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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

NRC/Response Center Discussion

Related to

Metropolitan Edison Company,

Three Mile Island Nuclear Station

Saturday, March 31, 1979.

THIS TRANSCRIPT WAS PREPARED FROM A TAPE RECORDING

(Note: This is a transcript of Commission meetings for March 31, 1979. The meeting commenced in the Chairman's Office at 10:27 a.m. on this date. Commissioners present: Chairman Hendrie, Commissioner Gilinsky, Commissioner Kennedy, Commissioner Bradford, Commissioner Ahearne. Also present: Mr. Dorie, Mr. Mazuzan. The transcript begins with a phone conversation between the Chairman and Mr. Gossick and staff. Please note the times and data as reflected in the lefthand margin of other Commission meetings as contained herein.)

BACKGROUND INFORMATION

As the Three Mile Island situation developed beginning on Wednesday, March 28, the Commissioners met to discuss the nature of the event and scheduled a staff briefing held on March 29 at 9:50 a.m. The emergency nature of this situation at Three Mile Island led the Commission to go into "continuous" session for the duration of the event beginning on the morning of March 30. This meant that whenever a quorum was present, it was part of the continuous session. Because of the nature of these sessions, particularly on Friday, March 30, Saturday, March 31, and Sunday, April 1, most of the Commission meetings were held outside the Chairman's Conference Room which is equipped with magnetic tape recorders. Part of Saturday's and Sunday's meetings, for example, were at the Incident Response Center at Bethesda.

The nature of these meetings was informal and often interrupted. Commissioners and staff members came and went as conditions arose. During many of the sessions, multiple conference telephone calls and twoway telephone calls were made and received that were difficult to record and to transcribe.

These continuous meetings were for the most part recorded by several portable tape recorders using mini cassettes and regular cassettes. Nonetheless, in the fast moving events connected with this incident, there may have been times when Commissioners discussed matters which were not recorded.

The transcripts of the tapes of these continuous sessions, particularly where the meetings were held outside the regular meeting room, are a composite of several tapes. For all of the reasons above, these transcripts do not represent formal or official Commission statements on the matters discussed therein, nor have they been reviewed or edited by the Commission.

P R O C E E D I N G S

10:27 a.m. CHAIRMAN HENDRIE: I was looking at the thing Harold sent down.

The Bettis calculation, when they go over -- when they calculate the inventory in the coolant of the isotopes they sampled for, what are they doing? Multiplying by total volume of water in the containment as best it's known, is your guess, or do you have any feeling at all for it?

VOICE: Okay.

COMMISSIONER AHEARNE: Is this calculation -- why is it so (inaudible) What is the reg number?

(simultaneous discussion)

CHAIRMAN HENDRIE: The Bettis sample data, the handwritten stuff that came down. I'm just curious. The coolant inventory in curies, are they multiplying the concentrations by what's thought to be the total water in the containment?

COMMISSIONER AHEARNE: There isn't any -- you don't have any indications of any exposure to burning inside the containment? Of course, the pressure is not exactly constant.

CHAIRMAN HENDRIE: Just a primary inventory. Does the sample line come from the primary?

Okay, so this is...

(simultaneous discussion)

CHAIRMAN HENDRIE: Okay.

Okay. What that means is that the coolant inventory column in the final fraction, which I assume is fraction of full core initial inventory, it may be low so that it means that we focus interest on the ratio between these numbers rather than on the absolute numbers.

(simultaneous discussion)

CHAIRMAN HENDRIE: That's the first good news I've had in a long time.

MR. AUSTIN: I hope it's not against policy to open it up.

CHAIRMAN HENDRIE: Okay.

COMMISSIONER KENNEDY: Just so you don't say what it is,

CHAIRMAN HENDRIE: Let me go back and harass you or Roger, somebody, about my favorite subject, hydrogen, oxygen, and all those great things.

You've been designated a hydrogen-oxygen chemist by Brian who chortled as he turned over the telephone.

Rog, what we've, I had an earlier report when I calle Daryl earlier this morning in fact when B&W had done a cut at the peak pressure on what as I understood it was, a stochiometric thousand pound gauge of thousand or so, cubic foot as volume, and I got a splendid 14,000 psi pressure peak.

Westinghouse was working -- was to be working both an independent evolution calculation on radiolytic oxygen, and I wonder if there's any, enough stuff coming in so you can begin to pull together any sort of a picture?

Okay. Good. Because, you know, some of the evolution rates from Tedesco's first cuts at it, at least, sounded like it would come up flammable pretty rapidly.

And I think, you know, that we want to, A, check that; is this stuff indeed stripping pretty completely into the dome as the decomposition occurs, the radiation, or is a good part of it staying dissolved and circulating around? Unfortunately there isn't much else in the way of a place for it to strip except the damn dome, but...

And what does it mean as we go toward the flammable limit? Do I remember correctly that the flammable limit doesn't change usefully as you go up in pressure? Or -- anyway, somebody -- okay?

Well, let's -- yeah, that's right. You know, I'll bet a cookie that in the containment pressure range, why, never mind the pressure. Never mind whether there's steam present either. The three go on a diagram --

Yeah. Does it change, and what does it all mean? I think --

Okay. We're all kind of anxious here because of the feeling of -- that if the flammability limit is a point of major concern, then we may be getting there faster than we

like.

Yeah. Okay. Thank you.

Yeah. Okay. Thank you, Ray.

No, it hasn't -- it's not integrated.

COMMISSIONER AHEARNE: On this chart they sent out, they plot the inside of the containment at 16.5 percent oxygen and 82 percent nitrogen. It just seems an odd mixture.

Commissioner Bradford arrives at 10:35 a.m.

COMMISSIONER BRADFORD: [Expletive] I just had to turn that meeting down.

I expect I'd get a medal.

CHAIRMAN HENDRIE: I think one of us has the responsibility to go on television and go deeply into that 1000 manrem situation, you know, just make that all crystal clear.

COMMISSIONER BRADFORD. And you think I'm the one to do it.

COMMISSIONER AHEARNE: Yes.

CHAIRMAN HENDRIE: You have that talent for neat expression that you need.

COMMISSIONER BRADFORD: I have the advantage of knowing little enough about it that I probably can say what I dc know in a relatively short time. Harold could difficulty was that he took more time than he needed.

CHAIRMAN HENDIRE: I got into that situation with Mr. Weaver the other day at that hearing. He said "is

there anything you know that you haven't told me", and I was able to say that since I was away yesterday "I told you more than I know".

(Laughter)

COMMISSIONER AHEARNE: Does that indicate that there was an explosion?

CHAIRMAN HENDRIE: Well, the oxygen -- several percent, two or three percent oxygen went someplace. Now in order, you know -- that wouldn't be otherwise with the hydrogen burning. And there is that 28-30 pound pressure spike.

COMMISSIONER BRADFORD: How would the oxygen have gotten in the --

CHAIRMAN HENDRIE: Well, because of the containment -- this is the containment building now, which is just a normal atmosphere, a normal 20 percent oxygen and 80 percent nitrogen. And there was that pressure spike and the oxygen is a little depleted.

I think it's real forethought of Ed to have conducted a detonation test of the containment. Expect to do that again -- went so well the tested procedure --

COMMISSIONER AHEARNE: As Ralph Lapp said last night.

COMMISSIONER KENNEDY: Was he on?

COMMISSIONER AHEARNE: Yes, yes. He knew this was going to be really -- really wonderful. The word he used

which might not have been the most felicitous, the "autopsy" of the event.

(Laughter)

COMMISSIONER BRADFORD: It was not one of Ralph's finer moments. Except that the circumstances favor following normal procedure. There have been other occasions --

CHAIRMAN HENDRIE: After a (gopher's) prognostication on Wall Street Week we'll probably enter -- what is it ? -- probably four or five months of over-regulation of the nuclear industry.

COMMISSIONER KENNEDY: As contrasted with what

CHAIRMAN HENDRIE: I feel an inadequacy in almost any statement I make.

(simultaneous discussion)

The hydrogen problem is still working, and I want them to get around it. He has reported in and he is talking to his troops now and will as arranged [get] back to us range sometime after 11:00. He'll call us. We'll try to patch him simultaneously on the response center so they can listen and tape him out there. I don't know how that will work - probably boost the signals. Then he's going to talk to the President.

COMMISSIONER BRADFORD: Is that going to be the same sort of thing he did last night, where he could take questions?

CHAIRMAN HENDRIE: I don't know, but a least they've said "we'll try to keep you up to date", and this one is in Middletown, you know, right up there at the site.

There is a Congressman flapping up and down. They're anxious to have it in Middletown. It's inevitable.

The Governor of New Jersey wants into this afternoon. [Expletivw]

COMMISSIONER BRADFORD: Is our situation in relation to the press such that basically we've decided that the statement should come from Harold Monday or --

CHAIRMAN HENDRIE: At the moment, unless we want to change things, we haven't stopped (recording interference)- cutting off the press release or the ACRS.

They have got a rapdi-fax hookup now down at the site so that PNs and such things can, texts can go back and forth for confirmation of the details.

There's a steady -- what the response center is doing is producing, you know, a sort of - here we are or so while you get a PN presumably -- I want to make sure--

Bill, would you make sure that Congressional is getting these waves of PN in the hands of, you know, everybody.

MR. DORIE: I'm sure they are, but I'll doublecheck it.

Frank Ingram called me this morning. He's very

anxious to get you out there if you want to go about 12:30 to talk to the press people, whether or not you really have anything additional to say But he was thinking for the weekend, you know, papers and so forth.

If you're amenable, I'm sure it could be arranged down here, if you wish.

(Inaudible.)

They say that just your appearing would have a calming effect. It might be better --

(simulteneous discussion)

(Laughter)

If you just show up so they know who you are.

CHAIRMAN HENDRIE: It generally leads to dismay. I don't know why that group would find it different.

(simultaneous discussion)

COMMISSIONER KENNEDY: It wouldn't be a bad idea and if you're going to do it, it would be better to do it here.

(Inaudible.)

COMMISSIONER BRADFORD: I think certainly at some point you're going to have to do it. It's just a matter of picking the time.

The situation looks like a relatively stable one.

I guess from your point of view, it would be better to do it at a time when you knew what you thought you could say about to be (inaudible - recording interference). How much time do you have before you can do anything again. And you do not want to get into the box Harold got into last night. On one end you would like to be able to say weeks

and on the other hand say you know the answer to that. In the process you really don't know what sells.

CHAIRMAN HENDRIE: I don't know whether we're going to know the answer to that, allright. I think that has to be how long before we have to do something. That has to be regarded as one of the questions which is pensive to be studied, along with some others.

COMMISSIONER BRADFORD: Well, if the answer to that question isn't likely to change soon, then I think probably this morning is as good a time as any to address it, if you expect by mid afternoon to have a better handle on it.

COMMISSIONER AHEARNE: Nick said that he mentioned something about a Brookhaven calculation of 200 minutes or between when things start going bad.

COMMISSIONER KENNEDY: 200 minutes, three hours and --

CHAIRMAN HENDRIE: It sounds like WASH-1400 -- WASH-0740.

COMMISSIONER AHEARNE: Just a minute.

CHAIRMAN HENDRIE: The correct calculation or...

COMMISSIONER AHEARNE: He just whispered that one on his way up.

CHAIRMAN HENDRIE: Who's that?

COMMISSIONER AHEARNE: Vic.

CHAIRMAN HENDRIE: Oh.

COMMISSIONER AHEARNE: He had been out to Bethesda and he said that the guys out there gave him heck.

COMMISSIONER AHEARNE: It's probably best to wait until Vic gets here to straighten this out.

CHAIRMAN HENDRIE: If it dates back to WASH-0740 (recording interference). It's not necessarily a very useful number because of their -- you know, when they were making estimates it was on the basis of suppose all this stuff gets out in the atmosphere then what happens. They weren't dealing with the probabilities or with the details of a release in any attempt to calculate what it would be.

It would be just simply put everything up there and then what they stripped out was the stuff that just immediately falls down. Their aim would have been to get things out in an early time. They would then have the choice of either starting with the core at equilibrium, the fission product burden at full power, or deciding there ain't no way you're going to avoid having maybe two hours or three or ten or whatever delay and then select some number, and they would tend to select on the shorter side so as not to [illegible] prejudicing their estimate.

(recording interference)

CHAIRMAN HENDRIE: There may have also been some further calculation but there's been some contractors--

this containment group up there, the technical support group by the containment branch.

On the other thing, I don't know. I think there's some advantage of urging the press people to keep working with Bethesda press men. So maybe I'd better try to go out there. It may run a little later than 12:30, depending on Harold's call in -- its a half-hour ride, or a little longer, probably.

COMMISSIONER BRADFORD: What is the status of the Kennedy hearing?

CHAIRMAN HENDRIE: I talked to -- well, as I told you, I talked to Cubie last night. They told him that it really bothers him. He said he was going to recommend to the Senator that they postpone. He said the Senator might want to call back. I haven't heard anything.

I'm going on the assumption that I'm not going (inaudible). And if I don't hear anything else about it I won't go (inaudible). There's been a terrible misunderstanding and I will write letters of apology. My heart is --

COMMISSIONER KENNEDY: It's pure, there's no question.

VOICE: We'll each write a letter in your --

COMMISSIONER AHEARNE: That's why you give a calming influence.

COMMISSIONER KENNEDY: We'll each write a letter on your behalf.

CHAIRMAN HENDRIE: It's stupid.

COMMISSIONER KENNEDY: Dear Senator Kennedy.

CHAIRMAN HENDRIE: With regard to the exercise at Bethesda, do you think we should all go out?

COMMISSIONER AHEARNE: Well, if you're going to transfer all the information for them, probably yes. As far as meeting the press, then I think --

CHAIRMAN HENDRIE: No, no; it was for the press meeting. The information flow -- we'll get Harold's report here and discuss it.

But then I'm wondering whether --

COMMISSIONER KENNEDY: I don't think so.

CHAIRMAN HENDRIE: Do you want to come out? You're more than welcome to come.

COMMISSIONER AHEARNE: I think in this situation getting a clear message is much more important than the number of persons.

COMMISSIONER KENNEDY: Also, maybe in a subverse way it would have the opposite effect you're trying to seek, which is to keep them there.

If they see the whole crew of Commissioners there, they will look the next time for where are they going to find the whole crew of Commissioners and they are going to find that that is on H Street.

CHAIRMAN HENDRIE: A pride of Commissioners?

COMMISSIONER KENNEDY: A pride. I do recall believe --

(Laughter)

(Simultaneous discussion)

CHAIRMAN HENDRIE: A gaggle is good. A gaggle of Commissioners met this morning.

MS. SHUTTLEWORTH: Dr. Hendrie, Frank Ingram on 59.

CHAIRMAN HENDRIE: All right.

10:50 a.m. Hey there.

COMMISSIONER AHEARNE: (inaudible) -- he was getting briefed by his troops. Ed Case.

CHAIRMAN HENDRIE: Yeah. I'll try to come out.

You were talking about 12:30?

Oh, that would be handier, because I was going to say it didn't look like the time would make -- I'll come out there and we'll get the report from Harold. All right. Yeah, sure. And -- Frank? Yeah, yeah. I guess so. Yeah, okay. Okay. The time is a little bit flexible because -- I will want to hear back from Harold, okay? And you'll arrange -- get through to Sharon and arrange for Harold to try and call me as soon as he gets off the floor. Okay. Okay. Are we keeping the White House information people informed about these progressions of events? By the way, is Lee at hand there?

(recording interference)

COMMISSIONER KENNEDY: Why don't we leave that open and get some recirculation of air?

CHAIRMAN HENDRIE: Yes, I think so. And it's open at the other end, good.

Why don't we circulate it amongst the -- so that everybody knows? I don't know.

10:54 a.m. Hi, Lee.

We're keeping the situation room at the White House updated on the status.

Yeah, Okay. One thing I would like to -- that's okay. All right.

For what.

Somebody threw away a piece of paper out of one of those files. Gone through it and said "what's this doing in here" and threw it away.

10:56 a.m. Bickwit arrives with McDonald's bag. Okay, thanks.

You come prepared to share Egg McMuffin, I trust.

MR. DORIE: It's too late for Egg McMuffin.

COMMISSIONER AHEARNE: That's all right, we'll share whatever you have.

COMMISSIONER AHEARNE: A Big Mac?

CHAIRMAN HENDRIE: He's got a thick chocolate malt and 12 straws.

(Laughter)

CHAIRMAN HENDRIE: In one enormous schlurp the whole thing disappears.

COMMISSIONER AHEARNE: Joe, what about the possibility of asking, oh, I don't know who would be there -- it may take a minute - Ed - to jot down a couple of points to advise other B&W operators of caution on such things as perhaps avoiding tinkering with the caution adjustments to the chief pump and rechecking operator procedures.

CHAIRMAN HENDRIE: And if they get a high pressure relief after a feedwater transient --

COMMISSIONER AHEARNE: Well --

CHAIRMAN HENDRIE: Don't turn off the main pumps yet.

COMMISSIONER AHEARNE: You know, just a couple of advisories. They don't really know yet what the problems were, but it might be useful to try to share with the other operators some initial precautions.

CHAIRMAN HENDRIE: Yeah.

Let's see, I guess the response center, would be the best place to --

Peggy, you want to see if you can get out to - I guess Roger would be the best person.

MS. SHUTTLEWORTH: Will do.

CHAIRMAN HENDRIE: I think he's ranking on the NRR side now.

COMMISSIONER KENNEDY: Where's Case?

CHAIRMAN HENDRIE: Oh that's right, Case is probably ranking (inaudible)

10:59 a.m.

Peg, Case would do fine, Maybe better.

MS. SHUTTLEWORTH: Okay.

(Simultaneous group discussion)

MS. SHUTTLEWORTH: Mr. Case is on 59.

CHAIRMAN HENDRIE: Edson. In the midst of all of the flurry and hoo-rah, is there any staff resource between I&E and NRR left that might contemplate a sort of interim advisory to the other B&W plant operators about watch out for this or that?

Yeah. I think, you know, you don't want to pull people off the sort of primary tasks, but I think it would be useful and John thought it would be a good idea, I agree, so why don't you see what you can do about that.

And I think the I&E side can contribute.

I think whatever --

Yeah, and I think, you know, there are -- we have got some residents out at other B&W plants, and it might be useful for I&E to sample there and see what suggestions come through.

The one from Davis-Besse. Okay, I had that in mind specifically.

Good-0. Thank you.

He has the -- that paper.

Let's see, why don't you tell Vic about that open thing. Okay. Good.

(Recording difficulties)

11:03 a.m.

CHAIRMAN HENDRIE: I'm glad to see we have the sunshine officer here.

MR. BICKWIT: It does present an issue.

CHAIRMAN HENDRIE: Does it?

MR. BICKWIT: Yes. I think you should vote to --

CHAIRMAN HENDRIE: Why?

MR. BICKWIT: close this continuing series of meetings.

COMMISSIONER BRADFORD: What basis?

MR. BICKWIT: On the basis of 9b of the Sunshine Act, frustration of purpose. We discussed this last night.

COMMISSIONER KENNEDY: I know when we discussed that --

MR. BICKWIT: The issue is if you were to have this meeting open, would you be frustrating some of your purposes, those being to advise the state, advise the public on questions which require your deliberation prior to that advice.

As I read the Act, you're entitled to close the meeting under 9b of the Act because it deals with that kind of situation.

COMMISSIONER BRADFORD: I'll buy it under these circumstances, I'm not sure that I would if the weight on the other side --

COMMISSIONER AHEARNE: Under these circumstances, to be frustrated in what we're trying to do because of the contraints of --

COMMISSIONER BRANDFORD: Mere requirements of law?

COMMISSIONER AHEARNE: Well it's not mere requirements of law.

MR. BICKWIT: I think it is -- I really believe it is consistent with the requirements.

COMMISSIONER AHEARNE: I am sure that Senator Chiles did not intend, in writing the bill, to frustrate --

COMMISSIONER BRADFORD: I'm sure Senator Chiles never thought of it, you know, we could do our legislative in ten exercises --

MR. BICKWIT: The General Counsel's office would have no problem arguing this in litigation.

COMMISSIONER BRADFORD: I don't even think you'll ever have to.

MR. BICKWIT: I don't expect to.

CHAIRMAN HENDRIE: Okay, well let me just call for a vote to close, then.

Chorus of Ayes (Commisssioner Gilinsky not present)

CHAIRMAN HENDRIE: So ordered.

(Simultaneous group discussion)

CHAIRMAN HENDRIE: This is a continuing series of meetings.

COMMISSIONER KENNEDY: That's interesting because I think one of very first ones we voted as an open short notice meeting, I think the record will show.

MR. BICKWIT: That's true.

COMMISSIONER BRADFORD: But having closed it, Steve, we are now obligated to keep the -- I mean, Len --

MR. BICKWIT: Steve's away.

MR. BRADFORD: -- we are now obligated to keep the transcripts.

MR. BICKWIT: You are keeping one.

SOMEONE FROM SECY: We're recording (inaudible) --

COMMISSIONER BRADFORD: Yeah, but I mean some of these sort of wandering discussions that have been going around the building, I --

MR. BICKWIT: We've been trying to tape everything, everything, even the wandering --

COMMISSIONER BRADFORD: Yeah, but I'll be amazed if you succeed in getting all --

MR. BICKWIT: We haven't succeeded in following. We've done our best.

COMMISSIONER AHEARNE: We may not have, but I think you do your best, the primary thing is to make sure that a crisis is handled here --

CHAIRMAN HENDRIE: Come on over here and I'll -- I'll withdraw to the desk, it's a more comfortable chair.

(Simultaneous group discussion - Commissioner Gilinsky arrives)

COMMISSIONER AHEARNE: Vic, can you tell us, what does this 200 mean in the calculation you're talking about?

COMMISSIONER GILINSKY: Well this is some numbers I had run up at Brookhaven.

CHAIRMAN HENDRIE: It's current, it isn't just out of the WASH 740?

COMMISSIONER GILINSKY: No, this is something that Brookhaven calculated I guess yesterday, today.

COMMISSIONER KENNEDY: But what assumptions, what scenario?

COMMISSIONER GILINSKY: That from the time you lose coolant, how long would it take for the water to go into steam, for the stuff to slump down and --

COMMISSIONER AHEARNE: Lose the coolant pump?

COMMISSIONER GILINSKY: That was my impression, yes.

CHAIRMAN HENDRIE: Well to go into a --

COMMISSIONER GILINSKY: From the time you lose circulation.

CHAIRMAN HENDRIE: To go into a --

Well, and then what, on through to what?

COMMISSIONER GILINSKY: I think on through the vessel.

And it was 230, 250, something like that, 211 -- I can't remember the numbers.

COMMISSIONER AHEARNE: For whom was it meant?

COMMISSIONER GILINSKY: I think Roger was the one that was quoting that or Steve.

COMMISSIONER AHEARNE: Yeah.

CHAIRMAN HENDRIE: My guess is that it would have been requested out of the containment systems group who have that technical assistance group at Brookhaven in particular.

COMMISSIONER KENNEDY: I'm not yet clear on what the scenario is that takes 200-plus whatever it is.

COMMISSIONER GILINSKY: Well, the best thing to do, of course, is to call them up. But as I understand it, from the time you lose cooling -- sense of circulation -- because they were allowing something like 50 minutes for boiling off the water, another 100 minutes for fuel collapsing, I guess the rest of the time is going to the vessel. So that would bring it up to, times to be consistent with other things I've heard earlier, I've read in the past or something.

COMMISSIONER BRADFORD: That assumes you starting with fuel that suffered no damage.

COMMISSIONER GILINSKY: Well, since these calculations were just done, I presume that it's the best estimate, I don't know whether it is with no damage or --

CHAIRMAN HENDRIE: I don't think it makes -- in the kind of calculation they would do that is available on short notice, you simply assume an adiabatic -- once you

go through the, getting the water out and getting the heat transfer dropped, why you just go through adiabatic heatup to get to --

COMMISSIONER GILINSKY: I think I remember them using the word, "realistic" in connection with that.

But, again, I mean, I didn't come here to, sort of, conveying these views and it ought really to come from them.

COMMISSIONER BRADFORD: Did the measurements come back from the Bettis analysis on the --

CHAIRMAN HENDRIE: Sample?

COMMISSIONER BRADFORD: Sample? What did it say about melting?

(Simultaneous group discussion.)

COMMISSIONER BRADFORD: It probably told you somethin that it didn't clearly tell me. That's okay, if its in the guess.

CHAIRMAN HENDRIE: Yeah, I've talked to Brian Grimes about it. It's a sample -- they took a sample from the letdown line so that its out of the primary system.

They analyzed for the contents of certain isotopes -- fission product isotopes of interest to get the concentration. Then they multiplied by the nominal primary system volume and get an inventory, then, in the primary system water, compare that to the core inventory calculated for the appropriate

running time of the machine, 1200 hours up to 330, and then calculate then the fraction of these fission product isotopes apparently in the primary system water compared to the original -- to the total core inventory.

Now there are bound to be a lot of fission products that are out in the containment. What that means is that these fractions of the total core inventory of these isotopes are not, in themselves, very significant. We know that the release is larger than that and may be a factor of two or three or who knows.

What is of interest, then, is not the absolute number which we recognize as having that kind of uncertainty but, rather, the ratio between the isotopes and what this means with regard to fuel condition.

And if the sample is -- you know, if the concentration analysis is correct, the strontium is the interesting one compared to the volatile elements. And the strontium to iodine ratio would be consistent with high fuel temperatures, oxide temperatures, but not with a melting situation. That is, if there had been extensive melting --

COMMISSIONER GILINSKY: It would be nice to know -- I wonder, did you discuss those things with them, because they said one of those lines was wrong on that. I don't know if you got a corrected one or not.

CHAIRMAN HENDRIE: Yeah. Yeah, I know which one --

There's one that's quite apparently wrong. They quote three cesium isotopes. One of them ending up at 0.24 percent and the other two at 2 percent and 1.7 percent. Now, there's no --

COMMISSIONER GILINSKY: It said something about a factor of 10 on one of those.

CHAIRMAN HENDRIE: Yeah. There's no way that cesium-134 can come out at a rate 10 times less than the other cesium isotopes, so that's clearly in error.

But the interesting -- but cesium is fairly volatile. That is, it moves as the temperature goes up. And what's interesting, then, is that the strontium ratio to the iodines would be consistent with the amount of strontium you would see in the gap of the fuel rods, rather than with a melting situation.

So it's -- I regard it as a preliminary set of numbers that suggests that -- you know, certainly fuel temperatures have been high, we know that, but there ought to be more strontium in that water if there has been any substantial amount of pellet melting.

COMMISSIONER BRADFORD: Would you also expect to see uranium in itself in water?

CHAIRMAN HENDRIE: They didn't analyze for it. They were looking for things which, in particular --

1:14 a.m. (End of tape) (Tape 1-A)

11:14 a.m.

(Continuing discussion) (Beginning Tape 1-B)

CHAIRMAN HENDRIE: Indeed, you have to sort out the log there are more important things that can -- but they have got, sorted out some of these things. I haven't read down it to see what they all mean. I think maybe it's too sketchy as yet to make that a very useful exercise. That's a post-mortem proposition.

They also said they had that gas header hookup back to the --

COMMISSIONER GILINSKY: -- to the containment?

CHAIRMAN HENDRIE: -- to the containment place. They haven't tested it. They propose not to exercise it until they think they're going to have to do --

COMMISSIONER AHEARNE: Another release?

(Recording difficulties)

COMMISSIONER AHEARNE: How are they coming with the lead bricks?

CHAIRMAN HENDRIE: Haven't asked since about 8:30.

I asked them last night if they could check out -- there is a hydrogen recombiner on the containment hooked up, probably one of the flame type.

I'd asked them to -- you know, was it operable, could they please look at that, what was the situation and, if it could be gotten into operation-- at that time they didn't have a containment atmosphere sample, they were

going to try to get one -- I suggested if they could get the recombiner in operation to get some gas to flow out of the containment to the recombiner and back, you could tell from the recombiner temperatures whether you were burning any perceptible amount of hydrogen.

Since then they have a sample -- they've gotten a sample which shows gas numbers that we have slightly reduced oxygen and about 1.7 percent hydrogen.

COMMISSIONER AHEARNE: Is it right that there probably was an explosion or some burning.

CHAIRMAN HENDRIE: I think --

COMMISSIONER AHEARNE: -- at least consistent.

CHAIRMAN HENDRIE: It's -- that is consistent with the pressure spike with the oxygen level and with that kind of residual hydrogen level.

MR. AUSTIN: Yesterday it was asked of Roger, if that recombiner was working, how is it that we could have had a hydrogen explosion earlier?

CHAIRMAN HENDRIE: Well, because it wasn't working.

MR. AUSTIN: It was just not on?

CHAIRMAN HENDRIE: You don't run the recombiner, it's valved off. It hasn't been opened up.

Furthermore, in a situation in which you have a release to the containment associated with a substantial amount of metal-water reaction, enough to give you

appreciable hydrogen fractions in the containment, that evolution occurs fairly briskly and the recombiner flow is small, so that's a slow, slower control situation.

You get a batch of hydrogen in the containment and if it takes you up over the flammable limit in the initial evolutionary stage, an hour or two or whatever, you can't catch that with a recombiner, because you don't have a sufficient flow rate to it to hold that down.

The estimates of metal-water reaction here are way up, so even if it had been running, why I expect it probably wouldn't have stopped the burst.

COMMISSIONER GILINSKY: There was apparently a report that got over across the street that the NRC had recommended evacuation within a 20 mile circle, which I told them didn't sound like anything I'd heard --

COMMISSIONER BRADFORD: Well, Joe had said to the Governor --

COMMISSIONER AHEARNE: You talked to the Governor --

COMMISSIONER BRADFORD: Yeah, Joe had said to the Governor that if you had to evacuate, in order to play with the bubble, you might have to evacuate out to 20 miles. That's the only time I've heard 20 miles mentioned.

COMMISSIONER GILINSKY: I see.

CHAIRMAN HENDRIE: And over in the situation room

report -- you know, the emergency plan people were interested in, you know, notice time, how far out --

COMMISSIONER GILINSKY: That's right.

CHAIRMAN HENDRIE: -- and details like that.

And for want of any sort of better calculation at hand, why my estimate was 20 miles which is not inconsistent with some kind of an average over the, you know, the isopleths

COMMISSIONER GILINSKY: What you'd have to do if things went bad.

CHAIRMAN HENDRIE: Yeah.

That you might want to go out with now --

COMMISSIONER KENNEDY: The question was in the worst case?

COMMISSIONER GILINSKY: Yeah.

Okay. What about --

CHAIRMAN HENDRIE: In the worst case, who knows, if you were in inversion conditions and that plume were moving, why you might want to ask people down the track of the damn thing, considerably further out to at least stay indoors and --

COMMISSIONER GILINSKY: Yeah.

COMMISSIONER KENNEDY: -- and nobody else?

COMMISSIONER GILINSKY: Well, it's some kind of average over bad cases --

CHAIRMAN HENDRIE: Yeah, I think so.

Because, you know, the more favorable the diffusion conditions indicate tht you --

COMMISSIONER GILINSKY: Maximum probable or something.

CHAIRMAN HENDRIE: Or the probable maximum.

COMMISSIONER GILINSKY: Look what about -- where do we stand on this question of whether people ought to be advised to move out or not?

I guess even though the situation looks better to me today than it did yesterday, I wonder if -- well, oughtn't we think about at least urging people who are real close in, they don't have to be around here now to, if they've got relatives 20 miles away, to go visit them.

COMMISSIONER KENNEDY: Given what we know today as contrasted with what we knew yesterday, let's say, in comparison of law, what would be the rationale for it?

COMMISSIONER GILINSKY: Well, you see, the way it looks to me is that, in a number of ways the situation looks better. I mean, the temperatures in the reactor in these hot spots seem to be going down and that's better and they seem to be developing all sorts of backups to pumps in other parts of the system and that's better and we've got a lot of talent on the spot that can think things through and they're organized and that's much better.

COMMISSIONER KENNEDY: And they're making -- taking steps to minimize the effect of any subsequent release which might have to be evacuated.

COMMISSIONER GILINSKY: Yeah. Right. So that's another --

COMMISSIONER KENNEDY: Is that better?

COMMISSIONER GILINSKY: -- that's another point on the plus side.

On the minus side is, they still don't have a way of dealing with this major hydrogen problem in the pressure vessel and, even though things are better, you know, there's still a possibility of the system degrading and if it does the time scales over which things might happen seem rather shorter to me than -- if I understand them correctly, than I understood them to be yesterday.

COMMISSIONER KENNEDY: That's something we need to --

COMMISSIONER GILINSKY: Check, sure.

COMMISSIONER KENNEDY: -- we need to check out.

COMMISSIONER GILINSKY: Absolutely.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER GILINSKY: So I guess in my mind, I gues I view it as whether it's worth buying a certain amount of portection for limited dislocations, limited economic costs and terms and costs of other kinds involved when you start moving people.

And I -- you know, I'm sort of thinking, if I had a friend in Harrisburg, I guess I'd -- I don't think I'd tell him to move, I'd tell him to keep close to his radio, something, if you had somebody really close in, you might tell him, if he didn't have to stick around, why maybe he oughtn't to be there.

And there's a factor of 10 in the number of people that would be involved, say, as between five miles and 10 miles, I think, roughly speaking.

COMMISSIONER KENNEDY: And you're speaking about people where?

COMMISSIONER GILINSKY: Well, say, you know, in the first few miles.

COMMISSIONER KENNEDY: Which is which, five or 10?

COMMISSIONER GILINSKY: Say five.

COMMISSIONER KENNEDY: Five

COMMISSIONER GILINSKY: Five

Yeah.

VOICE: So I would say then count what, Middletown?

COMMISSIONER GILINSKY: I guess so.

MR. KENNEKE: There's a substantial jump in population between five and 10.

COMMISSIONER GILINSKY: You go out -- how far is Middleton?

MR. KENNEKE: Five miles, it's within five miles.

COMMISSIONER KENNEDY: Three miles.

(simultaneous discussion)

COMMISSIONER GILINSKY: Okay. I haven't thought it through in terms of sitting down and looking at the map.

(simultaneous discussion)

COMMISSIONER GILINSKY: These are the people who would have the least time -- You know, if you really got into a situation that was bad, people further out would have more time, you also would have a more specific evacuation, in other words, you wouldn't be doing it in a circle. And I guess I just don't think the situation calls for going beyond that.

On the other hand, it seems to me, it might be prudent to move them. And, I don't know, I'm also thinking in my mind, if the guy's got cows he's got to feed, I guess I'd probably tell him to stay there and feed his cows. But I think I'd go beyond women and -- pregnant women and children.

MR. KENNEKE: The farmer doesn't need to think about where he's going to get the feed to give the cows.

COMMISSIONER GILINSKY: Yeah. So it's not a simple answer to this and I'm raising it for your consideration, you know.

COMMISSIONER AHEARNE: I guess I'd like to hear what they've found out and what leads them to numbers.

COMMISSIONER GILINSKY: True.

Yeah.

COMMISSIONER AHEARNE: And if they've got any new calculations on how much oxygen they think might be generated --

The negative that you talked about -- all the positives, all the positives are unrelated in the hydrogen bubble content, the negatives relate to the hydrogen bubble content.

COMMISSIONER GILINSKY: Right. Yeah.

COMMISSIONER AHEARNE: So that's what you have to focus on - find ou. what those negatives are.

COMMISSIONER GILINSKY: Now one of the problems here is you don't know how long this is for. I mean, you just have to say that, maybe you have to leave it to people's judgement.

COMMISSIONER KENNEDY: Yeah, but don't you -- if you're going to take that kind of a step, don't have have to be more direct about it? I mean, you can't sort of -- the agency to whom they would look for for advice, you can't sort of toss it out and say well, you know, golly, maybe --

COMMISSIONER GILINSKY: Well, I --

COMMISSIONER KENNEDY: You gotta say - say something fairly clear, a fairly clear indication of what you're saying to them. You can't leave it ambiguous.

COMMISSIONER GILINSKY: Right. And you would have to say that, on the whole, you think the situation has improved, but if you were going to take this step that it's a matter of prudence and a reasonable step to take, you may even, if things get better, draw back; if they get worse, you'd be in a better position to deal with the rest of the situation.

And --

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER GILINSKY: You'd have to look at the numbers, but --

CHAIRMAN HENDRIE: I'm not sure, in terms of dealing with a population like this, how well you can -- how well you can do this sort of an intermediate stage.

I think later on, after we get the update and so on, and we've had a chance to talk to Harold --

COMMISSIONER GILINSKY: Let me say, by the way, I have sympathy for the guys in Bethesda (inaudible) --

CHAIRMAN HENDRIE: -- one would want to talk to --

COMMISSIONER GILINSKY: who, yesterday, seemed to be more inclined toward movement of people, today less inclined and seemed not to be thinking about that at all so this doesn't -- their views seem to have turned around.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER GILINSKY: But somehow in spite of

that -- well, it would seem to be a useful precept -- to check on that number about just what sort of times are involved and various kinds of contingencies.

CHAIRMAN HENDRIE: Okay. Let's exercise --

COMMISSIONER GILINSKY: You know, I might have gotten that one wrong and it would change the picture somewhat.

CHAIRMAN HENDRIE: Well I don't, it's not -- let me talk first about the time, that's the technical problem -- that's not inconsistent with the kinds of times that I have in mind when I say 6 to 12 hours once things begin to go and you figure it's going to go, you know, that there's nothing else you can press or pull in the way of switches and you're going to have to let it run its course and the best thing to do is to just get away, this could take several hours which is consistent with this, four hours, three-four hours, at least, to work its way through the vessel.

The vents there, after you --

COMMISSIONER KENNEDY: That's after the event is -- that's from the beginning of the event.

CHAIRMAN HENDRIE: Well that's from the point where you say where Oh Bov, you know, it's gone, we've lost it.

COMMISSIONER KENNEDY: Haven't you reached -- Aren't you likely to reach that conclusion before the event itself actually begins, after that course of events that the scenario --

COMMISSIONER GILINSKY: Not necessarily.

CHAIRMAN HENDRIE:-- the valve --

COMMISSIONER KENNEDY: -- the point that your scenario begins --

CHAIRMAN HENDRIE: You probably hang in there trying to drive injection water and crank pumps and so on for a while down the line.

But let me just sketch loosely down the line: three to four hours for it to work its way -- for a melt, which would be assumed to be a core volume melt on the bottom head of the vessel to -- to work its way out of the vessel.

Now the vessel is in a substantial amount of water -- That is, the water level is well up in there, so the bottom of the vessel is in contact with the water and this melt, then, has got to go down into that water get on the bottom of the containment.

You can't absolutely rule out a steam explosion situation, but a much more likely course is that it settles down on the containment bottom and it's going to take a while to work back.

It doesn't necessarily have to spall its way all the way down to that white, thick concrete mat. What happens with a hot melt on concrete is that you get spalling and the concrete elements break up, some of them liquefy, float up as a slag, and you start getting substantial volumes of CO_2 out of it.

And what happens then is you've now got a non-condensable gas evolution at substantial rate into the containment; the containment pressure goes up, you're going to come to a point eventually where you either vent the containment -- you've got your choice, then, you can either vent the containment or you can let it go on up past the design pressure and probably somewhere on beyond a factor of two above design, why you'll blow something out.

But that again is at least like a several hour --

COMMISSIONER GILINSKY: So you're adding that on to this sequence --

CHAIRMAN HENDRIE: Yeah, an with -- obviously with caveat that once the melt is through the bottom of the vessel and beginning to work down, why you know, there's no way you can absolutely eliminate a steam explosion which would be -- which in itself would be enough to give you a containment leak someplace.

COMMISSIONER GILINSKY: Suppose we look at the beginning of that sequence, though. Suppose you lose the pumps on your cooling and you're not going to, at that point, call an evacuation. It seems to me you'd be rushing people in to try and fix those pumps and then it would be a certain amount of time before you press the button, and you may lose some time at the front end.

CHAIRMAN HENDRIE: Well, I think probably not all that long because --

COMMISSIONER KENNEDY: My question goes to precisely that.

If you begin well -- First of all, if your sequence runs to the point where you start, as Joe says, start rushing around trying to turn on other pumps and shift one line to another, at that point, you know you're in a kind of Let's go all out here to see if we can save the ballgame.

It seems to me at that point you've reached a point where prudence says you've reached the end game as far as population is concerned. You really ought to get them out because you have a reasonable probability -- not a high probability, at least, but a reasonable probability of failure.

COMMISSIONER GILINSKY: Yeah, but --

COMMISSIONER KENNEDY: And so you add that to the front end. I wouldn't have thought you'd get as far as the actual total failure of the pumps. I would have added something on the front end.

COMMISSIONER GILINSKY: Well, that would be the -- Well, I'm not sure.

COMMISSIONER AHEARNE: In a nutshell --

COMMISSIONER KENNEDY: Two different groups -- Well -- two different groups of people.

You're right about, you know, you'd be rushing

people in to work in the pumps. So if you're talking about, if you're talking about the people in the plant, right, I think that's one set of conditions. I think population evacuation, that is, outside the boundary, is another issue.

COMMISSIONER GILINSKY: In a way, you raise an interesting point, is that, you know, does Harold or whoever down there have a set of events which, if they occur, call for evacuation -- in other words, even though you're rushing guys in and trying to restore, you know, the flow or whatever, is that the point at which you go.

COMMISSIONER KENNEDY: Yeah, even at evacuation point you're still trying to save the plant, to stop it.

COMMISSIONER GILINSKY: And you've decided that beforehand or, at that point, is somebody going to be trying to reach Harold and, you know, people are going to be deciding and they're even calling back here trying to decide what to do.

Also what concerns me is then you really are talking about an emergency evacuation, which has all kinds of overtones to it and problems --

COMMISSIONER KENNEDY: Yeah, Vic, I don't -- I think yesterday's events suggest that there's far less difference in the popular mind between what we would take to be an emergency evacuation and something lesser. The act

of suggesting that people ought to go away is seen by most people -- the effect on people hasen't lessened.

COMMISSIONER GILINSKY: Yeah.

MR. KENNEKE: Do we have any idea how many people actually left the five mile --

COMMISSIONER GILINSKY: I saw a number like 25 percent of the people in Goldsboro left for somewhere.

COMMISSIONER AHEARNE: That's a town of 600.

COMMISSIONER KENNEDY: Yeah, but they kept -- who knows.

-- they kept saying but nobody knows because they were all going off to visit friends or someplace.

COMMISSIONER AHEARNE: You've got 29,000 people, roughly, 20,000 within a five mile zone.

I heard another report that there were a couple of hundred people in Hershey at the reception center.

COMMISSIONER KENNEDY: I got the impression the bulk of those came from Middletown.

COMMISSIONER AHEARNE: In this -- in WASH-1400, when they have these accident sequences, there -- one of them for PWRs which is the core meltdown steam explosion occurring. And there they have a one hour warning time for evacuation.

How similar to that is what we have here?

COMMISSIONER GILINSKY: Why are you looking at me?

MR. KENNEKE: Because of the core melt sequence.

CHAIRMAN HENDRIE: Say it again.

COMMISSIONER AHEARNE: WASH-1400 has -- one of its PWR accident sequences, there's a core meltdown and steam explosion. And there they have a one hour warning time for evacuation, 2.5 hours for the time of release.

COMMISSIONER KENNEDY: So that's 3.5 --

COMMISSIONER AHEARNE: How soon is --

COMMISSIONER KENNEDY: Is that cumulative?

COMMISSIONER AHEARNE: I don't know. I haven't got that figure yet.

How similar to what we have here is what 1400 has done?

COMMISSIONER KENNEDY: If it's cumulative, even at 2.5 hours, that's similar to the numbers you were quoting. 210 minutes.

CHAIRMAN HENDRIE: Yeah, several hours.

(Simultaneous discussion)

COMMISSIONER KENNEDY: If those are cumulative numbers, they come out to be the same as your numbers then, 210 minutes.

COMMISSIONER BRADFORD: Is that the one that's they talked about a big pipe break?

COMMISSIONER GILINSKY: I hope they didn't just look at it.

COMMISSIONER KENNEDY: It's interesting that it comes out this way.

They may have had some old computer tapes.

CHAIRMAN HENDRIE: The PWR -- we're not in the PWR -- one category is a, would have to be a large break LOCA with injection failure, so that in a relatively short time from full power you've gone over to a dry core. This thing then takes that core adiabatic heat up and puts that melt down into the water in the bottom head and gets you a steam explosion that reaches the vessel and the containment --

(Simultaneous discussion)

CHAIRMAN HENDRIE: -- were well down so the, you know, the adiabatic heat rates are lower and we're not starting from that situation where full power, void the core region, let it come molten, go as a blob, you know, down into the vessel.

The situation here would be a much more fragmented and sort of, you know, sequenced sort of -- this chunk goes and that chunk goes and then another one goes.

COMMISSIONER GILINSKY: But you're also starting off with a cooler, a cooler --

CHAIRMAN HENDRIE: Yeah, yeah, the after heat raises, it's way down from the full power thing. So -- yeah.

COMMISSIONER BRADFORD: Can you say with confidence at this point that you haven't got an explosive oxygen-hydrogen mixture in the reactor and --

CHAIRMAN HENDRIE: In the bubble?

COMMISSIONER BRADFORD: Yeah. If the answer to that is no, then can you be sure that if you did have a whump in there, you wouldn't have something close to the situation that I am taling about.

CHAIRMAN HENDRIE: This situation.

COMMISSIONER BRADFORD: Yeah.

MR. KENNEKE: It might lead to the same situation, but you would get presumably a smaller but more immediate release, in which case you're boiling time is much less -- about seven seconds -- so that would contribute also --

CHAIRMAN HENDRIE: Why do you say a smaller release?

MR. KENNEKE: Assuming that the initial burst that came out of it were the accumulated gases -- somehow found their way out of that initial thing.

It's a sudden thing, and if there were a release that might also occur suddenly.

(Simultaneous discussion)

CHAIRMAN HENDRIE: This one's pretty sudden, too.

MR. KENNEKE: Well, in terms of warning times to nearby folks -- you tend to minimize that --

CHAIRMAN HENDRIE: At this point, we haven't got our hands around the hydrogen -- around the bubble problem from the standpoint of flammability. The results aren't in out there, I called, I don't know, a little while ago and they were still trying to gather it together.

COMMISSIONER GILINSKY: You know, one of the numbers I heard out there is -- I heard people tossing around the number like 10 percent oxygen.

COMMISSIONER AHEARNE: WASH 1400 also had some of those numbers.

COMMISSIONER GILINSKY: I also heard lower numbers.

COMMISSIONER BRADFORD: Well --

CHAIRMAN HENDRIE: What I think we're trying to do is to get a more coordinated and considered view on where we are in that circumstance and also an assessment of the -- well, an assessment of what flammability means in this situation.

COMMISSIONER BRADFORD: I mean, is it at all likely that there is a sequence of events that could start anytime without warning which would leave you with substantially less than 200 minutes or six hours or whatever number on that order you want to use to have people more than five or 10 miles away.

CHAIRMAN HENDRIE: I don't think it's a very large possibility but you can't rule it out.

COMMISSIONER KENNEDY: What would the nature of that sequence be?

CHAIRMAN HENDRIE: A hydrogen explosion in the vessel

COMMISSIONER KENNEDY: Inside the vessel.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER GILINSKY: And what, tearing the head off and --

CHAIRMAN HENDRIE: Breach. Breach.

COMMISSIONER GILINSKY: -- breaching the containment somehow?

CHAIRMAN HENDRIE: Breach of the vessel.

COMMISSIONER KENNEDY: Breach of the vessel and containment.

CHAIRMAN HENDRIE: Well --

COMMISSIONER GILINSKY: What would that do to the containment if that went flying around?

CHAIRMAN HENDRIE: There's a fair amount of shielding on top and you're not going to -- the chances that you make a rocket out of a head is probably not, but --

(Simultaneous discussion)

CHAIRMAN HENDRIE: Probably not, but you know --

COMMISSIONER KENNEDY: Is it more likely to rputure or blow?

CHAIRMAN HENDRIE: Rupture.

COMMISSIONER KENNEDY: Yeah.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER KENNEDY: So that you're not going to have large missiles.

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CHAIRMAN HENDRIE: Well, that's where I would judge the center of the probability distribution is, but it's clear that, you know, you can't rule out a containment failure.

COMMISSIONER GILINSKY: How would -- I mean, suppose it ruptured, suppose you don't worry about the head flying around or whatever and all those -- well, then what then, what are we worried about at that point?

CHAIRMAN HENDRIE: What you've got then is, there'll be a substantial shaking up and the bang. This core isn't in any great shape to be rattled at the moment, so the brittle parts of the core, you'll have a lot of debris there. The thing will be water flooded and -- you know, as I was speculating yesterday with regard to debris beds in water, why there's a pretty fair chance you'll stay cooled, but again that's not an absolute by any manner of means.

If you don't produce some sort of projectile that would put a hole or cause a penetration failure in the containment, then the concern with regard to the containment comes from two sources: one, whether the debris bed which is the core will equilibrate short of consolidating into a molten mass and, secondly, whether you've still got enough hydrogen left -- which is now loose in the containment which has 16 percent oxygen in it, so that you could have a secondary hydrogen explosion and would that be enough to breach the

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containment or blow out a penetration or something.

Now my understanding is that the amount of hydrogen in the bubble, 1000 to 1500 cubic feet, probably most of it hydrogen, 1000 pounds gauge, there is enough hydrogen mass there so that it will take the -- if that were released into the containment, it would take it well up into the flammable region.

If you get a bang, you will probably burn a good chunk of that hydrogen, but not all of it. So there's that, that's the second part of the containment failure possibility.

COMMISSIONER BRADFORD: What would initiate the first bump in the reactor, would it take a spark of some sort or just the heat from the --

CHAIRMAN HENDRIE: That's one of the things I want an opinion from from the hydrogen flammability crowd. And that's one of the reasons I've got it out working at, in the vendor shops and elsewhere, Bettis and so on.

It may be that -- you know, the fact that you've got a flammable mixture doesn't necessarily mean that it's going to go. It's a nice, damp contained volume. And the judgement may be that while you're not happy with having that thing over the flammable limit that it's not that --

COMMISSIONER BRADFORD: There's no way to set it off.

CHAIRMAN HENDRIE: -- not that much of concern.

But that's one of the things I'd like to know before

we --

COMMISSIONER BRADFORD: But we are in a situation now that -- there is a sequence of events that we can't rule out that would give you well under six hours.

CHAIRMAN HENDRIE: Six to 12 hours.

COMMISSIONER BRADFORD: Yeah.

CHAIRMAN HENDRIE: Yeah, I think that's a fair statement.

COMMISSIONER BRADFORD: I think that that really ought to be told to the Governor in clear terms tht it has been -- I mean, he knows about the concern --

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER BRADFORD: But I don't think he knows that there's some low percentage possibility that we could run out in that shape.

CHAIRMAN HENDRIE: Well I think I ought to talk to the Governor to get some of this report. Harold's overdue in to us, I presume he's finishing up his discussions with his own staff.

Why don't I call now and see what's going on.

(Simultaneous discussion)

CHAIRMAN HENDRIE: Hi there. This is Chairman Hendrie of the NRC, can you connect me down to the Three Mile Island communications center, please?

11:52 a.m.

Okay.

CHAIRMAN HENDRIE: Harold? Chairman.

We're waiting for you to check in and report. How are you doing?

Well hang on because I want to put you on the squawk box. Are you ready to go ahead or are you still in talking to the troops?

COMMISSIONER BRADFORD: You'll have to have him call on the phone.

COMMISSIONER KENNEDY: You'll have to call him on the other green phone.

CHAIRMAN HENDRIE: Okay now what I would like to do is to try to get -- do you want to go ahead now or do you want to take a few more minutes for the -- Okay.

What I want to try to do is to a) get you on the squawk box here and b) -- Yeah, it may require some repatching here -- the other thing we were hoping to do is to get a patch out to the response center so that you were to them at the same time.

Just hang with me a second, can you?

Who understands the electronics?

COMMISSIONER KENNEDY: They told us yesterday it is not hooked up to the squawk box.

COMMISSIONER BRADFORD: It is now hooked up?

MR. DORIE: No, it is not.

No, you can't get him through the speaker

phone here. You can have a conference call with the response center and him at the same time, but that has to be done on the black phone so best he call back on the other number or else we'll call him.

COMMISSIONER BRADFORD: If we just call him on the other number --

MR. DORIE: Yeah, there's no way he can brief them at the same time --

CHAIRMAN HENDRIE: Harold, is there any way to get --

COMMISSIONER KENNEDY: There's another way to do it.

CHAIRMAN HENDRIE: -- Is there any way to get to you?

COMMISSIONER KENNEDY: Just dial -- what is it? 395-4000?

COMMISSIONER BRADFORD: Yeah.

COMMISSIONER KENNEDY: What's the number?

CHAIRMAN HENDRIE: Just don't match the colors on my desk, Harold, I don't know how we're in touch.

MR. DORIE: It's 395-2000.

COMMISSIONER KENNEDY: That's right.

If you just call -- Joe, if you just call 395-2000.

CHAIRMAN HENDRIE: Hang on a second. Dick understands this stuff better than I.

COMMISSIONER KENNEDY: If you just use the other phone, call the White House on the other phone, 395-2000, ask them to do the same thing using the other phone and

it'll come in on that phone you won't use the black phone number.

That's all you have to do.

And then you'll be on this thing.

CHAIRMAN HENDRIE: Okay.

MR. DORIE: Let me try on this phone.

CHAIRMAN HENDRIE: Do you understand that sequence?

MR. DORIE: I understand what the procedures are --

CHAIRMAN HENDRIE: See if they can -- see if the White House can patch the response center and this telephone.

It's going to take a nimute or two to try to crank this thing around --

11:55 a.m. (End of tape) (Tape 1-B)

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

NRC/Response Center Discussion

Related to

Metropolitan Edison Company,

Three Mile Island Nuclear Station

Saturday, March 31, 1979.

THIS TRANSCRIPT WAS PREPARED FROM A TAPE RECORDING.

(Note: Continuation of Commission Meetings for this date, Chairman's Office at 12:00 noon.)

Tape No. 2-A

12:00 noon

MR. DORIE: Get Mr. Gossick on please

MR. DORIE: Thank you (confused - noises)

MR. DORIE: Are there, Harold?

MR. DENTON: Yes, I'm here.

MR. DORIE: Okay. Fine. Thank you.

Please just stand by.

Lee, the Chairman is out of the office at the moment but the other Commissioners are here and we got you patched through with Harold on the other end and all the Commissioners here. So I trust Hal can brief everybody all at once.

Someone may have a question or so. The Chairman will be back in in just a minute.

MR. DENTON: Alright.

MR. DORIE: Hang on, please.

COMMISSIONER GILINSKY: Harold.

MR. DENTON: Yes?

Talk to us. I can hardly hear you. Am I coming through?

COMMISSIONER GILINSKY: Yes, you are. You're coming through very well. Joe isn't here yet but you might tell us how things look to you.

MR. DENTON: I'll give you a general rundown. It's awfully noisy and hard to hear the other way, coming back. It's kind of a one-way conversation because you're barely perceptible.

If we could get the switchboard to try another reconnect?

COMMISSIONER GILINSKY: Let's take a look at that. Apparently he can't hear us very well.

COMMISSIONER BRADFORD: Can you hear us if we speak closer to the box, Harold?

MR. DENTON: That's much better.

VOICE: Okay.

MR. DENTON: We have a noisy environment here anyway. Do you want to try to plug in again?

COMMISSIONER GILINSKY: Go ahead, Harold. Joe just walked in.

MR. DENTON: Let me just give you a general state of summary. You may have heard that already, and then maybe get into some of the details.

But I guess I think we're making some progress. The big picture is the heat from the reactor is still being removed by the circulating pumps and the heat exchangers. The pressure is up to 1,000 pounds.

The letdown flow of primary coolant has been reduced to a few GPM. The release of gases from that source is down somewhat. No liquid waste is being discharged from the primary system and no reactor building waste is being pumped out.

They are bringing in a lot of tankage -- capacity in the way of trucks, bringing them onsite.

They've got this line or this juryrig hooked up

to permit cutback of the waste gas storage tanks and the letdown system into the containment. We're holding on that until we have a better handle on the hydrogen situation within the containment.

The first sample that was taken shows 1.7 percent hydrogen. The hydrogen recombiner, and there are redundant hydrogen recombiners at this plant, one of them is operational now. The other one is not yet operational. The Licensee doesn't want to begin operation until both are running.

I have asked someone to calculate how effective they'll be in bringing the concentration down. I think one of our first decisions we'll have to make today if they both appear to be working and functioning, and after we take another grab sample of the containment to be sure it's really going down, is to permit pumping back these waste gas storage tanks and the letdown gas into the containment.

It's a continuing problem because this waste gas storage tank is sitting there at about 80 psi and even right now it's occasionally burping occasional releases out. It's intermittent -- Excuse me, Dick was shaking his head. I have new information.

(Pause.)

Well, there is another, apparently, a source of activity going out of the plant in addition to that from degasification or letdown flow that bears --

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VOICE: (Inaudible) -- contradiction.

VOICE: Well, the dose rates are going up a bit in the plume at this time, Frank. Does that make sense?

Hang on while I clarify what is happening. Just a second.

(Pause.)

Well, mainly there isn't any release from that tank. What we have are four measurements in a straight line that start at 10:30 and the last one, say, 11:45. They show at the closest location like 12 millirem an hour and they drop down to .067 and .75 at various locations? But maybe that was-- maybe not entirely accurate.

If the hydrogen-- If the recombiners are working, if we can verify the hydrogen concentrations are dropping, and if we can get a sample of this offgas tank which holds the 80,000 standard feet, or so I understand, and be sure it's not all hydrogen and can start venting the hydrogen -- that system back in there and the letdown system, I think we'll go a long way toward controlling the continuing release that's occurring.

What's occuring right at this moment appears to be a little murky and I'll have to retract that the valve released slightly.

Going to the status of the core, there's been little change in the bubble. I think it's going in the positive direction. The idea of using the one-inch line on the

pressurizer to blow down a little bit and sort of degasify the coolant appears to be a feasible but very slow process. And once again, from what I understand, the containment atmosphere before going very far in that --

The loose parts monitor that's in operation says the core is not very noisy apparently by comparison to other cores so we're not-- much out of it except the noise that's being generated doesn't alarm the specialists in that area.

Core temperatures look slightly better than yesterday The flow patterns are still holding up and of course (recording difficulties) -- cool.

pump vibration is going up a bit. It's up to about 20 mills now and it's supposed to be (inaudible) -- at about 60 mills. That's something we're following.

COMMISSIONER GILINSKY: Repeat that

VOICE: If it happened what --

Mr. DENTON: Let me go through my notes here and see if there are any other highlights I want to hit.

The control room dose levels are now down enough so respiratory equipment is not required. This makes things a lot better.

I guess I've developed a management concern about the capability of the utility here to cope with new problems that come up. They're scretched very thin in some areas. I've discussed it with the local management and with the management

of GPU I think they need stem to stern reinforcements
eb6 down here in many areas.

Everyone here is putting out 150 percent but basically it's modifying operations work here.

For example, the health physics teams on both Units 1 and 2 are contaminated. We can't use them. (Inaudible) -- in the first place, health physics technicians -- go in and (inaudible) -- taking samples. No effort was being made toward restoring the plant.

Bill Creegar tells me if he were running it he'd need 50 more technicians to get the thing back in shape.

Defining the same absence of formal -- planning applied to core recovery, B&W is -- operating mainly in a monitoring -- situation, they're not being asked yet to look into what is the thermocouple mean what are all the (inaudible) -- fuel failures.

What I'd really like to do is to get them turned on in terms of analyses that we require for an FSAR and do them for the core in its present situation. And I did talk to the company president this morning. He said-- I tried to heighten his sensitivity. That is, if I were he, that if forward looking, planning, developing procedures to cope with eventualities rather than waiting for something to fail and then trying to work your way out of it.

I would sure like to see them muster their resources against (inaudible) -- and tackle these problems clearly.

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That's kind of where I am today.

COMMISSIONER BRADFORD: Harold, does it require their invitation to muster the resources of the industry, or is that something we can do?

MR. DENTON: You'll have to get a little closer.

COMMISSIONER BRADFORD: I'm sorry.

Does it require the company's invitation to muster the resources of the industry, or is that something we can do?

MR. DENTON: I can move to a quieter environment I'm told on this phone. If you'll let me come out here a moment and move to the other area?

COMMISSIONER AHEARNE: Joe, how serious -- (mumble)

MR. DENTON: Well, I think it really would take their initiative. I think we could always muster it ourselves. But, for example, I know from some of the discussions with B&W that they sure have the capability to do exactly what we want here and down there, and they just have not been turned on full bore to do what we're trying to do.

I think each one of these technical areas ought to be explored now because the basis for not ordering the evacuation in the interim is that we can cope with whatever eventualities wi come up, and the plant operators have ideas in their heads which might be very good and might be exactly the thing to do, but still these considerations need to be thought out and evaluated in advance so that if there are events that happen

in the future, they've got the best procedures that they can develop in the time.

I'm kind of waiting for them to respond. The area, the forward-looking area is half the problem.

The other half is just this problem of -- that they've run out of HP technicians and other technicians maintaining things. And I think they have just underestimate the size of the problem they're trying to cope with.

CHAIRMAN HENDRIE: Hal, I'll try to get through to the company officers soon after this conversation.

MR. DENTON: I think a call from you would probably be in order.

CHAIRMAN HENDRIE: Yeah. I think we ought to boost that effort up considerably. I thought I'd made the point with Creitz yesterday but it can stand reinforcing, clearly.

MR. DENTON: (Inaudible). If you ask them what happens if, you know, the attitude is well, maybe that won't happen and if it does, we'll cope with it then.

CHAIRMAN HENDRIE: Yeah.

MR. DENTON: It's just too low a level of attention.

CHAIRMAN HENDRIE: Yeah.

Harold, have you got any sort of an idea at this point what sort of a trigger situation might be where you would want to see evacuation started?

MR. DENTON: I guess the only one that -- There are

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perhaps two that you can visualize. One is if they do lose the method of cooling they've got and if for some reason were not able to stay on the steam generator and if for some reason if they didn't actuate (inaudible) -- pumps immediately effective and they had to go down to the low pressure injection system, maybe by the time you degrade that far, you might want to reconsider evacuation, even though you're safely injecting and so forth.

If you go to the recirc mode you might have a potential for leakage out. I guess that's one eventuality that if we end up losing this present system and there's a significant degradation of the systems that should be functioning we might want to reconsider.

The other one is once we figure out a plan to try to make the switch over to RHR in an orderly fashion, depending on the circumstances of the bubble at that time, it might be well to plan it at 10:00 a.m. with the Governor put on standby and everybody all alerted so that if anything happened during that time, everybody would be coordinated and know what to do.

I guess in either of them would I consider it necessary to evacuate just in anticipation of a problem.

CHAIRMAN HENDRIE: I had the impression in talking to Vic last night that in your discussions with the Governor there was a pretty fair discussion of the various scenarios and so on, and that he's aware that the situation could change here and give

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rise to a need for evacuation.

It seemed to me that at least in some of his comments last night about reassessing that situation, you know, on a daily basis and so on that he was reflecting that.

Is that your impression?

MR. DENTON: We walked him through the scenarios all the way from a complete failure of all the core cooling systems and what kind of time swings might be available, up to the likelihood of the systems working.

I think the one he's reconsidering is if we get control of these routine emissions that are occurring now, he would want to cancel his recommendation for pregnant women and small children to stay out of the area. That one was more connected with this continual offgassing.

COMMISSIONER GILINSKY: What sort of times did you lay out?

MR. DENTON: Excuse me?

COMMISSIONER GILINSKY: What sort of times did you associate with systems degrading?

MR. DENTON: Not very specific. This was something we asked Matt Taylor to get on and told him we'd get back to him.

With the core being somewhat cooler and decay heat being where it is, it's not as critical a case as for an instantaneous pipe break. And we tried to tell him the time series as short as 30 minutes (inaudible) -- out to several hours.

Our own speculation was if everything failed here it was likely we'd have several hours before the thing would fail, but we promised to confirm that with better calculations. And I understand Research is doing that for us.

COMMISSIONER AHEARNE: Dick, ask him about the hydrog explosion.

CHAIRMAN HENDRIE: Harold, --

MR. DENTON: Yes, sir?

CHAIRMAN HENDRIE: -- I talked to Matt last night and also a limited amount to Vic about a concern that I've had that we're evolving oxygen from radiolytic decomposition up into tha bubble, and that at some of the rates that have been quoted, why we're either at or getting close to flammability, or at least if I remember the 4 percent number correctly, and it's also true up at 1,000 pounds.

It's another possible scenario --

MR. DENTON: That right.

CHAIRMAN HENDRIE: -- that could lead -- not necessar ily lead but could lead to, you know, short times to a breach o the containment and significant release.

We're trying to have Bethesda pull the problem togeth

MR. DENTON: They've given me a calcuation estimate.

CHAIRMAN HENDRIE: It's not in hand at the moment.

MR. DENTON: It is still being worked, on the order of 15,000 psi. Does that sound in the ballpark?

CHAIRMAN HENDRIE: That sounded like -- yeah -- the number I got back from a B&W calculation overnight of peak pressure.

COMMISSIONER GILINSKY: If it all went.

CHAIRMAN HENDRIE: If it all went, yeah. Sort of a --

COMMISSIONER AHEARNE: (Inaudible.)

CHAIRMAN HENDRIE: Sort of a -- Well, a stochi -- I think that was it, a stochiametric mix.

But it is a considerable concern and I wonder -- Your capabilities for looking at it are limited but I think it's --

MR. DENTON: That's clearly one that this extra industry effort could really do some good in.

CHAIRMAN HENDRIE: Yeah, and they're working it. We've got people at Westinghouse and at Bettis and so on working on it.

In the near term it enters the consideration in the sense how -- what sort of a risk does it present and what does that mean about our judgment on advising the Governor either for some further evacuation, limited evacuation measures or a general recommendation.

MR. DENTON: Right.

COMMISSIONER GILINSKY: Have you heard of this one?

MR. DENTON: Vic and I discussed the need to generate some hard numbers on it and see if it went back but I've gotten really no feedback since that time.

CHAIRMAN HENDRIE: Yeah. I take it that this was not one of the scenarios that was discussed with the Governor last night.

MR. DENTON: No, it wasn't. We described more the WASH-1400 spectrum --

COMMISSIONER AHEARNE: (Inaudible.) You -- We really should.

MR. DENTON: -- but we didn't cover this one at all.

CHAIRMAN HENDRIE: Yeah. I think at some point here either you or I should call him and make him aware of this one.

MR. DENTON: At this time we've got very good communications and I call him about every two hours. Why don't I just follow up with it the next time I call him?

CHAIRMAN HENDRIE: Alright.

MR. DENTON: Let me say I think Lt. Governor Scranton is very interested and we've got very good communications. They have a person aiding us all the time, and we call them periodically and update them.

CHAIRMAN HENDRIE: When will you probably be back in touch with that office?

MR. DENTON: I think I can do it as soon as the press briefing that's been laid on for 12:30 or so is over.

CHAIRMAN HENDRIE: Okay.

MR. DENTON: What's the Headquarter's view of the potential?

CHAIRMAN HENDRIE: Well, we're still working it and urging them to get their integrated intellects pulled together and, you know, see what the judgment is. We don't have one yet

MR. DENTON: I guess my comments on it which prompted it are about the lack of an ignition mechanism.

CHAIRMAN HENDRIE: Yeah. Well, that's certainly one of the elements that goes into the judgment.

MR. DENTON: If the recombiners really perform well and we can demonstrate the containment levels are dropping, get a sample in the gas storage tank and so forth, maybe we'd want to move faster toward trying to degas the primary coolant through this one-inch relief valve.

CHAIRMAN HENDRIE: Well, yeah. My concerns in this area actually run two ways. One of them has to do with whether we may be already close enough to a situation where one ought to consider some further evacuation measures.

And the other one is in moving the gas bubble around, if we get it out into the containment I believe we're going to be flammable.

MR. DENTON: Yes.

CHAIRMAN HENDRIE: That is, if it doesn't go in the vessel and you do discharge it into the containment, why I think that takes you well up into the flammable region.

And I guess there's a third one and that is we may be thrust forward toward trying to get that bubble out of the

vessel a little sooner than we would otherwise like to have to do it on this account.

MR. DENTON: Well, and we could face that if there are malfunctions in the present cooling system.

CHAIRMAN HENDRIE: Well, that's true, yeah. That is certainly true.

Alright, Well, I think --

MR. DENTON: Well, I guess I had not put that one hig on my scale of concerns. You have heightened my worry about it I guess I need -- Really, it is going to take a lot of assistan from back there, people looking at this I guess to get me and us up here up to speed on it.

CHAIRMAN HENDRIE: Yeah. I think it would be useful

MR. DENTON: Is there any way to get a sample even on that upper head?

CHAIRMAN HENDRIE: I don't know.

What you might do is just take a minute before your press conference and go through to the folks in Bethesda and see what they've got on it. Presumably they're on a parallel patch-in and are also listening to this discussion so they can be alerted for a call to give you a rapid brief on what they think they know at this time.

MR. DENTON: I think about all the other issues you probably have heard from other channels. Congressman Walter spent some time here with us this morning and I had breakfast

with Congressman Eiler. I assume you're aware of these continuing Congressional interests, and they all are as helpful as they can be.

CHAIRMAN HENDRIE: Yeah.

MR. DENTON: I will get back with the center after this briefing.

CHAIRMAN HENDRIE: Okay. Let me see what other questions people have.

COMMISSIONER BRADFORD: Harold, did I understand you earlier to say that you had indicated to the Governor--

VOICE: Excuse me, sir. This is the White House operator.

12:42 noon

Mr. Denton?

MR. DENTON: Yes, sir?

VOICE: The President has requested you on a call sir. Can you (inaudible) -- call, sir

VOICE: Yes, sir.

(Laughter.)

(Pause - There is inaudible conversation)

CHAIRMAN HENDRIE: Gee, I guess I ought to turn this off. Okay.

COMMISSIONER GILINSKY: Unless you want to listen to the President.

CHAIRMAN HENDRIE: No.

CHAIRMAN HENDRIE: All we were doing was listening to the Response Center's recorder go beep.

(Laughter)

Yeah. I think it's useful that they did, and that wa my impression last night from the conversation with Vic, that they had talked about a range of errors, not about the hydrogen in the vessel burning, but had talked about, you know, short noticing.

COMMISSIONER BRADFORD: I thought that they had, too. I wasn't sure they'd associated any time with it, --

COMMISSIONER AHEARNE: Right.

COMMISSIONER BRADFORD: -- but that -- I thought that they'd (inaudible).

CHAIRMAN HENDRIE: As you say, I think it's helpful that the Governor has got in mind that there may be some short, some --

COMMISSIONER BRADFORD: Yeah.

CHAIRMAN HENDRIE: -- pretty short --

COMMISSIONER BRADFORD: He's less interested in the exact sequence than in knowing the time, but I wanted Harold to focus on that for a minute and tell us exactly what he has told the Governor about it.

CHAIRMAN HENDRIE: Oh.

VOICE: The utility in all events (inaudible).

CHAIRMAN HENDRIE: He's talking about seeing the explosion; he's talking about a breach of the containment.

COMMISSIONER BRADFORD: But not all the core (inaudib

CHAIRMAN HENDRIE: Well, when you breach your containment, Christ, we've got -- I don't know, we've probably got 15, 20 percent of the core iodine out there which is -- You know, that will do for starters.

(Laughter)

CHAIRMAN HENDRIE: That's -- Huh?

VOICE: (Inaudible.)

(Inaudible discussion.)

CHAIRMAN HENDRIE: Moderate. An item to watch.

They tell me that something like a 7 mill amplitude is the normal experience on that pump.

COMMISSIONER AHEARNE: This is up three times.

CHAIRMAN HENDRIE: This is up three times normal.

I don't have a continuous report so I don't know whether that's growing gradually or whether it's coming, you know, like this.

COMMISSIONER KENNEDY: The limits are about 30.

VOICE: (Inaudible.) said 60

CHAIRMAN HENDRIE: Yeah. I've also heard-- But I believe the plant previously, Del, earlier in the morning, Del, it said that the plant had been using 30 mills as a point where they would normally contemplate getting to it at the next convenient down time.

They have got, I understand, got the lube oil systems running on --

COMMISSIONER AHEARNE: The other pump in that circuit

CHAIRMAN HENDRIE: Well, it turns out the pumps running is over here. The second pump that looked like it would be available is over there on the loop with the damaged steam generator.

VOICE: (Inaudible.)

CHAIRMAN HENDRIE: Then the two that we had heard were the ones that were out are like that.

(Pause.) Can't feed back?

COMMISSIONER AHEARNE: It was backwards, wasn't it? If you ran that pump, wasn't it backwards?

CHAIRMAN HENDRIE: No, because it comes out of the core and goes to the same side of the exchanger.

See all of these--

COMMISSIONER AHEARNE: Aren't they on opposite sides?

CHAIRMAN HENDRIE: All of these-- Well, let's see. There's a loop configuration there in one of your drawings, but these pumps take suction from the exchanger right into the vessel. It goes up through the vessel and comes out in two large pipes. Each pipe then goes to an exchanger -- a steam generator.

Out of the steam generator it splits and you've got two pumps in parallel on the back end.

Now one of the useful attributes of the system at present is that there is a nice forced circulation to the core. It is pulling the temperatures down. One of those

off-- You remember yesterday there were three thermocouples; there were two offscale and one okay. The one that was above saturation has come below saturation. One of the offscales has come down. I believe the last one has come falling 20 degrees an hour or something like that. It is still above saturation, I would guess, now but coming down. I haven't heard about the remaining one.

So clearly that's having a beneficial effect.

Now you'd continue to have that forced flow on the other loop, but you wouldn't be driving through the operable steam generator, other than in a -- oh, a sort of a natural circulation plus just a sort of an over -- of, a little tail of the driving force to go that way because the main push would be over here on the other one.

We don't know the extent of the two failures and I don't know that they've been in a position to make any sort of measurements. I don't think they've attempted any sort of measurements on that side.

Because running the damaged side means that you-- What you do on the secondary side is take the steam evolved from the heat transfer from the primary. That steam then goes over and is condensed in the hot well. It's the same hot well that's the operable one (inaudible).

That secondary side isn't-- You know, that's out in the turbine building and it isn't all that well sealed so if you've got an appreciable leak rate you're

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going to be putting fission products over into that secondary loop and there's going to be an assortment of these low-grade leakages which are then just going to come out, so the local area dose rate is going to go up.

I don't think one wants to open the isolation valves on that secondary -- the damaged steam generator secondary loop short of pretty extreme circumstances.

On the other hand you can run a mode in which you're circulating through the core with the pump on the damaged side so you keep the forced circulation going and what will happen is that the primary system-- may not be able to get enough energy out on the good side; the flow just won't be there. You will then have temperature rise, just bulk expansion, and periodically you'll toot at the pressurizer release.

And then what you'd do would be to let it toot for a while, let the pressure come back down, the level drop in the pressurizer, cut it off and then let it build again. And so you'd do a burp and slurp energy release. You know, you're dumping the energy by that method into the containment.

So it's a feasible mode and is one that is contemplated in some of the loss-of-coolant sequences, some of the degraded small break cases.

COMMISSIONER AHEARNE: His concern about having--

CHAIRMAN HENDRIE: It would be nice if the other pump in the good loop could be rolled.

COMMISSIONER AHEARNE: He said it was operable.

CHAIRMAN HENDRIE: He didn't say it was operable. He said they got the lube oil system working again, they say.

COMMISSIONER AHEARNE: Joe --

COMMISSIONER AHEARNE: Were there more problems in that?

COMMISSIONER KENNEDY: They were operable but they were not tested.

CHAIRMAN HENDRIE: These are big pumps

VOICE: (Inaudible)

CHAIRMAN HENDRIE: Until you bump it and pick up load, why you don't know. And they are reluctant to make a test of that kind at the moment; they'd just as soon not. Because then what you do is go through a regime in which you're you know, coming up toward double the present core flow. They're not all that anxious to rattle things around that much

COMMISSIONER AHEARNE: Is Harold's concern about mor industry cooperation? Is it possible to get the company or someone to request some of the other --

CHAIRMAN HENDRIE: I'm going to call Creitz and DeCamp at GPU as soon as we get off here and --

COMMISSIONER GILINSKY: (Inaudible)

COMMISSIONER BRADFORD: (Inaudible) I'm flabbergast both that B&W needs an invitation and that the invitation hasn

been issued.

COMMISSIONER GILINSKY: Yeah.

COMMISSIONER KENNEDY: Well, of course I'm flabbergasted, too, but on the other hand, they have a fire and they're standing there with a fire hose trying to put it out, and they're not thinking about -- like what color the roof should be when they rebuild the building.

COMMISSIONER BRADFORD: No, these are more basic questions.

COMMISSIONER AHEARNE: (Inaudible) -- ended up really talking about they need more help to think about emergencies -- procedure.

COMMISSIONER KENNEDY: They need more help to do what they're doing.

COMMISSIONER AHEARNE: That's right.

COMMISSIONER KENNEDY: To think ahead.

COMMISSIONER GILINSKY: Aren't we doing that kind of thing?

VOICE: (Inaudible)

VOICE: Yes.

COMMISSIONER AHEARNE: One of the things that Joe said to Stello last night is if people during the night were working out what kinds of accidents might happen here (inaudible).

COMMISSIONER KENNEDY: I think we ought to talk to B&W and we ought to talk to Creitz (inaudible).

COMMISSIONER KENNEDY: We will.

VOICE: (Inaudible)

COMMISSIONER AHEARNE: (Inaudible.) And there are a number of other plants, people who have the same kind of plants (inaudible). I can jot down.

(Inaudible discussion.)

CHAIRMAN HENDRIE: We may get a patch back from Harol after his talk with the President and I'll sent it up.

COMMISSIONER AHEARNE: He said he has a press conference at 12:30.

VOICE: (Inaudible) -- press conferences?

CHAIRMAN HENDRIE: Lovely.

Well this is as of today, up to --

(Inaudible discussion between Bradford and Ahearne)

CHAIRMAN HENDRIE: You think maybe I ought not to talk to him?

Well, let me talk to Harold later on and see if it would be useful.

COMMISSIONER GILINSKY: (Inaudible) -- it's got to be with Harold.

COMMISSIONER BRADFORD: Yes.

CHAIRMAN HENDRIE: It certainly would.

COMMISSIONER GILINSKY: And maybe he didn't want to get on the phone with Harold on his own.

(Inaudible discussion.)

COMMISSIONER GILINSKY: I think the range of uncertainty here is --

(Inaudible discussion.)

(Interruption in recording.)

CHAIRMAN HENDRIE: We ought to get an update on that licensing situation there with some encouraging news there right after the press conference and ask him to-- You know, it's still in a preliminary stage but we've got lots of people working on it.

And then I think we should think about next steps.

Did I tell you, by the way, that we did get through to Herman DeCamp, the general public utility engineering vice president whom I've known for some time, and I couldn't get to him-- I had to wait a little bit. The reason I was waiting a little bit was so that Jack Watson could read him the riot act, to get people down there.

(Recording difficulties.)

Get people down there.

He said, "Listen, I've kind of heard that before." Denton had talked to him, and so he understood, and told me some of what they're doing. They're pulling in people from all over.

COMMISSIONER GILINSKY: What about B&W (inaudible)?

CHAIRMAN HENDRIE: Yeah. But he's got people from th rest of the industry. DeCamp has got Miles and that crowd at Naval Reactors coming down, and Joe West and John Detrick are on their way down with a team from Combustion and (inaudible).

Laney is sending in experts from Argonne as well.

I told him to-- Let's see. And he's getting health physics people from someplace or other but I don't remember where at the moment.

I told him that I thought he ought to supplement his operator and auxiliary operator crews with some additional experienced and knowledgeable reactor plant people, and that I recommended he call Duke Power and Arkansas 1 place, you know, where they have B&W plants of the same general vintage.

Told him if he needs any encouragement from the government to help with these people, why--

COMMISSIONER GILINSKY: Wasn't Harold, (inaudible) -- complaining about B&W. I don't understand.

CHAIRMAN HENDRIE: He wasn't complaining about B&W. What he was saying was it was his impression that B&W was sort of off, you know, monitoring and providing calculations and setting aside and more monitoring respectively,

COMMISSIONER KENNEDY: he said his impression was they were fully prepared to be more active if the utility asked them to do so.

CHAIRMAN HENDRIE: Yes.

COMMISSIONER KENNEDY: They haven't asked them.

CHAIRMAN HENDRIE: Yes. Apparently, you see, we've been using B&W perhaps more vigorously than the utility.

COMMISSIONER GILINSKY: (Inaudible) -- working them

up in the middle of the night?

CHAIRMAN HENDRIE: Yes.

Yeah, and what we have to do, and now on the hydrogen problem in particular, why, we have got most of the ranking world experts, you know, working in several parallel groups so there will be a cross-check of independently done calculations by different people in a helpful way to avoid getting caught in errors in assumptions or arithmetic.

3:27 p.m.

All 5 Commissioners and various assistants at Bethesda Response Center. Also, J.Austin L. Bickwit, G. Mazozan

Now I-- Go ahead. Go ahead.

VOICE: Go ahead and fill up some of the cameras so (inaudible).

CHAIRMAN HENDRIE: What have they got, Jim?

VOICE: (Inaudible)

CHAIRMAN HENDRIE: Tell us about hydrogen.

MR. MATTSON: We're learning about hydrogen at 1,000 psi. We're going to be concerned about (inaudible).

CHAIRMAN HENDRIE: Well, if pressure helps, I guess we can run it up another thousand pounds.

MR. MATTSON: Yes, pressure does help, and somebody has suggested that in the last half hour. I'll get a hold of one of the chemists at SAI made suggestions

Let's see. I can better trace the results that I was giving you before you went up there.

The name of the man that's performing the calculations is Bob Ritzman. He was with Battelle Columbus for a number

of years. He was the Reactor Safety Study expert on hydrogen. Saul says he's the best man in the country on--

VOICE: (Inaudible.)

MR. MATTSON: He's at SAI He's working in California right now, today making these calculations.

It's his number says 2 percent. It could be as high as 3 percent oxygen in the bubble.

COMMISSIONER GILINSKY: What determines that? In other words, what--

MR. MATTSON: He says radiolysis. He assumed that the oxygen was all scrubbed by the zirconium and the zirconium (inaudible). Ignition, 8 to 9 percent, detonational factor, 2 or 3 higher.

When I made that number off the top of my head it said you say 3 percent in 3 days, then you've got 5 days to reach 8 percent, probably a little longer because the rate of production is going to go down. It goes down about --

VOICE: (Inaudible.)

MR. MATTSON: -- 30 percent per day.

(Pause)

It goes down as the power decays, and today in a 12-hour period, it's going down three parts out of 20 -- it's going down 15 percent a day.

MR. MATTSON: There are control rod drives, and we've got people looking at the way to fail a control rod drive on

purpose and provide a crack. Unfortunately the only way you can do that that we know is to heat it; in other words, you want to start a fire.

We think we've got a way we can break the control rod--

CHAIRMAN HENDRIE: Let's see. That-- You know, it condenses to slightly over flammable conditions and if you wanted to burn it rather than let it continue to rise--

MR. MATTSON: You could convince yourself--

VOICE: (Inaudible.)

MR. MATTSON: You could convince yourself you were well under. If you knew it and were certain of it, there's probably a way to break it, which they're going to attempt at Ohio right now (inaudible).

CHAIRMAN HENDRIE: Okay.

VOICE: (Inaudible)

MR. MATTSON: I guess the latest we have is that three pumps are now operable. Last night it was felt that they only had one of the pumps that they thought they could go to start. At least Hal said this morning that they had three ready to start.

MR. MATTSON: They're running the noise monitor on the plant now. We got a call from the man who invented it at Oak Ridge. He said if they'd run it there were things he could learn about it. And they now think they can see the

bubble move with the noise monitor and do a noise analysis at Oak Ridge now to get up for that.

They've confirmed that the noise from the pump is not bad. The pump's in good shape even though it seems to be showing some motion. They've learned one of the things from the noise monitor must not have been that important it slipped my mind. Well, the performance and equipment, reall

The fuel is continuing to improve, the temperatures.

CHAIRMAN HENDRIE: Yes. I was delighted to learn--

MR. MATTSON: One of our errant thermocouples returned--

CHAIRMAN HENDRIE: Well, the last of your-- They told me the last of your errant thermocouples had returned.

(Simultaneous discussion.)

CHAIRMAN HENDRIE: I was so proud of it I stole the drawing off the table.

MR. MATTSON: That's not it. It's this one here that's still out. Yes, there's still one. This one returned last night.

What's the time on that one?

CHAIRMAN HENDRIE: 231, 12:50.

VOICE: I thought they--

VOICE: There's still one out.

VOICE: -- told me that evey one--

VOICE: That one wasn't (inaudible) -- on the table. The one across the table (inaudible).

MR. MATTSON: That one was not on the table.

When I generated that table I decided I'd (inaudible) -- leave out the few that were known but they've been adding them as they go along.

CHAIRMAN HENDRIE: They do have one (inaudible).

MR. MATTSON: Well, of course the question is how long do you stay here, and why do you stay here? I guess the bottom-line answer to that is because you know you're okay where you're at and things don't look like they're changing rapidly. The only things that are changing are getting better.

And until you know for certain that there's been close coordination between CPU and the plant staff and B&W on the procedure, the checkout procedure for bringing it down,--

CHAIRMAN HENDRIE: We all agree.

MR. MATTSON: -- and we've seen it, and you know I've got lists of things that ought to be thought about when we finally see a procedure,-- I can't sit here and develop a procedure for bringing it down. I'm not qualified to do that, but I can sure comment on one. And I've got lots of things I want to ask them when I see that procedure. But they're being very careful, studied four or five ways to bring it down, slowly, rapidly.

VOICE: What do they do--

MR. MATTSON: On any of those they could exercise a judgment at any given point in time and go. But they all need to be thought through.

COMMISSIONER GILINSKY: Right. (Inaudible)

MR. MATTSON: B&W is organizing teams that are looking at various ways to come down. The Westinghouse and Combustion Engineering people who are at (inaudible), New Jersey someplace now, they're at some kind of center where they're helping double-check these kinds of things with GPU management as the third party, on considering the various ways to vent in the process of bringing the pressure down to keep the bubble out of the core.

COMMISSIONER GILINSKY: What's the role of our guys down there in this process?

MR. MATTSON: Well, I'm not certain what the involvement has been for our people at the site with GPU management developing the procedures. We've got four people a shift in the control room, answering hands-on kinds of questions, dealing with hands-on kinds of problems; when you're in that environment and occasionally wearing a radiation mask, you're not really thinking much about protocol and procedures (inaudible).

CHAIRMAN HENDRIE: I don't think the on-site team has all that much -- worked all that much on those -- getting the bubble out as yet.

Stello, you know, after the press conference last night, I got him when he got back to the Visitor's Center and was back there, having the press out from under foot and getting down to work, --

VOICE: (Inaudible.)

VOICE: I'm sure he said so.

CHAIRMAN HENDRIE: -- was shaking down his night team to get started on a set of what-if's, which are not quite the same as these sequences but, rather, what will we do if the pump quits, what will we do if the core looks like it's beginning to move around, what will we do if the temperatures start to go, which obvioulsy affects, you know, in a few hours, where you don't get very far.

Anything you put down in those lines is going to be a help if one of those things happens. You aren't going to have much time to think when they go.

MR. MATTSON: He's doing some of that work there and he calls in questions here and we put teams of people in this building and in the Phillips Building on the line.

He called up three or four things today and we found out the blocked valve leading to the vent pressurizer is not on an emergency bus.

We're calling the Navy. They've got portable power supplies, as I understand There aren't any portable power supplies of the size you need for a reactor coolant

pump. Reactor coolant pumps are not on emergency buses so if we find a portable power supply we'll get it to the site.

The big one at the moment is Levine and I, I guess, are adamant about this we ought to be flying in additional RHR capacity for that plant. We ought to get it up there now, and we ought to get it installed now. We know we've got debris. We know we've got plugged lines in the primary system, and we can bet that will happen in the RHR heat exchangers when we finally get down to it.

Now's the time to be adding those three or four chains in parallel, to put additional line exchangers in the auxiliary building now rathen than after you've got the hot RHR going. There are things you can accomplish while you're figuring out how to go the next step.

The (inaudible) -- It seems to be stable where it's at now.

VOICE: (Inaudible.)

MR. MATTSON: Well, so far we just suggested it to the people at the site to see what the reaction is there. They may have started something. If they have not, then I think we ought to pump up something pretty fast.

This is something that Westinghouse and Combustion and others could help (inaudible).

COMMISSIONER BRADFORD: We'll be glad to help you.

CHAIRMAN HENDRIE: Yes.

We're still going to be vulnerable to a jump in the containment sump.

VOICE: Yes.

CHAIRMAN HENDRIE: What do the sump experts -- Have they got anything to offer?

MR. MATTSON: Got a screen. I don't believe one of the tests itself.

CHAIRMAN HENDRIE: Is it one of those--

VOICE: It's one of our mid-class sumps.

MR. MATTSON: It's mid-class sumps. They're not as bad as some of the old ones and as good as some of the new ones.

There was some talk about some strainers that may have confused people. They gave them a year to install strainers between the low head system and the high head system. You can pass particulate matter through the low head pumps that might cause the high head pumps difficulty. And there's a mode of operation on a B&W machines where you piggyback, where you can use the high head pumps on the sump water in case you run out of water.

That was a concern early in the transient when they were using the safety injection system and not using the reactor coolant pump, but since the water has been replenished, there should be no need for that mode of operation

at this juncture.

COMMISSIONER GILINSKY: Let me ask you--

MR. MATTSON: There is always the unknown in the RHR pumps and the sumps.

Yes?

COMMISSIONER GILINSKY: To return to this hydrogen problem, have we put that to bed?

CHAIRMAN HENDRIE: No, but I think at the moment we have a reasonable basis for believing it is not a problem for Saturday night. Okay? It is several days out into the next week before -- the best judgment is, before we hit the probability limit and the detonation limit is more than a week beyond that.

So at least it seems to me that to the extent there was concern, and there was concern, and we intended to sit here -- In fact, the reason we're all here is so we didn't have to waste time -- I didn't have to waste time driving back down if-- you know, if the word on hydrogen was that the best guess is that it's 3-1/4 and it's going flammable tonight and the limit's 4, and the spontaneous flammability point is 1,000 pounds at 200 degrees F., why you'd say we would call the Governor at the meeting and say we think you ought to get people out of here.

MR. MATTSON: Yes, we will be getting more --

CHAIRMAN HENDRIE: I think that situation is not

now before us.

COMMISSIONER BRADFORD: Joe, just one other thing.

What are the uncertainties in the various numbers like the 3 percent --

CHAIRMAN HENDRIE: I think there's a fair amount of slop. I think you have to regard it as being a fair amount of slop.

MR. MATTSON: I suspect we'll see some differences in the numbers before the day's over.

COMMISSIONER AHEARNE: (Inaudible.)

MR. MATTSON: Yes, yes.

VOICE: (Inaudible.)

MR. MATTSON Same problem, different people.

COMMISSIONER BRADFORD: You assume the worst case in each of the uncertainties.

VOICE: (Inaudible.)

COMMISSIONER KENNEDY: In other words, how much closer in does all this get?

MR. MATTSON: I can't answer the question.

COMMISSIONER AHEARNE: These other people that are giving us (inaudible).

MR. MATTSON: Well, that isn't-- I can give you better than that.

(Pause.)

Most of the uncertainty is in what's inside the

water. There's probably causing radiolysis -- at various points in time (inaudible). It's possible to bound that. I'm fairly certain at this point they are making attempts to bound that.

We've given everyone the measurements that were taken from the water so they can see the dispersal (inaudible). The calculations that were performed early were being performed on the TID release, and I think the measurements tell us now we do not have a TID release.

VOICE: (Inaudible.)

MR. MATTSON: And so we will be able to bound it.

COMMISSIONER KENNEDY: How much (inaudible)? About 60 percent iodine (inaudible)?

MR. MATTSON: The uncertainty shouldn't be sufficient to (inaudible). There's just not that much uncertainty on the other side (inaudible).

COMMISSIONER KENNEDY: That was the nature of the question.

MR. MATTSON: But we're not grossly underestimating this thing.

COMMISSIONER AHEARNE: Well, but now there are-- "Grossly," your term, does that mean that you're talking that you're not overestimating by a couple of days or--

MR. MATTSON: Well, I'm confident that I'm not underestimating it at this junction, and I will be confident

before I turn it over to the next person who has got the watch that he's not underestimating it either. And we just have to follow it, day by day. We're doing better on every calculation we do with each passing hour.

COMMISSIONER KENNEDY: It feels comfortable at least until the watch change.

(Laughter.)

Mr. MATTSON: The first calculation you make you make very roughly because you need an answer quickly, and then you keep people making calculations. That's the best I can give you.

COMMISSIONER AHEARNE: Well, I guess obviously what I'm pushing for is your estimate as to how much certainty in one of the earlier calculations would have led you to a concern at tonight or tomorrow morning?

MR. MATTSON: No, the earlier calculations were wrong. The measurements made today is going to make it go up.

The first number I have for the measurement made today says I've got two to three days.

CHAIRMAN HENDRIE: Yes. Well, except that I had an evolution number, number 30 to 40, cubic feet per day at or about 1,000 pounds, and --

COMMISSIONER AHEARNE: That's going to go up to 4 percent, isn't it?

CHAIRMAN HENDRIE: And I was using 4 percent because

couldn't remember high pressure data and I was saying, well, you know, in the containment pressure range it doesn't make any difference so I was working 40 cubic feet/day -- available at 4 percent flammability and--

MR. MATTSON: You said you're within?

COMMISSIONER AHEARNE: Well, fairly close.

CHAIRMAN HENDRIE: Then I couldn't remember whether the 40 cubic feet was total gas evolution or the hydrated -- you know, so the oxygen part was a third of it, or whether-- I think it turned out it was total, so that helped some.

But you know, it looked like we might be there and we've become very concerned, if it looked like that might be the case, that then we'd have to think very seriously --

Approx 3:34 p.m. E.Case and B. Grimes join meeting.

MR. MATTSON: But that's (inaudible).

CHAIRMAN HENDRIE: -- about getting people out of at least the close-in region.

MR. MATTSON: (Inaudible) -- the source of the 40 cubic foot per day.

CHAIRMAN HENDRIE: Yes.

MR. MATTSON: They're the ones that have to report in. They're working with the Navy to make sure they've got the right numbers. Most of where they got their information was working with the Navy on the submarines and aircraft carriers. Those are harder numbers than (inaudible).

COMMISSIONER AHEARNE: Do they expect to be down sometime soon?

Approx 3:52 p.m. Hendrie leaves to take call from Mr. Denton.

MR. MATTSON: He told me about an hour ago --

VOICE: Denton's on the line.

MR. MATTSON: -- he had the calculations set up ready to go.

COMMISSIONER AHEARNE: Do they have that-- What's the status of getting that line -- that jury-rigged line --

VOICE: It's-- They've made the connection but they haven't tested it and haven't used it.

COMMISSIONER AHEARNE: They're waiting to get shielding around it?

MR. GRIMES: No, I don't think they need shielding for that.

MR. MATTSON: It's a fairly simple thing they did. They had a nipple coming out of the containment with a valve and an instrument. They went outside the containment, shut the valve, removed the instrument.

They went to the makup tank. They had the same think on a line out of the makeup tank. They shut the valve and removed the instrument.

They took a piece of tubing with tubing connections at each end, screwed them into the places where the instruments had been, opened the valves. They did it very quickly. I assume it's a very hot area.

COMMISSIONER AHEARNE: They're not using it?

MR. MATTSON: They are not using it. It hasn't been tested. I assume what they mean when they say it hasn't been

tested, they haven't pressure tested it, which means they haven't opened up that line for the makeup tank yet. I don't know--

Brian, maybe you know more than I do about why not.

MR. GRIMES: It should be a fairly easy, simple thing to do. It's a hot area and they did it rapidly so they run the risk that they didn't stay there long enough to pipe it down enough with just a wrench.

COMMISSIONER KENNEDY: One of the latest numbers we're hearing on the recent (inaudible)

MR. GRIMES: -- no substantial change in the offiste numbers (inaudible) -- a couple of millirem per hour immediatel offsite dropping to a millirem within a mile and then dropping out further to .1 millirem in three or four miles and that's in the plume above ground so it's even less at ground level.

We have done some rough calcualtions to try to figure out the worst individual dose, dose to an individual on the ground offsite. We think it's probably less than 50 millirem. Although, we had 20 millirem clouds and individual 20 millirem readings (inaudible).

COMMISSIONER KENNEDY: This is cumulative dose?

MR. GRIMES: We've done another-- Yes, cumulative dose to an individual.

We've done some man-rem calculations and came up on the order of 1,000 man-rem.

MR. MATTSON: What fraction of that is total exposure for the 30-year life of the plant, to give a scale for that? Is that one year's worth or two year's--

MR. GRIMES: I think it's about a year's worth.

VOICE: Well, maybe two year's worth.

MR. GRIMES: Three years?

COMMISSIONER GILINSKY: (Inaudible.) I thought somebody was saying that that was like--

MR. GRIMES: We're calling it Appendix A here.

MR. MATTSON: Yes.

MR. GRIMES: That's the basis they used in their --

COMMISSIONER GILINSKY: I thought it was like 50 man year.

MR. GRIMES: Maybe on the new plants that's more typical.

I don't think there'd be any point--

COMMISSIONER GILINSKY: Harold said 2,000 over what time--

MR. GRIMES: I think you're right in that the 300 number was associated with the Indian Point type populations.

COMMISSIONER GILINSKY: Well, Harold said 2,000 was the--

MR. GRIMES: (Inaudible.)

MR. MATTSON: So it could be as high as 25 (inaudible).

COMMISSIONER GILINSKY: Suppose the system ticks along nicely. What are we looking to? Something like a couple of weeks of it sitting like this, it seems to me, for

people to think through a scheme, to write down procedures, for those to be checked out, since we haven't really zeroed in on anything at this point?

MR. CASE: I think --

MR. MATTSON: I don't think it will be that long.

MR. CASE: -- the human element enters in before that time, the psychological element of the tick, tick, tick.

COMMISSIONER GILINSKY: What is your limiting-- If you say you've got to bring it down earlier, can you tell me why?

MR. MATTSON: Because of the element that they're talking about.

COMMISSIONER GILINSKY: Just things breaking down in some way, --

MR. MATTSON: No, --

VOICE: (inaudible) operator?

COMMISSIONER KENNEDY: Because there's going to come a point where --

VOICE: Human nature --

COMMISSIONER KENNEDY: -- an optimum is reached in which (a), they've learned about all they think they can learn and (b), they're just getting nervous with the situation and they've got to do somewhat--

MR. MATTSON: Let me say, as frankly as I know how, bringing this plant down is risky. There's a not negligible

risk in bringing this plant down. No plant has ever been in this condition, no plant has ever been tested in this condition, no plant has ever been analyzed in this condition in the history of this program, --

COMMISSIONER GILINSKY: Alright --

MR. MATTSON: -- and there's risk in doing that in short order with a damaged core.

COMMISSIONER GILINSKY: Okay. Now that means -- That's the actual maneuver for bringing it down.

MR. CASE: Yes, anything to this system.

COMMISSIONER GILINSKY: What about getting to that point from here on? I mean that sounds a lot less cheerful than your description--

MR. CASE: Well, but you can make the same kind of table (inaudible).

MR. MATTSON: You'd be then staying where you are.

MR. CASE: Right. This has never been done before, and this has never been analyzed before, and we think we've thought it through--

COMMISSIONER GILINSKY: But the thing that we were talking about--

COMMISSIONER KENNEDY: It says here you ought to be prepared to make a decision.

MR. MATTSON: That's right.

COMMISSIONER KENNEDY: Well, you don't want to rush that but neither do you want to sit there, --

MR. MATTSON: That's right.

COMMISSIONER KENNEDY: -- I think is what you're sayi

MR. MATTSON: And I don't think it's two weeks.

COMMISSIONER KENNEDY: I understand.

MR. CASE: No, I don't either.

MR. MATTSON: It could be as short as a couple days.

COMMISSIONER AHEARNE: A couple of days, because of this pressure--

MR. MATTSON: No, there is just time to do it in a couple days.

COMMISSIONER GILINSKY: Well, do we know--

MR. MATTSON: Well, do we know--

No, you're generating more oxygen, you're generating more hydrogen --

(Simultaneous discussion.)

MR. MATTSON:-- your pump is running in a condition it doesn't like to run in. You've got three of them sitting there you hope four. You've got radiation in that containment with equipment you're depending on now that's not radiation-qualifie

It's going to reach a time when it's time to do it. The risk of staying there is going to continue to grow.

(Simultaneous discussion)

MR. MATTSON: It's going down; it's going to decrease some. And they're going to balance it.

COMMISSIONER GILINSKY: Alright. One of the things we're going to discuss is should we be recommending anything about moving

some people. And I guess I'm trying to relate what you're saying to that sort of a decision. Can you help me relate it? Because what you've been saying in the last few minutes seems to point in a different direction than what I took to be a rather more cheerful proposal --

COMMISSIONER AHEARNE: Optimistic is (inaudible).

VOICE: (Inaudible.)

COMMISSIONER GILINSKY: I mean a more favorable appraisal of, you know, a few minutes ago. You know, whatever is changing is changing for the better, and it's okay to keep doing what we're doing.

MR. MATTSON: Number one, are you asking me for a recommendation?

COMMISSIONER GILINSKY: No, no. I'm trying-- No, no, I understand-- Well, if you have one I'll take it. But I guess I'm trying to get a feeling for--

MR. MATTSON: Let me give you a feel for--

COMMISSIONER GILINSKY: No, no, I don't want to push you on that one, Roger, but I guess I'm trying to understand what are the things that you find troubling in this situation, or what are the things that you feel contribute to, you know, possible degradation of the system, and what sort of time scales might they operate under.

MR. MATTSON: Well, the environment that the plant is operating in contributes to its eventual degradation. They

make estimates of what margin is there in that degradation, and we've got factors of safety. They're not large but there are factors of safety.

And how long the pumps will stand up under the environment, how long the valve operators will stay up on this environment, how long the pressurizer heather will stay good. --

COMMISSIONER KENNEDY: There are some available redundancies that people weren't fully satisfied with, a couple of them, that are beginning to look a little better now.

MR. MATTSON: We found ways to improve situations.

COMMISSIONER KENNEDY: Right.

MR. MATTSON: We found they worked good. That's right. And there's also a reason to wait because there are things that can be done now that can't be done once you go down, the addition of the additional RHR capacity, for example, the improvement of the procedures.

COMMISSIONER KENNEDY: Things that if you have a chance to do you will do. Your -- RHR things, for example, you mentioned was something which in your view --

(Simultaneous discussion.)

MR. MATTSON: I think, yes, my recommendation to evacuate I'd change today. When I made that recommendation two days ago, it was on the basis that you were releasing

large amounts of radioactivity unfiltered up the stack with no apparent way to stop it and were allowing him to continue to do it with no recourse.

And so I saw a precipitous move to a shutdown and I wasn't convinced of control of the reactor, and I said move them.

Within the hour they had an apparent fix. It's gotten better as we've gone along, and there are additional things that we can do that we've identified. We've improved the procedure since then I think (inaudible).

COMMISSIONER GILINSKY: If that's kind of a--

MR. MATTSON: If the hydrogen explosion thing changes I'll probably change my position here.

COMMISSIONER GILINSKY: But that, in a way, was a problem. You had a release which it looked like you couldn't control and--

MR. MATTSON: No, I saw--

MR. CASE: That related to the uncertainty in the cooldown situation.

MR. MATTSON: I saw that release driving a quick decision on going to RHR and the early indications were that the procedure they had in hand would fail and that the core would melt. I didn't have any choice but to make that recommendation. Almost an hour away from starting a core melt sequence, what else could I say?

COMMISSIONER AHEARNE: You have to look at even if you don't start, you know,--

(Inaudible) -- would you have enough time.

MR. MATTSON: Yeah, but if you know you're going to start in an hour, you need all the time you've got.

COMMISSIONER GILINSKY: Suppose we're in a much more comfortable state right now, --

MR. MATTSON: We are.

COMMISSIONER GILINSKY: -- or at least we thought we were. Okay?

MR. MATTSON: Yes, you are.

COMMISSIONER GILINSKY: Even so, you know, what are the objectives and does it call for -- I guess I could say taking out a certain amount of insurance?

MR. CASE. The best you can do is alert people. You can't pull them out.

COMMISSIONER GILINSKY: In a way, --

MR. CASE: That's the worst case.

COMMISSIONER GILINSKY: In a way, Joe, --

COMMISSIONER AHEARNE: You know, they're certainly alerted.

MR. MATTSON: Yes.

COMMISSIONER GILINSKY: The world is alerted.

COMMISSIONER GILINSKY: Joe, I didn't hear the press conference but I gather in effect he said that one is taking

evacuation into consideration, --

MR. CASE: Yes, he did.

COMMISSIONER GILINSKY: -- and that's a certain kind of alerting.

MR. MATTSON: At least it gives them a chance to make a choice themselves, the individuals.

MR. GRIMES: Which isn't working (inaudible).

MR. MATTSON: Some of them are leaving.

MR. GRIMES: We've got some information on time scales for evacuation and we think within an hour probably we could evacuate five miles.

COMMISSIONER GILINSKY: I guess I'd find that hard to believe. I guess I just don't think these sorts of things work out.

COMMISSIONER BRADFORD: Especially if they are subjective.

MR. GRIMES: (Inaudible) -- local authorities go around alerting and they're well planned and (inaudible) -- for several days now. Even if that's off by a factor of two or three, probably once the situation gets out of control you've got three or four hours before you'd actually start having releases from the facility.

Once you know you're in a--

COMMISSIONER GILINSKY: Okay. Let me ask you this question: Suppose one of these pumps goes and you can't replace it. Now at that point it seems to me that we want to

start working on trying to fix that.

And at what point do we-- We're getting into this question of -- what we were talking about.

*Chairman returns to room

*

CHAIRMAN HENDRIE: Which one?

COMMISSIONER GILINSKY: Of evacuation..

CHAIRMAN HENDRIE: Oh, yeah.

COMMISSIONER GILINSKY: And Brian was talking about the times that would be involved if sometning went bad, and the number of hours, and the question is what could you do in that time? Would you in fact have that time?

Because it would seem to me that you would -- the first thing you'd do, you know, unless there is a specific trigger that --

MR. GRIMES: Yes?

COMMISSIONER GILINSKY: -- everyone has decided on beforehand, saying when that goes, that's it, even though we're trying to fix it, we would order, you know, movement in certain areas--

MR. MATTSON: I know what that trigger is in my mind.

CHAIRMAN HENDRIE: Sure.

MR. MATTSON: If they go to a shutdown without a procedure known to us in here and been reviewed by us, I'd say evacuate.

If they go to a shutdown with a procedure that's thought out and shared and talked about a little bit, with

24 hours notice, that kind of thing, then we'd have a tough question, but I'm not sure how it could come out. You might still want to--

MR. GRIMES: Well, we talked about the thermocouples starting all to go up. And then others --

MR. MATTSON: That's another trigger.

MR. GRIMES: -- where you've got the bubble laid out and --

COMMISSIONER GILINSKY: It seems to me it's worth writing these things down and I don't know whether anybody is doing that.

MR. MATTSON: Well, they kind of change as the situation changes, as you balance the changes.

COMMISSIONER AHEARNE: Brian, when you were giving the estimates these are estimates made by the people in Pennsylvania?

MR. GRIMES: Yes, --

VOICE: Those people--

MR. GRIMES: -- our state program.

COMMISSIONER AHEARNE: I gather from the -- Joe that you mentioned the other day, the Federal Disaster Preparedness, or whatever they are, also called?

CHAIRMAN HENDRIE: Yes, but they're standing by quiet because if there are going to be things like a federal set of planes flying in cots and camps and field toilets and who knows what --

(Simultaneous discussion.)

COMMISSIONER KENNEDY: Yeah, they don't have anybody who even fools with that sort of thing anymore.

COMMISSIONER AHEARNE: And your estimate time is one hour out to the five miles?

MR. GRIMES: Well, I had some estimates on time available if things started to go bad before you'd get a major release.

COMMISSIONER BRADFORD: Do you know that estimate to be 10 miles, 15, 20?

MR. GRIMES: No, but we can think about walking. The brisk walking pace is three or four miles per hour. And everybody is in cars and they're alerted and the roads have plenty of capacity.

COMMISSIONER AHEARNE: In that part of Pennsylvania?

MR. GRIMES: It's a matter of notification.

COMMISSIONER KENNEDY: The Pennsylvania Turnpike, the east-west Interstate, and two north-south Interstates pass through Harrisburg.

MR. GRIMES: Which means all brings in the opposite direction.

COMMISSIONER KENNEDY: That's right. All roads in the area would immediately be blocked by the State Police for one-way traffic.

VOICE: But that one hour time was for the sector,

not for-- Was that for--

VOICE: Well, you could--

VOICE: -- all sectors in one hour?

MR. MATTSON: Dr. Collins, I think gave a two-hour estimate at 10 miles to Hart.

CHAIRMAN HENDRIE: I wish we had a map someplace.

(Laughter)

COMMISSIONER KENNEDY: We sent Fouchard -- away.

(Laughter)

CHAIRMAN HENDRIE: Well, let's see. On the next question--

I guess we hadn't gotten around to covering all the evacuation possibilities for consideration.

It seems to me with what we believe we now know about the hydrogen-oxygen situation in the vessel, that that certainl has relieved that, at least sort of you know in the next 24 hou as sort of a proposition where you would want to make some decision on that now.

It seems to me the situation is unchanged with regard to the other two evacuation situations. The one of concern to me is the change in the configuration of the plant that would worry you. If that happens, why I think we want to see what it's like and where it's headed and make a rapid decision on it

That will have to be in large part Harold and his team's decision. You know, we'll know about it in parallel

but from up here with any sort of a dynamic situation in the plant it's just not wise to second-guess the people who are on the ground. He is in close contact with the state people, the county people, and so on, so all of that can trigger very fast if it is (inaudible).

And it seems to me that we're--

MR. MATTSON: And so the situation is that you'd expect Harold to advise the Governor --

CHAIRMAN HENDRIE: Yeah.

MR. MATTSON: -- as far as --

CHAIRMAN HENDRIE: Yeah, yeah.

MR. MATTSON: Fine.

CHAIRMAN HENDRIE: You know, somebody can be calling us at the same time --

MR. MATTSON: Sure.

CHAIRMAN HENDRIE: -- so we're on board, but--

If the agency's senior officer at the site says get them out, why we're not going to sit around up here and debate whether that's a good idea or not.

MR. MATTSON: You know, it might be good if we would make it a point once a day, with a little bit better perspectiv than Harold's probably got and his people have got there, to check on things like what do you think the criteria are today, Washington, on the system changes, or the (inaudible) -- changes.

You can write him an approval if you've got time for that kind of thing.

CHAIRMAN HENDRIE: Yes.

MR. MATTSON: Doesn't hurt, one conversation today and say what do we think today?

CHAIRMAN HENDRIE: Yes, it's a useful thing to keep working along. I wouldn't-- Don't pull anybody off the hydrogen problem, --

(Laughter)

MR. CASE: No.

CHAIRMAN HENDRIE: -- but work along. And as they are trying to develop these scenarios down there, Vic's effort to get in place a minimum set of what do we do if emergency things, that gives you some lead because you can see as you go down those, as you develop them, why if you come rapidly to a place where if that doesn't go on and work why it's time to start (inaudible).

So that will develop out of that some discussion up here with the people who will be helpful to them and help judgments.

Now the other-- So it seems to me that that situation does not change, you know. We had that situation-- We've had that before us ever since we went on this 1,000 pound intermediate cooling mode operation. In fact, you know, the situati is modestly better, but I don't think-- You're a shade cooler

now. We seem to have a better grip on the pump situation. We're getting into shape to be able to bump and roll the other pumps. We seem to know a little better that we have observed vibration in the one that's running may not be a problem.

COMMISSIONER AHEARNE: (Inaudible)

CHAIRMAN HENDRIE: And at least they're keeping track of it. So in a sense, the stability of this mode of operation is better right now than it has been since we went into it.

So I think the need for evacuation in this situation is, you know, modestly lessened although it is of the same order of magnitude.

The other situation of course is the one when we know what the evolution is going to be to get down to RHR cooling and low pressure and get the damned bubble out of there and get onto a long-term cooling thing. And I think the judgment as to whether a precautionary evacuation ought to be carried out during that evolution --

VOICE: Volmer?

VOICE: How about (inaudible)?

VOICE: Who?

VOICE: (Inaudible)

CHAIRMAN HENDRIE: Whether precautionary evacuation ought to be done at that time I think is a very alive question but we, you know, need to see the sequence and have a sense

of the confidence in it, and so on. I'd leave that for the future.

Let me go see what's up.

COMMISSIONER AHEARNE: Brian, you're, were talking about the various hours that you thought you might have in case that sequence (inaudible). You said three or four hours?

(Inaudible conversation.)

COMMISSIONER GILINSKY: Let me go back over this point.

This is a situation we've been living with and (inaudible).

(Simultaneous discussion.)

COMMISSIONER GILINSKY: On the other hand, there's a feeling that this plant cannot hold out indefinitely, so if there is something else that works which is degrading the situation, whether it's the people or concern about the machinery or something else, or some combination --

(Simultaneous discussion.)

(Recording difficulties.)

COMMISSIONER GILINSKY: Plus factor and the minus factor, And it's not clear.

It seems to me that when you project that into the future, you're a pretty strong minus factor if you go out several days, or certainly you'd feel that was past a week.

COMMISSIONER KENNEDY: That's what I think you could

say today. I don't know whether we'd say that Monday or Tuesday.

My impression of what Roger is saying, obviously the situation is maturing. Some things are getting better. You have to assume that at some point you have a situation system which is working in a mode for which it was never designed and in a mode which nobody understands or knows very much about.

So you have to assume that at some point it isn't going to be stable any longer, it's going to do something. Something's going to happen. You don't know whether that's going--

MR. CASE: You have the unknown too. So you don't know--

(Simultaneous discussion.)

COMMISSIONER KENNEDY: No, but I keep thinking, I keep thinking you know we may not be as close to the edge of that precipice as it seems all the time to us. Which, as a matter of fact, time has shown to be (inaudible). It's that step to the edge of the precipice. The closer you get to it the more comfortable you are and yet you're quite a long way from the edge of it.

CHAIRMAN HENDRIE: Oh, boy. No matter what you say the press -- up.

VOICE: (Inaudible.)

VOICE: But if you have a long (inaudible).

(Simultaneous discussion)

CHAIRMAN HENDRIE: The Chairman said that when we try to get rid of the bubble we're going to evacuate everybody out to 10 or 20 miles. Oh, boy.

What I said was what we told the Governor the other day and the whole shmear.

COMMISSIONER KENNEDY: Yeah.

CHAIRMAN HENDRIE: Oh, boy, (inaudible).

Listen, tell him that exceeds my normal standard of living.

(Laughter)

I'll treat it with great respect.

MR. CASE: Well, as a matter of fact you're going to ask two questions. One, you said you'd seriously consider it, or words to that effect.

And then they said Well, if you did, how far might you go? And you said --

COMMISSIONER GILINSKY: Implying the worst case.

COMMISSIONER KENNEDY: Yeah, you said 10 to 20 miles.

MR. CASE: Yes, he said that.

VOICE: He trimmed it.

VOICE: And we qualified it somewhat later.

CHAIRMAN HENDRIE: Well, that was a press dodge,

You know, the press people play this game. They now call up the State Emergency Planning Office. They say, "The Chairman of the NRC just said you've got to evacuate. What have you got to say about that?"

CHAIRMAN HENDRIE: (Inaudible) -- when are you going to do any. The Pennsylvania Emergency State people think "Whish" when they think about that.

(Laughter.)

CHAIRMAN HENDRIE: I think they have a problem with the press.

(Laughter)

MR. MATTSON: There was a time when I was sitting in rooms the last few days that every time somebody came by the door I felt that way.

(Laughter.)

CHAIRMAN HENDRIE: Which amendment guarantees freedom of the press. I'm against it.

COMMISSIONER BRADFORD: (Inaudible) -- in the last four or five hours, has someone in fact either reaffirmed or made sure that the Governor's office is kept current on --

Approx 4:20pm CHAIRMAN HENDRIE: I'm about to do it. I'm about to do it. And the first call, which I didn't get a chance to -- from Harold -- I've been on twice, but I didn't get a chance to report to the agency important elements of that.

He was talking about the evacuation situation

(inaudible) -- has set up. The Governor has asked Harold to please get back to him by 6:00 p.m. with our recommendation on the pregnant women and pre-school children coming back in or staying out.

Now, you know-- And it seems to me that we ought to talk some about that and anything further we want to say about more major evacuation matters, and then I think I ought to go call the Governor.

Now that will provide me an opportunity to make those recommendations clear to him. I think what I'll do is call Harold before I call the Governor, but I think I ought to call the Governor. You know, we ought to be coordinat and not say different things but I think I ought to call him and give me a chance to make our recommendations and the nuances in them clear about evacuation matters affecting women and pre-school children.

And also I can probe a little bit and see if he seems, you know, to understand the sort of thing we're worried about with the hydrogen bubble, you know. At the moment, you know, the data we have at hand suggests that it's not the concern that we thought it might be last night and this morning.

COMMISSIONER GILINSKY: (Inaudible)

(End of Tape 2-B)

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

NRC/Response Center Discussion

Related to

Metropolitan Edison Company,

Three Mile Island Nuclear Station

Saturday, March 31, 1979.

THIS TRANSCRIPT WAS PREPARED FROM A TAPE RECORDING.

(Beginning of Tape 3-A) 4:25 p.m.

CHAIRMAN HENDRIE: Governor, how are you?

No, I was just getting ready to call you. The Commission has been meeting out here at the incident center where we've been shaking down the latest round of information and were just about to get back to you, so your call was particularly opportune.

Yes. Yes, of course.

Yes, are we on the speaker? You manage to accomplish that better than I do. Every time I try to make that transition, I drop the calling party.

Yes, we want to talk to you about evacuation matters and I'm sure some of your questions relate to that. Why don't you go ahead with your questions and then let me fill you in on what we see here about the situation.

CHAIRMAN HENDRIE: No, that's not correct. I'm afraid that's one of those cases where the press is trying to work you -- work us at cross purposes.

What I -- Right. What I said at the press conference in response to a question specifically about whether evacuation might be a consideration during the time that we would be carrying out that, you know, those steps to try to get rid of the hydrogen bubble in the vessel.

And my answer was clearly it is -- that we would be considering whether, in view of the nature of those steps and an overall evaluation, whether a precautionary evacuation in the

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downwind quadrant would be a prudent step.

And I said that, you know, it would receive, obviously, very serious consideration and we would be discussing it with you and that it would certainly be considered and it could fairly be considered, you know, part of what we would be talking about when we get to that stage.

CHAIRMAN HENDRIE: Well, then there was a question, okay, if you were to think that kind of an evacuation were the right thing to do, what would the distance be?

And I told him as a rough number I would think between 10 and 20 miles. And then -- but in the downwind sector, and then we got into somebody wanted to know how about Washington at 100 miles and I said that was pretty unlikely, and then they got down to Baltimore at 55 and I tried to point out that at normal daytime diffusion conditions when we would be doing this sort of an operation that the dose rates if anything happened would not go above, you know, wouldn't trigger an evacuation need out much beyond a couple of miles so that when I said 10 to 20 I was trying to include a broad range of weather conditions, although not necessarily the very worst conditions obviously.

And I don't recall much discussion beyond it. But the --

CHAIRMAN HENDRIE: Well, yeah.

No, I don't regard what's going on at the site in any

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sense, manipulation of the bubble, of concern, which is the one in the reactor vessel.

CHAIRMAN HENDRIE: Yeah, I know.

Yeah, Harold was talking about the bubble in the vessel and Met Ed was talking about the bubble in the pressurizer and it came up at my press conference, and I attempted to point out that I thought the difference arose because people were talking about different bubbles and we had some discussion about that.

Yeah, well, you know, it's -- in order to avoid those kinds of things, why I'm afraid we all have to limit any public statements at all more than is probably reasonable with trying to keep people aware and reasonably up to date on things but then, inevitably, as you try to -- as you get into a little more detail, why they develop these differences and the press is very quick to exercise them and try to make something out of them.

CHAIRMAN HENDRIE: Okay -- think about it, yeah. Yeah.

First let me speak to the matter which, I believe, you'd asked Harold to please get -- for us to please get back to you pretty quick on the question of taking off the suggestion that pregnant women and preschool children stay out of the immediate plant area.

It's the judgment here that as long as we still have these low-level noble gas releases from the auxiliary building,

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that it's probably prudent to keep that recommendation in place, I would think at least overnight and, you know, we're --

CHAIRMAN HENDRIE: Yeah, we're, you know, we'll continue to evaluate it and we may have a better handle on those releases tomorrow and, you know, we've talked frequently.

But I think it would be premature to just say, you know, come back in, because that contains a suggestion that, you know, everything's just hunky-dory and maybe that's a little bit too cheerful for the situation.

CHAIRMAN HENDRIE: Now, with regard to other evacuation possibilities, the assessment here is that the plant is stable, that on balance we're in somewhat better condition than -- today than we were, say, 24 hours ago.

We're not going to allow any sort of, you know, radical plant evolutionary steps to take place. We'll all know about them and discuss them in detail before they do.

We don't think that any precautionary evacuation at the moment is called for and, as I say, the situation, the plant situation is slightly better.

I think that prudence dictates that all the emergency planning people continue to be on alert status. There is, I'm sorry to say, always the possibility that we could get a change in conditions at the plant which would, you know, make us think it would be prudent to ask people to move out. But that's not a decision that is before us at the moment, in my view.

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CHAIRMAN HENDRIE: Right, so you improve that responsibility, yeah, I think that's a very wise thing to do.

CHAIRMAN HENDRIE: Right. Right.

CHAIRMAN HENDRIE: Right. Yes. Yes.

CHAIRMAN HENDRIE: Right.

Yeah, I think so. Let me, right after we finish this conversation, talk to Harold and he can plan when it would work best into his schedule and his team's schedule to get up there --

CHAIRMAN HENDRIE: Yeah. Yeah.

Okay, well I'll -- what I'll ask him to do is to plan to do that and to call you pretty quick, call your office to let you know what looks to him like the best time to come up and to bring you up to date on everything that's going on there and his views and things.

CHAIRMAN HENDRIE: Right.

.298 CHAIRMAN HENDRIE: Well, I'm not -- as time goes along a little bit and people work the possible ways to get that bubble out of the vessel, why it may -- we may find a procedure in which we have such high confidence in the way it is laid out and can go and have covered all the likelihoods that we're all agreed that it's just not a problem and at an appropriate time we'll go ahead and do it.

CHAIRMAN HENDRIE: It's, at this stage, I think, still in an outline form.

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Now nat I should note and what we should all understand is that before any such debubbling process starts, there would be a very carefully worked out and detailed procedure which will have been extensively reviewed, we'll want to go over it with your technical people, it will be critiqued extensively up here and it will occur at a time that we all agree we're ready to go and, you know, so there would be lots of notice.

CHAIRMAN HENDRIE: Yeah. Well that -- yeah, that's the kind of thing I'm talking about when I talk about --

CHAIRMAN HENDRIE: No, I -- these are the same things.

Yeah, these are the same things. This is a process in which you get rid of the bubble in the dome of the vessel and then the system can be depressurized down to the point where you can go on the regular shutdown cooling systems at lower pressure.

So this is the same thing I'm talking about. Now this is --

CHAIRMAN HENDRIE: Getting to a cold shutdown, the process of getting there.

Once we're there, why then we will then be in a very stable recirculating mode with the core being cooled -- a mode in which we can stay for extended periods of time with, you know, essentially, what, very low risk levels.

CHAIRMAN HENDRIE: Yes, with the -- but let me put an asterisk

on that and say we have to do that step, that step is inevitable. Whether or not we'll decide on balance between us that a precautionary evacuation should go with it remains to be seen and I think that will depend, you know, on the details of the procedure, as I say, and what we assess as the possibility of anything going wrong at any step of it.

So I think we're by no means at this point saying we've got to evacuate when we do this inevitable step. But it surely is something that we ought to discuss and balance the pros and cons and we ought to have ample time to do it.

Now just to finish the evacuation discussion there is, indeed, a second circumstance in which you might face evacuation. We don't think it will occur but it certainly is a possibility and, you know, you need to keep it in mind.

And that is the one where we get, whether we like it or not, changes in the plant condition which lead us to think we've got to do something.

CHAIRMAN HENDRIE: Okay. By the way, did Harold -- Harold mentioned to you some of the concerns we've had about hydrogen flammability for that --

CHAIRMAN HENDRIE: Yeah. Yes, we've had some returns from the technical groups around the country that are working the problem, and it appears that it's at least not near term, not something that we have to deal with here immediately.

CHAIRMAN HENDRIE: Just so, yeah, just so.

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CHAIRMAN HENDRIE: Go ahead. (Now speaking to Governor Thornburgh's Ass't. Mr. Critchlow.)

CHAIRMAN HENDRIE: Yes, sir.

CHAIRMAN HENDRIE: It's possible. Our public information people here are looking at some sort of an explanatory press release which would explain about pressurizers and gas bubbles in pressurizers and the bubble we've got over here in the reactor dome and how Met Ed meant when they said the reactor system, they meant -- well, they were getting part of it out of the system, indeed, but it was over there in the pressurizer, where Harold Denton was, you know, his concern was more concentrated on the larger bubble in the vessel which is the one giving us the current problem.

I tell you what, why don't -- let me get a telephone number from you and your name, again, is Chris -- Okay.

CHAIRMAN HENDRIE: Well, what I was going to suggest was that I ask the public information officer here to give you a call and you professionals can talk about the best way to, you know, get it straightened out.

CHAIRMAN HENDRIE: Yeah. Yeah. I agree.

CHAIRMAN HENDRIE: Yeah. Okay.

Very good.

Listen, before I go away, why the Commissioners wanted me just to note -- not to be a Gloomy Gus, but we do have to keep in mind that we could need to move, with regard to protective actions for the public, in a hurry and the alert

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status of all the emergency teams is a matter of considerable importance, we think.

CHAIRMAN HENDRIE: Very good. I knew it would be.

Thank you very much, sir. Bye-bye now.

4:46 p.m. (Commissioners Gilinsky and Bradford leave for meeting with Califano and Cost

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CHAIRMAN HENDRIE: Yeah, this is the -- his name is Critchlow in the Governor's Office, and I think, you know, he's very worried about all of these bubbles.

And I think that some sort of three-way discussion between Frank and Joe Fouchard and Mr. Critchlow as to the best way to deal with it and let them figure out where to go.

Let's see, I -- they had to go off to the Califano-Costle party.

COMMISSIONER AHEARNE: What's the Califano-Costle party?

CHAIRMAN HENDRIE: Well, you know, they had to go to a meeting with Joe Califano and Doug Costle yesterday at 5:00, do you remember?

And now they've had to go again today, so I assume that there is a daily 5:00 p.m. --

COMMISSIONER KENNEDY: Yeah, it's cocktails.

CHAIRMAN HENDRIE: -- cocktail

COMMISSIONER AHEARNE: -- and I don't know why we're not invited to that

COMMISSIONER KENNEDY: You're needed here.

CHAIRMAN HENDRIE: Okay, he -- the Governor's instincts on that pregnant women thing was just, you know, that -- keep it

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on for a bit longer and we'll keep reassessing sort of on a six hour basis, you know, twice a day and --

COMMISSIONER AHEARNE: Joe, once . you recommend that there's no way

CHAIRMAN HENDRIE: Yeah, but he was saying that he didn't have a bit of problem with that.

COMMISSIONER KENNEDY: His problem would be off and on again.

CHAIRMAN HENDRIE: Yeah, absolutely.

CHAIRMAN HENDRIE: You see, though, it's (inaudible) -- when asked what the term meant, what's the term mean.

COMMISSIONER AHEARNE: Sure.

CHAIRMAN HENDRIE: And he was very, he is very concerned about the off again, on again because he wanted to be very clear about what was said at the press conference about the possible need for evacuation when we go through the debubbling process, the depressurization process, when we get around to that, and also to be very clear as to what I meant by that and whether that was the same as what we talked about before and whether the sense here was that it was an inevitable evacuation, that it was a step we would have to take some time and, you know, either we're dead sure now or very sure that we want everybody out. And I told him, you know, we'll have to wait and see.

. I guess yesterday my guess, if you'd asked me, would have been that I'd be -- there was about an 80 percent chance that I'd be voting for evacuation in the downwind quadrant when

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that took place. I think it's a little lower today but I suspect it's probably still higher than 50 percent. We'll have to see what the procedure looks like and what some of the developments are

(Simultaneous group discussion.)

CHAIRMAN HENDRIE: Yeah, that's right.

CHAIRMAN HENDRIE: I'd sure hate to sweat it over this thing for a week and get down to the place where we have to take a final step on the long term cooling and then blow the whole thing.

COMMISSIONER AHEARNE: What is the, this bit about these described pressurizers, is there any kind of (inaudible) --

CHAIRMAN HENDRIE: I don't know, it depends on the solubility of hydrogen in borax and some other things, they'll have to wait and see. It goes like this --

COMMISSIONER AHEARNE: No, I understand about it, I'm just not sure how (inaudible) --

CHAIRMAN HENDRIE: It depends on, you know, if the solution rate is sensitive to pressure and (inaudible) --

COMMISSIONER AHEARNE: Yeah, I understand all those. It's just what are the numbers?

CHAIRMAN HENDRIE: Oh, no, no, I don't know the numbers -- (inaudible).

COMMISSIONER KENNEDY: If the numbers are right, it's the theoretically reasonable thing to do.

COMMISSIONER AHEARNE Well I think it's reasonable to do, except how?

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COMMISSIONER KENNEDY: Well, if the numbers -- it isn't worth -- well, if they're not right, it's not a good thing to do, it'll cause other problems, won't it?

CHAIRMAN HENDRIE: Well, if it turned out that the solubility, say, of hydrogen were high and oxygen low, so that you would preferentially deplete the hydrogen in that bubble, what do you do if you if --

COMMISSIONER KENNEDY: -- increasing the potential (inaudible).

CHAIRMAN HENDRIE: -- increase the rate at which you approach the flammability? And you might, you know, you might find that point instead of the greatest thing (inaudible).

(Simultaneous group discussion.)

CHAIRMAN HENDRIE: My guess is that it's in Frank's view, they're about equal the other way around, but that remains to be seen.

And the base question just is whether those pollution rates, in fact, are anywhere near large enough to make much of a damn bit of difference.

But what Harold -- I was talking to Dick Volmer on one of those trips out there and he said if the plant people were pretty sure that they -- in the course of that venting operation that pretty well vented the noncondensable component out of the pressurizer bubble. And they're pretty proud of that. (Inaudible.)

COMMISSIONER KENNEDY: And this was (inaudible) -- over in the

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pressurizer.

CHAIRMAN HENDRIE: And now, now if this process would give us a way of transferring from the vessel bubble into the pressurizer, why then there is a vent valve, a remote valve controlled vent on the top of the pressurizer which just toots to the containment, so boy that's just what we need.

COMMISSIONER KENNEDY: Which you could do at a controlled rate.

CHAIRMAN HENDRIE: Exactly. And it would be a nice slow evolution into the containment, you're on the -- you're on the recombiners and, you know. It probably won't work anyhow (inaudible) --

COMMISSIONER AHEARNE: Where does the recombiner --
(Recording difficulties.)

CHAIRMAN HENDRIE: The recombiner takes it in a pipe out of the containment into the auxiliary building. Here's this recombiner, plain recombiner, two of them in parallel, and then the line goes back into the containment. And there must be a fan in there.

COMMISSIONER AHEARNE: All right. So there's no access into the auxiliary building from -- that is --

CHAIRMAN HENDRIE: Well, not unless -- not unless valve bonnets leak or seals blow out or a pipe breaks or something like that. The pipe does come out of the containment and the equipment is in the auxiliary building.

COMMISSIONER AHEARNE: That's true, but there's no planned leak -- planned venting into the auxiliary building.

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CHAIRMAN HENDRIE: No. Furthermore, there will be containment isolation valves, double isolation valves on the line out and the line in. So you've got a way of clamping it off if something happens.

COMMISSIONER AHEARNE: As with the air, that's what they are (inaudible) -- There's a question, they didn't want to (inaudible) both recombiners?

CHAIRMAN HENDRIE: They wanted to get them both up and ready to run.

Well, I have a notion that they're probably located close together because you'll almost certainly have a single line out and a header to parallel lines. And once you've got one of them running hot as holy smokes you're going to be in rough shape to get in there and piddle around with the other one. Furthermore, in getting Number Two running, why you might want to look up and see how Number One is adjusting and so on.

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So I've been encouraging Harold and Dick to, you know, kind of keep the pressure up, to keep that effort up because I think it's very desirable to get those things running and that circulation established so we can start controlling the hydrogen levels in there.

Furthermore, we've got 80,000 cubic feet at 80 # gauge in a waste gas tank which is from the -- the gas evolved from that letdown process. It's highly desirable to pump that back into the containment.

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On the other hand, if most of that is hydrogen. You want to stop and do a few calculations and just see if you're going to run flammable, you know.

So there again, is a nice reason to have a full going in and cleaning the hydrogen out.

COMMISSIONER KENNEDY: Is there anything that could be done about increasing the clotting capability of the filters, so -- a better filtering system --

CHAIRMAN HENDRIE: In the auxiliary building?

CHAIRMAN HENDRIE: -- so that we can vent some of this stuff from the auxiliary building without substantially increasing off-site releases?

CHAIRMAN HENDRIE: Now the filters they've got in there, in terms of their ability to remove material, are as good as you can do. The only thing that you could do, and it would be rather cumbersome because you're dealing with large cross-section ducts and they have to be dead tight and so on, would be to double the capacity.

See those filters at the present time are taking out all the iodine, as far as we can tell, and anything else that comes through it except the noble gases, which are just untouchable, except maybe by cryogenic trapping and that's, that's a little too far out.

COMMISSIONER AHEARNE: So that that essentially wouldn't help out any?

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COMMISSIONER KENNEDY: No.

CHAIRMAN HENDRIE: No, so the double filter wouldn't improve the removal factor. All you could do is to say is increase the capacity.

COMMISSIONER KENNEDY: There's nothing that will take the --

CHAIRMAN HENDRIE: And that's my way --

COMMISSIONER KENNEDY: Except cryogenic, nothing will touch the noble gas.

CHAIRMAN HENDRIE: No.

In the cryogenic systems, (expletive) you've got to have hydrogen or helium refrigerators and all kinds of (inaudible) which I just don't want to burden the (inaudible) operating staff.

CHAIRMAN HENDRIE: And the business of trying to double up those filters, I don't know, I think that would be a tough proposition to get in there and try to -- well, it would be a long-term job, you'd have to prebuild the set of ducts, the set of filter banks that are all welded (inaudible) -- pressure test and leak test the whole assembly and then have, plan the way that you could slide it over.

But then you have to go through a stage where you're opening a hole in the auxiliary building in order to make -- couple it on and there are ways to do that without having an open hole, but it's a long-term proposition and, you know, that's some weeks of work to get that done.

COMMISSIONER KENNEDY: I must say, in listening to the posture as Roger sees it, it seems to me that from a general perspective, the best thing that we can do is to try to stay in this kind of mode for some days, if that's possible.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER KENNEDY: Simply because every hour that goes by there is a better handle being gotten on a) what the situation really is and b) therefore, what your options really are as contrasted with what you they are and more chance to run all the calculations against each of those options to find out where your optimums are.

CHAIRMAN HENDRIE: And sort of day by day we're getting more equipment operable, ready to go and, as Roger says, there is every reason to line up alternates in case these exchangers -- have it all in place before you go over to that mode.

And I think in the next couple of days, the efforts by GPU, gather in strong teams to supplement the operating group and the engineering support groups, will begin to bear some fruit and that will considerably increase the effectiveness of the whole operation.

COMMISSIONER AHEARNE: (Inaudible) I think some probably tomorrow, maybe, is the best time. But after you've got all these other calculations, the groups that are looking at what are the procedures (inaudible). The next stop is very important, because that's as I understand it we're looking at is what if

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something goes wrong --

CHAIRMAN HENDRIE: That's exactly right. What do we do now? He's worried that the operating staff has not had a chance to think some of that stuff through and he feels negative about it.

COMMISSIONER AHEARNE: That's absolutely true.

CHAIRMAN HENDRIE: Well the upcoming teams will add considerably to that --

COMMISSIONER AHEARNE: The other sets of procedures are when you are going to try to remove the bubble, how do you go about it?

CHAIRMAN HENDRIE: Yeah. Just so. In a sense, that's a separate set of endeavors.

COMMISSIONER AHEARNE: But based upon, at least, an initial look at that and probably some of the estimates, the revised estimates of this hydrogen problem, sometime tomorrow we ought to try and give the Governor a sense of --

CHAIRMAN HENDRIE: When.

COMMISSIONER AHEARNE: -- when --

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER AHEARNE: -- because you've got three-quarters of a million people now within a 20 mile region which are tense.

CHAIRMAN HENDRIE: Yeah.

COMMISSIONER AHEARNE: And as Roger and Ed were talking about the human nature problem of events--predict what the people in the plant are going to want to try to do, we also have the human

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nature problem of this, these people sitting there under this increasing tension.

And so I think we owe it to the Governor and he owes it to the people to try to give them some idea if it's going to give them some idea

COMMISSIONER KENNEDY: You're right, you're right. I'm not sure that tomorrow, I'm not sure we'll be there tomorrow, I mean, I just don't have that (inaudible) --

CHAIRMAN HENDRIE: But as soon as we possibly can, Marty (inaudible) --

COMMISSIONER KENNEDY: The principle is exactly right, it ought to be done sooner rather than later, but I guess -- I'm not sure that from what I can see thus far, I'm not sure that we're that far along.

COMMISSIONER AHEARNE: For example, I think it would be very useful to let the people know that if it is still solid, the way we're thinking tomorrow, we don't see any real likelihood of an emergency. There is a chance, like it's a 1 to 5 percent chance that something significant is happening.

But other than that, the plan is to compare the procedures carefully and then at the appropriate time decide. And if a decision is made, as a precautionary thing.

COMMISSIONER KENNEDY: There will be plenty of time.

COMMISSIONER KENNEDY: It will not be an emergency matter. There will be (inaudible) --

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(Simultaneous group discussion.)

COMMISSIONER AHEARNE: And so a whole series of actions will take place some time in the next X. X may be in the next few days, X may be next week.

But that information -- we're relatively comfortable with it, we're (inaudible).

COMMISSIONER KENNEDY: Yeah, I think that -- and I think the way you put it is just about the way it ought to be put.

CHAIRMAN HENDRIE: All right. Let me go and call Harold, because I want to get him -- call the Governor back and make an arrangement.

COMMISSIONER KENNEDY: What are your plans now?

CHAIRMAN HENDRIE: I think I'll call Harold, then I probably want to talk to several of the Staff people here about the plant details and then I'm going to head back to the office for a little while.

It seems to me I don't, at the moment, see any need for a continued Commission collegial presence.

COMMISSIONER AHEARNE: Yeah, we had a reason

CHAIRMAN HENDRIE: Yeah.

(Recording difficulties.)

COMMISSIONER KENNEDY: What about tomorrow?

What time?

(End of tape)

5:03 p.m. Chairman Hendrie, Commissioners Kennedy and Ahearne go to another area of Response Center.