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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON THE MEDICAL

USES OF ISOTOPES (ACMUI)

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MEETING

+ + + + +

MONDAY,

MARCH 1, 2004

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ROCKVILLE, MARYLAND

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The Advisory Committee met in the Auditorium of the Nuclear Regulatory Commission, 11545 Rockville Pike, at 10:00 a.m., Dr. Manuel Cerqueira, Chairman, presiding.

COMMITTEE MEMBERS:

MANUEL D. CERQUEIRA, M.D., Nuclear Cardiologist, Chairman

LEON S. MALMUD, M.D., Health Care Administrator, Vice Chair

COMMITTEE MEMBERS: (cont'd)

DOUGLAS F. EGGLI, M.D., Nuclear Medicine Physician

NEKITA HOBSON, Patient Advocate

RALPH P. LIETO, Medical Physicist, Nuclear Medicine

RUTH McBURNEY, State Representative

SUBIR NAG, M.D., Radiation Oncologist

SALLY WAGNER SCHWARZ, R.Ph., Nuclear Pharmacist

ORHAN H. SULEIMAN, Ph.D., Food and Drug Administration Representative

RICHARD J. VETTER, Ph.D., Radiation Safety Officer

JEFFREY F. WILLIAMSON, Ph.D., Therapy Physicist

NRC STAFF:

ROGER W. BROSEUS, CHP, Ph.D., NMSS/IMNS

THOMAS H. ESSIG, Designated Federal Official, NMSS/IMNS/MSIB

PATRICIA K. HOLAHAN, Ph.D., NMSS/IMNS

DONNA-BETH HOWE, Ph.D., NMSS/IMNS

CHARLES L. MILLER, Ph.D., NMSS/IMNS

ROBERTO J. TORRES, NMSS/IMNS

ANGELA R. WILLIAMSON, NMSS/IMNS/MSIB

RONALD E. ZELAC, Ph.D., NMSS/IMNS/MSIB

I-N-D-E-X

P-R-O-C-E-E-D-I-N-G-S

(10:22 a.m.)

CHAIRMAN CERQUEIRA: This is the open session, and, Tom, if you could begin with your opening remarks.

MR. ESSIG: Sure. As the Designated Federal Official for this meeting, I am pleased to welcome you to Rockville for the public meeting of the Advisory Committee for the Medical Uses of Isotopes.

My name is Thomas Essig. I am Branch Chief of the Materials Safety Inspection Branch and have been designated as the federal official for this Advisory Committee in accordance with 10 CFR Part 7.11.

This is an announced meeting of the committee. It is being held in accordance with the rules and regulations of the Federal Advisory Committee Act and the Nuclear Regulatory Commission. The meeting was announced in the February 18, 2004, edition of the Federal Register.

The function of the committee is to advise the NRC staff on issues and questions that arise on the medical use of byproduct material. The committee provides counsel to the staff but does not determine or direct the actual decisions of the staff or the

Commission. The NRC solicits the views of the committee and values them very much.

I request that whenever possible we try to reach consensus on various issues that we will discuss today, but I also value minority or dissenting opinions. If you have such opinions, please allow them to be read into the record.

As part of the preparation for this meeting, I have reviewed the agenda for members and employment interests based upon the very general nature of the discussion that we're going to have today. I have not identified any items that would pose a conflict. Therefore, I see no need for an individual member of the committee to recuse themselves from the committee's decisionmaking activities.

However, if during the course of our business you determine that you have some conflict, please state it for the record and recuse yourself from that particular aspect of the discussion.

At this point, I would like to introduce the members that are here today. Dr. Manuel Cerqueira, Chairman, is a Nuclear Cardiologist; Dr. Leon Malmud, Vice Chairman, Health Care Administrator; Ms. Neki -- Nekita Hobson, Patient Advocate; Ms. Ruth

McBurney, State Representative; Dr. Douglas Eggli, Nuclear Medicine Physician; Dr. Subir Nag, Radiation Oncologist; Ms. Sally Schwarz, Nuclear Pharmacist; Dr. Richard Vetter, Radiation Safety Officer; Dr. Jeffrey Williamson, Therapy Physicist; Mr. Ralph Lieto, Nuclear Medicine Physicist; and Dr. Orhan Suleiman from the U.S. Food and Drug Administration.

Committee Member Dr. David Diamond, who is a Radiation Oncologist, was unable to attend this meeting due to a conflict in the schedule which he could not resolve.

We have three new members of the committee which will officially take office -- two of whom will take office later this year, and another one effective with our 2005 meeting. My understanding is that Dr. Robert Schenter, the new Patient Advocate Representative, will be joining us shortly. He arrived late last evening and will join us during the meeting today. And Dr. Schenter will replace Neki Hobson when her term expires later this year.

There are two other ACMUI members, who unfortunately were not able to attend today. They are Dr. William Van Decker, a Nuclear Cardiologist, who will replace Dr. Cerqueira; and Mr. Edgar Bailey, a State Representative, who will replace Ruth McBurney.

Mr. Chairman, that concludes my opening remarks.

CHAIRMAN CERQUEIRA: Thank you very much, Mr. Essig.

We'll move on to the first agenda item, which is Dose Reconstruction Subcommittee Findings on St. Joseph Mercy Hospital Case. This is an ACMUI subcommittee, and Dr. Jeffrey Williamson will be making a presentation.

DR. WILLIAMSON: Okay. All right. How do I connect myself up? I have a --

MR. ESSIG: Mr. Chairman?

CHAIRMAN CERQUEIRA: Yes.

MR. ESSIG: If I may, there was one order of business that I meant to include as part of my opening remarks, and it will just take about one minute.

CHAIRMAN CERQUEIRA: Okay. Jeff, if you could begin to hook up.

MR. ESSIG: While Dr. Williamson is setting up, I have certificates of appreciation for their tour of duty on the committee to Ms. Ruth McBurney and Neki Hobson that were signed by Chairman Diaz, and I would just like to present them.

(Applause.)

DR. WILLIAMSON: All right. Well, thank you very much. Well, you'll notice I have entitled this "Input from Jeff Williamson." Although I have gotten some comments on this from members of the subcommittee, we really haven't had an opportunity to have a telephone conference and really come to an official recommendation or endorsement of this. So I think it's -- it's best that I label these as the result of my independent review.

So this is just a review of the major factual findings. Two hundred eighty-five millicuries of I-131 were orally administered to a patient who had impaired kidney function and anomalous clearance of the radioactive material, an apparent three-day half-life rather than the usual 95 percent plus clearance with a half-day effective half-life.

The licensee did make daily bedside exposure rate measurements, and the problem, of course, is is over a six-day period the patient's daughter spent anywhere from six to 20.5 hours a day in close proximity to the patient who was her mother. So to quote from the inspection report, "Sat against the bed with her elbows or forearms on the bed."

In addition, although no data was presented, time-distance distribution data was

presented. Evidently, of the order of 25 other individuals who were part of the patient's extended family also were in the vicinity and exposed to some level of radiation.

The NRC staff concluded that the daughter's total effective dose equivalent was 15 rem. So the regulatory issues are fairly clear and narrowly defined. The regulatory question is whether the daughter's dose exceeded 100 mR, and how we're to calculate it is also clear. The appropriate endpoint is essentially the maximum dose to the body core, including arms and legs proximal to elbows and knees.

The Society of Nuclear Medicine and the ACNP have publicly voiced a number of concerns. They argue that the NRC dose reconstruction is too conservative by factors ranging anywhere from 1.6 to 17.

Some specific comments they make -- distance should have been reconstructed from measurements. The bedside distance speculated by Dr. Marcus, or inferred by Dr. Marcus, to be 32 cm is not a realistic estimate of the daughter arm-to-patient center distance, that source was not allowed to decay continuously but was, rather, calculated discretely in 24-hour steps.

And, finally, they argue that the TEDE is an inappropriate endpoint for risk assessment, that a whole body average dose would be more relevant for this purpose, and that tissue attenuation in the daughter should have been considered.

I did do a few Monte Carlo simulations of this, since I am a Monte Carloist as a -- simulationist as a researcher. So I thought this might be interesting for the committee to see. I did very simple geometry. I assumed the patient was a cylinder of water weighing approximately 150 pounds.

Since the patient had very low kidney clearance, I presumed shortly after the administration the I-131 became uniformly distributed in the plasma pool. So this could be simply modeled as a uniform volume source. I assumed a three point day effective half-life. I then calculated the point exposure rate as a function of distance in the patient transverse plane.

I also looked at the daughter and modeled her also as an elliptical cylinder, but this time as a detector, not a source. I did a couple of calculations, the daughter lying next to the patient in a parallel fashion with a 50 centimeter center-to-center distance, and then the kind of daughter

standing or sitting and the patient in a lying geometry.

And this is sort of interesting. What it -- the blue line shows falloff air-Kerma rate per millicurie -- air-Kerma per millicurie hour as a function of distance from the patient's center. The blue line is what you would get with inverse square law from a point source, assuming no attenuation. And the red line is, in fact, what one obtains from the volume cylinder source geometry.

And, first of all, you can see tissue attenuation is a fairly large effect. Secondly, you can see that the dose distribution falls off rather more slowly than predicted by inverse square law. In fact, over the distance range in dispute it's essentially one over R falloff, because the patient's cylinder is such a large source relative to the distance that's in question.

I guess what my analysis suggests maybe is that the average measurement distance might be inferred to be about 25 cm. You can see the licensee measurements overlaid on my curves for different distances reconstructed from the Monte Carlo calculations with the X-axis being the time and days.

So this shows tissue attenuations about 40

percent relative to the point source model, and that to decrease the TEDE by 50 percent essentially the patient-to-daughter distance would have to be doubled, as you can see here. This just shows the sitting -- daughter sitting geometry. The top -- the gray box represents the bed, and the white box is the patient lying on it, and the oval is the patient -- the daughter, rather, standing next to the bed.

So this shows the -- compares the Monte Carlo point detector dose, also the licensee measurements, the point dose at 31.6 cm, the distance that Dr. Marcus thought best approximated the measurement distance. You can see the green and black curves are the average doses to the patient. So what this shows is that the max dose -- maximum dose, the point dose at 31.6, is about four times larger than the mean dose averaged over the whole volume of the daughter's body.

So while it's not of regulatory significance in this question in terms of asking questions, what are the possible medical consequences to the daughter, probably the mean dose is a more relevant quantity for the medical consultant's risk analysis.

So it's somewhat presumptuous to label

these as ACMUI comments, so I'll call them kind of suggested discussion points. Overall, when I -- as I looked at this, I thought, well, this does seem to be a fairly conservative calculation. The reconstructed measurement distance seems short for the -- a little short for the patient-daughter distance.

It seems somewhat implausible that the daughter didn't move for 21 hours and had exactly the same point on her arm irradiated this whole time. I think the issue of continuous versus sort of step-wise decay is unimportant, with only about a five to 10 percent correction. So it's possible. Who knows?

We weren't really given any primary data to review, but certainly the actual TEDE could have been a factor of two lower. But that's -- without some more data, it's purely speculative. I don't know what to say.

However, I think that, you know, this is really missing the point. There is no doubt that the TEDE was many times higher than the regulatory limit. Even the most liberal analysis, if I can use that word, by the Society of Nuclear Medicine gives a result that's many times in excess of this limit.

And so if the question is, "Did this daughter dose exceed -- TEDE exceed 100 mR," I don't

think there is any doubt. We were not, in the subcommittee, provided with any kind of a factual basis that could really lead to an alternative quantitative analysis. I'll comment on that a little bit.

I think the mean dose, which is raised by the Society of Nuclear Medicine, is sort of irrelevant to the regulatory question. However, I think, as I say, it is important to assessing -- I think more relevant to assessing possible medical consequences than is TEDE.

So given that the regulatory limit is so much lower than any plausible reconstructed dose, I think, you know, the NRC estimate is appropriate for this purpose. But I will say that, you know, acknowledging the uncertainties in this analysis and putting a little bit more in the report to justify some of the assumptions made would have cost little, would not have compromised enforcement actions, and would have prevented what seems largely to be kind of a public relations crisis or, you know, questioning -- has led to questions now regarding the scientific credibility of these analyses done by the Commission.

So I actually think that is the central question -- how to enhance the scientific credibility

of future dose calculations. What can we learn from this incident?

I must say that I found a lot of the licensee actions, at least given the information we were given, to be highly questionable. For example, why was radioiodine therapy administered to a terminally ill patient with compromised kidney function? Why were 20 to 35 members of the public allowed to parade in and out of a high radiation and potentially highly contaminated area? Why wasn't the daughter and other relatives -- why were they not assessed for internal contamination?

I mean, I have some experience with these kinds of cases, and, you know, it doesn't take a lot to have a room get terribly contaminated. And why didn't the licensee consider training and monitoring the daughter as a radiation worker exempt from the 100 mR limit?

DR. NAG: What do you mean by -- what do you mean by "internal contamination"? Can you explain?

DR. WILLIAMSON: Yes. I mean, I guess that, you know, this patient was clearing iodine from her body somehow. And it wasn't coming out through the normal route, which is by urinary excretion. So

I think there was probably a lot of iodine on the patient's skin and probably -- potentially, you know, over all surfaces that the patient touched.

And to have the daughter in such close contact, presumably touching the patient and sharing the bed, and so forth, I would think that there is a significant probability of ingestion of I-131, I-131 getting into the patient's -- or the daughter's blood pool that wouldn't -- there's a reason why there's a 10 microcurie limit on I-131 administrations before you have to write a written directive. That is because very small amounts can produce deterministic damage to the thyroid.

So all in all, I would say a more sophisticated approach to dose estimation would improve NRC's scientific credibility in the regulated community. I think in this case, like I say, there is no question about this daughter exceeding the regulatory limits. So for that narrow purpose I think what they did was fine.

However, one could imagine borderline cases or perhaps whether action would be taken against the licensee based upon whether they thought 200 mR versus 100 mR was given, and I think in those sorts of cases strict attention needs to be paid to the

uncertainty of the calculation, and all of the assumptions scrutinized.

Some specific suggestions, you know, implausible scenarios, should be questioned during the interviews. Monte Carlo tools are useful in borderline cases to assess data consistency. I think to enhance the credibility of the report uncertainties should be addressed, and what appear to be peculiar assumptions, such as the daughter not moving for 21 hours, you know, something should be put I think in the report to justify this, or at least make it clear to the public that this, you know, really is the -- a reasonable estimate given what could be extracted from interviews from these individuals.

For medical risk analysis, alternative non-regulatory endpoints should be used. I must say that my ability to offer advice on this point was really hindered by not having access to any primary data. Essentially, only Dr. Marcus' paper and the final inspection report were available.

I understand from NRC staff that many hours of questioning of the relatives and staff did occur, and it would have been helpful to have at least a summary of this information, so that the assumed time-distance distributions -- the reasonableness of

those assumptions could have been evaluated.

So it might have been nice, as I say, to have -- if there were no written summaries, at least be able to talk to one of the inspectors who knew the case better. Then these time-distance assumptions could have been more meaningfully evaluated.

CHAIRMAN CERQUEIRA: Thank you very much, Jeff.

Do we have questions or comments for Jeff? Dr. Nag.

DR. NAG: Before you leave, can you summarize, a) what the NRC estimate, what the Society of Nuclear Medicine estimate, and what the ACMUI estimate, all in one slide?

DR. WILLIAMSON: Oh, boy.

DR. NAG: The three different estimates, so we can have some idea.

DR. WILLIAMSON: Okay. The NRC estimate was 15 rem. The Society of Nuclear Medicine estimate was -- it depended what they assumed. The factor of 17 lower, or approximately 1 mR, was based on the idea of not using the TEDE but using volume averaging endpoint.

DR. NAG: And your estimate --

DR. VETTER: Excuse me. May I please

interject? This is not a Society of Nuclear Medicine position. It's two authors who are nuclear -- two authors.

DR. NAG: Oh, okay.

DR. VETTER: It's not -- but the Society of Nuclear Medicine --

DR. NAG: I understand.

DR. VETTER: -- has not taken a particular position, to the best of my knowledge.

DR. NAG: Okay.

DR. WILLIAMSON: I think seven -- and there are other estimates -- 7.1 times smaller. That would have been approximately two rem, I think is based on different distance, time-distance assumptions, and 1.6 occurs -- I believe is based upon largely the sort of issue of continuous versus step-wise decay. You might remember better than I did.

What is my estimate? I mean, I -- given what we're told, I mean, I would -- if I use the 31.6, maybe my estimate would be, you know, of the order of 10 rem. But I don't have any basis for making an alternative estimate, because no data was provided, and no -- no basis for evaluating the inspection -- inspector's assumptions.

CHAIRMAN CERQUEIRA: Mr. Lieto, you'd like

to make a comment?

MR. LIETO: I guess I'm just -- actually, I have a question. Was the charge to the subcommittee to look at whether regulatory limits were exceeded or what I thought was whether -- or how the region went about calculating the dose estimate provided -- was done in an excessibly overconservative manner.

VICE CHAIRMAN MALMUD: My understanding of the charge to the committee was to review the NRC calculations and to review the communication from Drs. Marcus and Siegel, and to determine whether the NRC recommendation -- findings were overly conservative -- that is, whether the dose estimate was too large -- compared to the calculations generated by Drs. Siegel and Marcus.

In neither case -- and this is very important -- in neither case, neither that in the letter from Drs. Siegel and Marcus, nor in the NRC calculations, is the hospital involved found to be innocent of allowing an excessive exposure, because even if the individual involved -- the daughter -- had been labeled a radiation worker and been trained, then the cap would have been 500 millirem.

Both calculations -- both those from the NRC and from Drs. Siegel and Marcus -- clearly result

in radiation burdens in excess even of that limit.

My understanding was that the communication from Dr. Marcus, with calculations by Dr. Siegel, was meant to bring to the attention of the NRC its use of -- its interpretation of the regulations which leads to overly generous dose estimates, and that was the area of concern of Dr. Marcus.

The conclusion that Dr. Williamson came to in one of his bullet points was that the credibility of the NRC would be improved if the dose estimates were more liberal, liberal in this case meaning a lower radiation burden than that which was calculated.

DR. WILLIAMSON: That's not exactly what I said.

VICE CHAIRMAN MALMUD: Oh, all right. Well, then please tell us what you meant by that statement.

DR. WILLIAMSON: I think that, you know, paying some attention to the uncertainties, and anticipating assumptions regarding time-distance distributions that outright, when you just see it in this report with no other information, might seem kind of implausible would greatly enhance the scientific credibility of the Commission's future calculations.

And I think that's how we can maybe be helpful by making specific recommendations how they might go about that.

VICE CHAIRMAN MALMUD: Thank you. My observation was that the NRC calculations were based upon interviews which required them, under the existing regulations, to make worst-case estimates because the database was not adequate from which to draw conclusions, other than the interviews, the text of which we have not seen, but which gave the NRC investigators the impression that the daughter was at the bedside for what seems to us to be an unreasonably prolonged period of time each day, it being unlikely, but not impossible -- unlikely -- that a relative would sit at the bedside for 20 hours a day without any opportunity for normal bodily functions and food and rest.

However, if that's what the daughter said, and we were not privy to the circumstances under which she was interviewed, nor the statements that she made, but if those were the statements that were made then the dose calculation had to be based upon the information available.

I think that underlying the communication from Drs. Marcus and Siegel was a concern that, not in

this case specifically perhaps but in general, that the NRC has been overly conservative in calculating radiation burdens. And that seems to be the underlying theme, though it is not specifically expressed. And this is a subjective impression that I get from reading the correspondence.

And that the reason for the review of this is to determine if we should request a review of the way in which the radiation burdens are calculated in instances such as this, though neither party, neither the NRC nor Drs. Marcus and Siegel, have any reason to question the fact that the limits were exceeded.

DR. NAG: I think there are many uncertainties that do exist, and I think there will be many unknowns, not only on this case but almost any similar cases. Would it perhaps be better for the NRC to give its estimate as a range, that this would be -- our best estimate would be that this person would have received somewhere between seven to 18 rems, and that would give some idea of the range would be rather than giving just one figure.

CHAIRMAN CERQUEIRA: Neki, and then Tom.

MS. HOBSON: Well, from -- I cannot even begin to, you know, address the technical questions of who is right and who is wrong. My concern is that --

is the general principle of whether you're overly conservative or not conservative enough, and how it affects the patient and their family.

And I guess it's the borderline cases where you would really see the impact, because if the NRC makes these worst-case assumptions and it comes out that, you know, it was 200 millirem, and someone else would calculate it that it was 98 millirem, there is a different regulatory response.

And one of the responses is, you know, that it requires patient notification, and in this case I suppose the family would be notified, which I personally think is a really bad idea.

So I would not like to see more and more cases overestimated, have the dose overestimated, not that there should not be regulatory concern and try to keep it as low as possible, but the impact that it would have on the patient and the family by informing them that you have been overexposed, which is going to alarm them, worry them, add concerns to what they're already going through.

So, you know, can't we find a realistic way of calculating dose that's -- you know, that meets everybody's requirement without involving the patient and their family in extra worries?

CHAIRMAN CERQUEIRA: That's a good question.

Tom?

MR. ESSIG: Yes. I just wanted to speak to the comment that both Dr. Williamson and Dr. Nag raised about reporting a range of values. While I agree with that from a scientific perspective, one of the issues we face as a regulator, particularly when we're faced with enforcement action, the -- let's take a different case where maybe the range of the estimate was, say, 50 to 500 millirem -- in other words, bracketing the public dose limit.

Then, we'd be asking ourselves, well, did, in fact, an overexposure in excess of the 100 millirem occur, or did it not? You know, what is the most likely situation?

So while I think a range is good, and it enhances the credibility because it acknowledges the uncertainty analysis, at some point we would have to come to grips with, what is our best estimate, given all of the facts surrounding the case.

So I'm agreeing with your point about the range, but I think we also need to focus on -- not lose sight of what our best estimate might be for a particular evaluation.

CHAIRMAN CERQUEIRA: We have a comment from the back microphone.

MS. BHALA: Yes. My name is Neelam Bhala from Office of Enforcement. And in this particular case, going back to your comment about choosing a range, for the -- yes, in the inspection report, 15 rem was the estimate.

But when we did the final enforcement action we did go with the range in that particular case, only because from patients' interviews it seems like, you know, she was just going back and forth between where she was. And so in that case, because of that, for the final enforcement we used -- I remember it was about from 4.6 to the max of 15.

CHAIRMAN CERQUEIRA: Jeff, do you have --

DR. WILLIAMSON: Yes. Well, I can see that maybe you have to come up with a number, a single number. But certainly you could acknowledge uncertainty, and maybe even estimate uncertainty limits. And I think that it would be well to calibrate any enforcement action, you know, if it really is a borderline case, taking that into account as well as maybe other factors you observed in the licensee's behavior.

I can certainly see, you know, in this

case there was a lot of grounds for concern, it appears based on the written materials we have, for the licensee's behavior. And you definite -- you have a limited number of sort of regulatory hooks that you can use to have some impact, and so certainly the uncertainty of the dose calculation shouldn't be the only factor that informs or influences an enforcement action.

But it certainly is one, and I think it -- you know, a well-operated facility where, you know, the sort of only issue was, was it 99 or 101 mR, it seems unreasonable to sort of punish a licensee under those conditions. So, you know, I do think it is important that, you know, the integrity and fairness of these calculations be respected by all in the community. And I really think that's the lesson to take home from this.

I would say, too, we could do a lot better job for you had we been given some access to primary data. You know, there wasn't really very much to review. I mean, in the end I think that much of Dr. Marcus' letter was very speculative. I mean, how -- what basis did they have for assuming that the factor -- that the dose should be a factor of seven lower? That's just sort of an off-the-cuff estimate, no

better than my factor of two it might be lower.

And that's because we -- we, you know, had no basis for really assessing that critical assumption, which was how far and how long and for how long of a time was the patient really at a given point. And so I think we could have, within our subcommittee, you know, had a more helpful role had more data been shared with us, whatever form it was.

CHAIRMAN CERQUEIRA: Tom, you know, to try to wrap up this discussion, because this was given to the committee relatively late and we formed a subcommittee, and Leon and Jeff especially did a very good job of trying to track this down, but I don't quite see the role that you want us to have in this, because you didn't provide us with enough information based on what your -- the NRC had to make the calculations. And, you know, Jeff has made a very good attempt to model what he perceived was the situation.

What do you want from the committee specifically?

MR. ESSIG: Well, the -- as part of the tasking of the subcommittee, I had made -- of course, offered the inspection report and the report by Drs. Marcus and Siegel that's been referenced. I also

indicated that because of the shortness of the -- of time that I offered Dr. Sami Sherbini of my staff to engage with any member of the subcommittee who needed additional data.

If we didn't have it, we would interface with the -- either the regional inspector or the licensee, as needed. And so that was -- that offer has been on the table since the original tasking.

Now, it's not that we had a report that we're withholding from you. We had our own evaluation, but we want to -- because the Commission had directed us to make -- to task the subcommittee or the ACMUI with an independent evaluation, we didn't want to bias that outcome with providing the results of our own evaluation, which, of course, we had at the time of the subcommittee tasking.

So we were walking a line between -- that's the only thing that we really didn't provide the committee was our own evaluation, because we -- in order to meet that test of independence, we gave you the other reports and the other information to --

CHAIRMAN CERQUEIRA: Right. But the timeframe for doing this was relatively short --

MR. ESSIG: I understand that.

CHAIRMAN CERQUEIRA: -- in that situation.

MR. ESSIG: Yes.

CHAIRMAN CERQUEIRA: And I don't think Jeff had enough time to --

MR. ESSIG: And, certainly, the committee was -- the subcommittee was challenged in that regard. No question.

CHAIRMAN CERQUEIRA: Okay. Charlie -- Dr. Miller would like to make a comment, and then Jeff.

DR. MILLER: Let's see if I can either help or make this worse. We all recognize that the timeframe was short. We have a forthcoming Commission meeting.

While I know the Commission is anxious to hear the results, I think based upon the discussion that I heard this morning we want to make sure that we give them results that people can -- Jeff has used the word "scientific" information.

DR. WILLIAMSON: As much as can be.

DR. MILLER: So what I wouldn't want to happen is that we rush to an answer if you feel that more data could help you formulate a better conclusion with regard to the recommendation and the independent assessment that you were asked to do.

And I would be prepared -- you know, we're up against having a Commission meeting tomorrow, and

I don't want to let the Commission meeting drive the fact that you've got to get to an absolute answer today if you feel that the benefit of more data and some more time would allow you to get to a better conclusion.

I'm prepared to sit before the Commission and take whatever it is that they have to offer in that regard. I think what they asked for in this meeting was a status report on where we are. And I know at least from the staff's perspective the staff is not going to present staff conclusions at the Commission meeting tomorrow, because we were asked to seek independent evaluation by ACMUI, and then take that result and factor that into any assessment that the staff does finally.

So that's what I'm prepared to tell the Commission. And I'm prepared to tell the Commission, if you feel you need more time, I mean, you certainly can tell them that at the table.

Now, I recognize that certain Commissioners are going to be thirsty and anxious to get an answer. But I think it's important from my perspective that we try to give them the best advice and the best answer that you can give the staff, so that we factor that in as opposed to letting a

schedule of a Commission meeting drive an answer. At least that's my perspective.

CHAIRMAN CERQUEIRA: I think the members of the subcommittee would welcome the additional data. There is much data that is missing, and it was my impression, though a subjective one, that part of the reason that the final dose was derived by the NRC was because some of the data simply doesn't exist.

It was not -- records were not adequately kept, from what I read between the lines, though I haven't seen the records, to document the actual exposure of the daughter to the mother who was the source. Therefore, we would recommend any additional data that's available.

At the same time, this particular case is one in which there doesn't seem to be any question from any of the parties involved that the dose limits were exceeded. That point should be made.

CHAIRMAN CERQUEIRA: Jeff, and then Dick.

DR. WILLIAMSON: Yes. I guess it would be useful to discuss one comment that I think you made, Leon, and that is, is there anything in Part 20 that basically forces or biases the Commission in one direction or another in terms of making dose estimates? As I read it, I didn't think so.

I think as long as assumptions are reasonable and defensible, they can be used in doing shielding calculations to ensure that the 100 mR annual limit is met. One can make plausible assumptions about how often an individual patient is likely to visit the hospital and be in an exposed area, take into account reasonable occupancy factors, usage factors.

So I -- so I guess I'll put my question in the -- or my comment in the form of a question to the staff. Is this not the case, that, you know, the regulation is based upon using all available data to come up with the most reasonable answer, and there isn't a presumption that you should always aim for the highest possible or most conservative estimate.

MR. ESSIG: If I may, the requirement to which you refer is in the section of Part 20 that defines what a radiation survey is. And a survey is a combination of measurements and evaluations, and that the survey must be reasonable for the circumstances. I think the word "adequate" is used, and, of course, that isn't defined.

But it doesn't mean that we need to take the extreme value on everything and have a worst-case scenario. I believe our experience over time has

shown that -- I mean, certainly, when there is -- when we just don't have factual information, it's lacking and it will never be available, then we are forced to take some rather conservative assumptions.

But when we have factual information that we can assess and judge the reasonableness of it, then we -- it's incumbent on us to use it.

CHAIRMAN CERQUEIRA: Okay. Dick?

DR. VETTER: This case begs a number of issues, but just to clarify what we've actually been asked to address, is it whether or not the dose to the members of the public, or this particular member of the public, was accurately calculated? Was it to determine whether or not the methodology that the NRC used is reasonable? Or is it both?

VICE CHAIRMAN MALMUD: It has to be both, because the calculations are based upon the assumptions of the exposure of the daughter to the mother, of the public to the source. And, therefore, one is intimately tied with the other.

Parenthetically, the letter from Drs. Marcus and Siegel indicates that using a liberal dose calculation method that the dose might have been as much as 17 times lower than that calculated. I'm not accepting that figure, but I am pointing out to you

that 15 divided by 17 still is in excess of 500 millirem, which would be a radiation worker's exposure, which is still far in excess of 100 millirem.

So I don't believe that any of the parties is challenging the correctness of the conclusion that there was an excessive exposure. I think that it's a matter of how these calculations are made, and it addresses the precise issue that Nekita Hobson raised, which is, if this overlaps the area of acceptable versus unacceptable burden, are we not subjecting possibly the public to unnecessary anxiety? Not in this case, but in other cases.

And I would like to raise one other question that I think we should deal with, and that is, when a member of the public -- in this case the daughter -- is warned, as she had been, and given adequate opportunity to protect herself as she had been -- the report says that there was a lead shield moved into the room, which the source would be behind -- and doesn't do that, what -- how do we prevent this from happening in the future?

Obviously, there are many issues to be considered here. But I'm not aware that an incident like this has occurred before, and the question is,

how do we prevent it from occurring in the future? Which is my greatest concern, because that which is over is over, but it's the future we want to be concerned about.

CHAIRMAN CERQUEIRA: Dick?

DR. VETTER: Right. That's one of the other issues that I think this case begs. And I think that what you just said creates an ethical dilemma that needs some exploration. Should the NRC -- here we have a patient who was informed, steps were taken -- we can argue all day about whether they were adequate, but steps were taken. The patient -- the daughter ignored the instructions.

Now, should the regulated community -- should the regulators -- this is an ethical dilemma -- prevent a daughter from spending as much time as she wants to with her dying mother? I think that creates an ethical dilemma. Where is -- you know, what is best for the public here?

And I'm assuming that this daughter -- this member of the public has been adequately informed, and some steps were taken to reduce the dose.

CHAIRMAN CERQUEIRA: Orhan?

MR. SULEIMAN: I think you just hit an

important point. I think there are regulatory limits for the -- for the occupational worker. There are regulatory limits under certain constraints for the general public. There are no dose limits for patients medically -- you know, there aren't any.

When a family member -- and I believe there are some -- I think there is some guidance out there -- the NCRP, or whatever, regarding maybe family members. But we are transcending an area here where an individual has been informed, is aware, and we're not talking about ignorance. I mean, there is some awareness there. So that's something that maybe should be considered. Obviously, it doesn't affect the discussion right now, though it's important.

The other thing -- and I think I mentioned this at the last meeting, and I do agree, and I heard some of the staff say that they did report lower limits and upper limits. I think the worst-case scenario was nice to know. It's also nice to know what the lower limit is, and that is some science. You're not working with no information. You've got some information; it's not the best.

So the individual was in the room a certain time. You have to factor in that uncertainty. And as Dr. Malmud has said several times -- I lost

count after two or three -- the lower estimate was still above the action level. And I think most enforcement regulatory agencies also include a factor of tolerance.

They know that they're not going to come in and enforce when somebody just meets the 55 miles per hour speed limit. They won't -- you'll get tracked when you're doing 65, maybe 10 percent over. So the point is we may be debating the process, but this is Health Physics 101. Calculating the dose should -- this is not something we're doing 50 years ago. This is something that should be pretty straightforward. I don't think anybody who has done the dose estimates has really been that far off.

So I don't know whether we should be continuing to discuss the calculation and really decide is there enough information, and is the uncertainty enough that the NRC decision was appropriate?

CHAIRMAN CERQUEIRA: I think we should try to wrap this up. And I think, Leon, I -- you've made several good points. And, you know, there seem to be several issues and agendas here. And I don't think we're really quite prepared to go to the Commissioners tomorrow and tell them, you know, was the NRC

calculation done properly? Was it conservative? But I guess the question is: do we need to go further, let the subcommittee continue and do more work?

VICE CHAIRMAN MALMUD: We need more data, and we're appreciative of Dr. Miller's offer to provide us with more data. And that will allow us to make a recommendation to -- that will allow the subcommittee to make a recommendation to the committee.

Looking at this as a provider, as well as a member of the public, we must protect the public. And at the same time, there -- we have to be reasonable with the licensee. I believe that the reason for this having been brought to our attention was the concern of some parties about the methodology that the NRC uses in calculating doses such as this in general.

This may have been the wrong instance for them to have brought it before our attention, because in any calculation the dose is excessive. However, we've been asked to do that, and we will do that.

But there remains the concern that the calculations be based upon reasonable estimates, so that the public is not unduly made anxious, and so that the licensees are not unduly punished.

CHAIRMAN CERQUEIRA: I think, you know, if we're going to just stay on schedule here -- and I gather the feeling is to continue the subcommittee's work with the additional information and to sort of broaden the scope perhaps to deal with some of the issues that I think Neki brought up.

And, Neki, I'll allow you one comment.

MS. HOBSON: But, you know, in my simple view of the world, it seems to me what we were asked to decide was, are the NRC's way of calculating doses overly conservative? I think Jeff's presentation says yes, at least in this case the NRC was overly conservative, not that it wasn't a -- you know, an infraction, that it is not a regulatory concern.

But the fundamental question is: does the NRC make unreasonable, overly conservative assumptions calculating dose? We've concluded that, yes, in this case they did. So what's the benefit of in this case trying to come down to whether it's some point between 1.6 and 17? What is the precise point? Do we really want to spend more time on it?

You know, we weren't asked to calculate the dose, except in the general sense as to -- to support our position on the question, is NRC overly conservative? We've concluded it is.

CHAIRMAN CERQUEIRA: Leon.

VICE CHAIRMAN MALMUD: I think, though, that we do need a little more data. For example, we heard this morning something that I hadn't heard until I attended the session this morning. And that is that the regional office said that the dose range was between four point something rem and 17 rem. I hadn't heard that number until this morning. Obviously, there is some data that we have not -- that has not been shared with us as yet.

MR. ESSIG: May I clarify that -- that point?

VICE CHAIRMAN MALMUD: Yes, please.

MR. ESSIG: I'm reading from the Notice of Violation and Proposed Imposition of Civil Penalty that was sent to the licensee on May 7th of 2003. Part of the citation is that specifically a member of the public received a total effective dose equivalent of between three and 15 rem.

If one goes back and looks at the inspection report, you'll find the value of 15, but I don't believe you'll find the value of three. I believe that that was the -- the licensee's estimate of the value, and then we adopted that as a potential lower end of the range. And that's how that -- how

that was included.

CHAIRMAN CERQUEIRA: Thank you.

VICE CHAIRMAN MALMUD: We clearly are still collecting data for the subcommittee, and that's why I would recommend that we postpone presenting this data to the entire committee and then to the NRC.

DR. NAG: Yes. I think that one question that needs to be asked is that you are imposing a penalty on the licensee. The licensee has done its part in warning the member of the public that this potential exists, not to do it, and the member of the public goes ahead and does it anyway. What fault is that of the licensee?

For example, we do implants on young children. Now, if you do implants on young children, the mother would want to come in. Now, are we going to force the mother -- no, you cannot come in? If the mother still persists, what do we do? Or are we going to say we are not going to implant your child if you are going to come in, and, therefore, the child will not have an implant?

So I think, you know, we need to see -- are we going to penalize the licensee for having done it where -- where a member of the public ignores the recommendations of the licensee?

CHAIRMAN CERQUEIRA: I think that's an important point. Unfortunately, I think, though, we're not going to be able to solve this here. I think maybe the subcommittee should kind of redefine its charge a little bit to see exactly what it is, because, I mean, we've identified, you know, the accuracy of the dose calibration, how far off was it, issues of, you know, can you -- if you inform people adequately, can you then prevent them based on having the knowledge to assume the risk. I feel that's a separate issue, and I don't think we're going to solve that here.

I really do think we should move on, continue the subcommittee work. I guess the one question is: how much, if anything, do we present to the Commissioners tomorrow?

DR. WILLIAMSON: I think that we --

CHAIRMAN CERQUEIRA: Jeff?

DR. WILLIAMSON: -- need more time and more data.

CHAIRMAN CERQUEIRA: Okay.

DR. WILLIAMSON: And there wasn't time to get it. And I think rather than -- I think Charles is right. Rather than present something half-baked and speculative, we should, you know, come to the table

with better defined conclusions.

I think we might consider broadening the charge of the subcommittee to consider the management or regulatory significance of caregivers and patients' family members, and under what circumstances they might be exempted from the 100 mR limit.

It does seem to me unreasonable that in a situation like this family members are prohibited from spending significant time with their loved ones. So I think we could discuss that. We might, you know, also consider, you know, looking more broadly at the methodology of dose calculation, although that would get very involved, rather than just sticking to this one case.

VICE CHAIRMAN MALMUD: I agree, and I think that there's another issue we have to deal with, and that's on behalf of the licensee -- licensees in general. And that is, what should the licensee have done, or what should a licensee do in the future, when a member of the public, duly informed, ignores the information, knowingly ignores the information, and exposes himself or herself to a larger radiation burden than is permissible? What's the licensee's responsibility?

DR. WILLIAMSON: I'm not sure the 100 mR

was a limit they were obligated to follow. I actually wonder if they couldn't have set things up in a different way for this individual person to get a -- have a higher and more generous limit.

VICE CHAIRMAN MALMUD: I'm not arguing that, Jeff. What I'm saying is that what should one do in the future to deal with this issue? The limit for a radiation worker would have been 500 millirem -- 5,000. And in that instance, should this have been a proactive action rather than a retroactive action? Those are the issues we have to discuss in the committee for the future.

CHAIRMAN CERQUEIRA: Yes, I think that would be a more important charge. And so maybe if the committee and staff could come up with a new charge and just send it out to the committee so we're aware of what's going on, and then report on this at the next meeting.

One final word, and then we'll move on.

Roger, if you want to get prepared.

DR. MILLER: What occurs to me is where we are. You know, your charge was given to you by the staff at the Commission's direction as to what they wanted you to look at. But like for any case, sometimes when you look at a specific case it causes

you to start thinking about a broader question, and I think that's what we have here.

And it certainly seems to me -- and, again, it's up to the committee as to what you want to present to the Commission tomorrow. Far be it from me to tell you what you should be presenting, nor would I even endeavor to try to do so, but I think that -- I think that there are some important conclusions, and one is even given your preliminary calculations, there has been a lot of dialogue concerning none of us see that -- I think we're in agreement that at least with what we have out that none of us see that this particular case the enforcement was inappropriate. That much can be said.

But I think the second point with regard to some of the dialogue would be worthwhile to discuss with the Commission, because I think together we can tell the Commission we think there are some broader questions here that we can explore from this, and it would be worthwhile to do so.

CHAIRMAN CERQUEIRA: So maybe Jeff and Leon could bring this up during the -- and, you know, again, we can -- I think we -- since it's on the agenda, we have to address it. But I think as Charlie has outlined would be the appropriate way to do it.

All right. Well, thank you. This issue will definitely come up again.

The next item is -- where are we? Okay. ACMUI review of NRC method -- nope, that was that, wasn't it? Wrong sheet. Status of Rulemaking: Amend 10 CFR Part 35/Recognition of Specialty Board Certifications (T&E)/Preceptor Statement/NRC Form 313A. Dr. Roger Broseus will be making the presentation.

Roger?

DR. BROSEUS: Thank you.

CHAIRMAN CERQUEIRA: Sorry for the delay.

DR. BROSEUS: Excuse my little congestion here.

Thank you for the opportunity to address you this morning regarding the status of the proposed rule on training and experience in recognizing specialty board certifications. I'm going to start off by emphasizing that this is a status briefing.

It's a presentation giving an overview of comments that we have received to date -- actually, not even to date. The closing date for the comment period was February 23rd, which was last Monday. At that point we received in my office approximately 15 letters and e-mails. As of Friday, we were up to 25.

And so my presentation today is meant to be an overview and a summary of some of the comments to give you a feeling for what we've received through last Monday and give you a feeling for where we're at.

It's not meant to be an inclusive summary of all of the issues, but I think that this will highlight for you some of the major issues that we see. But before going into discussing the comments, let me indicate where we are in the rulemaking -- just a status report here.

The Office of Management and Budget approved the information collection related to the proposed rule on February 2nd of 2004, and that's a nice hurdle to have in our past. I have just mentioned that the public comment period ended on February 23rd, and I'd like to just note for you that you and everybody else can view the public comments on our rule forum website. And sometimes people have trouble finding it, so the URL for the website is included on the slide, so you can find it more easily.

As I mentioned, through the beginning of last week we had received e-mails and letters from 15 commenters. And you do have before you a copy of the slides, so thank goodness you don't have to be facing away from us and the audience to view what I'm talking

about here.

At that point, there were five agreement state representatives and 10 members of the public who had commented. I might mention that I have an arbitrary breakdown between agreement states and the public, just for convenience in presentation.

The public commenters included individuals, professional societies, and other groups -- physicians, medical physicists, a whole variety of people. Overall, there was general support expressed for the proposed rule, with five offering what I term "explicit" support like, "We feel this is a good thing to do," just in general terms. And that support came from one agreement state and four of the public commenters.

To refresh your memory, and others' memories, we posed three questions in the FRN, the Federal Register announcement, which included our supplementary information explaining the rationale for the rule as well as the proposed rule changes. And these three questions related to: do the proposed changes adequately cover safety? Should agreement states establish requirements in their rules by October 24th of 2005? Or should they be given three full years to develop a compatible rule? And should

the word "attestation" or "attest" be used in place of "certification"?

I will deal first with comments on the proposed rule coming from the public. First point that came out in my reading is -- I shouldn't say a first point, but one of the points -- preceptors should not be required to attest to candidates passing board-administered examinations.

The way the rule is written it appears that -- the proposed rule -- that in the certification statements or preceptor statements that a preceptor would be attesting to an individual having taken an exam and passed it.

Several comments from the public dealt with the timing issue that we mentioned a moment ago, along with pros and cons of the timing of agreement statement adoption. There were comments on -- from the public about using "attest" versus "certify." Generally, the commenters agreed with the ACMUI -- excuse my use of the term ACMUI for A-C-M-U-I. It's something I fell into a long time ago. It's just the way it comes out of my mouth. Generally, though, they say use "attest" instead of "certify."

One commenter pointed out that in the definition, if you look up the two words, they mean

the same thing. Okay? But another commenter pointed out that to avoid confusion between the use of the word "certification" by a board, and a preceptor certifying or attesting, that they felt "attest" was a better choice of words.

Additional comments from the public -- one of the boards indicated they felt that if the rule is put into place immediately after the expiration of Subpart J on October 24th of this year, the boards would not have enough time to submit applications for recognition, and that staff may not have enough time to evaluate them. So they are suggesting that a period of time be allowed to have boards apply and for staff to evaluate.

Another comment -- the wording in proposed 35.390(c) is unclear. Again, this is an implication that a preceptor must satisfy passing of certification examinations.

There was a suggestion that radiation oncologists be proposed from the requirements in 390. These are certain training and experiential requirements.

And, finally, coming from the public were many comments that dealt with details such as the one we had talked about and others, as well as details of

implementation of the proposed rule.

Let me move on to agreement state comments on the proposed rule, and then we'll go into comments on implementation procedures of the drafts that we sent out a couple of months ago.

Agreement states generally are asking for a full three years to develop a compatible rule. One of the themes that came through from several states was that they have to go to the legislatures to change the rules, and they have two-year legislative cycles. And so to be able to phase things and get the rule change into place, they need three years.

Another issue that came out in the agreement state comments related to the number of hours of training for various categories of use. They suggested, for example, that there should be explicit requirements in 35.190, 290, and 390, for number of hours of training.

One of the arguments that was posed was this would lead to more consistency and ensure that the rules are consistent between states in terms of the way the rule is evaluated and also help ensure compatibility -- adherence to the requirement for compatibility, which means that the state requirements -- agreement state requirements should be essentially

the same as those of the NRC.

More agreement state comments -- they'd like a clarification of the definitions in Section 35.2. In particular, they felt that the way the definition is worded in the proposed rule that it wasn't clear that an individual who meets the requirements in the alternate pathway, as opposed to the certification pathway, that they were defined as RSOs or authorized users, or whatever.

There was general support for retention of requirements for receptor statements. They like the idea of decoupling of preceptor precertifications from those of the board in some cases. One person termed this change to be unfortunate, but they said it was because it would be confusing for applicants for a while. It would take a while for them to get used to it. Others said they're glad to see the burden shift from boards to -- they characterized it to individuals.

Again, as with the public comments, agreement state comments dealt a lot with details of the rule as well as implementation, which we'll talk about in a moment.

Now, I want to -- with this slide I just want to draw a distinction between what I've been

talking about to this point and my next topic.

We drafted implementation guidance for review concurrently by the Advisory Committee, as well as agreement states. That draft was distributed to this group during the November meeting, and to agreement states on October 23rd. So there was a little bit of overlap, but generally there was a one-month period there where we asked for comments back on the implementation procedures.

Dr. Vetter provided a compilation of comments from ACMUI members back to us -- to staff -- on December 15th. We also got responses from four agreement states on our draft implementation procedures.

Here is what we heard from the Advisory Committee member compilation -- that the NRC doesn't understand the purpose and process clearly of the board certification procedures and requirements. They pointed out that boards do not determine the content of training programs. They determine if a candidate possesses adequate knowledge and understanding of content, and that the draft procedures, as we move forward, should reflect this difference.

They indicated they felt that the draft includes redundant requirements, for example, for

boards to declare that candidates must complete T&E to sit for an examination. It felt that it was inappropriate for the NRC to examine board processes -- for example, looking at examinations, passing point workshops, grading procedures.

It felt that the NRC should not review specific procedures of boards, and that there was confusion about the role of agreement states in recognizing boards. One of the questions was: can a board recognize a state -- I'm sorry. Can a board apply to a state and be recognized by a state?

And if approved, will the certification approved by one state be recognized by all and by the NRC? And there was a question about whether or not states have resources to conduct the recognition program.

Continuing on, more comments from the members of the Advisory Board -- Advisory Committee -- why should boards be required to renew every five years? In other words, programs are static, they are unchanging; why should the staff keep asking questions of the boards?

They indicated that when the NRC invites applications from the boards that the consequences of not applying should be addressed in the invitation to

the board. It said a board should not be delisted, unrecognized, due to non-response to communications from the NRC. That is, if a letter goes out and there's no response coming back, that shouldn't be a sole basis for not recognizing a board, or whatever.

They advised the NRC to have interaction with the boards, so they understand the processes -- for example, having a public workshop or a teleconference -- to explain procedures as well as announcing in the Federal Register the opportunity, I guess I would say, to apply to the NRC for recognition.

I'd like to move on next to agreement state comments on the procedures for implementation. We saw in the comments on implementation procedures an echo. Actually, it wasn't an echo, because we got comments from states on proposed rules after the implementation procedures. But there was crossover, there was a common theme on some issues between comments on implementation and comments on the proposed rule.

And one of them was in the area of a need for specification of number of hours, so that hours comment came up both on -- in comments on implementation procedures as well as on proposed

rules.

They want guidance for evaluation of training programs for certification, and for alternate pathways. One of the arguments they posed here was they need some common performance indicators for their IMPEP reviews. And IMPEP -- had to go look this up myself -- is Integrated Materials Performance Evaluation Program. This is a program that Office of State and Tribal Programs uses to assess the performance by agreement states.

Question?

DR. WILLIAMSON: Yes. Before you leave this slide, is the issue of number of hours of didactic training an issue for just the alternative pathway, or the requirements that a board has to meet in order to be recognized?

DR. BROSEUS: Both. Both. They'd like to see more specification number of hours as a tool to evaluating how good the certification program is.

There was also a comment here on the training area that the states would like to see more specification for T&E, training and experience, for what they termed "modality training" -- that is, what is required in the case of uses that fall under 35.1000.

Continuing on with agreement state comments, there was an expression of doubt that boards would allow review of examinations. You might recall that the Commission directed the staff to include procedures for evaluating whether or not agreement -- I'm sorry -- certification board requirements were adequate when, for example, there's a trend in medical events.

They said that they need more guidance on proposed changes for uses of sealed sources in medical therapy, including the specialty modality such as IVB, intravenous brachytherapy.

They indicated states should recognize boards that, for example, might be a state medical physicist licensing board. And if a state were to do this -- I shouldn't say that they should -- but should they recognize state boards, and, if so, were these recognitions to be -- have national applicability.

One state indicated they felt there was new process lacking in the procedures, the draft procedures, indicating they would be required to have a hearing should there be a determination to delist a board.

I want to move on to where we see ourselves going in the future, but reemphasize that my

presentation today is a first look. You all are the first ones to hear any sort of summary of what comments came in. And the staff will be continuing to compile the comments and put them into a form where we will be organizing them and analyzing and resolving some comments, and so on.

After we resolve the comments from the stakeholders, we will prepare a draft final rule. And part of our plan for moving forward is to distribute this to the Advisory Committee and the agreement states for parallel review. We're doing parallel review, because it's necessary to move quickly with this to have a rule published before the expiration of Subpart J on October 24th of this year.

So the Advisory Committee will have an opportunity to give us more feedback on the final rule while it's in draft form.

After that, we will resolve the comments from the Advisory Committee as well as agreement states and move it on to the Commissioners -- to the Commission for review and approval. We will post -- once we've got everything reconciled, we'll publish, of course, the rule in the Federal Register.

We hope to do that -- we must do that before the end of October, and our plan is to get it

out in September. We will post revised implementation procedures on the web and contact the boards to invite their application.

In closing, I'd just like to -- not only to reemphasize that we're in process here, but also what we will be doing in doing our review, and so on, and that is to make sure that, to the best of our ability, that the rule and the supplementary information explaining the rationale is clear and addresses all of the comments of everybody, there's a clear basis for the rule change, and to have this in place before the expiration of Subpart J.

Are there any questions or comments?

CHAIRMAN CERQUEIRA: Well, I'd sort of like to make one comment and to acknowledge that I am president of one board that has gone through the application process. It's the Certification Board of Nuclear Cardiology.

But, you know, a lot of the -- maybe I've been in the process too long. These were questions that came up at all the various stages, the public forums, and we had a lot of input, and we made some decisions, and now we're going back and we're relooking at it again, which is not necessarily long -- wrong, but it's going to delay the process.

You know, specifically things like hours. We had hours. Well, we got a lot of complaints that we shouldn't have hours, and we ended up taking the hours out. So I think we -- you know, the committee is quite willing to continue to give comment, but at some point we have to ask how often we're going to go back and relook at things that have already been solved.

And, Dick, I think you have been working on this more than anyone else. Do you have any comments relative to what Roger has said, or -- you don't have to agree with me necessarily, but --

DR. VETTER: And I don't have to agree with Roger either I guess.

(Laughter.)

No. I don't have any specific comments. He is simply reporting on the feedback.

CHAIRMAN CERQUEIRA: Yes.

DR. VETTER: And we can argue for or against any of that feedback, but that's not what he's here for. I do appreciate seeing all of this put together in one presentation.

CHAIRMAN CERQUEIRA: Good. Okay.

Other comments or questions for Roger? Ralph?

MR. LIETO: Roger, when someone posted a response to the proposed rules, how soon after posting does it go up there for review, if they were doing it electronically? The reason I'm asking is because I was looking at this --

DR. BROSEUS: Yours weren't there.

MR. LIETO: Pardon?

DR. BROSEUS: Yours were not up, correct?

MR. LIETO: Yes.

DR. BROSEUS: The answer is that there is some internal delay. Okay? For example, your comments I believe came in -- they were docketed on the 23rd, which was the deadline, but not posted on the website.

Now, I did see your comments, because they were available to staff, but there's a lag time. And one of the things that we say when we're looking at comments is, you know, we will consider comments up to the deadline, which was the 23rd, and others as we can. But part of the process also is to realize that, you know, sometimes there are some time lags. But yours certainly made it in within the docketing period. But the answer is it's about a week.

MR. LIETO: Thank you.

CHAIRMAN CERQUEIRA: Patricia?

DR. HOLAHAN: And to address your comment fully, we'll accept comments if they're postmarked the day that they're -- postmarked by the 23rd. And that takes time, getting them in, and then it will take even longer to get up on -- them up on the website.

DR. BROSEUS: As of Friday -- I'm sorry, Monday, it seems to me -- the 23rd, it seems to me that during the week last week there were on the order of 15 on the website, or maybe 20. But, you know, we're up to 25 as of Friday, comments coming in that will be considered.

Another comment or question?

CHAIRMAN CERQUEIRA: Yes. Charlie?

DR. MILLER: Yes. Will regard, Dr. Cerqueira, to your comment concerning continuing to comment, I think what we need from here on in is not your continued comments that went into the draft rule as it is currently constructed, but, you know, as part of our rulemaking process we're obliged, once we get the public comments, to have to resolve those public comments, and if -- if we see fit based upon those public comments, change the proposed rule in some way, shape, or form.

Where we would need your input would be in the final -- once we've done that, in the final

formulation of the rule package, if things are to be changed from what they were proposed based upon public comments, your advice to us would be beneficial. Is that --

DR. BROSEUS: I might observe also that, you know, it's typical for people to continue to comment on points they have made before. That's part of the process.

CHAIRMAN CERQUEIRA: Right. Okay, good.

MR. MOORE: This is Scott Moore. I'm the Chief of the Rulemaking and Guidance Branch. What Charlie said is correct. The next official stage that we would seek ACMUI comments is at the draft final rule stage, and it's the point where we would go to the agreement states also for comment.

And if the ACMUI feels that it's commented in your -- and you don't feel inclined to comment again, then that would be fine at that stage, if you don't feel it's a good use of your own resources. But we would come to you to give you the opportunity for comment at that point.

And the amount that there are changes in the final rule we don't know yet. As Roger said, we're just getting the comments in now. The comment period closed on the 23rd. Last week the comments

doubled in size. So, you know, as Dr. Vetter pointed out, we haven't analyzed them yet. Roger is just reporting on what they say. We haven't taken a position on any of them yet. We don't know how the final rule will change or not.

CHAIRMAN CERQUEIRA: Good.

Neki, and then Dr. Miller. Neki? Ruth?

MS. McBURNEY: Yes, I'm Ruth.

CHAIRMAN CERQUEIRA: I apologize.

MS. McBURNEY: I think the reason that you're seeing questions about the number of hours is that -- from the agreement state is that you're already getting questions from the training courses that are only like 16 to 40 hours, saying, "Are you going to accept our course?" where the didactic portion -- it doesn't go to the alternate pathway.

DR. MILLER: I just wanted to comment that we talked earlier this morning, had a motion passed, to have a conference call for the committee at some point in the mid-term. I'm confident that this will be a topic of discussion for a mid-term kind of phone call, you know, on the final comments for the rule.

CHAIRMAN CERQUEIRA: Good. Okay.

All right. Are there other questions? Perhaps we could break for lunch, then.

Roger, thank you very much.

DR. BROSEUS: Thank you.

CHAIRMAN CERQUEIRA: So I think we'll break here for lunch. We'll reconvene at 1:00 and the Emerging Technologies Subcommittee.

(Whereupon, at 11:51 a.m., the proceedings in the foregoing matter recessed for lunch.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:06 p.m.)

CHAIRMAN CERQUEIRA: If everybody could please take their seats, we will begin, try to stay on time. This is the post-lunch session of the ACMUI. The first item on the agenda for half an hour is "Emerging Technology Subcommittee Discussion on Mission and Meeting Procedures." Ruth, are you doing that?

MEMBER McBURNEY: Partly. And I think Jeff will have some comment.

EMERGING TECHNOLOGY SUBCOMMITTEE DISCUSSION ON MISSION AND MEETING PROCEDURES

MEMBER McBURNEY: The draft licensing guidance for the seedSelectron device was sent out in December to the subcommittee for review. Part of the discussion this morning about process and so forth and when a subcommittee could meet and discuss things over the teleconference and discuss matters with staff without that having to be noticed came up.

So in order to save time, I sent out e-mails to the subcommittee members and said, "Do we need to have a teleconference where we are going to have to notice it in the register and so forth or do you just have comments that we can pass on to the

staff?"

Basically most everybody just had some minor comments, but I think Dr. Williamson addressed some concerns that were more technical in nature and also in the way the guide was set up.

Now that we have gotten information that subcommittees can meet by teleconference and discuss issues with staff without that having to be noticed, I think that in the future, subcommittees can go forward and do the things that we need to do with staff on commenting on documents and get into more detail.

Are we talking about the guidance itself? That is basically all I wanted to say about the procedures unless one of the other subcommittee members has some comment about that.

CHAIRMAN CERQUEIRA: Jeff, you had some comments?

MEMBER WILLIAMSON: Yes, about process. I think we really have been hampered in our activities. We really have only been allowed to meet or have been planned to meet or have had fairly brief meetings at the ACMUI, face-to-face meetings. If the seedSelectron is any good example of what the future holds, these are very detailed technical documents and

take considerable time to go over the technical details.

So unless we come up with a methodology by which we can meet for appropriate lengths of time and have the, if necessary, maybe even some outside advice, I don't think we are going to be very useful to the staff on these matters.

CHAIRMAN CERQUEIRA: So two items. One is just meetings.

MEMBER WILLIAMSON: Yes.

CHAIRMAN CERQUEIRA: Do you need face-to-face meetings? Can you do it with the telephone conferences that we have discussed?

MEMBER WILLIAMSON: For the most part, my sense is I think we could do it with teleconferences. It may be necessary. For example, with the seedSelectron, there were a number of fairly complicated technical issues that could only be resolved by actually seeing how the device works and having detailed conversations with the vendor's representative.

So I undertook that on behalf of the subcommittee. And I think it wouldn't be necessary for the whole group to do that. So for the most part, I think we could have subcommittee meetings by

telephone with perhaps some travel and face-to-face meetings that individual members might have to make.

CHAIRMAN CERQUEIRA: You said consultants. Do you think that travel to vendor site would provide adequate information? Do you need additional expertise? I would ask, Tom, is there anything in the budget?

MEMBER WILLIAMSON: This is another very interesting aspect of process. I understand there is a more current version of this draft guidance up on the Web site, which I haven't seen certainly. So I base my comments on the one we were given I think in January.

This is an incredibly detailed complex document. At least the version I have seen is basically filled with mistakes, misunderstandings. You know, I am not trying to attack anybody. I think that the point I am trying to make is that this is to come up with an effective quality assurance protocol that meets the needs of future regulations for the Commission. You can't do it unless you are an expert.

So another aspect of process that the staff might want to consider is in the formulation of these documents forming a working group that has some outside expertise in the form of consultants up front

I think is going to help you get these documents done in a more timely fashion. I think the product would be more appropriate and closer to being finished.

So this is really not meant to be a criticism of any specific staff member. I honestly don't think this document or such a document could be crafted without a fair amount of very detailed input. So this device is sufficiently different from manual brachytherapy and sufficiently different from any other type of remote after-loading device that you simply can't take existing 35.600 as a template for this because so much of it doesn't apply.

So what essentially Commission staff or NRC staff is faced with is having to go through the same thought process that, for example, the AAPM had to in crafting its task group 56 and 59, which is what the 35.600 is based on.

I think to have a better quality product more quickly, it would be better on the front end to try and involve some consultants who have a lot of experience, if not with the specific system in question, with similar systems. That is my other suggestion for process.

CHAIRMAN CERQUEIRA: Ruth?

MEMBER McBURNEY: Following onto that but

not particularly in comment on this particular guidance document, I am also on the National Materials Program pilot working group dealing with establishment of priorities of regulatory needs. Certainly if NRC is seeing some of these emerging technologies and the need for licensing guidance, the agreement states are as well.

In order for the National Materials Program to work under what we call the alliance concept where the states and the NRC are working together to come up with regulatory products, such as rules and guidance and so forth, together, part of our recommendations have been that centers of expertise be identified, that alternative resources be identified, and, as Dr. Williamson suggested, bringing in some expertise from some of the other professional societies to help that have the knowledge of the inner workings of some of these new emerging technologies and the devices.

Also, that was the main point. At a recent symposium that we had dealing with like the fusion technologies, the CT PAT, we also had a session dealing with emerging technologies. That was one of the recommendations that came out of that symposium, that there are professional societies that have people

willing to help out.

And I realize there might be a little bit of a conflict of interest, but at least give the input onto a more knowledge base on how some of these devices work and what are some of the radiation safety situations that should be taken into account in licensing those devices.

CHAIRMAN CERQUEIRA: We have a comment from the back microphone. Can you please state your name?

MS. FAIROBENT: Yes. Lynne Fairobent with the American College of Radiology.

Listening to this discussion and just suggestions on perhaps bringing in some outside consultants when a subgroup of the entire Committee or even the entire Committee is looking at anew product or a new modality is not inconsistent with how ACRS and ACNW do operate.

They quite often have a task force where they look at a special issue, a subset of a global issue they may be analyzing. They do quite often bring in I will use the term "consultants" or temporary federal employees to look and debate or provide added input into that.

So I think that this would not be, one,

precedent-setting; and, two, I do think that overall it would give a better start product for NRC and the agreement states but also for the community who is trying to get on licenses and use these modalities as soon as they are approved by FDA for clinical use.

CHAIRMAN CERQUEIRA: Those comments are helpful. I guess from staff or from Dr. Miller, I guess you have heard the Committee say that some of these areas are really beyond the expertise of the membership.

What is your policy on having outside people? Can we solicit them from the professional medical societies? If they are not special government employees, the process of getting them on board can take forever. Can you use them in other ways?

Potential conflicts of interest, we as members of professional medical societies have certain agendas, recommendations. How does that fit into the overall NRC mission?

Tom or Charlie, a lot of stuff there, but somebody weigh in.

MR. ESSIG: Yes. I believe you did have a lot of stuff there in your question. Certainly, as Lynne Fairobent mentioned, the other two advisory committees have the capability of engaging

consultants, for lack of a better term, as they are needed. Of course, I think this Committee would have that same prerogative subject to budget constraints.

The earlier question was, do we have a budget for this kind of thing? I would say my best answer would be the budget is fairly limited. So we would have to choose whoever we needed to engage with in the form of a consultant. We would have to be fairly selective and use it judicially.

But, I mean, we wouldn't, in any event, be talking about a large number of people, perhaps one and maybe two at the outside on any particular topic for a limited amount of time, but we could certainly consider that and review it in light of the budget that we do have for the Committee.

CHAIRMAN CERQUEIRA: And do they have to go through all the security checks and all the other things if they have just a very limited role?

MR. ESSIG: I don't believe so, but we could certainly look into that.

CHAIRMAN CERQUEIRA: Ideally if it is required, it would just be too long a delay.

MR. ESSIG: I understand.

MEMBER McBURNEY: That's all I had to comment on the --

CHAIRMAN CERQUEIRA: So I guess this Committee --

MEMBER McBURNEY: And now that we have heard that we can now actually talk with staff as a subcommittee --

CHAIRMAN CERQUEIRA: And have conference calls.

MEMBER McBURNEY: -- and have conference calls without having to have all of the Federal Register notices and so forth, that in the future, we can move on and --

CHAIRMAN CERQUEIRA: There is no future for you, Ruth.

MEMBER McBURNEY: Right. I know there is no future for me here.

CHAIRMAN CERQUEIRA: So who is going to take over the committee, then?

MEMBER McBURNEY: I don't know.

CHAIRMAN CERQUEIRA: Who is currently on your committee?

MEMBER McBURNEY: Dr. Vetter, Dr. Diamond, and Dr. Williamson.

CHAIRMAN CERQUEIRA: Jeff is on every committee.

MEMBER McBURNEY: That's right. Maybe Dr.

Vetter would.

CHAIRMAN CERQUEIRA: Dr. Vetter, are you volunteering? Again, you have done a great job within all of the restrictions that have been imposed on you, but in order to keep this moving, we probably should have one of the committee members. Jeff?

MEMBER WILLIAMSON: I'll volunteer, yes.

CHAIRMAN CERQUEIRA: Great. And so you have got a limited budget that you need to decide what is appropriate in terms of additional people are required and whatever travel.

DR. MILLER: Yes. I think what we have to work our way through is bringing in consultants requires a formal arrangement, how we go about doing that. Even if you have the budget to do it, there are contractual ways that we have to do that.

MEMBER McBURNEY: It wasn't so much as actually bringing them in for the meeting but to provide information that would help in putting a guidance document together, any technical information needed.

MEMBER WILLIAMSON: For example, in the case of this device, there are at least three groups that have had beta versions of this system and have actually had some experience.

At least one of the individuals involved I know has had extensive experience with crafting QA protocols and would have been a very good person to have had the authorization to evolve in this process reviewing this document or even earlier on kind of helping to craft a minimal set of operating standards that would I think be reasonable in clinical practice and satisfy the needs of the staff to be assured that the device would be used safely.

DR. MILLER: Help me a little bit with that to be more explicit. The kinds of people you are looking for, are they people that work for the vendors or people who are actually users of the devices?

MEMBER WILLIAMSON: Well, this is a difficult situation.

DR. MILLER: Yes.

MEMBER WILLIAMSON: I mean, at least two of the individuals I know that have used this system have some sort of a consultant relationship with the vendor. And so I think they were, at least in some cases, retained by the vendor to either evaluate the system or help draft QA protocols that could be documented and given to the user to help them figure out how to integrate this into their practice.

Nonetheless, they would have a lot of

hands-on experience with this system in thinking about approaches to quality assurance for connecting errors and would understand the weak and strong points of the system, something that is unless you have hands-on experience with the system, it is very difficult to do.

MEMBER McBURNEY: Also, the regulatory jurisdiction for the sealed source and device review that's done would provide some valuable input as well. I think in this case, it was Maryland that did the sealed source and device review on this.

MEMBER WILLIAMSON: And we had access to that.

CHAIRMAN CERQUEIRA: To the State of Maryland?

MEMBER McBURNEY: Right.

CHAIRMAN CERQUEIRA: Okay.

MEMBER WILLIAMSON: Yes. We were given that, too, of the document stream.

CHAIRMAN CERQUEIRA: So from what you are telling me, this is a very limited distribution of equipment. It is very cutting-edge. And so the NRC doesn't have expertise, and there are no neutral people out there who aren't consultants or part of the --

DR. MILLER: That's what I am trying to wrestle with. The conflict of interest issues versus some of the things that we move forward on, for example, with the states are that we developed a number of working groups and steering committees with the states on a variety of issues, where the state employees actually come in and work with NRC working groups in trying to move the ball forward.

To the extent that these experts would be that kind of an employee, we could develop an arrangement. We wouldn't have to bring them on as a consultant. What we would have to do is we probably would --

MEMBER McBURNEY: Because you're probably going to find that some of the states have had to wrestle with this particular device as well in licensing it.

DR. MILLER: Right, right.

MEMBER McBURNEY: Rather than having about five or six states having to come up with licensing guidance as well as the NRC coming up with a licensing guidance separate from that, if they could work together on some of these issues, it would be a lot more resource-efficient.

CHAIRMAN CERQUEIRA: So is the next agenda

item going to address one of these systems?

MEMBER WILLIAMSON: I think so, yes.

CHAIRMAN CERQUEIRA: So maybe we could have that presented and then come back to the system or the format or the mechanism by which we use these outside people.

MEMBER WILLIAMSON: It might help if you give some specific examples of the sorts of things. You know, I found this draft document December 7th, which is the only one until now I have had access to.

CHAIRMAN CERQUEIRA: Okay. So the 130, is that the seedSelectron? No. That is the licensing guidance, which is part of the other agenda item.

MEMBER McBURNEY: Right.

CHAIRMAN CERQUEIRA: Where are we on this agenda? Donna-Beth, are you going to talk about something that would make this more concrete?

MEMBER VETTER: We do have a sheet of paper that was submitted from Nucletron.

CHAIRMAN CERQUEIRA: Right. And then there is the permanent plant low dose for manual brachytherapy sources and devices. This is what you are talking about, Jeff, as being poor quality?

MEMBER WILLIAMSON: An earlier version of this. I have not seen this until today.

CHAIRMAN CERQUEIRA: So you think it has been cleaned up sufficiently?

MEMBER WILLIAMSON: I don't know. I have no idea.

CHAIRMAN CERQUEIRA: But you are unhappy with the original.

MEMBER WILLIAMSON: Certainly I think it would be useful going at least generically through some of the issues raised by this December 7th document.

MEMBER VETTER: Who can apprise us of what this issue here with the Nucletron?

CHAIRMAN CERQUEIRA: The March 1st, 2004 dated letter, Raymond Horn?

MEMBER VETTER: Yes. It is addressed to us. It looks like they are looking for a decision. I don't know if we are supposed to.

CHAIRMAN CERQUEIRA: Again, I am a little confused as to where we go because we have quite a bit of time here. The Nucletron, is this something we could discuss?

DR. HOWE: I was just going to bring you up to date to where we are on the Nucletron seedSelectron and licensing.

CHAIRMAN CERQUEIRA: Okay. So maybe we

could have this. And then, Mr. Horn, we will bring you up after we have had your presentation.

EMERGING TECHNOLOGY SUBCOMMITTEE DISCUSSION ON SEEDSELECTRON LICENSING GUIDANCE

DR. HOWE: We had a TAR from St. Luke's in September. We got it here in headquarters after that. We developed the licensing guidance, which is currently on the Web site. And one should consider that to be a straw man.

It is a living document. And Jeff has pointed out that he hasn't had a chance to review that. It will look very similar to what you had in December, but I did incorporate some of your comments into it.

We recently completed the TAR. We put the licensing guidance up on the Web site. So St. Luke's should be hearing from the region on what it needs to do to complete its application for use of the seedSelectron. And the guidance is out on the Web site for all new licensees to see what we are looking for.

So I think we have addressed some of the issues in Nucletron's memo or letter to you as to what is the status of the St. Luke's application.

CHAIRMAN CERQUEIRA: So St. Luke's is the

first application you have received?

DR. HOWE: Yes.

CHAIRMAN CERQUEIRA: So we really are sort of not prototype, it has been approved, but not really any clinical experience beyond initial testing?

DR. HOWE: We have broad scope licensees, which are under a slightly different set of regulatory framework. They can use emerging technologies because their radiation safety committee under 10 CFR Part 33 are allowed to do a radiation safety evaluation. So they can use these technologies with a limited specific medical use licensee.

So St. Luke's is the first medical-specific licensee. We had to develop a guidance for them to use it.

CHAIRMAN CERQUEIRA: Right. How many of these other broad license institutions have had systems in place where they have had experience?

DR. HOWE: The manufacturer would have to answer that question because we don't normally get involved in licensing unless they are exceeding a certain limit on the amount of activity they have.

CHAIRMAN CERQUEIRA: Okay. Well, when he comes up, we will ask him then.

MEMBER NAG: Donna, can we use this system

or have we under the broad license? You have the experience to comment. We can call them. Are we allowed to call them up and ask about the problem and so forth, number one? For that, I don't think it would require any budget. We are just calling them up and asking for their advice.

And, number two, maybe we can ask them to be a consultant and give us a brief update in one of the future meetings. Would something like that be allowed?

CHAIRMAN CERQUEIRA: Tom?

DR. MILLER: I think certainly if it is a vendor, usually my experience has been if vendors are invited to make presentations to the NRC, usually they are more than willing to come in and do that.

That wouldn't be a cost to the NRC. They usually do that as an opportunity. If the NRC better understands what it is that they have got, then that is to their benefit.

So certainly that is not a problem. In other words, if someone is willing to come in and make a presentation to the Committee on the layers and what they have, we can certainly get that on the agenda provided that the vendor is willing to come in and do that.

MEMBER NAG: But the users who are using under the broad scope license.

DR. MILLER: Now, the question there is the same. Are they willing to come in and do that?

MEMBER NAG: Who is going to pay them?

CHAIRMAN CERQUEIRA: Right. And if they are sponsored by the vendor, would that be acceptable? I am sure the vendors --

MEMBER NAG: But then you really want someone neutral. Now, the moment someone sponsors them, they are no longer neutral.

DR. MILLER: Right. That is something I would have to look into.

MR. ESSIG: Just one point on that. We do have a mechanism called invitational travel, where we could on a limited number of instances invite folks that the Committee felt would make a useful presentation. It is when we start compensating them for their time here.

Assuming their employee is willing to pick up the time that they would spend away from the office as part of their normal workday and all we had to do was pick up invitational travel, that would be fairly straightforward. It is when we enter into these agreements to pick up to compensate them for their

time and their travel that it gets a little more complicated and we have to look at these consultant arrangements and that sort of thing.

MEMBER NAG: I think most of the time you should be able to invite them to travel. Most scientific people are by the universities. If they have broad scope licensees, it means they are usually at big universities.

Part of the responsibility of the university is for their doctors to advise the NRC and other federal agencies. So not only are the compensated for the time, but most universities will let them off.

CHAIRMAN CERQUEIRA: Ralph?

MEMBER LIETO: I'm a little confused as to what we are supposed to be addressing on this specific agenda item. Are we supposed to be answering a question from the vendor in response to this letter we received this morning or are we supposed to be addressing some specific licensing guidance that addresses this device?

CHAIRMAN CERQUEIRA: Well, I think it is the Emerging Technologies Subcommittee. And we have identified some hurdles in the Committee, getting things done that there are some devices emerging that

we don't have expertise within the Committee. And is there some way that we can get it?

We are trying to work out a mechanism for doing that. I think as part of that, we are going to get a presentation on this particular device.

The letter is brand new. Ruth?

MEMBER McBURNEY: The original agenda item was going to be the report of the subcommittee.

CHAIRMAN CERQUEIRA: Right.

MEMBER McBURNEY: And Donna-Beth is just here to give staff input on what has been done so far. It is not a total presentation.

CHAIRMAN CERQUEIRA: Right.

MEMBER McBURNEY: Basically the subcommittee has reviewed it. Several of the members had specific comments. And just from initial looking at the new document, -- this is the first time I have seen it -- they have addressed some of the specific comments that some of the subcommittee members had.

Dr. Williamson also had some concerns and had some technical questions about the device itself and the appropriateness of some of the licensing requirements. In order to gain information on the devise, Dr. Williamson arranged for a demonstration and a discussion with the manufacturer

representatives.

I listened in by teleconference to some of that demonstration, although I wasn't there to actually see it. So he can give a summary of what went on at that demonstration and any information that would be useful to the guidance that was gained out of that. And then we can talk about what next steps the subcommittee needs to take.

CHAIRMAN CERQUEIRA: Okay. So, Jeff, are you going to do that?

MEMBER WILLIAMSON: Yes. I guess I will go over two things, two issues mainly. As Ruth mentioned, we had I think a very productive meeting with the vendor and got a lot more technical detail on how the device operates.

I did receive some preprints of papers that are under review by a journal documenting the experience of one of the Nucletron contractors, who did a field evaluation of the device. So there is a lot more information now to sift through.

I think based on my interaction, actually seeing the system and talking with the vendor, I do have some detailed proposals for positional accuracy testing that we could either go over as a subcommittee or I could submit directly to Donna-Beth for possible

inclusion.

So that was very good. I think it was very difficult to arrange this, and there was a lot of confusion about with whom we could talk and whether we could talk with each other that hindered our operation. I think now that the way is cleared for us to have teleconference meetings as needed and to basically at least talk with outsiders on behalf of the subcommittee to solicit their views.

I think we can productively go over the new draft, make detailed comments, I would hope, and have something to Donna-Beth and other interested staff within probably I hope six weeks.

I would like to, in addition, go over a few of the general issues raised by the earlier draft. I don't know whether Donna-Beth's current draft has addressed them or not.

CHAIRMAN CERQUEIRA: Why don't you go over those items?

MEMBER WILLIAMSON: Some of these are somewhat detailed in nature, technical in nature, but I will go through.

You know, if one thinks in broad terms about how this device works, it is basically an enhancement of manual brachytherapy. The primary

method by which sources are delivered accurately is the positioning of the needles via the template into the patient. This new device used alone does not change that at all but is the same manual technique for inserting the needles, same kind of template, the same kind of clinician skills.

So I think in broad terms, one needs to really ask, what is different, what is added to the procedure by using this new device, and what is the same.

A lot of this is still really manual brachytherapy. And I think the rules that currently govern manual brachytherapy should be the ones that are adopted.

There are concerns that the rules of manual brachytherapy are inadequate for manual brachytherapy. This is not the place to bring up fixes to those rules. That needs to be done in another discussion and a rulemaking initiative made.

So this was one of the problems, that a whole bunch of restrictions were proposed in this licensing guidance that would burden users of this device to basically fix things I think that the staff is concerned about in general with manual brachytherapy.

A good example is a proposal for modifying the written directive. The staff has raised concerns in the past that the written directive as currently defined may not be adequate or permanent seed implants. That may be. That needs to be a separate discussion. There shouldn't be fixes put in this specialized guidance for problems like that.

DR. HOWE: Jeff, I took that out because I felt that was better in rulemaking space.

MEMBER WILLIAMSON: Right. Okay.

CHAIRMAN CERQUEIRA: So your criticism worked.

MEMBER WILLIAMSON: Yes. So there were a number of other things. Another cluster of issues had to do with verifying the seed location. Okay? The basic proposal in here was there were a lot of restrictions on testing the ultrasound device to make sure it could see seeds, individualized needle tips, and so forth.

Well, taking the two cases separately, since needles are placed manually in this system anyway, why does using the seedSelectron mandate special precautions to verify needle positions than any other manual brachytherapy permanent implant using needles? That part is really the same.

Certainly if you are using the treatment planning system to help guide those needles, special testing might be needed. But this document was to allow for both stand-alone use of the Selectron as well as using it in conjunction with the vendors' FIRST treatment planning system. So that is another example, I think, of trying to impose special requirements.

CHAIRMAN CERQUEIRA: So, Donna-Beth, why was that imposed?

DR. HOWE: It ends up we put those under the licensee's program for assuring that the written directive is that the administration's in course with the written directive. So this is the old quality management part of the rule.

Those procedures are not required. Certain requirements are in the regulations. What I put in here was in the notes to the licensee. It was essentially, we believe, a lot to consider the following things.

We tried to make it clear they were not requirements. Nor were they required to submit anything to NRC, but we are just pointing out problems that we have seen in the past with brachytherapy source delivery for this type of use. So it is

voluntary, and it probably needs to be over in the manual brachytherapy consideration.

MEMBER WILLIAMSON: Yes, it does. This is sort of what is so confusing is that there is a concern with manual brachytherapy in general. Then maybe an information notice should be sent out or a special rulemaking or guidance initiative started that is broader.

But to sort of put all of that stuff in here I think is going to mislead and confuse consumers of this device and I think create at least the impression among Nucletron's customers that they are buying a great big regulatory headache. They get this system. So I truly think this should be very specialized and focused.

CHAIRMAN CERQUEIRA: It's not required. It is suggested, which means it has no teeth. Now, Ralph, are you going to clarify this for us?

MEMBER LIETO: Well, actually, I am kind of jumping on Jeff's bandwagon here. I think that if you put it in as a quality management requirement, -- "requirement" is not the right word here -- every licensee is going to look at that as being every time they do one of these cases, they have got to follow that. And every deviation from that has got to be

documented and followed out.

I guess my question was going to go back to Dr. Nag and Jeff. Is that part of the quality management programs for manual brachytherapy seed implants in general that you have all of these requirements for the ultrasound equipment?

MEMBER NAG: Right. I mean, we do make sure that the ultrasound is working properly, but we don't have a series of UMP that doubles the ultrasound. We do make sure that however many millimeters off and so on, we catch those.

I think I will use this to make a comment. When we had this presentation at the last meeting in November, the licensing document was going to be ordering the 600 rule within the R-1. And I had make it quite clear that this system is a low-dose rate system and that what the guidance should be is mostly ordering the low-dose rate manual brachytherapy with some added provision that this being remotely controlled had the QA part for the remote after-loader.

I think that has been done from the very quick look that I have seen of this document. I have not gone into detail. Basically, the low-dost rate manual brachytherapy with the difference being instead

of the person manually pushing the seed in, having a robotic system manually pushing the seed in. So it is not a huge difference.

CHAIRMAN CERQUEIRA: What do you say to that, Mary-Beth? I mean, it sounds logical.

DR. HOWE: I think that is what I tried to do in this document. I have essentially three parts on where they have to provide additional information. The first is that you will abide by the manual brachytherapy considerations in the following parts because they are a little more appropriate.

And then it is an after-loader. So I identified very specific parts of after-loaders that this device needs to follow.

And then I had a third category where it really is in between the two. And then in some cases, it was following the after-loader. The after-loader was in such detail for all high-dose after-loaders that you really couldn't say, "I want you to follow A-1 but not C-3." So I just rewrote it to fit this particular device.

So I think it fits the device while Jeff is concerned on the voluntary program on how to assure that you are doing what you are doing. We tried to write that so that people understand it is voluntary,

we think you ought to consider these, you do not have to have these procedures, you do not have to submit them to the NRC.

MEMBER NAG: I think that portion applies to manual brachytherapy. And that should not be put under this. This is a special requirement for the after-loaded.

I mean, there are some problems with permanent seed implant, manual permanent seed implant. You cannot fix those by just writing it in a part of this document. You are confusing the issue.

CHAIRMAN CERQUEIRA: So you don't see the automated system being any different than manual brachytherapy. And so you understand what she is saying, but you don't feel that this is the right place for it to be. Is that correct?

MEMBER NAG: Right. I do agree with many of the things put in there, but this is not the place to put it in.

CHAIRMAN CERQUEIRA: Is this the practice of medicine, rather than radiation safety, though?

MEMBER NAG: No. This is how do you prescribe permanent seed implant? Okay? If you take a certain dose, that dose varies by more than 20 percent. We all know it.

Now, that will be true for this. It will also be true for the manual brachytherapy. That is an entirely different thing we have to fix but not here.

CHAIRMAN CERQUEIRA: So, Donna-Beth, are you willing to take it out?

DR. HOWE: I do believe for the first system, since that is directly computer-related from the visual output on the ultrasound into the seedSelectron other part of it, that we think you ought to consider the part on the ultrasound is quite appropriate because there is a direct link in.

But we aren't saying what it is you have to have. We are just saying we think you need to think about these things.

CHAIRMAN CERQUEIRA: Now, Jeff, what is wrong with asking people to think about things and not have to do it?

MEMBER WILLIAMSON: Well, let me defer your question until I can finish my comments on this part.

CHAIRMAN CERQUEIRA: Okay. I took a lot of time. I apologize. I am a little confused.

MEMBER WILLIAMSON: The SPOT system is a specialized treatment planning system the vendor sells that is much more highly integrated than the range of

other systems, both imaging and treatment planning, that users could use with the seedSelectron in the stand-alone mode.

So I think with the fully integrated FIRST system, the SPOT plus seedSelectron, I think many of the suggestions are very good ones. If you use a conventional ultrasound imaging system and a different vendor's treatment planning platform, then, really, this requirement can be met. Okay?

There are really standard systems. You can see needle tips and use that in a qualitative way to make sure needles are where they are supposed to be. There is no quantitative way you can measure needle locations.

The requirement about visualizing seeds is I think impossible to meet for any currently marketed ultrasound system. Quantitative localization of seeds is an active area of research. And a robust solution has not been advanced to the market to date. So I think it is quite inappropriate to put that in.

It may be that fluoroimaging can help you get a quantitative/qualitative feel if you have got the seeds in the correct location, but ultrasound isn't there yet. It is a very difficult research problem.

What I am now to address, your question, why is it bad to put things in here? Like Dr. Nag said, I think it's the wrong vendor. Really, the concern is with all of manual brachytherapy or at least permanent seed, image-guided permanent seed, implants.

And so to put this all in here I think certainly gives the impression that because you are buying the seedSelectron, even though it says it is voluntary, I think the community will perceive that they are going to get big regulatory headaches and it might be better to stay with manual brachytherapy and not have to raise the question about following these things.

So my advice would be keep it very limited to what this new system does. What is essential for this new system in a stand-alone mode is to make sure that there is a reasonable protocol quarterly and daily QA to make sure that it gets the seeds in the right place in the needle, that when you have the machine automatically retract the needle, you have reasonable expectation that it is accurate. That is what is appropriate I think for you to focus on in this regulatory guidance.

If there are broader concerns about how

permanent seed implants are done, I think then a broader communication, an information notice or something, where the domain is less specific and doesn't single out some particular vendor's product, I actually think this is a very nice product and you could inadvertently discourage people from using a system which in the end might actually eliminate some errors and improve radiation safety.

A last comment I will make is in high-dose rate brachytherapy, what is contained in AAPM guidance and echoed in 35.600 is a series of up-front tests you do on an annual, quarterly, and daily basis, which give the operator reasonable assurance that the source goals retell it to go.

There is no provision in anybody's guidance that says you have to have a dynamic method of verifying that each individual dwell position is actually where it is. You have a reasonable set of quality assurance tests that give you confidence that the source is behaving as you have programmed it.

Then you go ahead and treat the patient. And you are making I guess an inductive generalization that if it worked in your QA test setting, it is going to work in the patient. I don't think there is any reason to depart from that paradigm in writing

guidance for this.

CHAIRMAN CERQUEIRA: So, Dr. Howe, you have been nodding yes throughout all of this. Does this mean you accept it and you think these are appropriate changes?

DR. HOWE: Yes, I think we can work together and make changes to it. I think Jeff commented in the earlier comments that you couldn't see the seeds. So I took out a lot of that and just said, "Visualize the needle in the initial seed position" to make it simpler, but I can go beyond that. So I think I can work with Jeff.

CHAIRMAN CERQUEIRA: Again, Jeff has not had a chance to really look at this.

MEMBER WILLIAMSON: Yes. I haven't.

CHAIRMAN CERQUEIRA: So, again, it would be good if we could get it ahead of time. I realize that these meetings occur very frequently.

So where is the disagreement, then? What am I missing here?

DR. HOWE: I think our concern is this is a straw man. And I expect comments, and I expect comments back. It is a living document. So we will work on --

CHAIRMAN CERQUEIRA: So this is part of

the procedure?

DR. HOWE: This is part of the process.

CHAIRMAN CERQUEIRA: Dr. Nag, Ralph, and then --

MEMBER NAG: Yes. The other thing I suggest is that we have to decouple the seed from the after-loader because everything is put here with this seed with that after-loader. I can very easily visualize that any seed would be used because --

MEMBER WILLIAMSON: No. Both the FDA and I think the SSDR guidance are very clear that this system can only be used with that particular seed in pre-loaded cassettes.

DR. HOWE: And this seed has only been approved with this device. So it goes both ways.

MEMBER NAG: Right. But I am saying when you are making guidance, you should make a guidance for an overall system component, like that with the model. Unless the manufacturer makes similar seed, like the Isotron seed, they make palladium seed using very similar remote after-loading, you don't want to have to make a whole set of rules just because that seed is a different company's seed, though everything else is the same.

So I think that whenever you are making

rules like that, make it for the low-dose rate permanent after-loading system, rather than just for that one company's needs. It will save you a lot of headache later on because otherwise the specific radiation safety question would then remain the same. It doesn't matter whether the seed is made by company A, B, or C.

CHAIRMAN CERQUEIRA: So saving headaches for the user as well as the NRC would be worthwhile.

Ralph, you had a comment?

MEMBER LIETO: I guess I wanted to ask a question. If we agreed that this should be placed under the manual brachytherapy rules, what problems, if any, would arise from a radiation standpoint; in other words, if we need to take this out of this 1,000 category, where it is being dealt with right now, because it sounds like everything really just applies to manual brachytherapy here.

DR. HOWE: No.

MEMBER WILLIAMSON: No. I don't think even I agree.

DR. HOWE: The remote after-loader component is a very important part of how this device works. You need to address it, but it is nowhere near the restrictions that HDR would have for a

conventional low-dose remote after-loader has. So it doesn't fit in the 600 because you have to grant many, many exemptions to 600.

CHAIRMAN CERQUEIRA: So I think everybody wants to keep it in a 1,000 category.

MEMBER WILLIAMSON: Maybe it eventually could be incorporated into 35.600, but it would have to be a new section.

DR. HOWE: Rulemaking.

CHAIRMAN CERQUEIRA: Rulemaking. So you have got the straw man, and you are going to get input. You are getting it from us, and then you will get it from the community. And it will be a process like everything else.

DR. HOWE: Yes.

CHAIRMAN CERQUEIRA: Yes?

MEMBER WILLIAMSON: Well, I would like to understand what our charge is for the next few weeks. Do you want us to undertake the detailed review of the existing version of the document and get back to you with our views?

DR. HOWE: I would like that.

MEMBER WILLIAMSON: And if that is the desire of the staff, I will make sure we have a meeting and do that.

CHAIRMAN CERQUEIRA: Of your subcommittee of three people now?

MEMBER WILLIAMSON: Yes.

CHAIRMAN CERQUEIRA: I guess we can keep Ruth on.

MEMBER McBURNEY: Yes.

CHAIRMAN CERQUEIRA: Right.

MEMBER WILLIAMSON: So who are the members now?

MEMBER NAG: I would remember assuming I was.

CHAIRMAN CERQUEIRA: Does somebody have a list of that subcommittee? Angela?

MS. WILLIAMSON: I can find out.

CHAIRMAN CERQUEIRA: Maybe what we could do is ask Dr. Malmud to do this. If we could sort of define a charge of these committees? Sometimes we have a general idea, but if we could just have a written charge, it probably would be worthwhile.

All right. So I am still a little lost now. We have a letter that is dated March 1st, which was distributed, which none of the Committee members have read.

And we have the industry representatives here. Do we need their input in any way or have we --

MEMBER WILLIAMSON: I think we should ask them, in light of these recent deliberations, what concerns they have.

CHAIRMAN CERQUEIRA: That sounds appropriate. Raymond Horn, if you could come forward and introduce yourself, your position?

MR. HORN: Thank you.

I am Raymond Horn from Nucletron Corporation. I am the Director of Clinical Affairs. We are, of course, the manufacturer of the seedSelectron.

So with me today is Jack Coats, who is the President of Nucletron Corporation; Lisa Dimmick, the Director of Regulatory Affairs for Nucletron Corporation.

I invited and did not pay for Jim Goetz, who is the Director at St. Luke's Cancer Center, who has the pending application, to join us. And also are invited as well Howard Griffith, Ph.D., who is Chief of Radiation Oncology Physics at the George Washington University here in the District and, it should be noted, is operating under a temporary license for the use of this equipment. So there is some precedent in granting a temporary license.

In answer to your earlier question, there

are three broad scope licensees that have approval to use the device. There are four agreement state licensees that now have approval to use the device. And there is one large Canadian customer at Tom Baker and another one that is pending, Health Canada, approval as well for this.

So there are a number of users that are using this device. This situation with St. Luke's is that they are not a broad scope license and are in an NRC state.

CHAIRMAN CERQUEIRA: Can you give me how many patients have been treated at those eight centers that you mentioned in the U.S. and Canada approximately?

MR. HORN: About 80.

CHAIRMAN CERQUEIRA: Eight?

MR. HORN: About 80 so far.

CHAIRMAN CERQUEIRA: And how many total done ever with the system? Eighty?

MR. HORN: A few hundred, I think, worldwide. It is still --

CHAIRMAN CERQUEIRA: So we are really talking about a limited clinical experience?

MR. HORN: That's correct. I also would point out there still seems to be some

misunderstanding that this system, as we claim it, offers better tools.

But there really is no true feedback integration with the ultrasound. It provides visual QA, and it provides data input for treatment planning. There is no, as Jeff Williamson put it, dynamic feedback that takes place with the ultrasound system.

I do want to read a few portions from the letter that I submitted and then make some comment. Certainly Nucletron Corporation, would like to thank the staff of NRC for scheduling the time during this meeting to address the licensing guidance of the seedSelectron.

I would say that I certainly am enheartened to hear the discussion about the guidance and how it will shape up. I would say, though, that we feel strongly that the specific guidance for seedSelectron that is pending be considered. I would say even more so after the discussion that we just heard.

There is an amendment that was submitted. I know from speaking with Mr. Goetz this morning that they have revised amendment based on the information that they have. It is unclear whether it is the most recently posted guidance that Dr. Howe mentioned.

I think you are well-aware that in the last meeting in November, there was a discussion that there was a pending license amendment. This has been on hold. Dr. Goetz will speak a little bit about the impact to St. Luke's of weighting the process, this amendment. It has really been quite some time.

So, really, I think what we are asking is until the guidance is finalized, that you would accept the submittal of this guidance and begin to process it to the best guidance that exists so that it does not wait for finalizations to take quite some time. And I think that they are prepared to modify their amendment in the future should the guidance be different from what the current situation is.

I also will point out that the article that has been discussed and submitted to *Medical Physics* is under review, but it does try to ascertain that the seedSelectron meets the manufacturer's specifications.

It does try to ascertain all of the various AAPM task group recommendations on brachytherapy, how the system can be used to meet those recommendations, and it also includes some QA, both daily and quarterly checks as used at the Tom Baker Cancer Center, where they have done the most

patients in North America and have spent quite some time in evaluating the system.

I think the point is also to just follow up on statements made. It would seem to be in the best interest of the community to be able to reference professional society recommendations for QA and safety, rather than to create some kind of new requirements that parallel it.

So I guess, once again, we would recommend. And so we would ask the panel the answer to the question, "What are we asking for?" We would ask that the panel recommend to the NRC to process the amendment from St. Luke's and not wait until the guidance is finalized.

Again, for the purpose, we are hardened by the discussion that the NRC would limit the scope of the guidance to requirements that are basically found in either the high-dose or low-dose requirements and some combination that is deemed appropriate and to follow recommendations by AAPM and other professional societies.

So I hope that that sort of answered the question about what does the manufacturer feel about it. I would ask that you entertain the comment from St. Luke's since they are here as well, perhaps from

George Washington University if it is necessary.

CHAIRMAN CERQUEIRA: Jeff?

MEMBER WILLIAMSON: Just a comment. I think AAPM guidance is somewhat in the same boat as 35.600. It really wasn't written with this particular system and application in mind. It does require a certain amount of thought and consideration, how to best adapt it to cover this device. It is far more restrictive, I think, that it need be for the particular system.

MR. HORN: Well, I appreciate it. We had a very good discussion with myself and someone else from Nucletron, a technical expert. I think it is possible to suggest how the system could meet the various task group recommendations. It has a fair number of built-in safety and QA features that I think help it meet these recommendations.

CHAIRMAN CERQUEIRA: Other questions? Dr. Goetz?

DR. GOETZ: Good afternoon. My name is James Goetz. I am the Director of the Cancer Center in St. Luke's Hospital. Thank you for letting me speak today.

First of all, I believe you posted the guidelines on Friday. We did download them. I do

have an amended application for the 35.1000 that I certainly would like to give someone here today. I certainly would like to hand in my amended application if I could.

In addition to that, I have letters from the Medical Director, from the Chief of Radiation Oncology stating that there is a demonstrable community need for the prostate seed program.

We started this venture well over a year ago. We submitted amendments to our license in June or July of last year and are still awaiting an outcome.

Finally, I would like to just read a very brief letter from our urologist. His name is Dr. Mayer, and he came from the University of Pittsburgh, where they have a very large prostate brachytherapy program. He understands the needs, and he states, "I am writing on behalf of all clinically active urologists within the St. Luke's Hospital system. We are seeking your assistance in approving the NRC application for Nucletron, the brachytherapy system at our institution.

"We take pride in the fact that the treatment options for prostate cancer offered at our institution rival that of major metropolitan areas and

including modalities such as intensity-modulated radiotherapy and laparoscopic Da Vinci robotic-assisted prostatectomies.

"As you are aware, one of the mainstays for prostate cancer treatment in brachytherapy which I have been working aggressively with within the Radiation Oncology Department is to develop a program that will also offer the latest in the technological advances.

"Within the last six months, our group has had to refer upwards of 15 individuals to outside locations, sometimes one and a half to two hours away for definitive brachytherapy. This is an inconvenience and potentially affects the quality of our patient care.

"We are specifically seeking approval of the Nucletron FIRST system because this represents the next generation in brachytherapy administration. Its unique abilities allow for a lot of time, 3-D dimensional planning, and interoperative adaptations from any changes that may have occurred with no further radiation exposure to the operative staff. We feel also that the longer-term outcomes in terms of prostate cancer controlled with this technique may be superior to those previously in existence."

So, with that, I would like to hand the three letters in also and ask you to please consider our application again. Thank you for your time.

CHAIRMAN CERQUEIRA: Thank you very much. Unfortunately, this Committee does not make those kinds of decisions, but I am sure that the NRC staff will be happy to take the material.

Dr. Nag?

MEMBER NAG: No. I think our role as the ACMUI is to advise the NRC, help the NRC to do what they want. But from my viewpoint as a clinician, I would like to make sure that all of the guidelines for manual low-dose rate brachytherapy seed are followed with the additional proviso that the after-loader array is such that the tip of the after-loader will reach the needle tip.

So I think once we have accomplished that, while we are waiting for a permanent guidance document to be made, can we have a temporary licensing done and that can be modified as needed?

I think in terms of medical necessity, there are many patients with prostate cancer that need implants. They can be implanted by any system, even the Nucletron system, without the after-loader component. In terms of trying to get temporary

licensing, we want both of these, the safety of the immunity would be maintained.

CHAIRMAN CERQUEIRA: Jeff, is that your recommendation? I think it is reasonable that the application of the licensee should be looked at and the major focus should be, do they comply with those restrictions that need to be added to 35.400 relative to reasonably assuring themselves that the remote after-loader is capable of the spatial positioning that they assume?

MEMBER NAG: Yes, that's all we need.

MEMBER WILLIAMSON: I think it is as Subir mentioned. It is essentially making sure under certain conditions that the layer goes to the tip of the needle when it is supposed to, and it sorts out the program pattern of seeds and spacers that you ask it to.

There are I think a number of tests that would be reasonable to expect the licensee to do that go beyond 35.400 to assure that that is the case. Beyond that, I don't think there is much else that is critical in the application.

CHAIRMAN CERQUEIRA: Now, Dick, would the Mayo Clinic buy one of these? Would they have like 80 patients in the U.S.? And do have you any concerns

about radiation safety issues with using this device?

MEMBER VETTER: I don't know whether radiation oncology there is examining. We do not have one of these. Now, I don't know if they are looking at it or not. They do a large number of patients. It is very possible they would in the future. I haven't read anything here that is of a radiation safety concern to me.

CHAIRMAN CERQUEIRA: Go ahead.

MEMBER NAG: The reason for going into the remote after-loader was to reduce the radiation exposure. Now, that is one of the major reasons.

MEMBER WILLIAMSON: One of them.

MEMBER NAG: One of the major reasons. Now, we know that or think that iridium and high-energy isotopes because that is a lot of radiation exposure. With iodine, irradiation exposure is low and that high necessity of reducing the radiation exposure is not there.

CHAIRMAN CERQUEIRA: Dick?

MEMBER VETTER: The radiation exposure is from the fluoroscopy.

CHAIRMAN CERQUEIRA: Ralph, would this be a problem at St. John's?

MEMBER LIETO: I would say no. It is more

an issue of practice here than --

CHAIRMAN CERQUEIRA: Than radiation safety, yes.

MEMBER LIETO: Than radiation safety.

CHAIRMAN CERQUEIRA: Ruth, do the states have any problems with putting these in?

MEMBER McBURNEY: I think that just having some clear-cut guidance would be a little more issue with the states on where it fits in with the rules. And with this being a dynamic document, I think that if one come in out of state, we would look at how it fit in with the regulations and then do guidance on where the differences were.

I think that NRC could go ahead and use the guidance that they have developed to process this application and as it is further developed and refined to process any other applications.

CHAIRMAN CERQUEIRA: Okay. Ralph, last comment? And then we are going to move on.

MEMBER LIETO: I was just going to make sort of maybe, I guess, a summary statement here to be sure I understand things that basically what we are suggesting is that the applicants would have to meet the low-dose rate requirements in addition to certain QA, quality control, steps for positioning of the

sources because I think whatever we decide on obviously is going to be the precedent for any other licensee that is going to be applying to use this also.

So I don't think we are just doing it for one. I think there is an urgent, a clinical urgency, being expressed by one specific licensee, but I think we need to understand that what we are doing is also making I think recommendations to the staff that would apply to any of the sites or states.

CHAIRMAN CERQUEIRA: Right. And Jeff's committee will continue to work on this to come up with a protocol.

MEMBER WILLIAMSON: Is this at the moment Jeff's committee or still Ruth's comment until October 1st?

CHAIRMAN CERQUEIRA: Well, it's Ruth's committee. This is her last meeting.

MEMBER WILLIAMSON: But we could share it through October.

MEMBER McBURNEY: Or until the subcommittee's work is done.

DR. HOWE: Dr. Cerqueira, I think there is a little bit of confusion. We do have the guidance document up on the Web site.

CHAIRMAN CERQUEIRA: Friday, I guess, it went up.

DR. HOWE: So any NRC licensees can use that guidance and submit an application.

CHAIRMAN CERQUEIRA: And they have then modified it.

DR. HOWE: And they have done that. So it applies to everybody. We do have a provision in there that if we change our guidance and they apply for this authorization, they can make changes to their radiation safety program for this device without coming in to the NRC for an amendment.

So I think we have the flexibility when it is issued that if we amend it, we change the requirements so that they are different. Then they can go ahead without having to come in with an amendment.

So I think that we are set for licensing any seedSelectron coming in.

MEMBER WILLIAMSON: Suppose, based on our deliberations, you decide that in some key respect, that the licensing guidance has to be more restrictive than the one currently on the Web site. Then are our licensees obligated to modify their procedures to follow the more restrictive condition?

DR. HOWE: Generally our process is that you are required to meet what was current at the time. If we get more restrictive and we think that really is important for everybody, we would probably have to use a different mechanism.

CHAIRMAN CERQUEIRA: Good. Well, I would like to thank Dr. Goetz and Mr. Horn for bringing us this information. I think the Committee will continue their work and under the new liberalized guidelines for conference calls.

I guess the next item before the break is "Removing Modalities Out of Part 35.1000," Dr. Mary-Beth Howe. Dr. Howe?

DR. HOWE: Let me see if I can find my slides.

REMOVING MODALITIES OUT OF PART 35.1000

DR. HOWE: The big question many people have is we have got some devices now over in 35.1000 and what has to happen in order for us to move things out of 35.1000. So this talk is going to be global in nature. Basically it is talking about when is it right, when is the time right.

The time can't be measured in days, months, or years. You have to measure it in something different. What we are pointing out here is that in

order to move modalities out of 35.1000, you must do rulemaking. There are no other options.

There are two methods of getting to rulemaking. One would be the staff initiates rulemaking. And the second would be that stakeholders initiate rulemaking through a 2.802 rulemaking petition.

So right now we are wrestling with, "When is it right?" And part of when it is right is the question of when is rulemaking cost-effective. Do we have enough licensees seeking to use the technology that that justifies going into the rulemaking expense?

We could have a very elegant emerging technology that only a handful of licensees in the country will need. And once we have licensed those, then the licensing guidance may be sufficient for them. And we would not need to go through the additional expense for doing rulemaking with such a small group of licensees. They would have the ability to use the device.

We have other devices which can be used pretty widely. And if they are used widely, then there is a significant need to move those out of 35.1000.

The other thing is that rulemaking changes

need to be clear and fairly well-established. I can realize the Web site guidance very easily. I can get a consensus from the ACMUI, from the stakeholders, from licensees. They can come up. And we can look into how to modify the guidance. We can take it through our management chain of command, our Office of the General Counsel, and make that revision on the Web site. But if it is in rulemaking space and we need to make a change, we have got to go through rulemaking. So it is a lot more difficult to correct these things, especially on technologies that don't have wide use yet.

It also makes a difference on the degree of revision. Some of these technologies almost exactly fit into one of our subsections in part 35. And it would take maybe a little bit of tweaking of the rule to make that technology fit. That would be a good candidate for going into rulemaking.

Others, like the seedSelectron, may actually require another set in and of themselves because they are significantly different from both things that they are doing, that you would have to come up with its own set of criteria.

So to expand upon the idea that rulemaking changes are clear and established, one is the

technology is not really new anymore. There is enough experience out there. Both stakeholders and the NRC have experience with the technology so that we all understand how to regulate because we are only involved in the regulation of it.

The community is involved in its medical use and the practice of medicine issues, which we are not involved with. We are just involved in the regulation.

And the guidance is stabilized. It is at the point where we think we know how to regulate it. We aren't going to be making many changes to it. So it makes sense to now codify them in the regulations.

So what kind of experience are we looking for? We are looking for licensing experience. We have issued enough of these that we know how to license them. We have inspection experience. We have gone out and inspected facilities that have these new devices and technologies so that we understand how they are being used. We understand the problems that they are dealing with.

We have medical use experience. So we have enough physicians out there. And we also have medical event experience because the medical event experience really points out some of the areas that

everybody in their best thinking when they developed the product had no concept this could be a problem area.

Sometimes we have one problem area or a one-time event. Sometimes it points out maybe a weakness in the device or a weakness in how the user should use it. So we need experience in all of these categories so that we have confidence that we are ready to go into rulemaking space.

In inspection experience, one of the things that we did recently was we developed a new program code. Our program code is tied into inspection frequency. Our program code is for therapy-emerging technologies. And only those devices that we think need to go into that program code will go into the program code. So not all emerging technologies will fit that category.

If we think we have got an emerging technology that is in the program code and we have found through our inspection experience that we really don't need to inspect it as frequently, we will pull it out of the program code. Right now we have got the gliacyte. We have got the Yttrium-90 microspheres. We have the IVB devices in that program code.

What does it mean when you are in the

program code? It means that it is inspected every 2 years and that there is initial inspection within 12 months of the license being issued for that device. So we get more feedback early on within the technologies.

And, as I said, it is a dynamic program code where if we find that we are not having any problems at all with a certain technology, we may pull it out of that program code and then let the facility be inspected according to its normal facility inspection. So it is a dynamic process.

This is kind of a reiteration of what I said earlier, but the guidance is stabilized because it is so much easier for us to modify the Web site guidance. Examples of that are we have two Yttrium-90 microsphere devices.

One of the device manufacturers uses actually stasis. Actually, it ends up being the most important endpoint for when you deliver all of the microspheres that you are going to deliver. They use fluoroscopy, and they use dyes to monitor whether there is any backflow from the liver.

As soon as they start to see the dye not going through the liver, they consider that all of the active sites where the beads could into are filled and

that's at the point at which you should stop the procedure.

So we have modified the Yttrium-90 microsphere up on the Web site so that you can use stasis in your written directive as an endpoint because there is no desire for anybody to have more microspheres poured in just because a certain dose was supposed to be delivered when stasis essentially says the microspheres are no longer going into the right location. So we were able to make that modification fairly quickly.

Rulemaking changes are much slower. Many of you have been involved with rulemaking. It can go on for two to three years, sometimes four to five years depending on how major it is.

So we are trying to get as many of these important concepts and ideas into the Web site guidance as we can so that we are really pretty stable before we go forward with the rulemaking. And, as I mentioned earlier, some of these things are going to be minor revisions, some of them being larger revisions. It will take longer.

What do we have now for emerging technologies? We have go liquid brachytherapy sources. The liquid brachytherapy source that we have

right now is the gliacyte. That might involve minor changes to manual brachytherapy to be able to incorporate liquid brachytherapy.

We have microsphere brachytherapy sources. That one almost fits into manual brachytherapy without a lot of changes. That might be a good candidate.

We have beta high-dose remote after-loaders. We actually have two different kinds of beta high-dose remote after-loaders. One is the conventional high-dose remote after-loader, where you have got the beta source on a wire with direct connection to the machine in the distance.

The other is a hydraulic one, where you have less of a connection. That is a possibility for looking at rulemaking. And then we have the new one, the permanent implant low-dose remote after-loaders, which may be a more complicated rulemaking just because it fits in between two device categories, where the others may fit closer to one.

MEMBER NAG: Donna? In many places, you have low-dose rate after. That is not a low dose. That dose is very high. It is very confusing.

DR. HOWE: Point well-taken.

CHAIRMAN CERQUEIRA: Dick?

MEMBER VETTER: That’s a very nice

summary. With all of those advantages of having things in part 1000, why would we want to take anything out of part 1000?

DR. HOWE: The question we continually get from stakeholders is, when are you going to move things out of 1000?

MEMBER VETTER: Is what? I'm sorry.

DR. HOWE: When are you going to move things out of 1000?

MEMBER VETTER: Why are they asking that?

DR. HOWE: You need to ask the stakeholders.

MEMBER WILLIAMSON: I can give you one answer.

CHAIRMAN CERQUEIRA: Jeff and then Lynne in the back.

MEMBER WILLIAMSON: One answer is that when something moves into regulation space from guidance space, it is subjected to a whole lot more public scrutiny and comment. And in some sense, participatory democracy is working better than if NRC staff just legislates that this is what is going to happen for modality X.

CHAIRMAN CERQUEIRA: Lynne?

MS. FAIROBENT: Lynne Fairobent with the

ACR again.

Richard, I think there are a couple of reasons. One, during the development of part 35, it was clearly stated and understood that part 1000 was never intended to be a permanent licensing home for anything that initially was licensed under it.

Secondly, every licensee who wants to use the modality or technology under 1000 has to apply for a license amendment unless they are broad scope. So if we move it into 35 whatever, then they don't have to go through and submit all of the detailed application stuff that is necessary under a 35.1000 application.

CHAIRMAN CERQUEIRA: Dick, a follow-up?

MEMBER VETTER: Thanks. That is helpful. I am still searching, though. I do know we certainly don't want everything in 1000 15 years from now. But I am still searching for the real down side of having to deal with something that is in 1000 now. Even if we didn't have an HDR currently and wanted to get one, we would have to apply for a license amendment.

So I am not being critical. I am trying to inform myself. What is driving the urgency to move things out of 1000?

MS. FAIROBENT: For example, a lot of it

is that it was intended to be something new or emerged. We get into this whole circular discussion of how do we tell when something has emerged?

Well, I would say intravascular brachytherapy is a classic example. It has been in 1000 for, what, three years now, three and a half years? I think that it is really time that that one comes out of 1000 and goes into an appropriate home in 35.

The other issue is some of the stuff -- and I agree HDR is one that you would have to apply for a license amendment. But, for example, if the microspheres were initially found to be under a part 390 or 300.

I don't believe there would have been a license amendment in order to use microspheres. So I think it depends on the individual application as to whether or not there would be an additional license amendment.

Also I think you get less of an interpretation difference perhaps between the 17 NRC states and how the agreement states are handling some of the items under 1000.

CHAIRMAN CERQUEIRA: Okay. Jeffrey?

MEMBER WILLIAMSON: Well, I think several

of the points Donna-Beth made are very good ones. Waiting until the guidance has stabilized, to some extent, that means waiting until the community has had enough experience within their so-called industry guidelines to stabilize and mature as well.

So it took how long for HDR to make it into part 35? Probably 12 or 13 years from the time the initial guidance on remote after-loaders was released until it got codified in part 35.

So another something to keep in mind maybe or another sign of maturation or emergence from the emerging bin into the accepted bin would be the development of guidance by the AAPM or ACR that NRC could use to inform its formulation of final regulations.

DR. HOWE: And I think one of the things we are looking for here are some ideas from you. There are other criteria.

CHAIRMAN CERQUEIRA: Ralph, you had your hand up. You've got some good ideas?

MEMBER LIETO: I had a question on one of the slides, where it said something about the Web site. I guess that is the sixth slide that you had, "Revising Web Site Guidance is Easy to Do."

I guess the question or concern would be

it is much easier to do, but it also doesn't necessarily assure that that information is getting to others that already have the device. In other words, as this is changing, people once they have got it approved may not necessarily be going back to the Web site to see what changes are going into place.

It may or may not adversely affect how they are doing things. Imagine if you could take something off, it always makes it that much more attractive. But if you say you are going to do something one way but now you are going to require it to be done another way, there may be more that is involved in that than just simply changing it on a Web site as far as the licensee is concerned.

So it makes it easy, but it also makes it very difficult for the licensee to be assured that they are maintaining compliance with what that guidance is and may not be something that they really want to accept.

Now, if it is just going to be guidance, then I guess it is sort of like Dick was getting to. Why put anything in regulatory space? Just put it out there on the Web site. Just change things as they come along.

DR. HOWE: The licensee has to meet the

commitments they made when they applied for a license amendment. So if the Web site guidance changes, I think Jeff had the question or someone over there. It gets more stringency.

What happens? The licensee is still held to what they originally requested. So they aren't held to the new stringency. If they want to take advantage, more flexible, if it grows to be more flexible, then they can do it internally. But your point is also we need to make licensees more aware of when we make changes. That is the point we take.

MEMBER LIETO: And also the other point, addressing that point on the Web site, is that one of the concerns with the revision of part 35 originally a few years ago was the fact that a lot of guidance was becoming license conditions basically.

And if this is guidance and it's up to the site to accept it or not accept it, that is one thing. But if it is becoming guidance like the Reg Guides of old, I think what we are doing, we are starting back down that slide again, where we are putting things into guidance space, rather than the regulatory space. And you have all of these conditions out there that if it is something that needs to be a requirement, then it should go into regulatory space so everybody know

what is going on.

CHAIRMAN CERQUEIRA: From the perspective of the states, is it easier in guidance space or regulatory space?

MEMBER McBURNEY: What was your question?

CHAIRMAN CERQUEIRA: Regulatory or guidance space. Does it matter to the states when the NRC makes these rule changes?

MEMBER McBURNEY: I think for these changing modalities, I agree with Donna-Beth in that there needs to be some time for the requirements to kind of settle in before you actually go through the rulemaking process because, as you well know, rulemaking takes a while. And we are not only flooded with having to do medical rules but all of these others as well.

So for these emerging things and the things that are currently in 35.1000, it is easier for us to develop guidance, but we need to assure that there is some level of consistency between the states on the guidance along with that of NRC.

Certainly I agree that we need some licensing and inspection experience as well as any experiences to show how the medical use and the outcomes of this are going before we actually put it

into rule space.

CHAIRMAN CERQUEIRA: Dick and then Jeff?

MEMBER VETTER: Donna-Beth, how will you capture the licensing experience and medical use experience from broad scope licensees? So, for instance, the microsphere, they are allowed to simply do their own evaluation, start doing it, and you will get inspection experience and medical event experience, but there is no licensing there.

The medical use experience could be quite vast. I have no idea how many broad scope licensees are using microspheres now, but it is probably becoming fairly common.

DR. HOWE: I think you have a good point. We normally think of this in terms of the limited specific licensees. That is where we get our licensing and more of our inspections, but we would be using inspection and medical event experience from the broad scopes.

MEMBER VETTER: So there is actually no mechanism unless you went out with a questionnaire or something to capture that experience from broad scope licensees?

DR. HOWE: That's correct.

CHAIRMAN CERQUEIRA: Jeff, you are next.

MEMBER WILLIAMSON: Well, having heard all of this, I tend to agree with Lynne. I think that once the technology and guidance has stabilized and there is a significant user base in the community, it should move out of 35.1000. It would be in regulatory space, which is I think the best way to assure consistency among broad scope, specific scope licensees, and agreement states.

I suspect of all of these indications, the one that probably is most ready to undergo this rulemaking initiative is intervascular brachytherapy. And the ACMUI might consider recommending to the staff to consider working on it.

Now that part 35 is over, perhaps they are ready to do the project.

CHAIRMAN CERQUEIRA: Part 35 is not over, Jeff.

Lynne?

MS. FAIROBENT: I just have a question. Maybe I missed it, but I am a little confused as to why NRC is looking for medical use experience. Are you referring to really the radiation safety and protection of using these versus when I think in terms of medical use, I am thinking of clinical applications and clinical findings, --

CHAIRMAN CERQUEIRA: Medical efficacy.

MS. FAIROBENT: -- which I don't believe is NRC's jurisdiction. So I am a little confused over what it is you are seeking under your bullet on medical use experience.

DR. HOWE: I think in that case, we are looking at the device being out there for a significant number of users. So if there are problems on the radiation safety aspect, there will be enough opportunity for them to come up. We are not looking at practice of medicine issues. But we are just saying everybody has enough experience. We weren't looking at the practice of medicine.

MS. FAIROBENT: I think, then, that should be for future discussions perhaps reworded slightly because I think that you could get some reactionary problems that you might not be seeking if it is out in the general medical community from some folks thinking that, in fact, you are crossing over into general practice-of-medicine type experience-based concerns.

CHAIRMAN CERQUEIRA: Thank you for those comments.

Any additional comments for Dr. Howe? Jeff?

MEMBER WILLIAMSON: Well, I would like to

know what the staff's view is on the urgency of intravascular brachytherapy rulemaking, its desirability or lack thereof of pursuing that in the near term.

DR. HOWE: I think last year there was quite a bit of question because there were some new stents coming out with drugs in the stents. And so there was a question of whether intravascular brachytherapy would even still be a modality that would be used.

I think they have had significant problems with the drug-coated stents. It appears now that one manufacturer has totally ceased making intravascular brachytherapy sources. So out of our three, only two are left.

I am guessing that the two will stay. So this year it is different. It is not really in a wait and see will it all go away.

CHAIRMAN CERQUEIRA: In the cardiology community, I think the new stents have significantly impacted on the utilization. There probably will still continue to be a few centers that will do it, but the widespread implementation that we had anticipated a few years ago is unlikely to evolve over time.

Now, for peripheral vessels and things perhaps, but I think stents, these treated stents, will have an impact as well.

DR. HOWE: So do you see the intravascular brachytherapy staying as a technology that cardiologists use, just not as great as they --

CHAIRMAN CERQUEIRA: I think it's going to be localized at a few tertiary centers that are broad scope license to start with. I think the threat of cardiologists using it in their outpatient offices, I don't think that is ever going to happen because of all of the hassles that are involved. I think it probably will continue to be done in conjunction with medical physicists and radiation oncologists.

I think, again, we have anticipated what was going to happen. I think it does not appear to be moving in that direction. We probably should wait and see how it eventually ends up.

Subir, in terms of non-party applications?

MEMBER NAG: What I'm seeing is a change in the lesions. The longer lesions again, again, radiation is still the longer lesions are distant to the drug. So it is not going up astronomically as it was doing before leveling off, but I think that still there will be a need for regulating the ones that we

are doing now. The indications are somewhat different now, slightly.

CHAIRMAN CERQUEIRA: Well, if there are no other questions or comments, Dr. Howe, do you have any questions for us?

DR. HOWE: No, I don't think so.

CHAIRMAN CERQUEIRA: We have answered them. We have had more of your time than you anticipated. So our break isn't supposed to be until 3:15, but should we reconvene at 3:15 and get done a little early? That's fine? Okay. Good.

(Whereupon, the foregoing matter went off the record at 2:51 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN CERQUEIRA: If everyone will take their seats, we'll reconvene and we have two more presentations today. The first one is "Defining Medical Events Involving Prostate Seed Implants" and Dr. Ronald Zelac will be presenting.

DR. ZELAC: Thank you, Chairman. Before I begin, Thomas Essig has an announcement for general interest.

MR. ESSIG: It's concerning the handout that was included in the notebooks. There is a memorandum that was not intended to be included at

least in the notebooks that went -- that were on display out on the table in the lobby. So if there are members of the public that received this memorandum, we would ask that you either turn it back in or discard it and some of them may not -- we have removed it from the other notebooks. It's a memorandum dated January 29th from myself to George Panglerner, Region 1. This is typically how we close out a technical assistance request and the region takes the action and then ultimately we make portions of the public, of this technical assistance request publicly available. But the entire contents of the memorandum are not. They're just our input to the requesting regional office. And so it was not intended to include this in there.

It may not be -- it was following Dr. Zelac's slides. And if it isn't there, then we may have caught it and removed it. But I know it was in some and it wasn't intended to be. It's about a three and a half page memorandum.

And personally, I don't have any problem with members of the Committee having, as long as you understand that it's not a public -- because we often give you documents that are not publicly available. So if you just want to annotate it that it's not

publicly available, I would appreciate that and I would ask any members of the public who picked it up to kindly discard it.

Thank you.

MS. WILLIAMSON: We've already had one very honest member of the public, Lynne Fairobent that just turned it in.

CHAIRMAN CERQUEIRA: Thank you.

DR. ZELAC: The other thing worth noting about this is the handouts that were on the table and are on the table don't actually have a copy of the slides, so that was put out afterwards for anyone that picked up before that took place.

I've been asked to keep you all awake for a while. I think the discussion that will ensue may accomplish that. This, in fact, is a topic for which we really don't expect a resolution, but it's simply both an update for you and hopefully some additional information for us.

We have an issue. It focuses around defining what a medical event is for permanent seed implant, and particularly, in this case, prostate. I had come to you, as you may recall last November when there was a case for which we had had 21 at one facility events that needed to be defined in some way

to determine whether or not they, in fact, were medical events. And we did get guidance from the Committee at that time which was utilized.

The regulatory requirement is on the first of the slides. It's a delivery of a dose that differs from the prescribed dose by more than 50 rem to an organ or tissue and a total dose that differs from the prescribed dose by 20 percent or more. These are the requirements that are in 10 CFR 35.3045 that apply to an implant, brachytherapy.

Recommendations that we received from the Advisory Committee last November basically said use D90 as the criterion for a medical event. D90, as a reminder, is a dose which is delivered to 90 percent of the target which in this case is the prostate. That's a good criterion for us to use because as you saw in the previous slide, variations from the prescribed dose are, in fact, what's necessary to determine whether or not a medical event occurred. It's a good criterion in comparison to some of the others that could be utilized that are based more on volume than on dose.

The criterion that we got, D90, then is perfectly fine and acceptable and can be utilized for under dosing. It basically says that D90 is less than

80 percent. Again, the criteria are 20 percent variation from the prescribed dose. So for a D90 that's less than 80 percent, we have a medical event.

The problem comes in looking at the other end of the spectrum for over dosing where the dose being delivered differs from the prescribed dose of more than 20 percent, i.e., if we were to apply the D90 criterion, a D90 that was greater than 120 percent. The problem is that many standard treatments have D90s that exceed 120 percent of the prescribed dose. And compounding that is the fact that in standard treatments, a significant portion of the target volume receives a dose exceeding 200 percent of the prescribed dose. Now again, this may not have clinical significance in terms of the outcomes, but comparing these kinds of situations to regulatory requirement for medical event, we appear to have a problem if we are going to attempt to utilize D90 both for over dosing, as well as when it is useful, under dosing.

So the questions regarding the criterion for over dosing that I have are first, and I solicit your feedback as we go through this, first, are the previous two statements regarding D90s for standard treatments considered correct, i.e., many standard

treatments have D90s exceeding 120 percent of the prescribed dose? And two, in standard treatments, a significant portion of the target volume receives a dose exceeding 200 percent of the prescribed dose.

Are these statements correct? I've seen them in the literature. And in fact, Dr. Nag has been one of the people referenced in the particular publications that I have seen these things in, so I can pose the question to you as a Committee, but very specifically to Dr. Nag.

DR. NAG: The problem is that there is not a simple answer, okay? First of all, where is the organ? In brachytherapy, everything is in such a small volume that the tolerance of the body is really high. Now when you are treating a big area, if you're giving 20 percent higher dose or 30 percent higher dose, you have problems. When you are treating an extremely small volume, if you are giving that volume even double the dose, you don't have a problem unless you have some normal tissue within that volume.

When we talk about prostate, and what we did, what we had was a group of brachytherapists in the country in one room and we asked them to draw where the prostate is on a CT scan on a computer and we put all of those drawings on top of each other.

That's a huge difference in the volumes that a so-called expert do (unintelligible due to strong foreign accent) each other as to what the prostate volume is.

Now you take one particular implant and if you have the volume that's drawn differently by the five people, on that same implant you are going to have a D90 that's very high and with the same implant, it depends on how you do the prostate volume, then D90 would be very low. So on that same one patient, it depends on who is doing the prostate volume. You could have an over dosing or an under dosing on that same patient. So there is a big problem right there.

Secondly, the data about D90 being very important or D90, the dose that correlates with outcome and only in the prostate. The reason why D90 is useful in the prostate is that in the prostate and not the whole prostate that has the tumor. Only certain portion called the (unintelligible due to strong foreign accent) that has the tumor. So if the anterior zone of the prostate is even totally under dosed, you are not going to have any problem of recurrence.

So with both of these, you are saying that a valuable under dosing of 80 percent of D90 automatically is under dosing may not be. I have done

many implants where the D90 is less than 80 percent and the tumors are still controlled. So I don't think we have an answer yet of how low we can go. It's a problem because even if you are given a D90 dose that's 30 percent higher, more than 130 percent, you are still not going to have a problem unless there are normal tissues within the high dose area. There is not so much what the tumor is getting or how high the tumor is getting. It's how high the normal tissue is getting that will be the problem.

I know you had some questions and you don't agree with me, right?

CHAIRMAN CERQUEIRA: Dr. Williamson?

DR. WILLIAMSON: No, I actually agree.

(Laughter.)

DR. NAG: For once.

DR. WILLIAMSON: Essentially, all of what Subir said and I would just like to add to it, you know, there's a significant body of data clearly indicating that CT is an imperfect modality for imaging the prostate and that compared to ultrasound or MR, both of which show the outlines of the prostate more clearly, there can be errors as large as 50 percent in the assessment of volume of the prostate. So it's very hard to see parts, certain aspects of the

prostate boundary on CT. It's just part of the turf.

A second issue that you should be aware of is that institutions differ in when the post-planning evaluation imaging takes place. Many places do it the day of or day after the prostate implant. At that point, the prostate will have maximum edema. It will be its largest size, and so therefore the dose that you will evaluate will be essentially the minimum dose. This prostate edema resolves with an approximately 10-day half life and so those institutions that do the imaging 30 days down the line which is the other recommended protocol or a protocol a lot of people use will generally show higher doses because the whole volume will have retracted and they'll be calculating dose to a smaller volume with the seeds more concentrated. So this is another issue.

I would say the main rationale for using D90 as a parameter for regulatory purposes is the same reason we're interested in it clinically, is that there have been a couple of large retrospective studies which have shown that D90 under doses are correlated with a higher probability of recurrence and that if you can get D90 over 135 or 140 gray, that results in a statistically significant better BNED

outcome. So I think the lower end is justified. I think deciding whether it's 120 or 130 percent, that's really arguable and I don't know that there's a fact of the matter that could be advanced as to which it should be.

I would say to err on the side of generosity so that you don't -- you collect gross errors, but don't include a lot of events simply because of these variations in clinical practice as to when you do the imaging and how you outline the target volume and so on. I mean those are events that you probably don't want to see unless you want to be inundated with them. There are a lot of prostate impacts taking place.

I would like to point out to you a specific article authored by Gregory Merrick who has analyzed hundreds of patients and gives in table form the values of these indices in the population of patients they treated. I think they're very good and careful clinicians and investigators and this will show you in a really good institution just how much variation there are in these parameters and they show, on average, for some of the cohorts such as more advanced prostate disease treated with a combination of external beam and brachytherapy, their D90s,

average D90s are as much as 113 percent above prescribed.

So I think based on Subir's comments, this paper and my own observations, I think 120 percent is probably too narrow an integral for practice.

DR. NAG: Not only is it too narrow, but it doesn't matter you are giving the tumor on the higher side. On the lower side, if you're giving too low a dose, the tumor will not be cured. But if you are giving a higher dose, so long as the body is able to tolerate that you are going to cure the tumor. The only problem is if that high dose is in an area of normal tissue, then you may have some normal tissue complications. But if you are able to give a much higher -- even 200 percent of what you are supposed to give, you give it to the tumor without giving a high dose to the normal tissue, you're not going to have a problem.

I had a question about the part of how you prescribe in permanent impact. In a way, I think the old method of prescription was better, that is, you had supervision. You give a certain activity, for a permanent implant, you give a certain activity to the tumor and that is how you prescribe rather than by dose. So if you remember the old Part 55, it was the

total dose or number of millicuries that you're giving. So if you're thinking or if your plan was to give 35 millicuries and you gave 35 millicuries plus or minus 20 percent of that volume, then you're okay.

I think that in a way solved a lot of problems for prescription of permanent implants, rather than going for the dose.

DR. ZELAC: If I recall, that's still available. I don't think it's disappeared. It's total dose for --

DR. NAG: Not in the new one. At present, in the new one I think you see the activity and only the dose.

DR. WILLIAMSON: I believe Ron -- Dr. Zelac is correct that you can still prescribe.

Regarding the 200 percent, I think in any brachytherapy procedure there are going to be small volumes that get incredibly high doses and in the experience of Merrick, his average B150, that is the fraction of the prostate receiving 150 percent or more of the prescribed dose varies, it's about 47 percent. So I'm sure that if I were to extrapolate, my experience is about 20 percent of the volume would have 200 percent or so. That's just a normal implant and there's nothing really to be done about that.

DR. NAG: So long as it's a very small volume and getting a very high dose, the body tolerates that. So you don't want to extrapolate from normal brachytherapy experience when the volume is very large, where if you gave 200 percent to a large volume you are going to have a disaster. When you have an extremely small volume and a small portion of that is 200 percent, it never is a problem.

DR. WILLIAMSON: I'm glad that you departed from the idea of D100 or minimum dose because the data Merrick shows that the average coverage or the average D100 is about 67 percent plus or minus as much as 24 percent. So that's really an impossible criteria.

DR. NAG: D100 has absolutely no meaning in prostate implant because if 1 percent of that prostate got a very low dose, it will make the D100 very low and that does not correlate with anything at all. That is why the ABC came up with the D90 recommendations.

CHAIRMAN CERQUEIRA: So I'm confused. When do you get too much?

DR. NAG: When the normal tissue gets too much, not when the tumor gets too much. If the tumor gets more volume and the tumor got too much, the tumor

is dead, you can't make it any more dead and as long as you're not having a normal tissue complication. Now if the normal tissue is very close to the tumor, then I'm worried about over dosing, but if I don't have any normal tissue very close to the tumor, I think to err on the side of going to a higher dose rather than avoiding and having a failure.

DR. ZELAC: You may recall that the issue at hand with the case that we had discussed previously in November was discovered because of recurrence because a significant fraction of the total seeds that were being implanted did not get into the target as intended, but elsewhere. And the result of that was tumor did not get properly dosed and a recurrence and it was after that occurred that it was found that looking at the records of all of the other patients treated by these individuals a significant number of additional cases had been also treated in the same fashion came to light.

That was the reason for coming initially here to seek an appropriate criterion and as I mentioned earlier for under dosing it seems to generally be workable. But as you've pointed out, which is something that I recognize and why I came to begin with, we do have a significant problem in trying

to apply it to the high end for overdosing, the delivery of more seeds than had originally been intended which is not very likely or in a smaller --a considerably smaller volume which if it's in the tumor is not going to be an issue anyway. So where do we go? That's what I'm looking for.

DR. NAG: I think what we may have to do is have two criteria. One is with the under dosing, the criteria should be to the tumor. Are you under dosing the tumor. When you're over dosing, I think you have to apply the criteria to the normal tissue. Are you over dosing the surrounding normal tissue? If you over dose the tumor, I don't think that's any problem. I do that all the time and I think anything is good, but are you under dosing the tumor and are you over dosing the normal tissue.

CHAIRMAN CERQUEIRA: But from your description if you have five people drawing the region you're going to come up with five different regions, what's the measurement technique that you're going to use?

DR. NAG: That's the problem.

CHAIRMAN CERQUEIRA: Do you routinely measure after you give a dose? Is that part of the --

DR. NAG: What we do is we outline what we

think is the prostate and my outlining of the prostate may be quite different from the way Merrick --

CHAIRMAN CERQUEIRA: So reproducibility is quite bad.

DR. WILLIAMSON: It's not quite so bad. Practitioners differ to some extent on what they define the clinical target to be and this is an issue sometimes of how much margin you add or in dubious areas where it's really -- such as the apex of the prostate where it's very difficult to interpret. It's sort of an issue of what kind of conventions you use.

But I do want to -- I think it is important to consider the wrong site issue and this is really a different scenario. And there, I think Subir's suggestion that the written directive perhaps be in terms of number of seeds and total activity, really has merit and perhaps a reasonable criterion might be if more than 20 percent of the seeds wind up in the wrong organ, this is probably a really good indication that maybe somebody doesn't know what they're doing. And make the wrong site criterion be independent of dose and issue of the geometry of the seeds where they have been implanted.

So this is I think -- there really have to be three criteria, I think. There's got to be a wrong

site criterion. Did you get the seeds into the right organ and the right number and the right activity? Under dosing, I think is maybe, we all agree is fairly straight forward. Over dosing, normal tissues, this may be something that could be discussed. I don't have a good feel if there are well-defined normal tissue tolerances yet available.

DR. NAG: Unfortunately, under dosing is not as simple as you think because again under dosing will depend on under dosing what organ and how you define that organ.

If you make your circle two millimeters bigger, you can have a higher under dosing.

DR. WILLIAMSON: See, the issue really has always, I think the NRC has always done this and wisely so, is to basically default to the authorized user. How do they draw the target volume and how do they specify the dose themselves and it's relative to their own criterion, but I think the literature would support that if D90 is too low, you know that has clinical significance and therefore it's reasonable that -- more reasonable than if you pursued some arbitrary end point that NRC should have a regulatory interest in that.

So I think there's a lot of subtleties to

this as you can tell and I think it would be good if you tried to avoid the subtleties and medical controversies within the field and concentrate on setting limits that really do distinguish bad actors, the really bad actors from the standard of practice.

CHAIRMAN CERQUEIRA: But at what point does it become a radiation safety issue versus sort of a practice of medicine issue. I mean do you want these guys involved in every case where the guy is not getting the target correctly? It is a misadministration, but should this be the body, should the NRC be the one that's controlling that?

DR. WILLIAMSON: Somebody who impacts 30 percent of the seeds in the rectum, yeah, I mean I think that -- we're justified collectively as a society worrying about physicians doing that, given that we do start out with a premise that NRC and other Government bodies have an interest in assuring patient safety or some --

CHAIRMAN CERQUEIRA: Patient radiation safety, right.

DR. NAG: It depends. If you are having (unintelligible due to strong foreign accent) you know, X millicuries to be given to the organ, he is able to give that X millicuries to the organ, but it

turns out that the dose, if you calculate the dose, it is less than 80 percent of the D90, I don't think that's a problem.

On the other hand, if 10 percent or 15 percent, not even 20, 15 percent of the seed is ending up in the bladder or the rectum, then it is a problem. So I think you have to add that it's not only going to be a dose issue. I think the percentage of the intended millicurie activity that it was to the right organ is probably a better criteria than the dose. The dose may not be in the hands of the practitioner. It depends on how the seeds were distributed within the volume and many other criteria.

To make it a little more complicated there are practitioners who are more advanced and what they are doing is they are -- dose (unintelligible due to strong foreign accent) meaning the areas that have a high risk of tumor, they are purposely giving a higher dose and areas of the prostate that have a very low risk of having tumors, they are purposely giving a lower dose, which by a normal criteria would be called under dosing if you just say less than 80 percent of D90, it will be under dosing, but the purpose of doing that and I think it's a better treatment, not a worse treatment.

So we have to be very careful that we don't penalize the really good -- the ones who are going to be at the cutting edge.

DR. WILLIAMSON: But that can be handled by the practitioner appropriately writing the written directive so as to make it clear that they're not trying to deliver 100 percent of the D90.

DR. NAG: Yes, but if the practitioner is writing D90 and knows so much and yet the D90 will be much less, so we have to be careful on how we state it because the way it's reported is very simple if it's less than 80 percent of the D90 under dosing it not necessarily shows, that's all I'm pointing out.

DR. ZELAC: It's clearly deviation from the prescribed dose which is of concern, so as was pointed out, if the prescribed dose is noted in an appropriate fashion, it's a comparison to that.

DR. NAG: But a prescribed dose for what? Are you prescribing it to the prostate or to the tumor?

DR. WILLIAMSON: That's up to the practitioner, I would say, and they're going to be judged according to the way they write the written directive.

CHAIRMAN CERQUEIRA: We have a comment

from the back microphone. Sorry.

MR. WHITE: This is Gerry White from the AAPM. I just wanted to agree with everything everybody said, but the situation may be even more complex than you describe. There's a lot of talk about the prescription and the dose. But in many clinics, not most clinics, there is an arrangement called a pre-plan where a physician does a plan where they anticipate the isotopes curves are going to go and the physician may intend for a certain part of the prostate of significant volume to get 150 percent or 200 percent and if you set your criteria for under dose or over dose, based on some percentage of a prescribed dose, a single number. There may be in existence an isodose plan that the physician intends to have applied and it may not meet that criteria and that will be true, that situation may occur no matter where you set the -- no matter where the NRC sets the criteria. You can set a lower and an upper criteria anywhere you like and there may be a physician who has a pre-plan, a prescription in effect, a written directive, that doesn't correspond to that.

So the real issue, I think, is the correspondence between the physician's intention and what's actually executed. It's hard to describe that

with just three numbers.

DR. ZELAC: Well, that's exactly correct. The problem we're in at the moment clearly is we do have a rule and it does have a stated criterion, less than 80 percent of the prescribed dose is a medical event, greater than 120 percent is a medical event. But the question is how do you compare -- what do you to define the prescribed dose initially. That's where we are.

We've got the time, I guess, a little bit, but clearly, we came with the problem at the high over dosing and thinking that the problem at the lower end had been solved. Now we're backing up from that as well. So we're in a little bit more precarious a situation than we were previously, except in the case, I think, where a significant, as Jeff pointed out, significant numbers of the intended seeds were implanted in the wrong place.

CHAIRMAN CERQUEIRA: I'm just a simple-minded cardiologist, but I'm getting a little confused because it sounds like you guys are kind of making it up. I mean Ralph and Dick, how do you guys at your institution, how do you decide here?

Dick? At the Mayo Clinic, how do you decide the radiation oncologists are doing a good job

or a better job, misadministration or appropriate dosing ?

DR. VETTER: Outcome.

CHAIRMAN CERQUEIRA: I mean Ron can't deal with outcomes. He's got to deal with --

DR. VETTER: I know he can't. This is not a simple issue. We go primarily by seeds, seed count, rather than --

CHAIRMAN CERQUEIRA: Seed count in the right location?

DR. VETTER: Exactly.

DR. NAG: Activity, not seed count, activity.

DR. VETTER: Activity, yes.

CHAIRMAN CERQUEIRA: Ralph, how do you --

DR. LIETO: I would probably agree --

CHAIRMAN CERQUEIRA: Seed count. How do the states do it, Ruth?

MS. McBURNEY: I'm not sure.

(Laughter.)

DR. ZELAC: Just for information, the reference earlier was to what needs to be in the written directive. And of course, for implantations, it's different than all of the others in that you have a before and an after and the after is written in

terms of number of sources and total source strength and exposure time or the total dose. So the option is there. So we could operate with that just the way we are now.

CHAIRMAN CERQUEIRA: Dick and then --

DR. VETTER: Yes, I think that's an important point to mention that the physician goes into the OR with the plan and sort of a pre-prescription and then they dictate the prescription, the final prescription after the procedure because you might run into something that you did not fully anticipate before you implanted those seeds.

Then the final prescription would include all of the documentation to indicate the activity and the distribution within the organ.

DR. WILLIAMSON: Well, I think the way the community is approaching this and the inter-institutional trials is they're not requiring, for example, the clinical trials. They're not requiring submission of the pre-plan. What's really important is the post-implant evaluation and so if you -- I think you're on the right track. If you wanted to really do this in a rational way, the answer would be the appropriate written directive would be some statement of the physician's expectations of the post-

implant evaluation and some idea, a time frame, when it's supposed to be done.

I guess I have a question for you. The Part 35 is the way it is, so is your question how the current Part 35 within the confines of what's written there can be adapted to best handle this or are you actually contemplating a rule making initiative or some special guidance that would apply just to this class of cases and would attempt to rectify what you see as shortcomings in the current rule.

DR. ZELAC: I think you gathered from Donna-Beth's earlier comments that rulemaking is something which first is expensive and time consuming and it has to be justified. Unless there's a real problem, they're not going to move or I would personally not recommend moving to make a change.

The question is are there sufficiently well-defined criteria that are used in the community which can be applied to the existing rule in terms of the plus or minus 20 percent? Now if plus or minus 20 percent is inappropriate for implants period, then we need to look at a change in the rule on that basis.

CHAIRMAN CERQUEIRA: I think Dr. Howe at the back microphone has the answer for us.

DR. HOWE: If you remember your last ACMUI

meeting, I talked about proposed changes to Part 35 and this one of the issues that we wanted to explore to see if there was a way of making it better, easier to understand for everybody involved. So it is on the agenda for a proposed rulemaking, but we may decide yes, we may decide no.

CHAIRMAN CERQUEIRA: Based on the discussion so far, Dr. Howe, I mean what's your interpretation of his?

DR. HOWE: It kind of sounds like we need clarification on what everybody means, so at least go through the exercise of can we make the rule language better and maybe we can't.

DR. WILLIAMSON: So I'm hearing now maybe that what is desired by the staff is to kind of draft maybe with our input and suggestions what would be sort of an idealized way of writing a written directive and specifying what medical event means that would have some meaning, you know, or it would be reasonable within the regulated community and then go from there to decide whether that could be implemented by interpretation of the existing rule language or whether it's worked well revising the language.

DR. WILLIAMSON: What I'm hearing through these discussions is that the expertise which is

available here to us now can't provide anything that's so specific that it can be applied to the existing rule. Now if there's a possibility that as things evolve further that could change, we can kind of muddle our way through for the time being until we can get such a recommendation as to what criterion could be applied to the existing rule, if in fact, the likelihood of there being such a criterion in the future which there doesn't appear to be today, available -- if there's not going to be such a criterion, then we have to think about significant change to the existing rule in that regard.

DR. NAG: I think if you are using the activity criteria, you know, you are prescribing a certain millicurie to the target and you have plus or minus 20 percent of that in terms of activity then I think you are okay. But if you are going by what you were saying about the dose, then that's not okay because the dose will depend on where activity went within the volume. If the volume was smaller, with the same activity you are going to get 30 or 40 percent or 50 percent higher dose and it you went to a slightly bigger one, you would get much more under dosed. So if you went by millicurie activity you will be okay. But if you are going by a dose criteria, I

have talked with a lot of people and we haven't come up with any solution.

CHAIRMAN CERQUEIRA: Do you have a comment?

DR. LIETO: Yes. You go to all the separate -- to get qualified, credentialed people to do these procedures. You've addressed, Jack, you've addressed process, you know, double check to make sure that it's been done right at post-implant reassessment. What I hear here is an effort to come up with a quantitative metric, 80 percent, 20 percent for a target that is non-uniform. It is complex that may, in fact, depend on the health of the individuals so you may have the same geometry in a healthier individual versus a sicker individual, how you define healthy and sick are issues too. I hear a lot of concern about coming up with that 80, 20, 90 numbers. That tells me maybe you need to back off, but maybe you need to tighten up the process side and make sure that the qualified experts that are doing this, in fact, do re-evaluate, do make sure that they're doing the quality control checking, that they've done it right. But you really have to defer. The radiation safety in medicine issue, they're overlapping a lot here and I don't think you're going to segregate the

two.

CHAIRMAN CERQUEIRA: Yes. I'm mostly having a problem with do you make the prescription before or after? Do you define the target before and after, because if you do this all after, then there will be no misadministrations because you're going to define a dose to the target? No.

DR. VETTER: That's not true. After you go back and you look at the film and if 25 percent of your seeds are in the rectum, you have a misadministration.

CHAIRMAN CERQUEIRA: Okay, so --

DR. WILLIAMSON: No.

CHAIRMAN CERQUEIRA: No?

DR. WILLIAMSON: That's another issue, but I think Ron's sort of summary of what I thought Sibur and I said was excessively pessimistic. I think we are saying that a reasonable version of the wrong site criterion could be developed in terms of number of seeds/total activity implanted. I actually think under some limited circumstances at least low dose under dosing tightness medical events would be feasible to look at.

I think then the next question is whether the criterion or the definition of written directive

as it's now written could accomplish this. I would say probably the answer is no because for one thing I don't think there's a requirement in Part 35 that post implant CT or MR based evaluation be done. There really isn't. So neither of these criteria is implementable or decidable unless you do that kind of image-based evaluation after the implant has been complete.

DR. ZELAC: Well, let me say something on a positive note then. Because in 3540 written directives, as I mentioned earlier, the definition of whether or not you did what you had intended is based on number of sources and total source strength or exposure time. That probably -- you would have to talk to our counsel about this, that probably could be turned equivalent to the dose.

DR. NAG: Yes.

DR. ZELAC: And on that basis you can then look at the criteria for a medical event and rather than talk in dose as the wording said, say use the dose equivalent, if you will, which is again total number of seeds and so forth.

So I think the rule is not necessarily fatally flawed in terms of being able to apply what's here already to this particular situation. It's just

a question of what you're going to look at and how you're going to define it.

General counsel will have to be consulted on this matter, but I think that would probably work okay.

DR. NAG: Ron, I think you are technically correct. If you go by activity, then there's the case of the Guthrie Institution. They had more than 30 percent or 40 percent of their seeds outside of the prostate. Now that would then be a misadministration. So I think -- but dosing, again, if I made my prostate very small, I could make the dose very close to the D90 and what the -- for a permanent implant getting away from the dose and going into dose activity to the intended target would be better.

DR. WILLIAMSON: I think I would agree with that. It all does depend on the fact though that institutions practice according to the recommendations of the professional, scientific societies which is you do some form of post procedure imaging that's capable of detecting whether the seeds are in the prostate versus somewhere else. And if you don't require that, then you don't require the criterion to be decidable. So I think in that sense, I view the current regulation as being incomplete because a practitioner

could evade the question all together by simply not doing any post implant imaging.

DR. ZELAC: You're right. All the practitioner needs to do is to state how many seeds did I implant. He doesn't have to say where they went or know where they went. He just says I implanted so many.

CHAIRMAN CERQUEIRA: Dr. Zelac, how would you like us to move forward with this? I think you've gotten some input from the various Committee members who have knowledge. Do you need further clarification?

DR. ZELAC: I don't think so at this point. I think we have sufficient information now on the status of the art, so to speak, as well as how it relates to our existing rule, to be able to move ahead to one, as I said, get clarification and an opinion from our general counsel about the issue I mentioned earlier about relating written directive for permanent implant to medical event, the use of equivalent to dose.

And the second thing is that it's pretty clear from the discussions as well that we don't really have in the rule as it stands today something sufficient to determine whether or not the seeds went

to the right place and until we do, we will have this problem continue.

We do have individual physicians or licensees who will come in, who claim that they after the procedure was completed, they then changed the written directive. It's their prerogative to change the written directive until the procedure is completed. The question is when is the procedure complete? That's another issue that has to be resolved. Is it at the time when the patient leaves the OR? Is it at the time when the evaluation is done 30 days post? Those are differing positions.

DR. WILLIAMSON: And that's up to the practitioner.

DR. MALMUD: As a non-radiation oncologist, I have several questions to ask before I understand this issue. Number one, if a patient is undergoing seed implantation in the prostate for prostate cancer, and a certain percentage of the seeds are not in the prostate, let's say they're in the rectum, there are two problems associated with that from a clinical standpoint. One is that the prostate has not gotten adequate radiation and the second is that the patient may develop a radiation proctitis as a result of the seeds being in the wrong place.

Is it a requirement, is it a clinical requirement, not an NRC requirement, is it a clinical requirement for post implantation x-rays to be taken to determine the location of the seeds?

DR. NAG: There is not an NRC requirement, but there is a ABS recommendation, American Brachytherapy Society recommendation, the panel that heads that would say that you should consistently do post-implantation dosimetry. So it is a recommendation, not a requirement.

DR. MALMUD: Now it's a recommendation. So the patient really should be the one who's educated to ask his physician if he does routine post-implantation x-rays?

DR. NAG: Yes.

DR. MALMUD: And if so, let's say that 25 percent of the seeds were improperly placed, will they be relocated promptly if they're discovered?

DR. NAG: That's a problem. In a permanent implant, you cannot take out seeds. You can put in more seeds, so if, for example, in the post-implantation dosimetry it is found that there is a significant under dose, the physician has the option of going back and putting a few more seeds or doing some external beam radiation to make up the dose.

But if you have extra seeds to certain areas, like if you have extra seed to a normal tissue that does not matter. That's below the prostate. It's not a concern. But if the extra seed has gone into the rectum, you really cannot take them back.

DR. MALMUD: Will that patient develop a significant proctitis as a result?

DR. NAG: It may with the implants, it may. It does not have to, but he may.

DR. MALMUD: What are the complications of the seeds being in the wrong place?

DR. NAG: If it went into the bladder cavity, we do a post-implant cystoscopy and we will either take the seed out or the seed will be passed out.

If it went right into the urethra or into the urethra wall, then the patient is going to get a lot of urethritis and the patient will be running to the bathroom very, very frequently.

If it went into the rectum, then the patient may have rectal bleeding in which case we have to give them still an enema.

In the very worse case scenario, the patient can have a fistula in which case there would be a lawsuit.

(Laughter.)

DR. MALMUD: So the physician, the radiation oncologist has the option of don't look, don't tell.

DR. NAG: Yes, right now, yes.

DR. MALMUD: Right now. Now getting back to the NRC issue, the one that Dr. Zelac brings before us which is not a clinical issue, but a radiation dosimetry issue, it sounds to me not having -- not being a radiation oncologist, that the window of the radiation burden needs to be widened a bit, otherwise, under the current regulations a number of routine therapies are outside the limit.

Is that a fair understanding for a non-radiation oncologist?

DR. NAG: Yes and no. It depends if you are using activity criteria, then it's not a problem. If you are using a dose criteria, then a significant number may be outside the 20 percent issue.

DR. MALMUD: The activity criteria means that I am implanting a certain amount of activity and by definition that which I am implanting will always adhere to the criteria because I haven't given more than I had implanted.

DR. NAG: No, a certain number of activity

within the volume that you want. So if more than 20 percent went outside the prostate, then it's an issue. Or if by mistake you did a miscalculation and you added 30 percent extra seed and all of them went up into the prostate, then you have a problem.

DR. ZELAC: Dr. Malmud, we do have something in the regulation that exists under medical events that would cover the kind of concern that you have, if it became known and that medical event is a dose to the skin or an organ or a tissue other than the treatment site that exceeds by 50 rem to an organ or tissue and 50 percent or more of the dose expected from the administration to find in the written directive.

So if you have a defined plan and the rectum is to receive, on the basis of this treatment, a particular dose and because of seed misplacement the rectum now receives 50 percent more than was planned, and exceeding 50 rem which it certainly will if there are seeds in it, then that's automatically a medical event. So you essentially have in here already a cover for the over dose to normal tissue, at least part of it.

DR. MALMUD: Thank you.

DR. NAG: I want to point out there isn't

because what do you mean by more than 50 percent of the expected dose? The rectum is a huge organ. If only a small portion of the rectum, the area near the prostate, that will get a high dose. So now are you talking about the whole rectum in which case which portion of the rectum are you considering and how big is a significant volume?

We haven't answered that question yet. If you over dose 1 CM or 1 square CM of the rectum is that a significant volume or if you over dose at 5 CM? The question that we are trying to tackle with 3D dosimetry in which we don't have access. So it is, although you have it in the rule, it's not as simple as the book looks like.

DR. WILLIAMSON: My concern is if that were applied literally, again, you might get hundreds of cases that are routine cases because the change in the geometry of the prostate from the position of maximum edema to 30 days later, that alone can change the prostate or the rectal dose by 50 percent. That's been shown in the literature.

So one has to be careful. You might use it to catch cases where seeds are implanted in the rectum by mistake, but if you applied the criterion prospectively to all implants, depending on how you

construed it, practically every implant that's ever done might be captured as a medical event criterion and that's my worry.

DR. ZELAC: That again gets back to what has been suggested here that we should be using activity and not dose.

DR. NAG: Yes.

DR. ZELAC: If we can use it across the board, then I think we're in good shape.

CHAIRMAN CERQUEIRA: Thank you very much, Ron. It was very enlightening.

Okay, then we'll move on to the last and I think brief agenda item and Angela Williamson is going to talk about the update recommendations from the fall 2003 meeting.

MS. WILLIAMSON: We only had one, believe it or not, just one recommendation from the last meeting which was two days long, just one formal recommendation that was made to staff. And actually, we sort of initiated the recommendation because I came to you with an issue that we were trying to resolve asking for the Committee's opinion and the recommendation -- the issue was should there be a threshold for the treatment of hyperthyroidism? Should there be a threshold of dose imposed upon

licensees for the treatment of hyperthyroidism. The issue was we had licensees coming in claiming to have experience using levels of iodine for which we had no definitive proof that they really had this experience.

So we were trying to determine if it was appropriate for us to grant them this authorization to use activities of iodine for which we didn't have definitive documentation or proof that they had the expertise to handle.

And you came back recommending to us that we should have gone ahead and allowed these clinicians to use basically whatever they felt was appropriate for their patients. And this was initiated by technical assistance request from one of the regional offices, Region 1 to be specific.

So you came back with that recommendation and we implemented that recommendation and that's basically what happened and that's it. I don't really expect any comments because we agreed. You gave us a recommendation and we agreed with you, so --

(Laughter.)

CHAIRMAN CERQUEIRA: Dick?

DR. VETTER: Was the recommendation for licensees or authorized users?

MS. WILLIAMSON: For authorized users.

That's all I have.

CHAIRMAN CERQUEIRA: Okay. Well, I guess we're done for the day.

Tom, do you have any --

MR. ESSIG: Yes, I just wanted to make a clarification. The agenda that we have didn't label tomorrow morning's session from 8 until 9, didn't label it as either open or closed. It is, in fact, open.

There's a caption on most of the sessions except that one. It didn't and there may be some confusion. Of course, the Commission briefing is automatically open, but there may be some doubt as to whether or not that is open and when I checked with our Office of General Counsel, they informed me that talking about a presentation alone is not enough to justify closing the meeting to the public. So it will be open. I just wanted to clarify that point for --

DR. NAG: Tomorrow's meeting will be here, 8 o'clock meeting will be here?

MR. ESSIG: Yes, it will. And then we'll adjourn and go up over to the other building for the Commission meeting.

CHAIRMAN CERQUEIRA: We have quite a long lunch break there from 11:30 to 1 o'clock. Would

there be any criticism to shortening the lunch a little bit and trying to start earlier so we could end earlier?

DR. LIETO: I have an objection.

(Laughter.)

DR. LIETO: Actually, I have a question regarding the session tomorrow. Will we have the slides so that we can discuss what's going to be presented to the Commission? My PowerPoint presentation and what other --

MR. ESSIG: Yes, I think we will.

MS. WILLIAMSON: You need a copy of your slides?

DR. LIETO: For the whole Committee.

MS. WILLIAMSON: For the whole Committee, okay.

CHAIRMAN CERQUEIRA: Certainly the first two. Now are we going to see what the first two presenters are going to present?

DR. MILLER: We're going to get clarification on the agenda for tomorrow for the staff presentation. There's been some updates. The staff is presenting first to the Commission, as I understand, is that correct, Tom? Yes.

MR. ESSIG: Yes.

DR. MILLER: The staff is going to present two items. Dr. Paperiello will represent the Executive Director for Operations as is custom in a Commission meeting. The Executive Director or his designee, one of the Deputy Executive Directors usually opens up the meeting with the Commission and makes opening remarks. The he's going to turn it over to me and I'll introduce the topics that we're going to discuss as a staff.

Dr. Sherbini is not going to make a presentation on the dose reconstruction tomorrow. Tom Essig is going to make a presentation on the status of our efforts. We're not going to get in at that time into any technical discussion of the status of the staff efforts. Rather, we're going to -- Tom's going to walk the Commission through where we are in the process which includes the Commission's direction to seek your input before we proceed to finalize any effort that we have.

Then Pam Henderson from Region 1 who is in the audience, Pam, maybe you could stand up and take a bow?

She's coming -- she's come down from Region 1 and she's going to make a presentation to the Commission with regard to the experiences with regard

to implementation of Part 35. She's interested in how it's going.

So there are the basic two topics that we plan on presenting to the Commission. Then we'll turn it over to you and we will leave the Commission table and you'll go to the Commission table and discuss with the Commission your topics.

Now along the way, the Commission may ask either of us any question that they so choose at which point we'll be in a question and answer period. I hope that clarification helps for your planning.

MR. ESSIG: Yes, Dr. Cerqueira, I think one thing we'll have to decide and maybe we can discuss that at 8 in the morning and that is when as Dr. Miller just noted, we will leave the table and the Committee will sit at the table. You'll have to decide because I don't think there will be room for the entire Committee at the table, so you have to decide some will sit at the table and some will sit in the row behind the table.

MS. WILLIAMSON: Just to let everyone know, there are going to be reserved seats, not with specific names, but in the audience for the ACMUI that is not presenting. For those members not presenting, there will be reserved seats. You'll just see some

sort of sign on a row of seats saying ACMUI.

CHAIRMAN CERQUEIRA: Well, I think besides myself, I think certainly the two presenters, Ralph and Dr. Malmud who should also be there as the co-chair of the Committee and I think perhaps the dose reconstruction, we should have Jeff at the table because he's actually done most of the work on this. And even though -- now we'll decide tomorrow what we're actually going to say because based on this morning's discussion we're not going to go into much detail because we didn't have enough information available to us to really make any kind of definitive statements, but I think we could certainly have --

MR. ESSIG: I think you'll find that Dr. Malmud has already given that considerable thought.

CHAIRMAN CERQUEIRA: Okay.

MR. McKINNEY: One of the things I know that the Commission will push both of us on is when are you going to give us an answer. So we probably should think about that overnight for tomorrow morning's discussion as to what we're going to say in that regard.

DR. MALMUD: With respect to when we would have an answer ready, we could probably have the review of the NRC data and Jeff's data and have a

report completed between two and four weeks. Which figure are you comfortable with, Jeff?

DR. WILLIAMSON: Well, it depends on how narrow or broad we interpret our mandate to be. I think on the narrow issue of this particular incident, two to four weeks is reasonable. I would say four weeks.

(Laughter.)

DR. MALMUD: Four weeks. Then it will be four weeks.

DR. WILLIAMSON: I think I'm echoing a well-established precedent in this Committee, defaulting to the longer time. But I think it's worth bringing up the other issues we'd like to consider, that is, how do manage this small number of members of the general public that have some valid reason for being included in treatment rooms and potentially getting higher doses in the regulatory limit and we may want to offer, I think, we should take advantage of this opportunity to think a little more broadly and deeply about the issue of dose reconstruction and do our best to try to articulate some general guidelines that help avoid a loss of confidence in the staff's calculations.

DR. WILLIAMSON: The issue that we're

dealing with though we could complete and have a report to the NRC by -- in four weeks. Let's say four weeks.

DR. WILLIAMSON: I think that's reasonable if we get the data promptly. A lot depends on I guess the complexity, but I wouldn't anticipate longer than that.

DR. MALMUD: Very good. And the other issue about how we would deal with incidents such as this in the future is an item that we should probably be prepared to deal with by collecting some data and recommendations from a variety of members of the Committee because this is a double-edged sword. On one hand, we don't want the dose estimates to be under -- to be inaccurate in being -- under-measuring the radiation burden. At the same time, in order to reduce public anxiety, we don't want them to be excessively conservative in over-estimating the burden because that subjects members of the public to undue pain and suffering in terms of their own anxiety about what they're experiencing or have experienced.

I'd rather deal with the two issues separately, as you suggest. We'll give the first report within four weeks and a number of the issues that we'll be facing, we would not have faced had this

issue been dealt with internally at that licensee, but it's after the fact now. So let's just separate the two and we'll deal with the first issue and then the second.

DR. WILLIAMSON: Yes. There's actually three issues, I believe.

DR. MALMUD: What's the third?

DR. WILLIAMSON: The three issues, the narrow question that we're going to report on in four weeks.

DR. MALMUD: Yes.

DR. WILLIAMSON: Having to do with the dose calculation for the specific incident.

DR. MALMUD: Right.

DR. WILLIAMSON: The second issue is the management of patient's relatives who -- where it is warranted, maybe in allowing them to have doses higher than the regulatory limit.

DR. MALMUD: Right.

DR. WILLIAMSON: The third issue is observations on dose reconstruction, in general, with the ultimate goal to try to enhance the scientific credibility of future dose calculation, avoid such problems in the future.

DR. MALMUD: Very good. I'll just ask you

one question so the rest of the Committee can hear it. Would you like the issue of high dose, low dose, most likely dose to be dealt with in answering Question 1 or in answering Question 3? The reason that I ask the question is that the deficiency is not in the physicist's calculation of the numbers. It is in getting the data from the licensee upon which the assumptions are made for exposure in terms of time and distance.

DR. WILLIAMSON: Well, I think the issues are interconnected.

DR. MALMUD: Of course.

DR. WILLIAMSON: And it might well be that in four weeks when we make our final report, one of the recommendations might that the issue should be studied more broadly and hence, we can move forward from there. But I think in the interest of trying to satisfy the Commission's need to have an independent review of this particular incident, I really think it should be issues one, two and three and one needs to be dealt with quickly and two and three can be given a more measured and not leisurely, necessarily, but since they are more general issues I think they have to be deliberated more carefully in that longer length than the four-week period.

DR. MALMUD: Then we will separate the three and just deal with Issue 1 within four weeks.

DR. WILLIAMSON: That's correct. That's what I would suggest.

DR. MALMUD: Does anyone -- Mr. Chairman? I ask the Chairman of the Subcommittee, does anyone object to that approach?

DR. EGGLI: No, and I think as we reconstruct the dose for Part 1 that we should take the approach that the regulation suggests which is the most probable dose rather than the worst case scenario.

DR. WILLIAMSON: I think that's reasonable.

DR. MALMUD: We agree that that's reasonable. The issue is the problem that the NRC faces the problem that Jeff faces, the problem that we face in looking at this is that we don't have the database. We haven't seen the database in adequate detail from the licensee to make a most probable estimate because some of the data isn't there. The measurements were not taken with great frequency and therefore in many instances it might be more acceptable to say worst case/best case/most likely recognizing that there's a range. That would explain

what has happened and what may happen in the future and that's why I, given my preference, would prefer to deal with the first and third issues together. It would explain a lot of the reasoning. It's not the over-aggressivity of some physicists versus others. It's the fact that the data isn't there to have made these precise calculations.

DR. EGGLI: It's actually more than that. I think it has to do with the most reasonable assumption to fill in the gap.

DR. MALMUD: Agreed.

DR. WILLIAMSON: I think it's very abstract. We're wandering off into abstraction and speculation and I think we'll just have to wait until we see the data, until we can make a conclusion about how closely linked 1 and 3 are. You may well be right.

DR. NAG: I'm wondering whether we perhaps add a fourth issue under the same thing and that is what if the licensee had issued the proper warnings, but the patient or the patient's relative willfully and knowingly took a dose over the limit and in that case -- right now, we are penalizing the licensee when really the licensee is not at fault.

DR. WILLIAMSON: I think that's part of

Issue 2.

DR. MALMUD: That is part of Issue 2. You are correct, and we intend to deal with that in Issue 2 because the issue may arise again in which any licensee may tell a very intimate relative of someone who is dying that if he or she exposes himself to the patient during this period of time, when there's so much radioactivity within the patient, that they're going to receive a radiation burden which exceeds a level that's permissible. But there are some tactics which could be used other than physically constraining the individual which we're not recommending be done, to alert the individual to the danger that he or she is placing himself in, the potential danger, since even this radiation burden is not carcinogenic, and it would be convenient to have those techniques available to RSOs who are not familiar with them and to licensees who are not familiar with them as a means of encouraging people to be aware of what they're exposing themselves to, other than verbal, putting a radiation monitor on them that beeps, putting a badge on them, etcetera, etcetera, giving them educational material to read while they're there.

These things may heighten the individual's concern about his own well-being and thereby lead to

more cooperative behavior. None of these is a guarantee, but they're all techniques which we probably should document in some fashion as means available to inform individuals in a humane way that they are both breaking rules and putting themselves at risk.

CHAIRMAN CERQUEIRA: Tom?

MR. ESSIG: Just one more comment unrelated to our current discussion. I wanted to pick up on and kind of respond to a couple of comments that were made earlier this morning regarding the interval between the current meeting and the previous one and why it was so short. The reason that we've scheduled this meeting now is because we didn't have any control over the Commission meeting tomorrow. That date was given to us. Our option was to assemble this Committee early and knowing that the interval was much shorter than the nominal six months, and the other option we could have said is well, come in for the Commission meeting and then come back in again maybe two months later. We opted not to do that to save, to combine -- make better use of our travel funds and that sort of thing. So I thought maybe those of you that weren't clear on that -- we didn't -- we do have some flexibility over the Committee meeting itself,

when it's scheduled, but we do not control when the Committee meets with the Commission. And we were given the date of March 2nd and so we lived with that the best we could.

CHAIRMAN CERQUEIRA: Last year, we ended up having two separate meetings and we actually met with the Commissioners. A large part of the Committee was not able to make it and that was not desirable.

All right, well, I think we'll end it here. Thank you.

(Whereupon, at 4:33 p.m., the meeting was concluded.)