

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:

TIMOTHY DWYER, Technical Director  
RICHARD AZZARO, General Counsel

PANEL MEMBERS PRESENT:

GREG ASHLEY, BNI  
DAVID BROCKMAN, DOE-ORP  
DONNA BUSCHE, URS  
STACY CHARBONEAU, DOE-ORP

DAVID DICKEY, Consultant  
INES TRIAY, DOE-EM  
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

ALSO PRESENT:

ADAM POLOSKI

STEVEN STOKES

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

(9:00 a.m.)

CHAIRMAN WINOKUR: My name is Peter Winokur. I am the 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. To my immediate right is Dr. John Mansfield, and to 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, of the Department of Energy's defense nuclear facilities at Hanford, are also present.

1                   Today's meeting and hearing were  
2                   first publicly noticed in the Federal Register  
3                   on July 26, 2010, and renoticed for a change  
4                   of location on September 15th, 2010. It is  
5                   being held open to the public in accordance  
6                   with the provisions of the Government and  
7                   Sunshine Act.

8                   The hearing is being broadcast  
9                   over the Internet via videostreaming. The  
10                  link can be found on the Board's Web site.  
11                  A video recording of the hearing will be made  
12                  available on the Board's Web site as soon as  
13                  possible after the hearing is concluded, and  
14                  will remain available for 60 days. A verbatim  
15                  written transcript, together with associated  
16                  comments, will be available for viewing and  
17                  copying in the Board's public reading room on  
18                  the seventh floor of the Board's headquarters  
19                  in Washington, D.C.

20                  In accordance with the Board's  
21                  practice, as it is stated in the Federal  
22                  Register notice, we welcome comments from

1 interested members of the public, at the  
2 conclusion of testimony for each of the three  
3 sessions comprising this public meeting and  
4 hearing.

5 A list of those speakers who have  
6 contacted the Board is posted at the entrance  
7 to this auditorium. We have listed the people  
8 in the order in which they have contacted us,  
9 or, if possible, when they wish to speak.

10 I will call the speakers in this  
11 order and ask that speakers state their name  
12 and title at the beginning of their  
13 presentation.

14 There is also a table at the  
15 entrance to this room with a sign-up sheet for  
16 members of the public who wish to make a  
17 presentation but did not have an opportunity  
18 to sign up previous to this time. We will  
19 allow those who have already registered with  
20 us--they will follow those who have already  
21 registered with us in the order in which they  
22 have signed up.

1                   In order to give everyone wishing  
2                   to speak an equal opportunity, we ask  
3                   presenters to limit their original statements  
4                   to five minutes.

5                   The Chair will then give consideration to  
6                   additional comments, should time permit.

7                   Presentations should be limited to comments,  
8                   technical information, or data concerning the  
9                   subjects of this meeting and hearing. The  
10                  Board members may question anyone making  
11                  presentations to the extent deemed  
12                  appropriate.

13                  The record of this proceeding will  
14                  remain open until November 7th, 2010. The  
15                  Board reserves its right to further schedule  
16                  and regulate the course of this hearing, to  
17                  recess, reconvene, postpone, or adjourn this  
18                  meeting and hearing, and to otherwise exercise  
19                  its authority under the Atomic Energy Act of  
20                  1954, as amended.

21                  Now let me proceed to explain the Board's  
22                  authority for inquiring into matters that are

1 the subject of this public meeting and  
2 hearing.

3 The Board's enabling statute, now  
4 in effect for more than 20 years, is found in  
5 the Atomic Energy Act, beginning in Section  
6 2286 of Title 42. One section of this defines  
7 the Board's role in the review of facility  
8 design and construction.

9 And I quote. "The Board shall review the  
10 design of a new Department of Energy defense  
11 nuclear facility before construction of such  
12 facility begins, and shall recommend to the  
13 secretary, within a reasonable time, such  
14 modifications of the design as the Board  
15 considers necessary to ensure adequate  
16 protection of public health and safety.

17 "During the construction of any such facility,  
18 the Board shall periodically review and  
19 monitor the construction, and shall submit to  
20 the secretary, within a reasonable time, such  
21 recommendations relating to the construction  
22 of that facility as the Board considers

1 necessary to ensure adequate protection of  
2 public health and safety.

3 "An action of the Board, or a  
4 failure to act under this paragraph, may not  
5 delay or prevent the Secretary of Energy from  
6 carrying out the construction of such a  
7 facility."

8 The hearing begun this morning  
9 forms a part of the Board's continuing effort  
10 to fulfill the statutory charge with respect  
11 to the Waste Treatment and Immobilization  
12 Plant, also known as the Waste Treatment  
13 Plant.

14 The record of the hearing, both  
15 oral and written, will be used by the Board to  
16 formulate recommendations to the Secretary of  
17 Energy for this critical project.

18 These recommendations may take the  
19 form of a formal recommendation to the  
20 secretary, or may be transmitted to the  
21 department through letters or informal  
22 exchanges between technical counterparts.

1                   The Board's oversight  
2       responsibilities continue through completion  
3       of construction, testing, operation, and  
4       eventual decommissioning of these facilities.  
5       The Board's statutory charter is like that  
6       given to other agencies operating under the  
7       Atomic Energy Act--the protection of public  
8       health and safety, including safety of the  
9       workers.

10       In the case of the Waste Treatment Plant,  
11       however, this statutory charge is made more  
12       complex because proper construction and  
13       operation of the plant is critical in  
14       resolving the underlying health and safety  
15       problem, namely, the large volume of toxic and  
16       radioactive waste now stored in underground  
17       tanks at Hanford.

18                   Many of these tanks are already 67  
19       years old, and most will be almost 100 years  
20       old by the end of the projected treatment  
21       mission.

22                   Consequently, it is not enough in

1 this case for the Board to focus solely on  
2 whether construction of the Waste Treatment  
3 Plant will not suffer accidents harmful to  
4 workers or the public. It must operate safely  
5 and effectively, for many decades, to  
6 remediate the safety hazard represented by  
7 tank waste.

8 The Board has therefore inquired  
9 into many issues that involve a mixture of  
10 accident risk and successful and efficient  
11 long-term operations.

12 At this time, I'd like to provide  
13 some additional background on the history of  
14 this project.

15 The Hanford high-level waste tanks  
16 began receiving waste in the 1940's. As the  
17 initial single-shell tanks were being  
18 constructed, they were designed for about a 20  
19 year life. Over the seven decades of  
20 operation of the tank farms, poor chemical and  
21 configuration control of the waste has created  
22 a much more challenging problem for

1 understanding the chemistry and properties of  
2 the waste, as well as getting them mobilized,  
3 than exist at other sites such as the Savannah  
4 River site and the Idaho Cleanup Project.

5 Characterization of this waste  
6 remains problematic. The first time that a  
7 single-shell tank was suspected of leaking was  
8 the mid 1950's. Many single-shell tanks have  
9 been proven leakers since then. The leakage  
10 exacerbates the need to get these wastes out  
11 of the tanks and in a suitable form for  
12 eventual disposal.

13 The Department of Energy's  
14 solution to removing and stabilizing the  
15 waste, to reduce the current and future  
16 threats to health and safety, is the Waste  
17 Treatment Plant.

18 The Waste Treatment Plant project  
19 was initiated in the mid 1990's. This is the  
20 first- of-a-kind project. The Board's formal  
21 oversight of the project began, in earnest,  
22 after a privatization effort was abandoned in

1 2002.

2 The Board has been advising the  
3 department about our concerns related to  
4 design basis safety requirements, and their  
5 potential impact on operational safety  
6 throughout the life of the project.

7 Since initiating the project, the  
8 department has pursued internal and external  
9 reviews of the project, obtaining advice from  
10 experts in academia, the chemical and process  
11 industries, and its national laboratories, to  
12 help inform the design, the safe operation,  
13 and performance of the plant over its  
14 projected 40 year operational life.

15 It is important to note that the department  
16 undertook a significant redesign effort  
17 starting in 2009. Even though the design of  
18 the plant was more than 70 percent complete,  
19 the redesign of the plant is now over 80  
20 percent complete, and construction of its pre-  
21 treatment facility is more than 30 percent  
22 complete.

1                   Recently, the department indicated  
2                   to the Board that it is transitioning the  
3                   Waste Treatment Plant from a design and  
4                   construction project to one of construction  
5                   and commissioning.

6                   The department has referred to  
7                   this transition as "pivoting." As such, the  
8                   department is planning to wrap up its design  
9                   actions by establishing the final design  
10                  criteria for the plant's structure, systems  
11                  and components. The pivot is intended to  
12                  provide a defined path forward to finish the  
13                  design of the systems and components that have  
14                  not been finalized, and to resolve any  
15                  outstanding technical issues.

16                  The Board is deeply concerned that  
17                  the plant may be commissioned before several  
18                  key technical issues are fully resolved. Once  
19                  operational and exposed to radioactive waste,  
20                  options for design changes in black and hot  
21                  cells will be extremely limited, costly, and  
22                  expose workers to hazardous situations.

1                   To the maximum extent possible,  
2 solutions must be accommodated before  
3 commissioning. A learn-as-we go philosophy  
4 does not seem prudent for this facility.

5                   Given that the project is now  
6 pivoting, wrapping up design, and focusing on  
7 commissioning, it is a crucial time to have  
8 DOE [Department of Energy] explain where they  
9 are, where they are going, what remains to be  
10 done, and in what time frame.

11                   Also implicit in the Board's  
12 statutory mandate is keeping the public  
13 appropriately informed of issues affecting  
14 public health and safety. Those are the goals  
15 of these proceedings.

16                   The proceedings began last month,  
17 when DOE pivoted--provided--excuse me--over  
18 200 pages of written answers to Board's  
19 questions. These questions and answers are  
20 available on the Board's Web site and will  
21 become a part of the record of these  
22 proceedings.

1 I want to take a moment to thank  
2 the department for its timely response to  
3 these questions. Over the next two days, we  
4 intend to explore some of these answers to  
5 gain a more complete understanding.

6 However, because of the large  
7 volume of information that must be discussed,  
8 a lack of further inquiry in this hearing, or  
9 in the future, should not necessarily be  
10 viewed as satisfaction on the part of the  
11 Board with either a previous written or verbal  
12 answer.

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

18 There are several areas of the  
19 Waste Treatment Plant design in which the  
20 Board has concerns with the safety, and its  
21 ultimate operation for the decades the plant  
22 must operate.

1                   These areas include the ability of  
2                   the plant to adequately mix the wastes after  
3                   they are transferred from the tank farms into  
4                   the plant. The hydrogen control strategy for  
5                   dealing with the hydrogen gas that is  
6                   inevitably generated by the high-level wastes.  
7                   The implementation of safety controls  
8                   necessary to implement the hydrogen control  
9                   strategy, and the likelihood that limitations  
10                  on the plant's operating envelope, resulting  
11                  from the performance of the plant's misting  
12                  systems, will result in more demands on the  
13                  tank farms to deliver waste that meets  
14                  restrictive waste acceptance criteria, or the  
15                  need to provide alternative processing  
16                  capability.

17                  The first session of the Board's  
18                  hearings, this morning's session, is going to  
19                  concentrate on potential concerns with the  
20                  plant's ability to mix waste adequately during  
21                  plant operation.

22                  We are trying to understand the

1 ability of the plant to safely, effectively,  
2 and efficiently process 53 million gallons of  
3 Hanford tank waste containing 176 million  
4 curies of radioactive materials, so it can be  
5 vitrified for eventual disposal.

6 This involves the treatment of  
7 waste containing high levels of solids. In  
8 addition, the mixing systems in the plant's  
9 waste receipt and processing vessels need to  
10 agitate the waste to prevent flammable amounts  
11 of hydrogen gas from building up into solids,  
12 and to prevent solids that are rich in fissile  
13 materials from accumulating in quantities that  
14 could pose a criticality hazard.

15 The mixing systems also need to be  
16 operated in a manner that avoids upsets such  
17 as pulse jet overblows. We have requested  
18 that the department's experts in mixing from  
19 industry, academia, and the National  
20 Laboratories participate in this morning's  
21 panel discussion.

22 We will endeavor to learn directly

1 from the department's own experts about their  
2 current safety concerns related to mobilizing,  
3 treating, and stabilizing Hanford's unique  
4 high-level waste during plant operations, and  
5 about how the Waste Treatment Plant design  
6 effectively addresses those safety issues.

7 Let me be clear. These are the  
8 department's experts that have been  
9 consultants to the project over the last  
10 several years. These are not the Board's  
11 experts. We have, however, evaluated their  
12 input to the department and monitored the  
13 department's response to them.

14 We have also asked for  
15 participation from project design person from  
16 Bechtel National, Incorporated, URS  
17 Corporation, as well as the department's  
18 responsible personnel for managing the  
19 project.

20 Since it appears that the  
21 department's solution to some concerns will  
22 require restrictions on the waste being

1 delivered to the plant, the Board will shift  
2 its discussions later this morning to panel  
3 members that include representatives from the  
4 tank farm contractor and associated federal  
5 personnel.

6 This concludes my opening remarks.

7 I will now ask my fellow Board  
8 members if they have opening remarks before we  
9 begin the testimony.

10 Hearing no such request, I would  
11 like to invite the Assistant Secretary of  
12 Energy for Environmental Management, the  
13 Honorable Dr. Ines Triay, to read a statement  
14 from the deputy secretary of energy, the  
15 Honorable Daniel Poneman.

16 She'll be followed by Mr. Dale  
17 Knutson, DOE's federal project director for  
18 the Waste Treatment Plant, and Ms. Stacy  
19 Charboneau, DOE's assistant manager of the  
20 tank farms project in the Office of River  
21 Project, who will also provide from brief  
22 remarks.

1 Welcome, Dr. Triay.

2 DR. TRIAY: Good morning, Chairman  
3 Winokur, and other members of the Board, the  
4 Board staff, and members of the public. We  
5 appreciate the opportunity to discuss with  
6 you our progress at the Waste Treatment Plant.

7 I will be reading a statement this  
8 morning from Deputy Secretary Poneman on  
9 behalf of the Department of Energy.

10 The Waste Treatment Plant project  
11 holds enormous importance for the nation, the  
12 region, and the Department of Energy. The  
13 department attaches the highest priority to  
14 the successful, safe completion of this  
15 project, on budget and on schedule.

16 This hearing comes at an opportune  
17 time as we prepare to pivot from  
18 design/construct approach to a  
19 construct/commission approach to project  
20 management at Hanford.

21 In preparing for this transition,  
22 we have sought input from several in-depth,

1 independent technical and management reviews,  
2 and have worked diligently to resolve  
3 important issues.

4 The secretary and I are strongly  
5 committed to continuous improvement in the  
6 execution of our capital projects. As the  
7 department's senior acquisition executive, I  
8 take full responsibility for delivering our  
9 projects, adhering to technical, cost and  
10 schedule baselines, and assuring the safety  
11 and reliability of our operations. Safety is  
12 not just a top priority for the department but  
13 an essential element of the design,  
14 construction, and operations of each of our  
15 capital projects.

16 As the largest, most complex  
17 project in our portfolio, the Waste Treatment  
18 Plant has fully engaged the time and energy of  
19 the senior leadership of the department. It  
20 represents the cornerstone of the department's  
21 efforts to address the hazards posed by over  
22 53 million gallons of wastes remaining in

1 aging tanks at Hanford.

2 Many of these tanks have already  
3 served well beyond their original design  
4 lifetime.

5 The secretary and I are also  
6 committed to assuring that the department is  
7 providing the resources necessary to complete  
8 the Waste Treatment Plant successfully. I  
9 want to identify some specific examples where  
10 we have engaged.

11 We have taken several actions to  
12 provide the appropriate resources, including  
13 the following. Assigned two senior  
14 individuals in the department to lead  
15 construction project reviews of the Waste  
16 Treatment Plant; recruited an experienced  
17 project manager from the Office of Science,  
18 with a strong track record in successful  
19 delivering projects, to serve as the federal  
20 project director.

21 Directed that the departmental  
22 resources from across the complex, the

1 laboratories, production facilities, and site  
2 offices, be made available to assist with the  
3 Waste Treatment Plant and technical matters.

4 We have had a number of  
5 discussions with the chairman and key  
6 executives of Bechtel, to seek their full  
7 commitment to providing resources and focus  
8 needed to successful complete this project.

9 Bechtel responded by assigning to  
10 the Waste Treatment Plant a project director  
11 with an established successful record in  
12 nuclear, chemical, and DOE projects, and  
13 operating facilities.

14 After the most recent peer review  
15 of the Waste Treatment Plant, the department  
16 chartered a technical review of the project,  
17 to determine whether technical issues  
18 identified in the previous review of the  
19 process technology were adequately resolved;  
20 to review the technical design against  
21 contract requirements; and to identify  
22 potential improvements to the Waste Treatment

1 Plant, that could result in a net reduction in  
2 the Hanford tank waste mission life cycle  
3 costs or scheduled duration.

4 That review has just been  
5 completed and a copy of the report has been  
6 recently provided to the Board.

7 We have taken steps to bring a  
8 heightened level of focus, discipline, and  
9 support to the waste treatment federal project  
10 director, and to the tank farm federal project  
11 director, as we transition the Waste Treatment  
12 Plant project from its design/construct phase  
13 to the construct/commission phase.

14 This means completing design and  
15 focusing on construction, and transition to  
16 operations, including the system for emptying  
17 the tanks and delivering the waste to the  
18 Waste Treatment Plant.

19 The Waste Treatment Plant federal  
20 project director has the full support of the  
21 Assistant Secretary of Energy for  
22 Environmental Management and direct access to

1 me as the deputy secretary.

2 We're working together, closely,  
3 to identify not only project needs, but also  
4 site office needs, to prepare successfully to  
5 begin the Waste Treatment Plant operations by  
6 2019.

7 An enormous task lies before us.  
8 As illustrated by the issues to be considered  
9 at this public meeting, there are numbers of  
10 concerns that the department must address to  
11 ensure the public and the Board, that we are  
12 constructing, and will commission a facility  
13 that can be safely operated.

14 I am committed to addressing the  
15 concerns identified by the Board, and welcome  
16 the opportunity afforded by this public  
17 hearing to do so.

18 Indeed, without the kind of  
19 transparency this hearing provides, our  
20 activities cannot gain the full confidence of  
21 the public, or fully explain our efforts to  
22 those present today, and to the surrounding

1 community. This process itself, and the  
2 feedback these hearings provide, will  
3 strengthen the department's efforts to do the  
4 nation's work, while keeping all eyes on  
5 continued improvement, excellence, and safety.

6 It also supports our efforts to  
7 serve as good stewards of taxpayers'  
8 resources, and to fulfill our moral and legal  
9 obligations to remediate the environmental  
10 legacy of our past nuclear operations.

11 Only through our collective  
12 efforts will this project successfully and  
13 safely complete its mission to remove the  
14 threat of Hanford's radioactive tank wastes,  
15 and to protect the public and nearby Columbia  
16 River for these and succeeding generations.

17 I will now yield the floor to my  
18 colleague, the federal project director of the  
19 Waste Treatment Plant, Mr. Dale Knutson.

20 MR. KNUTSON: Thank you, Dr. Triay.  
21 Good morning, Chairman Winokur, members of the  
22 Board, members of the public. Thank you for

1       inviting me to provide remarks today. I would  
2       like to share my time with my colleague and  
3       the tank farms federal project director, Stacy  
4       Charboneau, who will provide brief remarks  
5       regarding the tank farms project and those  
6       aspects relevant to this week's hearing.

7               On June 1st, at the request of the  
8       secretary of Energy, I assumed the role of  
9       federal project director for the Waste  
10      Treatment and Immobilization Plant.

11              This plant is the cornerstone to  
12      Hanford's tank waste cleanup mission, and  
13      vital to removing the threat posed by  
14      Hanford's 53 million gallons of radioactive  
15      tank waste.

16              As the Federal Project Director, I  
17      am responsible, and accountable to the  
18      taxpayer, as well as the acquisition executive  
19      and program secretarial officer. It is my  
20      job, and duty, to execute the project and  
21      ensure it meets safety requirements,  
22      technical, cost, and scheduled performance

1 baselines, and that when complete, it will  
2 operate safely and efficiently to successfully  
3 perform its mission.

4 I've been the Waste Treatment  
5 Plant Federal Project Director for just over  
6 120 days. When I accepted this job, I made a  
7 commitment to the deputy secretary, that I  
8 would prepare an assessment of the project and  
9 deliver that assessment to him by September  
10 30th, 2010, which I have done.

11 As part of developing that  
12 assessment, and as the FPD [Federal Project  
13 Director], I immersed myself in this project,  
14 working to assure myself that we are  
15 developing a safe, effective, and efficient  
16 plant, that our work is technically adequate  
17 and that we are ready to pivot our focus  
18 towards commissioning.

19 Over the next two days, you will  
20 be reviewing the technical and programmatic  
21 detail that I've had the opportunity to assess  
22 over the past four months.

1                   Right now, I want to take a few  
2 minutes to give you the highlights of my  
3 assessment report, defining the "big picture"  
4 of where we are and where we are going on this  
5 project.

6                   First, we now have a strong  
7 structure in place to obtain the necessary  
8 team members of this project. That's  
9 important as we begin pivoting focus, and  
10 allows us to pull from a variety of resources,  
11 across the department, as well as industry.

12                  The Waste Treatment Plant project  
13 has a long history of internal and external  
14 reviews, and from those reviews, a substantial  
15 list of recommendations has emerged. I can  
16 say, with confidence, every recommendation  
17 made to date has been considered, most have  
18 been accepted, and all are being or have been  
19 appropriately dispositioned.

20                  As part of my review of external  
21 flowsheet review team recommendations, we  
22 included the assessment of residual risk.

1 Remaining uncertainties and risks have been  
2 identified, and actions are being taken to  
3 provide additional confidence in system  
4 performance and gain operational knowledge  
5 prior to commissioning. The commitment for  
6 large-scale testing for pulse-jet mixers is an  
7 example of DOE's approach to managing residual  
8 risk.

9 As part of the maturation of the  
10 project, the definitive design and safety  
11 design basis has evolved with the overarching  
12 philosophy and logic, that a heightened degree  
13 of conservatism is appropriate during  
14 conceptual phases, where details--before  
15 details are available.

16 As a natural progression of the  
17 project, the level of conservatism has been  
18 appropriately refined. As testing is  
19 completed, the design matured, issues  
20 resolved, and more information became  
21 available through, among other avenues,  
22 external reviews.

1           The last construction project  
2 review concluded that the Waste Treatment  
3 Plant--I'm quoting--the Waste Treatment Plant  
4 can be delivered at the total project cost, if  
5 an accelerated funding profile is adopted, no  
6 new major technical issues emerge, and the  
7 project is proactively managed. End quote.

8           That is the first time that such a  
9 conclusion has been made on this project from  
10 an external source. These external reviews  
11 provide us with valuable information,  
12 highlighting areas of strength and areas  
13 require, areas that require more attention,  
14 and we will continue conducting these reviews  
15 throughout the project. The next one is  
16 scheduled for November.

17           At the request of the Secretary  
18 and Assistant Secretary for Environmental  
19 Management, a tank waste subcommittee was  
20 informed under the Environmental Management  
21 Advisory Board. Their first task was to  
22 assess closure of the WTP [Waste Treatment

1 Plant] technical issues raised in 2005 by an  
2 external flowsheet review team.

3 The subcommittee recently  
4 completed their assessment and determined that  
5 those technical issues were closed, and  
6 remaining technical risk is sufficiently low  
7 to allow a shift in focus towards  
8 commissioning.

9 Safety remains a priority for the  
10 project at this construction site. Late in  
11 September, the Department's Office of Health,  
12 Safety and Security, notified ORP [Office of  
13 River Protection] and Bechtel, that it had  
14 certified the contractor in the department's  
15 Voluntary Project Program at the star level,  
16 the highest such level awarded.

17 In closing, I want to stress that  
18 the safety of our workers, and the public, and  
19 protect of the environment, will always be our  
20 first priority. We are structured to access  
21 and utilize the appropriate team members to  
22 safely bring this plant into operations. We

1 are working closely to ensure integration with  
2 the tank farms to support operations. We  
3 remain focused and committed to addressing and  
4 resolving all technical issues, and ensuring  
5 this plant is built to safely carry out its  
6 mission, removing the threat of Hanford's  
7 liquid tank waste.

8 I welcome this opportunity to  
9 update the Board, and the public, on the  
10 progress being made toward completing design  
11 activities on the Waste Treatment Plant and  
12 pivoting the project to a construction and  
13 commissioning focus.

14 I'd like to now turn the floor  
15 over to Stacy Charboneau.

16 CHAIRMAN WINOKUR: Thank you, Mr.  
17 Knutson.

18 MS. CHARBONEAU: I too welcome the  
19 opportunity to address the Board today, and  
20 provide assurances that the tank farm project  
21 is working hand in hand with the Waste  
22 Treatment Plant project, aligning our efforts

1 to commission and operate the Waste Treatment  
2 Plant in order to complete the Hanford tank  
3 waste cleanup.

4 A safe delivery of over 53 million  
5 gallons of waste, currently stored as sludge,  
6 salt cake, and liquids in 177 underground  
7 storage tanks, to the Waste Treatment Plant,  
8 will require extensive infrastructure,  
9 including modifications to existing  
10 facilities, and construction of new  
11 facilities, to complete the tank waste  
12 treatment mission.

13 The requirements for additional  
14 facility modifications, or new facilities at  
15 tank farms, necessary to achieve waste feed  
16 delivery requirements, will be determined  
17 after the convergence of two major efforts  
18 currently underway.

19 The first is the tank farms  
20 pumping and mixing studies, and the second is  
21 the Waste Treatment Plant waste acceptance  
22 criteria, data quality objectives process.

1 The ability to adequately mix and sample waste  
2 to meet the WTP acceptance requirements is  
3 being evaluated, and will need to be  
4 demonstrated. As detailed in the tank farm's  
5 project technology developing road map, while  
6 this testing is currently underway, the extent  
7 of testing will be determined based on waste  
8 acceptance criteria requirements, as refined  
9 through the data quality objective process and  
10 closure of the WTP technical issues.

11 It is an integrated process, and  
12 both WTP and tank farms personnel are  
13 participating.

14 The tank farms project has worked  
15 closely with the Waste Treatment Plant project  
16 to address and close technical issues  
17 regarding wastefeed to the WTP.

18 Currently, no added acceptance  
19 criteria on wastefeed delivery are expected  
20 due to mixing concerns. Further, waste  
21 particle size and density criteria are  
22 satisfied by adhering to the existing

1 interface control document, ICD-19 [Interface  
2 Control Document 19], waste acceptance  
3 criteria on maximum critical velocity.

4 The sampling of each feed batch  
5 will ensure that the feed delivered to WTP  
6 meets the acceptance criteria and remains  
7 below the material at-risk assumptions in the  
8 safety basis.

9 Any changes to the WTP criticality  
10 safety evaluation report that impact feed  
11 delivery will be coordinated with the tank  
12 farms project to ensure the changes are  
13 attainable.

14 DOE and its contractors have  
15 systems in place to ensure control of safety-  
16 related design activities required to  
17 implement solutions, and facilitate  
18 development of appropriate safety-related  
19 structures, systems, and components.

20 And to mirror Mr. Knutson's  
21 statement, as the tank farms federal project  
22 director, it is my job and duty to execute the

1 project and ensure it meets safety  
2 requirements, technical, cost and scheduled  
3 performance baselines, and that when complete,  
4 these structures, systems and components will  
5 operate safely and efficiently to successful  
6 complete the mission.

7 I'm energized to move the River  
8 Protection Project to forward to the next  
9 phase. As we plan for commissioning these  
10 complex nuclear facilities, I look forward to  
11 our discussions during the waste feed  
12 preparation panel later today.

13 CHAIRMAN WINOKUR: Thank you, Ms.  
14 Charboneau. I'd like to thank the three of  
15 you. This session will continue now with  
16 testimony offered by members of the Board's  
17 staff. I ask each staff member who offers  
18 testimony to begin by stating his name and  
19 position for the record.

20 MR. KASDORF: Good morning, Mr.  
21 Chairman, and members of the Board. For the  
22 record, my name is Roy Kasdorf. With me are

1 Mr. Steven Stokes and Dr. Adam Poloski, the  
2 staff leads for WTP and mixing. I am the  
3 Board's lead for the nuclear facilities Design  
4 and Infrastructure Group.

5 I am responsible for ensuring that  
6 reviews of the Board's staff of design and  
7 construction projects are completed consistent  
8 with the Board's mission.

9 Over the past eight years, the  
10 Board's staff has been reviewing the Waste  
11 Treatment and Immobilization Plant pre-  
12 treatment facility, design and safety basis  
13 development. The staff recognizes that  
14 operation of the WTP is vital to the  
15 remediation of the Hanford site. The WTP is  
16 the primary means for reducing the risk  
17 resulting from the storage of high-level waste  
18 in Hanford's tanks.

19 As such, the Board staff  
20 recognizes that WTP must operate efficiently  
21 and safely over the entire duration of its  
22 multidecade mission. The staff's concerns

1 fundamentally relate to safety issues, but  
2 many of the safety issues would also result in  
3 significant operational problems, such as  
4 buildup of material in vessels, plugging or  
5 bursting of pipes. Such operational problems  
6 would delay processing of the Hanford tank  
7 waste.

8 The Board believes that such delay  
9 is a safety concern. This testimony will  
10 address the safety-related concerns of the  
11 staff associated with pulse jet mixing issues  
12 at the WTP. But first, I would like to  
13 discuss why the Department of Energy elected  
14 to use pulse jet mixers, PJMs [Pulse Jet  
15 Mixers], as their primary means of mixing in  
16 the WTP, and briefly describe how PJMs work.

17 The design philosophy for the pre-  
18 treatment facility involves the use of black  
19 cells. A black cell is a room in the pre-  
20 treatment facility that will not be accessible  
21 during the designed 40-year operating life of  
22 the facility. Black cells contain the vessels

1 and piping that will be used to prepare the  
2 waste for processing and subsequent  
3 vitrification.

4           Since black cells are  
5 inaccessible, all components located in the  
6 black cells must be maintenance-free. That's  
7 the reason for the selection of PJMs. They  
8 have no moving parts and are maintenance-free.

9           To operate, PJMs use air to draw  
10 waste up into a pulse tube, charging the pulse  
11 tube, and then high-pressure air to expel the  
12 waste into the vessel, discharging the pulse  
13 tube.

14           The repeated charging and  
15 discharging of the pulse tubes provides the  
16 mixing energy for each vessel. Proper mixing  
17 is necessary to avoid hazards from solids  
18 accumulating in the WTP waste tanks.

19           From a safety perspective, PJMs  
20 perform properly when the solids are  
21 successfully lifted from the bottom of the  
22 vessel and suspended in the waste, or at a

1 minimum, when solids move freely on the bottom  
2 of the vessel. Solid suspension is the  
3 industry standard. However, the project  
4 recently changed their criteria to use bottom  
5 clearing, where solids are shown to move  
6 freely on the bottom of the vessels but are  
7 not fully suspended.

8 In the opinion of Pacific  
9 Northwest Laboratory researchers, this change  
10 represents a significant reduction in mixing  
11 criteria. Fast-settling particles provide the  
12 greatest challenge for the PJMs. The fast-  
13 settling solids, which are generally the  
14 large, heavy particles, must be lifted off the  
15 bottom long enough to allow them to be pumped  
16 out of the vessel when the waste is being  
17 transferred.

18 The staff believes that this is  
19 the first use of PJM mixing technology  
20 involving radioactive slurries with a high  
21 concentration of solids with heavy radioactive  
22 particles. So it is not surprising that

1 Bechtel National, Incorporated, BNI [Bechtel  
2 National Incorporated], has experienced  
3 considerable difficulty developing PJM designs  
4 that meet their design objectives and  
5 requirements. BNI needed to change the PJM  
6 design, as recently as this year, to increase  
7 the mixing energy for problem vessels.

8           Mixing energy can be added--can be  
9 increased by adding more pulse tubes,  
10 increasing the size of the pulse tubes, or by  
11 increasing nozzle velocity of which the liquid  
12 is discharged from the pulse tube.

13           But there are limitations to the  
14 nozzle velocities and the size and number of  
15 pulse tubes that a given vessel can  
16 accommodate.

17           One other solution is to limit the  
18 amount of solids and particle sizes allowed  
19 into the vessel by tightening up on the waste  
20 acceptance criteria, the WAC [Waste Acceptance  
21 Criteria].

22           This could solve the WTP problems

1 but may have negative implications for the  
2 length of time that the plant may be required  
3 to operate, as well as put more burdens on the  
4 tank farm contractor.

5 As I stated, if the solids are not  
6 mixed properly, safety issues can result from  
7 the accumulation of solids in the pre-  
8 treatment vessels. There are three main  
9 safety issues. Inadvertent criticality due to  
10 accumulation of fissile solids, trapping  
11 excessive amounts of flammable gases in the  
12 solids later, and PJM overblows, which occur  
13 when the air pressurizing the pulse tubes is  
14 left on too long and compressed air blows out  
15 forcefully into the tank waste contents.

16 Overblows are potentially damaging  
17 to the process vessel, and BNI has limited  
18 them to one thousand occurrences during the  
19 operating life of the plant.

20 Without adequate mixing, safe  
21 operation of the pre-treatment facility cannot  
22 be assured and the mission of the facility

1 would be impacted.

2           As I mentioned earlier, the design  
3 of the PJM system has been very challenging  
4 for BNI. The challenges are due to  
5 uncertainties associated with waste  
6 characterization, the high concentration of  
7 solids in the slurries being mixed, and the  
8 ability to predict proper scaling factors to  
9 correlate PJM testing to actual in-plant  
10 performance.

11           As such, the Board staff is not  
12 confident that the ability--that the  
13 capability to adequately mix solids in the WTP  
14 has been demonstrated. I'll now discuss,  
15 briefly, some of these uncertainties.

16           Effective PJM mixing requires that  
17 characteristics of the waste supplied to the  
18 pre-treatment facility be well-known. The  
19 viscosity of the waste slurry, the particle  
20 size, and the density distribution of the  
21 solids are important parameters, if one wishes  
22 to understand mixing capability.

1                   However, the waste  
2                   characterization data used to establish the  
3                   WTP design basis uses slurry properties from  
4                   a 2002 report, that relied on limited data  
5                   from only a few of the 177 waste tanks.

6                   The limitations of these data have  
7                   been recognized since that report was  
8                   prepared. The report noted the need for  
9                   additional characterization data and stated  
10                  these slurry calculations must be regarded as  
11                  "rough guides" because of the apparently wide  
12                  variation of the data, and the relatively  
13                  small number of tanks for which measurements  
14                  have been made.

15                  PNNL [Pacific Northwest National  
16                  Laboratory] established characterization data  
17                  that considered 28 of the 177 tanks, in an  
18                  effort to establish a revised particle size  
19                  for use in testing and design. However, this  
20                  PNNL report does not, in the staff's opinion,  
21                  properly bound the particle size and density  
22                  distribution from tank farm place due to a

1 variety of problems. For example, the  
2 instrumentation used to measure particle size  
3 had no limitations that affected its accuracy,  
4 and the method used to estimate particle  
5 density at a particular size is based on  
6 assumptions on chemical composition, rather  
7 than measured densities.

8           Uncertainties in particle size,  
9 and densities, density, present significant  
10 challenges for defining simulants to use in  
11 the testing program, that ultimately define  
12 the design inputs and requirements for mixing  
13 in the pre-treatment facility.

14           Using limited tank data can be  
15 problematic. In 2009, PNNL compiled viscosity  
16 data for 28 waste tanks and found that the  
17 earlier 2002 correlations, which was developed  
18 from only three waste tanks, significantly  
19 underpredicted the viscosity as compared to  
20 the measured PNNL values.

21           Establishing the real logical  
22 properties of the waste presents significant

1 challenges to the adequate mixing of the waste  
2 in the process vessels. The second area of  
3 uncertainty is associated with using PJMs to  
4 mix solutions with high concentrations of  
5 solids. As early as June of 2000, prior to  
6 the establishment of WTP's design basis slurry  
7 properties, British Nuclear Fuels, Limited,  
8 the original design agent, completed the  
9 conceptual design of the PJM for WTP.

10 In August 2001, BNFL [British  
11 Nuclear Fuels Limited] established the  
12 technical basis for the adequacy of the PJM  
13 concept for the WTP application. This report  
14 concluded that testing was required to develop  
15 the PJM technology for the vessels that  
16 contained a high degree of solids.

17 BNI has attempted to further  
18 develop the PJM technology from 2002 until  
19 today. Some important milestones from this  
20 period are: In March 2006, the External  
21 Flowsheet Review Team released a report that  
22 identified mixing issues with PJMs.

1                   In their report, the EFRT  
2           [External Flowsheet Review Team] warned that  
3           an accumulation of large particulates in the  
4           bottom of tanks may further reduce the  
5           efficiency of PJMs. Accumulation may also  
6           cause plugging of the measurement bubblers,  
7           removal of those particles will require  
8           specific tank cleanup operations that are not  
9           planned in the design. The project ultimately  
10          referred to this as Major Issue 3, M-3.

11                   In May 2009, PNNL issued a report  
12          on resuspension testing of low solids, low  
13          solids vessels, which concluded that twelve of  
14          the 22 low-solids vessels were prepared to  
15          have inadequate mixing performance.

16                   In May 2009, BNI began additional  
17          testing but used a different experimental  
18          approach which relied on a combination of  
19          full-scale testing at the Washington State  
20          University, and small-scale testing at Mid  
21          Columbia Engineering. The full-scale portion  
22          of the testing attempted to measure the area

1 of sediment cleared around a PJM, while the  
2 small-scale testing used a prototype,  
3 prototypic small-scale vessel.

4 By the end of 2009, testing  
5 results from the new small-scale testing  
6 showed the velocity needed to achieve off-  
7 bottom suspension was significantly greater  
8 than the velocity that had been predicted by  
9 PNNL. This was an important finding, since it  
10 showed that even more mixing energy would be  
11 necessary to complete off-bottom suspension.

12 In December of 2009, the  
13 Consortium for Risk Evaluation with  
14 Stakeholder Participation, the CRESP  
15 [Consortium for Risk Evaluation with  
16 Stakeholder Participation] team, which is a  
17 consortium of experts from academia, that  
18 provides DOE an independent assessment of  
19 mixing, reviewed BNI's testing program and had  
20 seven recommendations.

21 One of the CRESP recommendations  
22 stated that the design basis for each vessel

1 should be established on clearly defined  
2 mixing requirements with the scaling basis for  
3 each requirement founded on physical  
4 mechanisms.

5 From January to June of 2010, BNI  
6 attempted to implement the 2009 CRESP  
7 recommendations in their small-scale testing  
8 program. The testing had already shown that  
9 some of the vessels would have problems  
10 mixing.

11 This led BNI to revise the  
12 requirements for mixing of these vessels to  
13 specify a lower solids concentration--this  
14 will lead to tightening of the waste  
15 acceptance criteria--and to use less  
16 conservative scaling factor for correlating  
17 PJM nozzle velocity from the full-scale  
18 vessels.

19 Further, BNI revised the approach  
20 for testing the problem vessels to one of  
21 simply demonstrating that solids could be  
22 transported out of the vessels, so that solids

1 would not accumulate, and that sediment on the  
2 bottom of the vessels could be mobilized to  
3 release flammable gas.

4 This revised approach and design  
5 criteria deviates from the standard industrial  
6 design approach for mixing off-bottom  
7 suspension or cloud height. As a result, the  
8 WTP mixing system will not be as robust.

9 Lastly, the scaling factors used  
10 by BNI to demonstrate that the full-scale  
11 vessels would mix properly, have been  
12 questioned by the Board, and others. BNI used  
13 the scaling factors to establish the small-  
14 scale testing parameters that correlate to  
15 actual design parameters.

16 A typical approach would be to  
17 predict full-scale performance from small-  
18 scale testing by conducting identical  
19 experiments with several test platforms of  
20 different scale, and then extrapolating to  
21 predict how the full-scale system will behave  
22 using scaling factors.

1                   BNI's approach relies on a single,  
2                   small-scale testing platform, and an assumed  
3                   scaling factor that includes an exponent of  
4                   0.18, that is based on a single journal  
5                   article that is not directly pertinent to the  
6                   WTP/PJMs.

7                   This scaling factor assumed by BNI  
8                   has been questioned by several of DOE's  
9                   independent experts. In their response to the  
10                  Board's Question 18, PNNL researchers write,  
11                  and I quote, "The smaller scale of factor  
12                  exponent allowed the scaled PJMs to be  
13                  operated at a higher velocity in the test  
14                  stand, thus improving the observed clearing  
15                  behavior. We think the use of 0.18 scaling  
16                  exponent, which derived from a sheer wall  
17                  measurement of steady air jets impinging on  
18                  the flat plate, to unsteady mobilization of  
19                  solids in the test stands, is not supported by  
20                  existing data." End quote.

21                  There are more recent compelling  
22                  scaling factor exponents in the literature but

1 BNI chose to use a nonconservative  
2 experimental basis.

3 In July 2010, CRESP issued its  
4 letter report number seven, following their  
5 review of the recent BNI small-scale testing.

6 This letter contained 13  
7 recommendations, and concluded, and I quote:

8 "There are several important PJM  
9 vessel design uncertainties and definition of  
10 operating requirements that remain to be  
11 resolved, including revision of the  
12 criticality controls, validation of scale-up  
13 relations for PJM zone of influence,  
14 integrated validation of vessel performance,  
15 recovery from a design basis event, and viable  
16 sampling strategies, that result in PJM  
17 performance and programmatic risk.

18 "The greatest risk is that the  
19 actual zone of influence during WTP operations  
20 is smaller than predicted by the current  
21 design basis, and therefore, solids  
22 accumulation may require more frequent clean-

1 out than predicted.

2 "Experimental programs that  
3 validate scaling relationships for the zone of  
4 influence, and the integrated vessel  
5 performance at full scale, or near scale, are  
6 needed. While none of these uncertainties  
7 fundamentally indicate that WPT will not  
8 function, provided there is enough flexibility  
9 in PJM operation, resolution of these issues  
10 may result in pre-treatment process operating  
11 at lower waste throughput than currently  
12 projected." End quote.

13 The Board's staff agrees with the  
14 CRESO conclusions and strongly supports the  
15 need for large-scale testing to reduce the  
16 uncertainty in the existing PJM design.

17 However, based on testing  
18 performed to date, full-scale testing may  
19 simply demonstrate that the PJMs are only  
20 capable of mixing lower concentrations of  
21 solids than originally planned. This could  
22 impact throughput, extending waste, tank waste

1 treatment, or requiring supplemental tank  
2 farms treatment capability.

3 As we've heard, DOE is pivoting  
4 the WTP project from design and construction  
5 into construction and commissioning. To  
6 address potential weaknesses in the PJM  
7 design, DOE recently committed to conduct  
8 large-scale testing within the next several  
9 years.

10 BNI has also proposed adding heel  
11 dilution and heel removal capability to the  
12 pre-treatment vessels, to mitigate any  
13 potential accumulation of solids. From the  
14 perspective of the Board staff, BNI is moving  
15 construction forward, with significant  
16 technical risk and uncertainty.

17 While DOE is committed to perform  
18 large-scale testing, before the testing is  
19 completed all vessel designs will have been  
20 determined to have been confirmation-ready,  
21 and the vessels will have been installed.

22 Without further comprehensive

1 waste characterization, the uncertainties  
2 associated with the range of particle sizes,  
3 densities, and fluid viscosities remain.  
4 Large-scale testing may only demonstrate that  
5 the vessels will not mix solids sufficiently  
6 to prevent accumulation and indicate  
7 limitations on solids loading, that may impact  
8 the project's schedule.

9           The functional design requirements  
10 for heel dilution and heel removal capability  
11 have not been established. Criticality safety  
12 issues remain to be resolved. The vessel  
13 sampling design remains incomplete, and the  
14 ability to meet design requirements also  
15 remain in question.

16           The Board staff believes that DOE  
17 should establish a credible strategy for  
18 dealing with this uncertainty. This strategy  
19 might include accelerate characterization of  
20 waste from the suspected worst-case tanks and  
21 waste types; accelerated--accelerate  
22 completion of the large-scale testing in an

1 effort to define the operational envelope for  
2 the PJM vessels; design the waste retrieval  
3 facility with mixing and sampling capability  
4 engineered to protect the operational envelope  
5 established by the large-scale testing; and  
6 design a small pilot plan capability to verify  
7 the acceptance of feed batches to the WTP.

8 This ends my prepared remarks and  
9 we'd be happy to try to answer any Board  
10 questions.

11 CHAIRMAN WINOKUR: Thank you, Mr.  
12 Kasdorf. Do Board members have any questions  
13 at this time of the staff?

14 I can assure you, in the last few  
15 months, the Board members have had a lot of  
16 questions for the staff.

17 Hearing none, I'd now like to  
18 invite the first panel of witnesses from the  
19 Department of Energy and its contractor  
20 organizations to take their seats. I'm going  
21 to take the--an opportunity to introduce them  
22 as they come up.

1                   Dr. Ines Triay. Dr. Triay is the  
2                   assistant secretary of Energy for Environment  
3                   Management.

4                   Mr. Dale Knutson. Mr. Knutson is  
5                   the federal project director for the Waste  
6                   Treatment Plant.

7                   Dr. David Dickey. Dr. Dickey is  
8                   an expert consultant on mixing, who provided  
9                   services to the Waste Treatment Plant and tank  
10                  farm contractor. He was the author of  
11                  Bechtel's external flowsheet review team  
12                  concern on tank mixing.

13                  Dr. Loni Peurrung. Dr. Peurrung  
14                  was the product line manager for environmental  
15                  products at Pacific Northwest National  
16                  Laboratory. Dr. Peurrung was responsible for  
17                  the laboratory's test program to evaluate tank  
18                  mixing.

19                  Dr. David Kosson is the chairman  
20                  of the DOE-sponsored consortium for risk  
21                  evaluation with stakeholder participation.  
22                  This consortium, drawn from academia, provide

1 the DOE with independent assessments on tank  
2 mixing.

3 Mr. Frank Russo is the Bechtel  
4 project director for the Waste Treatment  
5 Plant.

6 Mr. Greg Ashley is the Bechtel  
7 manager of engineering for the Waste Treatment  
8 Plant.

9 Mr. Leo Sain is the URS executive  
10 vice president for performance assurance and  
11 operations.

12 And Ms. Donna Busche is the URS  
13 nuclear safety manager for the Waste Treatment  
14 Plant.

15 Welcome. Does any member of the  
16 panel wish to submit written testimony at this  
17 time.

18 (No response.)

19 CHAIRMAN WINOKUR: The hearing  
20 record will be kept open for a fairly long  
21 period of time, so if you wish to do that at  
22 a later time, that will be okay.

1           Let me say, to start with, that we  
2           have a lot of material to cover. The Board  
3           has chosen its panelists very carefully and  
4           request that panelists alone answer questions  
5           that are directed to them to the best of their  
6           ability.

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

11          And so with that, I'm going to  
12          start with the first question. It'll actually  
13          be going to Dr. Peurrung. It won't be the  
14          last question I have for you today; but the  
15          first. And I think we all know that one of  
16          the measures that the Department of Energy  
17          uses to sense whether a technology is able to  
18          accomplish its intended mission, or its  
19          intended function, is called the technology  
20          readiness level.

21          And another way I think of that  
22          is, what is the maturity of the technology?

1 In a recent report to the project of this  
2 year, PNL researchers wrote the following. It  
3 was actually included in an e-mail from Terry  
4 Walton, who was the PNNL director of energy  
5 and environmental programs, to use Mr. Russo.

6 He wrote, "There has been a  
7 fundamental misperception about the maturity  
8 of PJM technology. This is new technology  
9 which is unproven for applications involving  
10 significant amounts of solids.

11 So my first question to you, Dr.  
12 Peurrung, is: Can you elaborate on that a  
13 little bit.

14 DR. PEURRUNG: Well, the document  
15 that you're referring to, Dr. Winokur, was a  
16 list of vulnerabilities, and essentially  
17 residual risks that we prepared at the request  
18 of Bechtel National. What risk we saw  
19 remaining, once the major issue, 3-M-3 issue  
20 had been closed, and it is true that there is  
21 relatively little experience out in the  
22 industrial sector with mixers of this type,

1 particularly at these sorts of solids loading.  
2 That was not the only vulnerability that was  
3 in that document, and it has been made  
4 available for the public.

5 CHAIRMAN WINOKUR: So I mean you  
6 certainly agree with the statement made there,  
7 is PNNL's perception that this is not a mature  
8 technology--

9 DR. PEURRUNG: No--

10 CHAIRMAN WINOKUR: --for this  
11 intended application?

12 DR. PEURRUNG: Given the  
13 relatively small amount of experience in the  
14 industrial community with PJMs.

15 CHAIRMAN WINOKUR: Okay. And I  
16 should ask you that question, Mr. Russo. What  
17 is your sense of the maturity of this  
18 technology at this time?

19 MR. RUSSO: It is a new  
20 technology. However, it's a proven technology  
21 in different applications. The technology has  
22 been in use at Sellafield, for, I believe over

1 20 years, and we visit Sellafield to gain  
2 operational knowledge from them in terms of  
3 the use of PJMs.

4 I would like to not that the e-  
5 mail that Terry Walton sent to me was at my  
6 request, and part of our overall  
7 vulnerabilities assessment that drives our  
8 residual risk analysis, that we presented to  
9 the Department of Energy as part of the  
10 closure documentation for M-3.

11 CHAIRMAN WINOKUR: All right.  
12 Thank you for that. And I guess you raise the  
13 issue of the use of PJMs at the Sellafield  
14 vitrification facility, and it's my  
15 understanding, and you just said so, that a  
16 team, I guess a team of DOE folks, and  
17 contractors, went out recently to visit  
18 Sellafield and to get some sense of, you know,  
19 the use of this technology for your intended  
20 application. Would that be true?

21 MR. RUSSO: That is true.

22 CHAIRMAN WINOKUR: And I think the

1       only panelist we have here, who was actually  
2       on that trip, was Ms. Busche; correct?

3                   MS. BUSCHE: True.

4                   CHAIRMAN WINOKUR: And can you  
5       provide any insights into what you learned, in  
6       terms of the experience of the Sellafield  
7       facility in the use of pulse jet mixers, but  
8       more specifically, the intended operation  
9       here, at Hanford, which includes the need to  
10      mix significant amounts of solids.

11                  MS. BUSCHE: Right. There were  
12      some--during our trip, there were some notable  
13      differences, right off the bat. In  
14      discussions with Sellafield, pulse jet mixers  
15      for their range of feed that's presented to  
16      their commercial production, is a very, very  
17      consistent band, and their solids range is  
18      significantly lower, that they would expect to  
19      see with their pulse jet mixers.

20                  Their pulse jet mixers were also  
21      coupled with a sparger design similar to ours,  
22      but they used the pulse jet mixers and the

1 design of their spargers to complete the full  
2 mixing of their tanks, and their vessels were  
3 significantly smaller in size.

4 So my main focus, on my journey,  
5 was to understand how to control the pulse jet  
6 mixers for many of the items that were  
7 identified in the opening testimony.

8 So there were some significant  
9 differences. I did learn a lot on how--as we  
10 move forward, to develop the control logic for  
11 those pulse jet mixers.

12 CHAIRMAN WINOKUR: What were the  
13 range of solids that they were mixing at the  
14 Sellafield facility?

15 MS. BUSCHE: I believe it was  
16 around 5 percent.

17 CHAIRMAN WINOKUR: Right. And did  
18 you ask them for any insight into your  
19 application here, at Hanford, where the  
20 percentage weight salt--weight percentage of  
21 salt would be considerably higher?

22 MS. BUSCHE: Not specifically on

1 the weight percent solids. No. I did not.

2 CHAIRMAN WINOKUR: Anything else  
3 that they shared with you, that gave you  
4 insight into the challenges you would face  
5 here at the Hanford Waste Treatment Plant?

6 MS. BUSCHE: I did inquire, some  
7 questions with respect to black cell  
8 technology because it is new to me. I've  
9 grown up in the DOE business with canyons and  
10 cover block. So I did ask, have PJMs failed?  
11 Again, they indicated for their range of  
12 feedstock, it predominantly was not an issue.  
13 But they have had instances where they've had  
14 to enter a black cell to repair what they  
15 coined to me as a failed vessel, and it was--  
16 you know it's--there will be, if we ever have,  
17 I think, some good lessons learned from what  
18 they had to do to go in and repair that  
19 vessel, and it was basically on the cycling of  
20 the pulse jet mixers when they got a feed spec  
21 that was off their normal input to their  
22 production line.

1                   CHAIRMAN WINOKUR: Did you  
2 specifically share with them the kinds of  
3 operations you were expecting to perform here,  
4 at Hanford, and ask for their advice?

5                   MS. BUSCHE: Not specifically, no,  
6 is the short answer to that. I did inquire  
7 some questions about the overall evolution of  
8 the high-level waste facility, not just pulse  
9 jet mixers but how did their whole flow work  
10 with solids, and there were some discussions  
11 of lines, critical velocities going downline.  
12 So they were more for my general edification,  
13 is was I comparing apples and apples, or was  
14 their design dissimilar to what I would expect  
15 it, at the pre-treatment facility?

16                  CHAIRMAN WINOKUR: Did you learn  
17 anything meaningful there, that would help you  
18 in terms of what you're doing at Hanford here?

19                  MS. BUSCHE: The most striking, my  
20 take-away, or lessons learned, was a  
21 discussion related to plugging of the lines.  
22 Did they have any problems? The feedback I

1       gained from the engineers were that their  
2       lines are gravity. They don't rely--you know,  
3       gravity works to move the solids.

4               I did indicate that we had long  
5       lines of, you know, long lengths of pipe, that  
6       we might need to move our solids from vessel  
7       to vessel in our process. And his reaction  
8       was that that would give us difficulty and  
9       maybe a wrong design.

10              But I'm not the design expert on  
11       this panel. It was more for my understanding  
12       of how am I going to write the control  
13       strategy from when the solids do enter our  
14       feed vessels to the day I exit.

15              CHAIRMAN WINOKUR: Right.

16              MS. BUSCHE: So I wasn't asking  
17       design questions, just trying to understand.

18              CHAIRMAN WINOKUR: Let me ask you,  
19       Mr. Sain. You're a URS executive, and URS is  
20       clearly part of the consortium that owns and  
21       operates Sellafield. So have you been using  
22       the experience that URS has gained over at

1 Sellafield to inform the Waste Treatment  
2 Plant?

3 MR. SAIN: Yes, we have. In fact,  
4 we actually brought Todd Wright, deputy  
5 director, for a visit to WTP, and we intend to  
6 continue that relationship.

7 CHAIRMAN WINOKUR: All right.  
8 Thank you. I'll turn now to Ms. Roberson.

9 VICE CHAIR ROBERSON: Good  
10 morning. I'd like to thank you all for being  
11 here. I'd like to actually start out,  
12 questioning the representatives from PNNL, Dr.  
13 Dickey and Dr. Kosson. I'll ask Dr. Kosson,  
14 first, if you can briefly describe the nature,  
15 extent, and timing of your organization's  
16 involvement in forming the project on the WTP.

17 DR. KOSSON: Certainly, Dr.  
18 Roberson. In 2006, CRESP was requested by the  
19 then DOE site manager, who was Roy Schepens,  
20 and also from headquarters, the then deputy  
21 assistant secretary, Mark Gilbertson, to form  
22 a technical review team as an external--

1 external independent technical review team for  
2 certain issues that were identified by the  
3 EFRT program. Amongst the ones that we were  
4 asked to look at was the M-3, or PJM mixing  
5 issue.

6 And as a result of that, CRESP  
7 sought out technical expertise to form a panel  
8 that then followed the evolution of DOE's  
9 responses to the PJM mixing, through to  
10 Decem--I'm sorry--till June of 2010.

11 VICE CHAIR ROBERSON: Thank you,  
12 sir. Dr. Dickey, could you share with us the  
13 response to the same question.

14 DR. DICKEY: Could you repeat the  
15 question.

16 VICE CHAIR ROBERSON: Can you  
17 briefly describe the nature, extent, and  
18 timing of your involvement in advising the  
19 project.

20 DR. DICKEY: I became involved in  
21 the project with the FRT in 2005-2006, as a  
22 member of the FRT, and as a result of that,

1 after having reviewed the general  
2 characteristics of the PJM mixing applied to  
3 these tanks, concluded that there were several  
4 potential problems in terms of the design or  
5 the extent of the mixing capability, and  
6 almost any plant processing a variety of  
7 materials will experience some possible  
8 accumulation of solids, and certainly that was  
9 an issue with the--a possibility.

10 Since then, I have been involved  
11 in periodic reviews of the work done by PNNL,  
12 the work done at MCE [Mid-Columbia  
13 Engineering], and most recently, since about  
14 June of 09, worked fairly extensively with BNI  
15 to help establish and understand the mixing  
16 characteristics of the vessels.

17 VICE CHAIR ROBERSON: Dr. Dickey,  
18 can you please inform the public of your area  
19 of expertise and how you came about that  
20 expertise.

21 DR. DICKEY: Yes. My area of  
22 expertise is truly industrial mixing. I have,

1 in my career, worked for four, five different  
2 companies, or combinations of companies, that  
3 have worked with both liquid and dry powder  
4 mixing equipment, slurries and things of that  
5 sort, and have done extensive work in small-  
6 scale testing and scale-up to industrial scale  
7 equipment.

8 VICE CHAIR ROBERSON: Thank you,  
9 sir.

10 Dr. Peurrung, can you characterize  
11 the nature, extent, and timing of the  
12 involvement of PNNL with the project.

13 DR. PEURRUNG: Well, Pacific  
14 Northwest National Laboratory has been  
15 supporting the Waste Treatment Plant project  
16 for more than 10 years now, back to 1999,  
17 which included support to its predecessor,  
18 BNFL Limited.

19 We've been providing a variety of  
20 science and technology support, including  
21 experimental testing performed at our  
22 facilities, and other sorts of modeling and

1 consulting services, not only to resolve this  
2 particular issue on adequacy of mixing, but  
3 also several other issues. M-1, the pipeline  
4 plugging issue. M-12 on the adequacy of  
5 scale-up for some of the chemical pre-  
6 treatment approaches, as well as other issues  
7 that the WTP project has brought to us for  
8 consultation.

9 VICE CHAIR ROBERSON: And Dr.  
10 Peurrung, I know you're representing your  
11 organization. How many scientists stand  
12 behind you?

13 DR. PEURRUNG: Hundreds, literally  
14 hundreds of Pacific Northwest National  
15 Laboratory staff have worked on this project  
16 over the years.

17 VICE CHAIR ROBERSON: Okay. Thank  
18 you.

19 Dr. Kosson, have you been able to  
20 maintain an understanding or awareness of the  
21 progress on the project relative to the areas  
22 you've advised?

1 DR. KOSSON: Over the period of  
2 time that we were engaged with the review of  
3 the project, we had periodic meetings with DOE  
4 and their contractor staff. We reviewed  
5 thousands of pages of technical material that  
6 they provided to us, both from the contractors  
7 and from DOE, as well as outside technical  
8 material from the peer review technical  
9 literature.

10 VICE CHAIR ROBERSON: Okay. Can  
11 you specifically tell us, based on that  
12 awareness, what concerns raised by your  
13 organization remain unresolved.

14 DR. KOSSON: I think that your  
15 staff member quoted our CRESP report  
16 accurately, earlier, about the nature of them.  
17 That the final conclusion that we had, that he  
18 quoted, and obviously we stand behind, that  
19 there are several important PJM vessel design  
20 uncertainties and definitions of operating  
21 requirements that remain to be resolved,  
22 including revision of the criticality

1 controls, validation of scale-up relationships  
2 for PJM zone of influence, integrated  
3 validation of vessel performance, recovery  
4 from a design basis event, and viable sampling  
5 strategies that result in PJM performance and  
6 programmatic risks.

7 The greatest risk is that the  
8 actual zone of influence during WTP operations  
9 is smaller than predicted by the current  
10 design basis, and therefore the solids  
11 accumulation may require more frequent clean-  
12 out than predicted.

13 I think that's a very succinct  
14 summary, and we still have that.

15 VICE CHAIR ROBERSON: Okay. Thank  
16 you.

17 Dr. Dickey, I assume you have also  
18 remained aware of the progress of the project  
19 on concerns raised by yourself in the flow  
20 review team.

21 DR. DICKEY: Yes. I have been  
22 very active in that part of it, and have

1 certainly approached it from a little  
2 different perspective of very much a  
3 combination of academic and industrial  
4 performance, on both the mixing  
5 characteristics and the scale-up, and I would  
6 be the first to admit, I think, that I have  
7 learned a great deal from the beginning of  
8 this project, and would very definitely state  
9 that there are significant differences in the  
10 way the PJMs operate versus other types of  
11 mixing equipment, and even other types of  
12 objectives for the mixing equipment.

13 VICE CHAIR ROBERSON: Okay.

14 Are there concerns, that you have  
15 been a part of raising, that remain unresolved  
16 today?

17 DR. DICKEY: My concerns I think  
18 fall outside of the basic operation of the  
19 mixing equipment. They're certainly the kind  
20 of thing that, as has been brought up, of  
21 being able to ensure that the feed to the WTP  
22 falls within the required specifications, and

1 that the operation of the plant will be such,  
2 that the vessels involving PJMs do not  
3 experience higher levels of solids  
4 concentration than the designs have been  
5 tested and evaluated for.

6 VICE CHAIR ROBERSON: So let me  
7 make sure I understand. Under the assumption  
8 that the tank farms can meet the  
9 specifications, the WAC specifications, and  
10 that the design operates as specified, you  
11 don't have any open concerns about mixing?

12 DR. DICKEY: Not about the mixing  
13 part of it.

14 VICE CHAIR ROBERSON: Okay. Dr.  
15 Peurrung, the same question to you. And we  
16 have time. You can be specific, please.

17 DR. PEURRUNG: Okay. All right.  
18 Well, you know, Pacific Northwest National  
19 Laboratory was asked by the project to do some  
20 scale testing, originally, we began those  
21 discussions in 2007, to look specifically at  
22 the adequacy of mixing, and at the time we

1 were asked to rate the tanks, how well the  
2 mixing systems would perform in those vessels.

3 And we did that testing in 2008 at  
4 three scales, so that we could try to derive  
5 these scaling factors for the tanks, to scale  
6 up to full scale. The testing we did was  
7 limited to noncohesive materials and we didn't  
8 use waste simulants. We were using a couple  
9 different sizes of mono-disperse beads.

10 The mixing criteria, at the time,  
11 as the staff discussed, were to make sure that  
12 the material was at least suspended off the  
13 bottom of the vessels, and also that the pump  
14 inlet concentration was no more than 20  
15 percent, because it was felt that higher  
16 solids loadings than that would clog the pump  
17 inlets.

18 So we performed that testing and  
19 we developed a couple of correlations, one  
20 physics-based and one statistics-based, and  
21 we've benchmarked the correlations from the  
22 scaled testing that we did to some other data

1 that we've done from testing for the project  
2 much earlier, that used a more complex  
3 simulant.

4 And from benchmarking the  
5 correlations, which we found to agree with  
6 previous data quite well, we concluded, as the  
7 staff mention in their report, that, well,  
8 four of the vessel types appear to be adequate  
9 against both of those mixing criteria. Two of  
10 them are marginal and seven of them failed to  
11 meet those criteria, and we published that in  
12 a report. The final version of that report  
13 came out in 2009.

14 We did have that report  
15 independently, technically reviewed, at our  
16 own expense. We're aware that since that  
17 time, since the time of the report, that there  
18 have been changes made to the mixing system  
19 designs, in some cases physical changes, in  
20 some cases changes in the operating conditions  
21 and the material that may be sent to vessels.

22 We're also aware that they've

1 changed the mixing criteria from an off-bottom  
2 suspension approach to the bottom-clearing  
3 approach, looking at zone of influence, and as  
4 we stated in our answer to Question 18, we do  
5 believe that this represents a lesser mixing  
6 criterion.

7 We felt that even just critical  
8 suspension was essentially a minimum criteria  
9 for mixing. But we recently actually had the  
10 opportunity to take our scale-up correlations  
11 and test them in the system that was set up at  
12 Mid Columbia Engineering with a more  
13 prototypic system, and we did actually find  
14 that they work quite well, now that we have  
15 corrected, made some corrections to them that  
16 account for operating a more prototypic  
17 system.

18 They still predict to us that  
19 against the mixing criteria that we support,  
20 that we feel are conservative and appropriate  
21 for the plant, that substantially higher  
22 velocities are going to be needed in order to

1       achieve suspension in the vessels than is  
2       currently planned in the designs, to our  
3       understanding of those designs.

4                   VICE CHAIR ROBERSON:   Okay.   Now  
5       Dr. Dickey, throughout this hearing, we're  
6       going to explore some of those concerns, the  
7       concerns, previous and current on the project,  
8       and I understand the assumption that the feed  
9       will meet whatever specification there is.  
10      But as a mixing expert, can you tell us what  
11      the assumptions are about mixing, that make  
12      you comfortable.

13                   DR. DICKEY:   I think that's  
14      probably the right starting point, because  
15      what evolved out of this project, the concern  
16      that I had raised with the EFRT was the  
17      accumulation of solids.   The net effect of  
18      this, and some of the things associated with  
19      the way we characterize the mixing, came about  
20      really by focusing on two primary objectives.

21                   One was no accumulation, and the  
22      other was mobilization of a settled bed of

1 solids. Those two items were completely  
2 different approaches, and as I mentioned  
3 earlier, part of the things that we learned  
4 about this.

5           What we found, or what my initial  
6 concern was about accumulation, once having  
7 seen how PJMs operate, in simplest form, the  
8 PJM is capable of lifting the solids off of  
9 the bottom during the power stroke, and then  
10 there's a refill period during which the  
11 rapidly-settling particles return to the  
12 bottom of the tank.

13           The initial concern was that, in  
14 effect, you were only able to withdraw solids  
15 that were lifted off the bottom for no more  
16 than a quarter or a third of the cycle, and  
17 the rest of the time these solids that had the  
18 potential for accumulating would rest on the  
19 bottom.

20           After some initial testing, we  
21 actually found that almost the reverse  
22 happened. That when the pulse fired, there

1 was sufficient material lifted off of the  
2 bottom, that you actually withdrew a high  
3 concentration of the rapidly-settling  
4 particles, and a higher concentration of all  
5 of the particles. In effect, what ended up  
6 happening was almost--and I say almost--to the  
7 point of not suspending the particles very  
8 well, actually gave you a higher percentage of  
9 the rapidly settling difficult-to-suspend  
10 particles actually leaving the vessel when you  
11 were doing a pump-out.

12 The net effect is that this change  
13 from off-bottom suspension to on-bottom motion  
14 actually appears to be an effective way of  
15 avoiding some of the problems with  
16 accumulation of solids.

17 The tests that were conducted were  
18 conducted along those lines. The simulants  
19 that were used, and some of the things that  
20 were measured--and this has evolved, over even  
21 the test program over the last year, of the  
22 kind of thing of testing with a tungsten

1 carbide material that more nearly matches what  
2 a crystalline plutonium oxide material might  
3 look like.

4 Those were found to come out,  
5 preferentially, as a result of the operation  
6 of the PJM mixers. So it appears that, based  
7 on everything that I've seen as far as the  
8 technology and the technique, that this has  
9 been a logical shift in the way we went about  
10 doing it.

11 All of those tests, and all of  
12 those evaluations were done on the basis of  
13 the one-third scale-down exponent, which said  
14 that the tests that were run in the small  
15 scale were run at greatly-reduced velocities  
16 compared to the design velocity, the  
17 anticipated velocity, the full scale.

18 That's the way--and I teach a  
19 course on scale-up--says go in, define what  
20 you want to do, and figure out what you need  
21 to test. The problem that's arisen is the  
22 understanding of this .18 exponent, and I kind

1 of was backed into that one.

2 My approach was to take a look at  
3 the material sitting on the bottom of the  
4 tank, more nearly represents the kind of  
5 situation that existed in the non-Newtonian  
6 study. The non-Newtonian study would have  
7 indicated that equal velocity would have been  
8 adequate to resuspend or mobilize this  
9 material that was sitting on the bottom.

10 That would have resulted in a zero  
11 exponent. That would have resulted in the  
12 test being run at the corresponding velocity,  
13 the full scale. My recommendation was to use  
14 a one-fifth exponent, partially influenced by  
15 this about .2 that came out of the theory,  
16 but, really, as a conservative exponent as  
17 opposed to using equal velocity. So that the  
18 resuspension or the mobilization of settled  
19 material really came about at the higher test  
20 velocity but not for the purpose of  
21 establishing whether or not you were  
22 suspending the solids.

1                   VICE CHAIR ROBERSON: Okay. Well,  
2 we're going to explore the concerns that you  
3 guys have summarized. I think for me, at this  
4 point, I'd like to go to Mr. Russo.

5                   Mr. Russo, I assume you are  
6 familiar with concerns raised by these experts  
7 in the organizations they represent.

8                   MR. RUSSO: Yes.

9                   VICE CHAIR ROBERSON: Is there any  
10 concern, that they have raised to the project,  
11 that you disagree with, you think is  
12 erroneous, or wrong?

13                  MR. RUSSO: We are aware of all  
14 the concerns that have been raised by all of  
15 our expert panels and consultants. All have  
16 been captured in our vessel analysis data  
17 sheets. We have done our analysis of those  
18 concerns in conjunction with our testing, and  
19 prepared what we considered a residual risk  
20 for each of those concerns, for each of those  
21 vessels, vessel by vessel, and presented that  
22 as part of our closure packages to the

1 Department of Energy.

2 We also, in our closure packages,  
3 in recognition of their concerns, and our own  
4 desires to advance the operability of the  
5 plant, we also recommended the larger-scale  
6 testing protocol to deal with some of the  
7 scaling questions, clearly, to deal with a  
8 simulant that would be representative, because  
9 we feel that the simulant, for Newtonian,  
10 particularly, starting with water, might be  
11 overly conservative, and some of our  
12 consultants have shared that concern.

13 When we did agree on the actual  
14 particle distribution, the PNNL reports that  
15 were referred to earlier, talked to a particle  
16 distribution that went out to 200 micron, and  
17 our testing criteria for Newtonian went out to  
18 700 micron.

19 So we feel that the large-scale  
20 setting will address some of the concerns  
21 raised by our own analysis and the analysis of  
22 our outside support consultants.

1                   VICE CHAIR ROBERSON: Okay. And  
2                   so let me just make sure I understand. It  
3                   isn't, at this point, that you disagree with  
4                   any concerns raised by these experts?

5                   MR. RUSSO: No.

6                   VICE CHAIR ROBERSON: Okay.

7                   MR. RUSSO: I don't think we  
8                   disagree at all. I think to the point, it's  
9                   how you then deal with those concerns, how you  
10                  analyze them in risk space, and then looking  
11                  at the suite of risks, including the risk to  
12                  the actual \$12.263 billion ceiling that the  
13                  Congress has put on this facility, you measure  
14                  those risks, you evaluate them in a very  
15                  dispassionate way, that's our job, and we  
16                  present that information to the department, as  
17                  both owner and regulator, to ensure that they  
18                  fully understand the risks, and we provide  
19                  them our recommendations on how to deal with  
20                  them including the large-scale testing.

21                  VICE CHAIR ROBERSON: Let me just  
22                  ask, because I understand what you just said,

1 but I guess what I'm trying to get to is: Are  
2 there concerns that have been raised by these  
3 organizations--and I'm going to use your  
4 vernacular, that you've put in to the, we'll  
5 figure that out later, bucket, because you  
6 don't consider it to be as significant as  
7 maybe they did?

8 MR. RUSSO: I wouldn't call it to,  
9 we'll figure it out later, vernacular. There  
10 are concerns that need to be addressed. The  
11 small-scale testing platform, no matter how we  
12 configure it, will leave some individuals with  
13 concerns.

14 So we then look to, from a overall  
15 project perspective, what is the best way to  
16 address our own questions of operability and  
17 our own recommendations to the department on  
18 how to balance the capital investment with the  
19 operating parameters that you can perform  
20 under.

21 I would like to state that from a  
22 BNI perspective, we are very confident that

1 the PJMs meet their functional requirement.  
2 They will adequately mix, they will deal with  
3 hydrogen, they will mix to the point that we  
4 can work our process flowsheet and make  
5 quality class.

6 We have included the hill dilution  
7 and removal that you spoke of earlier, because  
8 while we believe, and are very comfortable,  
9 that we will not get the kind of accumulation  
10 that would lead to a criticality, we recognize  
11 that something that's going to be sealed off  
12 for 40 years, even if there is the ability,  
13 potentially, to get into it, is not preferred.

14 And as a result, we felt that the  
15 heel dilute and removal process, with the  
16 ability to put cameras in service ports, would  
17 provide a higher degree of confidence for both  
18 our co-located worker and the public, that we  
19 can achieve the mission.

20 When you then look at what large-  
21 scale testing will do assuming that you accept  
22 my premise that we are comfortable the PJMs

1 will perform its functional requirement, what  
2 we'll do is determine if there are any  
3 operational limitations.

4 And I say, if any. Our own  
5 assessment says that we will be able to  
6 perform, as designed, to the mission life  
7 cycle. But we recognize that that's a very  
8 controversial subject. So a large-scale test  
9 will provide a high degree of confidence, both  
10 in the physical design that we are very  
11 comfortable with, the internals of the  
12 vessels, as well as the operating parameters  
13 that those vessels will have to perform under.

14 VICE CHAIR ROBERSON: Okay. And I  
15 have one last question, so I cannot hog all  
16 the time for my colleagues. Madam Secretary--  
17 and I apologize in advance, Mr. Knutson.  
18 Either one of you can answer this. I will  
19 probably give deference, based on your newness  
20 to the project. I asked the same question of  
21 the Department of Energy in regard to are you  
22 familiar with the concerns raised by these

1 individuals and the organizations they  
2 represent, and are there concerns that they've  
3 raised, that you believe are invalid or  
4 erroneous?

5 DR. TRIAY: I will start with my  
6 answer, and then I would like to take the  
7 opportunity to have Mr. Knutson complete, and  
8 give his own perspectives as a extremely  
9 experienced federal project director.

10 First off, I think that it is  
11 important that we go back to the response that  
12 we have already shared with you.

13 The strategy that we have  
14 designated to confirm the adequacy of the  
15 design is a phased approach. Phase I is the  
16 closure of the EFRT issue, and achievement of  
17 the targeted technology readiness level based  
18 on our issue response plan.

19 Let me stop here for a moment to  
20 discuss the fact that the technology readiness  
21 assessment process is a process that the  
22 environmental management program has fully

1 embraced as part of these capital projects,  
2 and the way that the technology readiness  
3 assessment process works, is that once the  
4 issues associated with a technology are  
5 identified, a maturation plan is put in place  
6 to take the technology from one level of  
7 readiness to a higher level of readiness.

8 That maturation plan exists for  
9 the pulse jet mixers and that is exactly in  
10 the process that we have been in, in order to  
11 ensure that the readiness level is appropriate  
12 from the perspective of the Department of  
13 Energy.

14 Phase II in our strategy to close  
15 this issue is the closure of additional issues  
16 identified with the pulse jet mixing control  
17 covers, suction line sign and sampling  
18 systems.

19 Phase III is the completion of the  
20 design change process to implement any  
21 required vessel or supporting system changes,  
22 and confirm the design of the post-jet mix

1 vessel system. The reason that is important  
2 is because the decision that the Department of  
3 Energy concurred with the design authority on,  
4 was to proceed with the design of pulse jet  
5 mixing, and the Department of Energy has laid  
6 out a very careful phased strategy to close on  
7 this particular issue.

8 I would also like to point out  
9 that the Department of Energy, at the request  
10 of the secretary, chartered an environmental  
11 management advisory board, Tank Waste  
12 Subcommittee, to look at the closure of all of  
13 the issues associated with the EFRT review.

14 And that group of experts also  
15 came to the conclusion that we should press  
16 forward with completion of EPC. I also would  
17 like to make some comments with respect to  
18 waste characterization.

19 Now, you know, based on the  
20 comments made by the experts, that we have  
21 some concerns with respect to waste  
22 characterization. They assigned expert in

1 waste management. Process knowledge is  
2 something that is an integral part of  
3 determining how waste is going to be  
4 characterized. And I would like, at the time  
5 that Mr. Rutland joins us in the next panel,  
6 to spend some time going through, in some  
7 detail, the waste characterization efforts of  
8 the Department of Energy and its contractors.

9 In short, we have a model that is  
10 correctly predicting our observations. It is  
11 not appropriate, because we have process  
12 knowledge, to simply say we have a very small  
13 sampling subset, because the process knowledge  
14 actually allows us to determine the specific,  
15 it's said, of samples that are going to be  
16 taken, and have those represent the conditions  
17 of the waste--

18 CHAIRMAN WINOKUR: Dr. Triay,  
19 we're going to be covering a lot of that  
20 material, I think, in the next session. Could  
21 you summarize your comments now? I think we  
22 have a lot of material to cover, and we'd like

1 to move on from there.

2 DR. TRIAY: The summary of my  
3 comments is that we have a phased approach for  
4 the closure of this issue, and that our  
5 colleagues at PNNL have stated that they have  
6 looked at the results up to Phase I, not  
7 anything past Phase I, and I think that that  
8 is very important, to look at the issue  
9 holistically, rather than just the snapshots  
10 that our experts have looked at.

11 VICE CHAIR ROBERSON: Okay. Thank  
12 you, Madam Secretary.

13 MR. KNUTSON: May I?

14 VICE CHAIR ROBERSON: Briefly,  
15 please. Yes.

16 MR. KNUTSON: Thank you for  
17 allowing me to chime in here just for a  
18 moment. From a project perspective, part of  
19 the assessment that we did over the last four  
20 months was to evaluate the concerns, and to  
21 understand that none of them, from a DOE  
22 perspective, had been put into a bucket of

1 "deal with it later."

2 I think it's also important to  
3 recognize that during this assessment process,  
4 we actually looked at design modifications  
5 that had been initiated as a part of the  
6 concerns being recognized and realized, and  
7 the mixing power was increased, distribution  
8 of mixing power was improved, reduced solids  
9 loading, heel dilution capabilities right at  
10 access ports, right--these were all points  
11 that were made following some of the prior  
12 commentary.

13 I think it's very important that  
14 the record reflect that we do recognize the  
15 concerns and we have accepted the concerns.  
16 We are addressing the concerns, and part of  
17 the commitment for large-scale testing is for  
18 the purpose of ensuring that a higher level of  
19 confidence results in our understanding of how  
20 these machines actually operate.

21 VICE CHAIR ROBERSON: Thank you,  
22 sir.

1                   Mr. Chairman, I'm going to hold  
2                   any further questions for the moment.

3                   CHAIRMAN WINOKUR:   Okay.   Thank  
4                   you.   Gee, that was kind of whirlwind tour.  
5                   I think I'd like to kind a step back and spend  
6                   a little more time discussing Phase I and  
7                   Phase II testing, so at least I understand  
8                   where we are.

9                   One of the questions the Board  
10                  asked was Question 18, that PNNL provided a  
11                  response to, Dr. Peurrung.   And I think we've  
12                  already gone over your background and your  
13                  involvement in the process, and what were the  
14                  goals of that testing again, very briefly?

15                  DR. PEURRUNG:   Well, as I said,  
16                  originally, when the test specification was  
17                  written, the first objective of the test was  
18                  to rate the mixing systems.   It was basically  
19                  a pass/fail on whether they would perform  
20                  against the criteria that were developed along  
21                  the way to planning the tests.

22                  CHAIRMAN WINOKUR:   And we've

1 talked about the two criteria that you felt  
2 were the most important, right?

3 DR. PEURRUNG: Right. And the  
4 criteria were something that were developed  
5 over time. I think none of us had any  
6 intention that we were going to create  
7 completely homogeneously mixed tanks. But by  
8 the time we began testing, in 2008, BNI and  
9 PNNL had agreed that the appropriate criteria  
10 were off-bottom suspension and pump inlet  
11 solids concentration.

12 CHAIRMAN WINOKUR: And the off-  
13 bottom suspension is an industry standard;  
14 right?

15 DR. PEURRUNG: It is.

16 CHAIRMAN WINOKUR: Okay. And how  
17 do you go about going from small vessels to  
18 larger vessels? I mean, is there a scaling  
19 fact, there's something you have to figure out  
20 to do?

21 DR. PEURRUNG: There is. We did  
22 testing at three scales. We had, I believe,

1 a 15-inch vessel, a 34-inch vessel and a 70-  
2 inch vessel that we did testing in in one of  
3 our facilities, the Applied Process  
4 Engineering Laboratory.

5 And from taking those three data  
6 points, it allows you to get a curve that you  
7 can project out to full scale.

8 CHAIRMAN WINOKUR: So you need  
9 more than one vessel size to be able to figure  
10 out a scaling factor, right?

11 DR. PEURRUNG: Typically, unless  
12 you're going to use some sort of conservative  
13 rule of thumb that comes from industry.

14 CHAIRMAN WINOKUR: And I wanted to  
15 go over -- I think we've already mentioned,  
16 and I'm going to enter it into the record,  
17 some sections of this report, WTP RPT 182 Rev.  
18 A, and there are some sections that deal with  
19 some vessel evaluations and rating of WTP  
20 vessels.

21 DR. PEURRUNG: Correct.

22 CHAIRMAN WINOKUR: And I'm looking

1 at the figures here, and I can kind a see on  
2 the X and Y axis, these two different  
3 variables you're talking about.

4 DR. PEURRUNG: Correct.

5 CHAIRMAN WINOKUR: And I see a  
6 solid suspension metric on the X axis, and  
7 what's that telling you in terms of the  
8 critical suspension velocity?

9 DR. PEURRUNG: So the two axes on  
10 the figure that you're looking at, one is  
11 comparing the velocity that the mixing system  
12 is designed to, the maximum velocity, against  
13 what we calculate is the velocity required to  
14 pick a cloud of particles up off the bottom  
15 and suspend them.

16 And so if that ratio -- the ratio  
17 of those two velocities is greater than one or  
18 less than one, that tells you whether you are  
19 meeting or not meeting those criteria.

20 Likewise, the other access then  
21 looks at inlet concentration compared to 20  
22 percent.

1                   CHAIRMAN WINOKUR: All right. So  
2 we have many vessels here where, for the solid  
3 suspension metric, were less than one. Let's  
4 take a vessel like FRP 2 which is the--I guess  
5 it's the receipt tank for low activity waste.  
6 It's got a value of about .3. So what does  
7 that mean in terms of the critical suspension  
8 velocity?

9                   DR. PEURRUNG: In both of these  
10 cases, you're looking for--one is your, just  
11 your "break even" point. Okay. If it's  
12 greater than one, then you're doing well. If  
13 it's at one, then we deem that to be marginal.  
14 If it's less than one, then you're failing to  
15 meet the criteria.

16                   So you've only got 30 percent of  
17 the velocity that you need in your mixing  
18 system design, if your criterion is .3, that  
19 is required, actually, to suspend the  
20 material.

21                   CHAIRMAN WINOKUR: So what that  
22 says is that if you needed, if you had a tank

1 and you had 12 meters per second, which is the  
2 maximum speed you could try that, that if it  
3 was .3, you'd need 36 meters per second or jet  
4 velocity to get to the critical suspension  
5 velocity?

6 DR. PEURRUNG: Again, against the,  
7 the vessel, I should caveat this by saying we  
8 had a design at the time, this was more than  
9 a year ago, we had operating conditions at the  
10 time and waste characteristics at the time.  
11 But yes, when we presented that information it  
12 was against a certain set of assumptions about  
13 how those mixing systems would be designed and  
14 operated. But essentially, your conclusion is  
15 correct.

16 CHAIRMAN WINOKUR: And in many of  
17 the cases where these numbers are less than  
18 one, there'd be no way in these vessels to get  
19 these kinds of velocities. I mean, there are  
20 limitations in terms of what the vessels can  
21 actually do.

22 DR. PEURRUNG: We're aware that

1       there are some challenges in redesigning the  
2       vessel mixing systems, yes. That is not our  
3       particular area of expertise, to determine how  
4       to change those designs.

5                   CHAIRMAN WINOKUR: Oh, I  
6       understand that, but I'm just trying to get an  
7       idea of what some of those numbers mean.

8                   Now on the Y axis, we're looking  
9       at this solids concentration. So let's say  
10      you have a number like .1 which you have on  
11      some of these graphs. What does that mean?

12                  DR. PEURRUNG: In that case, then  
13      you'd be saying that the solids concentration  
14      at the bottom is greatly exceeding this 20  
15      percent mixing criteria that we had at pump  
16      inlet. That is, essentially all the solids  
17      have fallen to the bottom of the tank and the  
18      concentrations there are much too high.

19                  Again, the one would be the value  
20      of, okay, it's at 20 percent. Numbers less  
21      than one tell you that your solids  
22      concentrations are higher than that.

1                   CHAIRMAN WINOKUR:  And so what we  
2                   have here, at least in the spring of 2009,  
3                   based on your testing, is we have many  
4                   vessels, very important vessels like HLP 22  
5                   [High-level Waste Lag storage and Feed  
6                   Blending Process System], which is the feed  
7                   receipt vessel for high-level waste.  We have  
8                   ultra filtration vessels.  We have low  
9                   activity waste vessels.  We have overflow  
10                  vessels.

11                 I actually have a cheat sheet here  
12                 that would tell me what they are.

13                 But many of them are in this lower  
14                 quadrant where the number is less than one for  
15                 both of these metrics.

16                 DR. PEURRUNG:  Correct.

17                 CHAIRMAN WINOKUR:  And based upon  
18                 that, you actually have a table, and based on  
19                 that table, you characterize whether vessels  
20                 are adequate or inadequate.

21                 DR. PEURRUNG:  Correct.  Against the  
22                 design, the waste characteristics and the

1 operating conditions at the time.

2 CHAIRMAN WINOKUR: Absolutely.

3 Absolutely. And of course these vessels, many  
4 of them, I think you say in your report, are  
5 simply inadequate at that time.

6 DR. PEURRUNG: Correct. The numbers  
7 that we gave were that four appeared to be  
8 adequate, two appeared to be marginal, and  
9 seven appeared to be inadequate, according to  
10 our scale tests.

11 CHAIRMAN WINOKUR: And you actually  
12 say, and I think you've said some of it, that  
13 you understand that changes have been made to  
14 these vessels, right?

15 DR. PEURRUNG: Correct.

16 CHAIRMAN WINOKUR: But you do write  
17 in your response to the Board, you say in some  
18 cases they increased the number of pulse tubes  
19 and/or nozzle diameters.

20 You also say operating conditions  
21 have been changed, such as reducing solids  
22 concentrations.

1 DR. PEURRUNG: Correct. Or perhaps  
2 fill height.

3 CHAIRMAN WINOKUR: All right. So  
4 changing solids concentrations would mean that  
5 these vessels aren't being required to mix as  
6 large a percentage of waste solids as they had  
7 before?

8 DR. PEURRUNG: Correct.

9 CHAIRMAN WINOKUR: Okay.

10 And as a result, you write, nine of  
11 the vessel types originally evaluated as  
12 marginal or inadequate, four of the designs or  
13 operating conditions for the vessels have been  
14 improved since PNNL completed Phase I testing.  
15 You're saying "approved" but you're not saying  
16 that you think they adequately or robustly  
17 mix. True?

18 DR. PEURRUNG: I think our analyses  
19 show that we've moved some of them that were  
20 marginal--that were inadequate are now  
21 essentially marginal.

22 CHAIRMAN WINOKUR: Marginal. And

1 then you write: However, there are still  
2 deficiencies with the technical basis for both  
3 Newtonian and non-Newtonian vessels.

4 DR. PEURRUNG: Correct.

5 CHAIRMAN WINOKUR: Okay. So this is  
6 where you stood at the end of Phase I testing  
7 for the project.

8 Excuse me. I'll ask the questions.  
9 Thank you.

10 And then we move on to Phase II  
11 testing, and I'm going to come right to you,  
12 Greg, so you'll have your chance to speak.

13 And we start doing Phase II testing  
14 at Washington State University; right?

15 MR. ASHLEY: Correct. And at MCE.

16 CHAIRMAN WINOKUR: I don't think  
17 they're on. That's on.

18 (Microphone adjustment.)

19 CHAIRMAN WINOKUR: Yes. All right.  
20 So I wanted to talk about the fact that the  
21 project--so PNNL's involvement with the  
22 project ends, and then the contractor--you are

1 going to start to do some experiments.

2 MR. ASHLEY: Correct.

3 CHAIRMAN WINOKUR: You're going to  
4 do full-scale and small-scale experiments, and  
5 you start out I think doing some experiments  
6 at Washington State University. Can you  
7 describe those experiments.

8 MR. ASHLEY: The experiments at  
9 Washington State University were looking at  
10 radial jets. They were--the primary purposes  
11 of those experiments was to measure zones of  
12 influence, and if you think about the zone of  
13 influence that as a jet impinges on the bottom  
14 of the vessel, what is the effect, what is the  
15 radius of the effect that that jet has on the  
16 bottom of the vessel.

17 CHAIRMAN WINOKUR: Right. And so  
18 what's happening here is that you're kind a  
19 beginning to use this bottom clearing, or the  
20 zone of influence as a metric to give you a  
21 sense of how well you're mixing.

22 MR. ASHLEY: I think it is important

1 to talk about--there's been a lot of  
2 discussion about, you know, suspension of  
3 particles and bottom clearing, and it's  
4 important to note that there are different  
5 effects. That the behavior in these vessels  
6 is complex. Okay. At the time that we were  
7 dealing the experiments at PNNL, we were  
8 learning. We were learning a lot about how  
9 the PJMs work.

10 We have the luxury, of we do get a  
11 lot of expert consulting advice and opinions,  
12 and they're not always in agreement, as you  
13 might imagine; but we did begin to learn that  
14 there are different phenomena that are of  
15 interest in terms of the performance of the  
16 PJMs. Different phenomena associated with our  
17 ability to pump solids out of the vessel.

18 CHAIRMAN WINOKUR: Right.

19 MR. ASHLEY: Different phenomena  
20 that are associated, if we have settled  
21 solids, how are we mobilizing those solids to  
22 release gas, which is one of our safety

1 criteria.

2 The purpose of the experiments with  
3 radial jets was really to understand how  
4 effective those jets are in terms of  
5 mobilizing solids on the bottom of the vessel.

6 CHAIRMAN WINOKUR: Right. And based  
7 on this work, I think you determined the  
8 scaling factor of 0.18, which has been  
9 mentioned before, and this was derived from a  
10 PRA [Probabilistic Risk Analysis] model. Can  
11 you talk a little bit about that.

12 MR. ASHLEY: Okay. That model is,  
13 is--the model is available, it was originally  
14 based on air jets. That model was the basis  
15 for establishing what those radial zones of  
16 influence may be. Obviously, we have fluid  
17 jets, you know, the settled solids, so there  
18 are correlations, and we need to verify the  
19 use of the PRA correlations in terms of  
20 predicting what those zones of influence might  
21 be, which is one of the reasons for doing  
22 those experiments at various scales, including

1 full-scale experiments up at WSU [Washington  
2 State University].

3 CHAIRMAN WINOKUR: Now I don't know  
4 if we covered it before, but you're finding a  
5 scaling factor for jet velocity's at .18, and  
6 I think the folks at PNNL had one, .33; right?

7 MR. ASHLEY: This is where we need  
8 to really be clear; okay.

9 CHAIRMAN WINOKUR: I haven't even  
10 asked the question yet.

11 MR. ASHLEY: Well, .33 for solids  
12 accumulation is what has been used, okay, in  
13 determining whether solids accumulate on the  
14 vessel. The velocities were scaled using .33.  
15 For determining whether we're able to get  
16 bottom motion, the scaling, as Dr. Dickey  
17 explained, the scaling coefficient that was  
18 used was .18.

19 This is for movement of solids on  
20 the bottom of the vessel. .33, though, was  
21 used to determine scaling the jets for solids  
22 accumulation.

1                   CHAIRMAN WINOKUR:    So Dr. Dickey,  
2                   you believe that, I mean that for these  
3                   bottom-clearing experiments, you believe that  
4                   the appropriate scaling factor for jet  
5                   velocity is .18?

6                   DR. DICKEY:    Basically, what it  
7                   comes down to is you're dealing with a  
8                   different phenomena.  All you're trying to do  
9                   is mobilize the solids.  You're not trying to  
10                  get them off the bottom.  You just simply want  
11                  to be able to erode the settled bed away, and  
12                  erosion tends to be almost an equal velocity  
13                  characteristic, as opposed to being one where  
14                  you have to change the velocity in going from  
15                  the small to large scale.

16                  If I may, let me make one other  
17                  point of clarification here, because to some  
18                  degree, it is my responsibility.  We came at  
19                  this with the idea of this off-bottom  
20                  suspension criteria.  It is truly much more of  
21                  an academic criteria than an industrial  
22                  criteria.  I'll explain in a moment.

1           What it is, it's a very clearly  
2           observable phenomena in solid suspension. You  
3           can tell when you get everything off the  
4           bottom. From an industrial perspective, the  
5           company that I worked for, for a long time,  
6           had a one to ten scale for mixing  
7           characterization, one being the minimum  
8           acceptable, ten being the maximum practical.

9           Off-bottom suspension, on the scale  
10          of one to ten, was a three. There were plenty  
11          of consistent conditions that were widely  
12          used, industrially, that did not meet the off-  
13          bottom criteria, and that's basically the  
14          methodology and the direction that it was  
15          headed in terms of this on-bottom motion  
16          criteria.

17                 CHAIRMAN WINOKUR: So you're  
18                 comfortable with a .18 scaling factor for that  
19                 phenomena?

20                 DR. DICKEY: No. To get the part--  
21                 in order to scale up for particle suspension,  
22                 you need to use a one-third exponent. The

1       only place that you're using the .2, .18  
2       exponent, is when you're looking at a yield  
3       stress material settled on the bottom  
4       equivalent to a DBE [Design Basis Event]  
5       situation, and what you're doing is you're  
6       looking at just getting the particles to erode  
7       away, and move enough, that you can release  
8       hydrogen. It's a completely different  
9       problem, a completely different phenomena, and  
10      the scale of approach was taken as being a  
11      different approach, much more like trying to  
12      move a non-Newtonian material.

13                   CHAIRMAN WINOKUR: I think we can  
14      agree, and tell me if I'm wrong here, Dr.  
15      Peurrung, that using off-bottom suspension is  
16      certainly a much more challenging and rigorous  
17      criteria than using bottom clearing.

18                   DR. PEURRUNG: Clearly.

19                   CHAIRMAN WINOKUR: But what I  
20      understand you saying, Dr. Dickey, is you  
21      believe that a value of .18 for bottom  
22      clearing for zone of influence experiments

1 would have been appropriate.

2 DR. DICKEY: Yes, I guess if I  
3 believed that the zone of influence was all  
4 that was important for solid--

5 CHAIRMAN WINOKUR: I understand. We  
6 haven't gotten to that yet. But okay. So  
7 here we have, Dr. Dickey, a situation where  
8 we're using, in these experiments--at  
9 Washington State University we're going to use  
10 zone of influence bottom clearing with .18  
11 scaling, and we're going to be using the .18  
12 factor. Okay? And do you sense that's going  
13 to give you a good measure of whether these  
14 vessels are going to be able to mix  
15 appropriately and perform their function?

16 DR. DICKEY: No. I don't think  
17 it'll mix appropriately.

18 CHAIRMAN WINOKUR: Okay. Now I want  
19 to go back, and I want to get you in a second,  
20 Dr. Kosson. I want to go back to you about  
21 this .18 value. How did you determinate the  
22 .18 value from that data set? How was that

1 done?

2 MR. ASHLEY: Well, the .18 value was  
3 determined, obviously, in consultation with  
4 our consultants, and also review of the  
5 literature, and, you know, one of the purposes  
6 of running multiscaled experiments at WSU was,  
7 once again, to confirm what the value should  
8 be. If you look at the jets that were run at  
9 WSU, a full-scale jet was run. It's a flume  
10 test, so it was just simpler to run a full-  
11 scale single jet test.

12 Now, once again, the purpose of that  
13 test, of those tests, were to confirm what  
14 coefficient should be conservatively used for  
15 simply the zones of influence, which would be  
16 used to evaluate bottom clearing and not  
17 suspension.

18 CHAIRMAN WINOKUR: Okay. let me ask  
19 you, Dr. Kosson, have you looked at the data  
20 from the zone of influence studies that were  
21 performed? And can you comment on whether or  
22 not, from that data, you could derive this

1 scaling factor of .18?

2 DR. KOSSON: Yes, we have looked at  
3 the zone of influence studies that have been  
4 performed, and I think it's important to  
5 recognize that there are several different  
6 functions of the mixing that are being  
7 confounded in this discussion, potentially.  
8 One of the zone of influence functions is in  
9 order to disrupt the bed to liberate hydrogen  
10 that may have accumulated in it during a  
11 design basis event. A second factor of the  
12 zone of influence is dealing with the bottom  
13 clearing, or resuspension effects that are  
14 necessary for making sure that solids do not  
15 accumulate in the vessel where they are.

16 CHAIRMAN WINOKUR: Right.

17 DR. KOSSON: Another function of the  
18 mixing is to provide a understood mixture that  
19 you're passing to the next vessel as part of  
20 your downstream processing, or to your next  
21 stage of processing.

22 CHAIRMAN WINOKUR: Right.

1 DR. KOSSON: Each one of those can  
2 have very different requirements. The zone of  
3 influence testing for the design basis event  
4 focuses on you now have a potential for a more  
5 completely settled, or a greater percentage of  
6 the bed settled due to the design basis event  
7 than you would have under normal operating  
8 strategy.

9 So at that point, your goal is to  
10 disrupt that bed to liberate any hydrogen that  
11 may have accumulated in pockets, so that you  
12 don't end up with a safety hazard, because the  
13 inability for hydrogen to be adequately  
14 cleared from the vessel.

15 Under that condition, you can have,  
16 in some of the vessels, depending on the  
17 specified weight percent, a considerable  
18 amount of settled solids, up to several feet  
19 of settled solids on the bed is potentially an  
20 option.

21 And the testing that was done under  
22 zone of influence testing was--at full scale,

1 was done with a limited particle size  
2 distribution, particle type, and only a  
3 limited solid depth settling.

4 So the zone of influence transfer,  
5 or scaling, and the ability to scale that to  
6 the full vessel, was one of the issues that we  
7 questioned.

8 For the off-bottom suspension, or  
9 the zone of influence that's looked at there,  
10 the issue is twofold. One is to be able to  
11 remove the particles from the vessel, so that  
12 you don't have accumulation in the vessel.

13 The conditions under the MCE  
14 testing, what they call Phase II prototypic  
15 testing, demonstrated at that scale, that that  
16 could be carried out for the vessels as they  
17 went through their design process and the  
18 experimental data gathering.

19 When you take that information,  
20 though, and recognize the complex geometry of  
21 the vessel, and the fact that there are  
22 different phenomena involved, some which scale

1 reasonably, some which don't scale at all  
2 reasonably, that when you integrate it all  
3 together, that's why we thought it was very  
4 important that large-scale testing be carried  
5 out to validate the scaling basis for that  
6 clearing. Some of it's the suction height and  
7 the like.

8           For the third function of passing  
9 downstream what you are processing, and  
10 providing feed to the next stage of  
11 processing, what is required there depends  
12 very largely on your process control logic,  
13 which had not been well-established at the  
14 time that we were going through the review  
15 that we had.

16           What was established was that as you  
17 do the clearing from the vessels, that there's  
18 bottom-clearing results that they can clear  
19 the bottom at that scale, and that also the  
20 faster settling particles will be transferred  
21 downstream, disproportionately, early on in  
22 the process, the clearing vessel.

1                   CHAIRMAN WINOKUR: Let me ask you,  
2                   Greg, At MCE, when you did these tests, and  
3                   these were small vessel tests, did they  
4                   attempt to look at off-bottom suspension?

5                   MR. ASHLEY: Yes. The cloud height  
6                   was measured, similar to the PNNL tests that  
7                   were done in the Phase I. That was one of the  
8                   measurements. So as Dr. Dickey said, that is  
9                   a classic visual measurement associated with  
10                  mixing, with various scales established based  
11                  on how high the cloud heights. So we did  
12                  measure the cloud height as we did the  
13                  testing.

14                  CHAIRMAN WINOKUR: And did you find  
15                  that the jet velocities necessary to do that  
16                  were greater or less than what the folks at  
17                  PNNL measured?

18                  MR. ASHLEY: We actually found that  
19                  the velocities required were higher, okay,  
20                  which also drove us to the need to improve the  
21                  performance of certain vessels.

22                  I think as was mentioned, we are

1       doing substantial modifications to some of our  
2       high solids vessels. You mentioned the HLP 22  
3       vessel, which is the primary feed receipt  
4       level for the high-level waste.

5                If you can just simplistically look  
6       at that, we're increasing the power in that  
7       vessel by 50 percent. We're going from 12  
8       PJMs, 12 pulse tubes, to 18 pulse tubes. The  
9       velocity in that vessel is the 12 meter per  
10      second velocity at full scale.

11              So our finding was to assure that we  
12      don't retain solids in that vessel, that we  
13      required adding that additional power to that  
14      vessel.

15              CHAIRMAN WINOKUR: My understanding  
16      was that to get off-bottom suspension, the jet  
17      velocities were actually higher than the ones  
18      that PNNL measured.

19              MR. ASHLEY: The correlations have  
20      been reconciled, and I believe, I'm not  
21      absolutely sure, but PNNL is reviewing, or has  
22      reviewed the reconciliations.

1           Once again, there is a difference  
2           in, you know, the MCE facility was a  
3           prototypic facility, the pulse jet operation  
4           was prototypic, whereas the Phase I testing at  
5           PNNL was not fully prototypic. So there was  
6           an exercise to reconcile the differences in  
7           that correlation.

8           CHAIRMAN WINOKUR: What I'm trying  
9           to get a measure of is that--and I have to ask  
10          the experts again. From what I've read and  
11          understood, you need to have off-bottom  
12          suspension if you want to have, I mean,  
13          adequate mixing, and convince yourselves  
14          you're not going to get solids accumulations  
15          in the bottoms of vessels.

16          Dr. Peurrung, do you think that's a  
17          reasonable conclusion?

18          DR. PEURRUNG: I'm sorry. Could you  
19          say the question again.

20          CHAIRMAN WINOKUR: The question is  
21          do you need off-bottom suspension? Is that  
22          what you really need to measure if you can

1       adequately mix this varied waste in these  
2       vessels?

3                   DR. PEURRUNG:   That was the  
4       criterion that we selected at the time, and we  
5       believe that that is an appropriately  
6       conservative criterion.

7                   CHAIRMAN WINOKUR:   Right.

8                   And Dr. Dickey, would you agree with  
9       that?

10                  DR. DICKEY:   I'm going to introduce  
11       one other quirk in this whole thing.   The one  
12       other factor that's involved with this is the  
13       fact that these are basically batch vessels,  
14       and as a result, yes, the suspension is purely  
15       on bottom motion when they are full vessels.  
16       All of the PNNL studies were basically done  
17       with full vessels.   What ends up happening is  
18       when you get down past about half full, where  
19       you're down half or quarter full, these  
20       vessels do have off-bottom suspension.

21                  You don't have as much to mix, you  
22       have better access to them, and they actually

1 get to that point. Again, it's one of these  
2 things, when you look at the whole process and  
3 try to assess how this is going to really  
4 operate, I don't think we're cheating here.  
5 I think we're going at this on a very  
6 practical scale, of using fairly conservative  
7 scale down, scale up criteria, of looking at  
8 all the aspects of what's going on, of  
9 focusing basically on the question that was  
10 asked at the beginning. Will this accumulate  
11 material? And I don't think it will.

12 CHAIRMAN WINOKUR: So you think,  
13 from what you know, these vessels will  
14 adequately mix?

15 DR. DICKEY: Yes, provided, you  
16 know, something, other upset in the plant  
17 doesn't occur, and I guess I'll toss in the  
18 one other caveat here, is that there are  
19 things that we have learned out of this that  
20 would cause efforts to go back, and I think  
21 PNNL raised the question about pumping and  
22 transfer. We now have experimental data that

1 tells us, if you put 5 percent into the tank,  
2 what's the concentration going to be,  
3 momentarily during a pulse, on an average  
4 during the first quarter pump-out? The data's  
5 there. We need to close the loop and make  
6 sure that it's being used properly, and being  
7 applied in the places it needs to be applied.

8 The test results are very, very  
9 worthwhile, and very, very useful in terms of  
10 not only they demonstrated the ability to mix,  
11 or at least transfer, and they give us some  
12 kind of an idea of what we actually have to  
13 measure and observe.

14 CHAIRMAN WINOKUR: I think we're  
15 going to have to finish up at some time, but  
16 I wanted to just get one more thing in place.  
17 You also did some pump-out tests too; right?

18 MR. ASHLEY: That's correct. In  
19 fact, when we talk about--you know, the off-  
20 bottom suspension is an observable criteria.  
21 A real criteria is no solids accumulation.  
22 Pump-out is a measurable criteria, and that's

1 why, as we went from the Phase I testing at  
2 PNNL, we relooked at that time--in fact, our  
3 criteria for solids accumulation was what we  
4 called a de minimus criteria. Okay. You  
5 know, some can say, well, what is de minimus?  
6 We changed. Our criteria is currently a no  
7 accumulation criteria.

8 We went to a pump-out because that  
9 is a measurable criteria. In fact, as Dr.  
10 Dickey said, what happens is the phenomena  
11 does change as the vessel level decreases.  
12 Jet velocities increase as vessel level  
13 decreases. It's a function of the fluidics,  
14 or the pulse jet technology.

15 So we felt that the pump-out was a  
16 true measurable criteria, where we would look  
17 at the distribution of solids remaining in the  
18 vessel, look at the distribution of solids  
19 that came out in the first quarter batch, that  
20 came out in the first half batch, that came  
21 out in the three-quarter batch, and then look  
22 at the remaining distribution of solids left

1 in the heel.

2 Typically, during normal operation  
3 we won't bring these vessels all the way down  
4 to an empty status. They'll be brought down  
5 to roughly a quarter batch status.

6 So that was a measurable criteria,  
7 where we could look at what are the  
8 constituents in the portion of the batch  
9 pumped out, and what are the remaining  
10 constituents as we draw the vessel down, all  
11 the way, to what would be the low level during  
12 operation.

13 That was a more positive  
14 quantitative criteria, rather than an  
15 observation that particles were moving,  
16 they're off the bottom. Those are  
17 observations. This was quantitative criteria  
18 for acceptance.

19 CHAIRMAN WINOKUR: Now when you did  
20 this pump-down test, when you did the pump-  
21 down test, you did not have off-bottom  
22 suspension; correct?

1 MR. ASHLEY: No. The pump-down test  
2 we had, the pump--

3 CHAIRMAN WINOKUR: You were using  
4 the scaling factor of 0.33. Was that true?

5 MR. ASHLEY: That's correct.

6 CHAIRMAN WINOKUR: And for those jet  
7 velocities, did you have off-bottom suspension  
8 during the testing?

9 MR. ASHLEY: There's off-bottom  
10 suspension. Our suction lines are off the  
11 bottom of the vessel. Okay. They don't come--  
12 -suction lines are not out of the bottom of  
13 the vessels. Some of them are as low as three  
14 inches off the bottom of the vessel.

15 For a participle to come out, some  
16 time during the PJM cycle, that particle is  
17 off the bottom of the vessel, and that is why  
18 this is a--the pump-out test is a very good  
19 measurement for our ability to clear the  
20 solids from the vessel.

21 CHAIRMAN WINOKUR: Let me ask the  
22 folks at PNNL, what your sense of these

1 experiments were, which included a full suite  
2 of tests at MCE as well as the pump-out  
3 experiments.

4 Was that pretty convincing data for  
5 you?

6 DR. PEURRUNG: Well, and I'd like to  
7 add, to clarify a little bit, we were not  
8 initially involved in Phase II testing, but we  
9 were asked by the project, in December of  
10 2009, to get involved again, after they'd done  
11 their tests, and found that the correlations  
12 were predicting--or actually, underpredicting  
13 how much power it took to move material  
14 around.

15 We got involved again, and we've  
16 been participating and advising on these tests  
17 along the way. I remember, when I heard about  
18 the pump-down test, in some ways I thought,  
19 well, that's not a bad criterion, in some  
20 ways, to figure out if you can get the  
21 material out of there.

22 It does not necessarily ensure that

1 material is, at all times, well-mixed in the  
2 tank. But it does at least allow you to get  
3 at, can you get material back out of these  
4 vessels?

5           However, at the same time, I would  
6 point out that we expressed some concerns to  
7 the project about, that these pump-down tests,  
8 how prototypic the systems were, that were  
9 providing suction to their test vessels, and  
10 we believe that the scaling of the pump-down  
11 may be fairly complex.

12           And so again, it is something that  
13 probably bears a further review as far as what  
14 the appropriate scale-up of--against those  
15 criteria are.

16           CHAIRMAN WINOKUR: Did the folks at  
17 PNNL share any of this with you, Mr. Russo?  
18 Their concerns.

19           MR. RUSSO: Yes. Again, on, I  
20 believe somewhere around June 17th, when we  
21 were getting towards closure, and I had not  
22 seen any recent data from PNNL, I went to

1 visit Terry Walton and the Lab Director, Mike  
2 Kluse, to solicit their most current, and as  
3 we've discussed, their most current was a  
4 little bit dated and they told us so.  
5 Vulnerabilities.

6 So we had all that information,  
7 analyzed it against the work that had preceded  
8 since their full involvement, and incorporated  
9 it into our risk analysis.

10 If I may, one other point that I'd  
11 like to clarify from your opening remark. The  
12 large-scale testing will be completed before  
13 the vessels are installed.

14 So our current schedule now is that  
15 of a large-scale testing completed, nominally,  
16 some time in mid 2012. Vessel installation is  
17 now scheduled for 2013. So we will be able,  
18 if there are any--and again our confidence is  
19 there won't be--but if there are any  
20 modifications required to an internal  
21 component of that vessel, we will have that  
22 opportunity to do before the vessels are

1 installed.

2 CHAIRMAN WINOKUR: I think that's  
3 good. I'd like to read you from the article.  
4 There was an article in Weapons Complex  
5 Monitor and it talked about an assessment that  
6 Terry Walton, who you just mentioned, PNNL's  
7 Director of Energy and Environment programs,  
8 sent to you. I have it as June 6. But I  
9 don't really know. It doesn't really make a  
10 difference what it is.

11 And here's what he says.

12 "Phase II testing conducted at Mid  
13 Columbia Engineering facilities modify the  
14 vessel designs and operating conditions which  
15 includes solids concentrations--which we  
16 haven't spoken much about--nozzle velocities,  
17 number of PJMs, bottom clearing, for HLP 22,  
18 UFP 1, FUP 17 and FRP 2, with the goal of  
19 showing the minimum tank requirements for  
20 bottom material movement, post-design, basis  
21 event restart, and nonaccumulation of solids  
22 during pump-out.

1           "The changes to the mixing systems  
2           in the vessels appear to just meet the minimum  
3           tank mixing requirements during the testing.  
4           This razor's edge approach means that any  
5           small change in a key testing element could  
6           result in a vessel that does not work at full  
7           scale in the plant."

8           Then he goes through telling you  
9           many of PNNL's concerns about the simulants.  
10          I know you know about that. He questions a  
11          lot of things about the Phase II testing that  
12          was done at Mid-Columbia Engineering, the use  
13          of the PRA model, and so on and so forth.

14          And I'm not completely clear, I'm  
15          getting that from you Dr. Peurrung, I mean  
16          that assessment. I may have misunderstood  
17          some things you said. So what I hear Pacific  
18          Northwest National Laboratory saying is that  
19          based on all this testing, they still have a  
20          lot of concerns about whether or not these  
21          vessels can adequately mix.

22          There wasn't a question there; but

1 please respond.

2 MR. RUSSO: So again, I guess the  
3 best response is that those concerns were  
4 immediately provided to our vessel assessment  
5 team. They went through and evaluated each of  
6 them, put them into the realtime data that we  
7 were collecting from testing that had  
8 completed some time in late April, early May  
9 of `10, consulted with, among others, folks  
10 from PNNL, folks from--both Dr. Dickey and Dr.  
11 Henschel, reviewed the CRESP data and got  
12 their inputs on that information, and, in  
13 essence, determined that the vulnerabilities  
14 were such, that they needed to be included in  
15 our vessel assessment reports that we  
16 submitted to the department.

17 I think a clarification that is  
18 important--and I'm speaking as the contractor,  
19 federal--contractor project director. Our job  
20 for the Department of Energy has many facets.  
21 We are accountable for a budget. We are  
22 accountable for a schedule. We are

1       accountable for a plan.

2                   First and foremost, a plan that  
3       meets the functional requirements, that  
4       protects the co-located worker and protects  
5       the public.

6                   The science, to applied science, to  
7       design determinations, and the risks  
8       associated with each of those, need to be  
9       measured against how you could mitigate those  
10      risks, and are there reasonable mitigations?  
11      And it's not I'm going to just push the  
12      problem down the road.  If there are  
13      reasonable mitigations, if you can manage to  
14      maintain the project schedule, and therefore  
15      the project budget, and address those  
16      concerns, that is our obligation, and that's  
17      why part of our conclusion--and I think Greg  
18      Ashley and I have been stating this to you in  
19      previous meetings--is that a large-scale test  
20      would answer, scaling, simulant, is it truly  
21      razor edge, or was there conservatism built  
22      into our testing, that extrapolated to a

1 degree of razor's edge, all legitimate  
2 questions that must be answered, but must be  
3 answered within the context of a holistic  
4 project.

5 CHAIRMAN WINOKUR: Let me ask a  
6 follow-up question. Then I'm going to turn  
7 the floor over Dr. Mansfield. I've been  
8 hogging this thing too long.

9 You have a Technology Steering Group  
10 which Dr. Mansfield will talk to you about,  
11 that did the vessel assessments, and they say  
12 that they have a high degree of confidence,  
13 that at least for the 33 Newtonian vessels,  
14 that you have robust mixing.

15 MR. ASHLEY: Yes.

16 CHAIRMAN WINOKUR: Okay. And robust  
17 would be defined as...?

18 MR. RUSSO: Meeting the functional  
19 criteria, which is getting the movements on  
20 the bottom, so that you have no hydrogen  
21 generation, getting adequate mixing, so that  
22 you are, as you're working down to the next

1 tank, and the next tank, are creating quality  
2 glass, and ensuring that you have the ability  
3 to determine if you are getting any  
4 accumulation, to avoid criticality, if you do.

5 CHAIRMAN WINOKUR: And PNNL is  
6 online with that? You're--you'd be  
7 comfortable with those conclusions?

8 DR. PEURRUNG: Yes. I think, at  
9 this point, PNNL has a, you know, has made its  
10 recommendations about approach, and has made  
11 the project aware of some of the--of its  
12 concerns about its assumptions. We're not  
13 asked to help make--to make that decision.  
14 We're not a signatory to those vessel  
15 assessments.

16 And so we're not on the record, one  
17 way or the other. Our role is to provide  
18 technical insight into the behavior of the  
19 material, and we have a series of products  
20 where we've made our concerns available to  
21 both the contractor and to the department.

22 CHAIRMAN WINOKUR: Based on the

1 technical knowledge that you presently have  
2 available, and the studies you perform, to the  
3 Newtonian vessels you've looked at, as well as  
4 some of the data you reviewed in Phase II  
5 testing, convince you that these vessels mix  
6 robustly?

7 DR. PEURRUNG: Not per our  
8 definition of robust mixing.

9 CHAIRMAN WINOKUR: And what is your  
10 definition of robust mixing?

11 DR. PEURRUNG: Our definition of  
12 robust mixing means off-bottom suspension.

13 CHAIRMAN WINOKUR: Okay. All right.  
14 I think I'll turn it over to Dr. Mansfield.  
15 Thank you very much.

16 MR. DWYER: Mr. Chairman, if I could  
17 just interrupt briefly for one clarification.  
18 Frank, you said that the testing will be  
19 completed, the large-scale testing will be  
20 completed mid-2012?

21 MR. RUSSO: Large-scale testing will  
22 go on indefinitely. The tests that have to be

1 run, that confirm the internal designs, which  
2 again we feel, as the design authority, are  
3 highly probable to be confirmed, will be  
4 completed in the 2012 time period. After  
5 that, there's a myriad of additional testing  
6 that we would say would go on indefinitely,  
7 including operator training testing, that you  
8 can use the large-scale facility to perform.

9 MR. DWYER: That commitment is as of  
10 when? When did you decide that was the  
11 schedule, if I could--

12 MR. RUSSO: We have a body called  
13 the Issue Resolution Team, and both Dale and  
14 I chair that, and when any technical issues  
15 come up that can't be resolved at the working  
16 level, between either our folks, or the  
17 department and our folks, it comes to that  
18 body. When they came to us about three weeks  
19 ago, they indicated that a unscrubbed  
20 schedule, meaning just a notional schedule,  
21 would have that testing done in `13. The part  
22 we need for the installation of vessels.

1           An immediate look at the  
2           construction schedule indicated that '13 was  
3           too late. We had them go back, look at what  
4           they would have to do. The long pull in this  
5           obviously is the selection of a simulant, and  
6           the agreement that that simulant is  
7           representative. But with that as the caveat,  
8           they came back and said 2012 was a doable date  
9           for the early tests, that would confirm that  
10          there is no further modification to the vessel  
11          internal.

12           MR. DWYER: Okay. That's rather  
13          important to us, because in the answers to the  
14          questions that have been the initiation of  
15          this hearing, no date or schedule was  
16          provided, and, in fact, one could have  
17          inferred that the testing was going to be done  
18          in the completed constructed facility. So  
19          that's not the case. You're going to do it  
20          somewhere else and the necessary parts will be  
21          done by the middle of 2012?

22           MR. RUSSO: That's correct.

1 MR. DWYER: Thank you. Thank you,  
2 Mr. Chair.

3 CHAIRMAN WINOKUR: Dr. Mansfield.

4 MEMBER MANSFIELD: Thank you. Many of  
5 my questions have been covered by what's been  
6 said already. I just want to make sure, for  
7 the record, that the PNNL report referred to,  
8 the 182 report, that's the M-3 mixing report?

9 DR. PEURRUNG: That's the report we  
10 did on phase testing--

11 MEMBER MANSFIELD: In spring of '09?

12 DR. PEURRUNG: Yes. May 2009.

13 MEMBER MANSFIELD: Yes. Fine.

14 Okay. I'll have some questions about that.

15 But first, I'm getting a confused  
16 picture of what--of how you move particles out  
17 of tanks. From what you've said so far, Mr.  
18 Dickey, Dr. Dickey, it's sufficient to clear  
19 the bottom, because then the currents from the  
20 pump suction are going to take the particles  
21 out of the bottom, regardless of how far up in  
22 the tank they're suspended?

1 DR. DICKEY: No.

2 MEMBER MANSFIELD: That's not true.

3 Okay.

4 DR. DICKEY: Not true.

5 MEMBER MANSFIELD: Then what does  
6 clearing have to do--for instance, what does  
7 the cleared area compared to the pump suction  
8 area, and pump--and that pump suction you had  
9 available, have anything to do with particle  
10 removal?

11 DR. DICKEY: Basically, the problem  
12 is that the zone of influence, the bottom  
13 clearing must be sufficient not to leave dead  
14 zones on the bottom, where particles do not  
15 move at all.

16 MEMBER MANSFIELD: Okay.

17 DR. DICKEY: And then what has  
18 happened--and this is again evidenced more by  
19 the experiment than any theory--that once you  
20 get the particles sufficiently in motion, that  
21 they are lifted far enough up into the tank,  
22 such that they are at the level of the pump

1 suction.

2 MEMBER MANSFIELD: And how many pump  
3 suctions are available for, say, HLP-22?

4 MR. ASHLEY: There is a single pump  
5 suction.

6 MEMBER MANSFIELD: Single pump  
7 suction.

8 MR. ASHLEY: Yes.

9 MEMBER MANSFIELD: So the particles  
10 40 feet away are going to see sufficient  
11 motive force from the pump suction to migrate  
12 all the way over to the pump suction inlet and  
13 be removed?

14 DR. DICKEY: Yes, and if you even  
15 listen to some of the people that watched the  
16 particles, looked like they even slide down  
17 the slope in a dished head, so--

18 MEMBER MANSFIELD: I'm sure they  
19 will. I'm sure they will. But they slide  
20 down the slope, and they're still half the  
21 diameter away from the pump suction. I'm not--  
22 -I don't have a picture of how the particles

1 on the bottom are going to move, when they  
2 have been plowed out in a zone of influence up  
3 the sides of the wall, or up into gliding  
4 zones from multiple PJMs, how they're going to  
5 get to the pump suction. Is that--nobody else  
6 has a problem with that?

7 DR. DICKEY: I could say they do but  
8 I won't--no. They really--it is one of those  
9 kinds of things, that you impart sufficient  
10 motion to the particles. You're not trying to  
11 remove the last particle that's there. You're  
12 just simply removing more particles than you  
13 put in, and that does seem to happen, and  
14 that's the reason for the pump-out.

15 MEMBER MANSFIELD: Okay. Then why  
16 do you need to suspend particles very high, at  
17 all? What's this issue of--why do you need  
18 the one-third scaling, if the particles only  
19 have to move a few inches off the bottom in  
20 order to be sucked into the pump suction?

21 DR. DICKEY: Well, they have to be  
22 moved far enough off the bottom.

1                   MEMBER MANSFIELD: A new--not a few  
2 inches? How many inches? How far?

3                   DR. DICKEY: Well, you have to have  
4 them suspended long enough above the 3 inch,  
5 or wherever the pump suction is, for that  
6 period of time to draw a sufficient number of  
7 them out, because they're going to all fall  
8 back down again. Some of the rapidly settling  
9 particles will be back on the bottom for a  
10 significant portion of each cycle. So you  
11 have to lift them far enough, that they are  
12 being drawn off for a sufficient period of  
13 time.

14                   MEMBER MANSFIELD: But you're doing  
15 it with multiple pulses?

16                   DR. DICKEY: Yes.

17                   MEMBER MANSFIELD: Okay. So you've  
18 always got another--

19                   DR. DICKEY: You're seeing a pulse  
20 every five minutes or so, and you're pumping  
21 out over an hour, kind of thing, so yes, you  
22 will see many pulses.

1           MEMBER MANSFIELD: How do you scale  
2 the pump suction inlet geometry in issue?

3           DR. DICKEY: Well, the first step  
4 was to make it just geometrically similar. In  
5 other words--

6           MEMBER MANSFIELD: Geometrically  
7 similar in...?

8           DR. DICKEY: In a small scale. In  
9 other words, the large scale--

10          MEMBER MANSFIELD: In area?

11          DR. DICKEY: The large scale is 3  
12 inches off the bottom. You reduce it in  
13 proportion of the scale of the tank.

14          MEMBER MANSFIELD: Linearly? By  
15 area?

16          DR. DICKEY: Linearly. And then the  
17 rest of it, we've gone around, we've looked at  
18 various ways of scaling that characteristic.  
19 The primary characteristic that was selected  
20 was a minimum velocity, to make sure that the  
21 particles were moving out of the vessel  
22 through the piping, in effect, and--

1 MEMBER MANSFIELD: So pumping  
2 velocity.

3 DR. DICKEY: The pumping velocity.  
4 And then we looked at it from the standpoint  
5 that that velocity seemed appropriate for  
6 capturing particles and not dragging them in  
7 from too far away.

8 MEMBER MANSFIELD: So what you're  
9 telling me, that suspension farther above the  
10 ground, above the bottom of the vessel, then  
11 is associated with zone of influence clearing-  
12 -

13 DR. DICKEY: Yes.

14 MEMBER MANSFIELD: --is still  
15 necessary?

16 DR. DICKEY: Yes.

17 MEMBER MANSFIELD: And so scaling by  
18 a gravitational settling number, for instance,  
19 is still important? Or whatever.

20 DR. DICKEY: Yes, yes.

21 MEMBER MANSFIELD: Okay. You  
22 mentioned that industry normally requires

1 fairly large-scale testings before they'll  
2 make an investment in a large, in a big  
3 process, installation. What percent--what  
4 scale do industries usually do? Five percent?  
5 Ten percent?

6 DR. DICKEY: I would have gone  
7 exactly the other way. That very, very often,  
8 the scales are very substantial.

9 MEMBER MANSFIELD: Very substantial.

10 DR. DICKEY: We were very successful  
11 at doing scale testing in a 3 foot diameter  
12 tank, to scale up to 80 foot diameter vessels,  
13 fairly routinely, and I think Mr.--or Dr.  
14 Eccleston would have commented along the same  
15 lines, that they have done tests in basically  
16 laboratory glassware and designed full-scale  
17 10-, 15 foot diameter reactors.

18 MEMBER MANSFIELD: So factors of 10  
19 or 20 scale-up, in length, are not uncommon at  
20 all?

21 DR. DICKEY: Not uncommon at all.

22 MEMBER MANSFIELD: Any way that, if

1       you're taking solids off the bottom, the way  
2       that you indicated, is there any--the smaller  
3       particles get taken off more easily and large  
4       particles get left behind for the end?

5               DR. DICKEY: The smaller particles  
6       will be suspended more nearly uniformly, so  
7       that if you put in 5 percent small particles,  
8       you're going to be drawing off 5 percent small  
9       particles. If you place large, high density,  
10      rapidly-settling particles in, and if you put  
11      5 percent of those in, you would most likely  
12      be drawing off 10 or 15 percent.

13              And it's a matter of how much of a  
14      gradient you'd have with the different  
15      particles.

16              MEMBER MANSFIELD: Okay. Thank you.  
17      Thank you, Dr. Dickey.

18              Mr. Ashley, I want to ask some  
19      questions about the Low Order Accumulation  
20      Model that's important for certifying tank  
21      mixing design. That's correct, isn't it? You  
22      will be using LOAM [Low Order Accumulation

1 Modell], L-O-A-M, to certify tank designs?

2 MR. ASHLEY: No, no.

3 MEMBER MANSFIELD: You won't?

4 MR. ASHLEY: LOAM was used as  
5 another method, in addition to the small-scale  
6 testing, was used as another method to provide  
7 competence in the ability to meet the mixing  
8 criteria. Specifically, LOAM was used to look  
9 at the accumulation, the solids accumulation  
10 criteria for the vessels.

11 MEMBER MANSFIELD: So what will you  
12 use to certify the vessel design, if you're  
13 not going to use LOAM?

14 MR. ASHLEY: Well, currently, as was  
15 established in our issue response plan, the  
16 IRP, as closure criteria 5, was the use of CFD  
17 [Computational Fluid Dynamics] and the V&V  
18 [Verified and Validated] of CFD to provide  
19 final design confirmation of the vessels. Now  
20 we have, as mentioned earlier, we have--are  
21 going to perform large-scale tests, which will  
22 provide us another opportunity to collect data

1 in support of final design confirmation of the  
2 vessels.

3 MEMBER MANSFIELD: Okay. Later, we  
4 will talk about hydrogen pipes and ancillary  
5 vessels. I was under the impression there,  
6 that LOAM is used in the design criteria, in  
7 the design QRA [Quantitative Risk Analysis],  
8 instead of--

9 MR. ASHLEY: No.

10 MEMBER MANSFIELD: That's from C.

11 MR. ASHLEY: No. LOAM has no role  
12 in the hydrogen and piping ancillary vessels.

13 MEMBER MANSFIELD: Okay. Why don't  
14 you go on to somebody else, Mr. Chairman?

15 CHAIRMAN WINOKUR: All right. We  
16 may come back to this for just a little bit,  
17 but I think for the time being, we're going to  
18 go to Mr. Bader.

19 MEMBER BADER: Good morning.

20 MEMBER MANSFIELD: Go ahead. That's  
21 all I have.

22 MEMBER BADER: Okay. Dr. Kosson,

1 I'd like to start out by going to one of your  
2 recommendations, and that was your  
3 recommendation number ten. And in this you  
4 were talking about the need for--that the  
5 preliminary CSER, Criticality Safety  
6 Evaluation Report, needed to be revised, and  
7 include workable and validated methods for  
8 criticality controls.

9 As a first question, could you  
10 summarize what you think that revision should  
11 incorporate?

12 DR. KOSSON: There are multiple ways  
13 that, or approaches that could be taken to  
14 criticality controls. However, I think what's  
15 most important here is understanding why we  
16 wrote that recommendation, because the current  
17 CSER, which my understanding is is scheduled  
18 to be revised before the end of this calendar  
19 year, explicitly was predicated on sampling  
20 accuracy and precision of plus or minus 5  
21 percent of the vessel contents.

22 And that sampling accuracy and

1 precision in a pulse jet mix vessel, with the  
2 sampling strategy that was being proposed, we-  
3 -our opinion was that that was not workable,  
4 that was not achievable within those tolerance  
5 limits. Therefore, as an underpinning of the  
6 current CSER, that was not a valid assumption.  
7 That's--we believe, based on other experience,  
8 that the sampling accuracy directly out of the  
9 pulse jet mixers would be much less precise to  
10 representing what is in the entire vessel,  
11 because of the mixing issues that were  
12 discussed earlier.

13           However, the alternative strategies  
14 can potentially include the sampling and  
15 understanding of the criticality controls  
16 prior to getting into the pulse jet mix  
17 vessels, and that's one of the options, I  
18 understand, that's currently being  
19 contemplated, and there are other options for  
20 that.

21           The other issue that we raised, and  
22 were concerned about, was the potential for

1       either particle settling-based segregation, or  
2       chemical-based segregation, if specific  
3       neutron poisons were extracted,  
4       preferentially, during the processing. In our  
5       opinion, the current CSER did not adequately  
6       address those issues, but as we understood  
7       from the comments earlier, that those issues  
8       are being looked at as part of the CSER  
9       revision that's in process right now.

10               MEMBER BADER: So just as a matter  
11       of interest, what would you estimate the  
12       difference in accuracy would be, if you were  
13       measuring at the outlets of the vessels?

14               You said you can't maintain the  
15       plus/minus 5 percent. What do you think it  
16       might be?

17               DR. KOSSON: The stratification in  
18       the vessel, and the oscillations that occur,  
19       will result, in part, due to the pulse jet  
20       mixing, if it's maintained in a cyclic  
21       fashion, which is currently the way most of  
22       them are designed, versus whether there are

1 other types of pulse jet mixing strategies.

2           However, we believe, based on prior  
3 experience, that 20 percent would be  
4 optimistic, but that there is not a good  
5 experiential basis, in actual test data, to  
6 even predict how close it will be. That  
7 that's one of the things that we felt was very  
8 important, if criticality controls are reliant  
9 on sampling from the vessels themselves, that  
10 demonstration of the precision of that  
11 sampling, and the accuracy of that sampling is  
12 an essential ingredient in full-scale or  
13 large-scale testing.

14           MEMBER BADER: If I understand your  
15 answer, this is the kind of narrow band that's  
16 not something like an instrumentation or a  
17 band, it's caused by the nature, it's that  
18 plus the nature of the process itself.

19           DR. KOSSON: Yes, sir.

20           MEMBER BADER: Dr. Dickey, would you  
21 agree with that, or would you like to add some  
22 insights?

1 DR. DICKEY: Yes, I would agree with  
2 the basic concept of it. I would qualify that  
3 with saying that the small particle sizes, and  
4 the liquid, can probably be sampled rather  
5 effectively, probably within the plus or minus  
6 5 percent. But certainly the dense, rapidly-  
7 settling particles, that may be fissile  
8 material, would be very difficult to sample,  
9 unless the timing were such that you could  
10 time it with the pulse, or something of that  
11 sort.

12 MEMBER BADER: That should be an  
13 interesting problem, to try and check timing  
14 with the pulse.

15 DR. DICKEY: I would agree. I fully  
16 agree.

17 MEMBER BADER: Okay. So back to  
18 what Dr. Kosson said, you're in agreement? Is  
19 that a good--

20 DR. DICKEY: Yes. I'm in agreement.

21 MEMBER BADER: Okay. Dr. Peurrung,  
22 would you like to make any comments on that?

1 DR. PEURRUNG: No. I essentially  
2 would agree with Dr. Kosson and Dr. Dickey.

3 MEMBER BADER: All right. Ms.  
4 Busche, you knew this was coming.

5 MS. BUSCHE: Yes.

6 MEMBER BADER: Is that consistent  
7 with what you understand, and then my  
8 question, second question would be, what is  
9 the implication, having to deal with the  
10 plus/minus, say 20, 20 percent, at best?

11 MS. BUSCHE: I do agree. I think  
12 with the technical challenges that we have in  
13 actually developing a Criticality Safety  
14 Evaluation Report for the final pre-treatment  
15 facility. In doing so, we are addressing some  
16 of the segregation, where we are with  
17 poisoning. That is one technical component of  
18 that, and that is, I think, to clarify, we are  
19 on target for that for the end of the year.  
20 We are not on target for the end of this year,  
21 to actually have the revised Criticality  
22 Safety Evaluation Report.

1                   MEMBER BADER: I'm going to go into  
2                   some of the other things that I think--

3                   MS. BUSCHE: Right. So to address  
4                   those--and I think my candid answer at this  
5                   point in time is somewhat I don't know. We're  
6                   evaluating the results of the vessel  
7                   assessment summary report, so that we can  
8                   clearly understand the nature and the location  
9                   of solids, not to oversimplify that, but so  
10                  that we can actually determine what is our  
11                  path forward to do that analysis. We don't  
12                  know. We're in the process of evaluating  
13                  those vessel assessment summary reports to  
14                  develop that.

15                  MEMBER BADER: Would it be fair to  
16                  say that it has to be somewhere other than on  
17                  the outlet of the vessels, in your opinion?

18                  MS. BUSCHE: I don't understand the  
19                  question.

20                  MEMBER BADER: In other words, would  
21                  you want the sampling to be done either in the  
22                  receipt vessels that are being talked about,

1 being built in the tank farms, the batch  
2 vessels, or--go ahead.

3 MS. BUSCHE: A fundamental tenet of  
4 our criticality safety strategy, going  
5 forward, has to be that criticality is  
6 incredible in our facility.

7 MEMBER BADER: I understand that.

8 MS. BUSCHE: It has to be, to meet  
9 the fundamental tents of 420, cause we have no  
10 mechanism to monitor, once it's in the plant.  
11 So to do that, it will be, I believe, a--I'll  
12 call it a specific administrative control on  
13 the waste acceptance criteria, that we will,  
14 through our pre-feed qualification program,  
15 have to verify that criticality is incredible,  
16 by the construct of that final criticality  
17 safety evaluation, once it's done.

18 So it will be based on the pre-feed  
19 qualification sample taken at tank farms in  
20 whatever mixing efficiency. We will have to  
21 factor that in to our analysis.

22 MEMBER BADER: Would it be fair,

1 then, to say, if you're sampling in the tank  
2 farms, if there is any accumulation of  
3 material inside vessels in the pre-treatment  
4 facility it makes it very hard to maintain  
5 that criticality is incredible.

6 MS. BUSCHE: Yes. The current  
7 results--

8 MEMBER BADER: That was--

9 MS. BUSCHE: Yes. My current--yes,  
10 it would. My current understanding is a  
11 result of the testing that we've completed to  
12 date, is solids do not accumulate, but there  
13 are still some uncertainties that I believe we  
14 are going to evaluate. We've done pieces, in  
15 parts, but to make sure we have the  
16 comprehensive answer, that's where the large-  
17 scale testing will come into play.

18 MEMBER BADER: So it seems to me  
19 that what again--and this is not unusual--  
20 you're dealing with a low probability, very  
21 high impact situation. So that, to me, would  
22 also say that what you really have to do is to

1 be sure that there is no accumulation in  
2 vessels, to an incredibly high degree.

3 Is that a fair statement?

4 MS. BUSCHE: Absolutely. That was  
5 the testing criteria that we put forth as part  
6 of the final phases of M-3. That was our  
7 safety criteria; yes.

8 MEMBER BADER: Okay. And I would  
9 then go back, and say you've heard the  
10 discussions here, and there is--probably the  
11 best way to characterize it is agreement among  
12 some of the--your experts, as to whether  
13 that's possible or not possible.

14 MS. BUSCHE: Correct. I mean, I--  
15 and I don't disagree with them. I mean, I'm  
16 not a--

17 MEMBER BADER: Yes.

18 MS. BUSCHE: I can't really  
19 challenge their pedigree. In going through  
20 the vessel assessment summary reports, there's  
21 quite a few parameters associated with solids,  
22 that we're trying to figure out our nuclear

1 safety control strategy for the entire plant,  
2 that those will play into.

3 So whatever those uncertainties are,  
4 that we believe, through analysis, we can  
5 demonstrate criticality is incredible, will  
6 need to be protected with a technical safety  
7 requirement.

8 MEMBER BADER: Well, and just to  
9 make it even more interesting, I would think  
10 that there--well, we've heard about some--I've  
11 just heard about some testing from Mr. Russo,  
12 that's going to be completed, 2012. But the  
13 large-scale testing, I understand, can't start  
14 before 2013; is that correct?

15 MR. RUSSO: No. What we're doing,  
16 we are doing a series of tests, and I'll  
17 answer your question by saying that the  
18 elements of the large-scale testing that  
19 affect the physical design of the internals of  
20 the vessels, will be completed by mid-2012,  
21 which is approximately a year in advance of  
22 the critical path date to install those

1 vessels and still meet the regulatory  
2 milestone.

3 MEMBER BADER: So you're starting  
4 the large-scale testing--

5 MR. RUSSO: Large-scale testing--

6 MEMBER BADER: --a year earlier than  
7 we had previously heard?

8 MR. RUSSO: I believe that to be  
9 correct, because again, when Dale Knutson and  
10 I had our IRT [Independent Review Team]  
11 meeting, a couple of weeks ago, and the team  
12 came in with a very notional schedule, we  
13 asked them to go back and see if they can  
14 improve it for the first test, and the  
15 sequence of tests, large scale, so that we can  
16 do the various confirmations of the  
17 vulnerabilities that you've heard discussed,  
18 and not necessarily full agreement on here  
19 today.

20 That test would be performed in  
21 advance of the installation of the vessels  
22 that are the HLP-22, HLP-27, the ones that are

1 in question in terms of accumulation.

2 MEMBER BADER: All right. Ms.  
3 Busche, let me come back to you.

4 First of all, I think it's good news  
5 that the large-scale testing is starting  
6 earlier, because just looking at the  
7 information that'll be gathered from that,  
8 would you believe that the large-scale testing  
9 really needs to be completed, particularly in  
10 terms of vessel clearing, before you can  
11 definitely write your criticality report?

12 MS. BUSCHE: The final criticality  
13 evaluation report?

14 MEMBER BADER: Final criticality.

15 MS. BUSCHE: Yes. Okay. We will be  
16 updating, because we're on the preliminary  
17 stage--

18 MEMBER BADER: Sure.

19 MS. BUSCHE: We will be updating  
20 based on what we know today, which I believe  
21 will give us better insight, as those test  
22 results are coming in, as to where the final

1           criticality evaluation will be.

2                       MEMBER BADER:   So if the--and now my  
3           memory is that the large-scale testing will  
4           continue until into 2014, and possibly up to  
5           2015.   Has that changed?

6                       MR. RUSSO:   No.   The current  
7           thinking is that that testing, in terms of the  
8           operability of the plant, and the internal  
9           designs, will go on indefinitely.   There's no  
10          reason not to keep that as a mockup for the  
11          operators, for future dates.   Once the  
12          investment is made, we are in discussions with  
13          the tank farm right now, in terms of, does  
14          that have utility to them, and they've  
15          indicated, you know, initially--and these are  
16          how do we get the best value to the taxpayer  
17          for the investment of the large-scale test?  
18          It actually serves to help operator training  
19          and operator management of the control system.

20                      So from a testing--

21                      MEMBER BADER:   Mr.--hold on.   Hold  
22          on, Mr. Russo.

1 MR. RUSSO: Yes, sir.

2 MEMBER BADER: I don't think  
3 indefinite testing, or testing that continues  
4 for an indefinite period helps Mrs. Busche.

5 MR. RUSSO: Again, let me clarify  
6 that point. I'm sorry. Ines says that it's  
7 the Latin in me sometimes.

8 The testing to validate the  
9 operating parameters of the plant will be done  
10 before 2014 is over. The testing or the  
11 utilization of that same facility, that same  
12 large-scale capability, as a mockup for  
13 operator training, is the second component.  
14 That's not testing. That is just how they use  
15 it as a operator training device.

16 MEMBER BADER: Is it reasonable to  
17 say, that by the end of 2014, or the beginning  
18 of 2015, Ms. Busche will have the data she  
19 needs to write the final report, the  
20 criticality evaluation?

21 MR. RUSSO: Yes.

22 MEMBER BADER: At that point, how

1 far away are you from initial "hot testing"?

2 MR. RUSSO: Hot testing?

3 MEMBER BADER: Yes.

4 MR. RUSSO: In the pre-treat, you're  
5 still over three years away.

6 MEMBER BADER: All right. So that  
7 really is a pretty critical piece of  
8 information. Would it help to accelerate the  
9 testing, from a criticality point of view?

10 MR. RUSSO: The--

11 MEMBER BADER: Let me put the  
12 background on that.

13 MR. RUSSO: Yes, please.

14 MEMBER BADER: I mean, this is  
15 something that simply can't be left to any  
16 chance at all. The earlier you do it, if you  
17 find something unexpected, the more time you  
18 have either to address it through a change in  
19 the plant, which is unlikely, given your own  
20 words, or in the tank farms.

21 MR. RUSSO: So the only caveat--I  
22 would agree with that premise but I also

1 believe it is extremely important, and if  
2 history is anything, you learn from it--that  
3 before we finalize the criteria for a large-  
4 scale test, we need to get agreement amongst  
5 our consultants, and at least full knowledge  
6 by you, the Board, as to what the simulants  
7 will be. Are those simulants truly  
8 representative? Is there a suite of simulants  
9 that would have to be used to demonstrate the  
10 questions that still remain, the  
11 vulnerabilities that still remain?

12 What is the appropriate scale-up  
13 factor? So my point, Dr. Bader, is that the  
14 schedule is very much predicated on getting a  
15 scope definition that will not have any  
16 unanswered questions, for the very reason you  
17 stated. Donna Busche must have clarity.

18 MEMBER BADER: So those tests have  
19 to, beyond any reasonable doubt, lay to rest  
20 the question of buildup of material in the  
21 vessel; is that correct?

22 MR. RUSSO: Presuming we can reach

1 agreement, we believe it's going to be a very  
2 complicated task to define a simulant that  
3 will satisfy the various expert bases, that  
4 will have--

5 MEMBER BADER: The size and density  
6 of particles.

7 MR. RUSSO: Cohesion.

8 MEMBER BADER: Cohesiveness.

9 MR. RUSSO: Cohesiveness, right.

10 MEMBER BADER: And then you have to  
11 also go into operation, simulation of  
12 operation.

13 MR. RUSSO: Right. And one of the  
14 reasons that--

15 MEMBER BADER: Mult--

16 MR. RUSSO: Go ahead. I'm sorry.

17 MEMBER BADER: Multiple batches run  
18 through the test. You're going to have to  
19 also look at bubbler and PJM control  
20 strategies. The effects of pipe and pump  
21 inlet and outlet effects. Sampling system.  
22 You've got to verify the sampling system.

1           You have to demonstrate your heel  
2 clean-out and inspection system, whether you  
3 can actually see something with those cameras.

4           Now I go back--and again, talking  
5 about the extension--really, this is an  
6 incredibly--it is a test to the operating  
7 system, and capability, in order to make it  
8 meaningful. I would say that the other thing  
9 that you're going to need to demonstrate is  
10 that for probably the first time in the  
11 history of this project, that a success-driven  
12 test really actually is successful, without  
13 major hiccups, because it looks to me like,  
14 with the schedule you've got on these tests,  
15 if anything goes wrong of any substance, and  
16 there's an issue, and if nothing else, some of  
17 these earlier tests that were supposed to  
18 demonstrate that mixing occurred actually and  
19 successfully in the way they were supposed to,  
20 what they proved was there were issues.

21           So it's not at all a certainty that  
22 you can do this as a success-driven test, and

1 it is a very complex, very lengthy test.

2 Ms. Busche, if all these things were  
3 done at the time you succeeded, or these tests  
4 came up with good results, you would then be  
5 able to write your final criticality  
6 evaluation report; is that a fair statement?

7 MS. BUSCHE: Correct.

8 MEMBER BADER: Is there anything  
9 that we've touched on that would be needed in  
10 addition to what we've just gone over?

11 MS. BUSCHE: From the criticality  
12 safety perspective, no. I think that the  
13 fundamental criteria is no accumulation in the  
14 vessels, based on the current geometry that we  
15 have. So we have to preclude accumulation in  
16 the vessels.

17 MEMBER BADER: Do you think all the  
18 different things that were mentioned are  
19 needed?

20 MS. BUSCHE: We need to refine or  
21 reduce the amounts of uncertainties to  
22 provide, I believe, the flexibility we're

1 going to need in the operations envelope, and  
2 it'll go back to the pre-feed qualification as  
3 to how we set the controls to preclude  
4 criticality in the plant.

5 MEMBER BADER: Do you--

6 MS. BUSCHE: I will--go ahead.

7 MEMBER BADER: Do you think there  
8 will be a reasonable basis for establishing  
9 the facility, the control philosophy and the  
10 operating and control instrumentation set?

11 MS. BUSCHE: There will be a basis.  
12 It may be conservative until we get plant  
13 operation then to conclude what testing would  
14 not--we could not gain from testing. So I  
15 will have to err on the conservative side when  
16 setting that control, if we have uncertainties  
17 that aren't answered by that large-scale test.

18 MEMBER BADER: Dr. Kosson, having  
19 heard all this, is this the kind of a test  
20 program you had in mind?

21 DR. KOSSON: The test program, as  
22 you've mentioned, is necessarily complex, and

1       it's unfair to characterize a test program  
2       until you've had the opportunity to review a  
3       detailed written scope of that test program.  
4       So I really don't think that I can comment on  
5       it at this time. I've not seen any outline,  
6       even, level of what the full scope of the  
7       program would look like, and as we all know,  
8       all of the--whether it satisfies the needs or  
9       not is in the details.

10               MEMBER BADER: Dr. Dickey, comments?

11               DR. DICKEY: Certainly the things  
12       that you mentioned sound like they have to be  
13       part of the program, and things that need to  
14       be resolved, and that's certainly the kind of  
15       thing that I would see out of a large-scale  
16       test.

17               MEMBER BADER: Dr. Peurrung.

18               DR. PEURRUNG: I have no additional  
19       comments.

20               MEMBER BADER: Mr. Russo, you  
21       mentioned that you would consult with your  
22       experts. Do you believe you need to bring

1       them in, and as you said, get agreement from  
2       your experts on some of these things?

3               MR. RUSSO: Absolutely. I think we  
4       need to demonstrate public confidence. We  
5       need to bring in the best minds in the  
6       country, and that's why Deputy Secretary  
7       Poneman put out the letter he put out to all  
8       the National Laboratories, and the other  
9       sites, indicating that this was one of their  
10      number one priorities. We also believe it's  
11      going to be very important to have your staff  
12      involved in, not the determinations, but a  
13      quality check on those determinations, in  
14      terms of, particularly in my mind the simulant  
15      selection, but also the scaling, so that as we  
16      progress through the testing, we can all  
17      arrive at a sense of confidence together.

18              MEMBER BADER: At this point, I  
19      think I've used enough time.

20              CHAIRMAN WINOKUR: All right. Thank  
21      you, Mr. Bader.

22              Mr. Brown.

1                   MEMBER BROWN: Yes. Thank you, and  
2 first, I'd like to thank the witnesses for  
3 being here this morning and being so  
4 responsive to the questions.

5                   You've addressed a number of the  
6 issues that I was going to ask before I got a  
7 chance to ask them, but I will go through some  
8 of them again, just to make sure I'm clear on  
9 these points.

10                  One of the points I would raise: it  
11 seems to me, from what I've heard thus far,  
12 that Mr. Knutson's statement, opening  
13 statement, where he said you were taking the  
14 advice of your experts, and you were  
15 addressing all of them, I'm not sure if I'm  
16 confident yet, but I've heard a lot of things  
17 this morning that suggest that some of the  
18 concerns, which I'll go through here in a  
19 minute, are being considered.

20                  One of the things you said, Mr.  
21 Ashley, earlier, was that you were increasing  
22 the power into the vessels by--on the order of

1 50 percent. Is that correct?

2 MR. ASHLEY: That's correct. HLP-  
3 22, for example, the design prior to going  
4 through the small-scale testing, and, you  
5 know, measurement of performance against  
6 requirements, had 12 PJM pulse jet tubes. The  
7 design that we are going forward with has 18  
8 pulse jet tubes.

9 MEMBER BROWN: But we need to  
10 understand that there's a limit to how much  
11 you can increase the power into those vessels.  
12 This isn't open-ended, where you can just keep  
13 going; is that right?

14 MR. ASHLEY: That's correct. There  
15 are physical limitations. For example, the  
16 increase in the pulse jet, number of pulse jet  
17 tubes, takes up volume in the vessel, thereby  
18 reduces the batch, the available batch size of  
19 that vessel, to a small extent. That's been  
20 evaluated.

21 We've evaluated that with the tank  
22 farm. We also have limitations in terms of

1 the air that we have, in particular the  
2 important to safety air. We also have current  
3 limitations in the design of our vent system.  
4 All of our vessels are vented to assure the  
5 release of gas, the dilution of gas. So there  
6 are points at which increased power in these  
7 vessels would cascade into other potential  
8 changes.

9 So we are--we do have to consider  
10 that when we consider the additional  
11 capability that we can provide in these  
12 vessels. As I said, the testing provided--  
13 testing and all of the assessments and  
14 analysis provide us an indication of what was  
15 acceptable to meet requirements in terms of  
16 moving forward with the design of these  
17 vessels.

18 MEMBER BROWN: And another one of  
19 the limitations is your emergency power,  
20 because these have to operate during a loss of  
21 power to the plant; is that right?

22 MR. ASHLEY: That's correct. AS I

1 said, we only have--right now, in the design,  
2 there is a certain number of compressors that  
3 provide important to safety air, those  
4 compressors are, in a loss of off-site power,  
5 are run from a emergency diesel. So that is  
6 an element of the design that has to be  
7 considered as we consider the modifications to  
8 these vessels.

9 MEMBER BROWN: The subject we've  
10 been talking mostly about this morning is  
11 accumulation of solids in these vessels, and  
12 Ms. Busche and others have addressed why  
13 that's important not to allow that to occur.

14 In response to the Board's  
15 questions, there were other options to just  
16 eliminating the possibility of accumulation.  
17 I mean, there is the feed that you put into  
18 it. There's also what some people have  
19 referred to as a Plan B, where you are able to  
20 muck the vessels out or monitor the vessels  
21 during operation, and I'd like to touch on  
22 those subjects for a second.

1           The options for the input into the  
2 vessels--and I guess this is going to be  
3 directed at the three experts, and then I'll,  
4 if anybody else wants to comment.

5           But my question is the feasibility  
6 of controlling these characteristics, and the  
7 technical gaps that remain in implementing  
8 some of these ideas, and I'm asking this now,  
9 it may be more appropriate in the tank waste  
10 section that's coming on a little later. But  
11 I don't think all of you will be here then.  
12 So I'd like to ask the questions now.

13           What are the challenges in changing  
14 the rheological properties of the waste, prior  
15 to feeding it into the plant?

16           Dr. Peurrung.

17           DR. PEURRUNG: We have done some  
18 work with rheological modifiers. There are  
19 materials that you can use to change the  
20 rheology. I think I'm somewhat more concerned  
21 about the match between the particle size and  
22 density distribution of the tank waste as they

1 currently exist and the waste acceptance  
2 criteria as identified in ICD-19.

3 MEMBER BROWN: Dr. Dickey.

4 DR. DICKEY: Well, I guess one of my  
5 pet concerns goes back to sampling, since I've  
6 also been involved in looking at some of the  
7 mixing problems in the tank farm, and sampling  
8 of solids of rapidly-settling particles is  
9 still a variable in the tank farm because  
10 they're using rotating pumps, and so it'll go  
11 through cycles as well. The sampling's going  
12 to be critical.

13 MEMBER BROWN: So whether you're  
14 talking about the tank farms or the vessels,  
15 it's a very challenging sampling, getting an  
16 accurate sample is a challenging--

17 DR. DICKEY: Particularly in  
18 rapidly-settling particles.

19 MEMBER BROWN: Okay. One of the  
20 things you said earlier, and I hope I'm not  
21 falsely encouraged, but I think I understood  
22 that this testing program that has gone on has

1       gone--you've gotten different conclusions than  
2       maybe what you expected, with regard to the  
3       heavier particles. I thought you said that  
4       they had--you didn't expect them to be, with  
5       pulse jet mixers, to be drawn out of the  
6       system, and I think at one time you said  
7       faster than what's going in.

8               DR. DICKEY: That's very true. The  
9       concern would have been that you couldn't get  
10      the particles suspended long enough, or at a  
11      high enough concentration, to draw them out  
12      during the power cycle, the power part of the  
13      pulse, and what appears to happen is because  
14      they are in the lower portion of the tank, and  
15      they are at a higher concentration, they seem  
16      to be drawn out preferentially over the small  
17      particles during a typical cycle.

18              And so what was learned by the  
19      testing was that when you pump the first  
20      quarter of a full tank out, you pump out more  
21      than the first quarter of the rapidly-  
22      settling particles. Matter of fact you--

1 perhaps as much as half.

2 MEMBER BROWN: And you suggested--you  
3 said the other particles--

4 MEMBER BROWN: And you suggested--  
5 you said the other particles, the smaller  
6 particles were more homogeneous, so you're  
7 getting pretty much--

8 DR. DICKEY: Same concentration.

9 MEMBER BROWN: Same concentration.  
10 That's encouraging to me.

11 DR. DICKEY: Oh, it was very  
12 encouraging to me.

13 MEMBER BROWN: So it suggests to me,  
14 that maybe this testing program might actually  
15 be achieving something very worthwhile and  
16 useful.

17 DR. DICKEY: Well, and I would add  
18 one other comment to that. The large-scale  
19 test would have been very, very difficult to,  
20 shall we say, visually observe off-bottom  
21 suspension. Now to PNNL's credit, they have  
22 used a type of device to measure, you know,

1 concentration of particles sitting on the  
2 bottom, and been able to correlate that with  
3 the off-bottom suspension. But this matter of  
4 being able to run a test, to look directly for  
5 accumulation, to be able to do a pump-down and  
6 see what you draw out, in the large scale, has  
7 got to be a very, very powerful test, to see  
8 whether you can prevent accumulation.

9 MEMBER BROWN: Dr. Kosson, can you  
10 comment on changing rheological properties of  
11 the waste.

12 DR. KOSSON: There is a wide variety  
13 of waste composition in the tank farms, as  
14 well as additives, as Dr. Peurrung mentioned,  
15 and therefore the strategy of how to manage  
16 the rheological properties most likely would  
17 include some management of the feed vector in  
18 terms of the blending strategy and the solids  
19 content moving into there.

20 Part of all of this is not only  
21 having acceptable targets but being able to  
22 verify that you have appropriate targets, and

1 that you can maintain them during actual  
2 operations. That goes very centrally to the  
3 pre-qualification program of how the waste is  
4 qualified, tested and analyzed, prior to going  
5 into the system, because there are certainly  
6 high degrees of uncertainty of the  
7 characteristics of the waste throughout the  
8 waste tank farm. We know there's great  
9 variability there.

10 That is why, in our report, we  
11 emphasize the need for tracking what the pre-  
12 qualification requirements are, and to make  
13 sure that the program tracks with that, so  
14 that it can meet the actual operational  
15 constraints.

16 MEMBER BROWN: Thank you. The other  
17 things that have to happen at the front end of  
18 this process are blending, or reducing the  
19 batch size, or returning feed, or diluting  
20 feed, or feed sampling.

21 Any comments on the challenges for  
22 the tank farm in those areas, that you'd like

1 to make?

2 DR. DICKEY: I think that some of  
3 this comes out of the ability to analyze and  
4 characterize the waste, ahead of its  
5 processing, and to look at the things that can  
6 be done. I think there--my understanding is  
7 that there are opportunities, and the kinds of  
8 things that have been done, as far the  
9 simulants that have been used to test the  
10 waste processing characteristics should, in  
11 combination with the waste characteristics, be  
12 possible to accomplish. The sampling's  
13 probably the biggest part of it.

14 MEMBER BROWN: Dr. Peurrung.

15 DR. PEURRUNG: I'll just step in and  
16 add that we have been supporting the tank  
17 farms contractor, Washington River Protection  
18 Solutions, on the development of an approach  
19 to qualifying, certifying the waste before it  
20 goes to the plant. We're actually using an  
21 experimental apparatus we developed for  
22 closure of issue M-1, and some of the sort of

1 ultrasonic approaches that Dr. Dickey  
2 mentioned, to look at, to ensure that material  
3 wouldn't be settling, or helping WRPS  
4 [Washington River Protection Solutions]  
5 understand how to use those technologies and  
6 then apply them for the purpose of qualifying  
7 the waste prior to transfer.

8 MEMBER BROWN: I think Mr. Russo had  
9 mentioned earlier, that the challenges of  
10 getting a surrogate, and I would point out  
11 that most all of the discussion this morning  
12 has been about testing with surrogates.

13 There isn't any testing with real  
14 waste, is there? Mixing? So this is the  
15 surrogate issue, that you raised, is a very  
16 important issue.

17 Could I run through a couple quick  
18 points that I had made to myself and that  
19 maybe-

20 DR. TRIAY: Mr. Brown--

21 MEMBER BROWN: Yes?

22 DR. TRIAY: --I believe that you

1 asked us whether one of us wanted to make a  
2 comment.

3 MEMBER BROWN: Yes. Dr. Triay,  
4 please.

5 DR. TRIAY: Thank you. I just  
6 wanted to emphasize a couple of things. I  
7 mean, I think that you mentioned, what I think  
8 that you call Plan B, you know, and I just  
9 wanted to make sure that the Board understood  
10 that the adding vessel inspection and hull  
11 removal capacity is part of the decisions that  
12 have already been made, and they are part of  
13 our response.

14 But I also wanted to comment on the  
15 fact that you said that the concerns of the  
16 experts, you wanted to be assured, you know,  
17 that we were going to take those concerns to  
18 heart, as Chairman Winokur mentioned, these  
19 experts that have been asked by our  
20 contractor, and the Department of Energy  
21 itself, to help us in ensuring success in this  
22 mission.

1           And we would be more than willing to  
2           put on the record, for the Board, how we are  
3           addressing the issues that have been raised by  
4           the experts, which we take extremely  
5           seriously, and are an integral part of the  
6           disciplined approach that we're taking to  
7           projects with management process. So we are  
8           more than willing to do that, so that you can  
9           specifically see how we are addressing those  
10          concerns.

11           MEMBER BROWN: Thank you. Thank  
12          you. Well, I know there are a lot of experts  
13          that you consult with. We just happen to have  
14          three here.

15           Can I ask you that question, Dr.  
16          Peurrung. The issues that you raised, or that  
17          you're aware of, that PNNL has raised, do you  
18          believe--or have you seen evidence that they  
19          are being addressed adequately by the project?

20           DR. PEURRUNG: I'm aware that there  
21          are risk-tracking tools and things where, for  
22          example, the vulnerabilities issues that we

1 raised. I'm aware that the project is  
2 tracking those. I have not yet seen formal  
3 resolutions of all of those comments yet, and  
4 I've seen the documents but they haven't been  
5 shared with me.

6 MEMBER BROWN: These are difficult  
7 issues that are being addressed here, but I  
8 think the first thing is some sort of  
9 transparency and receptiveness on the part of  
10 the person you're writing these reports for,  
11 that they recognize the problems that you've  
12 raised and then have done something to try and  
13 address them. Whether it's adequate or not,  
14 the "proof will be in the pudding." But is  
15 that the general sense? or not?

16 DR. PEURRUNG: The general sense I  
17 have is that the project is taking our advice  
18 into consideration, and is then proceeding to  
19 move forward, make their own decisions based  
20 on their own judgment, and create the closure  
21 packages, and so forth, that they see fit.

22 We have not been mostly operating in

1 a mode where we've gotten direct responses to  
2 our concerns.

3 MEMBER BROWN: Thank you. Thank  
4 you. Dr. Dickey.

5 DR. DICKEY: Well, I guess the  
6 simple answer is if I'm still sitting there,  
7 there is certainly the recognition of what the  
8 EFRT commented about what's going on, and I  
9 would have to say that while at times I felt  
10 the response was slow, of the concerns that  
11 were raised a couple of years ago, that has  
12 kind of forced us into some very rapid  
13 response here at the end, but the response has  
14 been there. So it's a qualified yes.

15 MEMBER BROWN: Okay. Thank you.  
16 Dr. Kosson.

17 DR. KOSSON: I think it's important  
18 to point out that CRESP is advisory to the  
19 Department of Energy and not to the  
20 contractor, in the role, the way that we're  
21 set up. We have provided our comments to the  
22 Department of Energy, and we have not had a

1 formal response back from them. From past  
2 history, it's been very evident that they take  
3 all of our comments very seriously and  
4 evaluate them.

5 But as is also documented in their  
6 response to your questions, that they path  
7 forward on them is not clear yet, other than  
8 the fact that they're tracking them and  
9 carefully considering them.

10 MEMBER BROWN: Thank you. I had a  
11 number of questions here for Mr. Ashley, but  
12 I'll eliminate most of them. Will this  
13 testing program--and that's what I'd like to  
14 shift to now, the large-scale testing issue--  
15 will it include scope for the ability of  
16 cameras to detect the presence of hills, and  
17 prototypic conditions in hill removal with  
18 cohesive sediments?

19 MR. ASHLEY: Yes. The design of the  
20 test platform will ensure that we can test the  
21 inspection, and hill dilution, and clean-out  
22 capabilities of the design.

1                   MEMBER BROWN: Okay. And will the  
2 testing include scope for the ability--excuse  
3 me. Could I ask the experts. My three  
4 experts here. The large-scale testing  
5 program. What are the critical things that  
6 have to come out of that program?

7                   What are the gaps in understanding,  
8 or that remain unresolved? And this may be  
9 repetitive from what you've said before but--

10                  DR. PEURRUNG: We are actually asked  
11 that question as part of Question 18, that was  
12 directed to the laboratory, and our response  
13 at the time was it depends--you know, whether  
14 to do large-scale testing, to some extent  
15 depends on what you want to get out of it.  
16 You know, first and foremost, I think we would  
17 support additional changes to design, to try  
18 to improve the robustness of the system. If  
19 you believe that the primary place of  
20 uncertainty resides in the scaling logs, and  
21 if you are going to choose these scaling  
22 factors that are perhaps not as conservative,

1 then you may need to do that full-scale  
2 testing in order to either validate how well  
3 the system does perform, make sure it  
4 actually--your performance falls into the  
5 range that you need.

6 If you--if the system is more  
7 robustly designed, though, the degree of  
8 uncertainty that you have doesn't really  
9 matter as much. And so to some extent, we  
10 feel that large-scale testing may or may not  
11 be needed. We would prefer to see some  
12 changes made to the system.

13 That said, there are some  
14 uncertainties on how some of these materials  
15 behave. The scale of behavior is complex, and  
16 there are areas in which, if you are limited  
17 in the changes that you can make to the  
18 system, you're going to have to do those tests  
19 in order to forecast how the system will work,  
20 and ensure that it will be adequate, or to  
21 establish the envelope of operability that you  
22 will have with the existing system.

1 I'm sorry. One more point. You  
2 asked what's critical, and I believe the  
3 selection of simulants, surrogates, as you  
4 say, is going to be critical.

5 You're going to need to be able to  
6 demonstrate that this will work on tank wastes  
7 that are highly heterogeneous, both from tank  
8 to tank and within the tank, and we do include  
9 cohesive materials as well as noncohesive  
10 materials.

11 MEMBER BROWN: One of the questions  
12 in my mind is, I'm not sure how you can get to  
13 simulants if you don't know what you're  
14 simulating, and I'm unclear on how well we  
15 have characterized the wastes in the tank  
16 farms. That's a subject we'll talk about  
17 later, maybe.

18 But first, you have to understand  
19 what you're simulating, and then you can try  
20 and simulate it, and in some cases, it seems  
21 to me that we don't have a really firm  
22 "handle" on the characteristics of the waste.

1 DR. PEURRUNG: And that would  
2 include both physical and chemical  
3 characteristics and how they vary over the  
4 course of pre-treatment, because you're not  
5 looking just at as-received waste, but also  
6 waste as in process.

7 MEMBER BROWN: And Dr. Dickey, would  
8 you care to comment on the objectives of  
9 large-scale testing, in particular, the  
10 challenges. You talked about sampling, and is  
11 this a critical--or how important is testing  
12 the sampling capability in these large-scale  
13 tests?

14 DR. DICKEY: I think sampling is  
15 very, very important, but I also would have to  
16 say that since, I guess, my recommendations  
17 are on the line as far as the scale-up, I  
18 certainly would like to have a much better  
19 verification of that, since that's a real  
20 opportunity here.

21 And I guess in response, that we  
22 keep coming back to the simulants and the

1 characteristics of it, one of the things that  
2 I would have liked to have seen out of the MCE  
3 testing, was more with different combinations  
4 of materials, such that we could understand--  
5 I'm coming at it from a mixing performance of  
6 saying one of the objectives would have been  
7 to define what the mixing capabilities are for  
8 different particle sizes, different densities,  
9 different concentrations, different degrees of  
10 cohesiveness, such that you could take any  
11 waste out of the tank farm, children it, and  
12 say for sure, yes, this particular mixing  
13 operation can be successful.

14 Basically coming at it from the  
15 other direction of saying what are the  
16 capabilities of the mixers in the WTP, and  
17 then being able to take a weight sample and  
18 say yes, that could be processed.

19 MEMBER BROWN: Yes. From what I  
20 understand, and I don't follow this as close  
21 as maybe I should, but the testing program  
22 hasn't, to date, hasn't had congealed wastes

1 in the bottom of the tank, and then led off  
2 the PJM to see whether it would, in fact,  
3 break those up or disperse them.

4 DR. DICKEY: No; those tests were  
5 run.

6 MEMBER BROWN: Were they?

7 DR. DICKEY: They actually--they  
8 found out that they couldn't get the stuff to  
9 settle in 24 hours, and so they actually made  
10 up samples of material with less water than  
11 was required, and pretty much laid the stuff  
12 into the tank, and got it to the point where  
13 they had 200 Pascal yield stress and restarted  
14 the mixers, and found out of that--I've  
15 forgotten exactly which one of the vessels,  
16 but they found that by firing groups of PJMs,  
17 that they were able to more successfully  
18 remobilize the material.

19 So one or two tests, is that  
20 sufficient? That's where I guess I would  
21 raise the question. But it's the kind of  
22 things that, no, the tests were run against

1 the expected characteristics of the waste  
2 coming out of the tank farm.

3 MEMBER BROWN: Dr. Dickey, just to  
4 clarify, the tests you're talking about are  
5 the tests where the increased--the decreased  
6 viscosity, or if you will, the property was  
7 obtained by compaction; is that correct?

8 DR. DICKEY: Not by compaction but  
9 simply by allowing the yield stress--this is  
10 kind of the function of the material--to get  
11 it to the point where it did have the cohesion  
12 characteristics, even though the simulant,  
13 when allowed to settle, didn't reach that  
14 level of cohesion.

15 It wasn't by compaction. It was  
16 just by partial hydration.

17 MEMBER BROWN: Okay. Thank you. I  
18 agree with you. It seems to me we need--we  
19 certainly need to look at the off-normal  
20 events as in a normal fashion, I guess, in the  
21 testing program, where there's nothing much to  
22 lose except money and time.

1 I read the EFRT reports and PNNL  
2 reports, but I read every word of the CRESP  
3 reports, and I'd like to quote a couple things  
4 from the CRESP reports, just to put into the  
5 record, to emphasize my concerns.

6 In July of this year, the number  
7 seven letter that CRESP wrote, said that  
8 "Uncertainty will remain about PJM performance  
9 until extensive experience has been gained  
10 through testing full-scale, prototypic PJM  
11 vessels, and actually operation of Waste  
12 Treatment Plant."

13 The important phrase there, it seems  
14 to me, "end operation of the Waste Treatment  
15 Plant." All this testing will not, because  
16 it's simulates, really resolve all the  
17 questions, I don't think.

18 We want to resolve as many as  
19 possible. But would you care to comment on  
20 that?

21 DR. KOSSON: Yes, please. Thank  
22 you. The testing that you do at large scale

1 would hopefully confirm that the vessels can  
2 meet the functional requirements that are part  
3 of the design basis for the vessels. It also,  
4 you would hope, would confirm the bounding  
5 functional requirements as you go through  
6 them.

7           There are a lot of uncertainties  
8 about the actual characteristics of the waste  
9 in the tank farm, and therefore you will not  
10 know, until you actually have experience, what  
11 the actual margin will be between your  
12 functional bounds that you have in your tanks  
13 versus the nature of the wastes that you  
14 desire to feed to it, based on what you pull  
15 out of the tank farm.

16           At that point, if the wastes that  
17 you pull out, or that you're sampling as you  
18 go, are fully within the design margin that  
19 you have with it, then you're fine going  
20 ahead. If they're not, then you have to look  
21 at options that allow you to modify the waste  
22 feed to bring them within those functional

1 requirements.

2           So there is not the ability, at this  
3 time, to reduce the uncertainty of the waste  
4 characterization, readily. There is a plan  
5 that is evolving to reduce the uncertainty of  
6 the ability of the tanks and what their  
7 functional bounds are. How much you test  
8 those tanks will determine how much confidence  
9 you have on what the actual operational  
10 margins and bounds are, as Dr. Dickey said a  
11 few moments ago, and that becomes a tradeoff  
12 between how you balance those.

13           But ultimately, there are going to  
14 be uncertainties that you're going to have to  
15 address as you understand more about those  
16 wastes, and at that point, I believe that  
17 having validated models helps you address that  
18 without having to go back to full scale,  
19 because you're going to need to have ways to  
20 address uncertainties as they arise during the  
21 several decades of facility operation.

22           MEMBER BROWN: Thank you. Thank

1       you. The other quote that I'd like to put  
2       into the record is from your recommendation  
3       from CRESP's. It's not Dr. Kosson's, it's  
4       CRESP Recommendation No. 1. Where he  
5       described full scale as one-eighth scale, or  
6       larger, on a volumetric basis.

7               And the recommendation said that  
8       "Near full-scale vessel testing facilities and  
9       simulation capabilities should be available  
10      for design confirmation, and during the full  
11      life cycle of WTP operations."

12              And that's what I keyed on with Mr.  
13      Russo's comment, that you are not just  
14      testing, you're going to build a facility that  
15      would be available for what other purposes?

16              MR. RUSSO: We're working wit the  
17      tank farm right now to scope out all the  
18      purposes that it could have, certainly, to  
19      understand how you do the waste preparation  
20      before it comes over to our facility. There  
21      could be some symmetry there.

22              Again, as I mentioned earlier, the

1 whole mockup on operator training, you know,  
2 that facility, after we're done testing, would  
3 have real value to people who have to go in  
4 and operate within the plant, in the real  
5 plant, after it's fully operational.

6 So those are a couple of examples  
7 that we would take out of the CRESP report, as  
8 how we would want to utilize it. I'd like to  
9 defer to Greg for a second, cause I think he  
10 can give you a more detailed summary of some  
11 of those things since he's working them  
12 realtime.

13 MEMBER BROWN: Thank you. Mr.  
14 Ashley.

15 MR. ASHLEY: Yes. We have formed a  
16 team with the tank farm and are doing some of  
17 the early planning, to determine, you know,  
18 what the purpose of the test is. Obviously,  
19 you never run a test until you first identify  
20 what gaps you're trying to fill. We have  
21 taken all of the expert suggestions,  
22 recommendations, issues and concerns, and

1 applied those in a matrix fashion, to  
2 determine which ones could be addressed--

3 MEMBER BROWN: Will that be  
4 available to us?

5 MR. ASHLEY: We'll make that  
6 available to you. Absolutely. We apply that  
7 in a matrix fashion to determine what a large-  
8 scale test could do in terms of advancing our  
9 knowledge of how these mixing systems will  
10 perform during the operation of the facility.  
11 We're also looking at that facility also  
12 providing information relative to tank  
13 transfers.

14 We're looking at, really, what are  
15 the edges--and I think Dr. Dickey pointed out--  
16 -what are the edges of operation? What are  
17 the true margins that we would expect. Once  
18 again, that's based on simulants but it  
19 provides a better understanding, during  
20 operation, of the margins that will be  
21 available.

22 There also has been discussion--and

1 everybody talks about the risks being on the  
2 underestimation, or overestimating  
3 performance. There also is the opportunity  
4 associated with this large-scale test, Our  
5 simulants have been in water, in effect,  
6 particles in water, so we believe also that  
7 there is the opportunity to show that, through  
8 this testing, that we actually have additional  
9 margin as opposed to what we have currently  
10 determined through our testing and through the  
11 assessments that we performed.

12 MEMBER BROWN: Thank you.

13 Mr. Chairman, I have three more  
14 questions, if that's all right.

15 CHAIRMAN WINOKUR: Yes. Fine.

16 MEMBER BROWN: Okay. The first one  
17 will be for Mr. Knutson, then Mr. Sain, and  
18 then Dr. Triay.

19 Mr. Knutson, much has been made of  
20 this pivoting of the project. I haven't seen  
21 the project move, in any way, so I'm not sure  
22 what--what I understand the pivoting is, is a-

1 -well you tell me what "pivoting" means.

2 MR. KNUTSON: Thank you, Mr. Brown.

3 I think it's important for people to recognize  
4 that projects of this scale need to actively  
5 transition from engineering through  
6 construction, to commissioning, to operations.  
7 There's a tremendous amount of inertia and  
8 momentum that has to be built, to be able to  
9 make those transitions occur effectively.

10 What I mean by "pivoting" is that  
11 this project has been in the engineering and  
12 construction phase for a decade, and it is now  
13 time to start adding the piece called  
14 commissioning, and ultimately start up and  
15 readiness for operation. That's the pivot  
16 that I envision as part of this pivoting  
17 message.

18 MEMBER BROWN: Thirty years of my  
19 childhood was spent in the Navy and I was on  
20 three commissioning crews of ships, and  
21 throughout the building of those ships, we had  
22 operators standing there, doing the testing

1 program, doing the planning, the operations.  
2 It seems to me that it's very important that  
3 you focus on--at some point in time you've got  
4 to focus on operating this plant, the  
5 operating procedures, the training of those  
6 operators, and such.

7 I mean, how far out are we until the  
8 plant becomes operational, at this point?

9 MR. KNUTSON: I think it's very  
10 important for the record to show that there  
11 are portions of the facility that will  
12 transition to operations as early as 2012.  
13 Things like the motor control centers and some  
14 of the switch gear buildings will become  
15 operationally ready in the next couple of  
16 years. So we are immediately upon that time.

17 MEMBER BROWN: Do you have the  
18 operating procedures written for those  
19 facilities that will come online in 2012?

20 MR. KNUTSON: We have the plan and  
21 the schedule associated for bringing those  
22 facilities online in 2012, and it includes

1 operating procedures, the training  
2 requirements, and the start-up and  
3 commissioning responsibilities, that have to  
4 be translated into people.

5 MEMBER BROWN: But those procedures  
6 aren't written today?

7 MR. KNUTSON: I'll defer the public  
8 record to answer that specific, with a  
9 detailed date.

10 MEMBER BROWN: Yes. I'd be  
11 interested in where we're at in the timeline  
12 of developing, writing procedures which can  
13 then be validated in the plant by the  
14 operators actually going out and putting their  
15 hands on the breakers and valves, and things.

16 MR. KNUTSON: My point, for the  
17 record, was to make sure that everyone  
18 recognizes that it is not too late. It's not  
19 too early. It's time. It is time to be doing  
20 that now, not waiting far into the future.

21 MEMBER BROWN: Thank you. Thank  
22 you. Let's see. Mr. Sain.

1 MR. SAIN: Yes?

2 MEMBER BROWN: A quick question,  
3 kind of in preparation for the next session.  
4 But from the point of view of the tank farm  
5 operator, what is the ideal waste acceptance  
6 criteria?

7 MR. SAIN: Well, the ideal waste  
8 acceptance criteria is on that you can meet.  
9 But--I couldn't resist that. And let me give  
10 you a perspective because, you know, this  
11 isn't the first time that I've personally  
12 heard a lot about, you know, what we know  
13 about the waste in the tank farm, and I'll  
14 remind you that I have a lot of experience at  
15 Savannah River.

16 MEMBER BROWN: How many years were  
17 you at Savannah River?

18 MR. SAIN: I've been at Savannah  
19 River, on and off, for almost 20 years. I was  
20 actually there at the site for 12 years. And  
21 you know, that's the site that had a PUREX  
22 [Plutonium Uranium Extraction] process. It

1 was certainly PUREX here. A lot of  
2 similarities. I can tell you that we disposed  
3 of--and the Board knows this--Tank 17-1 and F,  
4 which is the tank of -- to the tank farm.  
5 We're disposing of some plutonium to the tank  
6 farm, and, you know, we seem very capable of  
7 being able to mix sludge batches and feed DWPF  
8 [Defense Waste Processing Facility], and know  
9 what we're sending to DWPF.

10 And I propose, that as a company,  
11 you know, we have provided that expertise to  
12 the tank farm at Hanford. We'll continue to  
13 do that, that is my job, and we, I believe,  
14 know a lot more about characterization of the  
15 waste in TOC [Tank Operations Contract] at  
16 Hanford than is probably understood at this  
17 time. And hopefully, later today, as we get  
18 into some of that, Paul will be able to go  
19 through some of that.

20 But obviously we need to know what's  
21 in the waste that we're going to send to WTP.  
22 We need a waste acceptance criteria that's

1       feasible to be met from the standpoint of  
2       criticality. You've already been talking  
3       about that. I agree, totally, that for a plant  
4       like this, it's got to be credible.

5                You know, I'm very familiar with  
6       sending to a plant-

7                MEMBER BROWN: If I could interrupt  
8       for a second.

9                MR. SAIN: Yes?

10               MEMBER BROWN: How many--the  
11       chairman mentioned single-shell tanks and  
12       leaking single-shell tanks at Hanford, in his  
13       opening comments. How many of those single-  
14       shell tanks have been emptied at Hanford?

15               MR. SAIN: I don't know the answer  
16       to that.

17               MEMBER BROWN: Okay.

18               MR. SAIN: But we certainly have  
19       people here that can answer that.

20               MEMBER BROWN: Okay. And I guess my  
21       last question is for Dr. Triay. I'm sorry to  
22       interrupt. We'll catch up with you, I'm sure,

1 in a few minutes. But could you confirm for  
2 me that DOE is committed to this large-scale  
3 testing program that's been described by Mr.  
4 Russo and others.

5 DR. TRIAY: Absolutely. The  
6 Department of Energy has committed to the  
7 large-scale testing. As a matter of fact,  
8 it's part of our response. The schedule that  
9 has been given by Mr. Russo is the schedule of  
10 the Department of Energy.

11 And I'd just like to make absolutely  
12 certain that we all understand that the  
13 Department of Energy is extremely committed to  
14 addressing the concerns that have been  
15 expressed, that we have a strategy that  
16 consists of a disciplined phased approach, and  
17 fidelity to the technology readiness  
18 assessment process.

19 And we have had independent  
20 verification that we are moving in to close  
21 this issue in a viable and effective manner.  
22 And I really want to make sure that the Board

1 understands that the concerns that are  
2 expressed by our experts, and the amount of  
3 expertise that the secretary, and the deputy  
4 secretary, have asked the entire complex to  
5 support the Waste Treatment Plant with, is  
6 something that will lead to a successful tank  
7 waste cleanup.

8 MEMBER BROWN: Thank you, Dr. Triay.

9 Mr. Chairman, that concludes my  
10 questions.

11 CHAIRMAN WINOKUR: Thank you. We're  
12 going to move on to the next panel in a  
13 moment. I'd like to just ask one or two brief  
14 questions. I think Mr. Bader has one.

15 You said a few things here, Dr.  
16 Dickey, that I probably just don't understand.  
17 But it's very important that there's no  
18 accumulations in these vessels; right? That's  
19 a key feature. No accumulation of solids in  
20 the vessels.

21 DR. DICKEY: That's the top of my  
22 list.

1                   CHAIRMAN WINOKUR:  And you talked  
2                   about the pump-down test, about the fact that  
3                   you were surprised that the denser, the  
4                   heavier particles were swept out quickly, and  
5                   you said--and I may have misunderstood--that  
6                   they were like preferentially taken out of the  
7                   system, right?

8                   DR. DICKEY:  Yes.

9                   CHAIRMAN WINOKUR:  And so my  
10                  simplistic thinking is they were taken out  
11                  because they were down there.

12                  DR. DICKEY:  That's right.

13                  CHAIRMAN WINOKUR:  So it's very hard  
14                  for me to follow the reasoning here, where,  
15                  based on that testing, we're not going to have  
16                  serious concerns about solids accumulations at  
17                  the bottom of these vessels, because when I  
18                  look at the pump-down data, it doesn't go to  
19                  zero.  I mean, there's something left over.

20                  DR. DICKEY:  Yes, but it's a lower  
21                  concentration of what's left over.  You're  
22                  taking out more than you put in, which as long

1 as everything's moving on the bottom, it may  
2 not come out in this batch but it will the  
3 next.

4 CHAIRMAN WINOKUR: Yes.

5 DR. DICKEY: You're not  
6 accumulating. That's the critical factor.  
7 There's not stuff being left behind from the  
8 previous batch, and in effect what ends up  
9 happening, is you're actually putting material  
10 in that actually has a higher concentration of  
11 what's left in there.

12 CHAIRMAN WINOKUR: And I think some  
13 of the things Dr. Mansfield was getting at, if  
14 we were thinking about a 40 foot diameter  
15 tank, a big tank, I mean, is there the  
16 opportunity, in your opinion, that there could  
17 be regions where, if you can't adequately  
18 suspend these particles, that you're not going  
19 to begin to get accumulation of solids down  
20 there?

21 DR. DICKEY: Well, this gets back to  
22 the fact that what you're trying to do is to

1 make sure that everything is moving, and  
2 that's your bottom motion throughout the  
3 entire vessel. You don't have a place where  
4 the material is not ultimately swept up into  
5 the flow of the mixer. It may circulate out  
6 at the perimeter for three or four batches.  
7 But that's not saying that it's staying in  
8 there permanently and it's not saying that  
9 it's accumulating.

10 CHAIRMAN WINOKUR: All right. Thank  
11 you. One more quick question for you, Mr.  
12 Ashley. I guess the LOAM model is really what  
13 you used, in the end, to do calculations to  
14 close the M-3 issue. Is that correct?

15 MR. ASHLEY: As I mentioned  
16 earlier, that was one of the assessment tools  
17 that we used as the LOAM model, and that was  
18 for evaluation of accumulation, solids  
19 accumulation.

20 CHAIRMAN WINOKUR: And embedded into  
21 this equation is .18 scaling factor. Is that-

22 -

1 MR. ASHLEY: No. There is no  
2 scaling embedded in the LOAM model.

3 CHAIRMAN WINOKUR: There isn't?

4 MR. ASHLEY: The LOAM actually uses  
5 the actual test velocities and evaluates  
6 against the actual tested velocities. It does  
7 not use scale velocities.

8 CHAIRMAN WINOKUR: All right. Thank  
9 you very much. And Joe, do you have a  
10 question? Mr. Bader.

11 MEMBER BADER: Yes. A quick  
12 question for Mr. Russo. When will the  
13 detailed large-scale testing program be  
14 available to review? Hopefully, in a near  
15 final but not final draft, please.

16 MR. RUSSO: So again, I think the  
17 key element of answering your question is to  
18 get to a scope definition that we can get at  
19 least consensus on amongst our experts.  
20 Assuming that takes us about a month to two  
21 months to achieve that, and we would have to  
22 bring them all together and work that very

1 hard, to get that done.

2 The second element would then be  
3 defining the physical properties that would be  
4 needed in the equipment. We could have that  
5 done in short order. I would tell you, a  
6 first draft of something that we have  
7 consensus on, without agreement on simulant  
8 necessarily, at that point, could be done  
9 within three to four months.

10 And then while we're going and doing  
11 the physical work to solicit the tank, find  
12 the tank, get the equipment installed, we  
13 would have to work with all due haste to get  
14 that simulant defined because getting the  
15 physical simulant made, once it's defined, is  
16 another long pole in the cycle.

17 So a schedule nominally within a  
18 couple a months, and then an overall  
19 definitive plan, when we know the lead time of  
20 the simulant, would be probably within ten  
21 months.

22 MEMBER BADER: Presumably, you would

1 test a number of simulants.

2 MR. RUSSO: Absolutely. One of the  
3 questions is just how you would set up your  
4 simulant suite to get to a test result that  
5 people can look at and say we have  
6 significantly reduced the risk.

7 MEMBER BADER: Thank you. I have  
8 one question for Dr. Triay, and for Mr.  
9 Knutson.

10 You've heard the discussions.  
11 You've heard statements, just recently, from  
12 Dr. Dickey and Dr. Kosson, about testing the  
13 mixing, to see what it's capable of, and then  
14 matching batches against that from Dr. Dickey.  
15 You've heard a statement from Dr. Kosson about  
16 the possibility of needing to modify the feed  
17 to accommodate what you see as a result of the  
18 full-scale testing.

19 How would you--at the highest level,  
20 how would you summarize what you've been  
21 hearing in terms of the capability of the  
22 Waste Treatment Plant as defined by the full-

1 scale testing?

2 Mr. Knutson, would you like to-

3 MR. KNUTSON: Dr. Bader, if you  
4 could just repeat that last bit. There was  
5 quite a preamble that led to that and I'm  
6 trying to keep it all in context for that last  
7 bit, of what the question is actually focusing  
8 on.

9 MEMBER BADER: By the time the full-  
10 scale testing is completed, and I'm assuming  
11 you'll find a few things that needs to extend  
12 it, and things like that, you're going to be  
13 very close to hot functional testing.

14 And we've already heard statements,  
15 that it will be very difficult to make any  
16 major modification to the plant at that point.  
17 How are you going to relate what you see from  
18 the full-scale testing to the capacity and  
19 capability of the plant?

20 MR. KNUTSON: Okay. So I think it's  
21 important for us to recognize that we will not  
22 be close to hot testing, and in the process of

1 completing the elements of the large-scale  
2 test that are critical for design or for  
3 evolving the criticality safety report. We  
4 will be in approximately three years of a  
5 window for commissioning of--or hot  
6 commissioning of the pre-treat facility.

7 I characterize the path forward as  
8 one in which we recognize that there are five  
9 large facilities associated with this project,  
10 pre-treat being one of them, pre-treat being  
11 one that is a very complex facility.

12 We characterize that the risks and  
13 the issues associated with the concerns that  
14 have emerged from our experts are important  
15 and they've been recognized, they've been  
16 tracked, they've been captured in our risk  
17 registries. I believe our external experts  
18 associated with project management have  
19 evaluated the risk registries and have  
20 identified it as best in class, in terms of  
21 its ability to characterize and keep track of  
22 what the issues are and how that relates to

1 implementation of the baselines, and its  
2 effect on cost and schedule.

3 I believe it's also important, for  
4 the record, to show that there has been no  
5 disagreement amongst the experts, that for a  
6 vast majority of the wastes, the PJM systems  
7 are going to work just fine. There are  
8 elements of sludge and heavier particle  
9 distributions for which there is some  
10 discussion and some legitimate concern.

11 And we need to be able to continue  
12 to focus on that. We need to be able to  
13 address it. And that's what the large-scale  
14 testing program is set up to do. The testing  
15 program is aligned with the design schedule,  
16 so that outputs from the large-scale testing  
17 do dovetail with the design schedule, and our  
18 job is, as the Department of Energy, and  
19 certainly as the federal project director, is  
20 to make sure that that alignment remains  
21 robust.

22 MEMBER BADER: So if you saw test

1 results that indicated you needed to modify  
2 the internals of the vessel, you feel there is  
3 still time to do it?

4 MR. KNUTSON: I do; yes.

5 MEMBER BADER: Interesting. Would  
6 you also look at the option of resolving the  
7 issue by doing something else on the tank  
8 farms? Would that be one of your  
9 alternatives?

10 MR. KNUTSON: I don't have the  
11 opportunity to look beyond what I currently  
12 have in my plan. I can tell you that simply  
13 throwing things over the fence into the tank  
14 farms is not a particularly useful solution,  
15 because, ultimately, it comes back around to  
16 the issues of being able to commission, start  
17 up and operate. But based on the four months  
18 that we've been able to work together to  
19 understand what the issues are between the  
20 Waste Treatment Plant and the tank farms, the  
21 issues of our waste acceptance criteria and  
22 the feedstream deliveries from the tank farms

1 appear to be a very solid, very robust  
2 relationship, that can be implemented on the  
3 timelines that we're asking for.

4 MEMBER BADER: Let me ask Mr. Sain  
5 one last question. I remember a discussion we  
6 had, years ago, and you said the tank farms  
7 solves the sins of the plants that are built  
8 to treat the waste. Does that still hold?

9 MR. SAIN: It's definitely a complex  
10 business. But I think it's one that we  
11 clearly understand. Having responsibility,  
12 URS for Savannah River and Hanford, and been  
13 a good working relationship with Frank at WTP,  
14 I think really pays off.

15 MEMBER BADER: Mr. Chairman, I'll  
16 stop there.

17 CHAIRMAN WINOKUR: All right. Thank  
18 you very much. I'd certainly like to thank  
19 you, Dr. Peurrung, Dr. Dickey, Dr. Kosson. I  
20 appreciate your time, appreciate your  
21 insights. They were invaluable. I though it  
22 was a great exchange. I learned a lot and I'm

1       sure all the Board members did.

2               So that was wonderful. And I know  
3 we're going to be dismissing you, Mr. Russo,  
4 you, Mr. Ashley, and I think the others will  
5 unfortunately have to stay for a while longer.

6               But we're going to call up the  
7 second panel now, and that panel would include  
8 the addition of Mr. Brockman, who's the  
9 manager of DOE's Office of River Protection;  
10 Ms. Stacy Charboneau, who we heard from  
11 before, who's the assistant manager of the  
12 tank farms project in the Office of River  
13 Protection; and Mr. Paul Rutland, who is the  
14 mission analysis and strategic planning  
15 manager for Washington River Protection  
16 Solutions.

17               MEMBER BROWN: Mr. Chairman, while  
18 we're waiting, do you mind if I ask two  
19 follow-up questions to Mr. Knutson about  
20 follow-up to Mr. Bader's comments.

21               CHAIRMAN WINOKUR: Let's let  
22 everybody get seated here for one second and

1       you can do that.

2               Okay.

3               MEMBER BROWN: Mr. Knutson, you made  
4       the comment, a couple seconds ago, that the  
5       majority of the experts agree that--or don't  
6       disagree that most of the waste, or some large  
7       fraction of the waste can be adequately  
8       handled with the PJMs as they are. I think  
9       that--is that what you said, or did I misquote  
10      you?

11              MR. KNUTSON: Well, there may be an  
12      oversimplification in there, but I believe  
13      that there is a large fraction of the waste  
14      that needs to be treated from the tank farms,  
15      for which the PJMs, and the design of the  
16      Waste Treatment Plant, right now, are--is not  
17      controversial.

18              MEMBER BROWN: Do you have any idea  
19      of what percentage that is?

20              MR. KNUTSON: I'll defer to other  
21      experts for that, but perhaps Greg Ashley  
22      could answer that as part of the public record

1 and as deferred question.

2 MEMBER BROWN: Okay. And the other  
3 thing, we've talked about the large-scale  
4 testing and Mr. Bader asked would you be able  
5 to make changes to the PJMs, etcetera, and you  
6 said yes.

7 It seems to me there'd have to be  
8 pretty rigid metrics along the way, if the  
9 intent is that you allow yourself enough time  
10 before the vessels are in place, or finished,  
11 to make changes.

12 Have you got a set of rigid metrics  
13 in your own mind, or that this has to be  
14 achieved in the testing program in order to go  
15 forward, or it raises an alarm that you are  
16 not going to be able to complete the testing  
17 adequately, to then make changes?

18 MR. KNUTSON: My comment comes from  
19 the perspective that, I think as the Board  
20 recognizes, we have another construction  
21 project review coming up in November, and one  
22 of the expectations of that construction

1 project review is that we would have  
2 restructured the way we approach the  
3 operational readiness review process.

4 We would have restructured the way  
5 we looked at facility start-up and  
6 commissioning on parts of the project that  
7 aren't pre-treat, and by doing that, provide  
8 ourselves additional time for dealing with  
9 issues such as a surprise in the large vessel  
10 test activities that support pre-treat.

11 By doing that, we're able to work a  
12 large fraction of the issues well off the  
13 critical path. It's a very significant  
14 opportunity that the project should realize,  
15 and it allows us to provide another window of  
16 opportunity to deal with topics of  
17 uncertainty, should such a negative risk event  
18 occur.

19 MEMBER BROWN: So a critical path  
20 has been identified for this large-scale  
21 testing?

22 MR. KNUTSON: I won't go so far as

1 to say a critical path for large-scale  
2 testing. I can say that the near-term  
3 activities are directly tied to the design  
4 activities that require the input.

5 MEMBER BROWN: Thank you Mr.  
6 Chairman. That's all my questions.

7 CHAIRMAN WINOKUR: Dr. Mansfield.

8 MEMBER MANSFIELD: Thank you, Mr.  
9 Chairman. First, I'd like to set the stage,  
10 I'd like you to describe a bit about how the  
11 tank farms are going to have to operate.  
12 You're going to have to prepare waste batches,  
13 and it's the sludge batches I'm most worried  
14 about, because those are the ones that aren't  
15 necessarily easy to process.

16 You'll need to dilute them; right?  
17 So you'll have to--first, you have to get them  
18 out of the tank; right? Do you have to dilute  
19 them to do that?

20 MS. CHARBONEAU: The plans, as they  
21 are today, are essentially that we will have  
22 a set number of what we will call staging

1 tanks to feed the WTP, and for the sludge, in  
2 particular, the tanks that we have in mind  
3 currently have a quantity of sludge in them or  
4 we'll plan to have a quantity of sludge in  
5 them such that the amount of sludge in those  
6 waste tanks will be mixed. And I don't know  
7 if "dilute" is the right answer for that.

8 Basically, the amount of sludge in  
9 that material, we will add the appropriate  
10 amount of supernate to motivate that sludge.

11 MEMBER MANSFIELD: Okay. You'll add  
12 supernate. These will be single-shell tanks;  
13 right?

14 MS. CHARBONEAU: No. I'm sorry.  
15 The feed tanks for WTP are double-shell tanks.

16 MEMBER MANSFIELD: Okay. So all of  
17 the sludge is in double-shell tanks now?

18 MS. CHARBONEAU: No; it is not. So  
19 we have many years of retrieval activities--

20 MEMBER MANSFIELD: So you're going  
21 to retrieve it from the single-shell tanks, to  
22 get it--to retrieve it, you've got to dilute

1 it to move it, don't you?

2 MS. CHARBONEAU: For those--

3 MEMBER MANSFIELD: The sludge--

4 MS. CHARBONEAU: A couple answers.

5 MEMBER MANSFIELD: The so-called  
6 peanut butter sludge.

7 MS. CHARBONEAU: Right. So for  
8 those tanks that are, I'll say sound, single-  
9 shell tanks, we add supernate to motivate that  
10 sludges, or salt cake, quite frankly, and for  
11 those that are assumed leakers, we actually  
12 add very little liquid to those tanks, and  
13 right now, we're designing a system that's an  
14 eductor system. So very small quantities of  
15 liquid will be added for those tanks.

16 MEMBER MANSFIELD: Okay. So this  
17 will end up in a staging tank where you're  
18 going to now have to do things to do it, to  
19 make it meet waste acceptance criteria. Do  
20 you have any line-plugging problems when  
21 you're moving this sludge around?

22 MS. CHARBONEAU: Currently, today,

1 we do not experience line-plugging problems.  
2 It's pretty low, the percent solids that we're  
3 moving today.

4 MEMBER MANSFIELD: These are going  
5 to be--okay. But in the future, are you going  
6 to--will the waste be sufficiently dilute,  
7 that you won't have some of the line-plugging  
8 problems that sometimes happen with less  
9 dilute material?

10 MS. CHARBONEAU: I'll defer to Paul  
11 in a second, but we have the ability to flush  
12 lines, should we have a line-plugging issue  
13 within the tank farms, as we're retrieving  
14 waste or moving waste between our single-shell  
15 and double-shell tanks. Paul, if you had  
16 something to add.

17 MR. RUTLAND: Our integrated grade  
18 waste feed delivery strategy has been evolving  
19 over the two year since we've taken over the  
20 tank farm contract. Initially, when we took  
21 over the tank farm contract, the plan, at that  
22 time, including in System Plan Rev 3, was to

1 pile waste into tanks up to 200 inches, and  
2 try to retrieve and feed from those tanks to  
3 the WTP. Our initial assessment, when we took  
4 over the job, was that we didn't believe you  
5 could mobilize that amount of sludge in a  
6 double-shell tank system.

7 So in our integrated waste feed  
8 delivery plan, we have identified five HLW  
9 [High-level Waste] tanks that we are calling  
10 our waste feed staging tanks, and those tanks  
11 will stage approximately 70 inches of sludge,  
12 which, if you do the rough math, basically  
13 correlates to about 16 weight percent solids  
14 that we'll be feeding to the WTP.

15 MEMBER MANSFIELD: Directly?

16 MR. RUTLAND: From those staging  
17 tanks; yes. The key thing to remember is that  
18 the sludge that is in those tanks will be a  
19 combination of sludges that we've mixed  
20 together, and blended together, in order to  
21 produce a batch for the WTP. So we've tried,  
22 we've recognized the issues that we had with

1 mobilizing large layers of sludge in DSTs  
2 [Double Shell Tanks]. We've identified that  
3 issue. We've addressed it in our waste feed  
4 delivery strategy, such, that we're only now  
5 planning on having batches of 70 inches in  
6 those five staging tanks for the WTP.

7 So your dilution question is one of,  
8 we believe when we have created the batch, we  
9 will be at the feed concentrations that's  
10 necessary to meet the WAC for the WTP.

11 To answer your line-plugging issue,  
12 currently, we don't have any issues with that  
13 going on in the tank farm, either in our  
14 retrieval systems, or in our transfer systems.  
15 Previous issues with plugging at the Hanford  
16 site primarily dealt with phosphate,  
17 phosphates being, gels being formed in  
18 transfers due to not controlling the chemistry  
19 of the waste appropriately.

20 Our waste compatibility program now  
21 controls that, where we stay away from those  
22 areas where you may have those line-plugging

1 regimes with phosphate, and we do not believe  
2 that we'll have any trouble in transporting  
3 the waste to the tank farm. We have no  
4 evidence today, that we have any line-plugging  
5 in the transfers that we're doing today. We  
6 don't believe that we'll have significant  
7 settling in our lines.

8 Our design criteria for our waste  
9 transfer system is six feet per second for a  
10 linear velocity in our pipes, so we are a  
11 little bit above the velocity that's in the  
12 WTP in our transfer system, because we will  
13 probably be transferring around more  
14 concentrated sludges than you would see in the  
15 WTP.

16 So our linear velocity that we  
17 require in our pipes is higher. So we don't  
18 believe we'll have plugging in the lines in  
19 the tank farm.

20 CHAIRMAN WINOKUR: I'm going to ask  
21 the Board members to try to keep their  
22 questions in the range of ten minutes as we go

1 through this, so that we can, you know, finish  
2 up with this and then get to the public  
3 comment period. Okay.

4 MEMBER MANSFIELD: At what stages do  
5 you have to sample the waste and test the  
6 waste to determine physical properties, and  
7 what physical properties do you have to--will  
8 you have to measure to meet a WAC, a waste  
9 acceptance criterion?

10 MR. RUTLAND: We will sample, that  
11 we will do the prequalification sample of the  
12 batch. Each one of those 70 inches of sludge,  
13 as I've just described in the file staging  
14 tanks, will have to be sampled for that  
15 prequalification sample. Once that sample's  
16 pulled, that tank has to remain quiescent, and  
17 what I mean by "quiescent" is no additional  
18 weights can be added to that tank during that  
19 six month period, while we go do the analyses  
20 of the sample that we pulled, to make sure  
21 that it meets all of the requirements for the  
22 WTP waste acceptance criteria.

1                   MEMBER MANSFIELD:   And how do you  
2                   ensure that that sample is--how do you ensure  
3                   it's homogenous and that your sample is  
4                   appropriate?

5                   MR. RUTLAND:   Currently, right now,  
6                   we have a waste mixing and sampling program  
7                   that is ongoing in the tank farm.  Our plan,  
8                   and strategy today is to do the waste sampling  
9                   and mixing in the million gallons tanks.

10                  Just so that everybody's very clear,  
11                  the mixing and sampling issue for Hanford  
12                  waste is not a new issue.  It was identified  
13                  in 2002 and has been incorporated in the ORP  
14                  Risk Register since that time.

15                  So we've known for a while, that  
16                  this risk was out there.  In 2008, when we  
17                  took over the contract, EM [Environmental  
18                  Management] and ORP accelerated our mixing and  
19                  sampling program by the application of ARRA  
20                  [American Recovery and Reinvestment Act]  
21                  funds, such that we accelerated the mixing and  
22                  sampling program by two years, because we felt

1       like we needed to have those answers earlier,  
2       so that we could support the WTP.

3                   MEMBER MANSFIELD:   Okay.  I'm going  
4       to read a list of some potential waste  
5       properties that are important for  
6       understanding various aspects of the pre-  
7       treatment facility operation, and I'd like you  
8       to tell me whether or not you measure those,  
9       and kind of precision, or rather, confidence  
10      level do you have in your measurements.

11                   For instance, density.  What would  
12      that--shall I read the whole list, or would  
13      you like me to do one at a time?

14                   MR. RUTLAND:  I guess first of all,  
15      I'd like to say that the requirements for the  
16      sample are really being determined, and the--  
17      and we'll call it the quality of the sample,  
18      are being determined by the ongoing DQO [Data  
19      Quality Objectives] effort that we have with  
20      the WTP today.  So I may not be able to answer  
21      all of your questions in that--

22                   MEMBER MANSFIELD:  So you don't have

1 any current goals for that.

2 You will measure solid content,  
3 though?

4 MR. RUTLAND: Yes.

5 MEMBER MANSFIELD: Okay. And  
6 activity of course.

7 MR. RUTLAND: Yes.

8 MEMBER MANSFIELD: And gas  
9 generation?

10 MR. RUTLAND: I believe that's a  
11 part of one of the things that we have asked  
12 for; yes.

13 MEMBER MANSFIELD: Okay. Including  
14 not just H<sub>2</sub> but O<sub>2</sub>, N<sub>2</sub>, N<sub>2</sub>O?

15 MR. RUTLAND: I believe that's a  
16 part of the program where we have identified  
17 that we need some analytical technique  
18 development and need to do that.

19 MEMBER MANSFIELD: Okay. Do you have  
20 heat generation?

21 MR. RUTLAND: Yes.

22 MEMBER MANSFIELD: Viscosity?

1 MR. RUTLAND: Yes.

2 MEMBER MANSFIELD: Yield stress?

3 MR. RUTLAND: Yes.

4 MEMBER MANSFIELD: Okay.

5 MR. RUTLAND: Those are currently  
6 required by the ICD-19, so we know that we  
7 have to measure those.

8 MEMBER MANSFIELD: Yes, and we  
9 expect them to show up in the WAC; correct?

10 MR. RUTLAND: Yes.

11 MEMBER MANSFIELD: Okay. Are there  
12 any others?

13 MR. RUTLAND: I believe we will be  
14 asked to determine fissile material content,  
15 which is already a part of ICD-19.

16 MS. CHARBONEAU: And critical  
17 velocity, which refers to the previous  
18 question about the density.

19 MEMBER MANSFIELD: I'm sorry. Say  
20 that again.

21 MS. CHARBONEAU: Critical velocity.

22 MEMBER MANSFIELD: The critical

1 velocity; right. Okay. But you don't know  
2 yet what accuracy is going to be required?  
3 What confidence level, I should say.

4 MR. RUTLAND: Currently, we don't  
5 know the accuracy that's going to be required.  
6 That's a part of the DQO process that is  
7 ongoing with the WTP now, and the results of  
8 that will feed in to our mixing and sampling  
9 program such, that we modify our program to  
10 meet the requirements of that DQO.

11 MEMBER MANSFIELD: Okay. The  
12 Environmental Management Tank Waste  
13 Subcommittee reported 28 issues closed,  
14 including the prequalification capability for  
15 waste batches. "Closed" doesn't mean that  
16 you've got all the answers; right. It means  
17 that you don't believe at this time, that  
18 anything that will prohibit you from  
19 continuing, completing the engineering  
20 procurement or construction efforts; is that  
21 correct?

22 MS. CHARBONEAU: That's correct.

1           MEMBER MANSFIELD:   Okay.  Right now,  
2           that's all that that means; correct?

3           MS. CHARBONEAU:   That's correct.

4           MEMBER MANSFIELD:   So what's closed  
5           is not closed, and you've got a lot of work to  
6           do, and you can't answer questions today about  
7           whether or not you're going to be able to meet  
8           any particular waste acceptance criterion  
9           until you know what it is and--

10          MS. CHARBONEAU:   So as the EFRT  
11          issues were closed, and those technical issues  
12          were addressed, any changes necessary to the  
13          interface control document were looked at and  
14          visited.  There were some specific changes  
15          with regard to the solids waste percent, that  
16          will be dealt with within the WTP facility as  
17          one of those technical issue closures.

18          Right now, the tank farm believes  
19          that we can meet the waste acceptance criteria  
20          as--

21          MEMBER MANSFIELD:   Any waste  
22          acceptance criteria that's--

1 MS. CHARBONEAU: As outlined in the  
2 interface control document today.

3 MEMBER MANSFIELD: Okay. In ICD-19;  
4 right?

5 MS. CHARBONEAU: Right.

6 MEMBER MANSFIELD: Okay.

7 MS. CHARBONEAU: And so as we go  
8 through the DQO process and understand, like  
9 you said, what's the confidence level, to what  
10 degree do we need to sample, what is the size  
11 and quantity of those samples, not the kinds  
12 of things that we'll need to determine through  
13 the DQO process.

14 MEMBER MANSFIELD: Okay. My list of  
15 properties before--let me add to it. Would  
16 you have to test for gels and for precipitates  
17 that might clog the ion exchange columns,  
18 things like that, and things like that as  
19 well? Would that be part of a criterion, do  
20 you think?

21 MS. CHARBONEAU: I think what we'll  
22 need to do is have a good understanding as we-

1        -and I'll just call them "problematic tanks."  
2        And Ines referred earlier today about good  
3        process history we have with regard to the  
4        constituents, and the characteristics of the  
5        waste in the tanks today. I think we have a  
6        good understanding of the problem tanks that  
7        we knew, and we will address those problem  
8        tanks through the transfer and blending  
9        discussions that Paul had talked about  
10       earlier, so as we're putting that feed batch  
11       together--right now, I can't answer the  
12       question on to what degree will we  
13       characterize those samples specific to things  
14       like phosphates.

15                    MEMBER MANSFIELD: Is there going to  
16       be--it the waste acceptance criteria going to  
17       define a particle that's too big for you to  
18       transfer to the PTF?

19                    MR. RUTLAND: Currently, we don't  
20       believe that it will. The waste acceptance  
21       criteria, as written today, is based on the  
22       linear velocity. If we can pump it through

1 the pipe and meet that linear velocity, we'll  
2 be okay.

3 MEMBER MANSFIELD: Okay. What if  
4 they have problems processing material with  
5 large particles, say, in the 100 micron stage?  
6 What will you do about that?

7 MR. RUTLAND: We will have to  
8 prepare batches that will meet the waste  
9 acceptance criteria--

10 MEMBER MANSFIELD: How will you do  
11 that? You can't blend large particles away.  
12 They're large, no matter how much you dilute  
13 them.

14 MR. RUTLAND: Currently, we don't  
15 have a means or mechanism in the tank farm to  
16 separate out large particles like 70 microns--

17 MEMBER MANSFIELD: No. I know you  
18 don't.

19 MR. RUTLAND: We will have to  
20 develop a strategy that would include--

21 MEMBER MANSFIELD: All right. Okay.

22 MR. RUTLAND: --grinding, or

1 something else, that would put the particle  
2 size into the particle distribution, that  
3 would be able to be accepted by the waste  
4 acceptance criteria.

5 MEMBER MANSFIELD: And my last  
6 question, Mr. Chairman. Are you going to  
7 have enough lab space to be able to do all  
8 this?

9 MS. CHARBONEAU: For what we know  
10 today, the answer's yes.

11 CHAIRMAN WINOKUR: Mr. Bader.

12 MEMBER BADER: Thank you.

13 Ms. Charboneau, looking at the  
14 criticality safety recommendations from the  
15 Criticality Safety Support Group, there is a  
16 statement that tank farms have been in static  
17 storage mode. Activity will increase for  
18 tank-to-tank sludge transfers, reconfiguration  
19 of kilogram quantities of plutonium in the  
20 near future.

21 Are you going to revise the  
22 criticality safety evaluation report, to

1 recognize the fact you're going into a dynamic  
2 from a static mode?

3 MS. CHARBONEAU: I am not aware if  
4 any plans to go back and reevaluate our  
5 criticality safety report today. Today, the  
6 evaluation has been done, and in fact we had  
7 a criticality safety review performed across  
8 the tank farms, again, about 12 to 18 months  
9 ago, and in the farms today, we find  
10 criticality to be incredible. And that's  
11 primarily based upon the geometries of our  
12 tank, and where we know the Pu oxide is, and  
13 some of the other--you know, we understand the  
14 distribution of some of the wastes as they are  
15 today, and knowing that process and knowing  
16 where we do have a couple of direct Pu oxide  
17 discharges to those tanks, how we address  
18 that, operationally, keeps us in appropriate  
19 DSA [Documented Safety Analysis] space.

20 I don't know, Paul, if you had  
21 anything to add.

22 MR. RUTLAND: Well, there's a couple

1 things that we really want to make sure that  
2 we are cognizant of. The first one is, we  
3 know where the plutonium is. It's not like  
4 the plutonium's going to surprise us, that  
5 we're going to find plutonium that we don't  
6 know about.

7 We feel we have a very good  
8 understanding and characterization of where  
9 the waste is in the tank farm. The  
10 characterization of what's in the waste, the  
11 overall composition of the tanks, we feel we  
12 have a very good "handle on."

13 As you know, in the late '90s, DNFSB  
14 [Defense Nuclear Facilities Safety Board]  
15 issued Finding 95-3, that dealt with the  
16 characterization of the Hanford tank farm. In  
17 the closure of that Board finding, the tank  
18 farm and its contractors developed the  
19 Hanford-defined waste model, and also did some  
20 additional sampling in the tank farm.

21 The Hanford Defined waste model was  
22 based on the process knowledge from the

1 Hanford site, from the very beginning of the  
2 Hanford operation. Each transfer that was  
3 made in the tank farm, and from any of the  
4 operating facilities in the tank farm, were  
5 tracked in that model.

6 In addition to that, the Origin 2  
7 code was used to predict the composition of  
8 the waste streams, of what was processed into  
9 the canyon facilities, PUREX processes and  
10 those things. The Origin 2 code was updated  
11 in 1965. It was updated, once again, in 2001.  
12 The reason it was updated in those two  
13 timeframes was it was overpredicting the  
14 amount of plutonium that was being accounted  
15 for.

16 And the Origin 2 code is not just a  
17 code that applies to Hanford. I'm sure you  
18 know it's an industrywide code.

19 MEMBER BADER: Mr. Rutland, let me  
20 read--I read from a March 2010 Office of River  
21 Protection Report, which summarizes what was  
22 discussed. The last sentence is:

1           "Team suggests that contractor not  
2 wait until a CSER Change is needed to start  
3 working on the next revision."

4           The report goes on to criticize the  
5 basis on which the existing CSER is done. It  
6 specifies a number of weaknesses. It makes  
7 the statement that for a static system, i.e.,  
8 not moving sludge around in large quantities,  
9 that there is sufficient margin, the benefit  
10 of having large amounts of conservatism, such  
11 that as long as it stays static--and I'm  
12 summarizing a number of statements in here--  
13 there's not an issue.

14           It says that when you start moving  
15 the sludge around, you really need to redo the  
16 CSER.

17           MR. RUTLAND: And I was about to get  
18 to our control strategy for that. For every  
19 transfer that we make in the tank farm, we  
20 have a waste compatibility program. One of  
21 the things that has to be analyzed for each  
22 transfer is criticality. It's also phosphate

1 generation, gel generation, all of those  
2 things.

3 So for each transfer, Dr. Bader, I  
4 believe we do do an analysis of the  
5 criticality associated with that transfer.

6 So I don't know if we've done--if  
7 there are plans to redo the CSER, but I know  
8 for each transfer, each retrieval that we have  
9 to do in the tank farm, we do have to do a  
10 criticality analysis for that transfer.

11 MEMBER BADER: Dr. Triay, do you  
12 have any comments on this situation?

13 DR. TRIAY: As you know, Dr. Bader,  
14 we have an extremely experienced contractor in  
15 the tank farms. They have a substantial  
16 amount of experience at the Savannah River  
17 site, and they retrieve waste and process  
18 waste for treatment at the Savannah River site  
19 routinely. So with respect to the analysis  
20 that has been discussed, the Department of  
21 Energy, at the local level, as well as the  
22 contractor, will get together like they always

1 do. I mean, Mr. Rutland is not a part of the  
2 safety authorization basis of the cadre of  
3 experts in the tank farm contract, and as you  
4 know, we take, of course, the safety of the  
5 tank farms extremely seriously, and our  
6 authorization bases are indeed what allows us  
7 to move forward.

8 So Ms. Busche and Mr. Sain will  
9 probably like to make a comment on this  
10 matter.

11 MR. SAIN: Sure. I would. As you  
12 know, all that work is controlled under a DSA,  
13 for the safety bases, and certainly, any  
14 criticality safety evaluation--all of that has  
15 to be looked at, just like Paul was saying, as  
16 part of preparing and planning a transfer.

17 So I can assure you that we're using  
18 the same process at TOC that you're familiar  
19 with at Savannah River, and that process is  
20 very rigorous, to include the safety bases and  
21 the criticality safety evaluation part of the  
22 planning process.

1                   MEMBER BADER: A number of your  
2 people were a part of writing this report.  
3 Mr. Brockman, do you have any comments?

4                   MR. BROCKMAN: I do. I'm not  
5 familiar with the report. Could you give me  
6 the title of that report. You said it was  
7 Office of River Protection?

8                   MEMBER BADER: It's Criticality  
9 Safety Recommendations from the Criticality  
10 Safety Support Group, and the lead sentence  
11 is: "The U.S. Department of Energy, CSSG  
12 [Criticality Safety Support Group], conducted  
13 a review of the tank operations contract,  
14 criticality safety technical bases, in  
15 December 2009."

16                  MR. BROCKMAN: I haven't--I'm not  
17 familiar with if I read that, but if that  
18 report was written, I would assume that the  
19 findings have been documented and have been  
20 transmitted to the contractor, and we'll  
21 follow up with it and make it a matter of  
22 record, what the status of that is.

1 MEMBER BADER: The other--

2 MS. CHARBONEAU: I guess I would  
3 just comment, I am familiar with that review.  
4 That's the review that I was referring to  
5 earlier.

6 MEMBER BADER: That was what I--and  
7 I saw you were down on distribution.

8 MS. CHARBONEAU: Right. But you  
9 know, as my response was earlier, I am not  
10 aware of any current plans, right now, to  
11 revise a CSER. We do address those issues  
12 through our waste compatibility and our  
13 transfer plans. So I'll have to defer and get  
14 back to you, if there's a specific date that  
15 we have identified based upon our increased  
16 retrievals and DST to DST transfers, we would  
17 deem that it's appropriate to readdress the  
18 CSER.

19 But today, we deal with waste  
20 compatibility and ensuring we stay within the  
21 DSA controls.

22 MEMBER BADER: The only other

1 question I have is, to me, the discovery of  
2 the plutonium dioxide particles, plural, in a  
3 sample, is a potential game-changer.

4           Would you comment on how prevalent  
5 you think they are and what characteristics  
6 you've seen from the PoO2 samples that have  
7 been examined, in terms of size, in  
8 particular.

9           MR. RUTLAND: The samples that we  
10 have today, the largest particle that's been  
11 seen is the one that's referenced in the  
12 report on the WTP, the 40 micron particle,  
13 that if you do the spherical equivalent  
14 becomes a 10 micron particle. As far as a  
15 surprise, I would not say that finding Pu  
16 oxide was a surprise. We actually do know  
17 that Pu oxide does exist in the tank farm. It  
18 also exists in some other tanks in the tank  
19 farm. TX farm, for example, that we have  
20 samples from, we do know we have Pu oxide in  
21 those tanks.

22           As I said, you know, our HDW

1 [Hanford Defined Waste] model did predict  
2 where those materials would be. Our sample  
3 program, every time that we've done a sample,  
4 it actually documents and confirms what the  
5 HDW model has predicted, as far as waste type  
6 is concerned being found in the tank. So the  
7 presence of Pu oxide was not a surprise. We  
8 knew that Pu oxide was in the tank farm and we  
9 have controls to deal with it.

10 MEMBER BADER: Do you plan to do  
11 further sampling of those two tanks, SY-102  
12 and TX-18--I think it's 118, in order to  
13 further characterize those because of the  
14 discovery--and I'll say, there was statements  
15 made that PoO2 was not expected, earlier on.

16 MR. RUTLAND: I don't know who made  
17 that statement. I would not agree with it.  
18 We do plan on actually re-sampling SY-102. It  
19 was in the plan, actually for this year, to  
20 resample SY-102. However, the project--we are  
21 in the process of replacing our core drilling  
22 machine, and it was deferred until next year.

1 So SY-102 will be sampled next year.

2 Currently, there's not a plan--I  
3 mean, I don't--it's not in the next year. We  
4 have sat down with the Department of Energy  
5 and developed an integrated sampling schedule.  
6 I don't believe that the 118 sample is  
7 scheduled in the next year. It may be in the  
8 year after that but I'm not--I don't have that  
9 at my hands, right now.

10 MEMBER BADER: Thank you. I have no  
11 further questions.

12 CHAIRMAN WINOKUR: Mr. Sain, in the  
13 last year or so, we've reduced the MAR  
14 [Material At Risk] coming into the facility,  
15 or we've reduced the waste acceptance criteria  
16 by reducing the MAR, and there have been other  
17 changes, and I think you've heard the  
18 discussions today about the potential  
19 uncertainties.

20 What do you see as the challenges  
21 that the tank farm is going to have to face?  
22 Do you think this is the toughest job that a

1 tank farm is going to have to prepare this  
2 waste, to control and characterize it, and  
3 feed it to this facility.

4 MR. SAIN: Well, I think, certainly,  
5 it's going to be a challenge to prepare the  
6 waste. But as I stated earlier, I think we  
7 have experience at doing this, at Savannah  
8 River, and I think we have brought expertise  
9 to TOC from Savannah River. We're capable of  
10 supplementing that. I think as the project  
11 goes along, we're going to do what we need to  
12 in the tank farm, to support, you know, the  
13 start-up and the operation of WTP.

14 CHAIRMAN WINOKUR: Are you going to  
15 be doing that in a proactive role, because we  
16 had a discussion, a very nice discussion with  
17 Paul Beck in Washington, and we were talking  
18 about particle size, and we asked him if he  
19 could control it, and we've had a little bit  
20 of a discussion here about that, and he said  
21 something like, well, we haven't received  
22 notification yet.

1                   And I kind of thought, well, you  
2                   know, the tank farm is going to run this show  
3                   in the end, and it would be, it seems to me  
4                   important, and I encourage you to make sure  
5                   that you're looking in front of the headlights  
6                   as much as anybody, to make sure that you can  
7                   see in advance, and way in advance, if you  
8                   can, what you're going to have to do to  
9                   prepare that waste.

10                   MR. SAIN: I can't agree more, I  
11                   agree totally with that, and I think we've,  
12                   since that time when we had that discussion,  
13                   you know, we've really focused a lot on  
14                   integration between WTP and the tank farm, and  
15                   certainly we have realigned, organizationally,  
16                   to provide an integrated approach, and, you  
17                   know, Paul, I'd like for you to address--one  
18                   of the things that we also discussed at that  
19                   time was, you know, to do additional sampling,  
20                   to improve, you know, the characterization of  
21                   the waste in the tank farms.

22                   DR. TRIAY: As Paul gets ready to

1 address that, I would like to point out that  
2 part of the assessment report that Mr. Knutson  
3 talked about in his opening remarks, called  
4 for an integration position at the Department  
5 of Energy level, and that position, we have  
6 moved out with that position at the Senior  
7 Executive Services level, and we're filling  
8 that function because we also recognize that  
9 integration is extremely important, not only  
10 at the contractor level or at the DOE level.

11 One of the specific tasks of the  
12 contract, that the tank operator contractor  
13 has with the Department of Energy, is  
14 integration, and looking ahead for the  
15 operability of the Waste Treatment Plant, and  
16 how we're going to be feeding the waste to the  
17 plant. Go ahead.

18 MR. RUTLAND: One other I would like  
19 to point out is we did develop a waste  
20 planning DQO, so that we would obtain more  
21 information in order to do better planning of  
22 the batches going to the WTP. So we completed

1 that effort this past summer and we have  
2 included samples in the sample program for  
3 that very specific purpose, to allow us to do  
4 better planning for the batches that are going  
5 to the WTP. So we are trying to get out in  
6 front of the headlights, so to speak.

7 My experience at the Savannah River  
8 site is that's very important, and one of  
9 those that Leo talks about being sent up here.  
10 We understand the issues that occurred, early  
11 on, in the DWPF operation with Sludge Batch  
12 2A, where they had to come back and blend some  
13 additional waste in it, so that they could  
14 actually pour glass in the melter.

15 So we're very familiar with the  
16 problems and the issues that we're facing, and  
17 we believe we have the right people. In  
18 addition, to make sure that you know that  
19 we're communicating significantly with the  
20 DWPF on the Savannah River site, we actually  
21 had a Waste Feed Workshop at the Savannah  
22 River site about two months ago, where we

1 spent three or four days with the DWPF people,  
2 discussing, walking through their waste  
3 acceptance criteria, how they mix and sample  
4 waste and how we could apply what they've  
5 learned at the Savannah River site to how  
6 we're going to do it at the Hanford site.

7 CHAIRMAN WINOKUR: At this time,  
8 have you received any basis of design changes  
9 that are telling you to limit the size of  
10 plutonium particles, or particles, in general?

11 MR. RUTLAND: We have not received  
12 any BOD [Basis of Design] changes to this, to  
13 date, that limits the particle size, or  
14 particle size of plutonium. The document that  
15 you were referring to, when I was in  
16 Washington two, I guess it's almost three  
17 weeks ago now, we met with the WTP on that.  
18 It was a draft document, and what you'll see  
19 in the next version is that it will say that  
20 the linear velocity measurement of 4 feet per  
21 second will meet the requirement, as outlined  
22 in that document, and although the document

1 was not written well and did not say that  
2 specifically, it should have said that, and  
3 we've talked with the WTP, and we've met and  
4 are working together to make sure that that  
5 type of issue doesn't occur again.

6 CHAIRMAN WINOKUR: Our last  
7 question. Stacy, you needed a new DSA for the  
8 tank farms; right? And when do you--

9 MS. CHARBONEAU: That's correct.

10 CHAIRMAN WINOKUR: What are the  
11 plans for that?

12 MS. CHARBONEAU: We actually just  
13 revised the DSA this last year, and so we  
14 rolled that out at the beginning of calendar  
15 year 2010. We find that that's -- we relooked  
16 at a number of control strategies within the  
17 tank farms as a part of that new DSA, as I  
18 know you're aware of, and specifically as we  
19 look at passive controls and specific  
20 administrative controls, we've reanalyzed,  
21 based upon some of the material-at-risk  
22 discussions, and some of the other, looking

1 forward and how we'll operate the tank farms  
2 specific to increase operations in transfers  
3 and retrievals, and we believe that the DSA  
4 today reduced a great deal of cumbersomeness.  
5 I will say in the previous DSA, it's more  
6 streamlined and allowed for improved work  
7 planning, which we rolled out a new work  
8 planning control strategy this year, as well.

9 CHAIRMAN WINOKUR: All right. Thank  
10 you. Mr. Brown.

11 MEMBER BROWN: Yes. Thank you, Mr.  
12 Chairman. I just have a few questions here.  
13 As I--and I guess the first one is for Mr.  
14 Knutson. As I prepared for this hearing, I  
15 went back and read the testimony of the former  
16 Waste Treatment Plant federal project  
17 director, that was given to this Board in  
18 March 2007 public meeting on safety and  
19 design.

20 And in his discussion of technology  
21 readiness assessments, he said that after the  
22 decision was made not to proceed with two

1 fully prototypical pilot plants, the omission  
2 of extensive prototypical testing has been an  
3 expensive error for DOE to correct, one that  
4 has prolonged the safe disposal of Hanford  
5 tank waste.

6 Now in Mr. Kasdorf's opening  
7 statement, he talked about the need for a  
8 credible strategy for dealing with  
9 uncertainties, and suggested four actions, and  
10 I'm curious, what your reaction is to those  
11 four suggestions that he made on how to deal  
12 with, or how to put together a credible  
13 strategy.

14 So do you see a need, a necessity  
15 for accelerating the characterization of the  
16 worst tanks, the waste types, that is, SY-102,  
17 TX-118, in the tank farms?

18 MR. KNUTSON: Well, I can tell you  
19 that in the evaluation we've just completed,  
20 there are two types of risks that are the  
21 driving risks for our ability to actively  
22 implement our commissioning and start up an

1 operational approach.

2 One is the ability to identify a  
3 simulant that actually is representative and  
4 for which we have reached consensus. The  
5 second is the realtime characterization of  
6 feedstreams, as well as the realtime  
7 characterize of material in the Waste  
8 Treatment Plant, or at least as close to that  
9 as we can get to maintain assurance that what  
10 we expect to be there is what we actually have  
11 there.

12 Hopefully, those are elements of the  
13 technology development program. They are both  
14 elements that have been at least  
15 conceptualized in terms of methodologies that  
16 are available to help us deal with those  
17 issues, and to the extent that the  
18 recommendations that Mr. Kasdorf made in his  
19 opening comments actually help us to deal with  
20 those risks and deal with the ongoing issues  
21 that we'll learn from the large-scale vessel  
22 test, they would all be considered.

1                   MEMBER BROWN: So you're satisfied  
2 with the progress of characterization of the  
3 wastes in the tank farms? I mean, that's  
4 meeting your needs, or you need them to  
5 accelerate their characterization?

6                   MR. KNUTSON: I believe that the  
7 characterization of the tank farms, as  
8 described by Mr. Rutland, meets the needs of  
9 what we would require for an input feedstream.  
10 But from an operational point of view, and the  
11 ability to understand anything that would be  
12 off spec, or something that would happen on a  
13 realtime basis, a finer level of detail may  
14 very well be required. We'll understand that  
15 more as we go through the processes of large-  
16 scale testing as well.

17                   MEMBER BROWN: Okay. The second  
18 thing Mr. Kasdorf recommended was accelerating  
19 large-scale testing, which we've already  
20 talked about. The third thing he suggested  
21 was designing a waste retrieval facility with  
22 mixing and sampling capability engineered to

1 protect mixing requirements established by  
2 large-scale testing. Is there a necessity for  
3 that, or is that more in Ms. Charboneau's ball  
4 park?

5 MR. KNUTSON: I believe that should  
6 be deferred to Ms. Charboneau or to Paul.

7 MEMBER BROWN: Okay.

8 MS. CHARBONEAU: We've talked about  
9 a purpose-built facility and we've talked  
10 about the waste receiver facilities in  
11 previous discussions with the Board. The tank  
12 farm's baseline, as it exists today, includes  
13 construction of two waste receiver facilities.  
14 The primary function of those waste receiver  
15 facilities are basically pumping stations and  
16 staging stations as we need to motivate the  
17 single-shell tank waste from those far-  
18 reaching tanks, from a geographic perspective,  
19 looking out at the T farms and the B farms  
20 that are far away from our double-shell tank  
21 farms, as we retrieve those wastes.

22 We're approaching the need for those

1 waste receiver facilities from a number of  
2 angles with regard to potential improvements  
3 in how we move the waste from the single-shell  
4 tanks and consolidate those wastes and stage  
5 them, and again move those to the WTP.

6 As we look at the requirements and  
7 needs for mixing and blending to meet the  
8 waste acceptance criteria of the WTP, we've  
9 framed the mixing and sampling studies that  
10 are ongoing, right now, in that regard.

11 We expect to know by the end of this  
12 calendar year, I should say calendar year  
13 2011, whether or not we will need to enhance  
14 some of the capabilities in the east area  
15 waste receiver facility.

16 And so that's what we've discussed.  
17 We have it in some of our integrated waste  
18 feed plans as a potential opportunity, but we  
19 don't know today, if we will need some  
20 additional blending and mixing capabilities  
21 that we cannot fulfill within a million gallon  
22 tank today, until the end of 2011.

1           But what we've talked about is  
2           enhanced capabilities within the existing  
3           waste receiver facility for 200 East.

4           MEMBER BROWN: So you say the two,  
5           there are two waste retrieval facilities in  
6           the baseline?

7           MS. CHARBONEAU: Yes.

8           MEMBER BROWN: And when do you  
9           expect the design of those to be complete?

10          MS. CHARBONEAU: The design for the  
11          200 East waste receiver facility, as it's in  
12          the baseline today, those design activities  
13          start in 2015. So we will want to have an  
14          answer on, is it necessarily to add capability  
15          and enhance that waste receiver facility  
16          before 2015? But that's where it is today.

17          The second waste receiver facility  
18          is out in past-2020 timeframe.

19          MEMBER BROWN: Okay. Thank you.  
20          And the last thing that he recommended was  
21          designing a hot pilot plant capability to  
22          verify the acceptance of feed batches to WTP,

1 and I think a hot pilot plant is more in the  
2 range of WTP's realm. Do you agree with that?

3 MR. KNUTSON: I don't know that a  
4 hot pilot plant actually adds anything more to  
5 the information that would be needed to  
6 support input feedstreams to the Waste  
7 Treatment Plant. I do agree that the idea of  
8 using the large-scale vessel testing to ensure  
9 that we understand what the characteristics  
10 are of a batch ,or what the characteristics  
11 are of a feedstream process, of even what the  
12 training and qualification criteria would be  
13 for individuals who have to interact with that  
14 type of a batch, is a critically important  
15 element.

16 Whether you take that all the way to  
17 establishing another contaminated facility for  
18 the purposes of dealing with hot pilot  
19 capabilities, that's a question that I haven't  
20 considered yet.

21 MEMBER BROWN: Mr. Rutland, how many  
22 flow sheets do you expect to come out of this,

1 the tank farms? I've heard a number up in the  
2 near 500 different recipes for wastes that are  
3 going to be developed as you try and--as you--  
4 not try--but as you actually empty these  
5 tanks.

6 MR. RUTLAND: I'm not sure exactly  
7 how to answer your question. I can tell you  
8 that we have 49 different sludge types in the  
9 tank farm. Those will be blended together to  
10 produce a batch of material.

11 Right now, on the HLW side, I  
12 believe we have 300 batches over the life  
13 cycle of the mission. Now it's been a long  
14 time. I can get the exact numbers and put them  
15 in the--

16 MS. CHARBONEAU: It's three hundred-

17 -

18 MEMBER BROWN: But we're in the  
19 hundreds?

20 MR. RUTLAND: We're in the hundreds  
21 of batches--

22 MS. CHARBONEAU: 376.

1                   MR. RUTLAND:  --that we will  
2                   prepare, very similar to what's being done at  
3                   Savannah River site.  They have several, lots  
4                   of batches that they have to produce too.  On  
5                   the LAW [Low-Activity Waste] side, we have a  
6                   fewer number because the LAW waste is able to  
7                   be stored in million gallon tanks, and it's  
8                   not nearly as complex to be able to move that  
9                   waste around.

10                   So right now, I would say we have  
11                   300 and something batches of high-level waste.  
12                   We have 49 different waste types in the tank  
13                   farm.  I want to be careful, cause that sounds  
14                   like a lot, because there are--most of those  
15                   waste types are very, very similar to one  
16                   another.  There's just slight nuances  
17                   associated with them.

18                   For example, AZ-101 is a waste type,  
19                   and we have a AZ-102 waste type, because  
20                   they're just very slightly different and what  
21                   was predicted by the model was actually found  
22                   in the tank.

1                   So although they're both PUREX  
2 waste, very, very similar waste, we have two  
3 different waste types to describe them. So to  
4 say we have 49 waste types is a little bit  
5 misleading because it's not nearly as many as  
6 that.

7                   So does that answer your question?

8 I apologize--

9                   MEMBER BROWN: What I understand the  
10 hot pilot plant to be is to take these recipes  
11 and run them through until they're glass, to  
12 make sure that you don't experience a problem  
13 in the big plant, and with several hundred of  
14 these to do, it seems like it might be nice to  
15 know that it's going to work, before you fill  
16 up the vessels in the Waste Treatment Plant.

17                  MR. RUTLAND: And we agree with you,  
18 Dr. Brown. It is planned during the  
19 prequalification--

20                  MEMBER BROWN: Mr. Brown.

21                  MR. RUTLAND: Mr. Brown. I  
22 apologize. Mr. Brown, we do, in the

1 prequalification of the sample, do intend to  
2 take the sample that we pull from the waste  
3 tank. When we lock it down, we tell you about  
4 the six months. The reason it's six months is  
5 so that we can take that sample and run it  
6 through in the laboratory, each step in the  
7 WTP process. So we will--if we're going to  
8 leach that sample, we'll reproduce the  
9 leaching in the laboratory to make sure that  
10 we understand what's going to happen in the  
11 WTP from a leaching perspective.

12           So we will do that on a bench  
13 laboratory scale. I'm not--and that was very  
14 similar to how we actually started up the  
15 DWPF, where we would pull the samples and take  
16 it to the lab, and run it through the mini  
17 molter, and determine whether or not we could--  
18 -it would pour, or what the viscosity of the  
19 glass was, all of those properties that were  
20 critical, at that time, at the Savannah River  
21 site. So we have a similar process here.  
22 Although it's not a pilot plan, it is a

1 laboratory plan to take the sample through the  
2 various operating, unit operations in the WTP  
3 in a laboratory setting.

4 MEMBER BROWN: Okay. Thank you.

5 MR. SAIN: That actually validates,  
6 Larry, what you were asking, how are you going  
7 to validate before you put it in the plant.  
8 But you heard what Paul said.

9 MEMBER BROWN: I've heard a number  
10 of people suggest that, and when I went back  
11 and read the previous technical director's  
12 statement, I said, "gee, that's come up  
13 again." So I think it's something you might  
14 think about. I just want to ask one more  
15 question. I know we're trying to move on, so  
16 we make sure that the audience, anyone who  
17 wants to make a statement, and I know, Mr.  
18 Chairman, you have several other comments.

19 Dr. Triay, if I could ask you just a  
20 couple questions here.

21 According to the current Hanford  
22 cleanup project system plan, which I think is

1 Revision 4, but whatever the baseline is, when  
2 will the waste treatment mission be completed,  
3 here, in Hanford?

4 DR. TRIAY: I believe that it's  
5 2047, in the last systems plan. But please  
6 correct me if--

7 MS. CHARBONEAU: The TPA [Tri-Party  
8 Agreement] milestone is 2047 but the system  
9 plan actually has us completing the mission in  
10 2045.

11 MEMBER BROWN: So you've given  
12 yourself two years of margin in that.

13 MS. CHARBONEAU: Plenty of cushion.

14 DR. TRIAY: But let me make sure  
15 that we understand the regulatory framework.  
16 The regulatory framework of the triparty  
17 agreement necessitates that the Department of  
18 Energy look into improvements to those dates,  
19 the date of 2047, that we proactively look at  
20 ways to accelerate the tank waste cleanup,  
21 here, at the Hanford site.

22 And we have, at the direction of the

1 secretary, made a significant investment, on  
2 the order of \$50 to \$60 million per year,  
3 depending on the year, to technology  
4 development associated with a tank waste  
5 cleanup, at both the Hanford site and Savannah  
6 River site.

7 And we invested, from the Recovery  
8 Act, about \$300 million associated with  
9 accelerating the infrastructure that we are  
10 going to need at the tank farms in order to  
11 support the Waste Treatment Plant coming  
12 online. Some of those infrastructure  
13 improvements were, indeed, associated with the  
14 laboratory that Mr. Rutland was just talking  
15 about.

16 MEMBER BROWN: So the current  
17 baseline to meet that date, 2045, or to meet  
18 the commitments to the state, that includes a  
19 second LAW; is that correct?

20 MS. CHARBONEAU: That is correct.

21 DR. TRIAY: The baseline does, the  
22 regulatory framework calls for a decision on

1 supplemental low activity waste capability.

2 MEMBER BROWN: That's actually where  
3 I'm trying to get to, the problems that the  
4 farms have to address. Do you need--in your  
5 assessment today, I know that's not a decision  
6 today, but do you feel a need to have  
7 supplementary pretreatment in the tank farms  
8 to meet the commitment?

9 DR. TRIAY: In order to meet the  
10 commitment, what we definitely need is  
11 supplemental capability for low activity  
12 waste. As we have delineated and is clear in  
13 our regulatory framework, the Waste Treatment  
14 Plant will provide capability for about 50  
15 percent of the low activity waste capability  
16 that we need for the entire tank waste  
17 cleanup.

18 So we definitely need supplemental  
19 capability for low activity waste as part of  
20 the technology development efforts that we are  
21 conducting. The Secretary of Energy feels  
22 strongly, that the environmental management

1 program needs to invest in technology  
2 development, applied research and development,  
3 that would allow us to perform our mission  
4 more effectively, and accelerate the mission  
5 in this particular case of the tank waste  
6 cleanup, and as part of those efforts, you  
7 know, to accelerate that mission, we are  
8 considering in tank, at tank precipitation,  
9 including a number of options for adding  
10 supplemental low activity waste capability to  
11 the tank waste cleanup at Hanford.

12 MEMBER BROWN: And that's including  
13 a number of other novel technologies like  
14 steam reforming, or any of those?

15 DR. TRIAY: That is part of what we  
16 are looking at. As you know, the regulatory  
17 framework does call for a waste form that is  
18 as good as glass. So we have asked the  
19 National Academy of Science to perform a study  
20 on waste forms. I mean, they have published  
21 the interim report. They have spoken about  
22 the criteria of as good as glass, but, yes,

1 the reforming would be one of those options,  
2 there would be other options, and the at tank,  
3 or in tank treatment would involve innovative  
4 technologies such as rotoring microfiltration  
5 or a small ion column exchange. It is  
6 essential that we perform the tank waste  
7 cleanup in earnest, and that is the objective  
8 of our investments in applied research and  
9 development.

10 MEMBER BROWN: Thank you very much.

11 I think I've gotten the hook. So Mr.  
12 Chairman.

13 CHAIRMAN WINOKUR: Thank you. And  
14 Ms. Roberson.

15 MS. ROBERSON: Okay. Actually, I'm  
16 just going to ask two questions. Mr.  
17 Chairman, I'll be very, very quick.

18 In reading the responses to the  
19 Board questions, it struck me that ICD-19 must  
20 be undergoing an update. Is that right, Mr.  
21 Rutland? No?

22 MR. RUTLAND: Let me respond. ICD-

1 19 is in revision. Yes, it is. We are  
2 working with the WTP. There are several areas  
3 that we're still trying to close on ICD-19,  
4 and as the results of the DQO assessment come  
5 out, and as the results of our mixing and  
6 sampling program come, we will again meet  
7 together to make sure that ICD-19 still meets  
8 all of our requirements.

9 So ICD-19, I would describe it as a  
10 living document for the next short period of  
11 time, until we close these issues, and then we  
12 can finalize the ICD-19. So it is being  
13 revised. We have actually just made a minor  
14 revision to it in the last two months, so--

15 MS. ROBERSON: Okay. And then my  
16 last question, and it actually crosses over  
17 another session, so I'll just keep it brief  
18 because we're kind of creating a sense that we  
19 have finality, but, in essence, because you  
20 haven't created your operating envelope for  
21 WTP--is that right, Ms. Busche?

22 MS. BUSCHE: Correct.

1 MS. ROBERSON: Okay. Who, WTP, tank  
2 farm, will be developing the procedures, once  
3 you have that operating envelope, for  
4 standards and verification that the waste  
5 meets that acceptance criteria that will be  
6 enveloped in the safety basis for WTP? Who?  
7 Which--who will do that?

8 MR. KNUTSON: The Waste Treatment  
9 Plant project includes the scope of work for  
10 developing those procedures and for training  
11 and qualifying the staff that are responsible  
12 for implementing those procedures.

13 MS. ROBERSON: So WTP will have a  
14 certification group, or whatever you want to  
15 call it, a group that is responsible for  
16 certifying that the waste, and the process  
17 utilized at the tank farm, is acceptable in  
18 qualifying waste?

19 MR. KNUTSON: I think that we  
20 introduced this concept of the integration  
21 function between the tank farms and the WTP.  
22 That role is a Senior Executive Service role.

1 Part of that role includes the definition of  
2 what I would call "expected conditions,"  
3 expected conditions both from the tank farm  
4 feedstream and expected conditions from the  
5 Waste Treatment Plant, in terms of its  
6 readiness to receive that feedstream. That  
7 function is now being defined.

8 MS. CHARBONEAU: Can I stake a stab  
9 at this one. The ICD, as its written today,  
10 requires a WTP contractor to do the waste farm  
11 qualification during commissioning, and so as  
12 Dale had talked to, they are responsible for  
13 writing the operating procedures, et cetera.  
14 But as we've talked about earlier today,  
15 clearly, the eventual operating contractor  
16 needs to be a part of the commissioning  
17 efforts and the readiness efforts of operating  
18 the WTP.

19 We are using ARRA funds today to  
20 upgrade the 222-S facility that we anticipate  
21 to be used for waste farm qualification in the  
22 future, and so while those procedure and

1 processes will be a part of the commissioning  
2 effort for WTP, that will transition to the  
3 operating contractor, most likely at the 222-S  
4 facility.

5 Does that help answer the question?

6 MS. ROBERSON: Well, it does, and I  
7 think we can come back to it later. You're  
8 not going to wait until commissioning to  
9 figure that out, because if you need  
10 additional capabilities, you've got to have  
11 them in place, so--

12 MS. CHARBONEAU: No; you're  
13 absolutely right. That's actually almost a  
14 different question than I was answering. So  
15 Paul can help answer that too. But we  
16 understand there are some additional  
17 analytical methods that will need to be  
18 developed for waste farm qualification, not  
19 necessarily for commissioning, but as we  
20 understand the waste acceptance criteria, and  
21 the characterization of the waste we have in  
22 some of those more problematic tanks today,

1 and so we have a good idea of what additional  
2 analytical methods will be need to be  
3 developed, and that is a part of the tank  
4 operations baseline today.

5 MR. RUTLAND: We have already  
6 actually asked the 222-S lab to start  
7 developing some of those analytical  
8 techniques. We've identified some of them,  
9 and we've already asked them to start working  
10 on developing those techniques.

11 MS. ROBERSON: And I guess the only  
12 thing I want to confirm is, even though ICD-19  
13 is a living document, you are assuming, based  
14 on at least what we got in response--we saw a  
15 lot of responses that said, "And if this will  
16 be a restriction on the waste acceptance  
17 criteria." You're assuming, though, so that  
18 you're prepared; is that right?

19 MR. RUTLAND: Yes; absolutely.

20 CHAIRMAN WINOKUR: Well, let me  
21 thank our panelists, some of whom have been  
22 with us for five hours, and probably will get

1 a Board medal. We haven't designed it yet.  
2 We'll be sending it out. Thank you, Dr.  
3 Triay, Mr. Knutson, Mr. Brockman, Mr. Rutland,  
4 Ms. Charboneau, and Mr. Sain and Ms. Busche.  
5 And that concludes the testimony from our  
6 staff and the department, and we're now going  
7 to move on to call members of the public who  
8 have signed up to speak.

9 As I indicated earlier, I'll ask  
10 each speaker to limit remarks to about five  
11 minutes. If times permits, I'll extend the  
12 time for additional comments.

13 And I believe there are microphones  
14 in the audience that you can use. And the  
15 first person on our list is Ms. Suzanne Dahl.

16 MS. DAHL: Well, thank you. Thanks  
17 to the Board for offering this opportunity for  
18 public comment. I'm Suzanne Dahl of the  
19 Washington State Department of Ecology. I'm  
20 the tank waste treatment section manager. The  
21 Department of Ecology regulates the cleanup of  
22 Hanford through the Hanford Facility Agreement

1 and Consent Order, and most recently through  
2 a consent decree filed in court, and through  
3 our authority in various permits, we regulate  
4 the design, construction and operation of  
5 equipment that touches the hazardous waste, to  
6 protect the environment, the workers, and the  
7 people of this region.

8 I would like to say that the State  
9 of Washington welcomes and depends on the  
10 nuclear waste safety review that the DNFSB  
11 provides, both today and for many years before  
12 this. As regulators, we appreciate your  
13 detailed approach on these safety issues.

14 I would like to highlight, that the  
15 tremendous risk that exists from the 53  
16 million gallons of high-level radioactive  
17 mixed waste. It poses a significant risk to  
18 the underlying aquifers, to the Columbia River  
19 and to the region as a whole, and it is  
20 essential that this waste be retrieved and  
21 immobilized into glass, to prevent future  
22 catastrophic impacts.

1           I can also say that Washington State  
2           Governor Gregoire, and the ecology director,  
3           consider it essential that the Waste Treatment  
4           Plant is completed in a timely manner,  
5           essentially the end of this decade, and that  
6           the Waste Treatment Plant proceed to emptying  
7           the tanks and immobilizing the waste to  
8           protect this region.

9           However, it is Washington State's  
10          expectation that the Waste Treatment Plant be  
11          constructed in a manner that will allow it to  
12          operate safely and efficiently.

13          We recognize the complexity of this  
14          facility and strongly support the detailed,  
15          comprehensive and timely review, and  
16          resolution of both technical and safety  
17          issues.

18          And to just talk about two of those  
19          issues, briefly. ORP has spent a significant  
20          amount of time with the Department of Ecology  
21          explaining the changes that they propose at  
22          the material-at-risk, and their approach

1       seemed reasonable, and the goal of reducing  
2       the complexity of active controls made sense  
3       to us, as regulators.

4               The resolution of the mixing issues,  
5       and the need to be able to move the waste, the  
6       heel waste, so to speak, downstream, so it can  
7       be treated, is essential, because obviously,  
8       all this waste needs to eventually end up in  
9       glass. And the Department of Ecology is  
10      anticipating, and plan to be very involved in  
11      the resultant changes of the vessels that will  
12      need to occur.

13              And so again, I'd like to thank the  
14      Board for its commitment to this project and  
15      commitment to this region.

16              CHAIRMAN WINOKUR: Thank you, Ms.  
17      Dahl. Next is Mr. Carl Adrian.

18              MR. ADRIAN: I'll make it easy on  
19      the sound people and stay at one microphone  
20      this afternoon. I'm president and CEO of the  
21      Tri-City Development Council, locally referred  
22      to as TRIDEC. TRIDEC is the lead economic

1 development organization that serves Benton  
2 and Franklin counties. The organization was  
3 formed in 1963, and among other designations,  
4 we have the designation from the Department of  
5 Energy as the community reuse organization, or  
6 the CRO for the metropolitan area.

7 TRIDEC has approximately 375 member  
8 firms as well as contracts with all, or most,  
9 of the local governments in the community.

10 Our primary mission is to facilitate job  
11 creation and capital investment in the region.

12 But as part of those broader economic  
13 development programs, TRIDEC has had a long  
14 history and interest, and involvement with  
15 DOE, the Hanford site, and the contractors.

16 Now let me talk about some of the  
17 details from a community standpoint. First,  
18 Hanford. As you well know, for 67 years, our  
19 community, along with other weapons complex  
20 communities, has supported national missions.  
21 First, World War II, next the Cold War, and  
22 finally, the cleanup mission that's underway

1 currently.

2 The good news is Hanford is getting  
3 cleaned up, and I think we're all pleased  
4 about that, particularly from a community  
5 standpoint. In just four short years, by  
6 2015, the 586 square mile site will be reduced  
7 down to approximately 75 square miles, and I  
8 know it sounds like a big area but it's only  
9 75 square miles compared to that 586.

10 And as you know, that's where the  
11 location of the WTP is. Between 2015 and  
12 2019, the Waste Treatment Plant construction  
13 will be completed, systems will be turned over  
14 and the plant becomes operational. We've had  
15 two members of TRIDEC's staff monitoring  
16 design, construction, working with DOE, and  
17 others, in this process for the last ten  
18 years.

19 We at TRIDEC, with support from the  
20 Department of Energy, have hosted more than 85  
21 congressional staff at the site during that  
22 same time period. We have consistently felt

1 that it's important for congressional staff to  
2 personally visit the waste treatment facility  
3 and witness firsthand the size and complexity  
4 of the plant.

5 Also, we feel strongly that it's  
6 important for the congressional staff, and the  
7 members, to know that this community is  
8 directly involved, interested, and concerned  
9 with making certain the plant works, and  
10 making certain the plant works safely.

11 And safety both in terms of the  
12 workers that are at the plant, but, frankly,  
13 also for us that live nearby the plant, in the  
14 community.

15 Confidence in the Waste Treatment  
16 Plant is imperative, I think, from a community  
17 standpoint. The fact that the single-shell  
18 tanks are aging makes the need to complete the  
19 design, construction, and make the plant  
20 operational extremely important. You heard  
21 that from the Department of Ecology a few  
22 minutes ago.

1           We ask the Board to make the  
2           necessary decisions to complete design as  
3           quickly as possible. We certainly don't want  
4           to sacrifice safety, but again, I think the  
5           message from the community is "we need to get  
6           on with it and get the cleanup completed."

7           Successful operation of the WTP is  
8           the largest and final steps to Hanford  
9           cleanup. The other nations, such as France  
10          and Japan, have reprocessing programs,  
11          classification programs, they're working, and  
12          we support this plan and want to see it go  
13          operational. We have confidence in your  
14          ability to do the necessary reviews to make  
15          this plant a safe plant and get it online.

16          We also have the utmost confidence  
17          in Bechtel and the DOE's Department--or Office  
18          of River Protection--to make sure that the  
19          plant goes operational in a timely fashion.  
20          Again, the message from the community is we  
21          want to get on with it, we want to finish  
22          cleanup, and get on with whatever that post-

1 Hanford economy looks like.

2 So again, thank you very much for  
3 the opportunity to speak. I'd be happy to  
4 answer any questions in the future. Thank  
5 you.

6 CHAIRMAN WINOKUR: Thank you, Mr.  
7 Adrian.

8 Mr. Tom Carpenter.

9 MR. CARPENTER: So I realize I'm  
10 your last, maybe your last person standing  
11 between you and lunch, so I'll try to be  
12 efficient. So again, I'd like to repeat,  
13 thanks for you holding this hearing today, and  
14 to afford an issue for the public to weigh in  
15 on these various important issues. My name is  
16 Tom Carpenter, and I'm the executive director  
17 of an organization called Hanford Challenge.

18 It's a regional public, nonprofit  
19 organization, that seeks to have a positive  
20 influence on the environmental remediation  
21 mission at the Hanford site.

22 Hanford Challenge fully recognizes

1 the urgency for a robust and effective  
2 treatment strategy for dealing with Hanford's  
3 high-level waste. So, of course we support  
4 the Waste Treatment Plant strategy for  
5 vitrifying high-level waste with disposal in  
6 deep geological repository.

7 Of course any such facility, as has  
8 already been said, and is recognized by you  
9 folks, must operate safely and efficiently.  
10 Therefore none of my comments should be  
11 interpreted to mean that we are in any way  
12 opposed to the Waste Treatment Plant but we do  
13 care about a facility that works, and works in  
14 a manner that does protect workers and the  
15 public.

16 I've had a role at Hanford since  
17 1987, assisting numerous employees who have  
18 raised concerns about environmental safety,  
19 health, and management issues. Many of the  
20 employees I've helped suffered reprisal as a  
21 result of their attempts to raise these  
22 issues. Some where unjustly and illegally

1 fired from their jobs. Others were harassed  
2 and discriminated against in various ways.

3 It is vital to Hanford's  
4 environmental remediation mission, that a  
5 safety culture is established and nurtured, so  
6 that employees can bring concerns forward  
7 without fear of reprisal. A culture of  
8 suppressed concerns leaves us guessing whether  
9 there might be hidden defects that could  
10 result in a failure of equipment or processes  
11 that could impact workers, the public, or the  
12 effectiveness of the mission.

13 Since 2002, we have worked with  
14 insiders from the Waste Treatment Plant,  
15 including experts who have raised issues about  
16 the design and construction of the facility.  
17 Most of these employees have been fearful  
18 about stepping forward because of the impact  
19 on their careers.

20 Our major concerns with the Waste  
21 Treatment Plant are simply stated. The  
22 quality and reliability of the Waste Treatment

1 Plant is suspect when employee concerns are  
2 effectively suppressed through the design and  
3 construction phase of the facility.

4 Additionally, the recent decision to quickly  
5 close out unresolved design concerns for  
6 resolution at a later date perpetuates what we  
7 see as a "delay and deny" strategy that  
8 continues to set the WTP up for failure.

9 While this decision may have met a TPA  
10 milestone and earned the contractor millions  
11 of dollars in fee, it does not inspire  
12 confidence in the motivations of the  
13 contractor and the government agency tasked  
14 with building facilities capable of vitrifying  
15 high-level nuclear waste.

16 Bechtel has a history of suppressing  
17 employees raising safety concerns. The  
18 Department of Energy itself has confirmed the  
19 existence of a hostile work environment at the  
20 Waste Treatment Plant in the 2005 report. The  
21 team from DOE interviewed 117 employees, and  
22 found that greater than 50 percent of the

1 workers interviewed believed that their job  
2 would be in jeopardy due to their  
3 participation in that inquiry.

4 Most of the interviewees, the report  
5 says, mentioned other workers had issues but  
6 felt they could not risk their employment by  
7 coming forward. Roughly 20 percent voiced the  
8 belief that when individuals raise safety  
9 concerns, those individuals are targeted for  
10 future layoff lists.

11 Roughly 15 percent of the  
12 interviewees claimed that there were fear of  
13 layoffs of workers who reported issues to the  
14 Employee Concerns Program.

15 In 2008, the DOE also imposed a  
16 civil penalty for nuclear safety violations  
17 against Bechtel National, Incorporated, based  
18 upon the findings of a DOE hearing officer  
19 that a Bechtel engineer had been terminated  
20 after having raised nuclear safety concerns.

21 And more recently, on July 2nd,  
22 2010, Dr. Walter Tamosaitis, the manager for

1 research and technology for the Waste  
2 Treatment Plant, was removed from his position  
3 following his submittal of approximately 50  
4 safety and technical issues. His abrupt  
5 removal sent a shock wave through the facility  
6 and led to that engineer's letter to this  
7 body.

8 CHAIRMAN WINOKUR: Mr. Carpenter,  
9 could you summarize fairly soon.

10 MR. CARPENTER: Sure.

11 CHAIRMAN WINOKUR: Thank you.

12 MR. CARPENTER: His concerns are  
13 identical to many of the issues being  
14 discussed at this meeting. Yesterday, in an  
15 apparent rush to publish a report in honor of  
16 this very hearing, the DOE's Health Safety and  
17 Security Office released a report on the Waste  
18 Treatment Plant safety culture, and in that  
19 report concluded:

20 "A number of individuals have lost  
21 confidence in management's support for safety,  
22 believe there is a chilled environment that

1 discourages reporting of safety concerns, and  
2 are concerned about retaliation for reporting  
3 safety concerns."

4 So we have a number of questions to  
5 raise to you. In the interest of time, I'm  
6 just going to skip through to the last couple  
7 of questions, and submit material for the  
8 record.

9 One of our major concerns is why has  
10 the Department of Energy assigned the design  
11 agent and the design authority role to  
12 Bechtel, when Bechtel clearly has a potential  
13 conflict of interest in authorizing its own  
14 work? Our question is shouldn't these roles  
15 be separated and the design authority operate  
16 independently of the contractor responsible  
17 for building this plant?

18 And we would suggest that perhaps  
19 this body, the DNFSB, or the Nuclear  
20 Regulatory Commission, could fulfill that  
21 role.

22 At this stage in the game, we wonder

1 if Bechtel is the right contractor to build  
2 this facility, or continue building the  
3 facility, given the history of failures,  
4 reprisals, and missteps. We question whether  
5 or not DOE is providing the necessary  
6 oversight for a rigorous, robust and  
7 conservative design. Again, we appreciate the  
8 Board and its role here.

9 We note that for the first six years  
10 of design and construction, Bechtel lacked a  
11 vendor quality assurance process, and how can  
12 we assure that the quality of procured  
13 equipment and instruments is adequate without  
14 the necessary pedigree? Which leads us to  
15 ask the question, would this facility be  
16 considered for licensing by the Nuclear  
17 Regulatory Commission or would that license be  
18 denied due to its quality, indeterminate  
19 state?

20 And does the public deserve a plan  
21 that meets the safety standards of an NRC  
22 [Nuclear Regulatory Commission] licensed

1 facility?

2 So to wrap up, after spending, from  
3 our perspective, spending ten years and \$6  
4 billion so far, designing and building the  
5 Waste Treatment Plant, it appears that nobody  
6 can really guarantee that this plant will  
7 operate safely or effectively.

8 The strategy of closing out  
9 unresolved safety concerns and waiting until  
10 operations begin, or at a later date, instead  
11 of resolving those issues before start-up,  
12 guarantees far greater cost increases and  
13 schedule delays in the long run. When the  
14 atmosphere has been poisoned by a history of  
15 reprisals against employees who raise  
16 concerns, the quality and safety of the plant  
17 will always remain indeterminate.

18 So again, I will submit the rest of  
19 my comments in writing, and thank you very  
20 much for your attention.

21 CHAIRMAN WINOKUR: Thank you. We'll  
22 be happy to accept it into the record, and

1 thank you for your comments, Mr. Carpenter.

2 Now just as a matter of formality,  
3 there are a few names down here that I need to  
4 assure don't want to speak at this time. The  
5 indication is they may not. One is Mr.  
6 Jennifer Gregory. Liz Matson. John Williams.  
7 And Walt Tamosaitis.

8 Seeing nobody approaching the  
9 microphone, I'd like to say that this  
10 concludes the public comment portion of the  
11 session and I'll therefore close this session.

12 Anyone who wishes to submit written  
13 testimony should do so at this time, by giving  
14 a copy to the Board's general counsel, Richard  
15 Azzaro. Thank you all for coming.

16 We're recessing the hearing and  
17 we'll reconvene at 5:00 p.m. this evening.

18 (Whereupon at 2:03 pm., the above-  
19 entitled matter went off the record.)  
20  
21  
22

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