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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

DISCUSSION OF SECY-80-107 - PROPOSED INTERIM HYDROGEN CONTROL REQUIREMENTS FOR SMALL CONTAINMENTS

PUBLIC MEETING

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

Thursday, June 26, 1980

The Commission met, pursuant to notice, at 3:30 p.m.

BEFORE:

JOHN F. AHEARNE, Chairman of the Commission
VICTOR GILINSKY, Commissioner
RICHARD T. KENNEDY, Commissioner
JOSEPH M. HENDRIE, Commissioner
PETER A. BRADFORD, Commissioner

ALSO PRESENT:

L. BICKWIT
W. DIRCKS
H. DENTON
D. ROSS
L. RUBENSTEIN
W. BUTLER
R. BERNERO
M. MALSCH
R. BUCHHOLZ
J. STARK

Pages 1 to 56

P R O C E E D I N G S

CHAIRMAN AHEARNE: The Commissioner meeting this afternoon follows from a request originally put out by Commissioner Gilinsky in which he asked that we have another meeting on the proposed interim hydrogen control requirements for small containments. It was a SECY paper 80-107.

In his call for the meeting Commissioner Gilinsky expressed a particular concern with the ice condenser plants, especially the D. C. Cook units and Sequoyah. He has recently returned from an on-site visit at Sequoyah.

We have an additional Commission paper on the particular subject at hand, SECY-80-107B of June 20, to add to the large amount and large collection of information we have.

We have an august array of individuals on the other side of the table. ›, Bill, as the senior staff member on that side let me ask you what you have in mind.

MR. DIRCKS: For the briefing that you have described that Harold and Dennie will certainly bear the burden of I have also asked Bob Budnitz and Tom Murley to be available to talk about the scope, direction and pace of the studies and research program that is involved, particularly including whatever short-term studies that are going on relating to the ice condenser situation.

MR. DENTON: Since we have talked to you last, we have continued a program of evaluating the efficacy of various hydrogen control "easures. Today we want to describe the bases for our response to you a few days ago answering Commissioner Gilinsky's last few questions.

Dennie Ross will make the presentation.

(First slide.)

MR. ROSS: As we go through the briefing this afternoon the people here at the table who might respond to your questions are to my immediate left Less Rubenstein, Assistant Director for Core and Containment Systems, and to his left Walt Butler, Branch Chief of the Containment Systems Branch. If we get into any structural matters Fron Showers of the Structural Engineering Br-nch is here. On a related matter of the proposed interim rule under graded cores Jim Norberg from the Office of Standard Development is in the audience if we have any questions on that related matter.

Go to slide two.

(Next slide.)

Matters that we are prepared to discuss this afternoon, I will get into the chronology and discuss the issues. I might point out that the issues on hydrogen control will be brought to the Commission for more formal decisions in two separate arenas. The issue of Sequoyah full power will come to the Commission shortly and hydrogen management we expect to be discussed there. Also when the interim rule is brought up for to the Commission for endorsement you will be discussing and either commenting or concurring on a proposed hydrogen management policy. We are not requesting any formal Commission decisions or guidance this afternoon.

CHAIRMAN AHEARNE: Although you may get it.

COMMISSIONER HENDRIE: I was going to say, decisions I doubt you will get but guidance I would be surprised if you can avoid.

(Laughter.)

MR. ROSS: Nolo contendere on that.

(Laughter.)

CHAIRMAN AHEARNE: It is creeping everywhere.

(Laughter.)

MR. ROSS: We will discuss the decision elements on how to decide whether additional hydrogen management measures are needed in a given containment. These include the likelihood of events, the response to the containment both in whether you are going to expose a burnable mixture or not and a structural response and the availability and practicality of various mitigation measures.

There is a relatively small but growing research program on various areas of hydrogen mitigation. We will discuss those. The related topics I mentioned briefly already, the rulemaking ventures and the Zion/Indian Point plant specific matter which has hydrogen control measures there.

Go to the next slide.

(Next slide.)

As Harold mentioned, the base document is SECY-80-107 which came to the Commission in February. We had a briefing in March and supplemental questions in late March and then we have provided answers to the Commission's questions in April as SECY-107A and then again last week with 107-B. We believe that we have completed the response now to the Commission's questions of March.

Next slide, please.

(Next slide.)

Unless there is a specific request, I was not going to go back and summarize the contents of either 107 or 107A. The thrust of the document that you just got last week, 107-B, we had been asked to provide the views of the probabilistic assessment staff. We provided as an enclosure to the paper an integral report from the previous speaker, Mr. Bernero. By the way, I believe Mr. Bernero is still in the audience, and along with Mat Taylor, who contributed to the document.

Inerting would have a small value in the overall accident risk reduction for the MARK I and MARK II containments. Some of the features that lead to that conclusion is the fact that you can get containment failure before the onset of metal water reaction for some sequences due to steam overpressure.

We also pointed out in our view, that is, in the view of the originating office, NRR, that the PWR/BWR designs were we thought in the same order of magnitude in terms of likelihood of having a degraded core per year. Some of the numbers you saw in the earlier paper from Mr. Bernero I think by and large agreed with that.

We felt in terms of the lessons learned from Three Mile Island, and this is in response to a specific Commission request, that, yes, some credit could be given to lessons learned, that is, the large body of improvements on operating reactors in the last 15 months should, in our opinion, reduce the likelihood of a severe or a degraded core per reactor year.

As a supplement to our 107B paper we provided an analysis from the Division of Safety Technology of NRR that did not appear to be a significant reduction in safety by inerting the BWR MARK I and MARK II, and this would agree within the views of the PAS.

COMMISIONER KENNEDY: You said there would not be a significant reduction?

MR. ROSS: Significant reduction.

COMMISSIONER KENNEDY: That means there would be some?

MR. ROSS: There is a tradeoff, and numerically I don't believe we could provide an answer. There is a day-to-day advantage in having a non-inerted containment. You would probably be more likely to go in and do an inspection. To that extent inerting would be a disincentive. On the other hand, there are some sequences for which you would not get containment failure if you inerted and that would be an advantage.

In our view, risk assessment will not permit one to decide one way or the other because it is sort of too close to call. That is the flavor I got from the PAS paper also, although you may ask them directly.

COMMISSIONER KENNEDY: I wanted to be sure I understood what you just said that on the risk assessment basis when you add the negative and positive you come out to essentially zero; is that right?

MR. ROSS: Well, it is within the margin. Yes, sir, zero interpreted as being the margin of the spread of risk assessment. Like I said, the originating office's viewpoint, Mr. Bernero may want to put it a different way.

CHAIRMAN AHEARNE: Do you, Bob? Do you want to put it a different way?

MR. BERNERO: Dennie has to make a risk assessment. We evaluated the effect of inerting on the accident sequences, but did not evaluate the counterpart of it, you know, the maintenance and accessibility and so forth. So ours was a more narrow scope.

CHAIRMAN AHEARNE: In your more narrow scope the conclusion you reached ---

MR. BERNERO: ---said that the benefit of inerting appeared to be marginal.

COMMISSIONER KENNEDY: That is even without considering maintenance?

MR. BERNERO: Without considering the maintenance.

COMMISSIONER KENNEDY: Well, I guess that does come out about the way Dennie is saying. Okay.

MR. ROSS: In our paper, 107B, we continued, however, to support the viewpoint that you should inert the MARK I's and MARK II's. The logic that we provided was threefold: that it is a proven technology; apparent low cost, low being relative of course; and that we did not see any significant safety disincentives.

COMMISSIONER KENNEDY: Would you remind us what that low relative cost was?

MR. ROSS: I believe it is one or two million dollars per year.

We did provide by Commission request two additional letters from General Electric giving their viewpoints, and those are enclosed to the Commission paper. Our view of those letters is that the GE believes they have a superior design which would reduce the likelihood, and they believe that the preferred way to solve this problem is through the rulemaking procedure.

MR. DENTON: I do want to say just a bit about the use of risk assessment for a specific area like this. It is sort of a microrisk assessment as opposed to a big risk assessment. Whether or not a particular corrective action helps a lot depends on what you think the dominant sequences are. If you think some other sequences dominate the risk then something you put in to help a specific one has little credit, whereas if that one you have corrected for is the one that really happens, as the one at TMI was the case for their extensive core damage but no containment pressurization, then it would have made a substantial difference, or could have made a substantial difference.

COMMISSIONER GILINSKI: I wonder what the response of the probability assessment people to that is? I guess I am not sure I understand your point of view. Is it that you feel there would be failure through overpressurization coming from sources other than hydrogen that would proceed possible problems with hydrogen and therefore there is no point in, so to speak, defending against that, or what, because at TMI we did in fact run into a situation where the hydrogen was in fact being the dominate source of high pressure.

MR. ROSS: Who were you addressing that to, Bob Bernero?

MR. BERNERO: I wasn't sure whether Harold wanted to some something else. Really what the risk assessment such as we are doing does, it says on average, statistically or probabilistically looking at the spectrum this is how it balances out. What I understood Harold to say was that that still leaves a family of sequences which may not indeed be the odds on favorites. They may not necessarily be the dominant ones, but they are there and there is a way to deal with them. That is what I interpreted him to say, I am not sure, and I agree with that, yes, the risk can be reduced. All we are saying with a probabilistic comparison such as was done for the inerting of the MARK I there was that the degree of overall risk reduction is modest or marginal or small, whatever word you would prefer on balance, but it doesn't say that it is zero.

COMMISSIONER KENNEDY: I didn't understand Dennie to say that. He, too, said that the benefit was there but small, admitted, and that there were tradeoffs which also were small, and I said, does that add to essentially zero, and you know, plus or minus some fraction, and the answer is yes.

COMMISSIONER GILINSKY: Well, it sounds to me as if it is zero if you are confident that the sequences that we think are dominant are in fact dominant and that the relative probabilities are about right. If one has some doubt about that one may want to hedge against the possibility that there are other sequences which we may underestimate.

MR. BERNERO: That our cast of sequences may not be accurate. We are not that certain of it.

COMMISSIONER KENNEDY: Is that true equally as to the possible negative effects? We are not that sure of that either? I guess that is true.

MR. ROSS: This is one question we had been asked as to the experience on entering the dry well because that is the area where we speak of disincentives. We did provide the information and it looks to us like there is little or not correlation between dry well entries between inerted and noninerted. It looks more like the correlation, and it is a weak one at best, between a new plant and an old plant. So the younger BWRs inerted or not seem to get more unscheduled dry well entries than the more mature plant.

CHAIRMAN AHEARNE: That wasn't surprising, was it?

MR. ROSS: I guess not. I think the so-called bathtub curve prevailed there as well.

Okay, on the slide that you now see we have tried to put up the issues associated. This is sort of a decision tree for us. It categorizes the plants in more or less increasing containment volume. We are asking questions like shall the MARK I's be inerted that are operating, which would affect only Vermont Yankee and Hatch because the others are? Should the new plants in the operating license phase be inerted?

CHAIRMAN AHEARNE: Those are plants that are designed to be able to be inerted but are not currently planned to be inerted?

MR. ROSS: It is our understanding, and Walt can maybe add on to it, that you could without much trouble adding the inerting feature.

MR. BUTLER: That is true.

MR. ROSS: Okay. Now, the first of these plants won't come on line for another year anyway it looks like.

MR. DENTON: I guess I am one who thinks that the downside of a plant that is designed to be inerted is mainly financial. In other words, if you design it for inerting then you can compensate for design and you don't have to make the entrances. However, it is a different picture if you make that balance for a plan that is not designed for in..ting. Then there are more disadvantages when you inert.

CHAIRMAN AHEARNE: But I and II have been designed to be iner.ed; is that correct?

MR. DENT-: Yes.

MR. RC Point No. 3 is should additional hydrogen mitigation measures be required for the ice condenser? This would affect two units in the full power state, the Sequoyah unit in the start-up phase and then seven other units in different construction phases.

CHAIRMAN AHEARNE: D. C. Cook are the ones at are in the operating phase?

MR. ROSS: D. C. Cook I and II are the only two in the full power mode and then of course Sequoyah I in the start-up mode followed by the other Sequoyah plant, Mcguire, Watts Bar and Catawba, two units each, and of course if the offshore power builds, those also.

The first MARK III is Grand Gulf and it would come into operation late 1981. The question there is do we need more for it? Then finally, do we need more for the large dry containments in the subatmosphere. Those seem to us like dividing up the issues into something we can chew on.

Next slide.

(Next slide.)

It seems like there are four decision elements. The front end or the probability that the event would occur in the first place, and this is one area where we answered the Commission saying we think there has been a net reduction already over the last 15 months as a result of TMI lessons learned.

The second decision element would be related to the rate at which hydrogen would build up in the containment per unit time or per unit ZR-water reaction.

The third decision element would be how well the structure could respond to various amounts of hydrogen combustion.

The four decision element was how readily available and effective would be various mitigation devices like combusion suppression through hylon or inerting and perhaps early burning, and in the extreme some late event that the pressure is a result of burning.

Let's have the next slide.

(Next slide.)

This is put in for reference purposes. Since the Commission issued it I won't dwell on it. It is the recent policy on CLI-80-16 on hydrogen management. The relevance has to do with on a plant to be licensed. Can we permit additional hydrogen measures as contrasted with can we require hydrogen measures.

We read the Commission decision as saying that additional measures could be required for hydrogen control if there was a credible LOCA scenario. We put that in there in terms of the regulations permitting us to require things.

COMMISSIONER GILINSKY: Could you repeat that?

MR. DENTON: Let me try to say it a different way. I read this as issuing guidance for case-by-case adjudication of this issue. It wasn't available when we first formulated our papers to you, but now it does set policy for future adjudication in these areas.

COMMISSIONER GILINSKY: This is the TMI staten

MR. ROSS: This is the TMI policy statement in response to this certified question from the Board.

CHAIRMAN AHEARNE: Yes, it was an order that was ---

COMMISSIONER GILINSKY: I know what we are tal about now.

MR. BICKWIT: Then that tracks with your readi That is fair.

COMMISSIONER GILINSKY: Let's see now, you fee you can only require hydrogen mitigation measures if the is a specific scenario that you can march through that w take you to a place where you feel you would need them?

MR. ROSS: Well, not quite. 50.44 lets us require, for example, recombiners now, but recombiners w not do anywhere near what one would need to do for a degraded core type hydrogen, a TMI type hydrogen release

COMMISSIONER GILINSKY: Right.

MR. ROSS: The question is what regulation wou permit us to require measures to combat TMI type hy release, and the answer, I think provided through t counsel's office was if we saw a credible LOCA scen under part 100 we could require measures.

Now, the rulemaking that will be on the C table next month, in my opinion, would supplant tha for now we see this as authority. Now, in all like what we would do if we saw a credible LOCA scenario fix the scenario. Nonetheless, that mechanism exis

CHAIRMAN AHEARNE: Pardon me?

MR. ROSS: Like the interfacing LOCA, if like it was a big problem you would fix the interfa and not put in hydrogen control.

CHAIRMAN AHEARNE: I see.

COMMISSIONER HENDRIE: Or maybe do both, least fix the interfacing LOCA.

MR. ROSS: Right, as a minimum, yes.

Okay, next slide.

(Next slide.)

COMMISSIONER GILINSKY: Excuse me. The Co is in the position of saying that you cannot oppose to deal with hydrogen in excess of five percent meta reaction unless you can detail a specific series of leading toward a problem situation.

MR. DENTON: Under part 100.

MR. ROSS: That is my understanding.

COMMISSIONER GILINSKY: Which leaves us in the position of saying -- well, it is rather odd. Here we are and we have experienced Three Mile Island and there was a lot more hydrogen generated there. It leaves us saying that the lesson of those events is if specific things happened then we will have to deal with them rather than if certain unexpected events happened.

CHAIRMAN AHEARNE: Those are the same points that you made at the time that the Commission affirmed the order. As we pointed out at the same time we do have this rule on degraded core coming up. So, yes, those were the relevant points you made at the time.

MR. HENDRIE: And I would like to note that I disagreed with the points then and I disagree with them now. I think that is not an unreasonable characterization of the Commission's order in TMI unit one on hydrogen, but I am not sure that it is useful for the present discussion to reiterate on each side why we think these things.

COMMISSIONER GILINSKY: Well, I will tell you why I raise it, and not to go over the old ground again. It is because it means you can't, I don't know whether it will come out on this subject, but you seem to be ruling out measures to control hydrogen more or less on general grounds and on the fact that we have experienced an accident in which substantial hydrogen was generated and that would seem to be a reasonable thing to guard against. Do misinterpret you?

CHAIRMAN AHEARNE: Which of us are you addressing?

COMMISSIONER GILINSKY: Well, I don't know, either one of you.

COMMISSIONER HENDRIE: What we said is that those matters are litigable under part 100. If you can show that the part 100 guidelines would be exceeded by some sequence which involves hydrogen evolution in particular, then among other things it is reasonable to consider measures to deal with that hydrogen evolution.

Our problem at the time I will recall for you was that there was a question of whether to withdraw 50.44 and thus withdraw the established design basis for hydrogen control systems or whether to leave that design basis in place for the value which it did still have in the process and to supplement it by allowing specifically litigation on the hydrogen question under part 100, and I think we went the right way.

COMMISSIONER GILINSKY: Well, let's hear what Dennie has to say.

(Next slide.)

MR. ROSS: This is more elaboration on the point as to whether lessons learned from TMI should reduce the likelihood. The left side of this slide is some different failure sequences like large and small LOCA or various transients. The right half of the slide is some of the preventive measures that have come since Three Mile Island, some of the so-called lessons learned. There is a catch-all at the bottom that applies to all of them, like the shift technical advisor, shift turnover procedures, training, simulator training and operating licensing measures. Then some of the specifics are requirements, not all of these have been implemented yet by the way, requirements to test the relief and safety valves, being to detect the pressurizer level even with on-site power, direct indication of valve position, training subcooling meters, better feedwater systems, and so on.

This is an elaboration of why we think the likelihood of getting degraded core accident sequence is less.

Next slide.

(Next slide.)

The Commission has seen this slide for reminders of the build-up. In the ordinate is the volume percent uniformly mixed in the containment and the abscissa being the percent metal water reaction with the ordinate being indexed at the burn and detonation lower limits for hydrogen.

COMMISSIONER GILINSKY: Which are those now?

MR. ROSS: I am sorry?

COMMISSIONER GILINSKY: The little bars?

MR. ROSS: The 4 to 74 I believe is the burnable and detonation is somewhere from 18 to 59 percent.

Now, those limits are ideal in that the persence of steam would substantially alter them. You can cross plot that.

COMMISSIONER KENNEDY: Which is almost assumed, isn't it?

MR. ROSS: It should be, yes, sir. You can contrive sequences that would lead to degraded core like an interfacing LOCA that would let steam outside the containment somewhere and then open a PORV or something and let hydrogen out. You could contrive instances with dry hydrogen. I wouldn't think they are likely, but they are not zero. Of course, the significant thing is that for any given metal water reaction the MARK I's and II's have much higher concentration.

The next slide.

(Next slide.)

The next three slides respond to some questions that the Commission had asked at several places. We have done calculations over the last few months on safety factors of containment. We see on this first slide here a spectrum of calculations done for Zoin, Indian Point, Sequoyah and

Mcguire. It looks like a ball park of two and a half to three is a good safety factor for containment. I need to qualify these safety factors. They are uniform static load. They are not dynamic loads.

The design pressure for these containments varies marketedly. Sequoyah's design pressure is 12 pounds gauge, Mcguire's is 15, and the large dry containment are up in the 50 or 60. The numbers that you see there are multipliers of design pressure where you would expect the containment to either yield on left, or the metal column, or to fail in the right column.

Now, there are some qualifiers on these calculations that follow on the slides to follow.

CHAIRMAN AHEARNE: Wait. So you point is that they are all designed roughly with the same safety factor against yield and roughly this estimated safety factor against failure?

MR. ROSS: The design turns out that way. Well, the question comes up, remember one of the decision elements is, when do you need additional measures. If you concluded, for example, that you could have a stoic emetric burn and still not exceed the yield pressure, then you might conclude nothing more is needed, and for a large dry containment that is what would happen.

CHAIRMAN AHEANE: You would need a lot more than just this safety factor to get anywhere.

MR. ROSS: The ultimate, of course, is to retain the integrity in term of leak tightness. That is the qualifier that is coming up on the next page is that these calculations are relatively primitive and there are discontinuities and there are penetrations that are anchored in maybe an outer shield wall and they penetrate and enter containment and the relative displacement could produce LOCA yielding and LOCA leakage. It is this area where not much is known.

CHAIRMAN AHEARNE: Well, also the potential pressures you have is significantly different across those various types of containments.

MR. ROSS: The absolute pressure, right. If you put the failure pressure and not the safety factor, then you would see numbers like 40 to 42 pounds for Sequoyah and up well over a hundred for the large drys.

I would like to discuss some of the qualifiers that are mentioned on the next slide.

(Next slide.)

The structural analysis people point out they feel relatively comfortable in terms of integrity staying below yield which would mean that the ultimate pressure load would probably in order to feel comfortable as a regulator would take a lot more research, scale model testing and so on.

The areas that are not rigorously analyzed are mentioned in point No. 2, the penetrations that are anchored at different places.

There is a modest amount of research in technical assistance programs in this area. The Ames Laboratory consultant has done some of the calculations for Sequoyah and Mcguire. Los Alamos is doing Zion and Indian Point.

Now, the uncertainties, as I mentioned, integrity, leak tight integrity at or beyond the yield point we are not comfortable with at this time. We don't think you can accurately compute it or predict it. There is little or no data on the behavior of the liner and the weld materials and perhaps even the way the liner is anchored to the concrete. Again, if we could keep it below yield we would feel relatively comfortable.

We expect that this will be the subject, and I will mention it in a few minutes, of an additional research request.

The final decision element had to do with mitigating measures.

Let's go to the next slide.

(Next slide.)

Again, this is a slide that the Commission has seen before. You could inert with nitrogen. You could have a halon suppression system that would be activated on need.

If you had some detection like an adequate core cooling detection, undesirable superheat or maybe a hydrogen monitor reading off scale or something you could activate the halon system.

The filtered vented system is one of the more exotic system that would be part of the long-term rulemaking study.

CHAIRMAN AHEARNE: Why do you call it an exotic system?

MR. ROSS: Well, the concept had been specifically considered and turned down some time ago.

CHAIRMAN AHEARNE: Is that the reason it is an exotic system. (Laughter.)

MR. ROSS: Well, yes. I think one of the ingredients is requiring maybe some decisions on the operator as to the course of the accident. Could the stored energy in the compressed fluid be released, and then the fission product release is assumed to come sometime later where you could let out all the stored energy.

The first safeguards policy statement ever issued came from the ACRS in 1964, and I guess Dr. Hendrie was on the ACRS. You were not. In essence they didn't call it filtered vented containment system, but that is what it was. It could require some decisions about release energy now but don't release fission products later, or when would you activate the system. It also has a potential for letting out stuff that doesn't filtered. We have licensed one. It would take a lot of experimental analysis work to do it and to that degree I think exotic is the word.

COMMISSIONER HENDRIE: We have got approximately the equivalent out there at Fort St. Ring where if you get a vessel breach why you get rise in pressure in the containment building, but it is a confinement building really more than a containment and the pressure is relieved through louvers when then presumably swing shut, and by the time you would see any fission products why you haven't got very much leakage because they maintain a suction on the building and run everything through a filter.

I will note for the historians that I dissented as an ACRS member from that concept long, long ago. The scheme here is if you get LOCA or something like that it pressurized the containment, and you look at the situation and you say, well, I have all these gases steamed in the containment now, but I don't have many fission products at the moment, just faily low level stuff that was in the primary water. I am worried about what might happen down the line, and so why don't I start venting the containment excess pressure now and take the small releases ---

COMMISSIONER GILINSKY: But you don't have any hydrogen then either.

COMMISSIONER HENDRIE: At that point you don't have any hydrogen either. What you are doing is to create a a capacity for subsequent hydrogen evolution without release.

COMMISSIONER GILINSKY: But wouldn't you in the meantime be using sprays or something like that?

COMMISSIONER HENDRIE: Oh, yes, sure.

COMMISSIONER GILINSKY: So it just keeps the pressure down so the hydrogen wouldn't be adding very much to it; is that the idea?

COMMISSIONER HENDRIE: Well, it would carrying it way up into a dangerous range.

MR. DENTON: A fundamental issue we are confronting in ongoing looks at design at Indian Point is a rate of energy addition of hydrogen. The removal capacity of containment systems is normally about a hundred million Btu's an hour, something like that. The possible heat addition by combusion of hydrogen is on the order of 400 million Btu's. So you can't wait until the containment is fully pressurized and then start trying to take this heat out. There are studies going on, as Commission Hendrie said, to vent the containment before the hydrogen burn or recombination could start. So it is a rate problem.

MR. ROSS: Okay, next slide, please.

(Next slide.)

Some related research.

COMMISSIONER HENDRIE: Dennie, before you go on off on that other one, we ought to note that with regard to potential methods for improving hydrogen management capability there are some things which don't deal directly with hydrogen but deal with your ability to remove heat from the containment, on the one hand, or reduce the likelhood of having hydrogen on the other. So that in the broadest sense hydrogen management capability goes beyond just these specific things which would deal with hydrogen if you got it.

MR. ROSS: Yes, sir, these are definitely consequential measures. The presented the existence and now try to control it. Yes, sir, that is right.

In the research area we are having discussions with the Office of Research on two categories of users request, a short-term which would cover the next six to nine months, say, and then a long-term request for research that would support the final rulemaking which includes studies of the core retention devices and the filtered vented containment system.

Probably of more interest is the short-term work that we are going to try and get from research and through technical assistance or some combination thereof and to get a quick evaluation of one of the last bullets on the previous slide that had to do with hydrogen combustion. Both TVA and we are seriously considering the merits of distributed ignition sources. There may be some side effects that are deleterious and we hope to explore that rather vigorously in the next few months. This will be a cooperative venture between us and research. We should have the details on that and I hope to finally sign in the next couple of weeks. Meanwhile we are having informal discussions and negotiations with what we believe would be the principal contractors.

In fact, one of the research results that has already culminated is a rather extensive handbook on hydrogen combustion and all of its glory. There is a copy there in a draft form, "Behavior of Hydrogen During Accidents In Lightwater Reactors." At a first glance it looked like it might be very useful to us in making some of these short-term decisions.

The next slide, please.)

(Next slide.)

In the table of contents I mentioned related topics. There are four: the interimrule, which I have already discussed and should be up here next month; the final rule, there should be an advanced of rulemaking out relatively soon this summer. We are in the final review process. That rulemaking process will take a couple of years. We are considering whether to recommend to the Commission that degraded core coolant of which hydrogen management would be a subset should be an unresolved safety issue.

COMMISSIONER GILINSKY: Let me understand. The interim rule describes the requirements during the period that a rule is developed, is that right, the final rule is developed?

MR. ROSS: That is right. There are several items that would include operator training and what to do for a degraded core. It would mandate early MARK I's and II's. It would mandate some studies on some of the others, and I believe there are six principal features. It would sort of be like two Aspirins until the doctor came. Interim is the key word to it.

We have mentioned a specific related topic, the Zion and Indian Point, and hydrogen management is certainly an issue there.

(Next slide.)

The last slide is the conclusionary slide which integrates I hope the decision elements with the containment type. The first real likelihood, if you read across, it looks like for the different containment types, which of course are also the different reactor types, there doesn't seem to be any difference in the likelihood per reactor year of having a degraded core, again within the margin that one can quantify things.

The flow on the row No. 2 hydrogen concentration from left to right is from high to low because the containment is getting bigger, so t.e dilution is more. This would tend to say the containment types on the left are in more need of hydrogen management than the containment types on the right.

The structural problem from the calcultions that we have done, if you combust obtainable, that is obtainable in the sense of TMI mixtures, for the first three containment types you could have a structural response problem, the problem meaning at or above the yeild point. Again, this is a feature of how one specifies the calculation. If you specify that I release hydrogen like was obtained from the Three Mile Island event and have no combustion until you have released all of this hydrogen, then that is how you would put the word problem in.

Mitigation measures for MARK I and II, we point that these exist and beyond that we don't know.

CHAIRMAN AHEARNE: Dennie, before you pass over that. In a chart that had been provided in an earlier briefing I would have reached the conclusion that the subatmospheric plant was in a separate category from the MARK III and ice condenser. I would have reached the conclusion in talking about structural response that the MARK I and II were one category and MARK III and ice condenser were another category. It seems to indicate that

MARK I and II and ice condenser and MARK III are all the same.

MR. BUTLER: It is with respect to the hydrogen concentration that they are the same. However, since the subatmospherics have a higher design pressure, 45 psig versus 15 psig for these other smaller containments ---

CHAIRMAN AHEARNE: MARK II is also 45, isn't it?

MR. BUTLER: The MARK II is indeed also 45.

COMMISSIONER HENDRIE: Yet, but the volume is a lot smaller.

MR. ROSS: We pointed out in our original paper 107 that you could take a hundred percent metal water reaction on a subatmospheric containment if you could demonstrate a factor of two safety margin over design pressure.

The conclusion of the last slide, the bottom line both of the slide and of the staff position is that we continue to believe that MARK I's and II's require inerting. We will skip the ice condenser for just a minute. Then the MARK III, subatmospheric and dry we state nothing more now.

CHAIRMAN AHEARNE: The mitigation measures that exist, you are talking about ---

MR. ROSS: Inerting.

CHAIRMAN AHEARNE: Inerting. So that exists for most of the MARK I's?

MR. ROSS: The technology exists. There may not be valves and stuff at Vermont Yankee and Hatch to do it, but they know how to do it, especially Hatch since their sister reactor is inerted.

CHAIRMAN AHEARNE: The MARK II's and MARK III's are they substantially different in the sense of the difficulty of inerting the two?

MR. ROSS: In my understanding the III is markedly different. We would not state that the technology exists for the MARK III.

CHAIRMAN AHEARNE: You would for the MARK II?

MR. ROSS: We would for the II.

I skipped over the ice condenser bottom line. Some of the points that we feel about the ice condenser is that there have been many improvements derived from the action plans which of course is just a summary of many improvements that came before, lessons learned, bulletins and orders and so on.

CHAIRMAN AHEANE: Those kinds of improvements though are across the board on all types?

MR. ROSS: Yes, sir, that is correct.

We believe it did result in improved safety margin for the ice condenser plants relative to what they were before, in particular being able to recognize a severe accident or the onset of problems and perhaps the o inadequate core cooling.

We have looked at the factors that would disincentive for inerting the ice condenser and in particular to the maintenance problems associated w ice itself. That appears to be a significant disin if you had to inert it. You could not get in as ea the process of inerting and deinerting would be del to the ice.

CHAIRMAN AHEARNE: Pardon me, would be wha

MR. ROSS: It would affect the subliminati the ice. It would be flowing through the ice chest.

In terms of requirements we believe that condenser class of plants is generally acceptable fo full-time operation with respect to hydrogen measure However, we also believe, and it may appear to be a but I don't think it is, that there are probably som interim measures that could be taken on ice condense would increase the safety margin of these containmen

As I described a minute ago on the researc efforts, we are looking at a short-term study to inv the efficacy and acceptability of these features. W to look closely at the pros and cons of inerting and filter vented systems throughout the process of the rulemaking.

As far as the combustion process, that is th distributed ignition source, we intend to look at it especially and TVA is also. TVA has been looking at t very same questions. They have made presentations to ACRS earlier this month on this subject.

We believe, and these are from conversations have had with TVA people almost daily, that they have narrowed down their consideration to two features. On feature would be a distributed ignition source that ha by side with it a hydrogen sensing or hydrogen detecto appears that if you install this in the interim and wi perhaps a relaxed criterion on seismic qualifications redundancy and diversity until the completion of the long-term rulemaking on degraded cores that this would increase in safety margin.

I think the same logic would apply here that did on the MARK I's and II's. This type of instrument probably readily available and it is probably relativel cheap. Certainly the hydrogen detector is. For that it would appear that on a cost-benefit ratio that this feature of distributive detection and ingition instrume would probably be a safety benefit.

We think we ought to look into it quickly. W retaining consultants in terms of primarily Sandia, and between us and the Office of Research we think we can p down the pros and cons of this issue very quickly. We expect to have meetings to this end next week and we have had daily phone calls to this end.

CHAIRMAN AHEARNE: You said you felt they had narrowed it down to two possibilities instead of one.

MR. ROSS: They were looking into the halon system also. I am informed that in the last few days apparently halon dropped off as something that could be done in a few months. I don't know if that was economic or availability or both.

COMMISSIONER HENDRIE: I was going to ask Dennie do we know what some of the pro and con arguments were on the halon system?

MR. ROSS: On halon, of course, it is expensive, but I guess expense is a state of mind. If you have got a three billion dollar plant and a three million dollar price tag for halon, maybe three million is not expensive. It does have a personal hazard, that is, you wouldn't want it go off while you were in the containment accidentally, although I don't see any reason why this halon system shouldn't be manual. I don't know any reason to automate it.

COMMISSIONER HENDRIE: I thought you had some minutes to walk out without significant physiological harm.

MR. ROSS: It is up to 20 percent concentration which would probably be the recommended concentration.

There is apparently some chemical reactions, and I know of people who have worked with Freon that worry about this and maybe at high temperatures it breaks down into some bad actors, high temperatures like eight or nine hundred degrees.

MR. DENTON: Of course, it doesn't get rid of the hydrogen either.

COMMISSIONER HENDRIE: It just suppresses it.

MR. ROSS: Right.

MR. RUBENSTEIN: I was going to point out that the fluoride ion may be deleterious to the primary system is you had a spurious activation of the system and it does involve like 90,000 pounds of halon being put into the system. We are not quite sure that we know all about it that we want to know about how it.

MR. ROSS: I think a problem like that could be worked out though. Those are not serious problems. I think probably it is the timing more than anything else.

What we expect to happen over the next few weeks, we expect the TVA to be more firm as to what they are going to propose and we are going to be more firm as to what we would accept and hope we can come to closure on the issue of whether distribut... ignition sources are both desirable and perhaps even necessary for the ice condenser.

CHAIRMAN AHEARNE: Now, Dennie, if you reach that conclusion with respect to Sequoyah, then I would presume that equivalent conclusion would be reached with repect to Cook.

MR. ROSS: It could be. The Cook containment is a reinforced concrete and you might argue different strokes for that. We haven't discussed it, and as far as I know there has been no dialogue with Cook, but they can take on hydrogen.

CHAIRMAN AHEANE: They can, pardon me?

MR. ROSS: They can take more hydrogen because they have a stronger containment.

MR DENTON: They also have a so-called bottom spray ring that the Sequoyah doesn't have that also gives them a bit more protection. Certainly that would flow. I think we are looking at the margin here. When we went into this we didn't think we could develop the pros and cons from a safety point as quickly as we apparently are able to do. I guess the first concern is to be sure we don't put in something or require something or encourage something that makes the plant less safe. I want to be sure we don't start that.

If it is going in the right direction then we need to ask ourselves and are asking ourselves should we encourage the insulation of systems which don't meet all the safety criteria for seismic or equipment qualifications or aging. If it certainly goes in the right direction it is better to have it during a year while we study it further to get in a proper system working.

CHAIRMAN AHEARNE: When you say that Cook is stronger, is it at the Mcgu. :e end there?

MR. ROSS: It is a steel lined reinforced concrete as opposed to the Sequoyah which is just steel.

CHAIRMAN AHEARNE: For example, Walt had provided I guess the last time a table under ice condenser and design pressures, failure pressures, et cetera. Where would Cook fit, at the upper end of that?

MR. BUTLER: I am sorry, I don't recall the design pressure for Cook. It is either or 12 or 15. I think it is 15, but I would have to check the record.

CHAIRMAN AHEARNE: Well, the range is 12 to 15 on ice condensers.

MR. BUTLER: It is one or the other, but I am not sure which at this time.

MR. DENTON: With regard to Sequoyah I think they anticipate initial criticality in the first week of July, at least five or six weeks above our testing.

CHAIRMAN AHEARNE: They don't have approval for full power, right?

MR. DENTON: Of low power testing.

CHAIRMAN AHEARNE: I know.

MR. DENTON: That is right.

CHAIRMAN AHEARNE: In the paper you sent up, Harold, you mentioned that the methodology, and I assume you are referring to the methodology that both the probabilistic group and also Roger Matson's group used didn't give credit for the amount of energy transferred through the steel dry well and torus.

MR. ROSS: They did not because a system for doing that does not exist. It is not plumbed in. In the Sequoyah design there is a free-standing steel containment and then an annulous and then a concrete shield. You see, this transient fails due to steam overpressure of as many hours. An ad hoc procedure could be to spray the thing with water with fire hoses. This would probably be very effective in reducing the pressure, but you can't take credit for it.

MR. RUBENSTEIN: Or increasing the strength of the containment.

MR. DENTON: Or you could install a spray system in advance.

MR. ROSS: We discussed this with TVA and presumably they have either have or are considering it, one of the other.

One final feature is a side effect of the recent report that we got from Sandia that illustrates the potential benefit of a distributed ignition system. If you start burning hydrogen on the threshold of the burnable concentrations you may get only half of the combustion that you would get if you waited a little bit longer. The chart on this report shows that at 10 percent hydrogen concentration you would expect essentially get full combustion, but at 8 percent you might only get half. So this incomplete combustion is bound to have an overall safety benefit somewhere down the line.

MR. DENTON: I guess overall for the ice condenser class I feel like our understanding of mitigating systems and their pros and cons is rapidly increasing because of TVA's cooperative attitude in this regard.

FROM THE AUDIENCE: We can't hear you.

MR. DENTON: I think in the area of the ice condenser our understanding of mitigating systems is rapidly changing because of TVA's attitude in this regard. They are studying all these possibilities. We are learning a lot and I would propose that we decide that issue in the course of coming back to you on Sequoyah specifically.

COMMISSIONER GILINSKY: I don't have any questions on this, but I was going to return to part 100, if you could stand it.

(Laughter.)

MR. ROSS: If I could squeeze in the announcement, this concludes the staff presentation.

(Laughter)

CHAIRMAN AHEARNE: Before Dennie leaves Sequoyah, though, since you have visited it ---

COMMISSIONER GILINSKY: Well, I would just on the basis of my own brief discussion with TVA second what Harold has said. I was there to take a look at the facility, but did have a discussion on this subject with them and found TVA working very hard on the problem analyzing the various approaches and taking what I thought was a very commendable approach and attitude.

CHAIRMAN AHEARNE: Dick, did you have any questions you wanted to ask on this?

COMMISSIONER KENNEDY: No, not now.

CHAIRMAN AHEARNE: Joe?

COMMISSIONER HENDRIE: I guess not.

CHAIRMAN AHEARNE: Peter?

COMMISSIONER BRADFORD: No.

CHAIRMAN AHEARNE: Before you get to your part 100 discussion which I don't think referred to Dennie ---

COMMISSIONER GILINSKY: No, although I am interested to what extent the outcomes are affected by the Commission's decision. Where does that impinge on how you are coming out?

MR. ROSS: On ice condensers I don't think it had any effect because Sequoyah is doing what it is doing. On Hatch and Vermont Yankee I think the only thing that will get them inerted, which is our recommendation, is a rule that permits it. We will have a rule up here in a month that would do that. The only other regulatory authority that we could would be to presumably to somehow interpret part 100. Now, we haven't done that. If we were looking for regulatory authority to compel inerting absent a rule that we are proposing, then I guess we would have to look at part 100 somehow.

CHAIRMAN AHEARNE: But, of course, the Commission hasn't reached the conclusion yet that they ought to be inerted.

MR. ROSS: It affects the MARK I's and II's but it does not affect the ice condenser in my opinion.

COMMISSIONER GILINSKY: The point I was going to make about part 100 which as I understand the way it works, and I am sure, Joe, you understand it better, I think you applied it vigorously for a number of years, is that you assume that there is a certain quantity of radioactive material in the containment and go on and calculate from there. Now, that is not related in any specific way to a particular accident. It is just a general assumption of a certain fraction of fission products.

COMMISIONER HENDRIE: That is right. In the conventional analysis, the classical analysis that we have done we say look to examine whether you have proposed the containment that it is tight enough and has a low enough leak rate. We will simply assume this atmosphere full of fission products corresponding roughly to a full core melt and then with certain established assumptions we will calculate off-site doses from the leakage and see how that looks. Indeed, within that framework there is no particular mention of hydrogen or no hydrogen. You are calculating doses from fission products.

What we have done in the TMI I, in the answers to the questions certified to us, is to say that we believe that questions about hydrogen in which hydrogen evolution becomes a significant element in the possible release of fission products by causing containment failure or whatever, that that is in our view a litigable subject under part 100.

Now, saying that doesn't confirm the direction of the argument just to that rather strict and artificial dose calculation that the staff classically does according to reg. guides 1.3 and 1.4 and for part 100 cite guideline conformance, but rather leaves it to the parties want to bring the arguments how they will pursue those.

Now, let me see if I can get a nod out of the counsel's end of the table for this explanation and maybe we ought to ask if there is anything want to edit.

COMMISIONER GILINSKY: What I was going to say is you can't have that quantity of radioactive material without at the same time having generated a rather large amount of hydrogen corresponding to it.

COMMISSIONER HENDRIE: In the real world I think that is probably correct. A water reactor is going to have enough steam in it so that if you get that kind of fission product inventory out you will probably have made a lot of hydrogen. I am just saying that I don't think that any litigation under the Commission's order on TMI I would be confined or bound by that sort of prescribed dose calculation that the staff does under reg. guides 1.3 and 1.4.

COMMISSIONER GILINSKY: But it sounds like you are not letting someone say simply, Look in part 100 you use this much radioactive material and corresponding to that is a quantity "X" of hydrogen.

COMMISSIONER HENDRIE: I think you could let them make that argument, but if I were their technical adviser I would advise them to make a more considered argument than tha because for years we have done this rather anomylous fission product assumption in the containment as a way of testing the containment design basis.

COMMISSIONER GILINSKY: I mean, that was not tied to any specific accident. As it turned out in retrospect that even thought it was a more or less arbitrary approach it was a good thing that we had it and we stuck with it because had we gone consistently with the approach that you don't consiier accidents involving core melt we might have ended up with no containment at all.

COMMISSIONER HENDRIE: No. I think you would have had to have a containment, but its leakage rate might have been substantially higher than unit II was and that would have been unfortunate.

COMMISSIONER GILINSKY: Where this brings me is that it seems in designing safety systems there is something to be said for putting in measures and in a sense hedging it against certain contingencies and not necessarily tying those up to specific scenarios but using certain general principles like part 100.

COMMISSIONER HENDRIE: I am compelled to agree with you since I have argued precisely for that sort of philosophy many times in the past and that is the way in general that the regs are set up, you know, the general design criteria. There are some of these overlaps. In fact, we have had arguments with the Appeal Board about whether the overlaps in requirements were in fact permitted and intendei by the regulations. The Commission has generally come down on the side of conservatism, that is, saying, yes, you can have one regulation that says the system has to limit the damage to two percent. Then you have another system that says, let's assume the damage is five percent or something beyond it. Then when you get to the containment why there is yet another process that says, boy, let's assume the core just dumped its fission products into the atmosphere and now let's see what kind of a leak rate is allowable in view of the site distances and meterological conditions in the area.

COMMISSIONER GILINSKY: That is why in view of our experience it seems to me to make sense to protect the fairly sizeable amount of hydrogen generated.

COMMISSIONER HENDRIE: I think parties are free under the order if they wish to make that argument. All we have really done is to say you have to make it in the context of part 100 rather than under an altered 50.44. I think we wanted to retain 50.44 because there are some design features that end up being required under 50.44, and if you just removed it you would leave yourself in peculiar fashion to regulate those design features. So I think it was desirable to keep it, but we have allowed the litigation.

CHAIRMAN AHEARNE: Clearly the reason we have the staff going through all this on these various containments is on that general approach.

COMMISSIONER HENDRIE: Presumably in due time we will straighten out on a more sweeping and rational basis where all of these things ought to lie, and if that had occurred before then the question in TMI wouldn't have come up about hydrogen. It would be clear how it was to be treated, but we have to have some sort of interim basis for operation.

COMMISSIONER GILINSKY: Well, just as far as the discussion we have had we are moving in the right direction with all of these litigation measures, and I hope we will keep moving forward on this.

CHAIRMAN AHEARNE: We had also agreed to give General Electric at their request a short period of response.

(Short pause.)

CHAIRMAN AHEARNE: If you will identify yourselves.

MR. BUCHHOLZ: My name is Robert Buchholz. Steve Stark and I are here today to represent GE to argue against the staff recommendation to require inerting of MARK I and II containments on an interim basis during the rulemaking proceeding.

As evidenced by our previous discussion on March 19th, I think you will recall, and the several letters that have been transmitted back and forth i that interim period ---

CHAIRMAN AHEARNE: I would recommend that you assume we both remember and have read.

MR. BUCHHOLZ: Okay. I think we have in our presentation here. We consider this to be an area of significant concern to us. We are here today to spend a few minutes to amplify and supplement our previous comments and communications with you.

We have two charts and they have not been handed out to you previously, but I believe they are in back of the screen somewhere, and I will pass them over to your side of the table.

(First slide.)

I think it is fair to ask the first question as to why are we struggling against this inerting recommendation of the staff so arduously? The answer to that I think is on the first chart.

Specifically the BWR has several design features which mitigate the probability of core uncovery and consequently hydrogen generation.

I note that these kinds of design features are not specifically included in the risk assessment thing, and that is the reason for highlighting them here today. For example, the BWR does have redundant reactor vessel water level measurement.

If core coverage is threatened the operator will know about it in advance and can take the necessary actions by ensuring, for example, that the high-pressure injection systems are operated or by utilizing on the second bullet there the rapid depressurization capability of the ADS system, the automatic depressurization system, to bring on the low-pressure injections systems.

The BWR is designed to operate with the bubble in the pressure vessel and has strong natural circulation capability both internal and external to the vessel. This capability is demonstrated, you know, during the start-up of each plant and thereby we feel eliminating any concern regarding coolability of the core when there is a void in the pressure vessel.

In addition to the three bullets there that I have indicated relative to the NSSS, there are design features. Specifically I want to mention the fact that there is a large passive heat sink in the containment of about a million gallons of water which is available to mitigate the consequences of things like a stuck open relief valve and, you know, the more probable types of transients that the system would have to undergo.

I think this summarizes the reasons and some of the things that we believe are features, not to say that you shouldn't to try to further improve the safety levels, but we want to make sure that these things are focused on when you are considering the need to inert our plants.

Now, I think there is no disagreement around the circuit regarding the fact that inerting yields a small risk reduction, and accordingly I won't spend time to read from the staff paper that says that. That has been covered.

We further expect this belief to be substantiated by studies that we are undertaking as well as Vermont Yankee are undertaking. We are undertaking these studies in response to the request for the Limerick evaluations, and Vermont Yankee is sponsoring studies at MIT under Rasmussen.

The next two bullets have to do with operational related items that were covered by the Vermont Yankee personnel on March 19th. The hazard to plant personnel I think has been referred to before because of the possibility of incomplete purging of hydrogen from the system. Of the problems we have talked about today that is probably one of the more real problems throughout not just the nuclear industry but througout all of industry.

The Yankee operations personnel spoke of the advantages of being able to correct operational problems while they are still small and being able to instill into their operational people a positive attitude of prevention in terms of the maintenance capability.

I think the staff seconded that motion in the 107A document when they noted that when considering day-to-day operational aspects we would agree that inerting is a definite disadvantage.

What I would like to suggest here is that, first of all, we concur with that and we believe that safety is really built upon the foundation of, you know, appropriate kinds of day-to-day actions. The kinds of things I think we should focus on are those that are the more probable in nature rather than those that are the less probable in nature.

As the staff as indicated in their presentation earlier today, those transients or those accidents we are inerting would prove beneficial or several orders of magnitude less probable than the other kinds of transients that would result in containment failure.

CHAIRMAN AHEARNE: It sounds that it would be General Electric's position that the inerting would lead to a decrease in safety.

MR. BUCHHOLZ: We believe that is the case, yes.

CHAIRMAN AHEARNE: Then would you conclude that the inerting plans are unsafe?

MR. BUCHHOLZ: No. I think there is a distinction between believing that it is a decrease in safety and saying that something is unsafe. Several of the inerted plants at the time of Three Mile Island were preparing papers to come forth in order to deinert. They have been distracted somehow from that endeavor, you know, for the last year.

CHAIRMAN AHEARNE: It is not quite the appropriate time to come in and say hydrogen burn is not a problem.

MR. BUCHHOLZ: It is a little awkward, yes.

COMMISSIONER GILINSKY: What is the situation abroad, with your plants that you have sold abroad?

CHAIRMAN AHEARNE: You know one is inerted.

MR. BUCHHOLZ: Yes, the Tarapur plant is inerted. I believe they are all inerted abroad.

COMMISSIONER GILINSKY: Is this following our lead?

MR. BUCHHOLZ: No, it is really following our lead here in the United States. I would expect that they would follow our lead again if we were deinert the plants, too.

(Next slide.)

Well, the second chart, and I promise to be brief.

With the information that we have just discussed, you know, we have concluded that the staff proposal should not be approved. We consider that the proposal is prescriptive in nature and that there are other methods of hydrogen control that weren't fully considered that could possibly not lead to some of the disadvantages that we have discussed.

I think we all agree that it is not an urgent safety issue. The staff in their most recent paper stated that "We agree that there are no overriding safety arguments to support an inerting decision." Therefore, I claim it is not an urgent issue.

We feel that the basis for the recommendation is shaky at best and inadequate at worst. We are doing some work, and it is noted in the Vermont Yankee Nuclear Power

Corporation letter to you, Chairman Ahearne, on June 19th both GE and VY are conducting additional studies to try to shed, you know, more definitive light on this subject. We would earnestly wish that those studies be allowed to come to completion.

We ask that the issue be addressed as part of the rulemaking process for this, as I said, will, you know, solicit some additional quantitative input as a result of these studies. We feel that this request is reasonable and that the timing is consistent with the determination that we have all had that the situation that we are talking about is a low-risk one.

We feel that if it is judged that there is a need to reduce risks further that going this process will permit us to identify the actions that would reduct the risk that have the least adverse consequences.

I think that kind of sums up our position and we would be glad to answer any questions that you have.

COMMISSIONER GILINSKY: I observe that you seem to be arguing on your first page of your observations on the basis that an accident involving hydrogen generation is unlikely. The staff seems to be saying that in such an accident other things will happen first and therefore dealing with the hydrogen doesn't help you much.

MR. BUCHHOLZ: I think we are all in accord, Commissioner Gilinsky, in just quoting the staff's paper that the accidents that lead to significant hydrogen generation are two orders of magnitude less probable than those that would fail the containment first thereby mitigating any influence of the inerting.

I think one of the faults that we have had perhaps over the years is to be working on problems that are two orders of magnitude less important than the problems we should have been working on perhaps. So I am suggesting that for that reason there is no urgency to inerting the MARK I and II containments.

COMMISSIONER GILINSKY: We were working on the ones that we thought were the important ones and it turned out that we didn't have it quite right. We were talking about this a little earlier, the question of to what extent one one ought to hedge against having made some of these calculations incorrectly and estimating the probabilities incorrectly, and therefore they have left out some important considerations dealing with, you know, possible large accidents. This would be in the nature of a hedge against those kinds of possibilities.

MR. BUCHHOLZ: The think that I guess I would ask you to consider is the desirability of implementing that hedge, and I understand exactly what you are talking about, versus the known undesirability of implementing that hedge.

One of our concerns is that we have to this point in time not obtained as good a set of data back from the utilities regarding the the virtues of not being inerted and the adverse consequences of being inerted, and I would like to have those.

CHAIRMAN AHEARNE: Perhaps there aren't any good set of data.

MR. BUCHHOLZ: At this point in time perhaps there is not. We have supplemented the NRC staff's request with a set of questions of our own which we tried to learn a few lessons from the staff's set and then provide supplementary questions.

COMMISSIONER GILINSKY: It is really a balancing of inconvenience on a day-to-day basis and cost against the value of the safety measure that deals with certain contingencies. .That is a balance that one has to make, and I think we are all agreed that that is what is at issue here.

MR. BUCHHOLZ: Yes. All we are saying is that we are taking some action to get some further information on that and would suggest that in considering the agreed upon lack of urgency on the matter -- I mean we are talking about implementing this recommendation as an interim action. That is the context that I am arguing the case.

CHAIRMAN AHEARNE: Vic?

COMMISSIONER GILINSKY: No. Thank you.

CHAIRMAN AHEARNE: Dick?

COMMISSIONER KENNEDY: No. Thank you.

CHAIRMAN AHEARNE: Joe?

COMMISSIONER HENDRIE: No. Thank you very

MR. BUCHHOLZ: Thank you.

CHAIRMAN AHEARNE: Thank you.

(Whereupon, at 5:00 p. m., the public meet adjourned.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

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in the matter of: **Discussion of SECY-80-107-Proposed Interim Hydrogen Control Requirements for Small Containments - PUBLIC MEETING--**

Date of Proceeding: **June 26, 1980**

Docket Number:

Place of Proceeding: **Washington, D. C.**

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Mary C. Simons

Official Reporter (Typed)

Mary C Simons

Official Reporter (Signature)