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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

REACTOR FUELS SUBCOMMITTEE

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WEDNESDAY

APRIL 10, 2002

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Dr. Dana A. Powers, Chairman, presiding.

COMMITTEE MEMBERS:

DANA A. POWERS, Chairman

MARIO V. BONACA, Member

F. PETER FORD, Member

GARY L. JOHNSON, Guest Lawrence Livermore

THOMAS S. KRESS, Member

GRAHAM M. LEITCH, Member

MILTON N. LEVENSON, ACNW Member

COMMITTEE MEMBERS (cont.):

STEPHEN L. ROSEN, Member

WILLIAM J. SHACK, Member

JOHN D. SIEBER, Member

ACRS STAFF PRESENT:

MAGGALEAN W. WESTON

C-O-N-T-E-N-T-S

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

(8:31 a.m.)

CHAIRMAN POWERS: Let's come in order. This is a meeting of the ACRS Subcommittee on Reactor Fuels. I'm Dana Powers, Chairman of the Subcommittee. ACRS members in attendance are Mario Bonaca, Peter Ford, Tom Kress, Graham Leitch, Steve Rosen, Jack Sieber and Bill Shack.

We are assisted today by Gary Johnson from Lawrence Livermore. We all bless that particular institution. He's going to be consulting with us especially about the electrical instrumentation and control system.

We are also assisted by Milt Levenson from the Advisory Committee on Nuclear Wastes. This should not be interpreted as our feeling that MOX is waste but rather that there is an interest by ACNW in the development of this facility. The purpose of this meeting is to discuss that mixed oxide fuel fabrication facility construction authorization and the DOE announced changes to the application for this facility.

The Subcommittee as usual have been gathering information, analyzing relative issues and facts, formulate proposed positions and actions as appropriate for deliberation by the ACRS as a whole. Mag Weston is the cognizant ACRS staff engineer for this meeting. The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register on March 22, 2002. I'm sure everyone has studied that closely.

A transcript of the meeting is being kept and will be made available as stated in Federal Register Notice. It is requested that any of the speaker first identify themselves and speak with sufficient clarity and volume so they can be readily heard. We have received no written comments from members of the public regarding today's meeting.

Let me begin by saying are there any comments that the members of the Subcommittee would like to make before we start on our deliberations today? Seeing none I'm told that Drew Persinko from the Office of Research will introduce our speaker from Duke Cogema Stone & Webster.

MR. PERSINKO: Thank you. My name is Drew Persinko and I'm with the Office of Nuclear Material Safety and Safeguards not the Office of Research. First on the agenda there will be two presentations by the MOX applicant. The MOX applicant is Duke Cogema

Stone & Webster.

The first will be discussion of the changes to the MOX facility as a result of DOE announced changes. The second presentation by Duke Cogema will be on electrical and I&C. We often refer to Duke Cogema Stone & Webster by the acronym DCS. With that I will introduce Peter Hastings, the licensing manager for DCS.

MR. HASTINGS: Good morning. I am Peter Hastings. I'm the licensing manager for Duke Cogema Stone & Webster. We appreciate the Subcommittee's endorsement that MOX is not waste. It's always a good start.

MEMBER LEITCH: That also has the endorsement of the ACNW.

MR. PERSINKO: That may be even better. The subject of my talk this morning is the impact on the facility and the licensing process from the recently announced changes by DOE on the surplus plutonium mission. Please feel free to stop me if you have a question or if something I say is not clear.

I'll very briefly give an introduction to the topic and then go into the details of the changes to the program which includes two primary unrelated changes by the way. The first of which is the processing of plutonium that was previously slated for a mobilization through the PIP facility. P-I-P. Plutonium immobilization plant facility which has been canceled as part of the DOE decision. The second is a change in the waste processing regime at Savannah River for liquid, high-alpha waste coming out of a MOX facility and the Pit Disassembly and Conversion Facility.

The plutonium disposition mission originally consisted of a two pronged approach whereby some surplus plutonium material was scheduled for processing through the Pit Disassembly and Conversion Facility which we refer to as PDCF and then sent to MOX for production in the MOX fuel. The second prong of which was send material through the plutonium immobilization plant. That second prong is the piece that has been canceled by DOE.

The PDCF obviously remains as part of the mission as does the MOX facility. This new waste solidification regime which we'll go into in some detail will handle liquid, high-alpha waste from both PDCF and MOX facility. You also will see as the MOX facility referred to in slides and in discussions as MFFF, Mox fuel fabrication facility.

Then obviously there are changes to the

environmental report and the construction authorization request as a result of those changes. We will go over those in some detail as well.

As I said the two elements of the program changes are first to process some material originally slated for mobilization and second to solidify waste at the Savannah River site in lieu of processing that material through the Savannah tank farms. The changes to the facility for the alternate feedstock that is the buzz word for this material that was originally slated for mobilization will involve some changes to the design but we are as with the MOX facility using very similar equipment and a proven design without introducing significantly different hazards from the existing safety basis facility.

With the exception of some changes to the aqueous polishing line to remove some additional impurities and some powder pretreatment changes there is a minimal impact to the remainder of the facility. There are minimal additional environmental or safety impacts.

The change to the facility to accommodate the alternate feedstock materials does result in a delay in the schedule and a minor change in the design but it's an impact that allows for the continued success of the overall program and continued support of the nationally important vision.

MEMBER SIEBER: How does that extend the expected lifetime of the facility?

MR. HASTINGS: It doesn't extend the lifetime but it extends the schedule for going into construction.

MEMBER SIEBER: But now you're going to process more material so the facility will operate longer in order to it.

MR. HASTINGS: There's a minimal impact to the capacity of the facility because our contract capacity was originally 33 metric tons of plutonium which was in excess of the 25.6 tons originally slated for MOX. The MOX facility will now take care of the entire Russian agreement scope which is 34 tons. So it's an additional ton. It's minor change.

MEMBER LEVENSON: Can I ask a philosophical question on the environmental issue? Since now there is not going to be immobilization can you get any credit for any environmental impact that might have occurred there as a write off against any you might have?

MR. HASTINGS: That's a good question. I'm not sure that philosophically that's how we'll approach the environmental report. I'm not sure that the staff would approach it that way from the EIS perspective but it's certainly something to keep in mind. We do believe that it provides for an overall reduction in the environmental impact because we're building less facilities. There's less operations going on and so forth.

I'll skip over the title slide there. There are two primary changes as I mentioned: the waste solidification and the alternate feedstock. It's worth pointing out at this point that the changes from waste solidification don't really impact the MOX facility significantly. They do impact our schedule because we have to account for the new waste processing building as part of our environmental report but it doesn't significantly impact the design of the MOX facility because we were always going to be sending our high-alpha waste to Savannah River. They are just changing the way that they are doing their processing of that material.

So here we have a summary of the alternate feedstock and waste processing changes. As you see here the original 25.6 tons of plutonium and significant digits notwithstanding all of these numbers are approximate. The original baseline amount coming through the PDCF is about 26 tons. There's an additional six or so tons that was originally slated for plutonium that will now be coming to the MOX facility and the balance to reach the 34 tons of material to meet the Russian agreement is future declaration of surplus by DOE. That material has not been identified to date.

MEMBER ROSEN: When you say approximate, how uncertain are those numbers?

MR. HASTINGS: The numbers that we have seen are plus or minus a couple of hundred kilograms. So the six metric tons is on the order of 6,000 kilograms to 6300 kilograms that sort of range.

MEMBER ROSEN: Okay.

MR. HASTINGS: The numbers are reasonably accurate but they certainly are not to any significant precision at this point. The significant difference in the alternate feedstock that results in a requirement to change the design of the facility is that the material does include additional impurities that require additional aqueous processing at the front end of the facility.

As a separate change and again the change to the waste processing regime and the change to accommodate alternate feedstock are entirely coincidental. They are unrelated. It is fortunate for us that we are making the changes at the same time so that we don't have two hiccups in our schedule. But they are unrelated changes.

As I said the high-alpha and also the stripped uranium waste stream from the MOX facility and PDCF will be solidified by Savannah River as opposed to going through the tank farm. This is a change that was made by DOE to minimize the risk associated with possible availability or unavailability of the tank farms in the future. It also happens to be responsive to some of the concerns that have been expressed by members of the public and others about adding material to the Savannah River tank farms. As we discussed before we think this results in an overall net reduction of our little impact across the program.

Just a little bit on what the material looks like. As was the material coming from PDCF the material will be unclassified, oxide powder when we receive it at the MFFF. It will come in in DOE-3013 canisters as with the PDCF material. It's still weapons grade material. The plutonium and uranium content is well characterized but the impurities are not necessarily. So part of the changes required include characterization of the in-coming material. We'll get into that in some detail.

MEMBER ROSEN: What do you mean by "unclassified"?

MR. HASTINGS: "Unclassified" in terms of we won't receive Pits. The fundamental purpose of the Pit Dissembling Conversion Facility not only is to convert the metal pits into oxide for us to process but also to convert the material from a classified form into an unclassified form in terms of national security information.

MEMBER ROSEN: Okay.

MR. HASTINGS: The baseline impurities are characterized as you see here by americium, gallium and uranium. Those impurities are the basic reason for the aqueous polishing front end of the facility to strip out primarily gallium for fuel spec reasons. We also strip out the uranium and americium in those same steps.

The alternate feedstock is broken up into several categories depending on the content of the impurities. Feed Type 1 is similar to the current PDCF spec but it's material that was going to go to immobilization. So Feed Type 1 would require by itself very little in the way of changes to the facility. That amounts of about 1,000 to 1,200 kilograms of plutonium.

Alternate Feedstock Type 2 contains additional salts but not chlorides. The chloride content is the breakpoint between Alternate Feed Type 1 and Type 2. We see a list of the main impurities there. The primary impact of the facility there is the requirement to strip these impurities out and the waste stream goes up somewhat. Alternate Feed 2 contains chlorides and that requires additional processing to pull the chlorides out. We'll go into that in some detail.

Let me back up. Alternate Feed Type 2 I mentioned -- Excuse me. I misspoke. Type 1 is about 1,000 kilograms. Type 2 is 1,000 to 1,200 kilograms. Type 3 is between 3,800 and 4,000 kilograms. So it's about half of the alternate feedstock material. Then there is a Type U which is material with limited depleted or enriched uranium content. That's only on the order of a couple of hundred kilograms. That's a small amount of material.

There is feedstock that was not considered for processing by the MOX facility. That's material that contained significant quantities of thorium, beryllium, neptunium and uranium, things that would have represented too much of an impact on the design for us to process efficiently.

MEMBER KRESS: Do you have to have a separate processing in line for each one of these feedstocks?

MR. HASTINGS: Yes. We'll go into that.

MEMBER KRESS: Oh, you're going into it.

MR. HASTINGS: We will go into the changes to the facility and the process itself. It does vary. That's an important point. The changes to the facility are not for the entire 34 tons of material. The changes to the process, the changes to the facility are only to accommodate this alternate feedstock so it will get limited use.

As I mentioned before there are two primary impacts to the facility to accommodate alternate feedstock and that's pretreatment of powder and then some changes to the purification line. We are again as with the baseline facility maximizing the reeves of the available experience. We don't believe we are introducing new hazards or significant additional risk.

The pretreatment changes are shown here. The receipt and storage of incoming 3013 canisters or containers is unchanged primarily because we currently assume maximum theoretical density for plutonium powder coming in of 11 and a half grams per cc so that's already an abounding analysis for that incoming storage.

MEMBER KRESS: What's the material density?

MR. HASTINGS: It's in the neighborhood of four to seven but we use 11 and a half to just abound the criticality controls. The powder pretreatment changes are driven by differences in the powder characteristics including particle size and as I mentioned earlier, the need to characterize the impurities. But again this is for the alt feedstock material only not for the entire feed stream.

So for the powder pretreatment we had a couple of ball mills to get the particle size down for dissolution and homogenization and also to control down stream density so that we don't have to continue assuming 11 and a half grams per cc for downstream criticality controls.

We will characterize each can to determine what the impurities are and determine which additional processing steps have to be utilized. Also to allow for an appropriate blending of cans if we get a can in that has a higher impurity than we like we can set it aside and reserve it for mixing and blending with future incoming materials to limit liquid waste and to provide for isotopic homogenization.

Recanning is a change and an additional process step to provide for again longer term storage, recanning of the material and putting it into the vault for blending flexibility later. This is very similar to providing for buffer storage in the new process itself.

There are also additional laboratory equipment obviously to do that additional characterization of impurities. You can see that the various glove boxes here and laboratory processes that are added. There are also some miscellaneous changes to the facility that aren't shown on this slide. Structural changes are one for example. The MOX processing building part of the MOX facility footprint has not changed but there are some internal rearrangement of compartments and so some changes in radiation zone, HVAC zones, some incidental changes to the HVAC and electrical I&C design as a result of the addition of the glove boxes and so forth. We have added a mezzanine level at one level of the facility to accommodate the additional laboratory equipment for example.

The changes to the process itself are shown here. Again for Type 1 and Type 2 feedstock there are no significant changes in the process itself. There are some minor process variables that get impacted, recirculation and flow rates in silver recovery for example because of the additional salts. But the primary change for Type 1 and Type 2 is the change in the additional salts in the waste stream.

Type 3 is where the significant process changes occur. It's the changes to remove the chloride from the feedstock primarily for process reasons to avoid precipitation of silver chloride for example. Also this will provide for polished plutonium that will meet the fuel spec. It also limits downstream corrosion problems.

I don't mention on this slide but I'll mention it here there is also an additional process step for the small amount of Type U, the uranium bearing material. We added a uranium stripping column because we may be getting material with uranium content that exceeds the PDCF spec but it's still low content but high enough that the plutonium stripping column wouldn't necessarily have high enough separation factor to take that uranium out.

I've discussed the process changes to

remove the chlorides. Again it's for process and fuel spec reasons. It also limits downstream corrosion as a result of chloride.

We sent the feedstock through a two step electrolyzing process to remove the chlorine and then dissolve the feedstock. We send the off-gas through a filter and then wash it to convert the chlorine into sodium chloride. This process is based on a process developed at the La Hague facility in France, the UCD plant which is a dissolution line for various wastes. It is a process that was developed by Cogema to treat scrap material that has both chloride content and plutonium that they want to extract. So it is a proven process.

That's the process change. The additional equipment involved includes a couple of dissolution lines with a hopper and electrolyzer and then filters and slab tanks, then the washing column as I mentioned before and the subsequent storage tanks for the liquid waste that includes the chloride salts. This isn't the Type 3. This is the Type U. We also have the additional uranium stripping column as I mentioned before.

So the AP part of a MOX facility the building does change. We're adding a process step so in that building we insert a process line of about 20 feet or so into the middle of the building so the building actually stretches. The resulting impact to the overall MOX facility is less than 10 percent change in the footprint of the area.

As with the MOX processing part of the facility, the AP area also requires some interior reshuffling of spaces and HVAC and radiation zone changes as a result of that. The waste characteristics are impacted primarily again by the Type 2 and Type 3. There are additional salts in the waste stream. The raffinates volume goes up about 50 percent resulting in an overall increase in the high-alpha liquid waste volume of about 10 percent.

Also there is a 10 percent increase in the low level liquid waste volume as a result of primarily the change in the size of the building. There is a slight increase in silver content as you see here as a result of the changes in the efficiency of the silver recovery unit because of the additional impurities.

We talked about what this means to the licensing of the facility. This presentation originally included information on the schedule change but I believe the staff is going to cover that later so we won't go into that in any great detail.

There are two primary documents that we have in staff review right now, the environmental report and the construction authorization request. You will recall that the licensing process for the MOX facility is a two step process. First construction authorization is needed which will be granted on the basis of a favorable environmental impact statement conclusion and an SER on the basis of our construction authorization request. Subsequent to that we will submit the operating license application, the application for possession and use.

So we currently have the two documents that I mentioned before the staff. Both of them will change for reasons that we will discuss. We obviously need to revise the environmental report to address alternate feedstock because we are eliminating immobilization so that element of the mission goes away. We will be receiving the additional material that doesn't match the original PDCF spec and the intended process changes and the waste changes as a result of that. It will also reflect the fact that we're increasing the capacity of the plant over its lifetime from 33 tons to 34 tons.

We did present the original impacts on an annual basis though so going from 33 to 34 won't impact things very much. We also did our original impacts based on the maximum design capacity of the plant which the annual design capacity of the plant times the operational life of the plant way exceeds 34 tons. So that should be a trivial change.

The environmental report also will obviously have to be revised to reflect the changes in how our waste is processed by Savannah River. We've talked about that in some detail already so I won't go into the details on that again. Also we have a number of RAI questions and clarifications. There are two that we've responded to but the document has not been formally revised and resubmitted to incorporate those changes so we'll take advantage of the opportunity to go ahead and fold those changes into the environmental report as well.

The changes will include obviously a description of the process changes and we've already discussed what those are, the powder processing equipment, the chemical processing changes for chloride removal, the uranium stripping column, the storage for waste, the additional chlorides and the small increase in the building footprint.

It's worth noting here that even though

the footprint of the building changes, the disturbed area associated with the facility does not. The minor increase in the footprint of the building didn't create additional disturbed area for the facility in terms of environmental impact.

We also will discuss the minor additional airborne effluents associated with off-gas from the chlorine stripping column. As indicated here, the clean condensate and stormwater effluents, those are nonradioactive effluents, will not be changed significantly.

To continue on, we'll also discuss the waste processing changes. As I mentioned before, the liquid waste volume increased by about 10 percent. That's both the high-alpha waste and the low level waste. Solid waste volumes are not expected to change. The impacts of the changes are expected to be bounded by the analysis that we have already done because the changes are not that significant in terms of additional risks or additional consequences.

Now we obviously have to conduct the analysis to demonstrate that. That's why we can't send the ER in today.

CHAIRMAN POWERS: This statement really puzzles me because the physical changes you are talking about as far as building footprint and things like that, they are all small. The complexity of the operation however is quite different now. The potentials for human error looks to me like they've gone way up.

MR. HASTINGS: I'm not sure why because the processes that we are using are analogous to the processes that were in place as part of the aqueous polishing process to begin with.

CHAIRMAN POWERS: Just the potential of mixing one waste stream with another seems to have gone up.

MR. HASTINGS: We obviously will have to confirm this but we're not aware that the waste streams are going to present a problem in terms of the Savannah River waste acceptance criteria for example.

CHAIRMAN POWERS: I meant the feed streams.

MR. HASTINGS: I see.

CHAIRMAN POWERS: I mean the whole flow of work for the facility now has the potential of people just forgetting what they actually have and mixing it with something else.

MR. HASTINGS: That's certainly true but the emphasis on control of a product not for safety reasons but for product quality reasons to meet the fuel spec which is verified at the tail end of the process anyway is going to dominate the controls associated with this.

CHAIRMAN POWERS: It seems to me that that's where the big change is going to be. I don't see how that can possibly be bounded by the previous calculations.

MR. HASTINGS: Well, when I refer to the previous calculations bounding I'm referring to primarily the consequence analysis associated with normal operating accidents. We've made some fairly significant conservative assumptions about material at risk, release fractions and so forth.

CHAIRMAN POWERS: I think I would be willing to stipulate for purposes of discussion that your consequence analysis probably are bounding. Now let's talk about frequencies of getting to consequences. There I don't think you can be bounding with the additional complexity involved.

MR. HASTINGS: It's certainly something we can address. Most of our analysis are done on a purely deterministic basis so we assume the event occurs. As you will hear in subsequent presentations I'm sure, our safety assessment to date has screened any internal events on the basis of frequency.

CHAIRMAN POWERS: I'm sure that your analysis have screened things on the basis of frequency not explicitly because you didn't think about them.

MR. HASTINGS: We hope we thought of everything but I understand the point.

CHAIRMAN POWERS: In that regard can you give us any insight how the events of September 11 have impacted your thinking about the facility?

MR. HASTINGS: Certainly. I'm not sure it's going to be particularly insightful though. We understand that both the Department of Energy and the NRC are in the process of evaluating the adequacy of the current design basis threat. We're waiting with bated breadth for either or both of them to give us additional guidance.

We haven't done a lot of speculating in terms of what the answer might be because we really can't predict what's going to happen. We're trying to stay on top of developments in that area as much as possible so that we can anticipate what those changes might look like when they come out. But we've been talking with the staff and they understand that we are keenly interested in any developments in that area.

However, we haven't heard significant.

CHAIRMAN POWERS: You said you are interested in what the NRC is thinking than what the DOE is thinking about.

MR. HASTINGS: They are actually working fairly closely together to try and make sure that the changes that they make on either side of the fence are at least coherent with one another because we do have a security regime for our facility that is responsive to both DOE and NRC requirements. Those requirements are generally analogous. There's not a lot of difference between the two. We're as interested as you are in what the new design basis threat is going to look like assuming there are changes.

CHAIRMAN POWERS: If someone came down and said locate this thing significantly underground, how much of an impact do you think it would have on you?

MR. HASTINGS: I wouldn't want to speculate. It would significant in terms of schedule if nothing else.

CHAIRMAN POWERS: Well, schedule I admit but in terms of facility design, safety analysis, things like that.

MR. HASTINGS: I would think that the safety analysis would get easier. I think the design would get harder. I'm certainly no expert but I would surmise that the design impact would be significant. That's admittedly somewhat speculative on my part.

CHAIRMAN POWERS: Thank you.

MR. HASTINGS: Continuing on with changes to the ER to reflect the waste processing changes. Again the waste processing changes at Savannah River impact almost exclusively the ER because it's not part of our facility so the CAR itself or Construction Authorization Request that contains the safety analysis in safety space isn't impacted. But the ER certainly is because it's a related action.

We will reflect the changes in the SRS waste processing strategy. Again I'm getting a little repetitive and I apologize but the Savannah River site will process the liquid waste in a facility that's not on a MOX site and we will be doing that in lieu of going through the tank farms. It will be to process both MOX facility waste and PDCF waste.

The conceptual design of the facility is currently underway. We expect the information for the input to our environmental report which is going to be submitted in the middle of July that is the amendment to the environmental report will reflect these changes.

The process that the MOX facility will use to get that waste to Savannah River has not substantially changed though because we were always planning to pipe it to a Savannah River facility off-site. Again the waste treatment characteristics include the MOX raffinate stream and PDCF sources as one type of stream and then the stripped uranium stream is a separate stream.

The environmental impact and this is not an exhaustive list certainly will include construction impacts from building the waste processing building, normal and accident releases, impacts for transportation of waste and deposal of waste. There are some other changes to the ER as a result of waste processing and alt feedstock. We will be addressing all those in the ER that's submitted here fairly soon.

CHAIRMAN POWERS: Your environmental impact statement should go and address deactivation and decommissioning of the facility itself.

MR. HASTINGS: I don't recall frankly the extent to which we treat deactivation. Decommissioning is not in the DCS scope. We're going to deactivate the facility and we have on our list of things to do to define the bounds of what that deactivation means. It will probably mean getting the building decontaminated to the point of release and then turning it over to the Department for some possible future use. So they have the responsibility of deactivation. I don't recall frankly what the ER says about that and how much detail we go into. But the deactivation of the MOX facility shouldn't be impacted by the change.

MEMBER ROSEN: The difference between deactivation and decommissioning is that in deactivation you don't tear down the facility.

MR. HASTINGS: Correct. You turn it over to the DOE and they will decide what they are going to do with it.

The tentative conclusions as a result of the work that we've done on the ER amendment for alternate feedstock and waste solidification lead us to conclude at this point that we're not going to have significant changes in affluence. We're not going to have significant increase in individual or cumulative radiation exposure or consequences from accidents. We don't expect a significant change in construction impact either from our facility or the new waste processing building relative to the impacts that we've already discussed in the ER that's before the staff today.

CHAIRMAN POWERS: How much of a change would have to occur to be called significant?

MR. HASTINGS: I can't answer that question off hand.

CHAIRMAN POWERS: I mean essentially you're getting six more metric tons of material to process. Discounting even the complexity, it's roughly a 25 percent increase. There has to be a 25 percent increase in the cumulative --

MR. HASTINGS: No. Because we've already assumed our contract value of 33 tons. That's only an increase of one.

CHAIRMAN POWERS: Good point.

MEMBER KRESS: Except that could have been viewed as margin and now you have reduced that margin.

MR. HASTINGS: It could have been but we didn't. The construction authorization request and the safety assessment that is embedded within it again will not require significant change for waste processing but will require changes for the alternate feedstock again as with the ER with the updating of process and system descriptions as we've discussed previously and confirmed that the safety analysis that we have done are still bounding or do the additional analysis that are required to evaluate any new scenarios and identify any new items relied on for safety.

As I mentioned we only anticipate a minor revision to the CAR itself to address the waste processing changes primarily in terms of the description of the waste processing regime. As with the ER, we have RAI responses and clarifications some of which are still open and staff is going to discuss that later today that will be folded into the amended construction authorization request. That's currently scheduled for submittal in October of this year.

Again staying with the CAR we'll also discuss as a result of alternate feedstock anticipated changes on the existing facility as with the ER that the CAR used significant conservative assumptions so we don't anticipate that those consequence analysis are going to be challenged by the changes in the facility. That's something that we obviously will confirm before we submitted the amended CAR.

If there are any new scenarios, if there are any analysis that are not currently bounding, then it's conceivable that we would identify new PSSCs which are principal SSCs that is those things that are anticipated to be relied on for safety. They are not called items relied on for safety at this point in the process because we haven't been through the complete safety analysis but the terms are generally analogous.

As part of a later presentation the staff is going to discuss changes in the licensing schedule as a result of the alt feedstock and waste processing changes. We've certainly talked to them about those in a couple of meetings and discussions. But the upshot of it is we are delayed by about a year. That delay is dominated obviously by the design changes.

We currently are scheduled to submit the supplement to the environmental report in July of this year, the amendment to the construction authorization request in October of this year, and the schedule that I think the staff is going to show you will provide for construction authorization obviously assuming everything goes well in October of 2003 which is about a year beyond the original baseline schedule.

That concludes my presentation but I'd be glad to answer any questions.

MEMBER LEITCH: I'm still a little confused by the changes in waste processing. There is now going to be a new waste processing facility at Savannah River but not connected with the Fox facilities. Is that correct?

MR. HASTINGS: Right.

MEMBER LEITCH: Not on that site. Now what was the situation previously? Wasn't that always the case?

MR. HASTINGS: Yes. The original baseline was for us to send our liquid waste stream to a Savannah River neutralization facility for introduction into the tank farm. Instead of going to the neutralization facility and then into the tank farm and then presumably to the defense waste processing facility, we're now going into a solidification facility to bypass the tank farms and the presumed DWPF deposition path.

So in terms of the changes to the facility it's really no significant change. If it were only the waste processing change we might not have the full year delay because we don't have to do a lot of design work to accommodate that change but we do have to understand enough of the design to do the environmental report to understand the changes associated with that document.

MEMBER LEITCH: I just have a little trouble following some of the flow paths and so forth as you went through your discussion. I was just wondering if is there available a simply flow diagram of the process with the major pieces of equipment on it.

MR. HASTINGS: We don't have anything prepared today but we can certainly put something together. We did have some slides that we presented to the staff that had some flow information on it. Unfortunately those slides are proprietary. We haven't yet gotten the redacted version of those slides into them. I think we can turn that into a nonproprietary process flow chart and provide it to you that might give you some more information.

MEMBER LEITCH: That would certainly be helpful to me.

MR. HASTINGS: I'll take that as an action.

MEMBER ROSEN: That certainly would be to me as well. Maybe we should distribute it to the whole committee.

MEMBER LEITCH: Right.

MR. HASTINGS: We can certainly do that.

CHAIRMAN POWERS: I keep coming back to I think it's your slide six and the number of feeds that you have now. In the original design how many different types of feed did you anticipate?

MR. HASTINGS: Just one.

CHAIRMAN POWERS: Now you have four.

MR. HASTINGS: Correct.

CHAIRMAN POWERS: Yet the tenor of your presentation is this is a very modest change. But it seems to me that the complexity of the operation has gone up, way up. I'm sitting here wondering why should the changes be so modest if I've had greatly enhanced changes in the complexity.

MR. HASTINGS: Well, I'm not sure that the changes are as complex as perhaps I've led you to believe. The material will be evaluated upon receipt and fully characterized for impurities. If the impurities warrant they will be sent to a separate process for chlorine stripping or uranium stripping.

CHAIRMAN POWERS: Do you anticipate feeds coming in times sequence that is you would handle feed one for some protracted period of time and then you would be done with that and you would know switch to feed 2 or are you just going to get these feeds all willy-nilly?

MR. HASTINGS: I certainly wouldn't characterize it as willy-nilly but it certainly will be a carefully controlled process and appropriately scheduled. I'm not aware that there is an intent to sequence Type 1 and then Type 2 and then Type 3.

Again Type 1 is processed as per the

normal PDCF spec material with the exception that it goes through the laboratory analysis to confirm the impurity level first. Type 2 is very similar. The only change there is the impurity analysis to confirm that the only difference between that incoming material and PDCF spec material is the additional impurities that will increase the waste stream impurity content slightly. So the Type 3 material which is about half of the alternate feedstock material and the Type U material are the only materials that take downstream of the laboratory analysis any significant additional processing.

MEMBER ROSEN: This bears basically on Dr. Powers' question. This is inherently a batch process. Is it not?

MR. HASTINGS: Correct. There are elements of the process that run essentially continuously but the fundamental process to make a batch of fuel is a batch process.

MEMBER LEVENSON: Let me ask a question. If a mistake is made and --

CHAIRMAN POWERS: He himself makes no mistakes.

MEMBER LEVENSON: And any of the categories of materials are assumed to be category one and run through the process, is there really any safety connotation or is it just that you get off-spec product?

MR. HASTINGS: You just get off-spec product. Back in the process all of the material --

CHAIRMAN POWERS: I think that is not the case. I think that if you ran type 3 feed through thinking it was type 1 feed that would substantially contaminate your process system with chlorides with obvious impacts on corrosion and things like that.

MR. HASTINGS: Well, that's true but it wouldn't be an immediate impact. It's not going to create an accident.

CHAIRMAN POWERS: The metal would certainly think it was immediate.

MR. HASTINGS: But it's not going to result in an instanteous accident consequence. It's something that would have to go on for some protracted period of time uncaught by the plethora of controls that we have in the facility in order to create a substantial hazard.

CHAIRMAN POWERS: You wouldn't be the first to create a latent error that suddenly appeared as I understand.

MR. HASTINGS: It's clearly something

that's going to require nontrivial process controls. But those kinds of process controls again are primarily dominated by product quality concerns. After all we're a supplier to reactors of basic components. It is something that's already going to be in place. This is really just more of the same types of controls that are already required both for product quality, for criticality control and for controlling other hazards.

MEMBER ROSEN: Now that we've started digging at this let's dig a little more. Let's say it happens. Now you come up with stuff at the end of this process that doesn't meet the specs. What do you do then?

MR. HASTINGS: You scrap it. It goes back to the front end of the line and gets reprocessed.

MEMBER ROSEN: That's not scraping. That's reprocessing.

MR. HASTINGS: Well, scrap is a term of art for this facility certainly. Scrap material is referred to in our process in off-spec material that is returned back into our processing and recycled back into the process. I make this point because you'll probably see this term in subsequent discussions. You're right. It's certainly not waste.

MEMBER ROSEN: You respectively start over.

MR. HASTINGS: Right. There are provisions throughout the design for capturing and recycling scrap material. That's the case with the entire process anyway. If off-spec material is produced at the end of the line it's returned and certainly the entire batch would be evaluated for its quality. You obviously shut the facility down and find out where your problem was.

MEMBER ROSEN: Well, that's true typically of chemical processes in the interim stages as well.

MR. HASTINGS: Right.

MEMBER ROSEN: I mean if you get an interim step that's off-spec you recycle it at the interim.

MR. HASTINGS: Absolutely.

MEMBER ROSEN: You don't go all the way to the end and then recycle.

MR. HASTINGS: And that's a very good point. We certainly do not fail to evaluate the product at every major step in the process. But the ultimate product quality is verified at the end before we ship it off to the reactor customer.

MEMBER KRESS: Excuse me. Why are you

guys doing this? Is this a money making operation or what?

MR. HASTINGS: You mean MOX in general.

MEMBER KRESS: Yes. You don't make a money out of this.

MR. HASTINGS: Well, we don't work for free but we're certainly not in it for the money. I happen to be a Duke Energy employee as part of the DCS consortium. I can say very clearly that Duke's involvement in this process and I think the same is true for Cogema Stone & Webster as well as all of our subcontractors is primarily and fundamentally because of the importance of the mission.

MEMBER KRESS: So if you ended off-spec quality, you don't really care. You just go ahead and send it back.

MR. HASTINGS: Right.

MEMBER KRESS: Because you will get reimbursed.

MR. HASTINGS: Well, we're certainly not motivated by inefficiency.

MEMBER KRESS: That was my point.

MR. HASTINGS: That is we are not motivated to be inefficient. We certainly have provisions in our contract for encouraging efficiency in the process. But in terms of safety ramifications there is no impact of off-spec material with the exception that Dr. Powers mentioned that certainly a long term misdirected process could result in our not evaluating conditions.

MEMBER KRESS: I agree with Dana in that stress grows in cracking the chloride. It doesn't necessarily mean long term. It can happen pretty fast.

MEMBER LEVENSON: How about room temperature systems?

MEMBER KRESS: That's another issue. You are right. It's just pretty slow at room temperature.

CHAIRMAN POWERS: It seems to me that I can find lots of corrosion mechanisms at fairly modes temperatures. It also seems to me that we originally had a product feed. It was a pretty clean feed. It was a little bit of gallium and a little bit of americium in here. Now we're going to get a feed that has a Duke's mixture of stuff.

MEMBER KRESS: Was that a pun?

CHAIRMAN POWERS: Yes, intended. So now our quality assurance activities have gone way up at this facility. Again adding in a complexity I'd like to see Dr. Shack's reaction if I told him that I was going to put a lot of fuel in a reactor with copper in it. Maybe a little lead too, Bill. I mean it does seem to me that it's more complex than it's been before. And then add far more than the footprint of the building or the amount of disturbed ground that we have is really the impact here.

MR. HASTINGS: It is certainly not a trivial change to the design. It's minor in terms of a challenge to the processes that are involved because the processes are very similar to the polishing steps that are already involved. But it is a separate process to address specifically the additional impurities and embedded within those changes are the additional laboratory analysis that are required for all that material so that we do fully characterize what's in them and make sure that we get it out so that we do meet the fuel spec.

MEMBER KRESS: You dissolve all this powder in acid before you use it.

MR. HASTINGS: Yes.

CHAIRMAN POWERS: The good thing is it's an acid system.

MEMBER KRESS: That's exactly right. The material is going to be able to stand the chlorine if they can stand an acid.

CHAIRMAN POWERS: Any other questions?

MR. HASTINGS: With that I'll introduce Ron Jackson who is our electrical design lead. He's going to give you an overview of the electrical system followed by Jon Tanner who will give you an overview of the I&C system.

CHAIRMAN POWERS: Let me just as a point of introduction say that following our first meeting on this facility, we asked specifically that this subject get a lot of attention because this has to be one of the more novel features of the facility they put together. Otherwise it looks like an awful lot of other processing facilities I've looked at.

In thinking about process facilities I reminded myself that the last time I looked that PUREX facility at Hanford that year they had 2,000 misdirected feed operations over the year. Now all their valving and whatnot of course is done annually. This electrical instrumentation, computer-control system that they've created is intended to somewhat inhibit those errors so I found it quite interesting.

MR. HASTINGS: And let me point out before Ron gets started certainly without disputing what you just said that the fundamental design of this facility is based on a fourth generation design of an operating facility in France. I think I mentioned to one or more of you off-line or at the last meeting that I attended we certainly welcome any or all of you to come tour those facilities at your convenience. I think it clearly helps get a handle on it since you aren't aware of the processes.

CHAIRMAN POWERS: Yes. Since you said I had swarms of requests for visiting that facility by a most circuitous route.

MR. HASTINGS: And for that I apologize. Thank you.

MR. JACKSON: I'm Ron Jackson. I'm the lead electrical for DCS. I just want to give a brief overview of the electrical system and the design basis for it. Our electrical distribution system has several voltage levels. We get two independent feeds from off-site at 13.8 kV and then we step the voltage down to 4.16 kV. We have several large loads at 4.16 kV mostly large ventilation fans and HVAC chillers.

From them we also step down to 480 V where most of our distribution is done and most of our users are. We also have 120 V AC UPS system for violet type instrumentation and 125 V DC system for control power for switch gear controls, breaker controls, that sort of thing.

Our design basis consists of having sufficient capacity and capability to meet all of the operating modes of the facility. We prevent any single failure vulnerability. We have electrical and physical separation for the IROFS equipment. We have adequate protective relaying and for breaker controls. We are able to monitor our system and stay on top of the status of system. We are also able to test and do surveillances. We're designed in our IROFS for protection against natural type phenomena, earthquakes, tornadoes, that sort of thing.

MEMBER ROSEN: Hold on a minute. I'm coming a little late to this whole discussion being a relatively new member of the committee. I need to know when you talk about design basis and all these things you've listed here whether the standards for that are the same or similar to reactor plant standards.

MR. JACKSON: We use our IEEE standards for the nuclear industry. For instance, 308. Our separation criteria is --

MEMBER ROSEN: Reg Guide 1.75.

MR. JACKSON: We've committed to the IEEE standards. 384 for separation. The 1992 version. I have a slide just a little further on that discusses that.

MEMBER ROSEN: Okay. So you are going to talk about what standards you use.

MR. JACKSON: Right. On a high level.

CHAIRMAN POWERS: Mr. Jackson, I really appreciate this slide two, this nice summary of what your design basis is is very helpful.

MR. JACKSON: Thanks. In terms of capacity and capability, as I said we have two off-site supplies. We come in at 13.8 kV. Both feeds are capable of supplying the entire facility. We don't normally run in that configuration. Normally our loads are split between either side. Just to show you because I did not provide this in the handout because it gets a little difficult to see.

CHAIRMAN POWERS: You know you have a spelling mistake there on that third one.

MR. JACKSON: At a high level this is the composite configuration of the system. You can see we have off-site feeds coming from two different feeds from off-site. The tie breaker is normally opened and each feed supplies its own 4160 bus through a transformer. Then we get down into the 480 V distribution system and what you would classically call a Class 1E electrical system is this dashed area in here where emergency diesels are and emergency buses where emergency loads are supplied.

MEMBER ROSEN: Do they have the same kind of duty? Do they have to start very quickly or are they rather --

MR. JACKSON: No. The way our system is set up if we lose one feed the first thing we try to do is transfer over and supply everything from one side.

MEMBER ROSEN: Automatic transfer or is it manual?

MR. JACKSON: Automatic. If that fails we have standby diesels that are capable of supplying certain loads, not every load in the facility, but certain loads. For instance the sintering furnaces have no safety and significance but it takes several days to get them up to temperature therefore we want to keep them running if possible, those types of loads as well as being able to supply everything that is on the emergency bus.

If that standby diesel fails we isolate an emergency diesel for that particular site. We will start and supply all of the emergency bus loads.

MEMBER ROSEN: And all of that takes how long? Are they quick start, rapid start or is it a slower process?

MR. JACKSON: The transfer is automatic. The start of the standby diesel is within four or five seconds, just long enough to make sure if something has gone wrong and the transfer hasn't happened. We recently decided to make our start of the emergency diesel about two minutes, just enough so we don't have a lot of conflicts and systems fighting each other.

MR. JOHNSON: The application didn't describe the off-site power system. Is it necessary to understand outside power provisions at this stage?

MR. JACKSON: We basically are attempting to have an off-site system two feeds that are to 765 as far as the physical independence of the off-site power sources. These power feeds come from Savannah River site via South Carolina Gas & Electric.

MR. JOHNSON: When is that all going to get worked out?

MR. JACKSON: Right now we are in the process of all of our work task agreements with utilities the site supplies us. We're in the middle of working those details out and I would think by the end of this year that should all be finalized.

MR. JOHNSON: What kind of substation or interface will you be having to the off-site system?

MR. JACKSON: That's the detail that we're working out right now. Originally and conceptually Savannah River was going to add a couple of breakers to the two existing substations. We were going to get our own feed. There is some question about capacity at this point and a new substation may have to be built but that's still under study.

MR. JOHNSON: Now you mentioned using the reactor standards and I guess I have this question kind of broadly a heck of a lot of the stuff in the reactor standards really address issues and environments that are of concern to a nuclear power plant but it may not be of concern so much here.

765 is a good example. If you look at 765 there is a good chunk of that standard addresses the fact that you have a 1,000 megaWatt generator hanging on there and if you lose the plan it can be destabilize the off-site grid and the need for continuous supply of power is pretty high.

Presumably you're not going to go apply every bit of those standards even where they don't have any useful guidance to you.

MR. JACKSON: Right.

MR. JOHNSON: How are you going to pick and choose what parts to keep and what parts to ignore and what kind of interaction do you expect to have with the staff in making those decisions?

MR. JACKSON: That's been part of our review process. We've gone through and identified those standards that we felt were the best guidances available and that were appropriate. In our discussions with the staff many of the discussions and questions have been about whether we should be apply a particular regulatory guide or a particular standard that may not have full applicability to this facility versus a power plant.

So we are going through an evaluation process and trying to identify those standards that we felt were applicable. We are committed to using those portions that we felt were appropriate.

MEMBER ROSEN: Using a deterministic safety analysis. Is that correct? That's what I heard earlier that the safety analysis was fundamentally deterministic. You assume that an event is going to happen and then go ahead and design for it.

MR. JACKSON: Right.

MEMBER ROSEN: Now have you gone the final step which I think is to say okay well if none of this works we go to station blackout. We lost all the off-site supplies and both these -- what happens then?

MR. JACKSON: What happens is the most critical loads we have are the very high differential exhaust fans. They keep the negative pressure on the glove boxes so that you don't lose confinement. What we've done in that case is we have four 100 percent fans and we have each of them on a UPS. Each UPS has a one hour battery back-up. So even if we should lose all power we do have a battery back-up that will keep those fans running. In fact we only need one of them. And we have four.

MEMBER ROSEN: But if four fans come on and they're all running on a battery backed-up power supply that could last for an hour, right?

MR. JACKSON: Right. Presumably if they came on the operator would say I only need one of these. I'll cut three of them off.

MEMBER ROSEN: So he cuts three of them off and one runs for an hour and you still don't have power back. You've had a major hurricane or something like that.

MR. JACKSON: Right.

MEMBER ROSEN: You then could switch to the second one.

MR. JACKSON: You could then.

MEMBER ROSEN: And then to the third and ultimately the fourth. Then after that you're --

MR. JACKSON: And ultimately you have static boundaries that would prevent lose of --

MEMBER ROSEN: What is that? What is the failure mode? What happens if you lose negative pressure completely after you go through this whole series of steps? It's increasing improbably of course.

MR. JACKSON: Right.

MEMBER ROSEN: But at the very end you lose the pressure control in each NVAC. Right?

MR. JACKSON: Right. You have no negative pressure relative to that.

MEMBER ROSEN: And that's the consequence?

MR. JACKSON: That's ultimately what happened if you lost all of these fans.

MR. KAPLAN: Maybe I can help.

MR. JACKSON: Yes. Gary Kaplan.

MR. KAPLAN: I'm Gary Kaplan with DCS. Basically if you lose all power the aqueous polisher parts shuts down safely with loss of power. All the processes would shut down with loss of power obviously. The only thing we need running are the fans. If they shut down then you have basically three static barriers before you have a problem with the plutonium powder. They are in glove boxes. They are in process rooms. Then you have the building outside of that. So it would have to leave three confinement areas to get out to the public basically.

MR. JOHNSON: Does the design basis for the confinement system assuming no power or is power required?

MR. JACKSON: Active confinement for the BHD fans requires power. Those fans have to run. We do everything that we can to keep them running all the time.

MR. JOHNSON: And my eye sight is not as good as it was. What size are those fans?

MR. JACKSON: These fans are constantly changing. But the last rating I saw was 35 horsepower range. It wasn't very large. That's being reevaluated now also because there is an ASF impact. They are adding some additional glove boxes.

We talked about the two independent feeders, the medium voltage distribution system supplies 100 percent, each bus can supply 100 percent. We talked about the normal off-site power being our normal source of power. We have the stand-by diesels. Should we lose one or more of those feeds and then should those diesels fail, we have the emergency diesel generators that supply just the IROFS loads.

We also run our 480 V system with a high resistance Wye grounded system. We limit the fault current should we get a ground to a very low value of 5 amps or so. So we will get an alarm. We'll have a little time to try to isolate that ground before it escalates into something larger. So this allows us to continue to operate while we search out less serious types of grounds. It certainly limits the fault current and limits overvoltages.

As far as types of loads that the standby diesels supply, we mentioned the sintering furnace that and back-up for fire protection, those types of loads as well as being capable of supplying the entire emergency bus. The storage tank for the stand-by diesels has a 24 hour capacity. These two stand-by diesels both are supplied from one tank.

MEMBER BONACA: You need them both simultaneously.

MR. JACKSON: Excuse me.

MEMBER BONACA: You need them both simultaneously. I mean they are 50 percent each you said.

MR. JACKSON: The way the plant is

designed we actually have two processing lines and essentially we've divided the loads between the two different sides. So if we lost one feeder we would start one diesel on that side if we couldn't transfer over to the other side. We wouldn't have to start both diesels at the same time.

MEMBER BONACA: Okay.

MR. JACKSON: As far as the emergency diesels go, the emergency diesels are 100 percent capacity diesels. We only need one of them to run the supply of the IROFS loads. Those loads are the high differential exhaust fans and the AC feeds to the very high differential exhaust fans. Each diesel has its own storage tank with a 7 day capacity. We start automatically on a loss of voltage or a degraded voltage.

MEMBER BONACA: How many do you have?

MR. JACKSON: Two.

MR. JOHNSON: I want to make sure I understand. Oh, I'm sorry.

MR. JACKSON: Yes. We have the two emergency diesels.

MR. JOHNSON: And by 100 percent you mean 100 percent of each division?

MR. JACKSON: I only need one HD high

differential exhaust fan to perform my safety function. So either one will do it.

MR. JOHNSON: Right.

CHAIRMAN POWERS: When you have these hypothetical disruptions to your electrical supply system, I guess two questions come to mind immediately. I mean you're getting your feed basically from the Savannah River site.

MR. JACKSON: Correct.

CHAIRMAN POWERS: And what's this for you, a disruption in that feed?

MR. JACKSON: If I'm not mistaken over the past I forget how many years it's been but there's only been like a four hour interruption that we've been told about. It's probably over four or five years I believe is the time frame. So it's a very reliable source of power.

MR. JOHNSON: You have drawn our attention to the sintering furnaces for the reasons that nobody likes their sintering furnaces to change temperature. But you haven't mentioned the impact of a disruption on one leg of our two inputs to computer systems.

MR. JACKSON: Computer systems will be on UPS power.

MR. JOHNSON: Okay so.

MR. JACKSON: They will just keep running.

MR. JOHNSON: They would never notice. Not even a hiccup.

MR. JACKSON: Exactly. We did mention that the VHD fans have their own UPSs. They are in a similar position. If we lose AC, they keep running. You wouldn't know it.

Vital UPS is our term for the instrument type power that is fed from the emergency diesels. This would be the instrumentation that supports IROFS equipment. The normal UPS is the instrument quality power that supports the process. All of the PLCs that control are fed from this normal UPS system. We have the same division on our batteries. We have two normal batteries that supply control power for switch gear and breaker control and that sort of thing. We have two emergency power that do the same for the emergency buses.

MR. JOHNSON: You have an awful lot of UPS systems in this design and each one has its own battery. I'm accustomed to --

MR. JACKSON: Well what we've done is we decided to configure the UPS by hanging an inverter off of our battery system so we made our own UPS system in essence instead of buying a packaged unit for the vital and for the normal.

MR. JOHNSON: Okay. So basically where the application describes a package UPS now those are inverters running off of the station batteries.

MR. JACKSON: For the vital and normal UPS, yes. Now the VHD is a packaged unit. A packaged UPS.

MR. JOHNSON: Okay. I may have extrapolated what I read about that to all of them. Still there are a fair number of UPSs and a fair number of batteries. I'm used to batteries in nuclear power plants which take a reasonable amount of maintenance. What kind of maintenance problems is the proliferation of batteries through the station going to cause you and how are addressing that?

MR. JACKSON: The ones that are in the packaged UPS are sealed type units that should be relatively maintenance free type batteries. The others are station type batteries and we'll have the normal maintenance that every plant has to go through with its batteries. Periodic discharge. Tests. Measures of resistance on a cell terminations and specific gravity. That sort of thing.

MR. JOHNSON: If you are not doing cell measurements or specific gravity measurements and those kinds of surveillances on the packaged batteries, how do you survey them?

MR. JACKSON: We will certainly periodically have to load test them and test them for capacity.

MR. JOHNSON: When you mention that the computer systems were powered off of the UPS at least on the normal systems there is a provision for back-up power off of a regulated instrument bus versus the UPS which then would be subject to the transients that of loss of outside power.

MR. JACKSON: You mean like a maintenance bypass.

MR. JOHNSON: Well, nominally a maintenance bypass. I worked at a plant where over a five year period we had that kind of maintenance bypass in effect for about two years and it caused a lot of mischief. So I guess I would ask Dr. Powers' question again. Under that kind of configuration, what are the impacts a transience on the AC power system in that case or loss of the outside AC would cause?

MR. JACKSON: Again if we were bypassing and we had our batteries for some reason out of service and we were feeding directly off an AC bypass then if we lost power, it would only come back up when the diesels came back up. In terms of the process, it would mean that the process would simply stop.

MR. JOHNSON: Computers can sometimes reset themselves in odd configurations. Sometimes in the arrangement where you are putting power on and taking power off and putting power on again, we can get some race conditions. What's the process for addressing these kinds of issues on the design?

MR. JACKSON: That we'll have to evaluate what kinds of problems we would ultimately end up with. I don't know if Jon knows. Jon Tanner is our I&C lead. He might have some input on that.

MR. JOHNSON: Okay. Thanks.

MEMBER ROSEN: Now I'm taking away from this discussion the conclusion that loss or complete loss of power is totally a benign circumstance. That there is no likely safety consequences or feed consequences from a power loss that gets very severe in terms of its extent as well as its duration. Is that correct? I mean has a failure mode in effect analysis been done for all of the different alternate feeds that Dr. Powers was worried about earlier on.

MR. JACKSON: Our safety analysis group is in the process of going that route and doing those analyses.

MR. KAPLAN: Let me try and answer that. We haven't analyzed yet all the new changes for AFS. we are in the process of doing that so I can't address if the new feeds will any impact on that. But I don't believe that the new feeds will any impact on that.

Basically the facility shuts down in a safe condition. The only thing that we try to keep running all the time are the ventilation systems. If we lose power to those ventilation systems which we would call that a beyond basis event to lose power to the VHD systems which is the glove box. Then we go to the static confinement. We have the three layers of static confinement at that point.

I would agree with you at that point we believe it's a benign condition. We wouldn't want to be like that for months and months. But you would eventually get some transport of getting the dust out of the glove box and into the process room.

MEMBER KRESS: What's the driving force for transporting that? Just natural circulation?

MR. KAPLAN: That's right. If you have a stack and notice the stack is out so there would something like that. But the facility would be shut down completely. There would be no action going on if we lost power obviously.

MEMBER ROSEN: But you have four different feeds and you have lots of different process steps in the various process lines. You can think of no case where if flow stops that sitting there whatever that feedstock was at that particular point in the process where flow is not in some way keeping the pipes from being corroded at a very high rate. There is no nonbenign failure mode I'm trying to think of from a power loss.

MR. KAPLAN: On the lock side the actual powder pellets side there is nothing that you are talking about. If you are talking about the AP side, we're going to have some liquids in the tanks potentially.

MEMBER ROSEN: And pipes and pots and heat exchanges and whatever else you have.

MR. KAPLAN: We also have potential radiolysis that's going on all the time. If for a long period of time we had no dilution air we could have a problem. So right now the plant is designed with emergency scavenging air. You use your normal air. You have the scavenging air which lasts for seven days right now of scavenging air. If we were to lose all air for a long time we'd have to consider that.

MEMBER ROSEN: Scavenging air which is air being pumped or bubbled through ventilation.

MR. KAPLAN: Bubbled air to make sure you don't reach a certain concentration of hydrogen. Right. So right now it's designed for a seven day supply. We don't contemplate losing power or losing that system for longer than that without being able to bring in additional air. We would have to consider that.

The chemicals actually sitting in the tanks I know the process people said that it would muck up their tanks and they wouldn't want to do that. But they haven't come up with any actual safety concerns other than the radiolysis.

MEMBER BONACA: You said something about the loss of power to the fans is beyond design basis before.

MR. KAPLAN: Right. Our design basis is to keep the VHD fans running. That's what we designed the facility to do. The glove box fans.

MEMBER BONACA: But you're analyzing the consequences of losing all power. You just discussed this now.

MR. KAPLAN: We've discussed it. Right.

We've looked at it qualitatively. That's where we are with that point.

MEMBER KRESS: So that gets out of your design basis because of the single failure criteria. You can stand a single failure therefore it's part of your design basis. In order to get the loss of all of it you have to have more than single failure.

MR. KAPLAN: That's correct. Multiple failures and not be able to repair it.

MEMBER KRESS: Yes that's beyond design.

MR. KAPLAN: That's correct.

MEMBER BONACA: Yes but I mean for normal nuclear facility that's not beyond design basis. That's why I was asking. That's a difference I see there. You have to think about it.

MR. KAPLAN: Okay.

MEMBER LEVENSON: Steve, I think that's a hypothetical question you're asking but there are several cases that have already occurred. In their infinite wisdom when people were ordered to shut down, I think the PUREX plant at Hanford, they just turned off the switches and walked away and the columns were left full of liquid for years. This kind of thing has happened in several plants. A similar thing happened in some parts of the Idaho chem plant when it was shut down. It was just turned off, and people walked away. Nothing ever happened. We're talking about room temperature, atmospheric pressure systems which are much more benign than high pressure. No stored energy in the systems.

MEMBER ROSEN: Thank you, Bill.

MR. KAPLAN: Can I add one more thing? Even if we lose all the fans, we still have final filters through all the exhaust paths in our facility that are seismically qualified so there will be no direct release. In fact any outside piping coming in there are isolation valves and we can shut those valves also. The only direct path that we could conceive of if you lost all the pressure controls are through some doors that people would go in and out of. They are double locked doors.

MEMBER KRESS: Are these filters for particulates or for devices?

MR. KAPLAN: They are for particulates. They're HEPA filters. Multiple banks of HEPA filters.

MEMBER BONACA: So you do have provisions?

MR. KAPLAN: That's correct. We do.

MR. JACKSON: For our IROFS electrical systems, we are designed to prevent single failures. Emergency systems are redundant. They are physically separated. They are electrically independent. Of course the support systems for instance battery ventilation room fans are independent so that we don't have single failure vulnerability there.

We talked about our separation criteria. We have used IEEE 384-92 as our separation criteria, an industry standard. In cases where we can't maintain the minimum distances then we will erect barriers. We of course keep redundant equipment in separate rooms.

For our protective relaying and breaker control, we try to remove faulted equipment immediately and isolate the minimum portions of the systems necessary. We also have automatic supervision of manual and automatic operations. We initiate automatic operations for switching such as the transfer if one feeder should be lost. We're also capable of monitoring the system both on the utility control network as well as locally at the distribution equipment itself.

MR. JOHNSON: I'd like to ask about the controls systems for the electrical system that those things are getting more and more sophisticated as time goes on. Are the criteria that are described for process instrumentation and control systems the same criteria that would be applied to the design of the electrical system controls for example diesel starter or diesel generator control, load sequencers, that kind of thing? Maybe even packaged microprocessor based relaying?

MR. JACKSON: On our emergency diesels and emergency controls systems it's all hard wired. We're not using PLCs or computers for controlling that system. On the stand-by system we do have a PLC that monitors the electrical distribution system. It will be loading the stand-by diesels. As far as the criteria we use in general the same types of standards apply instrumentation side as well as the electrical side. It's our criteria the IEEE 308, 384, etc.

MR. JOHNSON: I'm wondering about for example 7432 or the EPRI criteria for acceptance of commercial software for example. I'm thinking a lot about embedded microprocessors not necessarily the more overt networks of PLCs. For example it's getting hard to buy a mechanical speed controller from Woodward anymore. If you go to the Switcom, motor control center vendors, there are a lot of choices for motor control centers that basically have embedded microprocessors rather than a network of mechanical relays. What is the philosophy on the use of those kinds of systems?

MR. JACKSON: The newer type of equipment for instance the Smart MCCs are used on the normal system. The emergency uses the old fashioned well-proven relay technology. When Jon comes up he will be able to address a little more about the application of computer standards as far as software and the qualification of software and that sort of thing.

MR. JOHNSON: Okay. Thanks.

MEMBER ROSEN: Did you skip the discussion of seven or was I asleep?

MR. JACKSON: Seven. Yes. Again we talked about criteria for separation and IEEE 384 is our criteria for separation. Again we chose to apply the industry standard as our criteria. We thought that was the most appropriate standard to apply for separation criteria.

MEMBER ROSEN: And that's a standard that is referenced by Reg Guide 1.75?

MR. JACKSON: Right. Although I think the versions of it, the years that 1.75 represents are probably 74 some timeframe like that. It hasn't been updated. One of the reasons that we felt this particular version of it was appropriate because it reflects the results of IEEE working groups as far as actually testing different configurations of cables under different fire scenarios. The results were incorporated into this later standard.

As far as testing calibration, all of our diesels, the emergency and stand-by, are capable of being synchronized and load tested. Of course we don't run them parallel to each other. But they are capable of being fully load tested and we expect to certainly have a test program that tests them periodically. You can certainly take one diesel out of service and test it while the other remains in service.

Our switch gear/MCCs are drawout type constructions. Again we tried to divide our redundant type loads so that we can operate at least one side and either perform maintenance or testing on the other side. Most of our normal buses have an alternate feed. So if one feed is lost, there is typically another way of supplying that bus.

You can see the primary feeds on a bus. You have an alternate feed that we can supply the same bus. It goes right down through the MCC level. We typically have an alternate feed. You notice no such connection on the emergency side.

MEMBER ROSEN: Would this facility have

something analogous to the typical tech specs you see in a reactor plant where if you lost or had a malfunction of some of these back-up sources that you have a certain amount of time before you would have to place the facility on stand-by?

MR. JACKSON: I think we expect to have something analogous to tech specs. What those are I think we've concluded that. It's probably an outgrowth of the safety analysis.

MEMBER ROSEN: Maybe that's a question for the staff.

MEMBER BONACA: On the same issue, you talked briefly about the design basis. I'm sure that the basis for your design of the electrical system has to be thought in terms of what scenarios do you have to coop with and what can you exclude from it? I'm trying to understand. Do you have a logic that you use? How do you determine that a scenario is remote enough that you do not have to address it?

I mean you do not have a full blown PRA. I understand that. But even before PRA, the word criteria that the industry has always used in nuclear to define what is an event that you do not have to consider as part of your design basis. Do you have some structure criterium, a self-analysis for example?

Why is the loss of all power to the fence beyond design basis? It has to be that you believe that that event is such low probably that you don't have to address it in design. Right?

MR. KAPLAN: That's correct. The regulation identifies different frequency criteria unlikely and highly unlikely. It requests the applicant to define that. We in our CAR in our further clarifications have defined that basically deterministically with four items: meeting the single failure criteria; application of the NQA 1 program; application of the codes and standards that he's describing; and being able to detect when your IROFS systems fail. That way you can repair them or shut the system down. We think that combination provides you with good deterministic background.

In addition we've committed to supplement that deterministic analysis for events that could impact outside the building with some quantitative analyses. So for specifically this system and the ventilation systems we are doing fault-tree type analyses to quantify and come up with reasonable liability and availability rates.

MEMBER BONACA: So you do have some criteria you use.

MR. KAPLAN: That's correct.

MEMBER BONACA: But then you made an estimation that said that the likelihood of losing off-site power and the 50 percent diesel and the two 100 percent back-up diesels, it's very low. I could agree with that.

MR. KAPLAN: And the batteries.

MEMBER BONACA: All right.

MR. KAPLAN: The four batteries.

MEMBER BONACA: Okay. So you do have some criteria you use there. It would be interesting for the committee at some point to see what they are.

MR. KAPLAN: We could provide this.

MEMBER BONACA: But we have NC standards 40 years ago for nuclear power plants.

MR. KAPLAN: That's correct.

MEMBER BONACA: And you use those.

MR. KAPLAN: Correct.

MEMBER BONACA: Okay. Thank you.

MR. JACKSON: In terms of our equipment, all of our IROFS equipment would be purchased under Appendix B QA program. It would be seismicly qualified per IEEE industry standard and environmentally qualification where required. Of course, the equipment will be qualified for natural phenomena and installed in buildings that are designed to handle those phenomena. Standby diesels on the other hand are commercial quality and are designed for the UBC type seismic requirements not the design basis earthquake.

CHAIRMAN POWERS: The seismicity of the Savannah River site has always been controversial both because of uncertainties concerning the Charleston earthquake but also because of seismic zones in the vicinity of the site. I don't want to get into a discussion of that. I'd like to know what kind of seismicity you're considering when you impose these seismic requirements.

MR. JACKSON: What the ultimate design basis earthquake for our facility is?

CHAIRMAN POWERS: That's it.

MR. JACKSON: I don't know if you have that. The design basis earthquake numbers.

MS. WESTON: Would you please give your name before you speak?

MR. HASTINGS: Certainly. This is Peter Hastings. At the risk of going out on a limb in an area I know nothing about, we are using as our design basis earthquake the Reg Guide 160 spec anchored at 0.2 G.

CHAIRMAN POWERS: You're going to have to remind me of that.

MR. HASTINGS: That's about as far as I can go with any of that.

MEMBER ROSEN: You said 0.2 G?

MR. HASTINGS: Correct.

CHAIRMAN POWERS: 0.2 G.

MR. HASTINGS: We can certainly give you more detail on that.

MEMBER ROSEN: That is the design basis earthquake.

MR. HASTINGS: Correct.

MR. JACKSON: Okay. That --

MR. HASTINGS: Excuse me. This is Peter Hastings again. Which is the same spectrum that is used at the Vogtle plant which is right across the river.

MEMBER ROSEN: You're saying that's the same as the Summer plant.

MR. HASTINGS: Vogtle.

MEMBER ROSEN: Oh, Vogtle plant.

MR. HASTINGS: It approximates a 10,000 year return frequency.

CHAIRMAN POWERS: The issue of course is that no one knows exactly where the Charleston earthquake occurred, how often it occurred. Similar earthquakes occur and there's been revelations of new seismic zones in the near vicinity. The site is susceptible to soil/structure interactions. It's a complicated seismic site. I'm sure when we get into seismicity we'll go into this in great detail. I just wanted to know what they actually used.

MR. JACKSON: That concludes the formal part of the presentation. Unless there are questions I will have Jon Tanner come up and talk a little bit about the instrumentation and control system. Jon.

CHAIRMAN POWERS: Jon is a little reluctant to come up.

MEMBER ROSEN: I thought we were being rather gentlemanly for us.

CHAIRMAN POWERS: We're being kind and generous today. It's a good presentation so we don't need to be too radical here.

MEMBER KRESS: We're changing our attitude.

CHAIRMAN POWERS: What we have is this tension that this is a single failure design basis here and we're coming from a context of people who have found a wanting approach and what not so there is a tension here. All right, Jon. Welcome.

MR. TANNER: My name is Jon Tanner. I'm with the DCS. I'm one of the assistant lead electrical engineer and I'm responsible for putting a control system in place. I thought I'd like to touch on four areas here: a review of the design basis and whence it came, the standards we are using to realize this design of the control system, an overview of the functional requirements of use in the instrumentation in the control system, and a review of the configuration of this system.

Some of the staff have already seen of these things but there has been a couple of changes since the staff last saw it. They were expecting it I believe so they shouldn't be surprised by that.

What's driving the configuration of the control system is the design basis that is essentially found in the performance requirements of 10CFR70.61 B, C and D which were touched earlier by Peter and by Ron a few minutes ago. The control systems specifically has design requirements of 10CFR70.64 that we have controls that we can look and monitor the behavior of these systems that are relied on for safety. We're doing that.

The systems are designed to provide multiple layers of control and measurement for process parameters and the plant parameters so that if something goes wrong something else is there to take the place of that thing that is not working properly.

MEMBER KRESS: Does that translate into redundant and --

MR. TANNER: Yes. We've been very conservative about this. As it's been mentioned earlier, we've taken the position that the nuclear power plants standards are largely applicable in terms of controls. That really means three things: IEEE 603 and I believe we are using the '98 version. Is that right? The most recent addition.

In terms of the software for the control systems which would be invoked we're using IEEE 7.6 7-4.3.2 which is as those of you who are not familiar with this a paragraph overlay of the 603 requirement. Then obviously it's single failure requirement which is identified in the 603 document. So the answer to the question is yes.

As I said we've been very conservative about that. We feel that those are well demonstrated in a nuclear power plant use. We recognize that the MOX facility is not a nuclear power plant. I believe the staff recognizes that also.

In 603 it almost says nothing if you just look at the document and not the appendices. You could use it for anything. It's a very nice little specification. It works. We're going to use it.

In any event, I think I mentioned earlier that the policy this IEEE 603 7.432 are nuclear power plant standards which have the largest impact on the control systems and for industrial safety which is not a nuclear safety issue set down by OSHA which is 29CFR1910. We will be observing those requirements also.

MR. JOHNSON: I notice that you have a defense in depth up there. I can see from the application that --

MR. TANNER: -- what it is.

MR. JOHNSON: That's okay. I can see from the applications some tracks of a defense in depth and a diversity philosophy of the design but I haven't quite formed the full picture in my mind of what that philosophy is. Is there a stated philosophy on how to provide defense in depth on the I&C system?

MR. TANNER: Well, a stated philosophy.

MR. JOHNSON: Well, what you're thinking.

MR. TANNER: It's not overly stated. But it's clearly there because and you'll see this in a few minutes. I'll put some illustrations up here which will show you how things work. The 603 requirement gives us two independent channels of safety control. We don't rely on safety controls around the plant. We rely on nonsafety controls. Those are pretty robust. To keep the facility safe we have a layered control system also which has three layers of control capabilities plus we have the passive controls which has been mentioned earlier in terms of HVAC.

The entire building is HEPA filtered both coming in and going out so there is passive boundaries there. In my narrow perspective of control systems we have multiple layers to do the job and the civil structural guys and mechanical people have put together systems which themselves are robust and not likely anyone of them to be a problem to you.

MR. JOHNSON: Is there a diversity philosophy associated with the multiple layers of control?

MR. TANNER: We don't require diversity. It's nice if we have it. I was afraid that might come up and I don't have a little picture here. Yes. If we can get away with it, if it works, we'll use it. It's not necessary. We don't want to invoke it because it's not always easy to do or even possible in some cases. Does that answer your question?

MR. JOHNSON: Yes, but you said you had something else to show. I'll wait.

MR. TANNER: No. I said I wish I did.

MR. JOHNSON: Okay.

MR. TANNER: I thought about that very issue.

MR. JOHNSON: I noticed that there are some places that you've made a case of using hard wired systems.

MR. TANNER: I can discuss that in a few seconds. I'll put some illustrations up here for covering this. The design will wrap this together. The design basis issues in addition to the overall safety requirements we'd also like to have the product to be a part 21 product. It's a basic product. So we need to be able to make the stuff. Economically we would like not to have the scrap as was talked about earlier that we have to recycle.

We have automatic systems which are preplanned. We put programs together and the system is running and does its thing without having much manual intervention. I can tell you that operationally when you work or you are given a build order or worksheet.

So the people who make the recipes have thought about what they need beforehand and that's calculated and put on paper. That is entered into the systems and the process is automatically served. They are watched over by operators so at the top level you have operations people making sure that what's supposed to happen is happening in accordance with the construction or the processing requirements.

As I said it's fully automated. Another advantage of that is that the people aren't required to get into the process and get potentially exposed in some way. That's another advantage of that.

Of course our systems are going to be reviewed to a new Reg 1718 and that's clear. There's a number of items in there that they are looking to find. We have to satisfy that. So those items of single failure create a city of testing. Components fail in the safe mode. These will be designed into the control systems. There are part of the control system design.

I believe this was mentioned earlier but we've been very conservative in the use of the IEEE nuclear power plant standards. These are the three from my narrow perspective of controls and instrumentation systems, 603, 7-4.3.2 and 379. That's what we believe will give you a very reliable control system. It's been demonstrated in the nuclear industry and power plant industry to be effective. I can see no reason why it can't be effective here.

The safety systems I think you will find in 603 and I tried to put together a little example of what the fundamental requirement of 603 is. It's that they will perform and maintain the plant parameters within the appropriate limits. There will be more than one safety group for any safety function and any better discussions about the single failure and what happens if you have a failure. Any safety group can accomplish the safety function. Just the same principles in the nuclear power plant. It won't be any different here.

The instrumentation systems. I'm going to touch on what the measurement systems are and they are pretty straight forward. In the process industry there aren't really very many standards. There is some ISA stuff and some IEC 61.508 and 511. We don't use those and we're not using them anymore in this country anyway.

What we want to do is to be able to monitor variables and the systems over their expected normal and abnormal ranges to see what's happening.

You need to be able to control the systems. We need to be able to bring the systems to a safe state which in the case of the AP systems at almost every state means stop and the MP systems it means stop and for the facility control systems we're down to as it was mentioned earlier HVAC. I'll show you a slide here in one second which will show you how we maintain those operations. Really that is the only thing that has to be positively maintained, actively maintained all the time.

The processing systems just bring them to a stop and the AP systems are all at a low pressure, atmospheric or slightly subatmospheric. The -- systems are making solid components and there is no pressure or temperatures there. There are some economic issues but I don't want to talk about that right now. That's not a safety issue but sintering furnace for example we would not like to compromise it. We want to measure the safety parameters but we don't want to even get in that area. We want to stay above that and into the normal operations.

The manufacturing systems are highly computerized and we're using modern human system interfaces. So everything we see is on the TV screen in front of you or on a human system interface PC screen. So rather than using minipanels as in the old days like steel panels 10 feet high and 25 feet long, everything is on a little graphic in front of you.

The manufacturing systems as well as the facility systems are modularized or systemized. So I have for example powder systems and I have a work station that's looking just at the powders. The pellet systems and I have a work station just looking at the pellets.

In the chemical area, I'll have dissolution work stations just looking at the dissolution system and it's get moved from the dissolution to the next stage to the next stage. Each one of those systems has its own work stations with its own graphics that are manned by the operators.

The systems are fairly robust because you have the graphic displays. You have the numerical displays telling you what the values are. When the components change the state of --

(Noise on microphone.)

The desirable conditions are shown. The undesirable conditions should they occur are identified. You have alarm systems which we'll display what an alarm is and why the alarm is there. There are some hierarchy rankings that are going to be imposed. So that will make the operational leverage rather more effective rather than have to dig through things.

MEMBER ROSEN: And all these CRPs that you described are in one place? In a centralized location?

MR. TANNER: That's a good question. No. In the MP systems you have a control room for a certain area. For example, pellets and there's a group of people in the pellet areas. If you are doing pellet operation, making pellets, grinding pellets, whatever, people are there. There's another control room that is centered around the powder processing areas. People are doing things in powders, grinding them or milling or mixing them or whatever. There are people in there. If you are making assemblies, there is another control room where that operation is supervised. The MP systems are pretty well distributed.

The AP systems are less so. There is a central control room. That's with D301 right? Yes. It is. That control room is where people are. Again they're modularized and distributed. Each functional unit in the AP systems has a control station. A guy has a CRT in front of him but it's all in a control room. That control room is also where we look at other parts of the facilities, the utility controls, the HVAC, power dispatching, fire systems, some security systems. There are several things in there. I don't want to go into the details right now because they are moving around a little bit. That's how that is set up. Does that answer your question?

MEMBER ROSEN: Yes. I take away from that is that there is one central control room that deals with all the facility support stuff.

MR. TANNER: Yes.

MEMBER ROSEN: Plus the aqueous processing and a number of satellite stations.

MR. TANNER: Yes. There are actually a couple of different facility support areas. I'm referring to reagents, supplies, gases, HVAC, heating and cooling, and some of the processes, chilled water, heating waters. There are actually two control rooms for that also. There is a secondary control room for that over on the other side of the plant. So there is a good deal of diversity, alternate ways of looking at things.

I can tell you that we had a little building out to the side of our plant where we mixed up our chemicals that were going to used in the liquid fuel processing systems. That has a small control room that anybody could go down there and watch for some reason. There's a small workstation in there.

MR. JOHNSON: To what extent are the multiple control rooms provided to address that potential need to evacuate one of the control rooms as a result of some facility upset?

MR. TANNER: The ability exists. Most of the safe conditions are just stop what you are doing. Just stop and review what's happened. The control rooms for the utility systems are there for what you mentioned. There are certain things you can do from those alternate control rooms if you need to.

MR. JOHNSON: What are the provisions for isolating one control room from the other electrically and for resolving any conflicting control demands?

MR. TANNER: All right. Let's talk about that for a second. Starting from the most degraded state, should the facility find itself in a degraded condition we do in fact have two separate control rooms called emergency control rooms. Not much goes on in there except to maintain the confinement and a few other things. There are two separate isolated rooms one next to the other and there is a wall between them. Those are the so-called emergency control rooms. This is your traditional IEEE 603 nuclear power plant fundamentally separate, redundant, isolated control rooms, different power, different cables. There is nothing in common between them.

Coming from down here some place. For example, this could be one of the HVAC, HDER or VHD fans. This would be the other one over here.

MR. JOHNSON: Different power.

MR. TANNER: All the controls up here are all the electronics or electromechanism. There is precious little software involved in these things which answers another question which was asked earlier. That's the A and that's the B control room.

(Presenter indicating.)

As we go up the ladder to our less degraded facility controls this is facility controls here. We're in this mode here. The manufacturing and processing systems have long been shut down. In fact we actively close them down under certain conditions. We turn the power off to them all. They just stop.

MR. JOHNSON: You're always doing that from here.

MR. TANNER: You just turn the power off and they are done. They are mechanically designed or set up so that they will be safe in those conditions.

Perhaps that is not desirable but they are safe.

The most degraded to the lesser loading going toward normal, the facility controls have two levels of control. We have what we call the back-up control system. We are using the term "back-up" to differentiate it from normal controls. This is not a safety system. It's not a safety but it's another layer of capability. Should you need to use this you can operate not the complete system but enough to keep the plant healthy.

The controls are implemented through electric and mechanical systems and there are some software controls which drive the facility through the MCCCs and they operate the various systems that are necessary to keep the plant happy and keep things normal. Perhaps it would not be fully operational but one without a lot of problems.

We don't want to be using this system right here as a back-up. We want to be using this system over here which is the normal controls for the facility.

(Presenter indicating.)

There are a couple of networks up there which we can watch the systems and observe their behavior. The operators can see what's happening.

MR. JOHNSON: Now there is a little tiny square box on that picture that has three arrows pointing into it and a relay coil coming out of it.

MR. TANNER: This one that says I/O right here.

MR. JOHNSON: No. The one immediately down and to the right.

MR. TANNER: Okay.

MR. JOHNSON: What happens in there?

MR. TANNER: What we are using is distributed I/O systems for the most part. They are not all distributed but a lot of them will be. We are trying to minimize the cabling and use the modern technology. We don't run one cable for one sensor. We run one cable shortly for about 10 feet, 20 feet into a remote I/O system and then we field bust things, multiplex things to put into the control room one fiber optic cable for example.

MR. JOHNSON: I was actually asking about the box that the output of that I/O point into.

MR. TANNER: Normal controller A.

MR. JOHNSON: No.

MR. TANNER: This box.

MR. JOHNSON: Follow the I/O output down.

MR. TANNER: This one.

MR. JOHNSON: I'm sorry. The other I/O. Right there. That tiny little box right there.

MR. TANNER: The tiny box. What I'm trying to there is what we call priority management. I didn't detail this out. The normal controller does not have priority over the back-up controller. It's more important. The hierarchy says that the emergency controller is more important than the back-up controller. That's the hierarchy of who's going to make the command.

If you need to use a back-up control system it tells normal control system for example software fault or a controller fault. Then the back-up controller takes command and runs the show. That's how that is done.

We're trying to show here that there would be a normal control signal coming into this little box right here which is the priority management. If this system is told by an operator or for whatever reason that it needs to be running then the command will come down here. This command will be obeyed ultimately by the actuator fan. This command will be ignored.

(Presenter indicating.)

MR. JOHNSON: How does that happen? What's the concept there?

MR. TANNER: The concept would be just relays and what you make happen in the relays.

MR. JOHNSON: So that's essentially a relay logic.

MR. TANNER: Yes.

MR. JOHNSON: Are the functions that you are going to be involving there are on/off control functions? Will there be no continuous functions?

MR. TANNER: The answer to your question is that there will be some continuous functions in there. Not very many. Most of them will be on/off. It gets complicated. I haven't given you all the details because I couldn't put them all on it.

MR. JOHNSON: That is expected.

MR. TANNER: But there are methods of providing what you are looking now on control signals. That's not shown on here. This is the turn off/turn on commands that are shown here. How you get the alternate control center on here would be these are the analog paths.

MR. JOHNSON: I know this isn't a reactor but a committee on next generation reactor they have been arguing for four years over the internals on that and exactly that little box.

MR. TANNER: I'm sure. We're not creating this control system whole cloth. We're using a method that's been used for a while in our prototype plants. That's the method that they've used and it seems to work. I don't see any reason why we should depart from that. We know the details.

Moving up the line here we're down to the facility the manufacturing and processing controllers. (Shuffling of papers.) -- at IEEE 603 configuration. This is a configuration for the manufacturing, the MP and AP systems. There is a nozzle control which we just got the recipes or the will-build instructions of the AP or MP processing in this. This is typical of what every function you're looking at.

There are a couple of safety controllers which look at a small number of important parameters and if those parameters are not where they are supposed to be they have the ability to prevent the process from continuing. To stop it.

MR. JOHNSON: I want to make sure the fact that there are no arrows pointed back into the safety controller.

MR. TANNER: No there is not. That's a good point. 603 says that you have to separate the two safety systems and you have to separate the safety from the nonsafety systems. We have no choice. We have to comply with that. We fully intend to.

Now you'll note I think that there are some arrows going from the safety controller into the normal controller. What's happening there is that if the safety controller is not satisfied with what it sees it issues a command to the normal controller which technically we call it "putting it in the freeze mode" which would drive all the actuators to zero. So all the actuators stop actuating.

MR. JOHNSON: Your application has a fair amount of information about criteria and about the general approach to the design of these systems. It's really pretty vague on what specific functions the I&C systems are going to perform especially the personnel protection and the safety systems. Is it reasonable to expect the staff to make a decision on an application without understanding the specific I&C functions that need to be implemented?

MR. TANNER: I guess I don't quite know what information is needed here. Peter, do we? You have some request for additional information which we are trying to address right now. But I don't know. Peter?

MR. HASTINGS: This is Peter Hastings. Let me infer what is an additional level of detail about what you are asking. We say in several case that some of the safety functions for example prevention of an explosion is satisfied by the process safety I&C system and we don't give a lot of additional detail on that. We try to keep things in the CAR at the design basis level and provide additional design detail when it was available at the time but limit what we call design basis so that we maintain our flexibility in implementation of the specific controls on how we use the I&C system to prevent or mitigate that event. Is that the upshot of your question? Maybe I didn't understand the question.

MR. JOHNSON: Yes. I think my question is that I'm accustomed to seeing a description of here are specifically the things the I&C system does and here's the arrangement and the functions for these specific things. What I found for example in looking at the applications --

MR. TANNER: I think I know what you are asking.

MR. JOHNSON: -- is that there is something that are called safety controllers.

MR. TANNER: Yes.

MR. JOHNSON: But not much about what

actually it is that a safety controller does.

MR. TANNER: You are asking for specific things that a safety controller does.

MR. JOHNSON: Yes.

MR. TANNER: I can address that. We're in the process of identifying those items and that's what Mr. Kaplan's group is doing. This temperature, this value, this condition, whatever it is. These have to be monitored and a response to those at a certain valve has to be accomplished. And we do know what some of them are. We are identifying those. We will be publishing in our internal documents those specific items that have to be put in the safety controller's list of functionalities.

MR. JOHNSON: When does the staff get a look at that?

MR. TANNER: Gary.

MR. HASTINGS: This is Peter Hastings again. That information will be fundamentally part of the ISA that is provided with the license application.

MR. TANNER: It's a schedule and it's when they do the ISA process. They are going through even as we speak they are evaluating these individual functional units to find out what has to be done.

MR. JOHNSON: There you go. ISA. Okay.

How late in the game does that come?

MR. HASTINGS: It comes in with the license application which is currently scheduled for submittal in the fall of 2003.

MR. JOHNSON: So I guess my question is what kind of risk do you run at that point of finding that you have some significant difference of opinion with the staff over what this system should actually do? If you do find that case, what risk?

MR. TANNER: I know what you're asking. It's really addressing the wrong person on this. That's the licensing and the safety analysis group.

MR. HASTINGS: This is Peter Hastings again. I think the answer is that the risk is that we can't implement the design basis that we've committed to and that's been approved by the staff for construction authorization.

The details of the design will be feted through ISA and the operating application. The construction authorization attempts to get concurrence from the staff that the design basis is adequate for authorizing construction.

MR. JOHNSON: Okay. But if you look at IEEE 603 for example it talks about a design basis for an I&C system and in view of that construction --

MR. TANNER: Yes. It requires that. That's the very first several paragraphs. 3.1 or 3.2 as I recall.

MR. JOHNSON: Yes.

MR. TANNER: I understand what you are saying. You have to identify what the problems are and how you mitigate them.

MR. JOHNSON: Yes.

MR. TANNER: And we're doing that. That is being done and it's part of our effort.

MR. JOHNSON: If you were looking for acceptance of the design basis and haven't provided that part of the design basis, is it reasonable to accept the other parts?

MR. TANNER: Go ahead, Gary.

MR. KAPLAN: This is Gary Kaplan. I'm not sure what your question is exactly. What information do you think that should be provided on the CAR that we haven't already provided?

MR. JOHNSON: Well, I'm wondering what the I&C system actually does specifically. The applicant says it does some safety stuff and it does some control stuff and it does some personnel protection stuff but below that there is no detail beyond that. I'm accustomed to and maybe because I'm accustomed to reactor applications which are more in depth.

MEMBER LEVENSON: You're talking about licensing application.

MR. TANNER: This is Jon Tanner. Correct me if I'm wrong, Gary or Peter. The license application will identify just as it would for a nuclear power plant and I will use that as an example the steam generator level low stage umptiscratch. That will be done here for our facility. Is that correct?

MR. KAPLAN: Yes. This is Gary again. I think in the CAR we provided a little bit more detail than you suggested. I think we provided that we are going to control temperatures where appropriate. We'll control flow rates where appropriate. The specifics on every single tank and level control or temperature control that we're doing through the ISA. We need a detail design drawing to do that. At the stage of the CAR two years ago it was a very preliminary design. We don't have that detail to analyze that.

MR. JOHNSON: Perhaps it's my problem that I haven't read enough of the application but it was hard for me to tell even that you control fans.

MR. KAPLAN: You probably read section

11.6 which is the I&C. If you go in to chapter 5 there is a detailed list of what we think are specific functions that the I&C will perform.

MR. JOHNSON: Okay.

MR. KAPLAN: There might be 15 things listed there or 20 things listed there.

MR. HASTINGS: This is Peter Hastings again. Clearly there are some areas where the staff has requested additional information on those kinds of details and we have provided or are continuing to provide in on-going discussions with them some additional detail. We try to be as clear as we can where we are providing design detail versus design basis because the approval threshold for the construction authorization is design basis not the implementation of those.

MR. JOHNSON: Okay. Thanks.

MR. KAPLAN: One more thing. This is Gary Kaplan again. But certainly in the ISA portion we will identify the specific controls and what they are supposed to do. So there will be a lot of detail in that part.

MR. JOHNSON: Gary, I guess I didn't expect to find a complete set of drawings in this version. But when you say safety controls. Well, what is that? One other question I had was on criteria for the normal systems. What failures in the normal control system might be considered as initiating event for accident sequences and what kind of criteria do you need to put in place for the design of those systems to reduce initiating event frequency?

MR. TANNER: Yes. Initiating an event caused by the control.

MR. JOHNSON: Right. By its system control failure?

MR. TANNER: That's been anticipated and that's why we have these differing layers. It could be many things. A software fault, a hardware fault, who knows. The different layers are there to compensate or mitigate that problem. I guess I can't exactly answer your question without sounding like I'm waffling. The defense in depth concept is how we are trying to address this.

MR. JOHNSON: I understand that. I guess my question was more along the lines of what quality standards and design standards do you apply to the normal control system in an effort to reduce the likelihood of failures in that system that can create initiating events.

MR. TANNER: We have a software group

which could address that rather nicely. Gary Bell.

MR. BELL: My name is Gary Bell. We have a set of software which is the IEEE Computer Society software standards for configuration management for verification validation for software requirement specifications, for design descriptions. So we are following a rigid life cycle for normal software to evaluate how the software is put together and to minimize those types of errors.

I believe also, Gary, on the ISA we have treated the normal system as one of the deterministic failure modes and it can fail.

MR. TANNER: It's assumed it will at some point.

MR. BELL: It's assumed it will fail. But we do have a fairly rigid life cycle for the normal control software development.

MR. TANNER: Did we address that?

MR. JOHNSON: Yes.

CHAIRMAN POWERS: Let me ask a question probably revealing a great deal of ignorance. What I know is that anytime you do a design of a facility to handle chemical processes of any type it doesn't matter how careful you are you will eventually get contamination events occur. What I'm wondering is how tolerant these digital systems that you are making heavy use of here are to contamination with alpha-generating materials?

MR. TANNER: Good question. Yes. Gary.

MR. BELL: Again this is Gary Bell. We've taken several design measures. For one thing the safety controllers, the normal controllers are not located in the region of the building with the contaminated material. They are off in their own electronic rooms in separate cabinets. For the local I/O we have selected devices that have been used in our model plants in France that have operated suitably in the alpha environments that they were subjected to.

MR. TANNER: I understand what you are saying and I've worked in places where this was a bit of a problem. The fluid systems are in their welded equipment. Those tanks, pipes and so forth are in the negative room cells, process cells which themselves have a high level of ventilation integrity.

CHAIRMAN POWERS: You're telling me you're being careful. And you're not willing to stipulate that what I'm saying is that no matter how careful you are eventually sooner or later there will be a contamination event of some sort. If there isn't then you will be the first in the history of mankind to avoid one. The question is how hard are these digital electrical systems to contamination and the most insidious contamination events are those that of course you don't know about until long after they occurred.

MR. TANNER: Right. I can't address that question because I have not looked at that particular question of an alpha contamination event. We're doing everything we can to not have it.

CHAIRMAN POWERS: Sure.

MR. TANNER: Let me say this. We have an HP group which is interested in finding out if that happens real fast because there is a human exposure problem involved here. If we get that some of that stuff becomes in places it shouldn't be, we need to know about it immediately. Yes sir.

MEMBER LEVENSON: This is a completely different type question but it was triggered by Dana's question. This isn't really to you but you're sitting there. The feed material you are getting you discussed significant variation, impurities, contaminants as it affects the chemistry and processing. Are there among those impurities enough light elements to impact the neutron dose due to alpha N that one might expect from this material?

MR. TANNER: In my reading of the AFS systems, I don't know enough to answer that. I would address that question to our ISA group over there. Gary Kaplan.

MR. HASTINGS: This is Peter Hastings. I don't think we know the answer to that question off hand. We can certainly look into it. I think the answer is no but I can't confirm that.

MEMBER ROSEN: Let me follow Milt's lead and ask you a question I know you're not responsible for. From the earlier presentation on page 10, we talked about equipment qualification. There is a statement made that the items relied on for safety equipment is provided on potentially 10 CFR 50 Appendix B QA program. That mean I assume purchased under that program. But is the general philosophy of this system that it will be operated under the Appendix B program, the IROFS would be operated, installed not just provided but installed, maintained under the Appendix B program?

MR. TANNER: That's correct.

MR. HASTINGS: That's actually a mandate of the regulation for a plutonium facility.

MR. TANNER: We have no choice.

MR. HASTINGS: We also happen to like

Appendix B.

MEMBER ROSEN: That means a lot of things including corrective action programs and so forth.

MR. HASTINGS: That's correct. Our QA plan has been approved by the staff for up through construction and it is a fully Appendix B compliant.

MEMBER ROSEN: For the scope --

MR. HASTINGS: For all 18 criteria. Yes.

MEMBER ROSEN: But just the IROFS.

MR. HASTINGS: IROFS and certain applicability to some non IROFS as well.

MS. WESTON: To follow up on Steve's earlier question about tech specs, we didn't get an answer to that, Staff. I think Drew you were about to answer.

MR. PERSINKO: No. Could you repeat the question first though?

MEMBER ROSEN: Well as Mag was referring to was the question about would there be an analogous set of operating rules to the kind of rules that are embodied in tech specs in power plants for this facility?

MR. PERSINKO: The Part 70 regulation doesn't specify tech specs like the Part 50 regulation does so we haven't been using the term "tech specs" per se. We haven't gotten to that point yet but I do anticipate there will be what we do call "license conditions" added to this part of the license and with certain parameters specified in the license conditions but we haven't gotten there yet.

MEMBER ROSEN: Well, the question arose if you recall in the context of what happens if one of these diesel engines is either out of service because it failed or is down for maintenance. How long can you continue to run the facility normally in that condition? Those kinds of circumstances are covered in power plants in tech specs. Are you saying that those types of circumstances would be followed in these license conditions or rules?

MR. HASTINGS: Let me try to answer that. This is Peter Hastings. The short answer is yes. We do anticipate as a result of the ISA things like specifications on limited conditions for operability and things like that.

Even though Part 70 doesn't specify tech specs it does in its most recent incarnation specify management measures associated with control of IROFS. Those management measures include along with a lot of the criteria out of an Appendix B like program recalled them. In Part 70 Appendix B is only applicable to plutonium facilities and 70 is written for lots of other people also. So there is some overlap between management measures and the NQA 1 program.

But there is also other stuff like addressing maintenance requirements and things like that. We think that derived from those management measures and derived from just the natural results of ISA, the safety analysis, we will end up with operating limits, LCOs, all the tech specs like stuff.

MEMBER ROSEN: Surveillance. Test intervals.

MR. HASTINGS: Right. And all controlled through plant procedures controlled under the QA program.

MEMBER ROSEN: Let me follow up with another question. It's really addressed to the ACRS and ACNW. Do we at a later stage get to see all of this? How many more bites of this apple are we getting?

CHAIRMAN POWERS: We have been asked specifically by the commission to watch this process of licensing this facility closely. So I suspect that you will be sick of this facility by the time we are done.

MEMBER ROSEN: I'm delighted.

CHAIRMAN POWERS: Let me ask a question back to the digital I&C system. Another thing that is evitable for any facility no matter how careful you are are nuisance fires. Fires that produce smoke. They don't do any damage. They don't initiate accidents. They produce smoke. Smoke goes around. Digital electronic systems have a magnetic attraction for smoke. How tolerant are the digital systems to that kind of smoke?

MR. TANNER: We've looked at this. We've addressed this. There are a number of NUREG publications out there discussing that particular problem. Our response to that is this. Two things. The control systems are physically distributed. So if there is a fire in a certain area the ventilation systems will draw that smoke away from it. So it limits the spread problem. That's the first thing we want to do.

The second thing is should we have a smoke exposure problem to some of these electronic control systems, they have to either be repaired or replaced. There is a document out there and I don't recall the number of it right now. It's a NUREG study that evaluated that very problem. Their conclusion was essentially that.

Coatings if that is what you are looking at are problematic at best. In a previous lifetime I worked in electronics and they are something that you don't want to get into unless you actually have to. So DCS's position will be if something is exposed to smoke it gets repaired or replaced under the plant's QA program.

CHAIRMAN POWERS: Superb. Excellent answer.

MR. TANNER: There's no other answer.

CHAIRMAN POWERS: Any other questions in this particular area? Any other questions that you would like to direct toward DCS? We're going to go back to working primarily with the staff after a break. With that I propose that we take a break until 11:15 p.m. I want to thank DCS for their presentations and comment again that the commission has specifically asked us to watch this process and advise them directly so you'll get to see us a lot I suspect.

MR. HASTINGS: We look forward to it.

CHAIRMAN POWERS: And if your presentations are as effective as the ones you gave today it will be a very smooth relationship.

MR. HASTINGS: Thank you very much.

CHAIRMAN POWERS: Off the record.

Whereupon, the foregoing matter went off the record at 11:01 a.m. and went back on the record at 11:17 a.m.)

CHAIRMAN POWERS: Let's come back in session. The members have complained about the delay in the break. We will note the generosity of the Chair in extending the break beyond the zero time that was originally allotted. Drew, we are going to come back to you and you're going to discuss first impacts and then summary. You have a long session.

MR. PERSINKO: I think it's going to be shorter than it shows on the schedule actually.

CHAIRMAN POWERS: So breaks are longer than shown on the schedule and presentations are shorter. Is this a trend or what?

MEMBER KRESS: I interpretted that to mean 24 hours.

CHAIRMAN POWERS: Your interpretation was entirely erroneous as usual.

MR. PERSINKO: Good morning. My name is Drew Persinko. I'm the MOX project manager at NRC with the Office of Nuclear Material Safety and Safeguards. My first presentation is just on the impact of the DOE announced changes on the staff's review of the MOX Fuel Fabrication Facility.

The effect largely is on schedule. I'm just going to go over what this did to our schedule. As the schedule currently stands now, what we intend to issue a draft SER for the construction phase aspects at the end of this month, April 30. But I want to emphasize that this SER does not take into account the alternate feedstock changes you heard about this morning.

This SER will be based on the construction authorization request that was submitted to the staff last February 2001. That's what this SER will cover. It won't cover the changes.

The schedule also now calls for that we will be receiving from the applicant a supplemental environmental report on July 15. We also will be receiving a supplemental construction authorization request in October 2002 as the applicant informed you earlier. We intend to issue a draft environmental impact statement for public comment in February 2003, a revised draft SER in April 2003, and then a final EIS in August, the final SER and the construction licensing decision in September 2003.

CHAIRMAN POWERS: Okay. Now the question

that is posed to us is this SER you're going to issue here in May, do you need a letter from us on that?

MR. PERSINKO: I don't believe so.

CHAIRMAN POWERS: It seems to me like we don't.

MR. PERSINKO: No, that's correct. We do not need a letter from you for the draft SER. Now when we issue the final SER which will be some time from now because have to get the additional information from DCS and evaluate that, then we would be looking for a letter from you.

CHAIRMAN POWERS: The operational question is whether we bring anything to the full ACRS in May or not. My prejudice coming in here was that not just because this is an interim SER. A dry run SER or something like that.

MEMBER ROSEN: Can you tell when we're going to see the ISA? To me that is a very important document to this whole process.

MR. PERSINKO: We'll talk in a minute about this but this is the two step licensing so you're going see the construction part. You'll see the ISA as part of the licensing application which the applicant said earlier would be submitted in the fall of 2003.

MEMBER ROSEN: So right around the time you issue a final SER for construction.

MR. PERSINKO: That's correct.

MEMBER ROSEN: In other words, they're going to be off and building something --

MR. PERSINKO: If we conclude satisfactorily in our SER that we find it adequate and we approve the construction of it then the applicant is free to go construct the facility at the same time that the license application is under review by the staff.

MEMBER ROSEN: They are going to go construct something but we really don't know what it is.

MR. PERSINKO: The way the regulation is set up it's the design basis at this stage were to be approved by the staff per the regulation 1070.23(b).

CHAIRMAN POWERS: You're reproducing here, Steve, a debate that has occupied the licensing structure since 1963 to my knowledge. Trust me. It's a dry hole.

MEMBER ROSEN: So I'm told by my distinguished colleague, Dr. Powers, that I'm not to worry about that. That if Duke Cogema Stone & Webster choose to build something in September presuming the staff said it's okay and the commissioners have agreed and we've agreed they can go ahead and do it. Then we get to look at the ISA and say what you're building doesn't make a whole lot of sense to us now that we've seen the safety analysis. It seems like there ought to be a whole lot of different things involved.

CHAIRMAN POWERS: That's exactly right. You have a keen insight on this whole process here.

MR. PERSINKO: I mean that's the risk --

CHAIRMAN POWERS: And like I say what troubles you now has bothered people since 1963.

MR. PERSINKO: Short of receiving the complete application up front it is the risk that one takes. It's similar to like you said in the reactor days you had a construction permit and then the OL stage.

MEMBER ROSEN: I'm left speechless.

CHAIRMAN POWERS: Steve, relative to what went on in the early days of reactor power there's less speculation here like civil orders of magnitude.

MEMBER ROSEN: And one would hope that the risks are at some civil orders of magnitude too.

CHAIRMAN POWERS: We don't have risk. We're doing an ISA remember?

MEMBER ROSEN: That's right.

CHAIRMAN POWERS: Drew, go ahead.

MR. PERSINKO: The provision that you have instituted the two step process for plutonium facilities that I mentioned the 1070.23(b) was instituted back in the early 1970s. If that wasn't there the applicant according to the regulations could go out and build a facility without even coming to the staff in the first place. But putting that regulation in place it inserted a staff review at an earlier stage. But granted it is only at the design basis.

MEMBER ROSEN: As I said I'm speechless which means I don't have anything else to say about it.

CHAIRMAN POWERS: Which is also so unusual that I'm appalled. Go ahead, Drew.

MR. PERSINKO: So that's the schedule. That's the new schedule that we've developed as a result of learning of the changes recently by DOE and DCS.

Next slide. The summary of the impacts are that we had originally intended to issue a draft environmental impact statement this past February and we did not. We felt that the changes were significant enough to affect the draft EIS so we did not issue it.

CHAIRMAN POWERS: Let me just inject here.

I probably will discuss what we've been doing so far in this area with the commission in July. It will probably be nothing more than just a progress statement much like you're first couple of view graphs and what the anticipations are. The problem is the ACRS has a specific request to address this. So we have to tell them what we're doing every once and a while. I don't think we're telling them anything substantive about what we're doing here other than we're doing.

MR. PERSINKO: The impact as was stated earlier essentially as you cut through the chase is that it delays issuance of the staff's final EIS and SER by approximately one year. The other thing it did is we did not originally intend to issue a second draft. We intended to issue a draft and then a final. The result is that we will now be issuing a second draft.

So you questioned will you get another bite at the apple? I'm certain staff is willing to come and talk to the ACRS staff at any time. But you will get to see a second draft issued which really hadn't been originally planned.

Lastly we expect that the areas most affected by these changes will be in the safety analysis area and the chemical safety area. There are other areas that affect design but you always have to remember that we are at the design basis at this stage. That concludes my talk about the impact of the changes on the staff's review.

Now I would like to move onto an introductory presentation prior to the four more detailed presentations you will be receiving. As I mentioned this is a two step licensing process according to the regulations in 10 CFR Part 70. For construction the regulations require that the staff must approve the design basis of the principal structures, systems and components, quality assurance program, and also there's a paragraph in subpart (h) of 10 CFR 70 called the baseline design criteria and that's in 70.64.

One thing I just want to clarify. You have heard the term IROFS, the items relied on for safety. You also heard PSSCs, the principal structures, systems and components. The distinction is is that the regulations required staff to approve principal structures, systems and components at the construction stage and at the license application stage we move into what's known as the ISOFS, items relied on for safety. So the term PSSC is linked to construction.

I also want to mention that the applicant stated that they also used the regulations 70.61 to define what are the PSSCs. Staff issued its QA program for safety evaluation report in October 2001. So that's been out since late last year. As a result of that, the applicant has just recently submitted a revised QA program to match the SER requirements.

Let's briefly talk about open items other than those you will be hearing about later after my presentation. You'll be hearing more detailed presentations in the area of safety analysis, radiological consequences, chemical safety and fire protection.

Many of you I think have seen this slide before. It's just to set the stage of where the jurisdictional and the geographical boundaries lie in this project because it's different. The geographical boundary is the Savannah River site for the pit disassembly and conversion facility and mixed oxide fuel fabrication facility.

Both of those facilities are located on DOE's Savannah River site. Yet the jurisdictional relationship is that the NRC has regulatory oversight of the mixed oxide fuel fabrication facility.

So the PDCF, the pit disassembly and conversion facility, and before that is DOE's jurisdiction. Once the material is received at the mixed oxide fuel fabrication facility then the NRC's regulatory oversight begins.

One thing I would like to mention on this slide though is that what doesn't show is the recent changes. It shows all of the material coming from the PDCF. As you heard this morning some of the alternate feedstock may be coming directly to the mixed oxide fuel fabrication facility.

The two reactors that have been identified are Catawba and McGuire. There has been discussion about potentially adding additional reactors but we don't have any information on that. Next slide.

CHAIRMAN POWERS: Nor is it pertinent to this SER.

MR. PERSINKO: It doesn't really matter that you would react.

CHAIRMAN POWERS: It goes to unless they change the fuel type. Right? Cladding type or something like that.

MR. PERSINKO: Correct. It doesn't affect the staff's safety evaluation. It does have an effect however to some degree in the environmental aspect.

CHAIRMAN POWERS: Okay.

MEMBER LEVENSON: Dana, just because some things get lost in history, does the ACRS have access to the information on the MOX fuel radiated in commercial power reactors back in the 1970s, the EPRI program? Was MOX fuel put in both PWRs and BWRs?

CHAIRMAN POWERS: The ACRS has not looked at it as far as I know. But do they have access to it? If they wanted to. Right now of more interest to the ACRS has been getting a hold of information on the behavior of MOX fuel under accident conditions. There they have not been so successful. But neither one of them are pertinent to this discussion.

MR. PERSINKO: The next two slides are a high level overview of the processes. I just want to be clear though that this is part of the mixed oxide fuel fabrication facility. You've heard the term "aqueous polishing." This is in the MOX facility. This is not in the PDCFs. This starts the staff's regulatory oversight.

The AP process, aqueous polishing process, consists of high level the three steps that you see in this slide. We'll go into it a little bit more when we talk about chem safety. I just want to note also that this is the process that is based on the processes at the La Hague facility in France.

Next slide. Now you'll hear the MP process, the fuel fabrication process. This is the dry side of the process. This is where the purified PUO_2 is blended to make pellets and then eventually the fuel rods. This part of the process is modeled after the Melox facility in France.

I'm just going to go over briefly some of the open items in our SER not the ones that you'll hear more about later. You'll hear more about a particular one in confinement. I'm just going to go over at a high level view some of the open items that are in our SER right now. Keeping in mind we are reviewing it at the design basis level not the design level.

We have a couple of issues on site description. We asked the question concerning the sensitivity of measurements that were made of soil samples regarding radioactivity. This statement was made that there was no radioactivity detected. We asked about the sensitivity of the equipment to detect it.

Another item regarding site description is that there was an analysis performed of aircraft hazards. One of the items was though it didn't include projected future aircraft travel. There is a requirement for that. Keeping in mind though that this aircraft analysis did not include any aspects after 9-11. This is the traditional aircraft analysis that was done according to standard review plans.

CHAIRMAN POWERS: Accidental impacts from adjacentary ports and things like that. Not directed air.

MR. PERSINKO: Right.

MEMBER SIEBER: I was under the impression that the Savannah River site was a restricted area as far as aircraft are concerned all the way to the Savannah River. So there are no commercial flights allowed over Savannah River.

MR. GITTER: This is Joe Gitter. They did look at aircraft from Bush Field in Savannah and the possibility that there could be a wayward aircraft. That could have an impact on the facility. I'd have to check that.

CHAIRMAN POWERS: Also flying golf balls.

MR. PERSINKO: The next area was nuclear criticality safety. We had a number of open items there but I'm just going to mention a few. We asked for information concerning bounding densities assumed for the powders. There was a table provided to us about assumed bounding densities and we wanted to justify those values that were put in the table. We also requested clarification of the term "other justification" because the CAR said other justification will be used to extent code applicability and we wanted clarification about what "other justification" meant. We are also asking a justification for the administrative margin and the upper safety limits that were assumed for criticality, K-effective.

Regarding confinement I'm just going to mention one item here but you'll get into this when we talk about reg consequences. We probably have the most significant outstanding item there which regards HEPA filter efficiency. The applicant has used the 99.99 percent efficiency for the two banks. Staff is questioning that number and asking for further justification of that number.

Regarding fluid systems, there is outstanding information concerning the classification of the nitrogen system. Whether it's a PSSC or not by reading the application, the CAR, it seems like it could be because it has certain functions which may need to be a PSSC but yet it wasn't identified as a PSSC. For example, it provides cooling to the calciner bearing. It also is used as a blanket in some tanks. It also is used as sweeping an airlock in from the sintering furnace. So it seems to have some safety functions yet it's not a PSSC. So we are questioning that.

We also are questioning the classification of seismic isolation valves. There are certain valves that were not classified as PSSCs and they perform a function during a seismic event. We asked the classification of that. Lastly, you mentioned corrosion. We are asking about the corrosion allowance in areas that are not readily inspectable.

So that gives you a high level overview of an introduction to the speaker who will be following me. Are there any questions?

MEMBER ROSEN: Yes. Each of those speakers will address the open items in those particular areas.

MR. PERSINKO: Yes.

MEMBER ROSEN: Thank you.

MR. PERSINKO: Any other questions?

CHAIRMAN POWERS: Could I go into this corrosion issue just a little further?

MR. PERSINKO: Sure.

CHAIRMAN POWERS: This is mostly

administrative. Procedural and things like that. It seems to me that the introduction of multiple feeds has increased the opportunity for inadvertent admission to the systems of corrosive materials. Is that being examined in your process or are you just looking the steady state corrosion problems here?

MR. PERSINKO: We have outstanding issues on corrosion in general. Like I said, this SER is based on the existing CAR so we haven't gotten into the effects of alternate feed where it shouldn't. But in the chem safety area as well as in the fluid area, we have asked the applicant questions and still have some outstanding concerns regarding the corrosion issue. You'll hear about the corrosion issue more in chem safety. We've asked certain issues regarding corrosion on stainless steel and silver and things like that.

CHAIRMAN POWERS: Okay.

MR. PERSINKO: Thank you very much. The next speaker I would like to introduce is Rex Wescott. Rex is the safety and ISA team leader, integrated safety analysis team leader, safety analysis team leader since we don't have an ISA but I'll just turn it over to Rex now.

MR. WESCOTT: Good morning. I'm Rex

Wescott. I'm going to talk about the review of the safety assessment. The safety assessment may be thought of the front end of the development of the integrated safety analysis which is prepared at the operating license stage. This is what was used by the applicant to develop the principal structure systems and components, to identify the hazards and events and the strategies needed to mitigate or prevent these events.

Next slide. I intend to talk about the purpose of the safety assessment review, the scope of the safety assessment review and the criteria used to reach conclusions and the results of the review in terms of unresolved issues or additional information needs.

Next slide. The major purpose of the safety assessment review is to review the hazards analyses which the applicant used to develop the PSSCs for the facility. The safety assessment review is a team effort and was complimented by detailed technical reviews of the discipline or process specific sections of the application. I'm going to add, the review in the safety assessment part did not include the design basis of the PSSCs. The review of the design basis took place in the technical reviews.

A number of issues came back to safety assessment review from the technical reviews. These issues are being identified by the staff SER as unidentified events. That means events that we think could affect the facility but weren't identified by the licensee.

Next slide. Additional information needs that is from incomplete strategies where they actually identified the event but we don't feel that the principal structure, systems or components or the strategies that they are being used with are going to be effective in mitigating or preventing the events.

Throughout this review process, the safety assessment team meetings served to help reviewers become aware of each other's issues and provide other technical input that is necessary so it served as an integrating function.

MEMBER BONACA: I guess this analysis provides also an input to functional requirements of SEFTA systems if you have any that respond to these events. Right?

MR. WESCOTT: Absolutely. That's right. What the licensee or applicant identified was principal systems, structures and components. Many of these are multi-functional. Some functions were necessary for mitigation and some types of accidents. Some in other types. So you had a PSSC and maybe three functions associated with it. That's what I'm referring to as the strategy. That was their mitigation or prevention strategy.

MEMBER BONACA: So this functional requirement will be pulled out of this analysis in a formal fashion and then used as parts of the design of the rest. I'm trying to understand how far into details have they gone to date.

MR. WESCOTT: At our last session here we tried to outline where the application for construction review left off and where the operating license will start. I guess in a nutshell the CAR left off at the denotation of principal SSCs, their functions, their strategies and their design basis for these principal SSCs, in other words, what types of standards to be used in designing these and some cases values. It differed depending on the actual PSSC.

At the O/L stage, that's where they are going to actually build from the conceptual design to the more the detail design, components and reliabilities and that type of things.

MEMBER BONACA: Set points.

MR. WESCOTT: Set points. Right.

MEMBER ROSEN: But at this stage if I read the hazard analysis from what you said I should find a list of initiating events.

MR. WESCOTT: That's correct. The next slide. The scope of the safety assessment review consists of reviewing of applicant's analyses of natural phenomena such as seismic events, floods, high winds, for example, external manmade events such as potential industrial explosions, chemical releases, aircraft crashes and process hazards. For the review of the process hazards we had to look at worker consequences, public and site worker consequences and environmental consequences.

The natural phenomena hazards for the most part were external so you designed against failures inside the plant so you didn't have the consequence analysis to go through. The same with the external manmade events. But for the process hazards if you weren't preventing the event you had to mitigate it. And in mitigation you had to worry about consequences.

CHAIRMAN POWERS: Let me ask a couple of questions here. In the earlier discussion we broached the issue of the controversies associated with the seismicity of the Savannah River site. Did you get into that or did you just take what people use on the site?

MR. WESCOTT: No we did fairly thorough review. The Center for Nuclear Waste Regulatory Analysis was actually the contractor that reviewed the seismic. Drew can probably tell you more about that. But no.

CHAIRMAN POWERS: You got into the then endless debate.

MR. WESCOTT: Luckily DOE had also reviewed much of this.

CHAIRMAN POWERS: Yes. They've been looking at it a lot.

MR. WESCOTT: But there's a lot there.

CHAIRMAN POWERS: I noticed that you have used the distinction public and site worker. When you say site worker do you mean the Savannah River site or do you mean the actual MFFF site?

MR. WESCOTT: No when I say site worker and I apologize. That first bullet should have been facility worker consequences. The site worker is the Savannah River site worker.

CHAIRMAN POWERS: So you deducted on whether the site workers are public or not by just making a distinction between the two.

MR. WESCOTT: True, but I think there is

still is a debate there. I think Dave might be able to talk to you about that far more intelligently than I can about that particular aspect.

CHAIRMAN POWERS: Members of the subcommittee should be aware that there are about 25,000 workers on the Savannah River site so it's like a small city. The Department of Energy has historically concerned people working on the site as site workers. Consequently that has ramifications on how they do the safety. Where here you have a little problem that they are not working on this particular site.

So now do you treat them as site workers or do you treat them as members of the public? You can make arguments either way. The one truism is that they are probably more controlled than the average member of the public. But it is also hard to draw distinctions between a secretary in a Savannah River office and a secretary in a bank.

MR. WESCOTT: One distinction certainly of the site worker is much closer than the public.

CHAIRMAN POWERS: Well, because of the peculiarity of the site.

MR. WESCOTT: Yes.

CHAIRMAN POWERS: But if I were to compare this to a reactor site and my secretaries, one in a bank and one in the Savannah River site office, they could well be sisters, twins in fact.

MR. HASTINGS: This is Peter Hastings. Let me just clarify to make it a complete thought. The one distinction is to the extent that the secretary at the nearby Savannah River facility has unescorted access, she is also subject to minimum training requirements to achieve that access under DOE systems.

CHAIRMAN POWERS: And she's a little more controllable. If they say evacuate she probably will. Whereas a secretary in a bank is a 50/50 spot.

MEMBER KRESS: On your first two bullets you mentioned that you don't carry those to consequence level because they designed against. I'm interested in just what those words mean. "Designed against."

MR. WESCOTT: There is a couple of aspects of this. Number 1 is the 7061 performance requirements which says that consequences that would be above the threshold and we just assume that the consequences of an earthquake or high winds, something that would destroy the structure or threaten the PSSCs inside it would result in a consequence above the threshold have to be highly unlikely.

MEMBER KRESS: That's what you mean by "design against." You render it into the highly unlikely.

MR. WESCOTT: That's right. We design it for a level that its availability to performance mission should have a probability of failure or not performing its mission should be highly unlikely.

MEMBER ROSEN: And there's no quantification of that number?

MR. WESCOTT: Yes there is some quantification. The SRP specifies a probability of 10^{-5}. But it also says you can be qualitative about it. What's happened is the applicant's basically used reactor type guidance and also what the DOE has gotten and in almost all cases I think with the exception of seismic event has come out with a probability of the event less than 10^{-5}.

When the seismic event analyses were performed it showed using fragility analyses and this type of thing that given the earthquake the fractional probability of failure of one of the systems would be less than 10^{-5}. So it came out acceptable under our SRP.

MEMBER LEITCH: I'm very much concerned

about operator staffing levels, training, qualifications and so forth. I assume that's further down the road. That are discussions that are not yet appropriate.

MR. WESCOTT: That would be correct. I think some of that at least what's been done so far came under the human factors review but that wasn't part of this presentation. I think from what you just said most of that would O/L stage.

Next slide please. Also as part of the scope the applicant established six event categories and numerous event groups. Event groups are things like the 3013 container drops or corrosion dose leaks. I talked about those later within these six categories. And the purpose of the event groupings was really to put together events that could prevented or mitigated by the same PSSCs.

So all together the applicant evaluated well over 100 different events and actually formulated almost 50 event groups to evaluate these events in. Just to give a very simple idea of the structure of his hazard analyses. There are many different types of events but they came within these six categories. He did it by looking at groups so he could determine a consistent strategy that would cover a number of similar type events. Next slide.

MEMBER LEITCH: Just a question here about security or sabotage. Is this MOX facility separate from the Savannah River site security or that again an issue that is up in the air?

MR. WESCOTT: I don't know if that's a future issue or if that's an issue that I'm not aware of.

MR. GITTER: This is Joe Gitter. In terms of physical security, it's our understanding that the applicant plans to rely on physical security available at the Savannah River site. That's one of the reasons that we wanted to talk to DOE very early on in this process in the aftermath of 9-11 to make sure we shared our concerns and that the approach the DOE takes to address this issue is consistent with the approach that they are taking at the Savannah River site as a whole. But we have talked to DOE about this and they are aware of our concerns in this area.

MR. HASTINGS: Let me add to that just briefly. This is Peter Hastings. We are relying in large part in some of the elements of the existing security infrastructure at Savannah River but we do expect and were required to demonstrate that it meets the requirements of NRC regulations as well under part

73.

MEMBER LEITCH: I guess I always think that the most secure site is the smallest site and that only the people that are required to go into that area have access to the area. In other words, what I'm picturing based on what was just said is that this 25,000 or whatever people once they get into Savannah River site have unfettered access to this facility. Is that the right picture?

MR. HASTINGS: No. This is Peter Hastings again. That's not the case. The details of how we work within the construct of the DOE badging program has not been worked out yet but there will be a limited number of people who are separately badged to get into the MOX facility.

MEMBER LEITCH: Okay. Thanks.

MR. WESCOTT: Next one please. In terms of review criteria there are four basic criteria. The criteria likelihood was directly applied as I just said before to an evaluation of the natural phenomena and external manmade events. For process hazards the licensee assumed that all process hazards that could have an over-the-threshold consequence had a likelihood of not unlikely which basically means having a probability of one. They will occur. So we didn't apply likelihood in terms of what the event probability was to the process hazards but we did apply it to the natural phenomena and the external events.

The next criteria that was often used was what we call deterministic approach or deterministic argument. Deterministic arguments were applied for many of the facility worker consequence evaluations. In these evaluations sometimes the staff required additional information such as dose calculations to evaluate the reasonableness of the argument.

The applicant also applied deterministic reasoning for excluding some natural phenomena and external manmade events from consideration such as amounts of explosives that would be required to reach an over pressure, things like that as opposed to probability.

The use of safe and accepted practices was often applied to the selection of PSSCs and mitigation and/or prevention strategy. In some cases the staff actually researched the history of certain types of events and upsets to establish what practices may have caused the event. In other cases adherence to standards, regulatory guides and practices safely used in the nuclear industry was accepted as an indication that the strategy would be a safe and accepted practice.

CHAIRMAN POWERS: Many of the features of the design that has been put forward are not unlike features of designs in DOE processing facilities. Many of the features of course parallel or draw from the system that's available in France. Did the staff attempt to look at the event history of DOE facilities and the event history of La Hague?

MR. WESCOTT: I think you will see in our chemical process review there is certainly some history of the DOE facilities. I don't know how much history from La Hague is in there. But when Alex gives us his presentation he can probably give you a much better answer than I can on that.

Finally the last criteria was the availability of mitigation prevention strategies. That was primarily applied to the prevention or mitigation of consequences to the site worker or public or in some cases environment from process hazards. One guide that we use was a table A5 in NUREG 718 which basically assigned an average probability of failure on demand to types of controls generic names and controls such as passive engineered control or robust passive engineered control or active engineered control or administrative control and so on.

And by looking at these probability assignments taking the description of the PSSCs we could come up with a gross idea of what we thought the reliabilities could be. Then by recognizing that by proper selection of a surveillance interval, you can greatly increased reliabilities and decrease the probability failure on demand.

We basically accepted the strategies providing that it would surveillable. The strategies would probably be able to meet the performance requirements in 70.61. We did not require the applicant to do a demonstration at this point of what the probability or reliability would be. We just accepted that if it had certain characteristics of design and surveillance could be applied to it they could probably reach the performance requirements.

Next slide. My last year's slide, this one and the next slide represent the organization of unresolved issues from a performance perspective. This slide is a listing of unidentified events which will be talked about in more detail by the speakers following me. I want to note that the steam explosion was probably actually the one event that was identified from the ISA review or SA review that took place on site. We had noted that steam explosions were part of the Los Alamos safe analysis from a water cooled sintering furnace. We felt that steam explosions should be part of this review when the applicant is providing us information on this.

CHAIRMAN POWERS: When you speak of steam explosions you are referring to the explosive interactions that occur when molten material contacts water?

MR. WESCOTT: No. In this case I don't believe we are. I think we are more concerned with the possibility of water in the cooling jacket contacting the furnace or I think the applicant is also looking at the possibility of moisture through the bubbler system going into the furnace. I think there is a number of different modes. But no, I don't think the molden metal contact.

CHAIRMAN POWERS: So you're not talking about a shock wave here.

MR. WESCOTT: Not to my knowledge.

CHAIRMAN POWERS: Just a pasteurization event.

MR. WESCOTT: I don't believe that's one of those initiators that is being watched.

CHAIRMAN POWERS: So steam explosion means something else.

MR. WESCOTT: Yes. When we did our tour review for melter we were looking at just that. But that's not a situation here.

MEMBER BONACA: Is there a difference between you and the applicant about what should be considered or simply the application ignored this? What I'm trying to understand is did they present these events and say that they are so unlikely that they don't need to address it in the design basis or did they simply not address them all together?

MR. WESCOTT: I think the best way to characterize these are that we did not see evidence in the CAR that this events were addressed and we thought they should be. Now it's possible we could get a response back saying well we really did address this. It's part of such and such. If we agree that would be an acceptable answer. So I wouldn't like to characterize these as disagreement at this point. These are just things that filtered back up from us that we thought should have been looked at.

CHAIRMAN POWERS: I'm fascinated by the last one on the list.

MR. WESCOTT: Titanium fires. Yes. Alex

will talk to you about that.

CHAIRMAN POWERS: Okay.

MEMBER SIEBER: So everything burns.

MR. WESCOTT: This final slide is where we had problems with the strategies. Like I said in most cases this is where we did not feel that the strategy that they were using filled our criteria for safety or accepted practice. We thought there should be a little more there or something a little different. That's why we identified these.

I want to note that the laboratory explosion and the sintering furnace leak are both facility worker only. We don't have a problem with the consequences to the site and public. We think they've solved that problem. But they just have a problem with the worker dose.

The process safety I&C system is one I think primarily of nomenclature. They are going to rename this system but they haven't done it yet to make two other systems. But that is still an open item. So this is just a listing of our open items which require additional information in the strategy area.

MEMBER LEITCH: The fact that criticality preventions is not on these lists that implies that you are satisfied with the information that you've received.

MR. WESCOTT: I think there are some open items in criticality but they are more or less -- Drew, I think you'd better speak to that one. I don't know if Chris Tripp is here or not so we can characterize the criticality problems better.

MR. PERSINKO: No. There are open items in the criticality area as I mentioned two or three early on in my presentation but they're not on this slide right now. But I would also like to say that this is the significant open items. This is not the all encompassing list. So don't think that because it's not on here that it's closed. There are open items in the criticality area.

MEMBER LEITCH: Okay. Thanks.

MR. WESCOTT: One thing I might add that there are some issues concerning design basis that are very significant but the way we did the review they're not really coming up back through the safety assessment presentation because they are more in a technical review area.

In other words they don't represent a problem with identification of hazards or formulation strategies. They have the right hazard. They have the right strategy but they don't have the right design bases on the system or whatever they are using to mitigate it. That concludes my presentation.

MEMBER KRESS: I thought red oil was placed in the category of a red herring. Is it still around?

MR. WESCOTT: It may well be. We're in fact going to talk about that. That's another one for chem safety.

CHAIRMAN POWERS: I don't think there's anything red herring about it at all.

(Discussion off microphone.)

MEMBER KRESS: Tributyl phosphate will really explode on you.

CHAIRMAN POWERS: It definitely can form. It definitely is problematical. It's definitely a mystery.

MEMBER KRESS: What is meant by laboratory explosion?

MR. WESCOTT: Well what they've done in their safety analysis is they looked at explosions in the laboratory and basically in the CAR stated that they are going to develop a strategy at the O/L stage for protecting the worker from laboratory explosions. It was our opinion that really that needs to be done to meet the requirements of the regulation at the CAR stage.

CHAIRMAN POWERS: That's a challenge.

MR. WESCOTT: Yes. It probably is.

CHAIRMAN POWERS: That's a challenge. I'm always fascinated to watch that. A suit of armor that would work. Make it a little cumbersome to work.

MEMBER KRESS: What was your problem with the HEPA filter efficiency? Is it because you expect them to not be installed correctly or you have the wrong particle size or what?

MR. WESCOTT: I think the problem there and someone should correct me if I'm wrong was that in a fire we did not feel that the applicant should take full credit for the filter. I think he wanted to take 99.99 percent efficiency credit for that. During a fire we felt that soot loadings and other problems could significantly reduce the filter efficiency so that in the consequence analysis and other lesser filter efficiencies should be assumed then that's as yet unresolved.

MEMBER KRESS: Yes. That seems like a problem to me because filter efficiency is either 99.99 or zero usually.

CHAIRMAN POWERS: Well in this case I

think there is a different issue in my mind on HEPA filter with plutonium particles is "knock-along." The radioactive decay causes the little particle to jump. So it sits on one filter and decays and goes through. Now you have just a single filter.

MEMBER KRESS: These are alpha decays.

CHAIRMAN POWERS: Sure. It's called knock-along.

MEMBER KRESS: It knocks them along.

CHAIRMAN POWERS: It's been something that they've been fighting with at Los Alamos for a long time. It moves little particles down pipes and things like that. It's fun to watch.

MEMBER LEVENSON: Especially 238.

CHAIRMAN POWERS: 238 is by far the worst on that.

MEMBER ROSEN: On your eight bullets on this slide you characterized the nature of the issue pretty well except in the case of the red oil and the HAN. Do you want to say anything more about that here?

MR. WESCOTT: Well, they are both explosions and they'll be talked about in chemical safety. I think the reason they are where they are on the list is because even though they were identified as events we don't feel that the preventive strategy is truly sufficient for preventing the event.

MEMBER ROSEN: So we will hear more about that this afternoon from Alex Murray.

MR. WESCOTT: That's correct.

CHAIRMAN POWERS: In the area of red oil I know no way to do it except the empirical definition of regimes not to get into. How do you mitigate or prevent something happening that you don't know why it ever forms. The only way to do is say empirically I know it doesn't form here.

MR. WESCOTT: Yes. I'm afraid to answer that one way or another. I better let Alex address that.

CHAIRMAN POWERS: Sure. You have completed your presentation.

MR. WESCOTT: That's correct.

CHAIRMAN POWERS: Any other questions? Seeing none, I think I will recess us until 1:15 p.m.

(Whereupon, the foregoing matter went off the record at 12:08 p.m. and went back on the record at 1:15 p.m.)