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NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Friday, April 23, 1993

The Commission met in open session, pursuant to notice, at 2:00 p.m., Ivan Selin, Chairman, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission
KENNETH C. ROGERS, Commissioner
JAMES R. CURTISS, Commissioner
FORREST J. REMICK, Commissioner
E. GAIL de PLANQUE, Commissioner

STAFF AND PRESENTERS AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

DOCTOR RICHARD SLEMBER, President, ABB U.S. Power Plant Segment

ROBERT NEWMAN, President, ABB-CE Nuclear Systems

REGIS MATZIE, Vice President, Nuclear Systems Business Development

CHARLES BRINKMAN, Acting Director, Nuclear Systems Licensing

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

2:00 p.m.

CHAIRMAN SELIN: Good afternoon, ladies and gentlemen.

The Commission is pleased to welcome representatives from Asea Brown Boveri, Combustion Engineering to brief the Commission on the status of the System 80+ application for design certification. We consider that design certification of the evolutionary advanced light water reactors to be of the highest priority and we know that you and the staff have been working closely to resolve both technical and policy issues. We look forward to hearing your views on the status of the review of the System 80+ evolutionary design.

Commissioners, do you have any comments? Fine.

Doctor Slember, you may begin, please.

DOCTOR SLEMBER: Thank you.

Good afternoon. We appreciate this opportunity to address the Commission on the status of the System 80+ certification application. I am Richard Slember, President ABB's United States power plant businesses.

At the table with me today are Robert

Newman at my right, President of ABB's Combustion Engineering Nuclear Systems. Regis Matzie, on my left, is Vice President of Nuclear Systems Development, and Charles Brinkman, Director of Nuclear Systems Licensing, next to Bob Newman.

I would like to also acknowledge Sterling Franks, Director of the Light Water Reactor Safety and Technology at the Department of Energy, who is the co-sponsor of this certification effort. Sterling is back here.

We last had the opportunity to address the assembled Commission in early April last year. Since that time there has been some organizational changes which may be of interest to you. Bob Newman and his counterparts in Nuclear Services, Nuclear Fuel and Nuclear Systems now report directly to me. And within ABB, the worldwide responsibility for the nuclear systems, the nuclear fuel and the nuclear services businesses areas are all now assigned to the United States. Just as the rest of the world looks to the United States for leadership in nuclear technology and regulation, so within ABB, the company looks to its U.S. sector for leadership in nuclear power.

As you know, there are 15 operating reactors in the United States whose nuclear steam

supply systems were designed and fabricated by ABB-Combustion Engineering. Another four are under construction in the Republic of Korea and there is one partially completed plant in Washington State which references a valid final design approval FDA which would greatly facilitate issuance of an operating license should its owners choose to finish construction.

Our topic today, however, is ABB's evolutionary 1350 megawatt advanced light water reactor, System 80+, and its status as we see it in the design certification process. I will ask Regis and Charlie to provide the details on how we are doing and Bob to update you on the commercial activity related to System 80+.

I would first like to acknowledge that our design certification effort has been cosponsored by the Department of Energy. I believe that design certification is the most important of DOE's new plant nuclear programs because the biggest area of uncertainty is whether a new plant can be licensed without the imposition of new requirements which, of course, means redesign, delays and increased costs. This program is absolutely essential for new plant sales in this country and, in reality, to maintain

American leadership in nuclear power and its regulation in the world.

Last April, ABB-CE management told you that ABB-CE was a believer that the Part 52 licensing process represented the most significant opportunity for standardization enhancement and licensing stability in the last two decades. It is certainly more than an opinion. We are dedicated to that proposition. We are putting our resources behind that belief. Because of that dedication, ABB-CE management told you last April that it was committed to do whatever was necessary to achieve design certification in accordance with SECY-91-161 schedules. We departed that briefing with the understanding that the Commission was similarly committed. I'm pleased to report that the progress that has been achieved on the System 80+ application in the last year is ample evidence that both ABB-CE and the NRC were truly serious in meeting those ambitious goals.

A year ago, ABB-CE had just completed responses to approximately 1500 requests for additional information from the NRC staff. The staff's role in evaluating those responses and assembling its draft safety evaluation report, DSER, was just beginning. Through much work and dedication,

the NRC staff essentially maintained the SECY-91-161 schedule for issuance of the DSER in September 1992. Immediately, ABB-CE set to work to close out the open items identified in the DSER with high quality submittals. That process continues today and we believe we are approaching final approval. We are pleased with the NRC staff's very professional effort on our application.

During the past year, we have achieved several areas of major progress. We are the first applicant to implement the new radiological source term technology. We have successfully addressed the severe accidents issue by demonstrating the robustness of the System 80+ design features and we are well along in obtaining NRC staff approval of specific design features for our Nuplex 80+ advanced control room. We have completed a probabilistic risk assessment which has been used in both design development and evaluation and which documents more than two orders of magnitude improvement in safety over previous designs. We have reached agreement with the staff on seismic methods for enveloping earthquakes and soil conditions for the majority of sites in the United States. Finally, we have gained agreement with the staff on content and details for

ITAAC so that we can now efficiently complete our tier 1 submittals. It's been a most productive year.

Let me now turn to Regis to amplify on these accomplishments and to discuss other technical issues. I will have some concluding remarks at the end of our presentation.

CHAIRMAN SELIN: Thank you, Doctor Slember.

DOCTOR SLEMBER: Regis?

MR. MATZIE: I would like to start my discussion by reviewing the major program milestones that we have achieved on the System 80+ design certification program.

Our first submittal on the CESSAR-DC was in November 1987 with the final submittal in March of 1991. We made these modular submittals to our safety analysis report to remain consistent with the development of the EPRI advanced light water reactor utility requirements document. Since that time, we have responded to all the requests for additional information, completing those submittals in May of 1992 and a draft safety evaluation report was issued by the staff in September of 1992, essentially in accordance with the SECY-91-161 schedule. We and the staff are working on closing all the open items that

resulted from this draft safety evaluation report and we are currently scheduled to complete those closure of the draft safety evaluation report open items at the end of June 1993.

On the slide that you're looking at now, I'm showing a schedule for the rest of the certification program. This schedule is our best estimate of what can be practically and effectively be achieved for design certification. It is not consistent with the recent draft SECY-93-097 that you have received recently. It is approximately four months earlier. We believe that these dates are achievable with a concerted effort on both our part and on that of the staff. Of course it is dependent on our maintaining a high quality of our submittals as I believe we have in the past.

(Slide) Next slide.

COMMISSIONER REMICK: Have you discussed that difference with the staff?

MR. MATZIE: We have mentioned to the staff as recently as yesterday our hopes and expectations that a quicker schedule could be achieved.

COMMISSIONER de PLANQUE: Do they see any problem on their side for matching that schedule if

you do your part?

MR. MATZIE: I guess I'd rather not answer for the staff. They realize with the magnitude of all the submittals before them there's a lot of work to do. I'm trying to focus on our schedule and how we have been dealing with the staff.

COMMISSIONER de PLANQUE: But you're hopeful?

MR. MATZIE: I'm hopeful.

COMMISSIONER de PLANQUE: Okay.

MR. MATZIE: We have made substantial progress since our last briefing a year ago. Responses to the staff request for additional information on our safety analysis report have been completed and as a result of that we had revised 2,500 pages of the safety analysis report. We have completed all our initial responses to the draft safety evaluation report and have submitted many follow-up analyses. This effort has resulted in a revision of almost 9,000 pages of the safety analysis report.

The principal remaining tasks are inspections, tests, analysis and acceptance criteria and structural design details in the critical parts of the plant. These will control our efforts to

completing all submittals by the end of June 1993.

We have also answered a number of questions that arose after the draft safety evaluation report and we believe successfully close the issues on the shutdown risk and on severe accident analysis questions.

(Slide) Next slide, please.

The current status of our draft safety evaluation open items as of April 6, 1993, as indicated by NRC accounting in a letter to us, are that of the 637 open and confirmatory issues 119 are resolved and closed, 234 are technically resolved and changed from open to confirmatory, and 284 remain open and we are closing these on a daily basis as we work with the staff on the elements of resolution.

Our overall assessment is that we have made significant progress and we're continuing to make significant progress in that none of the remaining open items appears to present an obstacle for final design approval of System 80+ on a timely manner.

(Slide) Next slide, please.

Major efforts currently ongoing to complete our submittal by the end of June are, as I mentioned before, ITAAC and the associated tier 1 design descriptions, an integrated review of CESSAR-

DC, our licensing application by the staff and management at ABB-Combustion Engineering, the structural design detail of critical plan areas, human factors engineering review of features of the control room and then a number of other items of less magnitude listed there. Of course, all of this effort results in closing the remaining draft safety evaluation report issues that I mentioned earlier, the 284 issues.

COMMISSIONER REMICK: Is there agreement on, if I recall the terminology, programmatic ITAAC and generic ITAAC issues?

MR. BRINKMAN: Yes, there is.

COMMISSIONER REMICK: There is resolution of that agreement?

MR. BRINKMAN: Yes.

MR. MATZIE: (Slide) Next slide, please.

CHAIRMAN SELIN: If he had said is there disagreement, would you have said there isn't? Is it completely agreed?

MR. BRINKMAN: I'm going to cover this a little bit in my remarks, but there have been a series of meetings and this has been the toughest issue of the ITAAC program, but we believe we've reached agreement with the staff and I don't think the staff

would dispute that, the technical staff.

MR. MATZIE: I would like to now review the major items or accomplishments which we have achieved significant progress, as mentioned by Doctor Slember in his opening remarks.

The success of any new regulatory initiative is the application of the new technology to specific design. I believe the use of a new radiological source term is a good example of that. We have implemented the new source term for the System 80+ design in our design bases safety analysis dose calculations and our probabilistic risk assessment level 3 off-site releases and in evaluation of the protective action guideline compliance of our design.

The benefits of implementing the new source term technology are: one, lower doses predicted for accidents; higher allowable nominal containment leakage from the containment, and this is approximately five times that of an operating reactor, is allowable to still get acceptable doses to the public; and changing the charcoal filters so that we do not take credit for them in the safety analysis which in essence allows us, if we so choose, to downgrade them from safety to a non-safety status. We'll still retain them for defense in depth.

To finish off this issue, there are computer codes that we're currently verifying with the staff. We are determining the final uses of the new source term in the area of equipment qualification and we expect to have approximately the same requirements as currently used with the old source term for these requirements on equipment qualification. We do expect closure by the June 1993 date.

COMMISSIONER REMICK: Did you find any --

COMMISSIONER de PLANQUE: Just --

COMMISSIONER REMICK: I'm sorry. Please go ahead.

COMMISSIONER de PLANQUE: Just for clarification, the new source term, is that based on the NUREG-1465 or what are you using?

MR. MATZIE: That's exactly right, Commissioner.

COMMISSIONER REMICK: Have you found any other benefits having to do with valve closure time, time for operator or automatic action and so forth, any significant change as a result of the new source term? I'm thinking of valve --

MR. MATZIE: No, sir.

COMMISSIONER REMICK: Okay.

MR. MATZIE: (Slide) Next slide, please.

The next item where we have had a major success is in the severe accident deterministic analysis. As you may remember from our last meeting, we have explicitly addressed severe accidents in our design. We have been able to respond to all the DSER, post-DSER severe accident questions without relying on future experiments. That is, we have addressed these issues by demonstrating a robust design, not relying on a lot of relatively esoteric calculations and difficult experimental calculations.

Our containment over pressure analysis shows that the ASME Level C stress limits are not exceeded for approximately 60 hours. A reactor cavity wall analysis shows the ability to withstand steam explosions from core debris water interaction. Our analyses shows that the reactor cavity structure can withstand the most severe core concrete attack for several days and, in fact, eight days without a significant release of radioactivity. We in the NRC are continuing to review the hydrogen mitigation capability of the System 80+ design. The issue remaining is the number and location of hydrogen ignitors in our containment. We have already included an ignitor system and placed a set of ignitors throughout the containment. The issue remains exactly

how many and exactly where.

COMMISSIONER REMICK: Why is this an issue since it's certainly been faced before with other designs?

MR. MATZIE: Other designs which have a much smaller containment size and really do not have to address the high levels of hydrogen generated in a severe accident had an approach and a design for that. We have a very large containment and we're trying to combat a much higher level of potentially generated hydrogen. So, it is in sort of a different regime of the issue.

COMMISSIONER REMICK: So, is it the ten percent concentration limit?

MR. MATZIE: That's right, 100 percent hydrogen generation from metal water reaction with a ten percent maximum limit. So, that's the new regime we're working at and we're working for this much larger containment than had ever been addressed before with hydrogen ignitors.

COMMISSIONER REMICK: Intuitively it would seem like with a larger volume containment you might have more rapid diffusion or convection. Is that the case or not, or is that the question?

MR. MATZIE: To my mind, the question is

how well we've done with the containment in terms of having good circulation, not having pockets, have we appropriately located ignitors where we would expect hydrogen to build up. Based on good engineering judgment, I might add, because these kinds of things are not a very exact science.

COMMISSIONER REMICK: Yes. I see. Do you see that as a major issue?

MR. MATZIE: I do not. I think it's just an issue we're really addressing now with the staff.

COMMISSIONER REMICK: Okay.

MR. MATZIE: (Slide) Next slide, please.

A technical area that we are leading the industry in is in the human factors engineering. The issue here is state-of-the-art methods must be used for control room design, but there are no established regulatory acceptance criteria. We do have a draft review model which we are being evaluated against by the staff. Thus far we and the staff have agreed on the basic regulatory review model. We have been making progress on addressing the various steps or items of that review model and we believe that in this review that we're nearing completion at this point in time not only on the process but with emphasis on approval of specific design features.

The procedures required to verify and validate the control room have not yet been agreed upon, but we are working with the staff, as recently as yesterday in fact, to address this issue.

(Slide) Next slide.

This next picture or slide shows a picture of our dynamic prototype that is operational in Windsor, Connecticut. Thus far, it consists of five of the 13 panels that will be eventually in an actual advanced control room, plus the big board display at the front of the control room. The staff is currently reviewing the basic design features with a view toward approval as part of our design certification of these basic features. The specific areas that are being reviewed are the control room layout, the large overview display at the front of the control room, and certain standard control panel features including plant computer display hierarchy, alarm tile displays, dedicated parameter displays, process controller and switch actuation of component controls.

(Slide) Next slide.

COMMISSIONER ROGERS: Are those panels interactive now? Do they interact?

MR. MATZIE: The panels are consistently addressing the information and controls. They do not

have an actual simulator connected to the panels as yet. What we do is simulate certain scenarios to show both the NRC staff and potential clients what the response will be in terms of events going on. But we as yet have not connected to an actual simulator.

COMMISSIONER REMICK: What are you doing about such things as operator or operating guidelines so that the potential COL holder would have guidelines for developing detailed procedures? At what stage do you do that if you're doing it?

MR. MATZIE: In terms of emergency procedure guidelines, those are being submitted with our application. With respect to guidelines for actual operating procedures, we view those as something that will be developed as a function of time, post-certification, and we would hopefully use those plus maybe something intermediate possibly between guidelines and actual procedures as we continue to develop the control room between its current state and something we would want to offer on a plant in the United States or anywhere in the world.

So, we view it as a continuing evolutionary process both in terms of guidelines and certain revs of the procedural development as we develop the actual remaining control room panels in

the entire control room.

COMMISSIONER REMICK: So, you'd see developing the general guidelines in parallel as you develop the details of the control room panels and so forth?

MR. MATZIE: That's correct, sir.

COMMISSIONER REMICK: Is the staff in agreement on that approach?

MR. MATZIE: That's what we're working out with the staff, exactly how you marry the state of development of the control room at the end of certification but before you actually have a COL applicant, where he will be developing the actual implementable procedures for the plant. It's how you marry those two things and evolve that's the issue.

COMMISSIONER REMICK: Would the development of the actual procedures be part of the so-called commercial standardization or life cycle standardization effort? Does it fit into that category?

MR. MATZIE: I believe it does fit into that and the way we would see that happen most likely is that the lead applicant, the lead COL really sets the tone and the pace for that, and that we would be very hopeful as part of standardization that those

would essentially be adopted by the follow-on units.

COMMISSIONER REMICK: I see.

MR. MATZIE: Next slide, please.

We have explicitly used the probabilistic risk assessment in our design process. We have just completed a reanalysis of our probabilistic risk assessment to comply with NRC staff requests. The major result of that reanalysis for System 80+ is a continuing verification that there are over two orders of magnitude improvement, that is decrease in the core damage frequency of System 80+ relative to currently operating plants. The actual values shown on the previous slide and in your slides before you show that the overall total core damage is on the order of 3×10^{-6} events per year. This compares to the U.S. industry goal for advanced light water reactors of 10^{-5} events per year.

You might note that the shutdown risk, which we have explicitly addressed, is only about 30 percent of the total risk and, in fact, if you compare on a more absolute scale the current plans, it's about two orders of magnitude below the shutdown risk of current plants.

COMMISSIONER REMICK: What all is included in the external events?

MR. MATZIE: The external events are a tornado --

COMMISSIONER REMICK: Earthquake?

MR. MATZIE: Fire and flood. The seismic has been excluded from the external events because the new approach that the staff desires the applicants to utilize is the seismic margins assessment rather than an actual seismic PRA contribution. Of course, the reason for this is the dispute of what the seismic hazards curve should be in their large range of potential seismic hazards curves. So, an approach that we believe is very good to address this issue of this seismic margin assessment --

COMMISSIONER REMICK: Just a suggestion. In comparing different core damage frequencies by different vendors around the world, it's always helpful one, because many times they don't even break out external events so you don't know if they're in there or they're not, you've done that. But it might be helpful, and just a suggestion, for external events to list in a footnote what that includes so one who is reading these things coldly has a better idea.

DOCTOR SLEMBER: Apples to apples.

COMMISSIONER REMICK: Apples to apples, yes.

MR. MATZIE: If we were to include our previous calculation of the seismic contribution to the core damage frequency, it would increase the external events up to about $1.2x10^{-6}$, which would raise the overall value about 30 percent.

COMMISSIONER REMICK: How about large break LOCA? What percent of the internal events does that --

MR. MATZIE: It is the controlling event now. Thirty five percent of the total internal core melt probability.

COMMISSIONER ROGERS: Just before we leave that, on your external events, what was the wind speed that you used in the tornado? Was that consistent with the NUREG-46-061, the latest one?

MR. MATZIE: Yes, sir.

COMMISSIONER ROGERS: It was?

MR. MATZIE: Yes.

(Slide) Next slide, please.

We have calculated the containment integrity given a severe core damage of 99 percent, so that we do have a very robust containment that will, to a very high degree, contain any potential releases from the reactor pressure boundary. Our large off-site release frequency is about $2x10^{-8}$ events per year.

This compares with the U.S. industry goal for advanced light water reactors of 10^{-6} events per year, a very substantial margin.

COMMISSIONER REMICK: Is that the EPRI definition of large off-site release?

MR. MATZIE: That's correct.

COMMISSIONER REMICK: Yes. Okay.

MR. MATZIE: The resulting health effects for this large release are $2x10^{-9}$ per year for prompt fatalities and $2x10^{-7}$ per year for latent fatalities. Our best estimate dose at the site boundary for the first 24 hours is .3 rem, which as a comparison measure compares very favorably with the predictive action guideline for emergency planning of 1 rem.

(Slide) Next slide, please.

COMMISSIONER REMICK: Are you -- as a result of that, are you requesting anything special on emergency planning, like the passive designs?

MR. MATZIE: We right now are not requesting any change in emergency planning. We have set the bases for emergency planning from the design standpoint so that we should be able to pass any reasonable criteria set up for a potential revision to emergency planning. We do believe that any revision to emergency planning should apply to all advanced

light water reactors, not just passive. So, we'd be hopeful that if the Commission addressed the emergency planning issue in terms of revision to it, it would be applicable to all future advanced light water reactors. And we believe we would fall under reasonable guidelines for that.

COMMISSIONER REMICK: Is there any reason to believe that it should be more applicable to passive plants versus evolutionary plants, assuming your calculations are correct?

MR. MATZIE: Not to my knowledge.

Next slide, please.

The final technical issue that I would like to talk to is the structural design and supporting analysis. We have developed a design, single design that is acceptable for the majority of U.S. sites by a very robust seismic design. We have developed a soil structure interaction analysis methodology and had that methodology reviewed by the staff. We have performed analysis for a variety of seismic spectra and soil conditions to develop an envelope that could be used on the majority of U.S. sites. We're currently in the process of doing detailed structural analysis in the critical regions of the plant to verify that this seismic envelope can

be properly met with the design. That analysis is expected to be completed by the end of June 1993. We have had audits of the methodology thus far and we will end up having an audit of all the calculations to demonstrate this robustness in the July time frame.

COMMISSIONER REMICK: What are the major elements of that envelope?

MR. MATZIE: The major elements are to look at I believe it was three different actual spectrum, spectra I should say, frequency spectra, and to look at a variety of soil rock conditions. That is the plant built upon bedrock, the plant built upon different layers of soil which are on top of bedrock and the characteristics of that soil are also varied to have different shear wave velocities. So, we look at a whole complement of these different combinations of those parameters and we look at the resulting spectra from that and then develop an envelope from that, which is very robust in terms of seismic conditions of which the plant has to be able to handle.

COMMISSIONER REMICK: And how about the ground motion acceleration?

MR. MATZIE: We have pegged the ground motion acceleration at .3 Gs.

That concludes my remarks on the technical aspects that I'd like to talk about today. I would like to introduce then Mr. Charlie Brinkman who will now address some of the policy issues that we feel are important for the Commission to be aware of.

COMMISSIONER CURTISS: Charlie, before you go ahead there, let me just go back to one issue that you had on your list.

Is your sabotage vulnerability review the standard review that you go through or is that an emerging issue as a result of recent events?

MR. MATZIE: It's a good question. The current situation is our reviewer was involved with those emerging events and he is just being assigned in May to us. We've had relatively little interaction thus far with him. We've responded to DSER open items, submitted them and had I think one meeting or one interaction but he has been elsewhere employed in the State of Pennsylvania.

COMMISSIONER CURTISS: Your review then is being driven by the recent events.

MR. MATZIE: That's correct.

COMMISSIONER CURTISS: Okay.

COMMISSIONER REMICK: But I assume you have trained separation, complete separation and so

forth?

MR. MATZIE: Yes, we do.

MR. NEWMAN: That's the real advantage of the spherical containment and the way we've laid out the auxiliary building around there as far as really overwhelming not only fire and flood but sabotage for a complete separation of the channels, bringing it out in various locations.

MR. BRINKMAN: Good afternoon.

(Slide) May I have slide 17, please?

I'd like to direct my remarks to four issues which are basically administrative in nature, but are important to the timely and correct implementation of the design certification process and any one of which could end up on the critical path. Those four are the certified design descriptions in ITAAC, the design control document, the NRC's policy on metric conversion and ABB-CE's integrated review.

(Slide) Slide 18, please.

Development and approval of the certified design description in the ITAAC has possibly turned out to be the most under rated hurdle which Part 52 posed to a design certification applicant. When I talked to you about this last April, I thought I was affording it considerable importance, but I sure had

a lot to learn in the next year.

Last April, ABB-CE met once with the staff on the topic, at the time we had briefed you, and we were preparing to make our first ITAAC submittal, which we did at the end of April. The staff, however, didn't think that we were abiding by the agreements that had been reached, which they thought they had reached, with the lead applicant. At that point we decided to make certain we were intimately involved with every public NRC meeting and industry meeting concerning the lead plant and ITAAC, and we have done that.

Shortly after that, NUMARC organized a small utility review of several lead plant ITAAC. The industry reviewers suggested a considerable number of changes from what the lead applicant and NRC thought they might have reached agreement on. Then, we, ABB, invited the industry to come in and look at some of the ITAAC we were developing and we received guidance which didn't run necessarily concurrent with what the staff and we had been pursuing.

Later in September, a month-long industry review was held in San Jose. Again, more changes. In February of this year, NUMARC led a two week review of nearly 20 System 80+ ITAAC and again a lot of changes

were recommended by the industry. Basically the difference between the industry's point of view and the staff's point of view was -- as you recognize, necessary and sufficient are the key words and the industry was looking for necessary and the staff was looking for sufficient, I think. So, there was sort of a tension there. The industry was interested in taking out material that they thought was not necessarily tier 1 material.

Another thing that the industry helped us to focus on was sharpening the acceptance criteria, which in many cases they felt was too ambiguous. So, those were the basic differences in philosophy.

It took a lot of time spent in these meetings, but eventually I think the NRC and the industry and the vendors all were coming to a fairly general consensus on this.

While all that was going on, the industry in a generic fashion was working to reach agreement with the NRC on what were referred to as generic or programmatic ITAAC. These were ITAAC covering such issues as how to handle equipment qualification, motor-operated valves, welding and so forth. I think at one point somebody had identified as many as 23 of these potential programmatic ITAAC.

The industry was concerned that the acceptance criteria associated with these could not be made unambiguous and therefore would be a trigger for a hearing request at the point that the plant would otherwise be ready to go into operation and the contention would be that the acceptance criteria of the ITAAC hadn't been met. Then you would be into a dispute as to whether or not you could really interpret what the acceptance criteria was.

This developed into a real battle between the staff and the industry and several people in the industry made it very clear that if these programmatic ITAAC were indeed incorporated, they would not consider referencing a standard design that had been. So, we really didn't have a lot of room to maneuver. However, about December, we all came to our senses and NRC staff management, NUMARC, General Electric and industry representatives, including ABB-CE, agreed to sit down in San Jose in January for as long as it took to come to agreement on generic ITAAC.

After two weeks, agreement was reached and, in my opinion, this session represented the turning point for ITAAC because success paths were now identified and basically agreed upon.

Subsequent to that time, General Electric

and ABB have worked together under the guidance of NUMARC to develop common sets of definitions and general provisions which we'll use in the ITAAC. I think the last time I looked at our definition sections we agreed on all except a couple where they were specific to one or the other of us.

In March, the NRC, which had put together an ITAAC review team, met in Bethesda for a week to reach agreement on several of the lead plants' ITAACs and at the end of the same month they met in the District of Columbia and did the same thing for 12 of our prototype ITAAC. As a result of the agreements reached with NRC management, which actively participated in those meetings after that session, both sides, the NRC and ourselves, now agree that ABB is in position to efficiently complete our remaining ITAAC and submit them. We've proposed to do so in three submittals beginning the end of this month and completing by June 18th, internal to ABB-CE. This means redoing about 50 ITAAC which have already been submitted and completing the remaining 25 or 30 ITAAC and subjecting all 75 or 80 of them to rigorous management review.

Now, ITAAC has been a hard issue to get our hands on at both the NRC and at the vendors and at

NUMARC, but it's not been for lack of management attention, I can assure you. I assure you that it's getting a great deal of continuous management attention at ABB. Every Monday, we have scheduled management ITAAC review sessions and every ITAAC that is ready to come to us goes through the process and if we're not able to finish them we will convene another meeting that week and keep going. A lot of long hours have been put into this.

I personally, by the way, observed the NRC's management in action on this with personal involvement and I'd like to acknowledge that without the substantial personal effort by Mr. Russell of your staff and his team, we'd still be twisting in the wind on this topic.

Today we seem to be over the process hurdle and are finally in the ITAAC production mode.

(Slide) May I have slide 19, please?

This next item I want to touch on quite briefly. It has to do with the design control document and I want to emphasize that I'm raising it only in the context of schedule, what its impact might be on schedule. I brought it up at the senior management meeting with the NRC staff yesterday and they assure me that they are not concerned about its

schedule implications. I think it's not a big deal. I'm afraid I'm a little jaundiced perhaps, but I think it has potential for impacting the schedule.

SECY-92-287, staff proposal on form and content of the design certification rule, was the first description that we saw of the DCD. There was some dialogue with the industry about this and then the staff produced 287A. But as far as I'm aware, it was never publicly released. So, we in the industry aren't fully cognizant of what the next proposal by the staff is. But based on the understanding that was gained from the original SECY, I'm concerned that there is potential for some additional delays in the FDA issuance.

The DCD, as we understand it, will consist of all tier 1 material, plus the complete CESSAR-DC less the PRA portion. The SAR must fully reflect the staff's final safety evaluation report because if the FSER retains any standing at all, it has been made subordinate to the DCD, according to that SECY. The staff therefore is proposing another review to make sure that all the FSER is properly incorporated and so forth. I'm not sure they're recognizing the potential that this review might have on reopening the design again, the technical review.

So, our proposal is not a new one to you. We would recommend that the design control document be divorced from issuance of the FDA. We don't think that they're really connected. If the review that the staff is proposing does reveal some inconsistencies, they would be administrative in nature and I think could be handled outside of reopening the FDA. We'd like to see the FDA closed out so that the technical review is definitively complete before the staff gets involved in this consistency review.

COMMISSIONER CURTISS: Before you go on to your next slide, if I could ask, in 92-287, which has been released, there is a recommendation there for the Commission to consider adopting as a change mechanism for tier 2 the 50.109 mechanism or backfit provision in 50.109. Do you have a view on that yet?

MR. BRINKMAN: Well, the industry has been trying to have a meeting with the NRC staff, senior staff, and I believe that's one of the topics they'd like to address. We generally are subscribing and participating with the industry on that. So, I'd rather not get into that topic, Commissioner.

COMMISSIONER CURTISS: You don't have a view yet. Is that what you're saying?

MR. BRINKMAN: That's right.

COMMISSIONER CURTISS: Okay.

MR. BRINKMAN: (Slide) Slide 20, please.

This next topic is one which we feel that the current policy as interpreted to us by your technical staff could be very counterproductive in that it creates a major expense for ABB and provides no recognizable benefit to any party and certainly no safety benefit. I'm referring to the apparent imposition of the NRC's metrication policy on the System 80+ design control document.

NRC staff has informed us that the Commission's metrication policy, which was published in the Federal Register October 7, 1992, applies to the design control document. The policy makes it expressly clear when you read it that the Commission didn't intend to force metric units on licensees or applicants. It states that it is designed to allow them to respond to market forces in determining the extent and timing for their use of the metric system. However, the staff assumes the policy does apply in this case because design certification is a rulemaking procedure which is applicable to the staff rather than a licensing procedure which would be applicable to the applicant. So, the policy seems a little bit vague in that area.

(Slide) Slide 21, please.

COMMISSIONER REMICK: If I recall, was your letter -- it was to the EDO.

MR. BRINKMAN: It was to the Commission.

COMMISSIONER REMICK: It was to the Commission?

MR. BRINKMAN: Yes, sir.

COMMISSIONER REMICK: So, it's before the Commission?

MR. BRINKMAN: Yes.

COMMISSIONER REMICK: Yes. Okay.

MR. BRINKMAN: The design control document is essentially, as I said before, the SAR which we submitted over five years ago, and it has thousands and thousands of units which would have to be converted if we were to do this. There's no purpose that we can see for doing this other than to fulfill this policy statement. The cost, however, would be very, very significant. Beyond this unrequited expense is the potential for delaying the FDA while the process is completed and thoroughly checked. The most egregious part, the most difficult part for me to understand of forcing an untimely retrofit on the System 80+ design, is that we designed the plant in English units and you reviewed it in English units.

Thus, there's going to have to be a disclaimer at the front of the document which says that the principal units should be not used and that the controlling units are in parentheses following the principal units. Seems a little silly to us.

I hope that you're going to agree that this is a terrific example of how the NRC could avoid imposing unnecessary and counterproductive requirements on applicants.

CHAIRMAN SELIN: Next, GPU is going to come in and complain that we make them change their name to Five Kilometer Island. You never know where this is going to end.

MR. BRINKMAN: That's correct. And somebody will intervene to say that it wasn't accurately reinterpreted.

COMMISSIONER REMICK: Charlie, you only mentioned the design control document, but I assume since your SAR is to be consistent, that it would require everything in your SAR to be changed too. Is that right?

MR. BRINKMAN: Well, in effect, yes, sir. What could happen in this -- if you carried this out to extremes is we could say, "Hey, it doesn't apply to us. You've exempted us," and the staff will say,

"Well, it applies to us, so we'll do the conversion." But, of course, we get to pay for that anyway and we wouldn't be comfortable with that unless we checked it. So, yes, sir, the net result is our SAR would be converted.

So, therefore, we have through the offices of our outside counsel filed an exemption request with the Commission, a policy exemption request. It's a bit unusual, but that was the advice we were provided by the staff. I want to clarify because we discussed this at yesterday's senior management meeting. I want to clarify that we're not seeking an exemption for ourselves, we're seeking an exemption for the staff because the policy statement doesn't apply to us.

COMMISSIONER REMICK: One question. Would you foresee that such an exemption should be made on into the future for all possible future applications or is it just because you already are far down the road when the Commission came out with that policy? In other words, would there be disadvantages sometime in the future a new application coming in being with metrication first? Does it give you particular problems on unpipe sizes and so forth or not?

MR. BRINKMAN: I think your policy statement said it very well, it ought to be the market

that determines that. If a particular applicant is coming in and it's his opinion or he already has been queried by a potential buyer for a metric design, I think he should have the option on that. And I'm not saying that at some point in time this design might not be converted to metric, but we ought to do it in a very systematic controlled way and I think we ought to be the ones who initiate and complete the job.

(Slide) May I have slide 22, please?

Regis mentioned that we were about to do an integrated review. The closeout of the DSER open items and the generation of supporting information for the ITAAC have created a great number of changes to the safety analysis report, CESSAR-DC. The last two amendments alone added or changed over 8,000 pages. The schedule we have been on, as you know, has been vigorous to say the least.

Before we submit our final CESSAR-DC amendment at the end of June, we believe that it is necessary to do a rigorous and far reaching review of our application to ensure its internal consistency. Therefore, next week we will charter a team of ABB-CE personnel, Duke Engineering and Services and Stone & Webster personnel to conduct a one month survey of the application documentation. These individuals are

going to be senior individuals on the review side that will be very familiar with the document and they will be assigned essentially full-time to this task. In the process they're going to utilize cross references which are currently being developed by cognizant engineers and lead engineers that are intimately familiar with each of the chapters.

Their purpose is to assure ourselves and be in a position to assure the Commission that the CESSAR-DC documentation and ultimately the design control document are internally consistent. In the process, another product of this review is going to be a very good cross reference system that we can use.

If there are no further questions, I'd like to turn to Bob Newman who intends to update you on some of the commercial developments related to System 80+.

MR. NEWMAN: Thank you very much, Charlie.

(Slide) If I could have slide 24.

I think I get the prize today for coming the furthest distance for the meeting. If I look sleepy, I am, having just returned from Taipei and Seoul.

I would like to first of all echo Doctor Slember's comments that I am very pleased with and

proud of the progress that has been made over the past year by my staff and the NRC staff. We are dedicated to the process of certification and we made that commitment and I believe we are keeping it.

Regis and Charlie have both told you what we have been doing and I thought it might be appropriate for us for a few minutes to talk about why we are doing what we are doing, and that is the commercialization of System 80+.

ABB is an energy company that serves all aspects of energy throughout the world. We firmly believe that nuclear energy is an option that should be and must be utilized to meet the future energy needs around the world. To that end, I have been provided the resources to do the work that we have done and we are committed to finishing that task on time.

When we look at the timing of what we are doing, some people might say, "Why are we doing this now? Why the rush or whatever?" But I think if we look at it in the proper time scale, it is extremely important that we, both of us, maintain the schedules that we are in order to meet the needs of the nations around the world.

First of all, I believe that the needs, if

you look at the prospects of the need for energy in this country, that there will be a tremendous need for base loaded power somewhere very early in the next century, which means that we should start building in this country very soon. If we're talking about seven or eight year projects, which is in our intent, not time tables of the past, we still need to be starting around 1995, which is consistent with the schedule we are talking about.

It is my observation as I travel throughout the world that we in the United States, rather than having been -- some people say we've been sleeping for the last ten years in this country, but I really think that more appropriately we've properly used the time that we've been given. In doing so, I believe we've come up with what I regard as the most improved readily available designs ready to be built now and I believe we've also done a good job in straightening out the process as well. In countries like Taiwan and Korea, where I spend most of my time, we are still very much regarded as the teacher and the leader. Not someone who has fallen behind, but someone who is actually leading the world. I believe that's the position the United States should maintain.

In Taiwan today -- before I go to that, if

we're going to have the option available to us in the United States, what we need to be able to do is to keep that viability alive to be able to use it other places and be able to develop the designs to their fullest and then have them available for standardized production here in the United States. I think that's the real advantage of the overseas market today.

We in the United States have the luxury of having readily available inexpensive natural gas and many other sources of energy that the rest of the world simply does not have. So, they face the crises much earlier than we do. I think the whole world faces the issues of global warming and various issues like that which bring nuclear back into perspective. But the ones who are facing it first are the ones particularly in Asia. In Taiwan, we are presently in a competition with worldwide competition. It is my opinion that the U.S. designs will do extremely well there. The two evolutionary designs that are competing, that are in the process of final stages of certification by the Commission, will do very well against the world market.

The Tai power specification actually asks for an advanced design which is really right down the lines of what we are doing in this country and

incorporates probably 95 percent of the EPRI requirements. So, they are looking to us as the example in this country.

In Korea, they also are using System 80+ as a basis for their standard design and are looking at many of the features that we use in our design to be incorporated in their standard design. I guess the good news is that in both countries, as well as in the U.K. right now, they aren't faced with an ITAAC situation. They still have a two step licensing process and have watched us over the last year and probably will stay with a two step licensing process for awhile. So, the FDA becomes a very important issue and obviously that's one of the reasons why we're committed to getting it done as quickly as possible.

My observation is also that in those countries in particular, as well as here, siting nuclear power plants is an extremely difficult process, not only the availability of sites but fighting it through once you get it. Both of those countries look to going to large size designs such as we are licensing here in this country.

The U.K. is also looking to try to improve its process and is evaluating System 80+ also as one

of its options. BNFL has led one of the major part of the evaluations, but Nuclear Electric, Scottish Nuclear have all participated in that process and I believe we will stack up very well against the rest of the world.

As I said, I am hopeful that we in the United States will also be ready to use that option sometime here in the near future. So, there is a good reason why we are doing what we are doing. We believe it is a necessary part of the energy alternatives that we need to serve our utilities.

Thank you.

CHAIRMAN SELIN: Thank you very much, Mr. Newman.

Doctor Slember?

DOCTOR SLEMBER: Okay. I'd like to wrap up our concluding remarks.

As we've covered today, the issue of schedule is again before the Commission in SECY-93-097. I'd like to speak to that very important topic and emphasize that maintaining the System 80+ on a vigorous schedule is important, not just to ABB-CE but to the U.S. nuclear industry as well.

If the nuclear options remain viable for the U.S., completion of regulatory approvals must be

achieved. As Bob mentioned, investors in the Far East are now in the process of deciding whether to buy a nuclear power plant which is designed by an American firm to American standards and to American regulatory requirements. But they would like to build their own standardization programs based on designs from a nation that completes what it starts. We can best support the American nuclear industry by ensuring that the evolutionary advanced light water reactor designs are approved in as timely a manner as is possible.

We believe that the utilities in the U.S. will not give serious consideration to the nuclear option until they see the industry making significant progress towards the regulatory approvals necessary to support a combined construction and operating license. Dates published by the NRC in SECY-91-161 represented achievable targets for the two evolutionary plant design certification applicants. The lead plant was scheduled for final design approval about one year ahead of our System 80+ standard plant. But much of that time was spent resolving, as mentioned here today, the difficult issues of ITAAC. We have been able to keep System 80+ close to the original schedule due to our strong commitment to succeed and to the NRC staff's concentrated review effort.

We are now at a point where both plants are at an equivalent position in the review process with respect to both ITAAC and design approval. In this regard, we request that both plants be appropriately resourced through remainder of the review process, in effect demonstrating to the world that the United States has a robust licensing process.

As you the Commission consider what schedules to direct the staff to achieve for advanced reactor reviews in your response to SECY-93-097, please bear in mind what I have said. ABB continues to stand fully committed to gaining NRC approval and certification of System 80+ as soon as it can possibly be accomplished. Please do not let System 80+'s schedule be unduly delayed by NRC resource limitations or by schedule problems associated with other views which are not within our control.

I really want to thank you for your attention to our point of view and we'd be pleased to respond to any other questions or comments that you may have on this afternoon's interaction.

CHAIRMAN SELIN: Commissioner Rogers?

COMMISSIONER ROGERS: Yes. Mr. Newman, what are your thoughts and how would you plan to try to maintain standardization after certification

outside the United States? In other words, the standardized features that will be included here in the System 80+ for U.S. certification, what is your position with respect to trying to maintain that for other clients worldwide?

MR. NEWMAN: I think, Commissioner, that will depend somewhat on the countries. There are some countries who have a stated purpose of having their own standard design and building an indigenous capability to produce that design, such as Korea. In those cases, it will be, I think, their responsibility to take and build upon what we have done and maintain their own standard licensing. I believe in other countries such as Taiwan that you will see those countries stay pretty well tied together with standardization and hopefully will be able to build through various owners groups in future the ability to keep those designs standard as they go. That, I guess, will have to remain to be seen as we --

COMMISSIONER ROGERS: I mean are there any thoughts that you have with respect to trying to promote that? You mentioned owners groups and things of this sort, to take a more aggressive posture on that yourselves.

MR. NEWMAN: I guess I really haven't

thought that much about it. I think that in most cases in the discussions we've had with our Executive Steering Committee, that the utilities have viewed that as their responsibility to stay with it. Now, obviously, the vendor, ourselves, would be very active in that group also. But all discussions we've had to date with the U.S. utilities indicate that they really want to have some voting rights in the ability to keep it as high a standard, to the point of in some cases perhaps if someone wants to change something out, they have to get permission from the rest of the people in that family of plants to do so.

DOCTOR SLEMBER: Yes. If I might just add to that, I think a very pragmatic view of maintaining standardization says that if you have a fleet of plants out there, you really have to have a very tight owner's group that almost signs up for that standard design that changes -- there must almost be a very formal change review process and I think that to be effective that the international groups, I think if they want to really truly standardize designs, that would participate. I don't sense any real problem in doing that, but as in any case now, and let's take Taiwan as an example, the first thing they have to do, whether it be ourselves or any other successful

vendor, is to win the contract and then it goes from there.

CHAIRMAN SELIN: Commissioner Curtiss?

COMMISSIONER CURTISS: I don't have any other questions. I do look forward to your comments on the 92-287 and 287A, if that one is released, and I think it hopefully will be.

I would like to commend you for the timeliness and quality of the submittals that you've demonstrated over the past -- well, since we last met. I have been impressed with the progress that you've made. It's obviously considerable. There have been some tough issues and ITAAC is perhaps the toughest of the bunch that we all have encountered. I urge you to keep up that same level of effort and I trust that if we can maintain the resource commitment on our side, and I think the Commission is committed to doing that, that we'll be able to proceed with the same kind of progress that we've seen in the past several months.

DOCTOR SLEMBER: Yes. Just to respond to that, I think we have a winner on both sides. It's really demonstrating what was set out to be done.

COMMISSIONER CURTISS: Thank you.

CHAIRMAN SELIN: Commissioner Remick?

COMMISSIONER REMICK: You didn't talk much

about the instrumentation and control situation. What is your situation with the common mode failure and hardwired control system? Where do you stand with the staff on those discussions?

MR. MATZIE: Commissioner, we are very close to completing all the associated issues with that. We have incorporated some hard wire indications and controls into the plant. That has been reviewed and is basically in agreement -- we're in agreement with the staff and we've done a very extensive analysis of the basic Chapter 15, Chapter 6 transients and there's one class of transient where now is the only issue remaining on whether what we have implemented thus far combats all the transients and all the potential events. So, it's down to one small class which is basically large break and I think that shows very good progress and we've been working with the staff on closing that last remaining issue.

COMMISSIONER REMICK: You don't see that as a show stopper?

MR. MATZIE: I do not at this point. I think we're well on our way to completing it.

COMMISSIONER REMICK: I'd be curious in knowing if you're prepared to comment on what is the status of your PIUS submittal and so forth? Where do

you stand on that? What kind of a schedule do you see since we are looking at our --

DOCTOR SLEMBER: Can I come in at the top on that one, to just reinforce what I said? In a very pragmatic sense, I always focus off the real world and a real market that drives us. The real opportunities are on the evolutionary plant, not on what I call more developmental plants that might be available around the turn of the century or beyond because, let's face it, many of us at this table, myself included, may be dead by then. What I'd like to see is a success and I think we do have the ability of achieving that in the short-term. So, it would put priority clearly in your thinking process on what we are covering today.

COMMISSIONER REMICK: Fine. I did have one final question I wrote as we were going along. I was going to ask you when you left here what was your most important message to the Commission that you'd hope would tear out and perform, but I assume that that was in your final comments, the message about --

DOCTOR SLEMBER: Yes. I always wonder sometimes in my comments if I'm too subtle, but maybe I wasn't.

CHAIRMAN SELIN: I wouldn't worry too much about that.

MR. NEWMAN: Dick is not known for being subtle.

COMMISSIONER de PLANQUE: I have no specific questions, but I'd like to thank you for the update. I think it sounds very good.

CHAIRMAN SELIN: I have just a couple of comments. I attach myself to the comments of my colleagues.

I take your exhortations about resources, et cetera, to be sort of preemptive and prophylactic, not a description of the situation up until now.

DOCTOR SLEMBER: That's correct.

CHAIRMAN SELIN: In fact, I read this as quite a positive report, that resources have been there and you want to make sure that we keep them there in the face of the difference resource problems. Well, you can be assured of that, that in fact one of the things we tried to do is we told our Appropriations Subcommittee the day before yesterday is make sure that the resources for this program, which is as important as any program to the Commission have been reserved. I've also heard you say that the staff has dug in to make sure that these first ITAAC projects can be done and that it can shown that, in fact, it is possible to do these. In fact, I read

your report as a kind of existence theorem, that in fact Part 52 will work. I mean that you're far enough along in both the process and in the development to see that if the quality of the work is there, which you said will be if the resources are there, which we say they will be, you can see the -- I don't want to say it's the tunnel, the light at the end of the tunnel, but it's the runway at the end of the flight path.

The reason I take this metaphor is, in fact, we have a situation where we have effectively two airplanes coming and we assure you that there are two runways, there are two gates, there are two ground teams and you've both been cleared for landing by air traffic control. The reason I say that is a year ago we couldn't make this statement. There were problems in the other application which had to be solved for you to be free. But at this -- so, it wasn't true from the beginning that either one could take a schedule independent of the other. But the Commission has spent a fair amount of time with the staff and we are assured that at this point really the two applications are quite independent in terms of resources and in terms of substance that each one is going on its own schedule and accelerations or delays

in one should not have an effect on the other one.

So, we read this, I read this as we're not there yet and there's still a lot of hard work to be done, but a demonstration that Part 52 with tier 1, tier 2, ITAAC, DAC, et cetera, is in fact doable. I find, in addition to the quality of the work of your submission that Commissioner Curtiss referred to, just that message is really a very positive message and, in fact, the schedule really isn't that far off from when it was done without a real understanding of what the resource implications were and what the real problems were. It's a pretty good show. I hope you feel you got value for the money and for the effort too.

Thank you very much for coming.

DOCTOR SLEMBER: Thank you, Commissioner.

(Whereupon, at 3:14 p.m., the above-entitled matter was concluded.)

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING BY ABB-CE ON STATUS OF SYSTEM 80+ APPLICATION FOR DESIGH CERTIFICATION

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: APRIL 23, 1993

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

Carol Lynch

Reporter's name: Peter Lynch

Commission Briefing on System 80+ Design Certification

April 23, 1993

ABB-Combustion Engineering

Nuclear Systems

Topics and Speakers:

● INTRODUCTION Dr. Richard J. Slember President, ABB, Inc. U.S. Power Plant Businesses	5 min
● TECHNICAL ISSUES STATUS Dr. Regis A. Matzie Vice-President, ABB-CE Nuclear Systems Development	25 min
● PROCESS ISSUES STATUS Mr. Charles B. Brinkman Acting Director, ABB-CE Nuclear Systems Licensing	15 min
● COMMERCIALIZATION PROSPECTS Mr. Robert E. Newman, President ABB-CE Nuclear Systems	10 min
● CONCLUSIONS Dr. Richard J. Slember	5 min

System 80+ Major Progress Achieved

- New Radiological Source Term Implemented
- Severe Accident Issues Successfully Addressed
- Control Room Design Features Approval Nearing Completion
- Risk Assessments Used in Design Development and Evaluation
- Structural Design Developed Which Envelops Majority of U.S. Sites
- ITAAC Agreements Obtained on Content and Details

System 80+ Design Certification Program Milestones

● First CESSAR-DC Submittal	November 1987
● Final CESSAR-DC Submittal	March 1991
● Responses to all RAIs and Supplements	May 1992
● Draft SER	September 1992
● Final CESSAR-DC Amendment	June 1993
● Final SER to Commission	November 1993 (est.)
● Final SER Issued	February 1994 (est.)
● FDA Issued	April 1994 (est.)
● Design Certification	May 1995 (est.)

Progress Since Last Briefing

- Responses to Staff Questions (RAI's)
  - Completed Supplemental Reports
  - Revised CESSAR-DC (2500 pages)
- Responses to Draft Safety Evaluation Report::
  - Completed Initial Responses
  - Submitted Follow-On Analyses
  - Revised CESSAR-DC (8800 pages)
  - Remaining Tasks (e.g., ITAAC, Structural Design) scheduled for June 30, 1993
- Post-DSER Questions from Staff:
  - Responded to Shutdown Risk Questions
  - Responded to Severe Accident Analysis Questions

Current Status of DSER Review (AS of April 6, 1993)

- DSER includes 637 open and confirmatory issues:
  - 119 are resolved and closed
  - 234 are technically resolved and changed from open to confirmatory
  - 284 remain open
- Overall assessment:
  - Significant progress has been made
  - None of the remaining open items appears to present an obstacle to final design approval of System 80+

Ongoing Tasks

- Tier 1 Design Descriptions and ITAAC
- Integrated Review of CESSAR-DC
- Structural Design Detail
- Human Factors Engineering Review of Control Room Features
- Additional Issues:
  - New Source Term Implementation
  - Severe Accident Design Features Cost-Benefit Analysis
  - Intersystem LOCA Design Review
  - Leak-Before-Break Analysis on New Systems
  - Sabotage Vulnerability Review
- Closure of Remaining DSER Issues

New Radiological Source Term

- **Issue:**
  Application of the New Source Term Technology to a Specific Design
- **Status:**
  - **Implemented for System 80+:**
    - **Design Basis Safety Analysis**
    - **Probabilistic Risk Assessment**
    - **Protective Action Guideline compliance**
  - **Benefits:**
    - **Lower doses predicted for accidents**
    - **Higher allowable normal containment leakage rate**
    - **Charcoal filters not required for the subsphere and annulus ventilation system**
  - **Computer code verification is ongoing**
  - **Environment for Equipment Qualification not yet finalized**
  - **Expect closure of issues by June 1993**

Severe Accident Deterministic Analysis

- Issue:
  - Respond to post-DSER severe accident questions without relying on future experiments (i.e., address issues by demonstrating robust design features)
- Status:
  - Containment overpressure analysis shows that ASME Level C stress limit is not exceeded for approximately 60 hours
  - Reactor cavity wall analysis shows ability to withstand steam explosion from core debris - water interaction
  - Analysis shows that reactor cavity structure can withstand the most severe core-concrete attack for several days without a significant release of radioactivity
  - NRC Staff continuing review of hydrogen mitigation capability

Human Factors Engineering

- Issue:
  - State-of-the-art methods must be used for control room design, but there are no established regulatory acceptance criteria
- Status:
  - Agreement on the regulatory review model has been achieved
  - NRC review is nearing completion with emphasis on approval of specific design features
  - Detail required for verification and validation of procedures is not yet agreed upon

Human Factors Engineering (Cont.)

- Final Design Approval Will Close Review of:
  - Control Room Layout
  - Large Overhead Display
  - Standard Control Panel Features
    - plant computer display hierarchy
    - alarm tile displays
    - dedicated parameter displays
    - multiple-parameter displays
    - process controllers and push-button switches for component controls
- ITAAC will include:
  - design process for remaing panels
  - verification and validation of the complete control room

Probabilistic Risk Assessment

- Major Results for System 80+:
  - More than two orders magnitude improvement (decrease) in core damage frequency

Core Damage Frequency:

-Internal Events:	1.7 E-6	events/year
-External Events:	0.3 E-6	" "
-Shutdown Risk:	0.8 E-6	" "
Total:	2.8 E-6	events/year

Probabilistic Risk Assessment (Cont.)

- Containment Integrity, given a severely damaged core, is 99%
- Large offsite release frequency is 1.9E-8 events/year
- Health effects:
  - The probability of exceeding one prompt fatality is 2.1E-9 per year
  - The probability of exceeding one latent fatality is 2.0E-7 per year
- The Best-Estimate Dose at Site Boundary for the first 24 hours is 0.3 rem (Protective Action Guideline for Emergency Planning is 1 rem)

Structural Design

- Issue:
  - Provide single plant design that is acceptable for majority of U.S. sites
- Status:
  - Seismic soil structure interaction analysis methodology established
  - Analyses performed for variety of seismic spectra and soil conditions to develop design envelope
  - Structural Analyses ongoing for critical regions of plant

Significant Process Issues

- DD/ITAAC Form and Content, including Supporting Information
- Design Control Document Form, Content, and Review Process
- Metrication of Design Control Document
- Integrated Review of System 80+ Documentation

ITAAC Progress

● April 1992	Ten Pilot ITAAC Submitted
● June 1992	Nine Pilot ITAAC Resubmitted
● January 1993	Forty-Seven ITAAC Submitted
● February 1993	Two-Week Industry ITAAC Review
● March 1993	Twelve Prototype ITAAC Submitted and Reviewed
● April 1993	Agreement Reached on ITAAC Content and Details
● June 1993	Target for Completion of All ITAAC Submittals

ABB

Design Control Document

- DCD per SECY-92-287 Expected to Consist Of:
  - Tier 1
    - Certified Design Descriptions
    - ITAAC
    - Interface Requirements and Site Parameters
  - Tier 2
    - CESSAR-DC (Less PRA) amended to conform to FSER
- Staff Plans an independent consistency review:
    - Schedule delays
    - New issues
- ABB-CE requests that the DCD be issued after the FDA and prior to the notice of proposed rulemaking for the Design Certification Rule

Metrication of Design Control Document

- NRC Policy Statement:
  - Effective January 7, 1993
  - Recognizes there is no safety benefit associated with metric conversion
  - Is not applicable to licensees and applicants, only to the NRC itself

Metrication of Design Control Document (Cont.)

- Impact if Applied to System 80+ Design Control Document:
  - Would require thousands of conversions
  - Complete reprint and review of CESSAR-DC
  - Would have major cost and schedule ramifications
  - Would have potential for requiring substantial re-evaluation of the System 80+ design
  - Would have no positive benefit to safety
- Solution: Exempt Design Certification Proceedings from Metrication Policy Statement Requirements

Integrated Review of CESSAR-DC

- Scope :
  - Regulatory issues
    - IE Bulletins and Generic Letters
    - Regulatory Guides
    - USIs and GSIs
    - TMI Rule (10CFR50.34f)
    - SECY-93-087 and SECY-90-016
  - Global Issues
    - Chapter 14 Initial Test Program
    - Chapters 6 and 15 Safety Analysis
    - Technical Specifications
    - Probabalistic Risk Assessment
    - ITAAC
  - Major features of structures, systems, and components

Integrated Review of CESSAR-DC (Cont.)

- Process:
  - Performed by senior engineering and project personnel
- Schedule:
  - Technical review completed by early June
  - SAR Amendments completed by June 30
- Products:
  - Cross reference database
  - Accurate and consistent SAR

System 80 + Commercialization Prospects

- Taiwan
- Korea
- United Kingdom
- United States

Conclusion

- Licensing System 80+ has required a significant effort and commitment by both NRC and ABB-CE
- Review is near completion, but continued emphasis on resource commitment and schedules will be required