have brought them in.

MR. HERBEIN: Yes, sir. I would certainly like to say that we do and I can positively state that.

We are a member of two B&W groups, operations group represented by B&W plant superintendents and then a technical group represented by our engineering staff members and engineering staff members of the B&W utilities. The engineering group deals pretty much with generic items and an effort is made to solidify a postition among the B&W utilities and that is not always in agreement with a positive proposed by the Staff.

In addition to that, as you know, the Institute of Nuclear Power Operations has been established with the purpose of providing benchmarks excellence in the training area.

We have taken an active role and Gary Miller, the acting manager of TMI Unit 1, very recently attended a conference that was held in Atlanta. I think Bill Lee, President of Duke Power, kicked that off and I expect we are going to see some very strong interaction with that group and I expect some help out of that group.

MR. ETHERINGTON: Any further questions?

Does the Staff have any comments?

MR. SILVER: No, sir, we have no additional comments.

MR. HERBEIN: Move to the next area now, Mr. Chairman?

MR. ETHERINGTON: Yes.

MR. HERBEIN: With regard to emergency --

DR. CATTON: When will the procedures be available for review?

MR. HERBEIN: The procedures are in a continual review process, certainly, before we restart, all the procedures will have been through the final review and revision process.

I am told by my Staff members that in the next two to three weeks we should have all of the Group 1 procedure comments resolved and based on that I would expect within four weeks the procedures would be in final form. Those are the Group 1 procedures which we committed to put together prior to Unit 1 restart.

DR. CATTON: I look forward to seeing them, thank you.

MR. ETHERINGTON: Perhaps, before you proceed, this might be a good time for a break. We will have a 15 minute recess.

(Whereupon a 15 minute recess was taken.)

(Whereupon the proceeding continued at 3:30.)

MR. ETHERINGTON: I think we are ready to proceed Mr. Herbein.

MR. HERBEIN: Yes, sir, Mr. Chairman.

The next agenda item has to do with the control of emergency feed water independent of the integrated control system.

Our current procedure guidance on the use of the manual loading station in the control room and local hand wheel control of the emergency feed water valves using sound power telephone communication has been incorporated into the emergency feed water and loss of feed water procedures.

The new manual loader station will provide control of the emergency feed water valves, that is EFE 30 A and B from the control room in a mode which is independent of the ICS.

The guidance on the use of these alternate means of control is also within the next few weeks going to be incorporated following additional procedures: Blackout, blackout with loss of diesels, and the loss of coolant procedures which I mentioned were contained in three separate procedures for small intermediate and large breaks.

And finally, a modification allowing control room transfer of ICS power is going to be addresed in the appropriate procedures.

We also, as I stated previously, expect some guidance from B&W on completion of their ICS failure modes and effects analysis, and when that becomes available why, we will certainly consider its applicability to our procedures.

MR. ETHERINGTON: Is the independent controller of B&W design?

MR. HERBEIN: Is the independent control of the EFV of 30 A and B valves of B&W designed --

MR. SLEAR: Is that for manual loading station?

MR. HERBEIN: Yes.

MR. SLEAR: It is identical to the existing manual loading station except that it has a different power supply.

MR. HERBEIN: Who designed it, David?

MR. SLEAR: I don't have the foggiest idea who designed it. I really don't know.

MR. SMYTHE: Was it Bailey?

MR. ETHERINGTON: Do you have any questions on this?

MR. EBERSOLE: No, not on this part.

MR. SILVER: I will simply refer you to the additional change I have made verbally this morning on the status of this item. Otherwise, no comment.

MR. ETHERINGTON: All right, thank you.

Let's see, we are on Item 4 now, are we?

MR. HERBEIN: Yes, sir. The procedure for our stuck open safety valve. The current procedure enables the operator to detect a stuck open code safety valve with the following control room indications: decreasing pressure, increase in pressurizer level. The new alarm ennunciator from the elbow tap DP cells indicating flow downstream if the pressurizer power operated relief and code safety valves.

The elbow tap flow indications on the power operated relief valve and code safeties which will read out in the control room. High temperature and high pressure in the reactor coolant drained tank and the fact that the reactor coolant drained tank pump would start and the cooler valves would open in the event of discharge into the tank from the valves.

In the response to a detected stuck open pressurizer code safety valve, the operator would carry out the actions described in our EP 1202-6 loss of reactor coolant pressure.

The objective of that procedure is to keep the reactor coolant system sub-cooled using high-pressure injection and steam generators on natural circulation in order to cool down and de-pressurize the reactor coolant system.

Depending on the reactor coolant system pressure, the piggy-back mode of high-pressure injection, or low presure injection, until decay heat removal mode of cooling is available would be established.

Within 24 hours, one of th: long-term cooling modes described in procedure in 1104-4 would be established to prevent boron precipitation.

For a condition with a pressurized relief valves may be leaking, the control room indications would be the same but would occur over a longer time frame.

In this case, the operator would refer to EP 1202-29, pressurizer system failure, for the guidance on appropriate corrective action.

MR. EBERSOLE: Could you refresh my memory on where you said direct coolant drain tank pump, you made reference to that that it would start. Where does that discharge?

MR. HERBEIN: It actually discharges two places, sir. Re-circulation back into the drain tank itself after passing through a cooler, and that enables cooling the contents of the tank, and when the tank reaches a high-level, the operator has the option to pump the contents of the tank to our reactor coolant bleed tanks in the auxiliary building.

MR. EBERSOLE: But that is blocked if that affliction valves pump were to be blocked? Right?

MR. HERBEIN: That is correct, sir.

MR. EBERSOLE: All right, that is part of the affliction complex is to stop, that last pumping function you mentioned?

MR. HERBEIN: That is right.

MR. EBERSOLE: Thank you.

DR. CATTON: Did you say there would be flow indication in the tail pipe?

MR. HERBEIN: Yes, sir, I did.

DR. CATTON: And what kind of flow meters?

MR. HERBEIN: I will ask Dave Slear to answer the type of flow meters associated with the elbow tap DP cells.

MR. SLEAR: These are the elbow tap differential pressure cells that I mentioned in my presentation with the indication on the console center of inches of water.

DR. CATTON: What is it, a veto tube or something?

MR. SLEAR: They are differential pressure cells that tap on either side of the elbow. Inside the radius bend and outside.

MR. EBERSOLE: And you can correlate this from mass flux?

MR. HERBEIN: Mass flow.

MR. EBERSOLE: Flow.

MR. HERBEIN: Yes, sir.

MR. SLEAR: We are doing calculations which indicate for mass flow of ten percent of rate of flow through the valve, you would expect to see so many inches of water, but we are not providing a meter that says you have ten percent flow, we are providing a meter that says inches of water.

This is intended to be go, no go indication that there either is significant leakage or not significant leakage through the PORB or safety valves.

It is not intended to be an accurate formula.

DR. CATTON: Well, that is good because measuring two type flow is a very difficult thing to do. I am curious as to how you accomplised it.

MR. SLEAR: We are trying to measure it accurately, and we are merely trying to convince ourselves that there will be a significant indication of inches of water on the meter under two place flow conditions and are doing calculations along those lines.

DR. CATTON: In your testing of this device, are you going to attempt to use realistic conditions, the kinds that you would expect during an actual PR reactuation. Rapid temperature changes can cause funny things to happen to pressure transducers.

MR. SLEAR: I guess I will have to defer the answer, it has been tested in the lab by Dr. Wilcox, I think under nominal types of conditions as opposed to upset conditions.

DR. CATTON: That is Appendix 2-A I believe which will be coming out in mid-February?

MR. TAYLOR: Dr. Catton that is not a transducer, it is a differential pressure cell with two taps into the elbow on the tail pipe and those tests were done in our last research center we did the tests on both the elbow flow meter and the acoustic flow detector and as Mr. Slear said they were not intended to be accuracy type tests, just to see what kind of flow it took to get a good solid reading on the meter.

DR. CATTON: Did you do this with two-phase flow?

MR. TAYLOR: I believe these tests were all with steam.

DR. CATTON: Well, delta p meter with single phase flow either vapor or liquid is one thing, two phase flow is another.

MR. ETHERINGTON: It's -- I would call it wet steam rather than really two phase. I think it is more like ten percent steam.

MR. TAYLOR: Yes, they were the conditions that --

MR. ETHERINGTON: They are two phase of course but it is wet steam.

MR. EBERSOLE: May I ask this, in view of all the difficulty of obtaining flow, direct coolant drain tank is a nice integrator. Why don't you just follow the variation and level in it.

MR. TAYLOR: Well, I think that is right. It is a good integrator. I am sure that would be a case and --

MR. EBERSOLE: It sounds like an easy way to do a hard thing.

MR. TAYLOR: Well, the high level of water is certainly going to tell you whether the valves are leaking or not.

MR. HERBEIN: On unit one, sir, we have experienced leakage in the past from both our power operator relief valve and code safeties and we were able to measure the rising level versus time and calculate the gallons a minute leakage --

MR. EBERSOLE: That is a lot more precise than any full gage --

MR. HERBEIN: And we are able to do that and

and we have done it, sir.

MR. EBERSOLE: Well isn't that function useful here to go back to the matter of whether the PR is leaking or not without involving trying to go through the exotic process of measuring flow.

MR. HERBEIN: I think it is a very meaningful indication and certainly something that we would do, and as I indicated our procedures do provide guidance to the operator with regard to a number of indications telling him that he has got either a leaking PORB or code safety.

MR. EBERSOLE: As an aside question, what is the capacity of that re-circulating cooler for that tank? Is it just based on a similar condition or just taking a charge, it's fairly small cooling capacity on the reactor coolant drain tank heat exchanger, right?

You mentioned the fact that you pump through a heat exchanger?

MR. HERBEIN: Yes, sir, that is true.

MR. EBERSOLE: What is it in BTU per hour --

MR. HERBEIN: I can't state that --

MR. EBERSOLE: Well, what is its functional duties? Is it just to take a short-time discharge out?

MR. HERBEIN: Yes, sir. That is correct. I can state from experience when the leakage from the safety valves into the drain tank runs up around eight or nine gallons a minute, we begin to have problems with tank overheating.

MR. EBERSOLE: So then, you risk rupturing the disc, all right.

MR. HERBEIN: Yes, sir.

MR. TAYLOR: Mr. Ebersole, I think the original size and criteria of that cooler back, 12 or 14 years ago was based on having the discharge of one cycle when you had a turbine trip and PORB listed, it would return the contents of the quenched tank back down to its normal temperature in something like an hour or an hour and a half.

MR. EBERSOLE: Thank you.

MR. ETHERINGTON: Are there any further questions from the Committee or attendants? Does the staff have any comments?

MR. SLEAR: No, sir, we do not.

MR. ETHERINGTON: All right. We will proceed with the next one.

MR. HERBEIN: Four B, the procedure for handling small break LOCA including ruptured steam generator two. I would like to first of all address our LOCA procedures.

As I mentioned, we have three procedures for small, intermediate and large-size breaks.

Into these procedures we have incorporated the small-break operating guidelines from Babcock and Wilcox, dated November '79.

Procedure 1202-6A contains instructions for verifying feed water availability, monitoring margin from saturation and verifying reactor containment isolation.

If the reactor coolant system pressure reaches 16 hundred pounds in our small-break procedure 1202-6A, the operator is then referred to 1202-6B, the intermediate break procedure.

1202-6B covering intermediate breaks contains guidance in the following areas: Reactor coolant pump trip and re-start criteria, verification of emergency feed water flow, increase in steam generator level to 95 percent, verification of reactor building isolation, the criteria for throttling high-pressure injection, the guidance for detecting saturated conditions, actions to respond to inadequate core cooling symptoms, instructions to monitor for hydrogen build-up, and place the hydrogen re-combiner in service; and finally, instructions for transfer to the reactor building sump with low pressure injections supplying suction to the high-pressure injection pumps.

The next procedure in the series for large breaks, which would result in low-pressure injection cooling contains guidance for reactor building isolation and cooling, verification of core flood tank flow, verification of low-pressure injection flow. Response to the failure of one low-pressure injection loop; and transfer of low-pressure injection suction to the reactor building sump.

Our procedures are, over the next few weeks, again being reviewed to insure that the latest B&W revision for guidelines on small breaks have in fact been correctly addressed in this series of procedures.

In addition, the procedures are being reviewed to assure they are usable for the operator and that the symptoms for each condition are clearly stated and readily recognizable.

Additionally, we do plan to incorporate the anticipated transient operating guidelines that are applicable to TMI into the LOCA procedures when they become available. and as I stated previously, they are expected in the NEAR future. I think they should be in final form prior to the beginning of April.

That covers small-break LOCAs. I have some additional remarks on ruptured steam generator tubes, but I think we perhaps ask if their are any questions on this.

MR. EBERSOLE: Item 4A read procedure for stuck-open safety valve, I guess I mis-interpreted that to mean PORB. The stuck-open safety valve is really a small LOCA located at the top of the pressurizer.

MR. HERBEIN: That is --

MR. EBERSOLE: It comes under Item B2, or 4B, but there is a difference in discharge in regards to the reactor coolant drain tank. So you know where it was.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: But, knowing where it was doesn't much change the procedure, does it because you can't unstick it, it is a safety valve.

MR. HERBEIN: No, sir, it doesn't and the guidelines for sub-cooling high-pressure injection are still applicable and are contained in both procedures.

MR. EBERSOLE: So A and B in that context are the same?

MR. HERBEIN: Yes, sir that is correct.

MR. ETHERINGTON: The behavior would be different, wouldn't it. The safety valve is a large small break, isn't it and blows right down.

MR. EBERSOLE: It depends on how much it is stucked.

MR. HERBEIN: Yes, sir, and it also gives erroneous indication of a full condition on the pressurizer.

MR. EBERSOLE: Well, isn't the more important difference though that a small break accident may be a liquid line leak like a seal failure or an inch of a non-failure or something like that where the inventory loss is more substantial than is it to blow the steam line.

That is, you are going to have a liquid loss to deal with as well as a steam loss.

MR. HERBEIN: But, in either case, you do loose mass from the reactor coolant system boundary.

MR. EBERSOLE: Right, but you would loose it to less advantage if it were below the water line and you were just simply loosing water without any heat in it.

MR. HERBEIN: Yes, sir that is true.

MR. EBERSOLE: So, it becomes more difficult later on when you are trying to make up and steam at the same time. You would have to have more make up water.

MR. HERBEIN: Yes.

MR. EBERSOLE: All right, I have no further questions.

MR. ETHERINGTON: You say you have?

MR. EBERSOLE: You were going to move into the ruptured steam generator?

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: When you do that, by the way let me call out something. B&W systems have a unique difference between their design and CE and Westinghouse, in that, if you have a steam generator tube break, almost invariably when you look at the PSAR and SAR you will note that the accident is analyzed in the presence of off-site power rather than the absence of off-site power.

The reason being, that with a once through boiler you have a steam line failure, but rather a tube failure, which discharges from your cooler into the more or less dry secondary side where it proceeds directly to atmosphere through the duct wells, without the benefit of being scavenged through the water system which exists on the other type of steam generators.

Therefore, invariably the does levels would come comparably much higher on a B&W plant for the case of loss of off-site power where you don't have the benefit of the condensors, do you follow me?

MR. HERBEIN: Yes, sir, I do.

MR. EBERSOLE: Is your analysis here based on the fact that you retain off-site power in order to run the condensors, or you do not have it for that steam line break case?

Is my question clear?

MR. HERBEIN: Yes, sir, it is. I am not sure that I have the answer to that.

We would look to B&W?

MR. EBERSOLE: I am saying B&W plants by and large look at the steam line break incident claiming the presence of off-site power because they don't have the benefit of scavenging through the water inventory of secondary side of a combustion of a Westinghouse plant, it is invariably a difference.

MR. SCHIELK: I would like to take exceptions to the word invariably.

MR. EBERSOLE: Well, maybe there are some plants that I didn't see that --

MR. SCHIELK: It depends on where the location of the tube rupture is.

MR. EBERSOLE: It is high, it is the worst.

MR. SCHIELK: Right. There is extensive work going on now within B&W specifically with regard to the tube rupture to examine exactly what is the proper operator action in the event of a loss of off-site power and a tube rupture. We expect to have results in connection with the ATOP program and we are scheduling that right now for about the end of March.

MR. EBERSOLE: Do you show in the analysis here what the case of off-site dose is when you don't have the condensor function on a tube failure? Is that in the -- I don't recall seeing that in the SAR's

MR. SCHIELK: No, in the TMI 1, FSAR --

MR. EBERSOLE: Do you claim off-site power?

MR. SCHIELK: Do we claim off-site power, right. which is the historically way that that accident has --

MR. EBERSOLE: Yes, that is your Westinghouse or CE, you know, they plan they can to get along without having to have that so they use that, but you have the disadvantage here of having to inject pretty much raw primary coolant into atmosphere through the dump pass.

MR. SCHIELK: There is some thinking that the main steam stop valve could be kept open steaming --

MR. EBERSOLE: You would be inclined to try to hang on to the usual pattern as long as you can.

MR. SCHIELK: Yes.

MR. EBERSOLE: Thank you.

DR. LAWROSKI: Maybe this should have been asked under operating procedures, but you heard of the word mine set some months ago and I wonder how you have addressed the matter of reducing the probability of an erroneous mine set amongst the control room personnel while you deliberated operating procedures.

Let me cite an example which was given us at one time; that when a doctor is confronted with a patient whose condition he is uncertain of as a result of his own diagnosis he will often ask the patient if he would allow a second doctor to get involved in, to assist in getting a more accurate diagnosis, and the usual procedures that I think have been used in the medical field reveal that second doctor does not confer with the first one before he talks with the patient but he first talks -- the second doctor talks to the patient, makes his own diagnosis and then the two doctors get together so that they avoid, hopefully avoid having set in a bias too early in arriving at each of their conclusions.

Do you follow me?

MR. HERBEIN: Yes, I do sir.

I would respond to that by saying with the training program and the assignment of the sixth shift technical advisors, to shift and the fact that the shift technical advisiors don't report directly and are not responsible to administratively the shift supervisor, you do get that degree of independence with regard to the accident assessment function. The shift technical advisors report to the plant engineering manager and while I don't know that they have a separate consultation with the patient so to speak, they do make their own independent assessment of plant conditions and are there to specifically advise the shift supervisor based on the independent assessment.

DR. LAWROSKI: Is that clearly spelled out in the procedures or whatever?

MR. HERBEIN: I can't say that it is clearly spelled out in the procedure but that is certainly our intent and we have emphasized that in our instructicns to the shift technical advisors.

MR. EBERSOLE: If I can follow on, on the ruptured steam tube thing, I just heard that the FFSAR ran the analysis assuming that off-site power was present therefore it was close to the condensor.

I guess I have to ask in view of the current sensitivity about radiation release does Metropolitan Edison, are they aware of the dose that would accrue if you had a steam generator tube failure and the off-site power kept to failure and are willing to take whatever risk that is.

MR. HERBEIN: Sir, I am not specifically aware of the numerical value of the off-site dose, but I do recognize that it is higher in the even you don't have the condensor available and must discharge to atmosphere.

With regard to the whole tube rupture issue, NRC has issued some bulletin and notice guidance to all the plants following the Perry Island incident in late 1979.

We have looked at that guidance; we have also looked at B&W's draft procedure guidelines that they published on the 10th of January providing procedural guidance for single tube rupture.

We recognize that the multiple tube rupture issue in the steam generator in itself has some unaswered questions.

We are working closely with B&W to arrive at what we think is a mutually acceptable approach.

I know we have reviewed the procedure they provided us, we have given them comments. We hope to resolve those comments.

We have a lot of work to do in this area, we recognize it and we are pursuing it vigorously.

MR. EBERSOLE: Thank you.

MR. ETHERINGTON: Are there any other questions? All right, you can continue.

MR. HERBEIN: The next area listed is Item 4C the method and conditions for blocking and unblocking the power operated relief valve.

Presently, our emergency procedures require the closure of the blocked valve which is upstream of the power operated relief valve during a loss of coolant accident.

Procedures also call for blocked valve closure for a leaking or a failed open power operated relief valve.

Guidance is provided in these procedures to re-open the blocked valve as necessary to control increasing pressure prior to lifting the pressurizer code safety valves.

In cases where it is required to have the fourth blocked valve open, such as during a loss of heat sink which is addressed in loss of feed to both steam generators, to steam supply system rupture procedure, and the inadequate core cooling procedure.

The procedures require a verification that the blocked valve is open.

This then provides a core cooling flow path for high-pressure injection which would pass through the core and out through the power operated relief valve.

MR. EBERSOLE: But that last function you mentioned is it present in that safety cleared?

Even the cellunoids and DC classifier or have you changed that? It used to be considered an unsafety function this opening function.

MR. HERBEIN: I am aware that that is one of the new reg items.

MR. SLEAR: We have protective power supplies but those valves are not safety break items, so it is not a safety grade.

MR. EBERSOLE: So this -- including in the PORV opening function is a safety function is at the moment is not valid, is it?

MR. HERBEIN: I don't know that I would say that, sir.

MR. EBERSOLE: It is not redundant --

MR. HERBEIN: I think we do have reduncdant power supplies to the core and to the blocked valve from our ES motor control centers.

MR. EBERSOLE: Well, you can have multiple power supplies and control but you still have to focus on one valve.

MR. HARTMAN: This comes from one CDS valve.

MR. HERBEIN: Which can be fed alternately from either 480 volt control center.

I think we have got the redundant power supplies to the valve, sir but you are right it doesn't meet the single failure criteria.

MR. EBERSOLE: But in the long run the relief there is a safety function you have to claim it, you have to claim it the safety assumption.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: You can't really afford to claim it through these lower pressure PORV's, not yet.

MR. HERBEIN: That is right, and our procedures are prepared to, and in fact, do provide operator guidance to do that.

MR. EBERSOLE: Thank you.

MR. SILVER: I would like to point out that we, in a recent letter, to CON ED, dated January 21st in fact, asked them to automatically close the blocked valve once it had opened and pressure continued to decrease below what would be the normal re-set point of the blocked valve.

We also asked them to evaluate the effects of this on the remainder of the system, which of course connects with your concern about stuck open safety valve. We of course do not have a response to this yet.

MR. HERBEIN: With regard to the staff's remarks, we currently are in the process of looking at a design for the automatic closure of the blocked valve which Mr. Silver mentioned.

Dave, could you comment on that?

MR. SLEAR: We are proceeding with a conceptual design where we currently think from the standpoint of a signal where we would choose a coincidence logic between both low pressure and an indication of flow of the tailpipe downstream of the blocked valve.

So, I guess there is at least a difference of opinion of what signal is the appropriate signal or a combination of signals is the appropriate signal to use.

MR. HERBEIN: Okay, and I would point out this, as Mr. Slear said that is still in the initial phases, we are not sure about the advisibility of the dual signal approach that that is under evaluation.

MR. EBERSOLE: Yes, I think all too frequently you see the presence of dual signals and dual power supplies converging on one mechanical, electrical device without consideration to the device itself to the point of failure, and a good reason for that sometimes is because that device may be very expensive. On the other hand it may be useless to put two part supplies or two control supplies to one valve if the principal underlies those to develop proper, and I don't know what improvements --

MR. SLEAR: The stapler and power supplies one of those valves, either the PORV or I guess maybe it is the blocked valve, the blocked valve is energized open and fails shut mechanically. So, I guess if you are trying to get this valve shut, and you lose power --

MR. EBERSOLE: Isn't that a motor driven valve that is driven to each position?

MR. HERBEIN: The blocked valve is motor driven.

MR. EBERSOLE: So it doesn't sprinkle -- I mean it is not internal energy to close is it or open either. It is motor driven to both either position?

MR. HARTMAN: That is correct.

MR. EBERSOLE: Anyway, it is an illusion sometimes to put two part supplies and two control supplies to the same device.

It may satisfy the electrical engineers or the 279, or some piece of paper somewhere, but it may not improve the system.

MR. HERBEIN: Yes, sir.

MR. CLARK: Philip Clark, GPU.

We also in that regard are evaluating whether it is in fact better to have an additional safety circuit with automatic closure and introduce a complication into the procedures, the operator training, and, his on the spot evaluation of what .s happening.

So, while we a e developing a design, we have not yet concluded whether, in our opinion, it would be an improvement to have automatic closure or not.

MR. ETHERINGTON: What is the staff's position on automatic closure?

MR. SILVER: The staff's position on automatic closure is relatively new for one thing and I don't know if we would be prepared to pound the table at this time and insist on it, but our position right now is that there should be automatic closure, and we certainly will examine the licensee's response.

MR. ETHERINGTON: Well, if there are no further questions we will go to loss of offsite and D. C. Power.

MR. HERBEIN: Our current procedures which address loss of AC and DC power start first of all with procedure EP 1202-2 which covers the loss of offsite power.

In the event of a loss of offsite power, the reactor trips and the on-site diesel generators automatically start and energize the safeguards busses.

The central loads are then manually started by the operator in order to stabilize and cool the plant.

EP 1202-2A provides guidance for the loss of offsite power with the failure of both diesels.

In this case, the vital 120 volt AC busses are supplied by the invertors which in turn are powered from the batteries.

The turbine driven emergency feed pump is used to supply emergency feed water and the steam from the steam generator is discharged to the atmosphere through the atmospheric relief valve because of the loss of the condensor.

Natural circulation cooling is established in the reactor coolant system, and the rate of cool down is minimized until AC power from offsite is restored.

MR. EBERSOLE: That takes care of the cooling of the core?

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: What about the ambient temperature is rising in a variety of places because of loss of ventilation including ambient temperature that may arise in areas around the steam supply line to the off-steam turbine which signal to it that it had a steam-line break and therefore were closed. I am saying this system may fall back on itself.

Sometimes temperature is used as a detection method for steam-line breaks to the off-steam steam line supply and the rise in temperature signifies to the system that it has a steam-line break and it closes the steam supply to the off-stream turbine because of temperature rise which occurs because of AC power failures.

MR. HERBEIN: Our steam line rupture detection system, sir, operates on steam pressure and at 600 pounds we do shut steam line valves. However, our emergency feed pump turbine steam supply line comes off up-stream of those stop valves.

So, there is an assured supply of steam to the turbine.

MR. EBERSOLE: I understand that, but do you not have a stop valve to close steam flow in the event you lose the -- of the repeat pump steam supply line? Isn't that pitch pressurized and to make up to some point where the blocked valve. I realize it takes up steam ahead of the mainsteam isolation valve.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: Then it has its own isolation valve.

MR. HERBEIN: Yes, that is correct, sir.

MR. EBERSOLE: Which is designed to cope, I presume with a hypothetical failure?

MR. HERBEIN: Yes, sir, but it does not shut on a temperature signal.

MR. EBERSOLE: It does not shut on temperature signal.

MR. HERBEIN: No, sir.

MR. EBERSOLE: Do you use some close signal?

MR. HERBEIN: No, there is no automatic isolation signal of -- to the blocked valve that supplies steam to the --

MR. EBERSOLE: Are you prepared then to take a continued -- that valve is not running closed however isn't it?

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: So you don't have any hazard potential downstream of the valve, it is only when you start using the line that you have a hazard potential which you could discount because of the infrequent use, I guess.

MR. HERBEIN: It would seem so.

MR. EBERSOLE: Right. Upstream of the valve you do have a problem if you lose the pressurize aux-steam supply line. Does that go into an area where it continued steam discharge from that point could be tolerated?

Do you follow me?

MR. HERBEIN: Yes, I understand what you are saying. Steam supply rupture to the auxiliary feed pump turbine and could we, in fact, environmentally --

MR. EBERSOLE: Tolerate the continued --

MR. HERBEIN: Tolerate that.

MR. EBERSOLE: You don't know way of cutting it off?

MR. HERBEIN: I don't know the answer to that exact question but I know we are looking at high-energy breaks inside and outside containment that is a generic issue --

MR. EBERSOLE: That would be one of those.

MR. HERBEIN: That is a generic issue and that is being --

MR. EBERSOLE: Isn't that an old issue that goes back to '72?

MR. HERBEIN: I don't know if it goes back to '72, perhaps the staff could provide some clarification on that. I think we -- I am sure we have just received guidance from the NRC with regard to the concern that they recently focused on high-energy breaks inside and outside containment, and I believe we have made an initial response in accordance with one of their bulletins.

MR. EBERSOLE: Well, the great letter that took up this matter, it was an anonymous letter in December of 1972 and I believe in the following years in '73 the staff took a comprehensive effort to look at steam line and other line breaks inside and rather outside the contaiment, am I correct?

MR. SILVER: Outside, sir, that is correct.

MR. EBERSOLE: How did this then persist for eight years after that?

MR. SILVER: I can't answer that at this moment.

MR. EBERSOLE: I am sure that the dates are correct.

MR. SILVER: Approximately, they are approximately correct.

MR. EBERSOLE: I have no further questions on loss of offsite and AC power, however, are you going to take up DC power?

MR. HERBEIN: I am aware, sir, that as a result of your tour yesterday, you had expressed some concerns about the loss of first single battery bank and then following a loss of AC power and additional battery bank, I think the --

MR. EBERSOLE: Let me make a correction on that. I didn't make reference to any AC power loss as being intrinsic to the DC power loss at all. I merely said that we -- because we only have two batteries, we must expect sooner or later that one of them will fail and that puts the second battery in a state of jeopardy, mostly, probably because of potential operator interaction and places the second battery or the second DC power source in some unusal state of reliability wherein it may cascade the failure.

Now, beyond that point, I didn't say that any of the things were automatically the consequence of that except I now know that invertors will fail if the AC power source fails, but I didn't say that I knew that they would fail, I suspect they will because among the things that happens the token generator will trip and go into a de-energized motoring operation which would influence the in-coming power function.

I suspect that you are going to have a loss of AC power for this case, but I think that has to be developed in detail because a consequential aspect of losing DC power and it is a very complicated business. Mr. Hartman and I went over this in some detail yesterday, but in the beginning, let me make clear, I didn't say that AC power was either lost or not lost. It has to be something that is ascertained, and I didn't just invoke it as a random occurrence.

I would have to say that either it was a consequential failure or not, and I suspect it would be --

MR. HERBEIN: I can state, sir, that our invertors are designed to go either way either from a loss of AC over to the DC battery bank.

They are also capable of functioning on the AC power supply provided from the motor control centers in the event there is a loss of DC.

So, the invertor has the capability to go either way, and I don't know that it has been established That in the absence of DC that there would in fact be the --

MR. EBERSOLE: The transition.

MR. HERBEIN: No, that there would, in fact, be the inability to make the transition and the subsequent failure of the invertor.

MR. EBERSOLE: I agree with you, I don't know either.

I think this is a complicated picture and mainly it says to me that a early study of which I believe you and Mr. Hartman has a copy of NUREG 0305, which says that if nothing works, including AC and DC and that there are pretty substantial times like about an hour and a half, two hours, for a typical PWR, much less time for the boiler, but it simply infers that within that time you can do something without actually determining whether you can do anything, but one of the consequences of the DC power failure, if it includes invertor failures, is that the plant goes into total blackness, and none of the steps which you presently outlined that the operator is supposed to take in emergency can in fact be taken because he can't see anything or do anything other than go fix the invertors. He has no information at all and, in fact, no illumination. He is in total darkness, he has no signals, he has no capability to operate any valves, other than manual, and in a later study, and I refer here to a document which is from a slide presented by and was opened by Aftosky on January 11th. I find that these times for you to take whatever action can be taken in this darkened condition without electrical functions is not any more of the roughly at one hour, but rather, it is run down to 20 minutes for atypical B&W plant.

In this analyses I have here, it says, consequence of temporary loss of all feed water in the B&W set 20 minutes available to initiate HPI or AFW pumps feed water.

So, it says to me, that this complex function that we are still wearing first the invertor classified to get some indication on to tell you where to go and what to do, and then after that, numerous actions involving energizing or rather closing certain breakers in getting the diesel re-started, the diesel connected to the LOCA rather, have to be done.

I don't think there is a match between the time available and the actions necessary to be taken after this event.

But, that has to be developed, I think in considerable detail.

At this point in time I would merely have to say that there is an inbalance between the time that we have after AC power failure and the things that have to be done under the conditions that existed at that time.

In short, I believe that this DC power loss leads to a cool out, certainly I will have to conclude that in the absence of better information than I have now.

Does, anybody want to argue that point?

MR. HERBEIN: Sir, I don't know that I want to argue that, I would state that it is probably a good bet that not only the B&W plants are in trouble if there is a total loss of AC and DC --

MR. EBERSOLE: It's generic, there is no particular difference, I agree with you.

But, it is a standing possibility which has not been analyzed.

Right now there are no procedures for coping with this event.

MR. HERBEIN: I would add one thing to what you have said, and that is in our plant we would have the capability to establish emergency feed water, there would be steam available. We do have the capability to run our turbine driven emergency feed pump and that could provide water to the steam generators.

MR. EBERSOLE: Yes, I understand that the loss of DC power would cause that pump to go into service and the valve would open, and as I presently understand it, your off steam pump will start up. What it does after

10/36 end

that, I don't know. It may in effect charge the secondary side until it kills itself, earlier than 20 minutes.

In short, if it runs 20 minutes, I don't know what as of now it regurgitated water back on itself and stopped permanently.

You remember this operation is blind, I have no level gauges, I have no transducers, I have no indication, I am running absolutely blind.

MR. HERBEIN: I think we --

MR. EBERSOLE: Let me see, I understand that you all have an ongoing investigation as to what would happen with DC power failure and it's premature to attempt to say now what really does; so, I just am looking forward to a conclusion of that examination.

MR. HERBEIN: I think we recognize, sir, that there is a concern over this generic issue and that we have some homework to do and we intend to get on with it.

MR. EBERSOLE: Thank you.

MR. ETHERINGTON: Let's see now, are we expecting a new report on this?

MR. EBERSOLE: My understanding is you have an ongoing investigation that you will reach some point in time here where you will draw a conclusion as to what happen-es; I don't know when that is.

Do you have any estimated date when you will pin that together?

MR. HERBEIN: Not at this time, sir.

MR. EBERSOLE: Would it be -- well, one month, two months, three months? I'm just inviting --

MR. HERBEIN: I would hesitate to make a guess at the culmination of our ongoing effort with regard to a generic problem such as you've just stated, sir.

MR. EBERSOLE: Well, I have to call out to the Staff that NUREG 0305, which culminates in a stated time before one begins to suffer core damage, which time is based on the thesis that you go to core midplane doesn't define what you can do in that available time; that's item one. And, the time so expressed here is consistent with the fact that it went to core midplane, not a very conservative position, whereas Mr. Lastofski's (?) report about loss of all feed water and loss of electrical power, in essence, is based on going below the top of the core and those times run down, in that case, to 20 minutes, not an hour or thereabouts.

So, there's a much diminished time and still no identification of what can be done within that time. So in essence, the 305 report reached a conclusion only to finding the time that might be available which is unduly lengthened and then it did not close with a statement or any conclusion as to what could be done, if anything, within that span of time; so therefore, it's deficient.

So, I would like to ask the Staff to look for an Appendix on extention of that document to include what could be done in that time and a reaffirmation as to whether those times are accurate in the light of new investigations as to TMI.

That's the Staff's job.

MR. SILVER: I will pass that information along. Again, I think it's apparent this is outside of the scope of the immediate focus of this thing.

MR. EBERSOLE: This is a generic item which is one of those things which we, I understand, must not ignore in just attending to the TMI specific problems.

MR. HERBEIN: Sir, before we leave this subject I'd like to ask the Staff if it's all right.

If the Staff's aware of any results or conclusions by anyone else with regard to this generic issue, perhaps they are aware of some studies or an ongoing schedule that someone else has established to resolve the issues that have been identified today. If they are aware of such schedules or efforts underway, we'd very much like to coordinate our efforts with them.

MR. SILVER: We might get some more information tomorrow in report on the backlog items. If there's not, I will certainly see that something's developed.

MR. EBERSOLE: Thank you.

MR. ETHERINGTON: Filling pressurizer solid?

MR. HERBEIN: I'm prepared to leave that issue and move on to the next agenda item, sir, if it's all right.

MR. ETHERINGTON: Sure.

MR. HERBEIN: Agenda item E, the policy on prevention of filling the pressurizer solid: during normal system operation, solid pressurizer operation is not permitted. This limitation is expressed in OP1101-1, our plant limits and precautions, as well as our makeup and purification system operating procedure. In addition, the technical specifications define the minimum conditions for criticality within the limits on pressurizer level of 80 to 385 inches.

Under accident conditions, reactor coolant system solid operation as indicated by a full pressurizer may be required to provide adequate core cooling throught the power operated relief valve or code safeties. In this regard, guidance is provided to open the power operated relief valve on increasing pressure prior to challenging the code safety valves and risking a stuck open safety.

Guidance for operating with an indicated solid reactor coolant system condition is provided in the following procedures: a loss of feed to both steam generators; inadequate core cooling; loss of reactor coolant pressure; steam supply system rupture; and the pressurizer operation procedure.

Finally, in order to take the plant into a solid condition, prior approval is required from the shift supervisor.

MR. EBERSOLE: In going to this condition, I guess, in theory, you're possibly invoking the lead feed process.

MR. HERBEIN: Yes, sir, in the absence of heat set.

MR. EBERSOLE: So, you do it when you don't have secondary cooling, loss of all feed water, right?

MR. HERBEIN: Yes, sir. That would be an instance where we might have to do it.

MR. EBERSOLE: I believe you said, didn't you say loss of main steam?

MR. HERBEIN: I said steam supply system rupture, sir.

MR. EBERSOLE: So, steam supply system rupture --

MR. HERBEIN: We boil the steam generators dry.

MR. EBERSOLE: You boil them dry so the turbine pump is gone, but the electric aux feed pumps are still there. Wait a minute; hang on. Isn't your answer now that in a steam supply failure that you preserve a fraction of the secondary system? I think that has to be your rationale in view of containment pressure; isn't it?

MR. HERBEIN: Yes, sir. That's a good point. But the procedure itself does address the steam system rupture where we either isolate the steam generators or, in fact, due to --

MR. EBERSOLE: Anyway, you hedge against it by going to full operation anyway; it's the more conservative thing to do.

MR. HERBEIN: The requirement is to maintain the 50 degree subcooling and anytime we're into an emergency procedure where we're not able to do that the procedure provides guidance to go with the high pressure injection system and on an increase --

MR. EBERSOLE: I guess this gets down around again to the matter of the level gauge and the absence of knowledge of inventory primary coolant lobe. The subcooling gauge will probably show subcooling, or it could show subcooling even with a core coolant below the top of the core.

MR. HERBEIN: I don't think that's possible. I think that as long as you've got the subcooling, that means that the core is pressurized and, in fact, the fuel is cool and you have not uncovered the core.

B&W care to comment on that?

MR. HALLMAN: Doug Hallman from B&W; I'll address the case.

We're measuring the temperature here of the top of the hot leg groups. And if, at that point, the temperature and pressure indicates subcooling, you have solid water at that point. You have steam underneath of that water which drains out in such a way that it will provide coverage for the core, so I'm able to say that in no way in which you are subcooled to the top of the hot legs for the core to be uncovered.

MR. EBERSOLE: You're subcooled at the top of the hot leg; that's where you're making the measurement.

MR. HERBEIN: Well, that's only one of the points where we're making the measurement.

MR. HALLMAN: Yes, sir.

MR. EBERSOLE: And for subcooled air, you invoke the fact that there has to be water in substantial quantities above the core.

MR. HALLMAN: There has to be water at the level of the one you are referring to, yes, sir.

MR. EBERSOLE: Yes, that will work for you, but it won't work for the CEUS deposit.

Thank you.

MR. ETHERINGTON: Does the Staff have any comments to make?

MR. SILVER: No, sir.

MR. ETHERINGTON: Then, I think we're ready to proceed to the emergency preparedness.

MR. HERBEIN: You're ready for emergency preparedness, sir? I would like to turn it over to Mike Segaris to address that.

MR. SEGARIS: Gentlemen, I've prepared just a few remarks on emergency planning status for Three Mile Island 1.

I'd like to start off with just bringing you up to date on the chronology of the development of the revised TMI 1 plan. In September of 1979, the NRC Task Force on Emergency Planning met with representatives of the Metropolitan Edison Company and the State of Pennsylvania to describe and discuss the new requirements in the area of emergency planning. Those primarily were NCFR 50, Appendix E, Regulatory Guide 1.101; Emergency Plan Review Guideline Number 1; TMI 1's order for restart; and a new document, NUREG 610, which describes the emergency action level required in the new emergency classification system.

Subsequent to those meetings, the State added a utility to develop emergency plans to meet those requirements and on October 28, 1979, a collected package of the State, County, and utility plans were submitted to the Task Force for review and comment.

In mid-November, the Metropolitan Edison Company has received formal comments from the NRC after their review of the plan, and made additional commitments and started efforts to address these comments from the Commission.

On November 29, 1979, the Metropolitan Edison Company submitted its final revised plan for TMI 1 to the NRC for review and included it into the Safety Evaluation Report for the restart of TMI 1.

Concurrently in mid-December, a group from the NRC's Office of State Programs and the Federal Emergency Management Agency reviewed the State plan and presented their comments in a formal meeting and discussed with the State the requirements for a further upbringing to meet NRC concurrence requirements.

During the month of December, the State then met with each of the counties in the ten-mile radius to review their plans in detail and discuss items which required further upbringing to county plans.

And then finally in January of this year, the NRC issued the Safety Evaluation Report on TMI 1, which you are aware of and determined that the licensee's emergency plan was consistent with the new and interim guidance, which I mentioned.

Basically, there were no significant discrepancies found, however, the Commission detailed several follow up action items the Metropolitan Edison must address to achieve full complicance. Those items are currently in progress and an analysis is being performed and submittals are being prepared.

I would just like to take a few minutes to review a few of the significant conceptual changes in the emergency plan. First of all, as I mentioned, the emergency plan now addresses a new classification scheme; unusual event, alert, site emergency, and general emergency. These classification systems and the specific action levels that describe each of them are based on instrument indications system status quench perimeters that have been developed to describe the entire spectrum of accidents from low consequency events to major accidents.

The second conceptual change in planning has been the adoption of the emergency planning zone concepts. The low population zone is no longer of primary concern; there are now two areas of concern: one the 50-mile emergency planning zone, which you can see extends into Maryland. The plan considerations for the 50-mile zone are considerations for the injestions exposed to the pathway. That has been adopted in the State, county, and utility plan.

The other planning zone of interest is the 10-mile emergency planning zone. The planning considerations for that area are for plume exposure; the State, county, and utility plans are coordinated for emergency response up to and including evacuation in that area. It's significant to note that the counties have maintained an evacuation capability out to 20 miles and exceed the current requirements.

DR. FOSTER: I have a question there -- as I read the intent of the NRC Staff when they put out the Appendix E, these 10- and 50-mile radiuses were only intended as approximations and there were some other guidance relative to demographic patterns of land topographic patterns that went with them.

I guess I was a little surprised to see that your -- both of these zones were, in fact, just exact 10 miles of circles.

MR. SEGARIS: The purpose of this drawing, I do show an exact 10-mile radius. However, the State has developed a specific map which does include demographic restraints of municipal boundaries and it is not a perfect circle. That map, I believe, is available now and you're correct; I believe the minimum distance on that map is 10 miles; however, it is jagged to coorespond with the kinds of things that you mentioned.

DR. FOSTER: Does the plume exposure zone extend up to include 2 miles beyond into Harrisburg then?

MR. SEGARIS: It's a 10-mile zone, as far as I know. Now, I'm not an expert on State's plan. It extends to the distance that I have shown, which means it intersects parts of Harrisburg.

DR. FOSTER: So, the actual planning in case of evacuation may, in fact, include a substantially larger number of people then you would indicate by your 10-mile radius.

MR. SEGARIS: Right, and as I mentioned, the counties, including Dauphin, have maintained and developed plans for evacuation up to 20 miles, which would include all of Harrisburg.

DR. FOSTER: Thank you.

MR. SEGARIS: The revised TMI 1 plan also incoporates additional accident assessment capabilities in line with the requirements of NUREG 578. Some of these items include the establishment of a technical support center, the ability to transmit data to that technical support center, and the procedures for the engineers at the technical support center to assess plant conditions. It is planned to transmit this data to the offsite support center and there are also plans and I believe that the hookup has been made to transmit plant data to the Mountain Lakes' computer; that's GPU headquarters.

The plan also includes improved organizational approaches and communication systems for accident management. There are detailed offsite organizations to cope with accident situations and several dedicated phone systems including the new NRC Red and Black phones, have been or are being installed.

DR. FOSTER: I may have another question there. This, if it's appropriate at this time, this relates to your offsite monitoring teams; would this be a good time to write that? In your emergency plan, it was provided with a table which showed the number of people in the operations group who were expected to be on plant who were available for immediate call in.

I didn't notice on that particular table identifications of the monitoring-type people. Could you tell us a little about where those monitoring people would come from and how many are expected to be on duty all the time and how long it takes to bring in people from off plant in order to staff your offsite monitoring teams.

MR. SEGARIS: Basically, the requirements in the plan call for any number of monitoring teams up to perhaps three or four for on- and offsite. The teams are characteristically manned by two individuals; the monitoring kits and the phone communications radios are available at the site. So that if you look at onsite teams and perhaps two offsite teams, you're talking a total of about six people.

I believe that Mike Ross and -- perhaps correct me if I'm wrong, but there are at least three health physics technicians addressing only Unit 1 now, three health physics technicians on the shift, four or five auxiliary operators who are trained to the same level as the health physics technicians are as far as radiation monitoring is concerned.

I believe the reason that you don't see that specified in the plan is that during accident conditions, the coordinator at the operations support center will designate who he wants on what team. I do feel that there is a capability, initially, to man three teams. Perhaps, not with two people; one individual man who drives, stops his vehicle and takes his survey.

DR. FOSTER: This would be three teams that would handle -- a total of three teams that would handle both onsite monitoring and offsite; is that right?

MR. SEGARIS: We're basically talking onsite outside the plant and offsite. Additional individuals would be require inside for monitoring purposes.

DR. FOSTER: So, you would probably under these circumstances, wouldn't really expect to be sending more than one or two cars off the plant; is that right?

MR. SEGARIS: I would say that initially, that would be correct, perhaps two cars offsite.

DR. FOSTER: And are these cars dedicated to that function or will they be competing with other people for them?

MR. SEGARIS: At any time there are vehicles available for security and for the maintenance force. The teams, normally, are located with the security people or the maintenance foremen. And operations, I believe, also has a vehicle -- no, operations has two vehicles and the shift supervisor holds control over those. So, vehicles are available.

DR. FOSTER: Are there -- beyond this, do you have the capability beyond that two or three people, two or three teams to bring more teams in from people that are, perhaps, off shift, or is that it?

MR. SEGARIS: Well, one of the things that I did not mention is there is a large manpower force on Unit 2 which could be called on to supplement. What we've described is the Unit 1 emergency plan with the capability for Unit 1 to handle any emergency in Unit 1. It has that capability. Additional manpower can either be brought in from Unit 2 or can be recalled, via the station recall team.

DR. FOSTER: What about the instrument that these people need for measuring, let's say, dose rates off plant; are kits available?

MR. SEGARIS: I believe that there are, I'm not sure of the exact number, five or six seal kits which are stored in emergency kit lockers in the security processing center. Also in that area are six radios that are emergency use only and are only to be used in cases where there is an emergency. Those kits are inventoried periodically and are always available for use.

DR. FOSTER: Will there be competition for inplant and onsite use for those same kits?

MR. SEGARIS: Those kits are only designated for offsite monitoring and for the monitoring team that would be performing peripheral onsite monitoring.

DR. FOSTER: All right. Why don't you go ahead.

MR. SEGARIS: The last thing that I was going to mention -- the plan details an emergency public information plan which has been developed to provide the mechanism for keeping the media informed of the latest technical information. This information, in accordance with that plan, will be provided by a single source.

Those are the only prepared remarks that I have.

DR. FOSTER: Have you had any contact at all with the FEMA people now that they're going to be entering into the emergency planning?

MR. SEGARIS: The only contact that I personally have had with the FEMA people was in a meeting in December where FEMA and the NRC Office of State Programs reviewed with the State their comments in regard to the State's plans.

DR. FOSTER: I'd kind of like to get back again to these offsite monitoring teams. I know from looking at the emergency plan that we had available that they're originally dispatched by the Met Ed people here.

I'm wondering perhaps a few hours into the situation when the Bureau of Radiological Protection is functioning. Would you anticipate that the Bureau of Rad Protection would be providing direction and guidance to these people, asking or specifying where they go or what they do?

MR. SEGARIS: Any interface between the Bureau of Radiation Protection and the Met Ed monitoring teams would be done through a relay through the control room. The Bureau of Radiation Protection does not directly control the monitoring teams. If they request some monitoring to be performed within a geographical area, they can make that request into the plant and then the plant could direct those to the monitoring locations.

The way the plan is designed to work is that the people in charge of the control room based on the meteorological conditions they have will place the teams in their best judgment where they feel that the monitoring should be done and then relay that information to the Bureau of Radiation Protection.

DR. FOSTER: Well, would you expect perhaps after the Bureau of Rad Protection got into operation that they would be requesting your teams to go to certain sectors and provide certain information?

MR. SEGARIS: What I would expect is that the Bureau of Radiation Protection would dispatch its own teams to perform and confirm measurements and to confirm our results and perhaps monitor other areas in conjunction with the Department of Energy monitoring teams.

I would not, I guess, expect direct requests for deployment of the Met Ed teams; however, if the request came, we would do that.

DR. FOSTER: In an initial monitoring offsite, can you give us a little feel for what these monitoring teams are going to be looking at and what they are going to be measuring?

MR. SEGARIS: The monitoring teams will primarily be measuring two things: direct radiation through the dose rate meter, gamma and beta gamma --

DR. FOSTER: From what?

MR. SEGARIS: From a hand-held mobile instrument.

DR. FOSTER: Is this ground vegetation --

MR. SEGARIS: Well, these would be general area readings. They would also be taking air samples and counting those for -- to determine iodine concentration.

DR. FOSTER: They can do that in the field?

MR. SEGARIS: Yes, they can

DR. FOSTER: Is this generally trying to confirm the direction of the plume?

MR. SEGARIS: Not only to confirm the direction of the flume, but to confirm magnitude of the release and then relay the information back to the plant so that the plant can refine its measurements of source release terms per second in the plant.

So, it's primarily for two things: to verify direction and to look at the magnitude of the releases based on the projections being made in the plant.

DR. FOSTER: Are the vehicles which they will be using radio equipped so that they can report back in that fashion or is this a -- do they have to find a telephone?

MR. SEGARIS: As I mentioned when I was discussing the kits, along with the kits are six, I believe six, emergency radios that are constantly on charge in a designated locker for emergency use only. As they go out and pick up a kit and a radio, then the vehicle can go.

DR. FOSTER: Fine. Thank you.

MR. ETHERINGTON: Are there any additional questions from the Subcommittee or Consultants? Does the Staff have any comments? Mr. Silver?

MR. SILVER: Excuse me one second.

MR. ETHERINGTON: All right.

MR. SILVER: I'm sorry we might be able to discuss the role of Three Mile Island of the NRC and what is happening involving the rules.

MR. ETHERINGTON: Yes, in general.

DR. FOSTER: Have you looked at the evacuation plans of the State and the County?

MR. SILVER: Can I ask Mr. Roe of the NRC to address this?

MR. ROE: Yes, sir. We have looked at the evacuation plans of the area. We have also discussed that December meeting on concurrence to State and local plans.

I also sent a letter to the licensee asking for further information concerning the back breaking planning.

We ought to be able to receive the answer to that letter shortly. I understand through informal contact with the licensee that they have finished their discussions with the Pennsylvania emergency management agency in providing that information on evacuation plans.

The thing about general emergency management agency is also in that meeting of December as part of the review committee.

DR. FOSTER: Did that, in fact, include Harrisburg?

MR. ROE: As Mr. Segaris said, they do have evacuation plans that go through that 20-mile radius.

Which will include the City of Harrisburg.

DR. FOSTER: Do those plans include identification of where the people would go to?

MR. ROE: Yes, sir.

DR. FOSTER: That's fine. Thank you.

DR. LAWROSKI: Is it appropriate here, or are you going to cover it under item 8, your position with respect to Reg guide 1.97, especially the Section C-3?

MR. HERBEIN: Mr. Chairman, I would like to clarify one point.

The basic responsibility in the plans and in the policies is that the State is really responsible for evacuation. We, of course, intend to and are cooperating fully with them in defining this effort and, of course, in the unfortunate circumstance that were to occur, why we would work with them, but the State has the ultimate responsibility for evacuation.

MR. ETHERINGTON: Have they accepted that responsibility to your satisfaction?

MR. HERBEIN: That's true. Yes, sir, they have.

DR. LAWROSKI: Do you think they have the resources?

MR. HERBEIN: Pardon me, sir?

DR. LAWROSKI: Are the resources there in line with what that responsibility may require?

MR. HERBEIN: I think that is a judgment that FEMA has to make.

DR. LAWROSKI: Do you plan now or when to take up the matter which was raised earlier today, I think, by Mr. Catton on your position on Reg guide 1.97?

MR. HERBEIN: We are not prepared to address that at this time, sir. We will see if we can't have something on that tomorrow.

DR. LAWROSKI: Alright.

MR. ETHERINGTON: So, that is a matter which is outstanding with the Staff still? It is unresolved with the Staff?

MR. SILVER: Pardon me?

MR. ETHERINGTON: Dr. Lawroski was asking the position on Reg guide 1.97.

MR. SILVER: We have not requested the licensee to conform with Reg guide 1.97. Many of the ,or some of the specific items are included in the order do go in that direction. No, we have not had a specific conformance with the Reg guide.

DR. LAWROSKI: But, nevertheless, I would like to hear what the licensee has to say about that.

MR. HERBEIN: Mr. Chairman, I would like to correct something that I said earlier. I indicated that we would be prepared to make some remarks on the Reg guide

1.97 tomorrow morning. I would like to change that, sir. We believe we could be prepared by the time of the full Committee meeting to make some remarks on Reg guide 1.97 but it would be very difficult for us to do that tomorrow and have them be meaningful.

MR. ETHERINGTON: That would be satisfactory.

MR. HERBEIN: Thank you, sir.

MR. ETHERINGTON: Let's see. We have already covered training item 6, that brings us to item 7, scheduling our plan for long term actions listed in table B-1, NUREG 0578.

MR. SLEAR: Dave Slear, again. The discussion centered around the long term category B items, if you will, from NUREG 0578, and I have made up this slide to lead us through the specific topics, and some description of our clients.

As a general statement, from the standpoint of schedule, the engineering is proceeding on these items and I anticipate that in the March time frame we are going to be in a position to be buying equipment and we will have engineering complete in the May/June time frame, for these specific line items.

The area containment pressure which is a wide range several multiple of the design and pressure for the containment and indication of that, and we intend to comply

Regarding containment water level, we had in advance of NUREG 0578 being issued reduced in our own mind that we, in fact, wanted a wide range containment water level that went above the level of the sump itself.

Specifically, we are going from the floor containment to a level of 10-feet high, with what I would term a control grade instrument, fundamentally because we didn't buy all the paperwork at the time when we bought this particular instrument. That is being installed through NUREG 0578 requires safety grade wide range and in addition, requires the narrow range of the sump level indicator itself be installed with the safety grade. We intend to comply with those requirements operating the pedigree of the existing control grade if practical and buying a redundant one with a wide range and also replacing the existing sump level indicator with a once again redundant safety grade installation.

Regarding containment hydrogen this revolves around the need for continuous on-line hydrogen measurement from, I believe, 0 to 10%, and we intend to comply.

DR. CATTON: How did you choose the ten feet for the containment water level?

MR. SLEAR: We took a look at -- Cortney you did that analysis. I don't want to put my -- do you want to describe how you selected that?

MR. SMYTHE: Courtney Smythe.

We did some calculations based on what water was available from various tanks in this station, based on the probable volume of the containment and came up with an estimate of the water level that would seem that is approximately six feet and .t that we should go somewhat beyond that as a contingency. So, ten feet is selected.

DR. CATTON: Do you plan to move all of the important instrumentation in electrical equipment and so forth, above that level?

MR. SMYTHE: We are already proceeding the steps.

MR. SLEAR: I think the answer is yes, we are already proceeding with steps to raise pressurizer level and steam generator level instruments to the level of six feet that he indicated and I guess, those are the instruments that we felt were important and needed to be moved and to my knowledge no other instruments have been identified from the 0 to 6 elevation that would require movement, if you will.

DR. CATTON: Aren't you at 17 already, at TMI 2?

MR. SLEAR: You mean the water level in TMI 2?

DR. CATTON: Yes.

MR. HERBEIN: It is seven and a half feet right now, the last time I checked, but that has a different capacity due to different building size than Unit 1. I am not sure just how many gallons you use, Cortney, that would relate to the ten feet.

DR. CATTON: Well, if there is a contingency on your level sensors, gee, I would think there would be the same contingency that you would apply to your pressure transmitters and so forth.

Also, isn't there a box that you bring the power to the pressure inter heaters? Isn't that pretty low, too? Are you going to move it as well?

MR. HERBEIN: Charlie?

MR. HARTMAN: Charlie Hartman.

The pressurized heaters terminal box is on the next floor up, it is not a very high level floor as the 305 elevation.

DR. CATTON: I was confused.

MR. SLEAR: With regard to RCS venting, our current plans are we are proceeding with designing a remote venting capability to be installed on the top of both of the hotlegs themselves, and, in addition, are adding a motor operator to manually operate the valve on top of the pressurizer which would give us the ability to remotely vent the pressurizer. The total criteria for these vents is continuing to evolve where they will discharge to and how they would be used, et cetera.

I feel reasonably confident the pressurizer then will remain discharging to the reactor fluent drain tank, is our normal DES path. I guess I don't know more details other than we perceive a need to vent the high points of the reactor fluent system as a mechanism of insuring if we avoided the hotlegs and for some reason natural circulation has been stopped, we can in fact vent non-condensables from the system, and re-establish natural circulation.

MR. ETHERINGTON: Is there still disagreement between you and the regulatory Staff on venting the top of the reactor vessel? I see nothing there, so maybe I should have asked the regulatory staff that question.

MR. VOLLMER: Yes, Mr. Chairman, there is still that disagreement and as I indicated earlier, this is likely one of the issues that we don't see any particular persuasion to depart from that position. I think the licensee has indicated that he can provide analysis which he would show that it is not necessary.

I think Mr. Slear was talking about the natural circulation. I think as far as the vessel venting itself and it is not a particular concern we have in that instance, it is the possibility of depressurization accident which would expand the gases in the vent and uncover the core. This is an area that still needs -----

MR. SLEAR: With regard to the plant shielding, we are proceeding with the design review. I anticipate that mid to late February that the -- well, the design review is done, but, it is in the re-review state, if you will, it has been done, and now it has to be gone over by the various technical organizations within the company that ought to have the prerogative to review this kind of assessment in operation types of organizations, to make sure that the criteria that we assumed and the assumptions made by the technical engineers are, in fact, valid.

We have a plant shielding design review. It is in the state of review , I anticipate that mid to late February we will be able to draw conclusions with regard to what additional shielding and/or other changes perhaps might be required to meet the requirements contained in NUREG 0578.

With regard to post accident sampling, we have committed to being able to obtain a reactor coolant system and to complete the analysis for heat parameters such as boron and I presume, radioactivity, within 8 hours and assess from the standpoint of given an accident situation and the demand on people's time, the activity levels that will be experienced and the need for a reasonable caution and to proceeding with these samples, that 8 hours is a reasonable committment and we feel confident we can make meet from the standpoint of getting a sample and having it analyzed.

We recognize that there are heat parameters that are useful in the early phases of an accident. This was mentioned early before with things such as boron concentration and therefore, we are proceeding with an online boronometer. Things such as the hydrogen indication and insight containment to assess the potential for problems due to the hydrogen generation, we intend to, as the NUREG requires, have it on line, continuous hydrogen monitor.

MR. ETHERINGTON: What is the principle of the boronometer? Is it neutron absorption or --

MR. SLEAR: I don't think we have selected -- my understanding is that there are two fundamental mechanisms for getting continuous boron measurements and we are currently assessing which ones we think has the high probability of functioning and I guess, I don't know the details, I don't know if --

MR. HERBEIN: I can talk a little bit about boron measurements.

Neutron source absorption is one method, using a BF-3 neutron source and, of course, depending on the boron concentration, why the degree of absorption and the subsequent indication on the BF-3.

The other type is the titrating device. I believe they use sodium mannitol.

The amount that has to be added to reach a given end point, is a measure of the boron concentration.

MR. SLEAR: I think, fundamentally, the whole subject of post accident sampling basically said get samples, be able to analyze them for these various parameters, and given the source terms that were in the NUREG 0578 don't exceed estremity doses of 18 and 3/4 gram and 3 ½.

This to some extent revolves around the previous discussion that takes a look at our existing sampling capability for the reactor coolant system, for example and for containment, gas samples, and assesses our ability to get them with high radioactivity levels, without over-exposing personnel. In addition, roles in such requirements as the on line boronometer. Should it be on the left outline or there is a school of thought that says the left outline of the isolator on reactor trip and perhaps a new sampling sink continuously on research.

I guess the bottom line is, we are still establishing criteria in this area, and determining what we feel is appropriate to be done from the standpoint of post accident sampling.

We feel that we are certainly going to meet the intent of what NUREG 0578 requires, from the standpoint of being able to assess the course of the accident, and obviously, hope to be able to convince the NRC Staff that we are, in fact, meeting the intent.

In regard to high range radiation monitors, we fundamentally intend to comply with NUREG 0578.

Are there any questions?

DR. DILLON: Yes, there is one mild inconsistency as I understand the situation, having to do with the relavant value to you in analyzing the situation on the volatile fission products that you might collect from the sample.

As I understand your sample condition is a cool non-pressurized sample in which you could well have lost the vol of this one sample before you get around to an analysis.

MR. HERBEIN: Mr. Potts, perhaps you could address the -- the issue is the loss of volatile fission products from a depressurized sample.

I believe we advocate the ability to take pressurized samples, and that is in fact the kind that we take --

MR. POTTS: We do, indeed, take pressurized samples.

MR. HERBEIN: We have the capability to take a pressurized sample, sir. That in turn, of course, gives us all the gas.

MR. DILLON: Is that capability something that is in prospect, or do you have it currently?

MR. HERBEIN: We have that capability now.

MR. SLEAR: I would presume this would maintain the capability but also, I am sure, that the people getting that sample were, in fact, overexposed, and that you could get it in a timely fashion given high radiation conditions.

That is the extent of --

MR. EBERSOLE: Before you turn that out, may I just go back one moment to the vent.

Do you have the completed design for the vents, and an operating procedure for them?

MR. SLEAR: We have what I guess you would call a conceptual --

MR. EBERSOLE: Conceptual. How do you anticipate operating the vents, are you going to vent until water appears?

MR. SLEAR: I guess it is my understanding from the technical engineers that in order to adequately utilize the vents that we might provide for the hot legs that we would need some sort of a void indicator on the hot leg itself in order to allow the operator to assess when he had been successful at removing the void.

The mechanism for providing that void indicator is yet to be determined. There are those, I guess sound is an option, light is an option, DT cells are an option, and the bottom line is, yes, I think we will end up with a void indicator.

MR. EBERSOLE: Isn't the effect that water is coming through, is an option is just like the old locomotives.

MR. SLEAR: I guess that is an option, too.

MR. EBERSOLE: And, that is the simplest option.

MR. SLEAR: Yes, sir. If we can figure out a mechanism for detecting --

MR. EBERSOLE: There used to be a thing called a tricok, which you used to guage -- in essence, that is what this is.

If water is coming through, there must not be a void in any of the valves.

MR. SLEAR: Yes.

MR. EBERSOLE: Why make it complicated when you can make it simple?

MR. SLEAR: I think we are trying not to make it complicated which is why I perhaps, wasn't saying, yes we are going to have a hot leg model meter but rather trying to assess how we would use it on, I guess, perhaps, I was in general, saying we need a void indicator in the hot leg.

We need to have an indication of when the void has been removed from the hot leg and certainly --

MR. HERBEIN: And, I don't know that that would require additional instrumentation of Dave to tell us that.

MR. EBERSOLE: Let me go a minute.

Something went by me a bit too fast a while ago, and I have been trying to understand it ever since.

Your saturation meter is not sensitive to accept the two parameters, that is temperature and pressure.

MR. SLEAR: Yes, that is correct.

MR. EBERSOLE: In no way, can it sense volume or inventory. For instance, let me ask you the question -- what do you expect your saturation meter to read? If I had water covering the core by one-half inch, what would your saturation meter read that would tell me that I am that far down and that close to trouble?

MR. HERBEIN: You mean you have a half of an inch of water left?

MR. EBERSOLE: Of water cov^r. Or even I might go below the top of the core because --

MR. HERBEIN: I would expect at that point you would be at saturation and you wouldn't have the margin indicator on the device.

MR. EBERSOLE: I would not know I was there, would I?

MR. HERBEIN: You would, in fact, know you were there. You would no longer have the 50° subcooling if you only had an inch of water over the core.

MR. EBERSOLE: Why? Couldn't it still have a proper balance between pressure temperature --

MR. HERBEIN: Because I assume that what you have got on the top of that water is steam. That steam is going to --

MR. EBERSOLE: No, no. I said I am holding pressure and temperature with a citation meter, except the water is not that low.

MR. HERBEIN: The titazine off the hot leg and, in fact, it the -- as we stated earlier, by maintaining the subcooling margin at the hot leg we have got a liquid full system because of the elevation of the Candycanes.

If you have got water in the Candycane, and you have got the subcooling based on the hot leg RTD then, in fact, you have a liquid full system.

Now, the situation that I think that you have just described, I would have to assume that the Candycane was not liquid full.

MR. EBERSOLE: Right, it is now empty. It has steam in it.

MR. HERBEIN: And as a result of that --

MR. EBERSOLE: But I am still at saturation conditions. I can have a margin.

MR. HERBEIN: That is my point, sir. You are at saturation and the meter would tell us that.

MR. EBERSOLE: But, it wouldn't say how close to trouble I am.

MR. HERBEIN: It would tell us that we were in trouble by our procedures, because we maintain a 50° subcooling requirement in our procedures and --

MR. EBERSOLE: I understand, but you are telling me and I am may be misunderstanding this, that I could have that 50° temperature mark, and in some way this would tell me that I have some core inventory above the level that I specified.

How can you -- do I have a mental block here?

MR. SLEAR: Yes, I don't see how you have water in the hot leg --

MR. EBERSOLE: Oh, now, wait a minute. Who said I had water in the hot leg?

MR. SLEAR: The only way that saturation meter is going to indicate that you have 50° subcooling is to have water covering the temperature detector, and the temperature detector is on top of the hot leg.

To get water to the top of the hot leg, you filled the hot leg. Unless, you had an inadvertent loss of gravity.

MR. EBERSOLE: You are invoking the head that is there.

MR. SLEAR: Pardon me?

MR. EBERSOLE: You are invoking the head in the hot leg. You are taking the credit for the head going up to the air vent?

MR. SLEAR: Yes.

MR. EBERSOLE: Right?

MR. SLEAR: Yes.

MR. EBERSOLE: So, again, you can do this, but others can't.

MR. HERBEIN: That's right, yes, sir.

MR. EBERSOLE: So, that is only a few PSI, by the way, I don't know how high the hot leg is.

MR. SLEAR: It is about 35 feet.

MR. EBERSOLE: So, you are utilizing that particular characteristic of your system to claim that.

Okay, I see what you mean now. Thank you.

DR. CATTON: On your slide you indicated the containment hydrogen and compliance, I don't recall what your compliance was, could you?

MR. SLEAR: The NUREG 0578, as I recall, indicated that we needed to have on line, continuous hydrogen indication in the containment atmosphere on a scale of 0 to 10%.

DR. CATTON: Now, where are you going to put this instrument that will give you compliance?

MR. SLEAR: I don't think we know yet, exactly where we are going to put it. I presume this is something much as the existing sampling system which takes the section on containment and, in fact, discharges back to the containment and goes through some sort of a detector.

DR. CATTON: Then, I think that should say will comply, rather than comply.

MR. SLEAR: Oh, I am sorry.

All of these should probably say will comply. This was to be a presentation of where we are going with regard for long term items and I guess you are absolutely right. In every case, where I put comply, it should say we intend to comply.

DR. CATTON: I also think you have a rather difficult analysis to do to determine what the mixing patterns are within the containment to decide where you ought to put it.

MR. SLEAR: I guess -- maybe I am suffering under illusion, but I was here during the accident and we are all worried about hydrogen and I got the message that the experts that were here said hydrogen diffusion is against the law of nature, and that it is going to pocket something. The diffusion is going to be everywhere unless you have a little dome that is going to catch it in a room where it is being generated.

DR. CATTON: You have a big dome to catch it.

MR. SLEAR: Yes, but from the standpoint of you know, it is not going to just because hydrogen is light it doesn't go to the top of the dome, in my understanding. It diffuses. I guess we have to confirm that in our own minds, but we have not been, at least I have not been perceiving that we had a major evolution and analysis to do with regard to hydrogen diffusion and worrying about pocket swallowing.

DR. CATTON: I don't know if you do or you don't, but most hazards analyses associated with hydrogen assume that it rises and gets in pockets and people usually use skimmers to avoid it.

TMI 1, as far as I can tell in going through it, does none of these things. Maybe your circulation is strong enough and you have got your ducts pointed in the proper direction that you get complete mixing but that was not obvious to me.

MR. SLEAR: I think we have some homework to do.

MR. TAYLOR: Mr. Etherington, Jim Taylor from B and W, and I would like --

MR. ETHERINGTON: Would you come up where you can speak into a mike, please?

MR. TAYLOR: Just a question of clarification on high point vents to see if we can better understand the position that the Staff is taking.

We have a feeling that --we have a firm feeling, that because of the unique configuration of the B and W system, the way the hot leg comes out above the core and goes up through the Candycane, that we are in very much agreement, I think that the utilities that we are working with agree with us. The high point vents on the top of the Candycanes and the pressurizer are appropriate.

Because of the configuration of the loop, we think that it is not necessary to have high point vents on the reactor vessel head, and in fact that there are some disadvantages to having a vent there.

Now, it is obvious that there is a difference in the configuration and the thing that we would like to make sure of is that the requirement for reactor vessel head vents is not just a generic thing without recognition of the difference in configuration.

MR. SILVER: If I may respond to that. It at the moment, at least, is a general thing, rather than a generic thing. We certainly would like to see B and W and Met Ed's justification for not having this reactor vessel head vent. But, again, as Mr. Vollmer pointed out the critical accident perhaps is the depressurization accident with a bubble in the top of the reactor rather than in TMI 2 scenario. That is with the hydrogen generation and then the depressurization of that, where I don't see that Candycane vents would, in fact, would do the job, since you have started with the bubble in the top head.

MR. ETHERINGTON: Are any of the Staff's analyses and according to my figuring the temperature at the top of the head was not sufficiently high to cause flashing at the pressure system.

I shouldn't have injected this now but it was assumed that the metal was hot enough to cause flashing of steam in the head. At the time you found this by that little nickey on the level trace and the pressure drop the saturation and pressure had not been reached even in the head. It is something to look at anyhow.

MR. TAYLOR: The point that we were interested in pursuing is that the way the top light comes out, unless the depressurization vent were one which were very subtle and if there is indeed some void indication on the hot leg, as Mr.Slear said, then all of the gases are going to flow up to the Candycane from which it is ventilated.

MR. SILVER: At a slow rate. Whatever the rate is.

MR. TAYLOR: Yes, the only kind of accident that could get into trouble which would not show up by the gas flow and would not allow the gas to flow up the Candycane would be if there was a very , very sudden depressurization, such that the Candycane vents are not going to take away the gas, but under those conditions, neither is the reactor vessel head vent.

MR. SILVER: I am not sure that it is proper to engage in this stuff, but I might point out that you could have vented the head previously, so that there would not be this residual bubble in the head, if there were a head vent.

MR. TAYLOR: It would be good if we could -- in order to bring us together, we could understand the criteria. We have a unique configuration and we want that recommended.

MR. SILVER: Indeed.

I do have some other comments, sir, if I may?

MR. ETHERINGTON: Yes, please.

MR. SILVER: As Mr. Slear pointed out on most of these,in effect should be will comply's rather than do, and this relates to our own comments in the status table where we, in fact, did indicate why against the lessons learned items of containment pressure water level and hydrogen level, again, the requirement is to make reasonable progress against these items.

We consider that at this time or the time of safety evaluation, in fact, reasonable progress has been made.

That, of course, is a changing requirement with time. A month or six months from now, quite obviously, more progress will or had to be made. We will so note such progress is appropriate.

Again, I would repeat, I guess, what Mr. Slear said that in some of these items we have not seen any submittal at all at this time. For example, of plant shielding which he did indicate would be submitted in mid to late February, and other plants who have already submitted this and counted some trouble in our review. I hope that we will have less with TMI 1.

ᵀ th regard to close to action sampling, we have quoted a letter to the licensee quite recently within a matter of days, pointing out the requirement of the lesson learned on the task force to have a sample -- the results of a sample be available in two hours.

In formal discussions, and I am a little bit confused on this point, it was my understanding -- third hand, ı might say, that the formal d:scussions have inc'icated that the licensee hɛs, in fact, agreed to go along and can accomodate this remark.

If that is not correct perhaps we could clarify it now.

MR. HERBEIN: Dave, can you address that the accomodation of the Staff's position that we would be able to take a sample of the reactor coolant system within two hours?

MR. SLEAR: I discussed this with Mr. Dubiel last night to make sure that I was not offtrack. Mr. Dubiel is the right man who would have been assessing our capability to get and analyze within two hours the sample and the fact that we should not be committing to that because it presents difficulty in the accident situation.

He sent it to agree with the 8-hour contract that I have in here, so it is not obvious who within our company agrees to it.

MR. HERBEIN: Harley, is this within two hours of an initiating event?

MR. SILVER: Yes, I think that is --

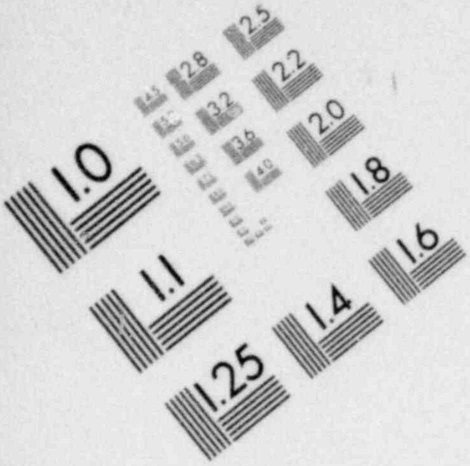
MR. TAM. Two hours from the time they decided the example.

MR. CLARK: Philip Clark of GPU.

We certainly are in agreement in trying to get a sample as early as practical.

I don't think we yet see any concrete step that we could take to get it in two hours that we aren't taking already.

Having recently been fined for rushing in to get a sample at the expense of an unnecessary radiation exposure in the minds of some people, we are reluctant to commit in



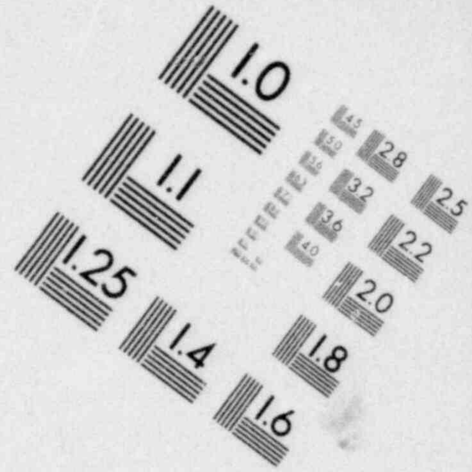
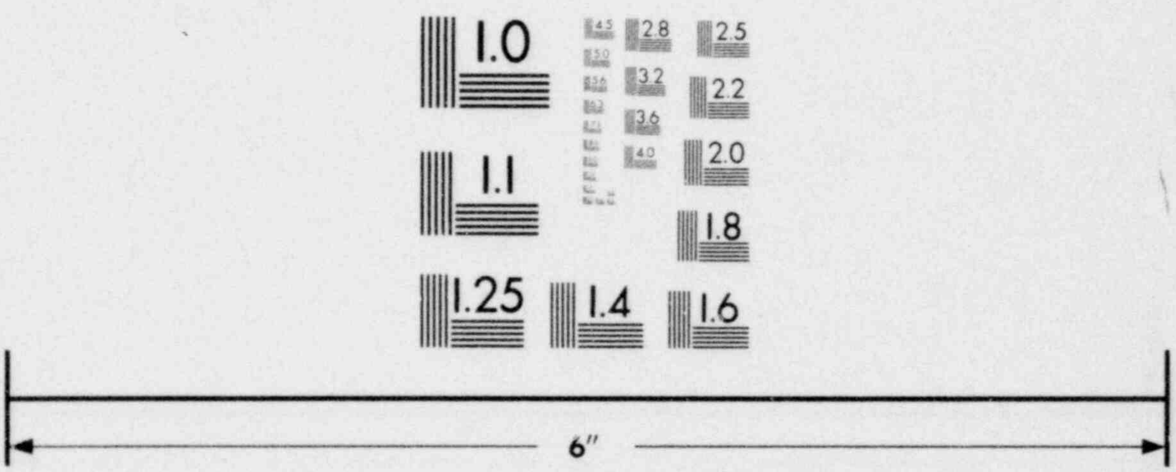
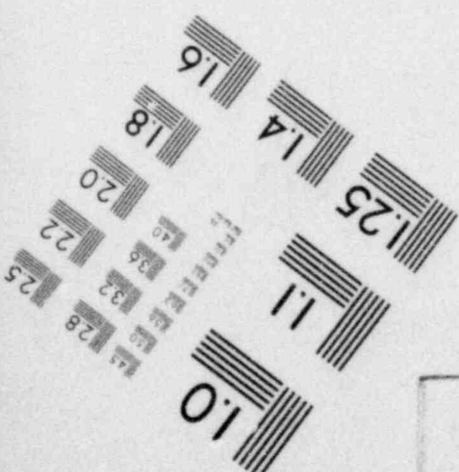
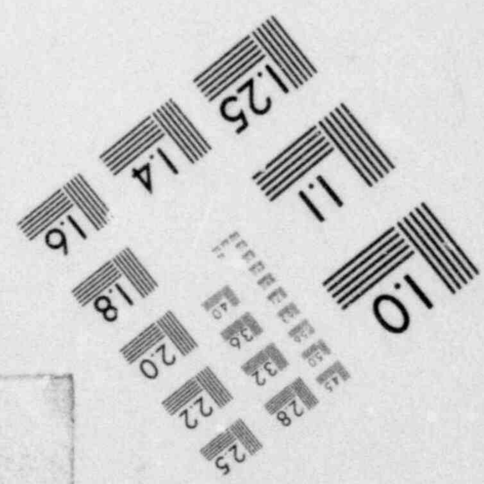


IMAGE EVALUATION TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART





an emergency to, in fact, be able to carry out in two hours.

If there are simple, practical steps that would facilitate taking it in two instead of eight, we certainly would consider and I think would try to take them.

The discussion is, do you commit two hours in an emergency with the other things that have to be done, and I think that is the basis for our present disagreement with the Staff.

DR. LAWROSKI: Was the exposure primarily in getting the sample or in arranging from that point on to get the analysis?

MR. CLARK: The time limit, as I understand it, is to take the sample and analyze it. So, the endpoint includes both getting and analyzing the sample.

MR. ETHERINGTON: Okay, the next item is the last, isn't it? Under the Radiation Protection Plan.

MR. ARNOLD: Mr. Bill Potts.

MR. POTTS: Good afternoon, gentlemen.

As the manager of radiological controls for Three Mile Island Unit One, I am responsible for the development implementation and enforcement of the radiological controls program. I report to the Vice President --

MR. ETHERINGTON: What about Mohammed coming to the mountain?

MR. POTTS: I'm here to describe the radiation protection plan and the radiological control organization. I'll start with the organization.

We've reorganized my group into three sections: first is the radiological engineering group, which contains a supervisor and the engineers; second, I have a field section which contains a supervisor, a foreman for each shift, and the technicians on those shifts; finally, I have an administrator with clerical staff to control the paperwork and document system.

The Radiation Protection Plan is a compilation of philosophies, policies, and objectives which we feel will make an excellent radiological control program. The object of the plan is to maintain exposures within regulatory limits as low as reasonably achievable, and also to increase the effectiveness of our control program. Details of how that program operates are found in our procedures manual.

The Radiological Control Program is based on the philosophy that radiological control is everyone's responsibility, not just those personnel bearing the title "Radiological Control Department". We stress with all our personnel, at TMI, their responsibility to minimize their exposure at all times -- that includes actions necessary from each manager, supervisor, and worker at TMI-1.

The policy of the control program is its verbatim compliance is mandatory in all phases including operation, design, maintenance, and administration.

The Radiation Protection Plan requires that the Rad Con Department stop any work which is not in concert with good radiological control practices.

To assure that the requirements of the control program are being met, and to assist in the management of that program, we have a system of audits, reviews and reports that have seven elements.

The first element is the control technicians who monitor and aid the radiological workers in performing their work.

Second, is the radiolog. al engineering group reviews on a regul.r basis performance of the radiological control technician, placing particular emphasis on areas that have a high potential for radiological difficulties.

An assessment function is conducted on a continuous basis by an inspector who reports independent of the Rad Con Group to the Vice President.

Further, we have q/a audits of the Radiological Control Program on a periodic basis. Periodically an outside consultant will be retained and is presently advising me in revising the program. We have the Plant Operations Review Committee, who reviews and comments on the Radiation Protection Plan and such procedures as I would request.

Finally, we are developing a system that will identify and document, resolve radiological control deficiencies no matter how insignificant they may appear.

The purpose of the system is to provide a mechanism for continuous improvement of the control program. To provide us with an increased ability to meet the objectives of the Radiation Protection Plan an extensive training program has been developed, parts of which Mr. Lawyer earlier discussed.

I will mention several differences -- several items that he did not include in his description.

We have a general indoctrination for employees not directly involved with radiation to provide them with an understanding of radiological hazards and what restrictions are placed upon them.

Occupationally exposed people are trained and retrained to provide them with an understanding of the facts and risks associated with radiation exposure to give them an understanding of their responsibilities within this program and also conditions under which they would be exposed.

Radiological workers are required to pass written examinations, pass a practical practice examination, and to requalify annually.

The work which involves higher than usual exposure, we're requiring special briefings in the use of mockups.

Finally, the training for the radiological control technicians and foremen have been considerably increased to include theoretical and practical training of the use of our procedures in the program and also places emphasis on training to handle unusual situations such as a contaminated or injured individual or a radioactive spill.

Following the training programs for the technicians and foremen they are required to pass both the written and an oral examination and also, in addition to that, there are periodic drills for the shift workers.

Our control of exposure, external exposure, is based on the assumption that any exposure involves some risk, however slight, and with inaccepted limits that risk is small compared to the normal hazards of life.

During our training and in the manual and procedures we emphasized the philosophy that exposure as low as reasonably achievable requires an active participation by all personnel at TMI.

The Rad Con Department's responsibility is discharged by way of establishing administrative exposure levels lower than those in part 20. We establish manaram exposure goals for each major job and for each year. We require free planning of work that involves exposure and major exposure jobs requiring corporation of radiological controls into the design and procedure in the pre-job briefing and rehearsal.

Control of internal exposure, it is our policy to control that to as low as reasonably achievable and that, to us, means that no one should be exposed to anything greater than ten percent of the internal exposure. This is accomplished, primarily, through controlling of surface contamination and airborne radioactivity. Exposure to airborne radioactivity -- the control for that is, primarily, one of engineering controls and controlling access as a first priority and using respiratory protection only when with medically qualified personnel and only when engineering solutions are not feasible.

Personnel who are qualified to use respiratory protection are required to requalify annually in the use of the respirator with a quantitative and qualitative fit and a medical examination.

And, finally in control of internal exposures we use a whole body counter annually for all those radioactive workers and any instant of internal exposure above a level near a background would be investigated to determine how that exposure occurred and a . effort would be made to prevent it in the future.

That concludes my prepared remarks.

Do you have any questions?

DR. FOSTER: Did the reorganization of your particular function that you mentioned, did this occur more or less coincidental with the reorganization in unit one which recently occurred or the Unit two, I should say?

MR. POTTS: It occurred very recently, yes, sir.

DR. FOSTER: During an emergency situation there will be a dose evaluator, I believe that it is mentioned in the plan. Is that one of your people?

MR. POTTS: The Dose Assessment Coordinator. Yes, sir, it is.

DR. FOSTER: That actually makes the estimates of or projections for off site as well as on site dose?

MR. POTTS: Yes, sir. Yeah.

DR. FOSTER: Back to these field monitors, are those your people?

MR. POTTS: Yes, sir.

DR. FOSTER: Okay. They, in fact, then are separate from the operating course.

MR. POTTS: That is correct, sir, I report -- my group reports to the Vice President.

DR. FOSTER: Yeah.

DR. LAWROSKI: Do all the hospitals around this area agree to accept contaminated injuries to individuals?

MR. POTTS: The Hershey Medical Center hasn't, as to the question of all out referred to --

Our plan calls for the Hershey Medical Center, and they have agreed to accept those casualties.

DR. LAWROSKI: Is that the only one?

MR. POTTS: I'm sorry, I can't answer that.

MR. HERBEIN: Sir, we're in the process of obtaining a letter of agreement similar to the ones that we obtained before Unit One was licensed. That does involve a number of these kinds of these activities of the State police, fire departments, and area hospitals, medical assistance, and so on. That's currently underway.

DR. LAWROSKI: Thank you.

DR. FOSTER: Back to the projection of these off site doses, kind of focusing on this because it has a lot of implications, obviously, in terms of protective action and whether it is going to be taken or not, I realize that the protective action is something which is initiated by the State people. But, I have a feeling that a lot of their decision in that matter will really come from you people who are making these dose projections.

Is this perception correct or do you anticipate that they are going to be duplicating the same sort of thing which your people are doing here?

MR. POTTS: I'm not in a position to answer a question having to do with the State's intention, sir.

MR. HERBEIN: Sir, to the best of my knowledge, the State does plan to have capability with regard to environmental sampling and analysis.

Additionally, the Brookhaven Laboratory is available on short notice and that they have that kind of capability so I wouldn't see that it would be only plant technicians that would be involved in the off site dose assessment.

However, were the accident to be of great magnitude without sufficient time then we do have the capability with our on site abilities that Mr. Tsaggaris previously mentioned to take on site and off site samples and make appropriate evaluations and, of course, communicate those to the various State and civil defense organizations.

DR. FOSTER: I noticed in your emergency plan that it refers to a second implementation manual. It makes reference there that you would be using this implementation manual to estimate doses relative to E.P.A. Protective Action Guides in providing this information to the State emergency centers and I was trying to get a little better feel for, you know, the people that are actually involved in -- I guess -- using the manual making additional assessments and feeding that kind of information.

MR. POTTS: The Senior Radiological Control Engineers are the men who make those assessments.

DR. FOSTER: Incidentally, since you're going to be bringing some of the training manuals tomorrow morning, would it be possible to get a look at your emergency implementation manual. Is that practical?

MR. HERBEIN: I think, at the present time, that implementation manual is currently under preparation because it does contain all of the implementing or, at least, the majority of the implementing emergency plan procedures; of which, I understand, there are some 40 and approximately 30 are prepared so I'm not sure that the implementing emergency plan manual is, in fact, available.

DR. FOSTER: All right, thank you.

MR. ETHERINGTON: Are there any further questions? Would the staff like to comment?

MR. SILVER: Yes I would have a word of explanation of our entering in our status table where indicated the date of February 15th against the radiation detection plan with the review complete by the supplement.

We have, in fact, of course received the radiation detection plan formally have had a meeting with Metropolitan Edison on it and have informed them of a rather large number of comments we had on the original radiation detection plan.

We have received informally a signed copy, I guess, of the plan but not a formal submittal on the docket of the revision to the plan which, in fact, does answer almost all of the points we have raised.

There are, however, four items still outstanding which we will communicate to the lecensee immediately and hope for a response in early February sometime.

In fact, one or two of the items may have been addressed in Mr. Potts' comments today.

If I may, I would like to regress, for amoment, back to the lessons learned on long-term items. There was a matter that I tended to discuss and elected to. I would like to, before I do that, I would like to reiterate, though, the staff position with regard to vessel head vents at the risk of redundancy and comment what the position is at this time to acquire vessel head vents and if, in fact, that it proposes and B & W proposes not to provide this we would have to be convinced that this is not, indeed, a good idea.

I would like to ask John Vodelwede of --

MR. ETHERINGTON: Could I ask on this one, does Met Ed have a serious difficulty in providing a head vent?

MR. HERBEIN: Sir, I think we do but I'm not prepared to develop the specifics at this time.

MR. ETHERINGTON: All right. Well it's still between you and the regulatory staff at present?

MR. HERBEIN: That's correct, sir.

MR. SILVER: I would like to ask Mr. John Vodelwede of the staff to discuss some other long-term items which we had not listed separately under long-term groups, because they are, in fact, combined with or discussed with short-term items that are in the lessons learned discussion.

There are perhaps some items that should be discussed, at this time.

John, will you do that?

MR. VODELWEDE: I wonder if I could use the mike, she's having trouble hearing.

MR. SILVER: I'm having trouble talking.

MR. VODELWEDE: My name is John Vodelwede. I would like to comment on Mr. Slears slide in which he identified long-term lessons learned items.

We think that it is somewhat deficient, our source of information is table 8-1 in the staff's evaluation in which I in light of my recall items which were not in catalog A which is short-term. I come up with something like 18 rather than seven. Among those items which I think should have been considered on the slide which were not is the vessel human level detector which was not there.

The current staff position is that for a long-term instrumentation needs for inadequate core cooling that the vessel level detector is necessary but not sufficient to meet that long-term requirement.

Another item is we need upgrading of the Technical Support Center. The short-term requirement is essentially that such a center shall be established. The long-term requirement is considerably more complex than that. Each one of these items are coupled to the short-term requirements of the new rates. Until we see some justification to turn away from the current staff positions on such things as the level detector we have to assume that that's still a requirement.

MR. EBERSOLE: Pardon me. I have to make an admission here.

It just came to me with almost shocking clarity that if cool temperature measurement is also a level gauge, that is it has to be under liquid.

MR. VODELWEDE: I do not believe that that's the case.

MR. EBERSOLE: Once it entered the steam phase it can't be so cooled.

MR. VODELWEDE: The saturation meter takes its inputs temperature and pressure, pressure transducer does not need to handle liquid phase changes --

MR. EBERSOLE: I know, but the temperature measurement.

MR. VODELWEDE: It does not either. A thermocouple for example as one wants to use that could use it for the steam.

MR. EBERSOLE: But you put it in the top of the candy cane.

Now, let me get my thinking straight here. You're putting this measurement in the top of the candycane then invoking your particular geometry here to do this rather than seeking Westinghouse geometry.

MR. VODELWEDE: I think you're talking about the steam generators.

MR. EBERSOLE: Yeah, the top of the steam generator.

Do you --

MR. VODELWEDE: I would prefer to have a measurement close to the core as possible.

MR. EBERSOLE: Well, anyway, you did it up there. Is that where you are -- are you not putting the temperature measurement at the top of the candycane?

MR. VODELWEDE: I believe your question should be referred to th› licensee.

MR. HERBEIN: The temperature measurement is at the top of the candy cane.

MR. EBERSOLE: Now, is this not true that the temperature measurement made there on which you require 50 degrees after cooling necessarily must be under water.

MR. HERBEIN: Yes, sir, if we're --

MR. EBERSOLE: And if it isn't under water you don't get the subcooling.

MR. HERBEIN: That's correct.

MR. EBERSOLE: So, therefore, it's a level gauge.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: So, therefore, you don't need a level gauge because you've got one in a lefthanded way.

MR. HERBEIN: I would agree with that.

MR. ETHERINGTON: It's not a level gauge it's a --

MR. EBERSOLE: Oh, I know it isn't a level gauge, but it says there's water, and then water is there and gravity hasn't failed it's going to be below.

MR. HERBEIN: I would also refer to the staff's remark concerning the proximity of the temperature detector to the fuel.

Yes, the subcooling meter ties off the temperature detector at the top of the candycane in a hot leg.

Additionally, our procedures do refer to the in-core thermocouples which are right above the fuel.

Our procedures require that we maintain subcooling on both the hot leg, the cold leg, and also on the thermocouples above the fuel assemblies.

We maintain the 50 -degree subcooling on all of those temperature readouts.

MR. EBERSOLE: Somebody correct me if I am wrong. I am reading this now as being the following: If I have 50 degrees subcooling at the top of the candycane I've got solid water there.

MR. HERBEIN: Yes, sir, that's what we have stated.

MR. EBERSOLE: If I've got solid water there then I also have it on the core.

MR. HERBEIN: Yes, sir.

MR. EBERSOLE: Because there's no monometer blockage between that point and the top of the core.

MR. HERBEIN: That's correct.

DR. CATTON: But if you reach saturation you'd have no idea what you've got.

MR. EBERSOLE: Right.

DR. CATTON: Even all the way down to the core because you could be reading saturation at the very high void.

MR. EBERSOLE: But you must have the subcooled condition.

DR. CATTON: So, once you reach saturation then you have to go into your feed and bleed mode independent of whether you need to or not.

MR. EBERSCLE: Yes.

DR. CATTON: Unless you do something else.

MR. EBERSOLE: Right.

DR. CATTON: Is that correct?

MR. HERBEIN: We need to keep the high pressure injection system on, and if, in fact, that takes us out through the P.O.R.V. and subsequently the code safeties in order to achieve that 50 degrees of subcooling then we're prepared to do that and our procedures provide that guidance.

DR. CATTON: So, rather than put more instrumentation then you are willing to take that penalty of maybe feed and bleed when you don't really need to, is that correct.

MR. HERBEIN: Yes, sir, I think that's an affirmative statement and that's our position.

DR. CATTON: Okay, I understand.

MR. ETHERINGTON: Now, that brings with it a price and that is you feed and bleed with everything you've got all high pressure injections. I think your design says you can feed and bleed with a hypothetical failure in the feed-bleed system, that is the, you know, one-inch piece.

The usual concept of a single failure in the high-pressure injection system. But at that point, though, you could then turn off half that capacity and judge from the design characteristic that you'd still be feeding and bleeding at an adequate core level even though you couldn't see it, Right?

MR. HERBEIN: Right.

MR. EBERSOLE: You would have no confirmatory information as to where the level was. You would just say I am meeting what I think is my design goal but I wouldn't confirm this. You do not confirm this by actual level pressure?

MR. HERBEIN: Bob Keaton, do you want to address that?

MR. KEATON: Well, that is true as long as you're talking about the water level down low, but you would get a confirmation of where the water level was before you went into a full feed and bleed mode, since you would measure the water level in the pressurizer.

MR. EBERSOLE: Well that, unfortunately, has the same problem in it, yet as the TMI-2 Case did. That water level reference is not a valid indication of the level above the core.

MR. KEATON: It would not be a valid reference of level above the core if it was at saturation conditions, that's true and in that case we would have to continue to fill it and go into the feed and bleed mode. But I might be able to avoid it if by the time I fill the pressurizer I also had re-established the necessary subcooling. In which case then my procedures would permit me to avoid going into the feed and bleed mode.

MR. EBERSOLE: Thank you.

DR. CATTON: When you have an overcooling situation, you are going to possibly get down to saturation. You're going to lose your subcool.

Does that mean you'd come on full feed and bleed as if you have a loss of fluid action?

MR. KEATON: Once again my answer is the same. Yes, you come on with full H. P. I. but whether you carry it all the way to a full feed and bleed depends upon whether you can re-establish subcooling and I think in the case of an overcooling accident that, in fact, you would re-establish subcooling part of the time that you fill the pressurizer.

DR. CATTON: Would you even if you lost actual circulation?

MR. KEATON: If you lose natural circulation I would --

DR. CATTON: Obviously, you wouldn't, I guess. Okay.

MR. KEATON: I think, obviously you wouldn't. I agree, yes.

DR. CATTON: Which brings up one last question that I asked earlier. How low can you get in the steam generator on the secondary side without -- and still maintain natural circulation?

MR. KEATON: I'm sorry excuse me?

DR. CATTON: How low can you get on the secondary side and still maintain natural circulation?

MR. KEATON: I do not have an unequivocal answer to the question. We know that at 50 percent level in the steam generator that there is very ample natural circulation from the geometry it appears that a level of about 120 inches in the steam generator corresponds to the mid-plane of the core. So, on a very simplistic argument one might argue that at that point it would be difficult to produce the driving forces for natural circulation so somewhere between the level of 50 percent and down at 120 inches is the cross-over point but I don't know exactly where that is.

DR. CATTON: Is it important that you know it?

MR. KEATON: No, sir, because our procedures say to take it above 50 percent.

MR. ETHERINGTON: No further questions on this topic?

MR. KEATON: I might add something, it is, however, as a matter of fact true that we're doing analysis to try to find out where the point is. I just don't think that we required the procedures.

DR. CATTON: When you complete your analysis and find i· I would very much like to know what it is.

MR. KEATON: Yes, sir, and we'll be glad to transmit that information.

MR. ETHERINGTON: I think that concludes our formal agenda.

I understand that Ms. Riley from the Pennsylvania State Department of Environmental Resources has arrived recently and she is willing to supply us additional information about the ten-mile protective action radius.

Ms. Riley?

TAPE 14-1

MS. REILLY: I am Margaret Reilly and I'm with the Bureau of Radiation Department of Enviromental Resources, and I am here to discuss any questions that you might have about the 10 mile radius. The first one will probably be in reference to the agency task force report between NRC and EPA in a matter of defining what distance is to be considered in emergency planning. That's where that number came from.

Now, where--how really that number was derived that near, that was never been quite clear to me. There appears to be a mix of opinion even between the agencies who developed the guidance. EPA maintains that it is 10 miles from PAG only and NRC maintains that it is 10 miles for short term effects reasonably so.

All I can say is 10 miles, its been a bone of contention of mine for sometime; so I'm still where I was.

DR. FOSTER: Thank you, Maggie. Part of the questioning that I started out with a little earlier was that in that original document there were a lot words that said about 10 miles and you really should take into consideration topography and demography and other features and drawings of that. And the answer we received will, for the purposes of the state, that it wasn't 10 miles at all, that the evacuation zone, could in fact, go out in some cases as far as 20 miles and perhaps either the state or county plans did include perhaps all of Harrisburg. So, I wonder how does the state view this situation?

MS. REILLY: Well, there's a lot of discussion going, as you can imagine; of course, you have the guidance which says 10 miles. The guidance says, for instance, if you have the outer edges of a densely populated area hanging on there, it is up to the state or the agency as to whether they are to include it or exclude it from the area.

As a result of the events of the weekend of March 30,31 and April 1, which--I don't want to be disrespectful, but it sounded as if there was an auction going on in Bethesda. First, they had 10 miles in the guidance and suddenly it's 20; and 20 has been sold now, at least in terms of the counties in the area. The state is telling the countries -- the state thrull PEMA, that is the Pennsylvania Emergency Management Agency, is saying, 10 miles because that is what the guidance says. But the counties, especially through the county commissioners since they were given 20 before, they are going to take again. So, for this particular site the planning posture is one of 20 miles solutionating in the counties. I don't know if I answered your question or not.

DR. FOSTER. Yes, I think so. You have submitted your state plan to the NRC.

MS. REILLY: Yes, one was submitted in the fall. We got comments back from the Regional Advisory Committee and another re do was going in sometime in February with recommended changes and some words that were required or recommended that weren't in there.

DR. FOSTER: Did you have this Pluming exposure zone defined in your documents to them at all?

MS. REILLY: We discussed Pluming exposure, of course, and methods of assessing or trying to develop protective action, based on what's going on. The general approach that we have been using is one that we, the Bureau of Radiation Protection, have been using as one of facing protective action recommendation on what is going on in the plant rather than relying on offsight mishigants (?) who take offsight mishigants (?) as a conformation of things that are more worse than you think they are.

We're--the method that we're using, if we need to project Plumes, is using convection overlays; we are looking into some other options, but we are looking at the overlays right now.

DR. FOSTER: I guess the bottom line is a statement. A person dealing with such emergency should they occur. Are you satisfied that the existing plans at the present time that can adequately respond do to conditons?

MS. REILLY: I think from our tehnical side, we're all right and I think, well this is still a personal opinion, because I'm not really in a position to systematically

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This is to certify that the attached transcript of the meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Three-Mile Island, Unit 1, Nuclear Power Plant, held in Middletown, Pennsylvania, was held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Sue Glocker

Sue Glocker

Janice Smith

Janice Smith

Sharon Corsanico

Sharon Corsanico

evaluate th generic aspects of the plant, I think that they are in considerably better shape than they had been.

DR. FOSTER: If you had to move the people, you feel the basic state plans, counties, are in place in order to do this.

MS. REILLY: I wouldn't say they're a 102 percent in place but things are being worked on rather studiously. Specific routing has been worked out with what kind of traffic flow possibilities, that sort of thing. There have been some informal estimates made as to how long it would take to evacuate, say 10 miles all around; they are working on several approaches. For instance, if you are considering a smaller radius, how would we do it?

DR. FOSTER: Okay, thank you.

MS. REILLY: Any questions?

MR. ETHERINGTON: I might mention that tomorrow morning that the Committee will not hear the Item 10 on Organizational Changes because of Mr. Arnold's absence.

I think that concludes the session for the day --

MR. SILVER: Sir, I'm not sure that I heard you. You said that we will not hear that?

MR. ETHERINGTON: We will not hear that; that's the first item, Item 10.

MR. SILVER: Thank you.

MR. MULLER: Will your people here start Item 2, the second item?

MR. SILVER: I will speak with them tonight, and make sure that they will be here.

(Whereupon, the meeting was adjourned at 6:05 p,m.)