UNITED STATES OF AMERICA
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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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PUBLIC MEETING AND HEARING

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THURSDAY
OCTOBER 7, 2010

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The Board met in the Three Rivers Convention Center, 7016 W. Grandridge Boulevard, Kennewick, Washington, Peter S. Winokur, Chairman, presiding.

PRESENT:

PETER S. WINOKUR, Chairman
JESSIE H. ROBERSON, Vice Chair
JOSEPH F. BADER, Board Member

LARRY W. BROWN, Board Member
JOHN E. MANSFIELD, Board Member

STAFF PRESENT:
RICHARD AZZARO, General Counsel
TIMOTHY DWYER, Technical Director

PANEL MEMBERS PRESENT:
GREG ASHLEY, BNI
DAVID BROCKMAN, DOE-ORP
DONNA BUSCHE, URS
STACY CHARBONEAU, DOE-ORP

DAVID DICKEY, Consultant
DALE KNUTSON, DOE-ORP

PANEL MEMBERS PRESENT: (Cont'd)

DAVID S. KOSSON, CRESP

LONI M. PEURRUNG, PNNL

FRANK RUSSO, BNI

PAUL RUTLAND, WRPS

LEO SAIN, URS

INES TRIAY, DOE-EM

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

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

(5:00 p.m.)

CHAIRMAN WINOKUR: My name is Peter Winokur. I am Chairman of the Defense Nuclear Facilities Safety Board, and I will preside over this public meeting and hearing.

At this time, I would like to introduce my colleagues on the Safety Board. To my immediate left is Vice Chair Jessie Roberson, and to her left is Mr. Larry Brown. On my right is Dr. John Mansfield. On his right is Mr. Joseph Bader. We five constitute the Board.

The Board's General Counsel, Richard Azzaro, is seated to my far left. The Board's Technical Director, Timothy Dwyer, is seated to my far right. Several members of our staff closely involved with oversight at the Department of Energy's Defense Nuclear Facilities at Hanford are also present.

Today's meeting and hearing was first publicly noticed in the Federal Register

on July 26, 2010, and renoticed for a change of location on September 15, 2010. It is being held open to the public in accordance with the provisions of the Government in the Sunshine Act.

The hearing is being broadcast over internet via video streaming. The link can be found on the Board's website. A video recording of the hearing will be made available on the Board's website as soon as possible after the hearing is concluded, and will remain available for at least 60 days.

A verbatim written transcript, together with associated documents, will be available for viewing and copying in the Board's public reading room on the 7th floor of the Board's headquarters in Washington, D.C.

In accordance with the Board's practice, and as stated in the Federal Register notice, we will welcome comments from interested members of the public at the

conclusion of testimony for each of the three sessions comprising this public meeting and hearing.

A list of those speakers who have contacted the Board is posted at the entrance to this auditorium. We have listed the people in the order in which they have contacted us or, if possible, when they wish to speak. I will call the speakers in this order and ask that speakers state their name and title at the beginning of their presentation.

There is also a table at the entrance to the room with a sign-up sheet for members of the public who wish to make a presentation but did not have an opportunity to sign up previous to this time. They will follow those who have already registered with us in the order in which they have signed up.

In order to give everyone wishing to speak an equal opportunity, we ask presenters to limit their original statements to five minutes. The chair will then give

consideration to additional comments should time permit. Presentations should be limited to comments, technical information, or data concerning the subjects of this meeting and hearing. The Board members may question anyone making presentations to the extent deemed appropriate.

The record of this proceeding will remain open until November 7, 2010. This Board reserves its right to further schedule and regulate the course of this hearing, to recess, reconvene, postpone, or adjourn this meeting and hearing, and to otherwise exercise its authority under the Atomic Energy Act of 1954, as amended.

Let me now proceed to explain the Board's statutory authority in inquiring into the matters that are the subject of this public meeting and hearing. The Board's enabling statute, now in effect for more than 20 years, is found in the Atomic Energy Act beginning in Section 2286 of Title 42.

One section of this defines the Board's role in the review of facility design and construction, and I quote, "The Board shall review the design of a new Department of Energy Defense Nuclear Facility before construction of such facility begins, and shall recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety.

"During the construction of any such facility, the Board shall periodically review and monitor the construction and shall submit to the Secretary, within a reasonable time, such recommendations relating to the construction of that facility as the Board considers necessary to ensure adequate protection of public health and safety.

"An action of the Board, or a failure to act under this paragraph, may not delay or prevent the Secretary of Energy from

carrying out the construction of such a facility."

The hearing begun this morning forms a part of the Board's continuing effort to fulfill this statutory charge with respect to the waste treatment and immobilization plant also known as the waste treatment plan.

The record of the hearing, both oral and written, will be used by the Board to formulate recommendations to the Secretary of Energy for this critical project. These recommendations may take the form of a formal recommendation to the Secretary or may be transmitted to the Department through letters or informal exchanges between technical counterparts.

The Board's oversight responsibilities continue through completion of construction, testing, operation, and eventual decommissioning of these facilities.

The Board's statutory charter is, like that given to other agencies operating

under the Atomic Energy Act, the protection of public health and safety, including safety of the workers.

In the case of the waste treatment plant, however, this statutory charge is made more complex because proper construction and operation of the plant is critical to resolving the underlying health and safety problem, namely the large volume of toxic and radioactive waste now stored in underground tanks at Hanford.

Many of these tanks are already 60, 70 years old and would be almost 100 years old by the end of the projected treatment mission. Consequently, it is not enough in this case for the Board to focus solely on whether the construction of the waste treatment plant will not suffer accidents harmful to workers and the public. It must operate safely and effectively for many decades to remediate the safety hazard represented by the tank waste.

The Board has, therefore, inquired into many issues that involve a mixture of accident risk and successful and efficient long-term operations. At this time, I would like to provide some additional background on the history of the project.

The Hanford high level waste tanks began receiving waste in the 1940s. As the initial single-shell tanks were being constructed, they were designed for about a 20-year life.

Over the seven decades of operation of the tank farms, poor chemical configuration control of the waste has created a much more challenging problem for understanding the chemistry and properties of the waste, as well as getting them mobilized, than exists at other sites such as the Savannah River Site and the Idaho Cleanup Project.

Characterization of this waste remains problematic. The first time that a

single-shell tank was suspected of leaking was in the mid-1950s. Many single-shell tanks have been proven leakers since then. The leakage exacerbates the need to get this waste out of the tanks and into stable forms suitable for eventual disposal.

The Department of Energy's solution to removing and stabilizing the waste to reduce the current and future threats to health and safety is the waste treatment plant. The waste treatment plant was initiated in the mid-1990s. This is the first-of-a-kind project. The Board's formal oversight of the project began in earnest after a privatization effort was abandoned in 2002.

The Board has been advising the Department about our concerns related to design basis safety requirements and their potential impact on operational safety throughout the life of the project.

Since initiating the project, the

Department has pursued internal and external reviews of the project, obtaining advice from experts in academia, the chemical and process industries, and its national laboratories, to help inform the design, safe operation, and performance of the plant over its projected 40-year operational life.

It is important to note that the Department undertook a significant redesign effort starting in 2009, even though the design of the plant was more than 70 percent complete. The redesign of the plant is now over 80 percent complete, and construction of its treatment facility is more than 30 percent complete.

Recently, the Department indicated to the Board that it is transitioning the waste treatment plant project from a design and construction project to one of construction and commissioning. The Department has referred to this transition as pivoting.

As such, the Department is planning to wrap up its design actions by establishing the final design criteria for the plant's structures, systems, and components. The pivot is intended to provide a defined path forward, to finish the design of the systems and components that have not been finalized, and to resolve any outstanding technical issues.

The Board is deeply concerned that the plant may be commissioned before several key technical issues are fully resolved. Once operational and exposed to radioactive waste, options for design changes and blackened hot cells will be extremely limited, costly, and expose workers to hazardous situations. To the maximum extent possible, solutions must be accommodated before commissioning. A learn-as-we-go philosophy does not seem prudent for this facility.

Given that the project is now pivoting, wrapping up design and focusing on

commissioning, it is a crucial time to have DOE [Department of Energy] explain where they are, where they are going, what remains to be done, and in what timeframe. Also implicit in the Board's statutory mandate is keeping the public appropriately informed of issues affecting public health and safety. Those are the goals of these proceedings.

The proceedings began last month when DOE provided over 200 pages of written answers to the Board's questions. These questions and answers are available on the Board's website and will become a part of the record of these proceedings. I want to take a moment to thank the Department for its timely response to these questions.

We began this morning to explore some of these answers to gain a more complete understanding. However, because of the large volume of information that must be discussed, a lack of further inquiry in this hearing, or in the near future, should not necessarily be

viewed as satisfaction on the part of the Board with either a previous written or verbal answer.

The Board noted in its transmittal of questions to DOE in August 2010 that these questions should be viewed as a starting point for the discussions that will occur during this public meeting and hearing.

There are several areas of the waste treatment plant design in which the Board has concerns with the safety and ultimate operation for the decades the plant must operate. These areas include: the ability of the plant to adequately mix the waste after they are transferred from the tank farms into the plant; the hydrogen control strategy for dealing with a hydrogen gas that is inevitably generated by the high level waste; the implementation of safety controls necessary to implement the hydrogen control strategy; and the likelihood that limitations on the plant's operating envelope resulting

from the performance of the plant's mixing systems will result in more demands on the tank farms to deliver waste that meets restrictive waste acceptance criteria or the need to provide alternative processing capability.

The second session of the Board's hearing, this evening's session, will concentrate on potential concerns with the pretreatment facility. These concerns are, first, the changes that Bechtel National Incorporated has made to the safety and design bases of the pretreatment facility in conjunction with a reduction in the material at risk; second, the effect of DOE's drive to reduce the complexity of the pretreatment facility design; and, third, the safety strategy for the design of piping and vessels to confine radioactive waste -- that is to say, the primary confinement design.

As in this morning's session, we are trying to understand the ability of the

plant to safely, effectively, and efficiently process waste delivered from the tank farms, so that it can vitrified for eventual disposal. We have requested that DOE and Bechtel National Incorporated participate in this evening's panel discussion.

That concludes my opening remarks. I will now ask my fellow Board members if they have opening remarks before we begin the testimony.

Hearing no such request, I want to invite Mr. David Brockman, Manager of DOE's Office of River Protection, to provide some introductory remarks.

MR. BROCKMAN: Thank you, Mr. Chairman, Board Members. I welcome the opportunity to introduce myself to the Board as a recent appointee to this position and provide introductory remarks on the subject of pretreatment facility safety.

I have asked my predecessor in this position, Shirley Olinger, to join me.

As the Office of River Protection Manager, I have the delegated authority for the waste treatment plant safety basis, a responsibility that is independent of the waste treatment plant federal project director.

This statement conveys my perspective on the evolving pretreatment safety basis, the chosen control strategy, and the view ahead as we plan for transitioning to commissioning and operations.

The waste treatment plant pretreatment facility is a design-build project with approximately 80 percent design, approximately 80 percent complete, and construction approximately 50 percent complete.

The approved safety basis is a preliminary documented safety analysis being modified for an addendum that addresses reduction in material at risk, or MAR [Material at Risk], and new criteria for

hydrogen and piping in auxiliary vessels known as HPAV [Hydrogen and Piping in Ancillary Vessels].

In an effort to improve the safety and operation of the pretreatment facility, a number of design changes have been implemented. These includes changes to select vessel mixing designs and changes to controls for hydrogen and piping. These changes represent approximately eight percent of the facility design.

The reduction in MAR aligns a waste treatment plant pretreatment safety basis with the existing approved safety basis for tank farm operations, the source of the waste treatment plant waste. The reduction from prior supertank MAR is consistent with the expected progression of waste treatment plant design as uncertainties are reduced.

Further, a committed specific administrative control in the tank farms will ensure the feed to the waste treatment plant

is within the assumed waste envelope. Likewise, the changes to HPAV criteria also reflect reduced uncertainty based on an experimental evidence collected by the project's investigation of piping response to a range of possible hydrogen combustion events.

I view these changes to be consistent with a normal design progression. Early project conservatisms are expected to be refined over time as the design evolves and as studies and analysis are completed to reduce the uncertainties.

Conversely, in some instances completed studies or analysis identify the need to increase design margin, such as vessel enhancements, to resolve mixing issues.

Important safety functions such as facility confinement and confinement ventilation approach were addressed early in the design process, and these strategies have not been affected by the recent changes in the

waste treatment plant facilities.

The project safety analysis -- analysis apply control selection and functional classification criteria for the WTP [Waste Treatment Plant] safety-related structures, systems, and components, that comply with a set of nuclear safety requirements, provide the framework for the Department of Energy and its contractors to design nuclear facilities.

Over the past year, numerous changes and analysis assumptions have been adopted in response to comments made by the project's independent experts and the Defense Nuclear Facilities Safety Board staff. Examples of issues that are being addressed with analysis changes or uncertainty evaluations include entrainment coefficient, deposition velocity, and spray leak phenomenology.

Pretreatment facility -- the pretreatment facility is on the critical path

for completing construction of the waste treatment plant and plays an essential role in assuring accomplishment of the waste treatment plant mission. Both the MAR change and new HPAV design approach will yield a superior design for the waste treatment plant, which complies with DOE's safety policy.

Both DOE and Bechtel National have high confidence that the project is procuring/instructing safety-related systems, structures, and components to the appropriate requirements and standards and ensuring that the final documented safety analysis will support startup and operation of the waste treatment plant facilities as necessary for efficient achievement of the critical waste stabilization mission.

I would now like to turn the floor over to Shirley.

MS. OLINGER: Good evening, Chairman Winokur, other Board members, Board staff, and members of the public. I, too,

welcome an opportunity to address the Board and provide introductory remarks as the prior Office of River Protection manager on the subject of the pretreatment facility safety.

My remarks provide a perspective as both the owner and the nuclear safety regulator for the Office of River Protection with respect to the evolving safety control strategy for the pretreatment facility during the 2009 to 2010 time period.

Bechtel National Incorporated, the contracted design authority for the waste treatment plant, developed key changes affecting the safety bases that were approved by the Office of River Protection. They reflect an expected evolution with iteration between the design and safety analysis processes to ensure reliable fulfillment of the facility's mission.

I believe the changes will yield a superior design and improve the overall safety of the pretreatment facility and comply with

DOE's safety policies. In late 2008, I requested a summary of the design changes that had been developed to implement conservative design criteria established in April 2006 to address hydrogen and piping in ancillary vessels, HPAV, principally involving the addition of active preventative safety controls.

That effort identified a significant number of HPAV safety controls in the pretreatment facility with the majority being active controls, such as fresh or vent systems, pump timers, and over 70 percent of them functionally classified as safety class, the highest safety classification.

I judge the resulting design approach to be inconsistent with the general principle that the design should be kept simple from an operational perspective to the extent practical.

I understood that these HPAV controls, and the many safety class controls,

were being driven by conservative design criteria set in prior years to address uncertainty in the hazard characteristics of the waste to be processed in the facility, including both the waste hazard characteristics referred to as the material at risk, or MAR, and the generation of combustible hydrogen in the pretreatment facility waste piping systems.

These conservative requirements drove an evolving design of increasing complexity. For example, high point vents on piping systems involve waste and gas interfaces that would be difficult to maintain during operations. And many hazardous waste components needed to be installed in protected bulges in the corridors outside the hot cell walls due to overcrowding in the hot cells.

Black cells contain only passive components, which will not be accessed once the facility goes operational, while the hot cells contain the active components, which

will be accessed for maintenance via remote handling equipment. The bulges are designed to ensure worker protection, but they entail increased risk of inadvertent worker exposures to hazardous chemical vapors and radiological hazards than if they had been included in the hot cell area as originally intended.

I request a comparison with the most comparable facilities in the EM [Environmental Management] complex, the defense waste processing facility, and the salt waste processing facility at Savannah River, that has double the curie content of Hanford's tank waste, and found that while hazards were generally comparable, neither facility required a similar large number of active preventative systems for combustible gas and piping, or more than a few safety class systems.

I recognize, however, that changes at this stage of the project must be taken with due diligence. Therefore, working with

Bechtel National, we convened expert teams to review the waste treatment plant material at risk, the HPAV design approach, and the operational implications of such a large number of controls.

The teams were chartered to assess whether changes were warranted and whether practical alternatives were available. The teams recommended changes in the design specification for the MAR to align with the waste treatment plant design requirements with the 2003 tank farms' documented safety bases assumptions that relied on characterization data from actual tank waste at the tank farms.

The teams also recommended an alternate strategy for dealing with hydrogen that is generated when radioactive waste is present in the pretreatment facility piping systems. This recommendation drew upon the results of the project's analysis and testing program from the 2006 to the 2009 time period.

After reviewing the team

recommendations, the Office of River Protection, working with BNI [Bechtel National Incorporated], required them to prepare the technical submittals and the safety bases change package to implement these recommendations, simplifying the design where justified, while ensuring a facility that meets DOE's safety requirements.

Following presentation of initially proposed changes to the Defense Nuclear Facilities Safety Board in the summer of 2009, the project incorporated their feedback, and Bechtel National submitted the change package to the Office of River Protection late in 2009.

I approved the change in MAR and functional classification of structures, systems, and components on November 2, 2009, and the change in HPAV design criteria on February 15, 2010. Both bases of approval -- approvals are documented in corresponding safety evaluation reports.

The approved criteria address Bechtel National's plan to use quantitative risk analysis to identify route-specific loading conditions from potential hydrogen events for design. The QRA [Quantitative Risk Analysis], quantitative risk analysis, was approved as a design tool, recognizing that the existing safety analysis assumed various piping boundary failures could occur as a result of hydrogen combustion and selected appropriate mitigative controls, namely the C5 boundary and filtered ventilation systems.

The acceptability of the QRA as part of the methodology for compliance with 10 CFR 830 [Code of Federal Regulations] is expected to be confirmed. In an effort to resolve technical issues expressed by the Board, comprehensive, independent expert-based review of the safety design strategy for control of hydrogen pipes was commissioned. This led to the formation of the HPAV independent review team.

The HPAV independent review team endorsed the plan's design approach, subject to resolution of their findings. Bechtel National has prepared a closure plan, and the Department of Energy waste treatment plant has approved this plan.

Once the findings are addressed, the HPAV independent review team concludes that the net result of this approach to design will be a low probability of pipe failure if hydrogen explosions occur. One additional conclusion of the HPAV independent review team experts was that the austenitic stainless steel used in the waste treatment plant piping systems would not fragment explosively, even if loaded to failure.

Bechtel National experts confirmed this conclusion for both piping and in-line components fabricated from austenitic stainless steel and the Office of River Protection directed that such fragmentation should no longer be assumed to be credible.

This change simplifies some designs permitting the shortening of long dead legs in the ultrafiltration loop, for example, and thereby reducing the potential for significant combustible gas accumulation.

Bechtel National is now resolving the HPAV independent review team findings and finalizing the tools to implement the new HPAV strategy. Only after those tools are applied will we know the extent to which the piping design can be simplified, although preliminary results lead Bechtel National to conclude that many pipe routes will be shown to meet the new criteria.

Once the design is complete, the project will focus on ensuring safe and reliable facility operation with a resulting mix of active and passive HPAV controls.

My bases for approval is that both the MAR change and the new HPAV design approach will yield a superior design and improve the overall safety of the pretreatment

facility that complies with DOE's safety policy. Together they ensure the operational reliability necessary for efficient achievement of the critical waste stabilization mission of the facility.

Thank you very much for your time.

CHAIRMAN WINOKUR: Thank you, Mr. Brockman and Ms. Olinger, for those comments.

The session will continue with testimony offered by members of the Board staff. I ask each member who offers testimony to begin by stating his name and position for the record.

MR. KASDORF: Good evening, Mr. Chairman, members of the Board. My name is Roy Kasdorf. With me is Mr. Steven Stokes, the staff lead for WTP. I am the lead for the Board's nuclear facilities design and infrastructure group. I am responsible for ensuring that staff reviews of the design and construction of the waste treatment plant, and the immobilization plant, are completely

consistent with the Board's mission.

In this evening's meeting, the Board is considering safety-related aspects of the pretreatment facilities design and operation. The staff will discuss the DOE's changes with the assumed material -- assumed radioactive material at risk and the resulting changes in the design and safety basis for the WTP.

As I indicated in this morning's meeting, for the past eight years the Board staff has been reviewing the WTP pretreatment facility design and safety basis development. The staff recognizes that the operation of the WTP is vital to the remediation of the Hanford site.

The WTP is the primary means for reducing the risk resulting from storage of high level radioactive waste in the Hanford waste tanks. As such, the Board staff recognizes that the WTP must operate efficiently and safely over the entire

duration of its multi-decade mission.

The staff's concerns fundamentally relate to safety issues, but many of the safety issues would result in significant operational problems, such as the buildup of material and vessels plugging/bursting the pipes.

There are several unique challenges in the WTP design and construction which complicate DOE's design effort and underlie the staff's safety concerns. First, the WTP is a one-of-a-kind facility. The design of this facility is complicated, and DOE and its contractors have chosen to use several unproven technologies. For example, pulse jet mixers are unproven in their ability to mix the types and variety of wastes that will be processed in WTP.

Second, the chemistry in Hanford's high level waste is extremely complicated and variable. The hazards in treatment and processing of the waste are different from

those encountered in storing the waste in the tank farms, and will remain challenging over the life of the WTP operation.

For example, the WTP wastes are heated to near boiling to aid in leaching aluminum, and solids are concentrated to the maximum extent possible to optimize loading of the high level waste class logs.

Third, characterization of the Hanford's waste tanks -- tank waste is difficult and expensive and time-consuming. The range and distribution of particle size, density of the high level waste solids are uncertain, particularly with regard to plutonium solids. The lack of adequate characterization of plutonium solids has complicated the development of WTP's criticality controls.

These challenges lead to increased uncertainty risk in the design. DOE routinely accepts and manages risk during design and construction, but in this case they have

accepted risks that will not be resolved until after WTP has been constructed and is being operated. For example, waste will not be retrieved and prequalified by the tank farm's operating contractor until six months before the waste batch is due to be shipped to the waste treatment plant.

Some of this risk and uncertainty was previously accounted for by the DOE's use of the supertank model to specify the bounding waste for the basis of WTP's design. But the supertank design approach has been abandoned in favor of the reduced MAR strategy.

A consequence of abandoning the supertank design approach is that DOE will be required to accept more risk due to uncertainty related to the characterization of tank waste, which increases the potential that WTP may not be able to accept all tank waste.

DOE elected to begin building the WTP facilities ahead of completing the final design. This design approach places

additional burden on both the contractor and DOE and exacerbates problems regarding management of project risk given uncertain and incomplete design information.

Although DOE and BNI have developed processes to minimize the impacts from building the WTP ahead of the design completion, design and safety-related issues continue to impact the project's costs and schedule. This fact places further pressure on DOE and BNI as they move forward -- move the design and construction forward and accept risks that are normally resolved prior to beginning construction.

In late 2008, DOE was becoming concerned that the plant was going to be too complex to operate safely. At that time, the design of the pretreatment facility was more than two-thirds complete and construction was about one-forth complete.

In February 2009, DOE informed the Board that they had concluded that the WTP

accident analysis and resulting complexity and safety-related systems were severely impacting the potential operability of WTP.

The staff has attempted to understand the basis for DOE's statements regarding design complexity but has been unable to substantiate DOE's position. The staff does not believe complexity issues will become clearer until the project develops operating procedures and technical safety requirements to support its safety basis. At this time, the project has not developed these documents.

In response to Board questions in preparation for this meeting, DOE stated that they did not make a formal determination that the plant would be too complex to operate. However, many of the discussions with DOE surrounding the revised hydrogen control safety strategy suggests that operational complexity was and remains a concern for the project.

DOE initiated an effort to resolve concerns with complexity of the plant. DOE believed that they could reduce the assumed MAR and could eliminate unnecessary conservatism in the design by reanalyzing the hazards and reducing unmitigated consequences.

They tasked BNI to eliminate unnecessary conservatism by reevaluating selected assumptions and methods used in the accident analysis for seismic and hydrogen explosion events for WTP.

Based on the reduction in the assumed MAR, and the perceived need to reduce complexity, DOE suggested that all safety class controls could be removed from the design. In February 2009, the DOE informed the Board that a review of the MAR would focus on removing unnecessary conservatism and that a revised safety analysis would provide a fresh look at the accident scenarios, the accident analysis, and the safety-related engineered controls.

The staff was not concerned with removing conservatism in the MAR assumptions. However, the staff did raise a concern that this could potentially put more requirements on the tank farm contractor who would now have to ensure that the waste being received to the -- delivered to the WTP did not exceed the new MAR limits, a tighter waste acceptance criteria.

In May 2009, BNI revised the severity level calculation -- this is BNI's term for an unmitigated accident analysis -- for the pretreatment facility. The staff noted that the unmitigated consequences to the public had decreased well beyond what could be accounted for by a reduction in the MAR.

The staff found that BNI had not only changed the MAR but had made other changes to the accident analysis. The Board communicated its concern to DOE and Congress in the Board's December 2009 quarterly report to Congress stating, "While the Board does not

question reducing the MAR, the Board's review found that the contractor made other non-MAR-related changes to the severity level calculations that may have inappropriately reduced the calculated consequences of accidents."

Since that time, the Board staff and DOE have resolved most of the concerns identified in May 2009. As a result, DOE has decided not to reclassify several safety class systems. DOE realized that they must remain safety class.

Key safety class controls that remain are the active confinement ventilation system for the facility and the ventilation systems for the process vessels.

However, several concerns remain unresolved -- the values selected for deposition velocity, which is a parameter used to estimate how much radioactive material reaches the public following an accidental release of material, the calculational

methodology used in determining consequences from spray leak -- consequences from piping system spray leaks, the safety design strategy for the pretreatment facility primary confinement, and the design requirements for mitigation of hydrogen controls in the piping systems.

The Board informed DOE that the value of deposition velocity established in DOE guidance is not reasonably conservative for the Hanford site and the WTP waste. The result -- this results in underpredicting the unmitigated doses to the public by about a factor of four.

DOE briefed the Board last month, indicating they now agree that the specified deposition velocity of one centimeter per second used by WTP is not technically correct. However, DOE asserts that there is sufficient conservatism in other aspects of the analysis to offset this lack of conservatism.

The staff does not understand the

technical basis for this assertion and continues to believe that the project should use a reasonably conservative value, between 0.1 centimeter per second and 0.3 centimeters per second, for deposition velocity.

After reviewing WTP's severity -- revised severity level calculations, the Board staff raised concerns regarding the calculation methods used to determine the unmitigated dose consequences due to spray leaks for the WTP process piping.

Subsequently, DOE's experts acknowledged that DOE's guidelines governing spray leak analysis may not be conservative when applied to WTP. As a result, BNI developed a WTP-specific method for the analysis of spray leaks.

Depending on the input parameters selected, BNI calculated unmitigated dose consequences to the public ranged from a few millirem to 80 rem, well above the WTP evaluation guideline of five rem used for

defining the need for safety class controls.

BNI concluded that the unmitigated dose to the public would be -- would be expected to be much less than one rem for spray leaks in the WTP based on what BNI believes are reasonable input parameters into their equations.

BNI has also concluded that uncertainties exist in their method -- selected methodology, which could easily cause the predicted consequences to the public to approach the five rem WTP evaluation guideline. However, BNI's analysis did not consider the lower value of deposition velocity that the Board believes is justified for use at WTP.

Ultimately, the public doses to the public -- the potential doses to the public could rise to be above the five rem WTP threshold, which would require safety class controls for protection of the public. DOE has selected safety class confinement

ventilation system and facility structure as the primary means of protecting the public from the release of radioactive materials from process piping and in-line components.

When compared to an approach that credits the integrity of the piping and the in-line components, DOE's approach would allow a less robust design for the piping and in-line components.

The Board staff evaluated the impact of DOE's approach on piping and in-line components in both the black cells and the hot cell. In the black cells, the piping and vessels are all welded construction and are required to meet the more rigorous seismic design criteria. In effect, the black cell design requirements are equivalent to a safety class design.

However, the Board staff believes that the WTP's design for hot cell piping is less robust. Further, we do not believe the design is consistent with DOE's policy on

defense in depth identified in DOE's standard for documented safety analysis, which states in part, "For high hazards operations, there are typically multiple layers of defense in depth. The inner layer of defense in depth relies upon a high level of design quality, so that important systems, structures, and components will perform their required functions with high reliability and high tolerance against degradation."

We interpret this to mean that the primary boundary -- the piping system -- should be designed to a high level of design quality consistent with the safety classification. This is also consistent with DOE's Order 420.1, Facility Safety, and its guides, which specify that the usual safety function of process equipment is to provide primary confinement and prevent or mitigate radioactive material releases, and further specifies that priority be given to establishing safety controls closest to the

hazard.

DOE is conceptually relying on a single barrier -- the building and its ventilation system -- to mitigate the consequences from a spray leak. Further, DOE has not considered the hazards to the worker having to clean up and decontaminate the facility following a significant leak.

Typically for new facilities releases are prevented by designing the vessels and piping systems to withstand potential accidents. However, the proposed -- the approach proposed by BNI and DOE would limit the potential release by isolating the potentially breached piping system from the vessels following an accident.

While this design approach can be acceptable, the staff believes it is inferior to designing the piping system to withstand possible accidents.

DOE's hydrogen controls are intended to prevent an explosion in process

vessels by retaining safety class process ventilation systems. The process piping and in-line components, DOE's design criteria, now specify that hydrogen explosions can be contained by the process piping or prevented, but would allow in-line components, which are part of the primary boundary, to leak.

The Board staff believes that DOE should classify the safety function performed by the primary piping system boundary based on potential consequences from a release of material to the public or the co-located worker. As I indicated earlier, the Board staff believes that the design requirements specified for black cell vessels and piping system are adequate.

However, in the hot cell piping system, the design requirements are less robust. They allow permanent deformation of a pipe due to an explosion, allow some leakage, and rely upon leak detection to minimize the consequences of potential

failures of piping and components.

At this time, the staff has not been provided any demonstration or analysis that proves that leaks can be detected adequately to allow timely mitigation actions, particularly for leaks involving thick, non-Newtonian waste. As such, the staff is not able to determine the leak detection capabilities will work and a suitable evaluation of BNI's proposal cannot be completed.

Now I would like to briefly discuss the incorporation of safety controls into the preliminary documented safety analysis, the PDSA [Preliminary Documented Safety Analysis]. BNI has yet to determine if the recent changes resulting from the preliminary -- from the pretreatment safety control strategy can be effectively implemented into the PDSA in the form of technical safety requirements.

This concern is particularly

applicable to the revised hydrogen design safety control strategy. The hydrogen accident scenarios and associated safety controls will be discussed in depth in tomorrow morning's meeting and hearing.

At issue in today's session is how safety controls can be implemented into the PDSA. DOE and BNI have chosen to use a quantitative risk analysis, a QRA, as both a design and a safety evaluation tool for piping systems subject to hydrogen accidents. The use of the QRA for this purpose is unprecedented in DOE.

DOE and BNI have to date invested very little effort in ensuring that the hydrogen control design strategy can be successfully implemented into the WTP safety analysis. The Board staff believes that since the use of QRA for the design of piping systems is new to DOE, great care must be taken in its development to ensure that the resulting PDSA meets DOE requirements.

This demands that the safety-related controls related to the use of QRAs be developed as soon as possible. This will ensure that the requirements for formulation of technical safety requirements can be implemented.

There are also other issues that impact the development of the pretreatment facility safety basis. Even though the pretreatment facility design is about 80 percent complete, DOE has not established the final flow sheet or completed the comprehensive hazards analysis. Both of these should have been completed much earlier in the design process, particularly considering the design-build nature of the WTP project.

BNI and DOE must establish the pretreatment facility flow sheet, complete the comprehensive hazards analysis, and demonstrate that the proposed safety strategies can be successfully implemented into the PDSA or risk late changes in the

pretreatment facility design that will unduly delay the project.

That concludes my prepared comments, and we will try to answer any questions the Board may have.

CHAIRMAN WINOKUR: Do the Board members have any questions?

(No response.)

If not, I now invite the panel of witnesses from the Department of Energy and its contractor organizations to take their seats. These witnesses are -- Dr. Ines Triay is the Assistant Secretary for Energy for Environmental Management, Mr. David Brockman is the Manager of DOE's Office of River Protection, Mr. Dale Knutson is the Federal Project Director for the Waste Treatment Plant, Mr. Frank Russo is the Bechtel Project Director for the Waste Treatment Plant, Mr. Greg Ashley is the Bechtel Engineering Director for the Waste Treatment Plant, Mr. Leo Sain is the URS Executive Vice President

for Performance Assurance and Operations, and Ms. Donna Busche is the URS Nuclear Safety Manager for the Waste Treatment Plant.

Does any member of the panel wish to submit written testimony? We have a lot of material to cover this -- at this hearing. The Board has chosen these panelists carefully and requests that panelists alone answer questions that are directed to them to the best of their ability.

If a panelist would like to take a question for the record, their answer to that question will be entered into the record of this hearing at a later time.

Thank you for being here this evening. And with that, we will begin the panel session with a question from Ms. Roberson.

VICE CHAIR ROBERSON: Good evening. I would like to start out -- can you hear me now?

Good evening. I'd like to start

out with a question to Ms. Busche. Ms. Busche, is the preliminary documented safety analysis and addendums, and the safety requirements document and the design, consistently reflecting the same safety strategy right now?

MS. BUSCHE: The current PDSA and the design are consistent. The PDSA addendum, which has not been completely approved -- we had some conditions of approval that were finalizing just some actions. So the design has not been modified to reflect any changes in the PDSA addendum, which I think was the heart of the MAR and the HPAV lead-in by Mr. Kasdorf.

So it is consistent with the current approved DOE PDSA and safety requirements document. But the safety requirements document did modify some hydrogen and pipe criteria. That has not gone forward yet.

VICE CHAIR ROBERSON: Okay.

MS. BUSCHE: From a design perspective, is my understanding.

VICE CHAIR ROBERSON: But your organization reviews all of these changes for impact on safety before they are approved or submitted to DOE, is that right? Any change that might affect safety, does your organization review those and analyze the impact?

MS. BUSCHE: My organization does review engineering design changes, yes, ma'am.

VICE CHAIR ROBERSON: Okay. Okay. In the context of those changes, I guess I really need to ask you, from a safety perspective or an ability to produce a safety basis for this facility, are there any specific areas of focus or concern from you as the project continues on?

MS. BUSCHE: In the pretreatment facility, we have several known technical issues that have been identified through one or more of our various processes.

Recently, as we have done just a routine update to our baseline and some refined planning, we have identified key issues like resolution now and implementation of mixing. Because we have just now completed M3 [Major Issue 3], that has not been carried forward into the PDSA addendum, PDSA or design yet, resolution of HPAV, and some other minor ones, but it's a pretty substantial effort to resolve those technical issues.

And some of the planning that my organization has worked with engineering and we have put in the hours that we need to systematically evaluate from an integrated perspective any of those final design changes starting with what's the hazards analysis that would feed and integrate in with that -- with the next iteration based on how we resolve those issues.

VICE CHAIR ROBERSON: So other than mixing and HPAV, are there any others?

MS. BUSCHE: We have other

technical issues that didn't rise to that level, but we know we have to resolve. For example, C5-V, as identified earlier, is a safety class structure, system, and component. Okay?

Given the resolution of comments from the spray leak methodology, we now have known performance issues based on the methodology that we have chosen. So we have identified the technical issue of areas where we may need to go out and get additional information to help us demonstrate when we write Chapter 4 of the final DSA [Documented Safety Analysis] that that confinement ventilation system will perform its intended safety function and how it will do so.

VICE CHAIR ROBERSON: Are there any others?

MS. BUSCHE: I think there has been enough discussion on the project on the overall confinement strategy. We have -- clearly, we have what is documented in the

PDSA and the PDSA addendum, but I think spray leaks has brought in, due to the results of that methodology, some questions on the overall safety design strategy for both the aerosolized portion of that and the liquid portion of that.

I wouldn't elevate those to the same level. I think that would be handled very typically through a normal iteration on any design-build project.

VICE CHAIR ROBERSON: Why is it appropriate to be completing the comprehensive risk analysis, hazards analysis, at this point? What is driving that?

MS. BUSCHE: I don't want to suppose. We have what we call an integrated safety management process where engineering and nuclear safety review the hazards analysis at a certain point in the design. Pretreat is a very complicated facility, and we have seen several examples, and they range in degrees of, you know, I think either complexity or

safety significance.

But when we looked at the collective set of that, I think my organization took pause and worked with engineering and says, "You know, we may have individual answers. We myopically analyze this engineering design and this engineering design. But we have some discomfort or uncomfortableness with the ability to have integrated that across to be able to establish a final control strategy -- and this is my terminology -- "that was licensable and commissionable."

So we need to have consistency in how we analyze hazards and how we structure that hierarchy and layers of defense in depth, as Mr. Kasdorf has identified.

So a systematic evaluation of hazards is -- it's on the project. We are actually planning it, and we are going to be -- we have started initiating some of the preliminary work we need to do to actually

conduct those hazards analysis.

VICE CHAIR ROBERSON: Mr. Brockman, you are the safety basis authority for WTP and for the tank farms, right? Correct?

MR. BROCKMAN: I am.

VICE CHAIR ROBERSON: Okay. In the SER [Safety Evaluation Report] that ORP [Office of River Protection] approved, and its owners' perspective attached to it, you describe the basis for the reduction in conservatism and why it was warranted. And you and Ms. Olinger really just went back through that in your statement.

I guess what I'd ask you to do is to categorize what those changes -- not -- I understand bulges, and I mean bulges are designed from a safety perspective, but the drivers for that. Is that question clear? One was simplicity; I got that.

MR. BROCKMAN: Yes.

VICE CHAIR ROBERSON: Another was

for facility reliability. Is that correct? I think that's what --

MR. BROCKMAN: That's --

VICE CHAIR ROBERSON: -- what you guys said. Another was to reduce potential worker safety risk, right? Is that correct?

MR. BROCKMAN: Correct.

VICE CHAIR ROBERSON: Was there another that I missed?

MR. BROCKMAN: I didn't make those decisions. But to me, just simply learning more about the effects of hydrating and when there is a deflagration or detonation or in between, it just seems prudent to make sure that that's well understood. And I think that the testing that has been done has really enhanced our understanding of that, and has allowed us to lead to changes that accomplish some of those things that you just discussed.

VICE CHAIR ROBERSON: Okay. So I think we are going to -- through the course of this hearing we will probably deep dive into

a lot of those elements that you guys cited in your opening statement.

But what I'd like to do is elevate a little bit and try to make sure we understand the managerial decisionmaking process. Okay. And I'm going to ask you -- you're the safety basis expert here -- I'm going to ask you to help me through this.

When constructing your safety basis, what are you trying to protect, okay, generally?

MS. BUSCHE: Generally, in constructing a safety analysis for any nuclear facility, the intent is to look at the breadth and depth of potential upset accidents and operational events, establish a hierarchy of controls and nuclear safety control strategy that can be implemented in a set of technical safety requirements and implemented in the field for limiting conditions for normal operations.

So you analyze all of the various

machinations of what could go wrong, and then you set controls at a much lower level so that it really never happens. That's my vernacular.

VICE CHAIR ROBERSON: So, but you establish some margin -- and correct me if I'm wrong -- you have -- you establish -- for instance, we have spent a lot of time talking about design parameters today. You establish your design at some level above what has been evaluated as failure modes --

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: -- based on material or components, right?

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: And then, at that design level, you integrate and evaluate the protection you need and you establish a safety basis for operating. Is that correct?

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: Okay. And so the question I have, when you remove

conservatism out of the design, naturally you remove conservatism out of your --

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: -- operating envelope, is that correct?

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: Okay. Is it -- let me ask this. I think I've already made this point. So the key parameters of your safety basis will be designed to protect that specific operation.

MS. BUSCHE: Correct.

VICE CHAIR ROBERSON: Okay. So, Mr. Brockman, generally speaking, you apply the same thought process in approving the safety basis for the tank farm and for the WTP, right? Because DOE safety requirements, you have used the same --

MR. BROCKMAN: I would.

VICE CHAIR ROBERSON: You would.

MR. BROCKMAN: I have not applied it. I would.

VICE CHAIR ROBERSON: Right. So let me just -- and the WTP is being built to remedy a hazard that now exists in the tank farm, right?

MR. BROCKMAN: That's correct.

VICE CHAIR ROBERSON: Is that right? That's the purpose of this --

MR. BROCKMAN: That's correct.

VICE CHAIR ROBERSON: So, Mr. Sain --

MR. SAIN: Yes, ma'am.

VICE CHAIR ROBERSON: -- I'm going to say something, and I'm going to ask you -- I don't know how to ask it in a question, and it's not intended to be provocative. But I would describe the tank farm as operationally fragile. Is that an unreasonable characterization?

MR. SAIN: I don't think so.

VICE CHAIR ROBERSON: Tell me why.

MR. SAIN: Well, it's, you know, very old. It has been around a long time. We

know we have had tanks that have leaked.

CHAIRMAN WINOKUR: So you have agreed with the assertion.

VICE CHAIR ROBERSON: Everything you said.

MR. SAIN: Well, I'm not sure what the assertion is.

VICE CHAIR ROBERSON: Okay.

CHAIRMAN WINOKUR: That the tank farm is fragile, the operation. Was that correct, Ms. Roberson?

VICE CHAIR ROBERSON: That's correct, yes.

MR. SAIN: Well, I'm agreeing that it's a hazard, a high hazard. And we're dealing with, you know, tanks, as I said, that have been around a long time. And the real goal is to go treat that waste on the tanks.

VICE CHAIR ROBERSON: Absolutely. Absolutely.

Well, let me say I characterize a tank farm as historically fragile, and I don't

mean five years ago or last year, I mean this week. I mean, your team is surprised by what they find, and it found the evaporating within the last two weeks.

You are going through an improvement plan for conduct of ops, and I have to say at least the four contractors before you have gone through the same cycle. It has a history of operational fragility.

The key to my question, my concern here, is more or less whose job is it, and what consideration was given? Because it appears to me when you remove conservatism from this brand-new facility that you are designing, and increase the worker transactions in this 70-year old facility that is clearly fragile -- that's why we want to get stuff out -- who -- where does the decisionmaking occur to balance the consequences of those decisions? That's my question.

MR. BROCKMAN: I will attempt to

give you my response to that, or I will give you my response to that. That occurs in my office, and in the new federal project director's office now we have the integration person. We are looking to that person.

But this mission that the Office of River Protection is on is to treat that waste, is a whole mission. It is a system in itself, and it isn't just tanks and it isn't just waste treatment plant. And it may include some additional facilities or systems that have to be built to accomplish our mission.

And we, my office, as well as the waste treatment WTP project manager, have to do what you just described. We have to balance, because our goal is to treat that waste and to optimize the life cycle cost and schedule to treat that waste, doing it safely.

VICE CHAIR ROBERSON: And I understand that is the goal. I guess what I'm asking is -- it isn't transparent that that

occurred, and that's really my question. Clearly, increased transactions in the tank farm increase the potential for worker risk in the tank farms.

What consideration was given to balance the decrease in worker risk in WTP to that in a tank farm? And why was one considered more valuable or meaningful than the other?

MR. BROCKMAN: Well, I believe that our tank farm operations can be done safely. And if we need to do additional operations, or additional facilities need to built and operated, that we -- they won't be operated at an unacceptable level of risk.

There is an improvement program going on in the tank farms. The infrastructure is old, but we are spending money to improve that with just exactly that concept in mind, that the operations over there have to be done safely. We don't have room -- that they be done less safe than the

waste treatment plant operations.

MR. KNUTSON: There has also been an important part of this conversation that needs to be very clear for the record, and that is that there is not an inherent transition of risk to the tank farm simply because the natural design progression and evolution on the waste treatment plant has reduced conservatism in the control selection strategy or conservatism of specific elements of a design. That risk is not inherently translated directly over onto the tank farms.

VICE CHAIR ROBERSON: I don't see how you could say that if you read the responses to the questions.

MR. KNUTSON: Well, I don't know from the perspective that you are bringing what part of the questions you are mixing to come to the conclusion. I don't intend to challenge that, but just for the record the idea that because an inherent iterative process of design reduces conservatism in a

design element and WTP does not inherently translate to an increased risk statement for the operation of the tank farms.

VICE CHAIR ROBERSON: Well, what --

CHAIRMAN WINOKUR: Can I --

VICE CHAIR ROBERSON: Yes.

CHAIRMAN WINOKUR: -- and you can go? I think what we heard this morning is, you know, the WAC [Waste Acceptance Criteria] in the -- is going to be more restrictive now, obviously, with the reduction in MAR. And we discussed a large range of tank farm operations that can be potentially extremely challenging, controlling particle size rheology, additional blending, things of that nature.

You don't believe that translates into increased risk for the tank farms, which, as we said, was -- some of the tanks are 60, 70 years old. Transfers aren't particularly easy in the tank farms. There is the

possibility for clogging, problematic events, but you don't see any relation between those two?

MR. KNUTSON: I can tell you that we discussed the idea that that is all managed through an ICD-19 [Interface Control Document 19], and we have accepted no changes to ICD-19 that would result in something that the tank farms, as characterized, has an inherent increase in their risk or their operational risk posture.

CHAIRMAN WINOKUR: So nothing resulted -- and I'll turn it back to Ms. Roberson -- in additional transfers needed to be made, operations that are more complex, and stressful operations that aren't fully defined right now that you may have to perform, none of that is represented as a risk?

MR. KNUTSON: I guess I don't understand the premise of your statement. But the issue is: does ICD-19 control those physical parameters and the waste feed

characteristics that must be met between the tank farms and WTP? And the answer is yes.

Have we modified those in a way that the tank farm operating contractor and my counterpart in tank farms have raised concerns with or have identified as substantially or significantly different than their current understanding? The answer is no.

DR. TRIAY: If I may, since the -- everything that happens in the authorization basis phase, the Office of River Protection receives oversight from the Environmental Management Headquarters Office, I would like to make two comments.

First, to ensure that we move to accurately reflect reality in a better estimate of the material at risk, I don't believe is correctly described as a reduction in conservatism. Conservatism is the selection about a number of supportable assumptions, not purposely selecting a known invalid assumption parameter.

The supertank, by definition, by its definition, does not exist as a waste stream at the tank farm. Regardless of the age of the tanks, regardless of any operational fragility of the tank farm, the supertank is not a waste stream in the tank farm. So I believe that moving into expressing reality in the material at risk, while still being very conservative, does not reduce the margin of safety or move risk from the waste stream in plant to the tank farm.

The key, in my opinion -- and that is why in my role of oversight of the Office of River Protection I was supportive of the decisions made by the office of River Protection manager -- is that a complex design, relying on over a thousand active controls, would have higher likelihood to have an event, like hydrogen deflagration or a detonation that active controls were trying to prevent, in one case were due to worker errors, and the QRA is certainly showing this.

So I truly have to say that I don't believe that the Department of Energy is moving risk from the waste treatment plant into the tank farm. Instead, I do believe that the Department of Energy is going to implement a superior design in the waste treatment plant with higher operational reliability than the current parameters utilized for the material at risk.

VICE CHAIR ROBERSON: So let me say to all of you, I am not challenging your intent. But when you look at added process requirements in the tank farm, you are clearly adding additional operator action in the tank farm. You are trying to remove it from WTP.

So my question isn't challenging your intent. It is, was that consideration given, and where was it given? That's really what I'm asking.

DR. TRIAY: I'm sure that you were not challenging our intent. My point is that it is not a matter of intent. It is a matter

or reality. The supertank concept is not a waste stream in the tank farm. You are not adding any risk by selecting a material at risk that is defensible, that is conservative. That in no way adds any kind of risk to the tank farm.

If you are referring to the fact that we need to blend or mix waste in the tank farm, we have to do that regardless of whether or not we have stayed with the super tank concept or not. So I don't see where we are adding risk to the tank farms.

VICE CHAIR ROBERSON: So the one thing we understand from the last section -- session is that ICD-19 is I guess classified as a living document now, but is changing. So there are additional requirements being added. Is that not correct? I thought that's what I understood from the last session.

MR. ASHLEY: Ms. Roberson, if I could respond to that, there are not additional requirements being added to ICD-19.

One of the requirements has -- is being modified, and that is the weight percent solids that is received in the HLWP [High-Level Waste Plant] receipt vessel. That change in requirement, though, was made in concert with the tank farm, number one, to ensure that we were not adding undue burden and changing their risk profile, substantially changing their feed delivery plant. That is a change in the ICD, but it is a requirement that was previously a weight percent requirement, going from 16 weight percent to 10 weight percent.

VICE CHAIR ROBERSON: Okay. Mr. Sain, did you want to respond?

MR. SAIN: Please. When I agreed with you about fragile, I was talking about, you know, the single-shell tanks. Upgrades are being made in the tank farm infrastructure, and to me when you have a supertank concept that was, in my view, grossly overconservative, and you bring it

down to reasonably conservative, that is not reducing or adding risk. And, in my view, at the tank farm it is not driving the tank farm to higher risk at all.

VICE CHAIR ROBERSON: Well, your DSA was the same. You didn't --

MR. SAIN: Sure.

VICE CHAIR ROBERSON: -- have a supertank. I mean, it didn't change anything in the tank.

MR. SAIN: All we've done is reduce the MAR to the point to balance the tank farm. So I am confused as to how that drives a tank farm into having to do more.

See, one thing I hear is that, "Well, you guys now are going to have to go do a lot more characterization." Well, remember, I have lived in a tank farm, and you don't move waste anywhere unless you know what is in it. So characterizing waste, knowing what you are going to transfer, we are going to have to do even if we had stayed with the super tank

concept.

And, I mean, that's just a fact of life. That's going to be a requirement. You're not going to be able to transfer high level waste somewhere and not know the constituents of what you've got in it.

VICE CHAIR ROBERSON: I fully understand that.

MR. SAIN: Right. So --

VICE CHAIR ROBERSON: I actually have a little process knowledge on this one, too.

MR. SAIN: I know you do.

(Laughter.)

To say that it's going to impose a lot more work characterization effort on the part of the tank farm, I just can't buy that.

DR. TRIAY: And we are relying, Ms. Roberson, on your historical knowledge to tell you that there are no added process requirements on the tank farm as a result of the MAR difference.

VICE CHAIR ROBERSON: Okay. So let me tell you, one of the things that is driving it -- one of them is the reality of the operation of the tank farm that raises that concern for me.

The other is in the response to questions. I can't remember how many times the response we got was, "If but, then this will be a restriction on waste acceptance criteria in the tank farm." So I will come back to those. I want to give the floor over to somebody else, but I'm probably not done with this one yet.

DR. TRIAY: Okay.

CHAIRMAN WINOKUR: Did you have a comment you wanted to make?

MR. KNUTSON: I just wanted to close on that last point. I think it is really important that we keep in mind that this morning's discussion also identified that we are talking about a very small number of the overall batches that would result in some

modification of the waste acceptance criteria. And we did talk about that this morning extensively.

CHAIRMAN WINOKUR: Thank you. One of the things I wanted to get clear about, because I heard it in your opening statement, Mr. Brockman and Ms. Olinger, as a result -- and nobody is arguing about the reduction in MAR -- is that what this led to was a superior design.

And I guess I'd ask you, Ms. Busche, from a safety perspective, looking at where we have come with the revised hydrogen strategy and your need to defend it, is it obvious to you that this is a superior design in safety space?

MS. BUSCHE: What I can say is the control strategy has fundamentally really not changed. What has changed, based on MAR and the revised HPAV criteria, which will include fragmentation, is reduction in the functional classification of certain SSCs, structures,

systems, and components.

So it may have eliminated redundancy, but I will still -- when the final DSA, when we write that for operations, the control will still be there. The question will be how to write that control for implementation. It will still be there. Going from safety class to safety significant, the control is still there.

So is it a superior design? The only answer I can offer is I don't know, because we haven't implemented the QRA. So I haven't had the opportunity to evaluate any potential design changes. We're not done yet. We haven't completed that activity.

CHAIRMAN WINOKUR: So it's very hard to make that judgment, because you don't know what you need to defend the QRA at this point, correct, in safety space?

MS. BUSCHE: That is correct. What we do know in running some of the test cases and examples, the QRA has afforded us an

opportunity to identify areas where our design was probably not the smartest way to do that, because it created a dead leg and it created a hazard.

So the tool will be used to eliminate many of those hazards now that we have -- once it is released to refine that process. So there are some good elements to the QRA. It is the integration with nuclear safety, right, that I will still need to come to terms with and figure out how to integrate in that to the final DSA, and then for the life of the project.

CHAIRMAN WINOKUR: Are you confident that you can support the QRA in a safety basis, that you will be able to identify the TSRs [Technical Safety Requirements] and other kinds of controls you need to implement that strategy? Are you -- can you definitively say that?

MS. BUSCHE: I am -- the QRA is primarily a design tool, so I would look at

the QRA just like I would any other engineering calculation. Consistent with 3009, Appendix A, I would look at all inputs and assumptions and determine what must be protected by a technical safety requirement. Okay?

CHAIRMAN WINOKUR: Do you think it's more complex than what the hydrogen control strategy was before the revision took place?

MS. BUSCHE: I absolutely have no feel for that, because the tool is not done. I have seen previous versions. So there are things that are a change to the current PDSA. If I'm -- because I've written several DSAs and TSRs, so I can kind of look ahead, that aren't required today in the control strategy that may very well be required in the future. Whether it's more complex or less complex, I can't answer that question.

CHAIRMAN WINOKUR: Well, that is kind of where I wanted to have an

understanding, because when we started this discussion -- and I guess I will turn to you, Mr. Brockman, and I think -- why did the Department, at the end of 2008/2009, why was it convinced that the design was too complex to operate reliably?

I mean, what was -- I mean, I'm hearing that we're not sure that we can -- that the safety basis is extremely difficult, or may be extremely difficult to implement as a result of some of these design changes. So how did you make that decision?

MR. BROCKMAN: I did not make that decision. I wasn't there at the time.

CHAIRMAN WINOKUR: Well --

MR. BROCKMAN: I would like --

CHAIRMAN WINOKUR: I'm sorry.

MR. BROCKMAN: -- Ines --

CHAIRMAN WINOKUR: The Department -- it wasn't you, you're right. So the Department, yes.

MR. BROCKMAN: And I'm not

familiar. I'm going to ask Ines if she would address that --

DR. TRIAY: Okay.

MR. BROCKMAN: -- if it's all right with you.

DR. TRIAY: Sure. I'm happy to --

CHAIRMAN WINOKUR: Absolutely. Absolutely.

DR. TRIAY: -- happy to address the question. The Department, and in particular the previous Office of River Protection manager, with EM Headquarters as the oversight of the Office of River Protection, made a decision not that it was impossible to operate the waste treatment plant as -- in the -- within the current design.

What we said, and what I believe Ms. Olinger has testified to, is that we believed that we could get to a superior design because we could remove dead legs, remove bulges with active components outside

the hot cell, remove several high point vents, remove human error that was very likely given the very large amount of controls in the facility.

I would like to make absolutely certain that we separate the discussion that we have had into several parts. The new material at risk bounds the tank farm contents. The change in the material at risk has not driven new actions in the tank farm. We have not been driven to any new requirements, transfers, or anything that hadn't already been planned.

Many of the responses I believe address the possibility of the waste acceptance criteria not being met. And then, we said that this could be fixed by either waste treatment plant actions or the blending and dilution in the tank farms. This is not saying in any way that the tank farm must assume a large burden.

I would like to really ask my

colleague, Mr. Leo Sain, because I believe that he led a team at the request of the Office of River Protection manager, Ms. Olinger, to look at specifically this issue of operability of the waste treatment plant and the issue of the material at risk as well as some of these overly conservative parameters that were used in the design.

And it -- the bottom line is that when you ask, why was the Department convinced that these changes would lead to more reliable operation and more effective operation, and even a safer operation, we relied on expert judgment by individuals like Mr. Sain.

CHAIRMAN WINOKUR: That is actually not -- I appreciate that very much. It's not what I asked. I asked if the Department was convinced at the end of 2008 that this design was too complex to operate reliably, the design you had for the facility.

DR. TRIAY: I believe that my answer was that the Department was not

convinced that it could not operate. The Department was convinced that it could improve the design and, therefore, have a more reliable operation.

CHAIRMAN WINOKUR: Okay. And I appreciate that. This is what it says in the owners' perspective on changes in the design basis of the waste treatment and immobilization plant pretreatment facility. And I just quote this, "These conservative design requirements for MAR and hydrogen drove an evolving design of unforeseen complexity that led both BNI and ORP to raise concerns for the reliability and the safety of future WTP operations."

And I'm not trying to criticize you for reaching this conclusion. I am just trying to get you to agree that you did reach that conclusion or -- because it seems to me it wasn't a matter of improving things. You were fairly well convinced at the end of 2008 that the plant was too complex to operate

reliably.

DR. TRIAY: My point being that what the Department did do was ask individuals with experience, individuals that had decades of experience in operating nuclear facilities, and those individuals, those independent experts that the Department engaged, they said that the operation of the facility could be greatly simplified. And, indeed, in the expert opinion of many of them, they said that it was too complex.

CHAIRMAN WINOKUR: And who were these experts? Do we have --

DR. TRIAY: As I just said, I -- that's why we wanted --

MR. SAIN: Let me jump in here.

CHAIRMAN WINOKUR: And now we're over to you, Mr. Sain.

MR. SAIN: I'm glad to be here.

(Laughter.)

Let me just say that I think it was November '08 I had gotten a call to come

out and do a review of the technical issues. MAR was not on the list of what we were to review.

I came, had -- as I remember -- this is all on the record, so I'm going from total memory -- about five or six experts with me that I handpicked. We came out and started reviewing the technical issues at the time, M3 being one of them.

In the very beginning of the review, we kept a number of individuals on the team tripping over MAR, the supertank concept. And we concluded, after two days of being at the project, that we were going to add MAR to the list and do a look at it.

And our conclusion was is that the supertank concept was totally unachieveable and was grossly over-conservative, especially for a plant that in our opinion was at the stage that WTP was, you know, significant design and construction completion.

And so our recommendation in that

report was that, you know, DOE and the contractor should go look at the MAR and see if there were not a more reasonable value of MAR that would really help the project, because having been a person that not only has been in Operations, I, you know, actually managed safety bases for a number of years, and I knew that a MAR of that value was driving controls that, in comparison to a reasonably conservative value, you would not have.

And when you look at the sheer size of WTP, someone like me that has this operational background knew right away instinctively that this has got to be fairly complex, and so in our report we said that one of the main benefits of going and rebooting at this MAR, and getting back to a reasonably conservative value, that the safety bases community across the country would agree was reasonably conservative, would reduce the operational complexity.

Now, I will tell you that what I have heard all along is, you know, reduce operational complexity. I personally -- I think this is the first time that I am hearing "too complex to operate." I don't know where that came from.

CHAIRMAN WINOKUR: It came from --

MR. SAIN: I think --

CHAIRMAN WINOKUR: It came from the Department of Energy.

MR. SAIN: You know, I am a person that had the challenge of starting up and running FB line, and I am convinced that after doing that you can operate anything if you've got the right leadership and the right programs.

So I don't think it's about "too complex to operate," but I think it's about being reasonable and trying to come up with a very large plant with multiple facilities that is going to ease the burden on the operators so that they can focus on the important things

and operate the plant.

So it was intuitive, and we said it in the report, and I think it took off after people started reading our report as something very intuitive to individuals that have been around operating facilities.

CHAIRMAN WINOKUR: Well, I think you might have the sequencing wrong there. But nobody disagrees with the fact that if there are fewer controls in a plant it can be more reliable. That is really not the issue I am trying to get it.

MR. SAIN: Well, more reliable and easier for operators to operate. I will take you back to TMI, which I was in Commercial when that happened. And one of the big things that came out of TMI was all of the alarms the operators had to contend with.

You know, the Safety Board, I remember DWPF. One of the comments that the Safety Board made, which was a good one, was you guys needs to go reconfigure your alarms

on DWPF, because you've got hundreds of alarms going off simultaneously. It is confusing.

It is going to confuse the operator in a casualty, and so the whole concept of trying to keep large facilities, you know, within the required nuclear safety envelope and reasonably conservative, but beyond that think about, you know, simplistic operations, as simple they can be. That's important.

CHAIRMAN WINOKUR: Ms. Roberson?

VICE CHAIR ROBERSON: One more question. I'm going to try this one more time, and I'm actually going to ask you to just think about what I'm saying and maybe respond for the record. I've certainly listened to what you have say.

What I want to say is this is what we know. We don't have an operating envelope for WTP yet, which means we can't have our operating envelope for tank farms yet, because they connect. They will become one process at

some point.

I understand from this morning the project -- tank farms -- has employed PNNL [Pacific Northwest National Lab] - I don't know who else -- to help develop a model for creating the recipe that will meet the MAR. Right? Is that correct, Mr. Sain?

MR. SAIN: Yes.

VICE CHAIR ROBERSON: Okay. What I'm saying is -- what I'm looking for is the evidence that the approach you just described -- simpler/safer -- is being applied to the totality of the process. And also what I'm saying is the Board will be looking for that evidence, because by the time -- let me finish, please -- the waste enters WTP it will be very sweet. The hard work is in the tank farm, so --

MR. SAIN: But the hard work, as far as transfers, is there before this. That's the point I was trying to make earlier. First and foremost, you are going to do sludge

batches here, and always were going to do sludge batches, just like we do at Savannah River today.

If you're going to do sludge batches, you've got to absolutely know the characterization of the waste you're dealing with, what you're going to add. If it's supernate, if it's recycled water, you know, in some cases we add recycled water at Savannah River coming back from DWPF. You're going to have to know what the characteristics of all that stuff is, and it's the expert engineers that, you know, put that formula together and come up with that sludge batch.

We were going to have do that, even if we had stayed with the super tank concept. We were going to have to know what we were transferring before we send it anywhere. That is a hard requirement in this business today, and you're not going to escape that.

So if we would have stayed with

the supertank concept, we couldn't have taken waste out of the tank farm and just sent it to WTP. We would have had to have characterized it, would have known what it was, and we would have had to have validated that it wasn't going to exceed any of the limits to send it to, you know, WTP.

VICE CHAIR ROBERSON: Okay. Well --

MR. SAIN: I assume WTP will have an organic limit, just like DWPF does, as an example.

VICE CHAIR ROBERSON: Let me wrap up by saying the Board hasn't been advocating the supertank strategy. What I'm saying to you is, as you make changes in the WTP, we will be looking at how they affect the tank farm. I advise you to look at it the same way.

MR. SAIN: Okay.

VICE CHAIR ROBERSON: Okay?

MR. KNUTSON: I just want to make

sure that the position that we discussed this morning of the tank farm WTP integration role -- I think I'm finally understanding the position of the line of questioning.

But one of the primary functions of that role is to understand the balance between, is it okay in tank farm space as well as WTP space, for the criteria that meets expected conditions? And those expected conditions have to change from the opening day of operations, the opening day of commissioning, through the multiple batches that have to be processed over the life cycle of the operating plant.

So that mechanism, that new senior executive service position, is a role that is actually focused on exactly the question you're asking. And as Ms. Busche identified, the evolution of the controls has to be able to -- has to be taken into the context of both the WTP operations and tank operations, and that role is designed to be able to do exactly

that.

MR. DWYER: Mr. Chairman, if I could just -- just to put this in a concrete example, again that we talked about this morning, we briefly discussed a change to the balance of design that you subsequently told us was not going to occur.

We talked about a requirement that you could not send plutonium particles greater than 10 microns from tank farms to the waste treatment plant. And when we asked this morning, "Won't that restrict and place a greater burden on tank farms?" I believe Mr. Rutland informed us, "No, that was just in the draft document. It has since been removed."

But that is the type of thing that if you put something like that into your restrictions that puts a burden on tank farm, would you agree? If you tell them, "You can't send me any plutonium particles greater than 10 microns"?

MR. KNUTSON: The hypothetical of

"if" such a thing should exist --

MR. DWYER: No. I'm agreeing --

MR. KNUTSON: -- then perhaps there would be a response.

MR. DWYER: Yes.

MR. KNUTSON: It needs to be balanced by the idea that with the role that is being envisioned the conversations and the dialogue and the formalization of expected condition definition takes place in a far more integrated fashion than it has to date. And that was done explicitly.

MR. DWYER: And, in fact, you -- you informed us this morning that on further inspection, "Gee, we can't do that," and you pulled it out of the draft document. So --

MR. ASHLEY: No. Mr. Dwyer, I would like to clarify what Mr. Rutland said this morning is the purpose of the basis of the design is to ensure that we have a documented basis for the design of the facility.

And as we went through the M3 program, we were updating the BOD, the basis of design document, and we had a draft, and we were clearly updating that for what we had tested and what we had verified that the vessels would mix, okay, would meet the mixing requirements.

What Mr. Rutland said is we have worked with him, we have clarified, that is not -- that is our basis of design. What Mr. Rutland clarified is how they will ensure they meet that. Okay? And as he said, the way that is going to be met is by control of the critical velocity.

The control of the critical velocity will ensure that they meet the limits, okay, our basis of design for transfer of --

MR. DWYER: I --

MR. ASHLEY: So we didn't remove -- when you see the final BOD, we did not remove those parameters. They are there in

the basis of design when it is finally approved.

MR. DWYER: Right. You chose to approach it a different way.

MR. ASHLEY: It -- the control, in other words --

MR. DWYER: Yes.

MR. ASHLEY: -- the specific control, but we didn't -- I wanted to clarify, we did not remove those specific parameters from that -- from what will ultimately be the approved basis of design.

MR. SAIN: And I think the good news with that was someone asked this morning, "What formal document, Mr. Rutland, did you get?" Well, he didn't get one. The reason is the integration. Paul talked to WTP, because we are integrating, and they resolved this issue.

CHAIRMAN WINOKUR: Okay. I --

MR. BROCKMAN: Mr. Chairman?

CHAIRMAN WINOKUR: Yes, I'll let

-- after you Dr. Mansfield will have some questions. Go ahead, please.

MR. BROCKMAN: Mr. Chairman, I can assure you that in my turnover -- and that is the best knowledge I have of my turnover -- the statement that the plant was too complex to operate was not used for the rationale behind these reviews of stuff. That was not used. And I'm interested in, for my information, where that statement is that -- where we said that. I would like to know --

CHAIRMAN WINOKUR: We're going to put the document, the owners -- we're going to put it on the record, and it is the owners' perspective on changes in the design basis of the waste treatment and immobilization plant pretreatment facility. And it is a part of the PDSA addendum. Is that accurate, or --

MR. STOKES: It's a part of the safety evaluation report.

CHAIRMAN WINOKUR: Safety evaluation report. And the timeframe for that

was?

MR. STOKES: I believe that was signed in November of 2009.

CHAIRMAN WINOKUR: November 2009. Okay. We'll get that for you.

Dr. Mansfield?

MEMBER MANSFIELD: I'm going to ask a series of four or five questions. There must be a simple answer to this. I could either ask you, Mr. Sain, but I'm going to ask Mr. Ashley. In the pretreatment facility, there are, by the count that I was given, 336 possible transfer routes from tank to tank, and 65 of them need routine flushing for HPAV under ordinary conditions.

And after several days of transfer, now what happens? You've shut the pump off, and then what do you do?

MR. ASHLEY: I'm not following the question.

MEMBER MANSFIELD: There's -- you've got a suction dead leg full of waste.

If you've got a low point in the discharge line, you've got that full of waste. What comes next?

MR. ASHLEY: Okay. Routinely in the operation of the facility, after transfers they will be followed by a flush.

MEMBER MANSFIELD: A flush.

MR. ASHLEY: Okay?

MEMBER MANSFIELD: How long do you have to do that?

MR. ASHLEY: Okay. One of the things that we are evaluating, and one of the advantages of using the quantitative risk assessment that we will be using -- and we will talk about that -- I'm sure we'll have questions --

MEMBER MANSFIELD: Tomorrow.

MR. ASHLEY: -- on that in tomorrow's session --

MEMBER MANSFIELD: Yes.

MR. ASHLEY: -- is that it avails us the opportunity to look in more detail at

our operation to determine what risks that operation presents, what hazards that operation might present.

MEMBER MANSFIELD: You mean how long you can leave the path unflushed.

MR. ASHLEY: Correct. Correct.

MEMBER MANSFIELD: Do you take gelling and precipitation into account when you do that?

MR. ASHLEY: We take basically -- and I think we will probably get into some of the -- more of those discussions tomorrow, but we do look at the rheology of -

MEMBER MANSFIELD: This doesn't have to do with HPAV, so much as it does --

MR. ASHLEY: From a -- the waste transfer perspective and a flush perspective, we do absolutely take into consideration the rheology of the materials.

MEMBER MANSFIELD: Okay. Now, in the -- we also -- guys figured out that in the 24 hours you've got about -- in a day --

(Whereupon, the audio system cut off briefly.)

MEMBER MANSFIELD: So you've got -- the jumper has a provision for flushing. It's got valves, it's got -- it's got some sort of flush liquid provision to the jumper to get --

MR. ASHLEY: Yes.

MEMBER MANSFIELD: -- to execute those flushes. Okay. Now let's look at the total loss of offsite power during a transfer. The jumper is still there. You have reserved power to complete that transfer?

MR. ASHLEY: Many of the transfers are not ITS, okay, which that is a specific event that is evaluated, what the effect of that event is. For example, once again you get into, you know, what is -- what is one of the hazards of stagnant waste in our piping?

MEMBER MANSFIELD: No, I'm just saying, do you have power to complete the transfer, or do you have to leave it --

MR. ASHLEY: We may not have power to complete the transfer.

MEMBER MANSFIELD: May not. Under what conditions might you?

MR. ASHLEY: In loss of offsite power, if the specific -- if that specific function is not a safety function, then that pump, to complete that transfer, would not be available and the waste would become --

MEMBER MANSFIELD: So there is no power --

MR. ASHLEY: -- would become stagnant.

MEMBER MANSFIELD: -- loss of offsite power, there is no power to those pumps?

MR. ASHLEY: That's correct.

MEMBER MANSFIELD: Or valves.

MR. ASHLEY: Specific pumps, the specific pumps.

MEMBER MANSFIELD: Well, I mean, all of the hot cells -- all of the hot cell

pumps?

MR. ASHLEY: You know, actually, we -- I never say "all." When I talk about the pretreat facility, the pretreat facility is a very complex facility, but many of the pumps are not ITS. And so there would not be emergency power to those specific -- to many of the specific pumps.

MEMBER MANSFIELD: How long if -- and you will know how long that -- it will take for that waste to gel up and make -- and become perhaps next to impossible to pump?

MR. ASHLEY: We -- basically, pipe plugging -- and, actually, that was one of the FRT issues was the potential for pipe plugging. That is one of the issues that was studied.

Also, associated with that, and we did make design changes associated with resolution of that FRT issue to ensure that we could flush lines, that we could clear plugging, we have the ability to do chemical

flushes, we have the duty to --

MEMBER MANSFIELD: With no offsite power.

MR. ASHLEY: We have the ability -- when restored, we have the ability --

MEMBER MANSFIELD: No, I'm talking about a day or multi-day -- waste in many cases begins to gel in a day.

MR. ASHLEY: That's correct.

MEMBER MANSFIELD: And in a week it's immovable.

MR. ASHLEY: It's not immovable.

MEMBER MANSFIELD: Well, it will --

MR. ASHLEY: It's not immovable.

MEMBER MANSFIELD: But it --

MR. ASHLEY: It's not immovable.

MEMBER MANSFIELD: -- enough it's immovable.

MR. ASHLEY: It is not immovable, and chemical cleaning for these wastes is very effective. We use a sodium hydroxide and use

of dilute nitric acid, which we have that ability in our systems.

MEMBER MANSFIELD: So you have -- but you have a jumper there with a flush line, and now you have to remove that flush line with your flush liquid and hook up something to acids or other chemical things, and that is not more complicated than flushing -- than providing emergency power so that you could flush every line?

MR. ASHLEY: We have -- the flexibility in these systems is -- we have substantial flexibility in these systems, and most of these connections are jumpered. The emergency power -- the emergency power is supplied to all of those systems that are required to have emergency power for safety reasons.

MEMBER MANSFIELD: That is just a C5 ventilation system.

MR. ASHLEY: Not just C5, the mixing systems --

MEMBER MANSFIELD: Okay.

MR. ASHLEY: We need to continue to mix the waste in --

MEMBER MANSFIELD: But not --

MR. ASHLEY: -- our vessels.

MEMBER MANSFIELD: -- not the valves and pumps in the hot cell.

MR. ASHLEY: For hot cell, we do not have power to the pumps in the hot cell.

MEMBER MANSFIELD: Right. So it is less complicated for you to wait until this thing sets up, and wait until power comes on, and rig a chemical flush or something like that, than it is to just turn on the water to the existing pump flush system by providing emergency power to the hot cell? I mean, that just doesn't sound right. This may not be important to safety, but it is certainly important to your night's sleep.

MR. ASHLEY: Actually, all of these situations, we have a detailed OR model. We looked at the availability of this

facility. We looked at the impact that these events have on the facility. We have our flush tanks, so that we can provide pressurized flushes.

Right now, the design is -- it is a design to assure that operations is not interrupted, we do not have substantial interruptions by line plugging. Line plugging --

MEMBER MANSFIELD: Not when there's external power.

MR. ASHLEY: Line plugging is a fact of this facility. These are slurry systems. Lines will plug. It is an important design feature to be able to clear the lines.

MEMBER MANSFIELD: But I -- so far you haven't convinced me at all that you have saved any complexity by having to live out a long, perhaps day long or longer, loss of offsite power and rig up a chemical flushing system when all you needed to have was an emergency power supply to the pumps and valves

in the hot cells.

MR. ASHLEY: And I want to --

MEMBER MANSFIELD: I'm not saying safety class. I'm just saying don't wreck the plant.

MR. ASHLEY: Right. But I want to clarify that there are some flushes which are ITS flushes, and that's why I wanted to make sure I don't say "all," because in this facility it is a complex facility.

MEMBER MANSFIELD: And I won't say "immovable."

MR. ASHLEY: We do have some of the flushes which are ITS flushes for our high solid systems.

MEMBER MANSFIELD: And it seems to me an added benefit to -- following my line of questioning is if you did this, you wouldn't have an HPAV problem at all.

MR. ASHLEY: Flushes don't resolve entirely accumulation of hydrogen. Flushes and purges are not the only solution. Venting

is required for elimination of pockets of hydrogen as well. So flushes are not the only solution.

MEMBER MANSFIELD: So you have provided vents?

MR. ASHLEY: We do currently -- and the design currently has high point vents, a number of high point vents, as part of the hydrogen control.

MEMBER MANSFIELD: I thought those were some of the dead legs that were being removed for complexity purposes.

MR. ASHLEY: And the high point vents, you know, just getting back to -- to what were the complex aspects of the design, high point vents that run out of the hot cell into bulges where the controls are actually in the bulges. As you can imagine, the height of the hot cell, those are very long legs that have to run up to the corridor outside of the cell.

That is part of the design

complexity that the previous control strategy with -- the active controls that we are currently looking at.

MEMBER MANSFIELD: So far you have explained something that -- it includes more design complexity, the necessity to rig up a chemical flush after several days of offsite power.

I'm not getting anywhere with this, Mr. Chairman. But you can see what I'm trying to say.

CHAIRMAN WINOKUR: I think you can see that we really are trying to probe the complexity issue and understand whether -- I mean, nobody is debating the supertank concept and the MAR reduction. That's -- you know, that's understandable and you definitely want to do that.

But there are a lot of aspects of the safety basis in some of these strategies that just aren't clear right now that we really have had a reduction in complexity in

the plant. But I will go to Mr. Bader now for some questions.

MEMBER BADER: Well, the first thing I'd like to say is the reason we are focusing on this complexity issue is for nearly two years it was the driver behind a lot of the discussions we had that affected safety and operation. And now when we get the answers to the questions there is a nice statement in several places in the answer. It's that too complex to operate was never determined. So it's -- there's a certain degree of "wow, gee whiz" to this.

Let me go to the question of what we discussed this morning in terms of the large scale testing. My memory of the discussion, Ms. Busche, was that there are a number of important clarifications that will come out of that testing that will allow you to do a number of things including work on the safety basis, the criticality safety evaluation report, is that correct?

MS. BUSCHE: Correct.

MEMBER BADER: We also discussed the number of -- a number of tests that should be done in that large scale testing, Mr. Knutson, and I think by my count what was enumerated -- and you can break this up different ways -- was eight major segments of testing.

MR. KNUTSON: There were many. I don't know what the number was.

MEMBER BADER: My concern with all of this is that at least some of those are likely to result in surprises in new wishes being developed. And at that point, I believe you said you are three years away from hot functional testing. Is that correct?

MR. KNUTSON: Correct.

MEMBER BADER: To me the likelihood that something will go wrong that results in a function being transferred to the -- from the waste treatment plant to the tank farms is pretty high. And that to me is why

we needed to have things that are important to safety, important to efficiency, decided as soon as possible.

Now, let me ask, this new SER -- or, I'm sorry, SES [Senior Executive Service] -- is this going to be his -- is he going to be heavily involved in this testing program from that perspective, looking at the balance between decisions that have to be made?

MR. KNUTSON: There are elements of commissioning -- training, operator qualification. There are elements of simulation. There are elements of controls evaluation that are all within the scope of this new individual's responsibilities.

In addition to that, there are specific elements of design and safety that we have talked about that need to be resolved. It will be a concerted effort from Bechtel design individuals, the URS safety individuals, and this integration role, all working together to ensure that the necessary

elements of the testing program are addressed.

MEMBER BADER: Mr. Russo?

MR. RUSSO: Yes, sir.

MEMBER BADER: Would you like to comment on that aspect of the decisionmaking process?

MR. RUSSO: Yes, if I may. And I'm going to go a little bit backwards to come forward if you don't mind. Many years ago I built a facility in Canada that was very different but in some ways very similar to this one. It was a $6 billion pitching and processing facility for Shell up at Fort Saskatchewan. The feed came from Fort McMurray through a 500-mile pipeline. It was a very thick slurry, very caustic. Of course, it had no radiological characteristics whatsoever.

And in the early stages of that project, because the ownership of the project, unlike this, was you had a mining company owning the mining part of the job and Shell

owning the actual processing part of the job, was there was a great deal of debate about where something should happen.

And there was a similar debate to what you were talking about, Ms. Roberson, in terms of, well, the risk of mining versus the risk of refining have to be somehow adjudicated and bounded. And initially there wasn't a method to really modify that, to control those decisions, and everyone was making them predicated pretty much on their self-interest as opposed to the interest of the holistic project.

Shell Solutions out of The Hague came in, worked with the project team on both sides, and we made the determination that what you really needed was, in essence, what Dale has introduced in terms of the integrated flow sheet with someone who owns the middle box.

So feed comes over. It doesn't meet the WAC; that goes back on that side. And the adjudication takes place in that

middle box. Feed comes over, I can't process it properly, I don't send it back to the tank farm. I have to physically deal with it.

But, again, the middle box is there to provide the oversight and the governance of determinations as to what is the best outcome, both in the physical design as you're designing the plant and as you get into operation.

So when you look at the question you asked, where will most of that effort come from, it has got to be in that middle box, and I'm pretty certain that's where Dale has determined to put it, meaning when we are looking at the integrated testing or anything that talks to the integrated flow sheet, Dale will obviously have a major say from the point of view -- when I say "Dale," I mean Mr. Knutson for the record -- in terms of the implications on the capital project.

Stacy Charboneau will have a great input in terms of the implications on the tank

farm. But that SES position will be the one that basically provides both sides a balanced determination as to what is best for the integrated flow sheet.

And I believe that to be the model that is being adopted, and, you know, Dale could -- Mr. Knutson can expand on that. But that is, I believe, critical when you are dealing with a feed and a facility to process that feed.

MEMBER BADER: Is it fair to say -- I'll wait until you read that.

MR. RUSSO: Let me see what -- okay. Go ahead. I'm ready.

MEMBER BADER: If all goes reasonably well, all this testing will be finished in three years prior to hot functional testing.

MR. RUSSO: Yes. All the testing that affects what I need to do to --

MEMBER BADER: If it goes reasonably well.

MR. RUSSO: -- to build a plant, right.

MEMBER BADER: Are you able to develop your control system completely until that is finished?

MR. RUSSO: You can develop the control system. But as I think was originally expressed -- and I'll let Greg, you know, embellish on this -- the design is an iterative process. And to the point earlier in terms of at 80 percent do you want it to be iterating as much as it is right now? Obviously, the answer to that is no. But that's a fact of life. It is. It comes from the learnings of many years in terms of what you call a one-of-a-kind facility, which is correct.

We can get a control system logic and a control system design established, and then the question becomes, what modifications in the final iterations you would have to do? If I may, I would like Greg to add to that.

MEMBER BADER: Well, let me -- before you do that --

MR. RUSSO: Yes, sir.

MEMBER BADER: -- let me go -- and by the way, I'd go back and say my memory was the first time we met you made a comment to me that you had never before worked on a project at this stage of design and construction that still didn't have a firm process flow sheet. Is that correct?

MR. RUSSO: Yes, in the -- that is a correct statement. In the process industry that I came from -- and, again, it's a totally -- not totally unfair, but it's an unfair comparison because it is reality -- those oil companies particularly, because product to market, price of that product per unit, was so important that they would invest a considerable amount of effort, not a lot of time by the way, but a considerable amount of effort, to get their feed defined to the level that they felt comfortable to go out and make

the capital investment, because understanding the feed had a great implication on how you line up the equipment, your heat balances, etcetera, material and heat balances.

So you typically would see process definition fully complete before you get into design. Now -- you know, final design. Now, as a reality of this job, as the EFRT came up and new questions were asked that were legitimate, reasonable questions, given that our feed stock isn't chemical but it is radiological, it really took the entire normal sequence and put it into a different parameter. We just have to deal with that. We understand it.

MEMBER BADER: So, but if I understand what you're telling me, you really can't determine the complexity of operation, the complexity of control on this plant until you get to that point. Is that correct?

MR. RUSSO: When you have your engineered features finally defined, obviously

it then allows Donna Busche to go out and determine what controls need to be applied around both the engineered and the administrative controls to ensure you are staying within the safety envelope.

That said, you could look at some of the design that was in the original HPAV, and I can compare it to when we first met way before that at AMWTP. But we took over that facility, I think as you know, Ms. Roberson, and there was a lot of design features in there that on paper looked extremely reliable and extremely good for the co-located worker.

But in reality, in application, we ended up in some cases, with the Board's approval in all cases, eliminating some of those controls, because when you got into operation they were actually creating opportunities for me to have to send workers in in suits to clean up contamination from the transuranic waste.

So until -- and I think this is

the "not putting it off" comment, until you really get to a point where -- and cold commissioning, by the way, which is before hot commissioning, should give us some experience in this area. Until you get into a point when you actually understand how the facility interacts with itself, you will always be questioning that.

And I think Donna Busche told me before -- a couple of days ago that it will be two or three years into the actual operation before you finally finalize what those TSRs really need to be. They will start out overtly conservative, and then as time and operating experience comes into play, there will be, you know, an endeavor to look at those and reduce them.

MEMBER BADER: Greg, do you want to --

CHAIRMAN WINOKUR: Mr. Ashley?

MR. ASHLEY: I think, Mr. Bader, in reference to some of Frank's comments, you

know, certainly the large scale integrated test from a control system completion is very important for us. And I think we -- you know, we identified that as part of our strategy.

You know, we have our basic design logics and concepts in terms of how we will control PJMs [Pulse Jet Mixer]. It is really important that we run those at full scale prototypically, so that we can finalize the control system strategy for the PJMs.

The one thing I did want to -- Dr. Mansfield, I do need to clarify some of the -- in response to your comments, our UFP filter loop does contain a pressurized flush system, which is ITS. As you know, our UFP filter loop is a critical process loop. It is a large loop where we -- where we, you know, post leach and concentrate solids. So this is an area where we are protecting that with an ITS power flush to ensure that we do not have line plugging.

I also misspoke. Our flushes,

which are below the hydrostatic level, can create dead legs. Our vents can't create dead legs, so our flushes that are below the hydrostatic level can create dead legs.

Another element in terms of plugging, particularly avoiding chemical plugging, as we talked about one of the issues, the FRT issues, and one -- was the potential for line plugging, something that we had to ensure that we were addressing properly.

One of those was to avoid potential for chemical line plugging. We do have a report, which I will make sure that the staff does get, which address how we address off-normal conditions and the potential for chemical line plugging. That was all done as part of the line plugging studies.

So this is an area that we have looked at extensively. We did have PNL do testing for us relative to critical velocities to ensure that we don't have plugging, as well

as determine what flush velocities were required to assure that we could remove plugs from the lines. So I'll make sure that the staff, if they don't already have this documentation, that it is available to them.

CHAIRMAN WINOKUR: Thank you. I would like to move to Mr. Brown at this time.

MEMBER BROWN: Thank you, Mr. Chairman. I guess I'm the wrap-up man again. As I listened to the whole conversation that has gone on about complexity, I thought back to the question I asked Mr. Sain earlier this morning, what -- from a tank farm point of view, what would be the ideal WAC? And your answer was --

(Laughter.)

MR. SAIN: Well, I won't go there again.

(Laughter.)

MEMBER BROWN: Well, why not? I mean, your answer was, whatever you can -- what you can send to the waste treatment

plant.

MR. SAIN: No. I said -- what I said was my ideal WAC would be a WAC we can meet.

MEMBER BROWN: Okay.

MR. SAIN: And that's what the WAC is all about is you've got to meet the waste -- or the -- you know, acceptance criteria before you transfer waste. So anyway --

MEMBER BROWN: And it seems to me that if -- if you had -- didn't have to do any blending, if you could send it directly from the tanks to the waste treatment plant, that would be an ideal WAC. There would be -- or maybe an ideal WAC. I mean, there would be almost -- there would be no requirements for processing or blending or, etcetera, for you --

MR. SAIN: But --

MEMBER BROWN: -- if you could. That would be the simplest.

MR. SAIN: But let me take a

little bit different approach. You want to use blending to your advantage. It's advantageous to you.

MEMBER BROWN: Sure.

MR. SAIN: You've got tanks at both sites that have real problems in the tanks with what is in there, and other tanks that, you know, it's not such a problem. And so by blending you can mix a blend that eliminates a lot of problems for yourself. So blending, in my mind, is a very positive thing. And we have learned that from years of experience.

I think the other thing is that when you look at stuff like condition of the sump tanks, and the fact that, you know, most of the liquid has been taken out of the tanks, you're going to have to blend. I mean, regardless of, you know, this issue that we have all been focused on, blending is going to be required.

And I say, do what we've done in

the past, use that to your advantage, and it will really help you be able to process all of the waste.

MEMBER BROWN: And I'm not an advocate for supertank or any other particular solution. What I'm an advocate for is the one that works best. And -- but it seems to me, it's not intuitive to me, that doing more blending or whatever in the tank farms is going to -- won't increase the chances for a safety problem. Any time you do more things and you have more people, more pumps, more pipes, more valves, it seems to me that you are more likely to have a problem, intuitively.

And I'm not a particular advocate for probability PRA [Probabilistic Risk Analysis] or QRA, but as you -- as you analyze these various options, it seems to me you need some sort of metric where you can compare them. And right now it is basically expert elicitation, "Well, I think blending will be

better here or there," and it seems to me like there might be some valve in having some quantification of what these hazards are as you try and compare, as Ms. Roberson has said, the totality of the problem, who is going to get more risk as you get it -- move it from here to there.

Just some thoughts.

MEMBER BROWN: Well, do you -

DR. TRIAY: If I may for a moment, I would like to say that there is no question that the Department of Energy is also looking at the risk holistically. And we completely agree with Ms. Roberson and with you, Mr. Brown.

Let me just be completely clear. The new material at risk does not require for us to blend the waste. There is no waste stream that has the concentrations in the supertank which is a concept involving taking the highest concentration of every constituent from the entire tank farm and creating a tank

-- a waste stream that does not exist on paper.

So I just want to make absolutely certain that everybody understands, in order to meet the new MAR, our current recipes for tank farm delivery do meet the new material at risk, and there are no blending requirements or any new requirements that we have imposed in the tank farm as a result of the revised MAR.

MR. SAIN: And I want to add one thing. I said it was intuitive, and I'm a little bit more thorough than that. And so I will add to this whole thing about MAR and the super tank concept that I went and did a comparison of WTP to DWPF.

And, you know, one of the things that I learned from you guys and ladies was, you know, we ought to take advantage of what is out there to learn lessons and compare and all that kind of stuff. So it's interesting when you go compare DWPF and what it has as

far as controls to the existing WTP today. It is startling, in my mind.

MEMBER BROWN: Thank you. I'd like to turn attention a little to -- back to the PDSA, the PDSA addendum, the DSA, the TSRs, that whole process. Maybe ask, Ms. Busche, if you could tell me where we are in that whole train of events. I mean, we have a PDSA that's approved, we've got an addendum that is awaiting approval. That is going to lead to the DSA. Can you explain that whole timeline and where we are at in it?

MS. BUSCHE: Sure. Before I did that, I was listening to that last exchange, and I wanted to offer just a couple, because I -- I think it -- sometimes we are not -- we are not communicating on our side. And so what I'd like to offer is it is clearly an iterative process, and you hear people say that. Okay?

But when you are resolving technical issues, sometimes that is easier

said than done, and it is going to play into your question, Mr. Brown, as we get into, how do we move forward? So in just simple terms, if you reduce the MAR, you could potentially reduce the functional classification, which could reduce the number of safety systems.

That does not mean that it eliminates the layers of defense in depth. It doesn't mean controls go away. Okay? The onus is still on us in the final documented safety analysis to eloquently describe in Chapter 3 those layers of defense in depth.

So I am comfortable that we are not removing controls that we don't need at this point in time. As we move forward, okay, and I think I hinted at some technical challenges, what we have to do is now iterate -- come up with realistic accident analysis where we are with the PDSA addendum is in unmitigated consequences. They are postulated, okay?

So if you look in safety analysis

space, we have not updated Chapter 3 to reflect the next level of transition into the accidents which lead into the technical safety requirements, which will give us a feel for controls.

Now, I answer on the conservative side of "I don't know," because I haven't done that work. That doesn't mean that as we have done our lower level working process of those integrated safety management system that there are lots of discussions on high point vent. Those are not articulated yet in the next iteration of where we are going to go in the license or the safety basis document. Okay?

So where are we? So that -- I just -- I was listening to that, and I think everybody was correct, but it really wasn't I think getting into some of the questions that Ms. Roberson started with.

So where are we? We have a PDSA that is currently approved, reflects that supertank MAR. Okay?

We have made no changes to the design yet that reflect the updated MAR, and I -- and I am comforted to hear that that's a good thing, because from an overall future operations from -- and I'll call it hazard, crave, or grave -- it is good if those source terms line up from the generating facility to the processing facility. So writing that final DSA, that makes it easy, and so that was refreshing for me to hear.

The PDSA addendum did make changes to the material at risk. I think Mr. Kasdorf identified there were other changes made to the analysis methodology. That document was approved by the Department. We had conditions of approval, and it is a minor point in my world, but maintaining configuration management of the license is paramount. So until we do every element of correspondence that has gone back and forth, we will not transition to that PDSA addendum.

So we are -- and I don't want to

turn around, but we are clearly -- we have had all of our discussions with the Office of River Protection. We have resolved their comments. What we are waiting is final verification that we have closed their comments per our agreed-to disposition.

So I would suspect I think in here we said by the end of September. So, but we are very close to as soon as we send it over there, then the Department would update their safety evaluation report and say that the matter is closed, and then we will begin the next phase of the next iteration.

We need to implement that PDSA addendum into the PDSA, which will necessitate changes to Chapter 3 and give us a better understanding of where the next vision of the technical safety requirements are going to be. Okay?

So the challenge that we have now is as we go through those technical issues, there is going to be a lot of changes

throughout the full scope of the 17 chapters. All right? So we are -- we have not finalized our plan I think internally.

What I am very strongly committed to now is we need to have an integrated iteration. It will do me no good, it will do the project no good, if I answer the mixing question, but I don't understand the mixing question with respect to potential HPAV issues, because they are not unrelated.

So that integrated -- we call it a plan for a plan -- is being kicked off with preliminary planning sessions, and it will be approximately 10 months to 12 months to complete that systematic evaluation of hazards that integrates it.

We've got the pieces and parts. We need to integrate it, because we are nearing the end of design, and we need to understand, are there any new nuclear safety functional requirements that need to be addressed?

I don't know if that answered your question, but --

MEMBER BROWN: Yes, I think so.

Mr. Brockman?

MR. RUSSO: May I just add one clarification, please?

MEMBER BROWN: Sure.

MR. RUSSO: Thank you. In recognizing what Ms. Busche said, when we look at the changes in pretreat, and what we have to do to keep them under configuration control and aligned with the PDSA, we took the approach that we wanted to not touch the P&ID [Piping and Instrumentation Diagram] more than one time. We don't want to touch all the follow-on documentation more than one time.

So we went out and redlined everything and put a complete matrix together of all of the affected documents, all of the affected drawings, and then put together a work unit, so that we can work these all off at one time. So we can look at the iterations

of M3, HPAV, and the other minor changes that Ms. Busche spoke about, which will facilitate our environmental and nuclear safety folks to do that integrated look at it from a PDSA point of view.

MEMBER BROWN: Thank you. Mr. Brockman, you are the approval authority for completion of these PDSA addendum issues, is that correct?

MR. BROCKMAN: That's correct.

MEMBER BROWN: And do you have anything you wanted to add to Ms. Busche's statement?

MR. BROCKMAN: Her statement was accurate. Was are awaiting -- I believe we are expecting very soon the final documentation to close the last condition of approval.

MEMBER BROWN: Okay. Thank you.

MR. BROCKMAN: And I wanted to add, if I may, one more thing now or later. I do have that document in front of me, and

I'd like to read the statement. It says, "The conservative design requirements for MAR and hydrogen drove an evolving design of unforeseen complexity that led both BNI and ORP to raise concerns for the reliability and the safety of future WTP operations."

To me, that says we had concerns, we raised a question. I don't read in there at all that we made a declaration it was too complex to operate.

CHAIRMAN WINOKUR: Let me tell you for the record, as a Board member, and having come out to Hanford many times in the last few years and been briefed, that that is my understanding of what the Department conveyed to the Board very clearly. And I will just leave it at that.

Thank you.

MEMBER BROWN: One of the statements Mr. Kasdorf made in his opening statement I wondered if somebody could clarify for me. And the question is: is the current

process ventilation system design undersized as compared to the current design criteria? Anybody comment on that?

MR. KNUTSON: Greg actually should probably address that.

MR. ASHLEY: I didn't recall that the comment was that it is undersized. The process ventilation vessel vent system -- as part of this process, we had -- it had previously been classified -- did not have an active safety function, that vessel vent system. The system was a passive vessel purge system.

The vent system contains a number of pieces of equipment, such as a scrubber, which does not have currently -- or previously did not have an active safety function. As we talked about potential reclassification of that vessel vent system, we then had to look at the ability of the design to meet what was then going to be the functional classification.

It has caused us to go back and talk to the supplier. Basically, in a post-DBE [Design Basis Event], the sprays in that -- that scrubber would not be operable. And so we had to look at, what is the effectiveness, then, in terms of the removal of aerosols and aerosols, then, that would end up on the vessel vent HEPA filters.

So when Mr. Kasdorf referred to that, it is that change in classification that has caused us to relook at the design to say, in that upgraded functional requirement, safety requirement for that system, could the design comply with that? That's just -- it's an issue that we are currently looking at.

MEMBER BROWN: Thank you. There has been some talk about the sprays and leaks question in the hot cells. Can you tell me what the functional classification of the piping in the hot cells is today?

MS. BUSCHE: By the current PDSA addendum, because I think we are very close to

that, it ranges from safety -- excuse me, no higher than safety significant, but we reduced no pipe that wasn't already commercial grade to commercial grade.

So in the revision of our unmitigated analysis, we actually have said it wouldn't go any lower than safety significant, and we have a note in the actual license that we would -- if we choose or need to find a solid technical basis, you know, to go to that next level, we could go back to the Department and request that.

So, and it -- it is really hard to do generalities when you are talking as much piping as we have. But I think it is a fair general -- and I will probably get a note if I'm wrong -- no lower than safety significant.

MEMBER BROWN: Is that the same classification of the pumps and the valves and other equipment in the hot cells, that it would be safety significant, no higher than safety significant?

MS. BUSCHE: That I am uncomfortable answering without looking at the actual document itself, because it is a pretty complicated Table 5 in the addendum, so --

CHAIRMAN WINOKUR: Dr. Mansfield has a clarifying question.

MEMBER BROWN: Yes, sir.

MEMBER MANSFIELD: On the issue of valves, the one -- the HPAV-related experiment we have had a valve failure that would have sprayed -- had a considerable spray of waste in the hot cell.

MS. BUSCHE: Right.

MEMBER MANSFIELD: So I'm going to reinforce that question. Should the -- for instance, the valving in the hot cells for transfer paths be qualified in some way, so that the possibilities of leaking past gaskets during shocks of HPAV detonations can be mitigated? Is that -- would that be -- it seems to me that would be as much a part of the safety qualification as making sure that

you are using safety significant piping.

MS. BUSCHE: I think you're referring to I think some of Roy's opening statements with your followup. I --

MEMBER MANSFIELD: It is not so much the piping in the hot cells that I am worried about for my question. It is the in-line components in the hot cells that have more leak paths than the piping has.

MS. BUSCHE: I don't know if I understand that.

MR. ASHLEY: Dr. Mansfield, I can answer that. In terms of in-line components, when we talk about specific events, in-line components are qualified. They are safety requirements. If the requirement is maintenance of the pressure boundary, the in-line components will be qualified for maintenance of the pressure boundary, if it's HPAV affected.

We have not completed -- and I believe we have discussed this previously with

staff -- we have not completed our test acceptance criteria, our test planning, but our intent and our requirement, as stated in our basis of design, is these in-line components will be component tested, just like we do seismic qualification, just like we do environmental qualification. They would be qualified for the HPAV event. They would be specific measurable test acceptance criteria associated with the qualification of those components.

CHAIRMAN WINOKUR: All right. Mr. Brown? Sorry.

MEMBER BROWN: Yes. So in the hot cells, are we talking -- when we are talking about defense in depth, are we relying on the primary waste boundary, which would be the pipes, in-line components, or are we relying upon the building and the ventilation system as the confinement boundary?

MS. BUSCHE: If you -- hang on just a second. If you look at the suite of

accidents, okay, we -- there is a lot of discussion, so when I say "loss of confinement events," okay, the credited control in the accident analysis is a confinement boundary, C5-V, to mitigate the release.

The basis for the selection of the confinement ventilation is -- our experience is pipes leak, jumpers will leak. Okay? Especially in hot cells. And I believe it is a fundamental tenet of the -- when you pick a credited control, you have to demonstrate it provides its credited safety function. Okay?

So now that doesn't mean we are done. The next layer of defense in depth that we will articulate is actually, what is the quality and the pedigree of the pipes -- and I'm sure that will go to the in-line components as well -- as we design that to protect that transient? There will be several for loss of confinement.

You will get some that are more on the operator. How do you hook up jumpers so

you minimize the potential for misalignment? All the way to you have an HPAV event, and do you need to provide another control to protect that boundary?

So the QRA will help us with the HPAV, and I think we will probably deep dive on that tomorrow morning. But there is much piping that is safety significant. It is just not the credited control, because in all cases we can't demonstrate that it will prevent the leak.

So when I am talking loss of confinement, I need to pick a control that is going to either prevent or mitigate it, and we saw no way, without pipe in pipe, you know -- I mean, you get into some scenarios, if you want to prevent the leak, we did not feel we could do that in all cases given the design with the jumper configuration.

MEMBER BROWN: Thank you. Now, we have talked a bit about the flow sheet in the pretreatment plant, that it's not final. What

safety basis decisions remain unanswered because the flow sheet isn't final?

MS. BUSCHE: It's a little hard to speculate. As part of our going-forward plan that I shared just a moment ago, we are actually -- part of that integrated hazards analysis, the process flow diagrams will be updated based on the results of mixing. What are our capabilities? That will then flow into an update of our data sheets or our project models and an update to the P&IDs.

Those will work in concert, then, to systematically evaluate the hazards to answer that question. I don't expect a lot -- I don't see any showstoppers, but that is based on my experience in looking at what I know. But I can't preclude that there will not be a new control until we follow our process.

So at this point, because we are nearing the end of the design, we need to pick a control that can provide the credited safety

function, and that -- pick a control that provides a credited safety function, and I think I will just leave it at that. Predicting what I don't know, I don't know.

MEMBER BROWN: So who can say when we expect to finish the flow sheet, complete it?

MR. ASHLEY: Mr. Brown, you know, when you refer to the flow sheet not final, the flow sheet will undergo revision, because we are doing some design improvements to the facility. Particularly, we are doing system modifications to preclude precipitation of solids after our ultrafiltration wash and solids concentration. Particularly, what we want to do is prevent solids that could plug our ion exchange column.

However, the flow sheet today is a final flow sheet. It will undergo those revisions associated with those system modifications that -- though we won't talk specifically about what we call the CNP/CXP

[Cesium Nitric Acid Recovery Process/Cesium Ion Exchange Process] modification, but that is part of the suite of modifications that we will make to the pretreat facility that Donna has talked about that will then undergo or go through the hazards analysis, the ISM process.

That is a very important modification. It allows sodium reduction. It will allow a reduction in the life cycle of WTP, and actually will preclude upset events where we would plug ion exchange, have to stop the process, have to flush or remove an ion exchange column and replace it.

So there will be some changes, but I don't -- I don't really know where the premise that the flow sheet isn't final has come from. It will undergo changes over the next year as we implement some beneficial changes to the facility systems.

MR. RUSSO: That CNP/CXP modification we are talking about is an example of the Department making a capital

investment in the pretreat facility to save operating expense over the life cycle of the project. So there were two options. One had a very minor capital implication but had a life cycle implication. The one that was selected had a higher capital implication to save life cycle costs.

MEMBER BROWN: It sounds to me like ARPMCU. I mean, you are in a constant -- those kinds of issues you are going to be addressing maybe over the life of this plant. But the basic flow sheet, you are telling me, is -- is final. Is that --

MR. ASHLEY: Yes. Yes. But as we -- as we do system changes, beneficial changes, or identify that we will receive a lower weight percent solids, those do have effect, the flow sheet will have to be updated. But the flow sheet and the mass balance has -- from the flow sheet has been completed.

MEMBER BROWN: I mean, as I think

we talked about this morning with Mr. Rutland, there may be hundreds of flow sheets that you have to develop for the different wastes that you treat. So, but the basic flow sheet for the pretreatment facility is final.

MR. ASHLEY: Yes. When we talk about the batches, and how the individual batches are characterized in the prequalification, that doesn't change the WTP flow sheet. That changes how we operate the process. For example, how long do we have to leach?

Depending upon the specific feed, how will we concentrate that feed? How many times will we wash that feed as we recirculate it in the UFP loop?

So that isn't a fundamental flow sheet change. That is how we're going to operate and how we're going to process that specific feed.

MEMBER BROWN: Thank you. So the flow sheet issue, Ms. Busche, isn't really

slowing you up on safety basis documentation, or is it?

MS. BUSCHE: My job is to verify. So when we do an update to the hazards analysis, even if there are minor changes, design improvements, okay -- I don't disagree at all with what Mr. Ashley has said -- we are still obligated to make sure that there is no impact. So we have configuration management of the hazards we have analyzed, the controls we have selected, and a clear path to transition.

So it is -- is it holding me up? No. But we are in the process of, for example, mixing. We are evaluating those vessel assessment summary reports to understand what those impacts are. Some may change the process flow diagram. Some may not.

So we are focused more on the outcome -- I mean, the inputs and assumptions, and then the output, so that we can update our

hazards analysis. But they have to be consistent before we release it, so --

MEMBER BROWN: Okay. Thank you. In talking about the safety-related aspects of hydrogen in the pipes design, is the current WTP design capable of meeting DOE's safety requirements in 10 CFR 830 and 3009?

MS. BUSCHE: Could you be more specific on what safety requirements? Does the design currently meet the hazards analysis methodology of Subpart B? I think that for a PDSA the answer to that is yes. Does it meet it for a DSA? The answer to that is no. I've got lots of work to do as we now finalize the QRA and mature that into the hazards analysis, lots of work to do.

So at a PDSA stage, we have information that is supporting design. But I think a lot of the dialogue in this particular session is as part of a natural iteration we have found out new information on hydrogen and pipes in ancillary vessels and how to

integrate that in. It is changing I will call it the hazards analysis of record, and some of the design basis of record is changing, right?

So it is a natural evolution, but it is a -- it is a complex facility to try to explain that. So I believe we are compliant for a PDSA, but not for a DSA, nor am I required to be for a DSA at this time.

MEMBER BROWN: Is it your understanding that the hydrogen and pipe design issues, the QRA will be used as a safety-related tool or not?

MS. BUSCHE: I believe it's a design tool. But from a compliance to 3009, Appendix -- 3009, Appendix A, I believe we are obligated to evaluate the inputs and assumptions just like any other design calc. You determine what is an initial condition and what is an assumption requiring to be protected by a TSR?

So there are some things, when we go -- the QRA has been through a state of

change. There are some things in the QRA that are obvious. There are some flushes that are already required that the QRA is going to lead me to say, "Yep, that's a key thing in the calculation, so I will continue to protect that with a TSR."

There is others that are -- from a normal hazards analysis process would be a safety management program. And we will figure out how to work that into defense in depth. Okay?

But then, there is others that I don't know today. Until the QRA is finalized, and they finish their distribution curves and they finish that out, we can't complete that process. I believe we can comply with both the rule and the safe harbor methodology, but obligated to evaluate that document just like any other engineering calc.

MEMBER BROWN: Okay. In my simple mind --

MS. BUSCHE: Okay.

MEMBER BROWN: -- okay, we have kind of a bright line -- before QRA was brought into this process and after QRA was brought into this process. Do you think that the use of QRA is going to simplify or complicate meeting DOE requirements, safety requirements, 3009, 830?

MS. BUSCHE: I think the level of detail needed for the DSA is approximately the same. Ultimately, we had to have a design basis for pipes. Period. That work is going to be the same no matter what tool they would have picked. It's just the route to get there.

Where it may be more complicated -- and to be candid, I haven't thought through it yet -- is if we adopt this tool, what would it mean for the future operations of the facility with respect to the unreviewed safety question process? Because it is embedding infrequencies, which is not necessarily -- I haven't figured out how to use the

requirements of the rule, risk bending, for example. I haven't -- I really haven't thought through it.

We have been more focused on how are we going to do the first scrub of the QRA to identify how to develop the DSA and the controls. But, clearly, that is on my list of things that has to be resolved as we move forward to operate the plant. You have to know how you are going to maintain that license through routine changes, test, and experiment.

MEMBER BROWN: One of my problems, a Larry problem, is how to deal with PRA and QRA when DOE presents a solution to a problem based on that analysis, because I don't have a DOE policy upon which to base my judgment. And so I have to make it up, and I'm not very good at that. So --

DR. TRIAY: If I may, Mr. Brown, the Deputy Assistant Secretary for Safety and Operations Oversight, Steve Krohn, is the

Chairman of our Technical Authority Board. This is a concept that the environmental management office adopted several years back, because we wanted to use concepts that were best industry practices like the QRA approach.

And in the Technical Authority Board, from the environmental management program perspective, it is going to be looking at the QRA, ensuring compliance with all of the DOE polices and procedures in a very formal, rigorous, and disciplined manner. That evaluation is ongoing. And the Chief of Nuclear Safety, who reports to the Undersecretary of Energy, is a part of that process.

So the Department of Energy and the environmental management program will have a formal evaluation of how the QRA meets all of the Department of Energy's policies and standards.

MR. DEWEY: Mr. Brown, Mr. Bader wants just a very quick followup on that.

MEMBER BROWN: Okay.

MEMBER BADER: Actually, two. We have been pushing 2009-1 as the recommendation for a DOE policy on risk. Ms. Busche, do you believe you need that policy to be out and agreed -- and approved by the Secretary before you can complete your QRA analysis?

MS. BUSCHE: I would agree that we need it out before we implement the QRA. I believe it is an effective tool. It is just, if you -- when you read 3009, it is not clear how to use it.

MEMBER BADER: At all.

MS. BUSCHE: So I believe before we implement it, yes. Or this determination that Dr. Triay --

DR. TRIAY: That is correct.

MS. BUSCHE: I mean, it's one or the other. It has got to happen, so --

DR. TRIAY: That is exactly right, and that is exactly why I brought up this comment is because we, in the environmental

management program, believe that this particular QRA application is extremely beneficial to our nuclear operations.

And we intend to use the Technical Authority Board that has a level of oversight, all the way to the Chief of Nuclear Safety, in the Office of the Undersecretary, to do the formal evaluation with all rigor and discipline. And that is what Ms. Busche is going to utilize.

So I believe that that will satisfy the Board's questions with respect to the Department of Energy's position on the QRA process.

MEMBER BADER: Ms. Busche, one further question along those lines. Once you are done in terms of the -- you get approval and you can implement, do you see the QRA having to be maintained online during operation?

MS. BUSCHE: Yes. And that goes back to my USQ. If it is a basis for making

some of those design decisions, one of the fundamental tenets we will have to ask is, does this change the frequency, as described in the DSA?

So even though it's not used as a safety control selection tool, it is clearly part of the design basis for selected design features, like the primary boundary and the pipe. So, yes, I do believe so.

CHAIRMAN WINOKUR: Mr. Brown?

MEMBER BROWN: Thank you. That takes one question off my list here. Thank you, Mr. Bader.

(Laughter.)

I am glad to see that Mr. Krohn, the Chief of EM Safety, and the Chief of Nuclear Safety, Mr. Lagdon, are both here, because I think it is important as they grapple with this subject to understand how this may be a design tool, but it bleeds over into safety space. And they need to understand that and consider that as they

grapple with this problem.

As I think back to the conference which EM and the Office of HSS [Health, Safety, and Security] and DOE recently sponsored through CRESP on uncertainty, I recall -- and Mr. Sain mentioned it earlier -- Three Mile Island and how the WASH-1400 report, Rasmussen report, whatever name you want to attach to it, was very controversial at the time.

It predicted things that nobody liked, and then Three Mile Island validated them, which was the loss of flow accident. And that was found through a QRA or PRA analysis but was not found through the traditional deterministic analysis.

So I guess my question with that lead-in, Ms. Busche, is, do you think the use of QRA will make WTP safer?

MS. BUSCHE: I believe it will provide a technical basis for understanding where hydrogen in pipes needs to be protected.

So by that, I actually look forward to being able to write that up in the bases of the TSR, because it will do that for us.

Will it make it safer for us? I am looking at the whole suite of controls that we have to have for the pretreatment facility, and this is just one of the design inputs that we have. We've got many, many, many.

So I really don't have a feel and haven't really thought about it from that perspective. I don't think it will make us more unsafe or safer. I just haven't thought about it.

MEMBER BROWN: Well, as I think about it, the -- if it eliminates some dead legs --

MS. BUSCHE: Oh, yes.

MEMBER BROWN: -- that hydrogen could have accumulated in, and could have created a problem, then that's a good thing. Now --

MS. BUSCHE: Correct.

MEMBER BROWN: Now, that's just one piece of it. Maybe by eliminating that dead leg you lose some other safety function. So it has to be looked at in the whole context, but it seems to me -- and I hope that it helps the safety problem, safety -- not problem, but the safety question at the waste treatment plant.

Do you have any other concerns with the use of QRA as related to WTP? And, if you do, do you have any plans for how you are going to address them? Anything we haven't talked about?

MS. BUSCHE: No. At this time, I am just waiting for -- to see the resolution of the HPAV independent review team comments, how they get incorporated into the tool, and then I could probably more appropriately answer that. Right now it is -- I need to see the final product.

MEMBER BROWN: Thank you. If I could ask Dr. Triay a question about this EM

Technical Authority Board. Will they be developing standards and requirements for implementation of QRA at WTP? Or is this going to be a recommendation that you -- that they make to HSS, and then it gets involved in the whole DOE bureaucracy? How is that -- how is that decision going to be made, so that it can be implemented or not?

DR. TRIAY: I would like to see whether -- I can either answer the question myself or if you will allow Dr. Krohn to join us, would that be --

CHAIRMAN WINOKUR: No, I think it would be best if you answer the question. And if you're not able to do so, please just state it for the record.

DR. TRIAY: Well, what we intend to do is make sure that in this particular tool the QRA is compliant with 10 CFR 830.

As you saw in the -- or you heard Ms. Olinger in her words, you know, to the Board, whether the QRA is viewed as a design

tool or as an element of the safety analysis, its acceptability as part of the methodology for compliance with 10 CFR 830 is expected to be confirmed. It is that confirmation that will be performed by the Technical Authority Board.

Actually, the waste treatment plant has been asked to evaluate the calculations that the QRA supports, determine 3009 requirements and guidance for those calculations, determine if there are any inconsistencies, and evaluate the impacts of any such inconsistencies.

The Technical Authority Board will then review the results of that evaluation. And with respect to the process, the environmental management program instituted the Technical Authority Board so that we could deal with best nuclear industry practices in -- without necessarily having to go through the consensus-building within the entire Department of Energy in order to press forward

with a very good practice such as the utilization of QRA.

We do have the oversight from the departmental perspective, by having our Chief of Nuclear Safety formally participate in the Technical Authority Board process.

So between the environmental management, Technical Authority Board's work, that is a very disciplined process, and the oversight from the Chief of Nuclear Safety -- we believe that that will be sufficient for us to press forward with the QRA approach.

I just would like to conclude by saying that in my opinion the QRA will risk-inform the design of the waste treatment plant, and that the HPAV independent review team has stated that it will make design a lot better versus a deterministic approach.

MEMBER BROWN: So if I understand it correctly, the EM Technical Review Board will see where the QRA is consistent. And if it's not in those areas or situations where

it's not consistent with DOE existing orders and standards, it won't be used.

DR. TRIAY: As I was saying before, we expect the QRA to be compliant with 10 CFR 830. But from the perspective of the final authority of the Technical Authority Board, yes, their decision will drive what is it that is going to be done in the waste treatment plant.

As you know, the pilot applications of this type of what we consider a very beneficial best practice of the nuclear industry are needed to develop new standards, and this QRA will serve as an important pilot for perhaps the Department then to develop new standards.

So we think that the work of the Technical Authority Board will be the final authority as to what we will do in the waste treatment plant. And, in addition, this particular pilot will serve to -- for the Department to interchange the promulgation of

new standards.

MEMBER BROWN: I just have one more question, Mr. Chairman. Going -- since we're on controversial issues, let me go back to one other one. How is the question of deposition velocity going -- how is that decision making process going, and how will that be resolved, or when will it be resolved?

DR. TRIAY: Again, the Chief of Nuclear Safety is here, and he is available to come before you. But if you want me to speak for him, I will do my best. As we have noted in our response, for deposition velocity our Chief of Nuclear Safety is the ultimate authority as to what kind of parameter we are going to use in the waste treatment plant.

And we have noted, however, that for the waste treatment plant the safety classification does not change if we were to use a value of .1 or 1. I believe those sensitivity analyses have been performed, and in the waste treatment plant it doesn't make

any difference for the classification of the safety systems.

But with respect to who is the authority, it would be the Chief of Nuclear Safety making that determination on behalf of the Department.

CHAIRMAN WINOKUR: But, Madam Secretary, the Chief of Nuclear Safety has agreed with the Board's position that the correct value of deposition velocity is in the range of 0.1 to 0.3. So what is the rationale of the Department for not putting a correct value into the code?

DR. TRIAY: As I was stating, for the waste treatment plant our uncertainty analysis indicates that there is no different result whether we use .1 or whether we use 1. So our Chief of Nuclear Safety will direct the waste treatment plant to utilize the value that he believes prudent for the waste treatment plant, that we will do it.

CHAIRMAN WINOKUR: So we're in a

situation right now where the incorrect value is the prudent value to use?

DR. TRIAY: I believe that I have made clear that for the waste treatment plant it makes no difference, and that we will take direction in the waste treatment plant from the Chief of Nuclear Safety. So when he finishes his work, and I believe that he has an upcoming review of a paper delineating the values that he wants us to use for the waste treatment plant that is going to be peer reviewed, we will take direction from him.

CHAIRMAN WINOKUR: Very respectfully, I am very surprised that the Department of Energy would take that approach. But you have expressed your opinion and your views. Thank you.

Ms. Roberson?

VICE CHAIR ROBERSON: Okay. I want to do one followup on what Mr. Brown was just asking, and maybe this has changed. My understanding was the Office of Primary

Interest, for whether it's 3009 or 830, is HSS. Are they a part of the effort to look at the tool and ensure it is aligned?

DR. TRIAY: Yes. Dr. Krohn has worked closely with our office of HSS. The point that I was making was that the QRA pilot will actually serve the Department well in terms of understanding how a tool of that nature could actually be utilized Department-wide.

So I think that the Department is looking at this particular application of the QRA as a good pilot, and Dr. Krohn, as the head of the Technical Authority Board and Mr. Chip Lagdon, as the Chief of Nuclear Safety, work very closely with HSS.

CHAIRMAN WINOKUR: Okay. Mr. Dwyer, I think you had a question?

MR. DWYER: Yes, if I could just followup with something Ms. Busche was saying. I believe you indicated when we were talking about the piping and the hot cell that it

wasn't possible to demonstrate that you could maintain confinement with the piping. Is that --

MS. BUSCHE: Not in all cases where there is jumpers concerned.

MR. DWYER: And why is that?

MS. BUSCHE: From an accident analysis perspective, around the complex it -- piping systems leak, specifically at connections. So we couldn't say we could prevent all leaks, so we chose an alternative control -- I mean, a mitigative control strategy. That has been the project's control strategy for leaks and loss of confinement events from pipes since the beginning PDSA.

MR. DWYER: So is this a specific -- I guess a specific characteristic of the jumper connections?

MS. BUSCHE: No. When you postulate failure, the places that you are most likely going to get a loss of confinement event due to the primary boundary is typically

going to be a jumper connection. You still have erosion/corrosion. You have all other potential initiators.

The most credible one is jumper connections. My experience in working, unfortunately, in tank farms in years past is they do leak. I have seen spray leaks, okay? They do leak.

So it is something that we postulate that it fails, not that it is not important, not that we're going to design it with pedigree, but we are postulating in the accident world that it will fail. And we are specifically crediting a mitigative strategy versus a preventive strategy.

I understand the rules of how you should select controls, but I don't believe we can prevent leaks unless we did pipe in pipe. I mean, there's multiple ways you could have done that, but --

MR. DWYER: Okay. So I -- let me try again.

MS. BUSCHE: Okay.

MR. DWYER: So I thought what you said is -- I'm sorry. I thought what you said was that this is not just a characteristic of there is a jumper in the line, but then you argued that it is a characteristic that there is a jumper in the line. Help me out here.

MS. BUSCHE: Well, it's -- again, at an unmitigated accident analysis, where we are in the severity level assessments, we are not refined. We don't have the details of the accident analysis updated yet that looks at the full suite of different configurations.

In the unmitigated -- I call them scoping calques - you just assume the worst one. You figure out what is going to fail, and we just assumed it was going to fail. We didn't -- it wasn't a real complicated analysis. We just assumed it failed.

MR. DWYER: Okay. And you couldn't design a system that wouldn't fail?

MS. BUSCHE: Oh, it would lead you

towards a pipe in pipe type configuration. I'm sure you could, right? But it's -- it wasn't --

MR. DWYER: I'm just curious from the standpoint of we discussed that the piping is safety significant, but we never discussed the seismic characterization. Does that have anything to do with it?

MS. BUSCHE: Seismic is an initiator for loss of confinement events from the primary boundary, yes, it is.

MR. DWYER: Okay. So there is actually two different categorizations or classifications of safety significant piping in the complex that we are talking about there?

MS. BUSCHE: No.

MR. DWYER: There's not? Are --

MS. BUSCHE: I guess I don't understand the question, Mr. Dwyer.

MR. DWYER: Okay. One of the issues that we had was -- let me phrase it a

different way. What performance category are you going to meet with your safety significant piping?

MS. BUSCHE: I can answer that. I think the most qualified with respect to the application of the design criteria as connected to the functional classification is probably Mr. Ashley. It is functionally classified as safety significant in most cases in the hot cell, okay? Most cases. And that is typically your high activity process lines. So it's a general statement.

From that, the projects design criteria -- and, Greg, please jump in -- is if it's safety significant in our world it is seismic Category 3. It is not the terminology that you would use, say, from 1189.

MR. ASHLEY: That's correct, Mr. Dwyer. The design criteria has been the design criteria of the WTP from the beginning, is safety significant, is seismic Cat 3. Now, it is a unique categorization relative to the

WTP.

We do have conditions where we have designed the piping, even though it is safety significant, to seismic Cat 1, which is the highest seismic category for the WTP where SS, safety significant, is seismic Cat 1.

We qualify it to seismic Cat 1 for all the hot cell piping, the hot -- or not hot cell, the black cell piping -- the black cell vessels, and we qualify all the way out to the isolation valves in the hot cell, and those isolation valves are on jumpers. So all of that out to that isolation valve is qualified to seismic Cat 1.

I believe, as Mr. Kasdorf talked about in his testimony, those isolation valves there are on a post-DBE or post-seismic event. Their function is to be able to isolate. Obviously, our inventory, we don't have significant inventory in the hot cell. Our inventory is in our vessels. Our vessels are in our black cells.

So the function of those isolation valves is post-DBE through a switch. The operator has the ability to close those isolation valves. The switch also terminates power to non-safety pumps, i.e. we stop pumping. We'll stop pumping and we'll isolate the inventory in the black cells.

MR. DEWEY: Okay. And so up to the isolation valve it's seismic Category 1.

MR. ASHLEY: Cat -- seismic Cat 1.

MR. DEWEY: And on the other side it's seismic Category 3.

MR. ASHLEY: Seismic Cat 3.

MR. DEWEY: Is that part of the reason why you can't demonstrate containment?

MS. BUSCHE: No.

MR. DEWEY: Okay.

MS. BUSCHE: It's not. From a functional classification standpoint, we wouldn't care what the initiator was. We would functionally classify it based on the bounding unmitigated consequence. It's not

rocket science.

So we are primarily at this stage looking at what are the range of transients that could create a potential loss of confinement. The easiest one that drives it is a jumper misalignment. So at the unmitigated stage it wasn't --

MR. DEWEY: Okay.

MS. BUSCHE: -- just picked the worst one.

MR. ASHLEY: Just to add on to that, similar to commercial nuclear facilities, leaks of that type, spray leaks, are treated as non-mechanistic. We use consensus codes and standards for design of piping and vessels. Regardless of the codes and standards you use, you still assume non-mechanistic breaks.

And I believe what Ms. Busche is talking about is, regardless of what we had done in design, nuclear safety would still assume that we have vessel leaks, that we have

spray leaks in piping. That is just part of the safety control strategy that is required.

MR. DEWEY: So if you go to the description that you were just giving of a reactor, are you saying then that they don't consider the piping the primary boundary?

MR. ASHLEY: Absolutely. We consider the piping the primary boundary as well.

MR. DEWEY: No, we were just discussing that the structure in the C5-V is the primary containment.

MR. ASHLEY: We design the piping to the consensus codes and standards to maintain that confinement boundary.

MR. DEWEY: But you don't credit it.

MS. BUSCHE: Correct. From an accident analysis, it is a mitigative strategy. That is irrespective of how you protect the hazard closest to the source. We chose not to pick the primary boundary to

credit it in the accident analysis. We chose a mitigative strategy to credit the C5-V.

MR. DEWEY: Thanks.

MS. BUSCHE: Is still the -- the pipe is still the primary boundary. That has not changed.

CHAIRMAN WINOKUR: Dr. Mansfield?

MEMBER MANSFIELD: From everything that has been said about the future waste acceptance criteria, it almost certainly is going to require blending for -- especially for the sludge batches. And that is going to require more sampling, it's going to require lab work. Somebody even mentioned it might require grinding of large particles. And it is certainly going to involve, therefore, additional risks.

And will it involve increasing the number of batches? Right now you've got -- planned a fixed number of batches, 300 and something I think, wasn't it? What's going to happen if you need -- is all of this blending

going to require -- blending -- by the way, to achieve radiological properties that are going to be required to satisfy the HPAV conditions, for instance -- are you clear what I mean?

If you can't achieve proper shear strength, for instance, and it's going to require -- in the sludge waste, and it's going to require blending to do that, is that going to require more batches to be dispatched to the WTP? Or are you going to be able to use supernate from --

MR. ASHLEY: I believe that currently -- and as Dr. Triay spoke -- the current system plan already requires blending. There will be blending to mobilize the sludges. Those requirements, in terms of, you know, the rheology of those batches, are already in the ICD.

MR. SAIN: That's correct.

MR. ASHLEY: So --

MEMBER MANSFIELD: So no conceivable treatment requirement is going to

require more batches. You're not going to have to add any volume to the waste stream?

MR. ASHLEY: We are in constant discussion with the tank farm, as we talked about in terms of how we control the solids concentration in HLP-22 [High-level Waste Lag Storage and Feed Blending Process System], has a very small effect on the number of batches. However, that is -- as I said, that is being communicated and worked with the tank farm.

You know, some of the decisions that are made, they are integrated decisions in terms of our -- the WTP requirements and will that have an effect on the mission, on the mission life, increasing number of batches. So all of those are considerations as we discuss what -- you know, the specific requirements for the WTP.

MEMBER MANSFIELD: I don't have any questions.

CHAIRMAN WINOKUR: Mr. Bader?

MEMBER BADER: Ms. Busche, I'd like

to go back to the deposition velocity. Do you feel comfortable incorporating in your safety documents a value that is agreed to be wrong?

MS. BUSCHE: Short answer, no.

MEMBER BADER: I don't either. Would you like to set the precedent for being the first in the DOE complex to do that?

MS. BUSCHE: No.

MEMBER BADER: I wouldn't either. End of questions. I can't believe this. I'm done.

CHAIRMAN WINOKUR: Any others?

(No response.)

Thank you, Mr. Bader.

This concludes testimony from our staff and that of the Department and its contractors. Thank you very much. We appreciate it. We know that you are here late at night with us, and it has been a very good exchange. We appreciate that.

I will now call on members of the public who have signed up to speak. As I

indicated earlier, I'd ask that each speaker limit remarks to about five minutes. If time permits, I will extend time for additional comments.

And we do have one speaker with us tonight, Mr. Patrick Pinto.

MR. PINTO: My name is Patrick Pinto, and I am a chemical engineer. I have worked in this DOE nuclear fuels reprocessing and waste management business for over 35 years.

CHAIRMAN WINOKUR: Sir? We're having a problem with that mic feed.

(Whereupon, adjustments were made to the microphone system.)

Mr. Pinto, we'd like you to -- please start at the beginning, sir.

MR. PINTO: Okay. My name is Patrick Pinto. I am a chemical engineer, and I have worked in the nuclear -- in the DOE nuclear fuels reprocessing and waste management business for the last -- over 35

years. In fact, I started my working career here at Hanford in 1973 in the tank farms as a process engineer working on the sludge sluicing program, where the sludge was being sluiced out of the tanks. So I am very familiar with the nature of these solids.

In 1980, I moved to work in the oil business, because I was tired of the DOE nuclear fuels work. And the oil business went caput in 1985 with the oil price falling so drastically, so I had to seek refuge back in the nuclear fuels business, and I went to work at the Idaho National Lab, and I worked there as a project manager, as a conceptual design engineer, and as a safety analyst.

So, and since 2001, I have been working on the waste treatment plant design for Bechtel. I obviously do not speak for Bechtel, because I am speaking as a private citizen.

Now, we are all concerned about the two big hazards we have which are the HPAV

issue, hydrogen explosion in pipes, and the plutonium criticality issue. And I would suggest that keeping the waste constantly suspended is a very extremely conservative and costly process to mitigate these hazards.

I would rather propose that we let the solids settle and ventilate the tank space. To keep the solids constantly suspended takes a lot of energy, and we have to use all of these PJMs, and these PJMs are very compressive air intensive. And if one were to calculate just the cost of the amount of compressed air used it is a huge amount, and you are talking about a large continuing operating cost for the plant.

Now, you can take just a small fraction of that area you are using to keep these solids suspended and ventilate the vapor space of the tank and cause a virtual tornado in the tank. So you have really gotten rid of the HPAV issue just by the dilution effect.

Now, the other safety concerns I

have are with CCN [Correspondence Control Number] ion exchange and the ultrafiltration process itself. The CCN ion exchange process uses CCN ion exchange columns with valve manifolds. And the valves can leak, and you have all of these transfers, numerous and advertent transfers, and the project has written reports saying all of these leaks would be in a safe direction, so we don't have to worry about them.

But I don't think that statement really would hold true, if someone were to -- you know, but there is -- it's not really a safety issue so much. You know, providing valves and jumpers is a huge cost. And then, when the valves leak -- because the design that is used here is the same design that was used at West Valley. And, you know, there were valve leakage problems at West Valley.

So I -- in response to these concerns on valve leakage, I did submit defensive professional opinion reports where

I came up with a very simple system to get rid of the valves and do a valveless transfer between columns. And, in fact, the cost savings were so high that you could totally -- I was planning to use a cartridge system for the ion exchange, and it would totally get rid of the present disposal system and the resin addition system.

CHAIRMAN WINOKUR: Mr. Pinto, could you begin to summarize your comments, and we will accept what you would like to submit for the record.

MR. PINTO: Okay. Well, I haven't gotten into the ultrafiltration system yet. If we accept the premise that we could let the solids settle -- see, that is the only reason for using an ultrafiltration system, that we cannot let the solids settle. We could go with a gravity clarifier and get much higher concentration solids than the ultrafiltration system would yield for you.

In fact, the ultrafiltration system

-- ultrafiltration is a very inappropriate technology to use, because it is mainly used for polishing waste streams with very small solids content. You cannot use ultrafiltration to concentrate solids, because you run into an enthalpy problem. You've got this tank from where you're pumping the liquid around, and you're concentrating -- trying to concentrate the solids in this tank.

And as you remove the permeate, the level in the tank falls, and you've got to make up the liquid by adding very diluted solids. So you've got -- you are constantly adding four percent solids to a 10, 11, 15 percent stream. So you've got a big enthalpy increase problem.

CHAIRMAN WINOKUR: Mr. Pinto, could you --

MR. PINTO: Yes?

CHAIRMAN WINOKUR: -- could you finish up your remarks in about a minute, please?

MR. PINTO: Well, the basic comment I have is that we are wasting a lot of the public's money on these -- on using the wrong technology to do the separation of the solids from the liquids. If you use gravity settling, you could separate -- you know, the batch of ultrafilters, solids, that you are going to process could be done in one-tenth the time.

So if -- on the basis of that, the whole pretreatment facility would have to run 10 times longer. And look at all of the operating costs you are incurring in that respect.

CHAIRMAN WINOKUR: Thank you.

MR. PINTO: Well, since you are hurrying me up, I will end my speech and wish the project the best of luck.

CHAIRMAN WINOKUR: Thank you. Please submit whatever you would like for the record. We are happy to accept it.

Are there any other members of the

public who wish to speak at this time?

(No response.)

That concludes the public comment portion of this session, and I will, therefore, close this session. Anyone who wishes to submit written testimony should do so at this time by giving a copy to the Board's General Counsel, Richard Azzaro.

Thank you all for coming. We are recessing the hearing, and we will reconvene tomorrow morning at 8:00 a.m.

(Whereupon, at 8:25 p.m., the above-entitled matter went off the record.)

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