Department of Energy
Washington, DC 20585

October 15, 1999

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, DC 20004

Dear Mr. Chairman:

In response to your letter of September 22, 1999, I am forwarding with this letter replies to your questions regarding issues discussed during the recent 94-1 public meeting. I am also enclosing our responses to the list of questions which you provided to the Department prior to that meeting. I appreciate your keeping the public meeting record open so that this information may be incorporated.

I share the Board's interest in accelerating our process to make the necessary revisions to our stabilization commitments as soon as possible. We have already provided your staff with a draft of the 94-1 Implementation Plan change for Hanford's Plutonium Finishing Plant. We believe we are on schedule to complete coordination of this change request for approval by Secretary Richardson prior to sending it to you in November as previously discussed. I am also working with the Savannah River Site to establish a set of interim commitments to include with that change. Those new commitments would deal with the actions needed to facilitate preparation of a comprehensive implementation plan change request for Savannah River Site by April 2000.

Based on discussions during the public meeting, as well as our follow-up interactions, I believe much improved communication can be achieved between our offices. To facilitate this, I have directed the 94-1 Responsible Manager, David Huizenga, to set up a series of workshops between our staffs so that we may reach a better level of understanding of the issues of concern in our efforts to complete the necessary material stabilization activities as soon as possible.

We appreciate your continuing interest in our nuclear materials stabilization activities. If you have any questions, please feel free to contact me or have your staff contact Mr. David Huizenga at (202) 586-0368.

Sincerely,

Carolyn L. Huntoon
Assistant Secretary for
Environmental Management

Enclosures
cc:
M. Whitaker, S-3.1

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Replies to Key Issues
Identified in the September 22, 1999, Letter
From the Defense Nuclear Facilities Safety Board
to Carolyn L. Huntoon

Recovery of Schedule: *....The Board requests that a plan be provided specifying how lost time in stabilizing these materials will be recovered.*

Reply: We plan to get the Secretary's approval in November 1999 for a change to the 94-1 commitments at the Hanford Plutonium Finishing Plant, and by April 2000 for the commitments at Savannah River Site. Most of the material stabilization activities at other sites are progressing well in accordance with the December 1998 94-1 Implementation Plan. Accordingly, the following responses focus on activities at Savannah River Site and Hanford.

At Savannah River Site (SRS), there are nine remaining 94-1 commitments. The schedules outlined in the December 1998 revision to the Implementation Plan for those commitments are experiencing delays. The Department is working hard to ensure that all resources that are available are utilized as efficiently as possible in order to maintain the current pace of stabilization and avoid any further schedule delays. However, it must be recognized that some time already lost is not likely to be recovered for the reasons described below. We are in the process of evaluating the delays proposed for completing these stabilization actions, and will have to complete our review before requesting approval for commitment changes from the Secretary.

- IP Commitment Numbers 201 and 206: Stabilize H-Canyon Pu-239 solution and stabilize Np-237 solution – A funding shortfall in FY 1999 delayed startup of HB-Line Phase II, and associated completion of these commitments, by approximately six months. The funding requested in the FY 2000 Congressional budget request and projected for FY 2001 will support startup on this delayed schedule. We have initiated the startup program and it is expected to be completed in December 2001. Critical work remaining includes completion of safety documentation, preparation of new procedures and incorporation of double contingency analyses into those procedures, incorporation of the procedures into the linking data document, completion of testing, and simulator training. While much of this work is sequential, we will continue to look for opportunities, such as parallel work efforts where possible, to recover some of the delay.

- IP Commitment Number 202: Complete APSF – The Department is evaluating installing the stabilization and packaging equipment required to meet DOE-STD-3013 in the 235-F facility in lieu of APSF. A decision concerning construction of APSF will be made in March 2000 subsequent to completion of pre-conceptual work on the 235-F stabilization and storage option, which is expected in December 1999. The purpose of this pre-conceptual work is to determine the feasibility of safely performing plutonium stabilization and packaging in 235-F.

This pre-conceptual effort includes such activities as verifying the adequacy of the existing ventilation system, material flow path, seismic qualification of the building, radiation exposure to workers, equipment layout, and security issues. If the decision is to cancel the APSF subproject and pursue the 235-F option instead, then the Department will propose deletion of this commitment from the 94-1 program and provide a new commitment for the 235-F activities. If the Department were to resume construction of the APSF facility, it would no longer be possible to perform all the activities, such as re-issuance of a bid package, evaluation of the responses, issuance of a construction contract, construction of the facility, startup testing, readiness reviews, etc., necessary to begin operation of the APSF by December 2001.

- IP Commitment Numbers 203, 204 and 209: Repackage pre-existing metal and oxide to 3013; stabilize and repackage pre-existing residues to 3013; and stabilize and repackage RFETS residues to 3013 – As stated in the IP revision, the schedule for these commitments was based on the APSF beginning operation December 2001. Construction of the APSF is on hold, as discussed above. If the Department decides to pursue installation of stabilization and packaging equipment in 235-F, the Department's goal for completing these stabilization activities is July 2006, as stated in Secretary Richardson's July 2, 1999, letter to you. As the project evolves we will attempt to identify means of accelerating project completion.

- IP Commitment Number 205: Vitrify Am/Cm – As stated in the IP revision, this project was to be rebaselined, with a new cost and schedule planned to be approved in July/August 1999. The contractor provided DOE with a proposed new baseline for this project in June, which showed completion of stabilization 27 months later than our commitment date of September 2002. That proposal did not meet the Department's expectations for cost or schedule, and was not accepted. In addition to delaying completion of stabilization, the associated funding profile indicated a shortfall of approximately $9 million compared to the FY 2000 Congressional budget request, and another $9 million shortfall compared to the projected available FY 2001 funding. The funding profile indicates a large amount of contingency, and DOE and the contractor are currently working to make resources available to complete this project as soon as possible and to arrive at an acceptable new baseline for the project. The Department expects to be in a position by January 2000 to approve a new schedule which takes into account projected funding for SRS over the next several years. In the meantime, work such as preparation of the Multi-Purpose Processing Facility and completion of vitrification equipment design continues.

- IP Commitment Number 207: Complete disposition of pre-existing and Mk-16/22 uranium solutions – This commitment is currently projected to be completed seven months later than the schedule identified in the IP revision because of the delay in initiation of the HEU Blend Down Project Line Item, discussed below.

- IP Commitment Number 208 – Complete Mk-16/22 dissolution – The schedule for dissolution and blend down of this material is dependent on the tank space available to hold the resultant

solution. It was expected that transfer of the solution to a TVA vendor for conversion to an oxide and fabrication of fuel would begin prior to exceeding available tank space. However, capability to ship will not exist until May 2002 at the earliest, in accordance with the latest HEU Blend Down Project Line Item schedule. Dissolution of this material must be interrupted for a few months in the second quarter of FY 2002 in order not to exceed available tank space for solution storage, and preserve blending capability. Shipping of the solutions is now projected to begin in May 2002 and be completed in July 2004. Based on the latest HEU Blend Down Project Line Item schedule, it is estimated that dissolution will be completed approximately 18 months later than the current commitment date of December 2001. It is currently expected that an agreement between DOE and TVA will be signed in December 1999. If no agreement is reached, we will need to implement our contingency plan to blend the material down to less than one percent U-235 and convert the solution to an oxide using FA-Line or by providing the solution to a vendor for conversion to oxide.

With respect to Hanford activity schedules, in April 1999, Hanford completed the PFP Integrated Project Management Plan (IPMP) that provided a significant increase in schedule confidence for completion of the DNFSB 94-1 materials stabilization requirements as compared to the 1998 94-1 Rev. 1 Implementation Plan (IP). The IPMP, and an associated addendum, plan for final completion of packaging of all 94-1 materials for long-term storage two months earlier than the IP. A copy of the IPMP was provided to your office in May 1999, referenced in your subsequent letter to Mr. James Owendoff dated 5/26/99, and discussed during the Board's visit to Hanford on July 27th of this year. It will serve as the basis for updating the PFP portion of the December 1998 IP that is currently being completed.

As identified in paragraph 5.4.1 of the 1998 IP Rev. 1, the PFP IPMP re-baselining effort was ongoing during December 1998. It utilized a Systems Engineering approach that recognized material risks, process status, and credible funding profiles to optimize the resource-loaded, integrated schedule. Assignment of this task to a dedicated "Tiger Team" of recognized planning professionals, utilization of DOE complex-wide expertise, and a total re-evaluation of all materials processing approaches, guaranteed that this activity would satisfy our expectations for a detailed high-confidence schedule to support future DNFSB commitments. Recognizing that the re-baselining effort was underway, DOE established a series of eleven new DNFSB "interim" commitments that were added in the IP Rev. 1 update. Seven of the PFP IP commitments due prior to 10/1/99 were completed (an eighth commitment, installation of the production vertical denitration calciner, was deleted from the path-forward in the IPMP).

The resulting stabilization schedules for individual 94-1 material types deviated from those in the IP, as anticipated, and included stabilization of Pu metals 14 months earlier than the IP commitment. Completion of oxides stabilization has also been accelerated by two months. Resource leveling of the schedules dictated that some activities be moved out to achieve a credible funding profile and to fit within worker dose limitations. As a result, residues - considered a lower risk material - were selected for extended operations. Additionally, polycube

stabilization was planned for completion at a later date to allow earlier processing of other materials. Test data available just before the IPMP was published indicates that off-gassing is not the risk previously anticipated due to radiolytic degradation of the styrene materials. We believe that the remaining polycube hazard may be strictly a function of handling, because of dose and dispersibility considerations, regardless of the stabilization sequencing with respect to other materials. DOE is continuing its evaluation of the Hanford data, and we will be discussing the polycube stabilization path forward with the DNFSB staff during the week of October 18, 1999 when we are meeting to discuss the PFP 94-1 IP proposed change.

DOE recognizes that the polycubes remain a handling and storage concern over time regardless of the Pu content, especially with respect to worker safety. Excellent technical work at LANL, PNNL, and PFP Laboratories has provided both a baseline disposition process, and identified another opportunity that may provide acceleration opportunities. Confirmation of the viability of this path-forward is ongoing and is anticipated to be complete in the near future. Also, there exist potential opportunities to use cementation or pipe-and-go packaging of residue materials as "fill-in" work to accelerate stabilization of this material stream. Innovative actions by DOE are being pursued to bring these stabilization efforts to conclusion as soon as can be reasonable achieved. However, schedule improvements from these potential actions cannot be introduced at this date without impacting the confidence that DOE judges to be critical in establishing these and future commitments to the DNFSB. We are committed to continuously seek ways to improve the stabilization schedule for all material types.

In summary, while we are experiencing delays to some of our stabilization commitments, significant materials stabilization progress has been made. During preparation of the December 1998 Implementation Plan Revision, we evaluated the additional risk posed by the types of delays being experienced in our stabilization commitments, and we believe that adequate interim measures are being taken to assure the safety of those materials awaiting final stabilization.

Implementation Plan Completion: ....The Board requests that the efforts to complete the plan be accelerated to the extent possible, and that a significantly improved commitment date for completing the plan be provided.

Reply: As discussed above for Savannah River Site, commitments for completion of the material stabilization activities affected by suspension of the APSF can be established in March 2000 after the Department makes a decision to either proceed with construction of the APSF or pursue installation of stabilization and packaging equipment, and possibly additional storage locations, in building 235-F. As indicated above, in January 2000 the Department will also be able to establish a revised date for completion of Am/Cm stabilization. We expect to submit an Implementation Plan change for the Savannah River Site by April 2000 and this submittal will reflect our efforts for accelerating the stabilization program.

Plutonium Stabilization, Packaging, and Storage: ....The Board requests that DOE provide (again, much sooner than July 2000) a date by which DOE will decide how, where, and when plutonium at SRS will be stabilized and packaged to meet the long-term plutonium storage standard.

Furthermore, in the absence of APSF or another new storage facility, existing facilities such as 235-F Building and K-Area at SRS are planned to be used to store plutonium from SRS, Rocky Flats, Los Alamos, and Hanford. These existing facilities were not originally designed for such storage; in particular, K-Area would require that the plutonium packages be stored inside shipping containers, and would provide no capability to perform adequate surveillance of the stored materials. The consequences of a contamination release similar to the recent FB-Line event could be even greater in such a facility. The Board requests that DOE provide a commitment date by which DOE will have developed an integrated storage plan for stabilized plutonium packages.

Reply: As the Board is aware, Congress has asked the Department to produce an Integrated Fissile Materials Management Plan (called for in Section 3172 of the Defense Authorization Act for FY 2000), which must be submitted by March 31, 2000. This timing is consistent with the Department's March 2000 schedule for a decision concerning the APSF, as indicated above. At that time the Department will decide how, where and when plutonium at SRS will be stabilized and packaged to meet DOE-STD-3013.

The Department does not at this time plan to use existing facilities at SRS to store plutonium from Hanford, although we are currently evaluating increasing storage in 235-F and K-Area that could accommodate the Hanford material. The Department will only store plutonium in facilities after it has been determined, through detailed safety analyses, that the activities involved can be safely accommodated and that workers, the public and the environment are adequately protected.

The DNFSB is correct that storage in K-Area will require the plutonium packages be stored inside shipping containers, that there is no capability within K-Area to perform adequate surveillance of the material, and that the consequences of a contamination release similar to the recent FB-Line event could be even greater in such a facility. It should be noted that plutonium in FB-Line is, because of the facility's design, stored only in an inner 3013 container. It is because the plutonium packages, i.e., both inner and outer 3013 containers, will be stored in K-Area inside shipping containers that a release similar to the recent FB-Line event is not credible in K-Area. The safety basis for K-Area takes credit for the plutonium containment provided by the 3013 containers. Since there is no capability in K-Area to perform surveillances on the stored plutonium, when such surveillances are necessary the shipping containers will be transported to 235-F (or a new facility like APSF, depending on the forthcoming decision) where such a capability will exist. That capability currently exists in FB-Line.

Changes to Commitments: Activities committed to in the implementation plan are being

delayed and/or redirected without appropriate technical review of the safety implications or proper notification of the Board by the Secretary of Energy. Many of these changes are driven by short-sighted budget decisions. The Board requests a statement regarding how this problem is being corrected.

Reply: While making a strong effort to keep the Board fully informed of anticipated changes to 94-1 commitments, the Department acknowledges that there have been instances where changes have been implemented without full prior notification of the Board members. Specifically, the decision to send Rocky Flats' sand, slag, and crucible residues to WIPP vice Savannah River was made without formal consultation with the Board members.

On all of the changes to commitments discussed during the recent 94-1 public meeting, and on any future changes which may arise, the Department will work closely with the Board Staff and Members.

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EM-1 RESPONSE TO QUESTIONS FROM THE DEFENSE NUCLEAR FACILITY SAFETY BOARD (DNFSB)

(DNFSB Questions shown in italics)

II. Overview of Recommendation 94-1 accomplishments and description of delayed stabilization activities:

1. *In December of 1998, DOE submitted an incomplete revision to the Rec. 94-1 Implementation Plan. In January 1999, the Board requested that DOE provide plans for the omitted activities by the end of March, 1999. The Board has not yet received a completed plan, although a letter dated July 2, 1999 provided a potential path forward. On what date will DOE complete the Rec. 94-1 Implementation Plan and submit it to the Board for acceptance?*

The January 28, 1999 letter from the DNFSB addressed 3 issues:

1) Effect of APSF delays on stabilization activities (due by end of March)

2) Back-up for Off-Spec Fuel Program for stabilization of HEU solutions at SRS

3) Plans and Schedules for RFETS classified parts

The March 26, 1999 letter from EM-60 to the DNFSB answered items 2 and 3:

Back-up for HEU project is blending to less than one percent U-235 and converting to oxide in FA-line.

Also provided options and proposed schedules for RFETS classified parts.

Also asked for extension to end of June to reply to item 1.

July 2, 1999 letter from S-1 to the DNFSB committed to completing a revision to the 94-1 Implementation Plan (IP) for Savannah River Site (SRS) commitments by July 2000. SRS is examining if that schedule can be accelerated to April 2000.

July 22, 1999 letter from EM-60 to the DNFSB, the Department plans to prepare a revision to the IP for Hanford PFP activities in the Fall of 1999. This is planned to be submitted in November 1999.

2. *The near constant change in strategies make for much DOE staff activity, but little forward movement in getting some of these hazardous legacy materials in safer states.*

What, if anything does DOE intend to do to achieve greater firmness in both the plans and their implementation per the schedules committed?

Addressing technical problems such as Am/Cm stabilization, resumption of activities at PFP, and the appropriate configuration of the APSF have highlighted a need for greater emphasis on project management and cross-program integration. The current pathways for these projects are better managed than before and are receiving an appropriate level of management attention. The resultant schedules for stabilization of Am/Cm, PFP materials, and SRS plutonium materials which will be provided to you in the forthcoming IP revisions should reflect a higher degree of schedule confidence.

3. *In terms of material stabilization activities in the December 1998 IP, how many and which activities are being performed according to the plan?*

Of 55 commitments in the December 1998 Revised Implementation Plan, 12 have been completed:

101- RL Decide on Shipping or Processing Approach
102- RL Complete Categorization of Pu Solutions
103- RL Decide on Mag. Oxide Precipitator or Vertical Calciner
107- RL Initiate Thermal Stabilization of Pu Oxide and MOX>50%
108- RL Complete Analysis of Convenience. Can vs. Welded Can
109- RL Complete Hazard Evaluation of Unalloyed Pu Metal
112- RL Identify Approach for Stabilizing Ash Residues
301- RF Complete Draining and Processing of All B371 Liquids
308- RF Characterize Salts, Combust. & IDC 368 Residues
309- RF Complete Stabilizing ION Exchange Resins
310- RF Complete Stabilizing High Risk Salts
311- RF Complete Stabilizing Ash Residue IDC 333

Good progress on stabilization of solutions and solid residues (with exception of SS&C noted below) is occurring at Rocky Flats.

Preparations for stabilization of metals and oxides is progressing well at Rocky Flats and Lawrence Livermore National Laboratory.

Fuel salt removal preparatory activities continue on schedule at the Molten Salt Reactor Experiment in Oak Ridge.

The Prototype Vertical Calciner (PVC) began stabilization of plutonium bearing solutions on September 8, 1999. The PVC startup was delayed to address seismic concerns and operational problems with aging equipment.

4. *Which specific stabilization activities are behind schedule? What is being done to recover from these delays?*

One commitment is currently overdue, Milestone #402, Charcoal bed removal at MSRE at Oak Ridge. The contractor at Oak ridge is completing an analysis of how to proceed in light of unexpected conditions encountered when beginning bed removal.

Rocky Flats reassessed the plan to send "sand, slag and crucible" (SS&C) residues to SRS for processing and opted for a different disposal path. An Amendment to the Rocky Flats Residues Record of Decision has been issued, and that material will now be repackaged for disposal at WIPP.

Los Alamos experienced problems with part of their stabilization equipment for residues earlier this year. However, they believe they will be able to recover the lost schedule of legacy (94-1) material processing to meet their September 2005 commitment.

Schedules for <u>all</u> activities at Hanford and Savannah River are being reevaluated as indicated in previous correspondence to the Board.

Out of the nine SRS milestones identified in the Revision 1 IP, eight of the milestones will not be completed per the IP Revision 1. These eight milestones are listed below:

I.P. 201, Convert H Canyon Pu solutions to an Oxide
I.P. 202, Actinide Packaging and Storage Facility Operational
I.P. 203, Repackage Existing Pu metal and oxide per DOE Storage Standard
I.P. 204, Stabilize and Package SRS Pu Residues
I.P. 205, Vitrify F Canyon Am/Cm Solutions
I.P. 206, Convert Np-237 Solutions to Oxide
I.P. 208, Dissolve SRS Mk16/22 Spent Nuclear Fuel
I.P. 209, Stabilize and Package RFETS Pu residues and scrub alloy

Projected budgets do not support recovering the delays.

5. *What written criteria are used to determine when failure to stabilize materials to your plan requires additional compensatory measures to ensure safety?*

The safety posture at the site facilities are based on the requirements defined in the Authorization Basis documents, which identify controls for processing and storage of materials. The requirements identified in these documents are not time dependent. Therefore, a delay in the stabilization of the "at risk" material does not require additional compensatory measures to ensure safety. However, if indications exist that additional controls are necessary, these will be evaluated and implemented.

6. *By what criteria does DOE measure success in implementing material stabilization activities?*

The Department has translated the 94-1 milestones into performance measures with their contractors at the field activities performing stabilization. These performance measures are monitored quarterly and are included in considerations of the award fee paid to the contractors.

Assistant Secretary Huntoon has also included stabilization performance in her annual commitments to the Secretary, and the Secretary has included these in his annual performance agreement with the President.

Ultimately, Assistant Secretary Huntoon regards completion of the stabilization of these materials as the measure of success.

III. No questions in this section.

IV.A. Plutonium stabilization at Hanford's Plutonium Finishing Plant (PFP)

The Department agrees that the Plutonium Finishing Plant has had some problems in the past. However, we believe that the Richland Operations Office and the contractor at PFP have turned performance around and implemented a safety culture required to provide a safe work environment for it's workers and sustain operations in the future, while demonstrating success in restarting and re-planning 94-1 stabilization activities. Certainly over time we will validate this belief, but indications a t this point are that the plant is headed in the right direction. The safety issues that PFP experienced in 1996 were not new to the facility. In fact, they occurred periodically over the life of the project. Implementation of a good conduct of operations culture was absolutely necessary to support both restart of 94-1 stabilization activities and to maintain performance expectations that will provide a high confidence in their ability to support future DNFSB commitments. PFP's performance during an extensive Operational Readiness Review late last year and performance since restart of thermal stabilization operations demonstrate a maturing safety culture that we expect in our plutonium facilities. In addition to restarting and maintaining stabilization of Pu oxides in January, the prototype calciner was restarted in September. During the same period, all stabilization processes were extensively reviewed and a high confidence Integrated Project Management Plan was developed. Extensive testing of new processes identified in this plan, and processes that will enable PFP to accelerate the plan were conducted with successful results. These combined successes underscore our resolve to expeditiously reduce risks associated with continued storage of Pu materials in the safest manner achievable at PFP. As such, we believe we have struck a balance between the desire to accelerate progress and the need for safe prudent planning of these very important activities.

In April 1999, Hanford completed the PFP Integrated Project Management Plan (IPMP) that provided a significant increase in schedule confidence for completion of the DNFSB 94-1 materials stabilization requirements as compared to the 1998 94-1 Rev. 1 Implementation Plan (IP). The IPMP, and an associated addendum, plan for final completion of packaging of all 94-1 materials for long-term storage two months earlier than the IP. A copy of the IPMP was

provided to your office in May 1999, referenced in your subsequent letter to Mr. James Owendoff dated 5/26/99, and discussed during the Board's visit to Hanford on July 27th of this year. It will serve as the basis for updating the PFP portion of the December 1998 IP that is currently being completed.

As identified in paragraph 5.4.1 of the 1998 IP Rev. 1, the PFP IPMP re-baselining effort was ongoing during December 1998. It utilized a Systems Engineering approach that recognized material risks, process status, and credible funding profiles to optimize the resource-loaded, integrated schedule. Assignment of this task to a dedicated "Tiger Team" of recognized planning professionals, utilization of DOE complex-wide expertise, and a total re-evaluation of all materials processing approaches, guaranteed that this activity would satisfy our expectations for a detailed high-confidence schedule to support future DNFSB commitments. Recognizing that the re-baselining effort was underway, DOE established a series of eleven new DNFSB "interim" commitments that were added in the IP Rev. 1 update. All seven of these PFP IP commitments due prior to 10/1/99 were completed (except for installation of the production vertical denitration calciner, which was deleted from the path-forward in the IPMP).

The resulting stabilization schedules for individual 94-1 material types deviated from those in the IP, as anticipated, and included stabilization of Pu metals 14 months earlier than the IP commitment. Completion of oxides stabilization has also been accelerated by two months. Resource leveling of the schedules dictated that some activities be moved out to achieve a credible funding profile and to fit within worker dose limitations. As a result, residues - considered a lower risk material - were selected for extended operations. Additionally, polycube stabilization was planned for completion at a later date to allow earlier processing of other materials. Test data available just before the IPMP was published indicates that off-gassing is not the risk previously anticipated due to radiolytic degradation of the styrene materials. We believe that the remaining polycube hazard may be strictly a function of handling, because of dose and dispersibility considerations, regardless of the stabilization sequencing with respect to other materials. DOE is continuing its evaluation of the Hanford data, and we will be discussing the polycube stabilization path forward with the DNFSB staff during the week of October 18, 1999 when we are meeting to discuss the PFP 94-1 IP proposed change.

DOE recognizes that the polycubes remain a handling and storage concern over time regardless of the Pu content, especially with respect to worker safety. Excellent technical work at LANL, PNNL, and PFP Laboratories has provided both a baseline disposition process, and identified another opportunity that may provide acceleration opportunities. Confirmation of the viability of this path-forward is ongoing and is anticipated to be complete in the near future. Also, there exist potential opportunities to use cementation or pipe-and-go packaging of residue materials as "fill-in" work to accelerate stabilization of this material stream. Innovative actions by DOE are being pursued to bring these stabilization efforts to conclusion as soon as can be reasonable achieved. However, schedule improvements from these potential actions cannot be introduced at this date without impacting the confidence that DOE judges to be critical in establishing these and future commitments to the DNFSB. We are committed to continuously seek ways to improve the stabilization schedule for all material types.

DOE recognizes the need to maintain strict configuration control for all changes to the of DNFSB 94-1 Implementation Plan commitments. We anticipate that there may be the occasional need to shift resources at any of the facilities to optimize completion of the overall program, even if specific material streams are impacted. In this situation, DOE felt that it was necessary to complete an independent validation of the IPMP prior to acceptance of the plan and formal transmittal to your office - particularly since the overall impact of the re-planning accelerated final stabilization actions. The Department will coordinate the IP revision with your staff to incorporate the IPMP path forward into the DNFSB 94-1 IP.

Responses to Specific DNFSB Questions:

- *There have been several fits and starts in operating the thermal stabilization process and starting the prototype vertical calciner at PFP. During the downtime, little stabilization could be accomplished because neither the additional muffle furnaces nor the cementation line was operational. What is being done to accelerate making these additional stabilization paths operational?*

PFP funding priorities for FY 1999 were based on the need to restart the facility, and focus attention on achieving the capability to begin stabilization of the highest risk Pu materials. Key activities included:

- Restart of thermal stabilization using existing muffle furnaces. This action was completed in January 1999.
- Rebaselining of the Project to improve confidence in the 94-1 Pu materials stabilization and packaging schedules. The PFP IPMP was submitted in April 1999.
- Restart of the prototype calciner to continue solutions processing development, and equipment installation actions to initiate stabilization of the PFP Pu solutions. The decision to utilize Magnesium Hydroxide precipitation for solutions stabilization has progressed through the completion of equipment design.
- Actions necessary to attain the capability to provide final 3013 packaging of the 94-1 materials. DOE-HQ directed PFP to consider utilization of the SRS "BTS" type packaging system for implementation at PFP. This system was selected to be coupled with thermal stabilization furnaces and an outer 3013 weld station to provide the facility with the capability to meet this standard. The Conceptual Design Report for this system has been approved, and SRS is currently fabricating the BTS components.
- Process development activities to support polycube stabilization. This work has provided opportunities to accelerate stabilization of these materials in a more cost-effective manner.
- Completing installation of new muffle furnaces to support increased thermal stabilization capacity in the future, and
- Completing clean-out of the cementation lines to support restart of these stabilization processes in FY 2000

All of these actions were completed by 10/1/99.

A. New Muffle Furnaces: PFP completed installation of three new furnaces as funded for this fiscal year. The PFP IPMP submitted in April of this year scheduled startup of thermal stabilization in these units in June 2000. This schedule was based on several drivers including the need to hire and train staff to operate the equipment, and prioritization of the supporting resources on activities necessary to accomplish startup of solutions processing and 3013 packaging, in July and October 2000, respectively.

PFP recently initiated actions to accelerate startup of the three new muffle furnaces identified in the IPMP to January 2000. The key actions that must be completed ahead of schedule to support this startup include completion of a criticality analysis and preparation of criticality specifications, procedure preparation, training, startup readiness actions, and a contractor startup review. Hiring to support full utilization of the furnaces is also underway.

DOE and the contractor will provide the focus and supplemental contract support necessary to accomplish these tasks without impacting the other process startups planned for next year.

B. Cementation Line Startup: Clean-out of the cementation lines funded in FY 1999 has been completed. Based on the lower storage risk of the Pu materials planned for cementation, funding priorities in FY 1999 were focused on achieving startup of thermal stabilization, startup of the prototype calciner, and design of equipment to stabilize solutions and support 3013 packaging. As a result, progress on the cementation startup activities during the current year was limited to glovebox clean-out and limited support actions.

PFP initiated actions to accelerate startup of the cementation line, from April of 2000 as identified in the PFP IPMP, to the extent achievable while meeting all startup requirements. This acceleration presents a significant task based on the issues required for restart of the process. Key actions that will remain to be accomplished in FY 2000 include the following: Hiring and training of operators to achieve full utilization of the line, State approval of the RCRA Part A permit (submitted in December 1998), WIPP certification of the Hanford laboratories that will provide acceptance analysis (ongoing), completion of a Waste Analysis Plan, Safety Basis modifications, procedure revisions, startup readiness actions, and a Re-start Readiness Assessment.

Increased DOE and contractor management attention is necessary to accomplish the actions to achieve the startup without impacting startup of processes for higher risk materials. The primary initiative proposed for this stabilization activity includes identification of opportunities to establish an ongoing cementation operation. This will be accomplished through innovative cross-utilization of personnel as opposed to the campaigns currently identified in the IPMP based on manpower limitations as other stabilization activities are initiated.

2. *Safety analysis changes are required before restart of the cementation line. However, we understand that these changes concern hydrogen generation that may occur while cementing SS&C. Why can't other plutonium residues be cemented while the safety analysis work is ongoing for SS&C?*

The IPMP schedules initiating stabilization of the plutonium residues ahead of SS&C for this reason. While it is true that cementation of SS&C requires modification of the Safety Basis to address hydrogen concerns, the other plutonium residues have not been processed at PFP in the past. As a result, the balance of activities required for startup of cementation for these materials, such as the permitting, waste designation, and RCRA storage issues, requires more effort – somewhat offsetting benefits gained in the Safety Basis areas. Additionally, PFP operators are currently scheduled to support thermal stabilization of oxides through the planned cementation startup. Hiring actions and subsequent training will be required to support fully staffed cementation operations. However, DOE will continue to pursue startup on the materials where it can be most quickly achieved.

3. *While technical and strategy changes in the IPMP may provide significant programmatic acceleration, particularly with respect to polycubes, what is being done to improve the operational efficiency of activities at PFP so that all risk-reduction activities can occur faster?*

The IPMP, particularly the supporting documentation on anticipated operational efficiency, identified several opportunities to significantly increase productivity at PFP. Several organizational focuses have been initiated to address these opportunities. These include:

- A DOE and Contractor Project Management focus has been initiated to coordinate stabilization support activities and seek break-through opportunities
- PFP Systems Engineering approaches to efficiency improvements, including computer modeling of all processes, have been initiated to streamline material movements and stabilization processes
- The PFP Re-design effort has established stabilization teams that will include all key resources to focus on achieving optimum efficiency of personnel utilization
- A Near-Term Planning organization has been established during the PFP Re-Design effort to focus on execution of the PFP Stabilization Mission and integrate key activities with all other facility work
- Performance indicators have been established to track progress on the inefficiencies that contribute the highest impact to operating efficiency

Additionally, the PFP contractor has completed a major follow-up review of the PFP IPMP that has identified several "Breakthrough" opportunities to achieve major accelerations in the PFP Stabilization and Facility Transition missions. These opportunities include significant efforts to improve facility operating efficiency. Examples of initiatives include:

- **Redefinition of the radiological airspace boundaries.** Currently, the most significant TOE is from planned and unplanned posting of Airborne Radiological Areas (ARAs) in the process areas, and one routine operation can effectively stop all other processes in ancillary rooms. The ARA boundaries can be significantly reduced by reconfiguration of the HVAC coupled with redefinition of the airspace boundaries.
- **Addition of alpha distinguishing Continuous Air Monitors (CAMs).** The Hanford Site

has a history of spurious alarms caused by detection of naturally occurring radon. Response to these alarms requires a stoppage in operations pending verification of radon. Installation of CAMs that can distinguish radon would effectively eliminate the radon-caused false alarms.

- **Integration of preventive maintenance and corrective maintenance with operations schedule.** Reducing outages associated with preventative maintenance and the corrective maintenance will minimize the number of planned ARA activities.

- **Criticality Alarm Panel (CAP) reduction.** This initiative is aimed at elimination of unnecessary CAP systems to include 236-Z (PRF), and perhaps the duct level areas of 234-5Z Building where discrete items of material are neither transported, stored, nor processed. Reduction of the associated preventative maintenance, corrective maintenance, and surveillances on this system would yield FTE reductions in savings that could be reallocated to perform stabilization/transition work.

Results from these efforts are demonstrated on a programmatic level through initiation of actions to implement the polycube strategy changes as well as acceleration strategies for startup of the new muffle furnaces, and continuous cementation operations. Several PFP facility operational efficiency gains have already been also been achieved through ongoing efforts, including:

- Continued stabilization operations through planned steam outages that have historically resulted in lost time
- Performance of HEPA filter testing through techniques that do not require discontinued operations due to placing entire sections of the facility on Airborne Radiation Area restrictions
- Implementation of glove box sealed "diaphragm" actions using sealed bag-in techniques that avoid using the current "horse-tailing" techniques that historically result in placing the facility on ARA status and stopping some stabilization work.
- Workshops have made progress on development of approaches to improve throughput for the solutions load -in/load-out facilities in Room 227

4. *Three-shift operation would certainly speed up thermal stabilization operations. Why has it taken so long to hire and qualify the additional staff (e.g. a shift manager) necessary to man three shifts?*

PFP experienced the unplanned attrition of key shift manager personnel during a period when qualified candidates to cover the shift manager position were in very short supply. Extensive training and qualification of assigned personnel was required to fill the vacancy which is now fully staffed. Corrective actions to prevent this situation in the future are ongoing and include training of replacements and additional backups to prevent this situation from recurring.

5. *The IPMP was developed in the "War Room" in the 300 Area, albeit with substantial*

input from the facility. However, invariably with a project plan of this magnitude, the facility personnel will find errors and opportunities for improving the schedule. What is being done to capture these comments, incorporate them, and track their closure?

Several mechanisms have been utilized to capture any significant errors identified during the various reviews of the IPMP for validation and implementation:

- The PFP Program Manager is maintaining an ongoing list on key items
- PFP has documented several discrepancies and incorporated corrections during preparation of the PFP Multi-Year Work Plan (MYWP)
- Project Management Plans developed for each "Sub-Project" have been revised since the IPMP was submitted and have captured issues identified since that time
- Development of an IPMP Vault Upgrade Planning Case to address opportunities for performing vault upgrades and early packaging of BTS containers in the outer 3013 cans incorporated corrections to errors identified during this effort
- The PFP Project Management organization provides the point of contact for any PFP personnel that identify issues with the IPMP. These issues will be addressed during periodic updates of the Project Management Plans and rolled into IPMP updates

6. *Describe the planned vault modification in terms of what is being done for 3013 compatibility and what is being done for security upgrades.*

PFP submitted the Conceptual Design Report (CDR) for the W-460 Packaging and Stabilization Project, and the IPMP Vault Upgrade Planning Case that identified potential upgrades of the PFP vaults to accommodate the 3013 cans and security requirements in a manner that supports full 3013 compliance by 2004. The CDR identified modification of the vault racks in a conceptual manner that involved replacement of the current pedestals with racks that can hold the 3013 can. These modifications, as well as security upgrades, were based on previous design efforts prior to the decision to utilize the SRS BTS versus BNFL PuSAP approach to 3013 packaging. The IPMP Planning Case recommends insertion of "wine-rack" type racks into the existing vault cubicles without removal of the existing pedestals. This approach results in cost savings, efficiency gains, and a reduction in personnel exposure. Insertion of these racks and any required security upgrades are proposed to be performed in an incremental "just-in-time" approach to level funding requirements and minimize the exposures. Further vault upgrade details are being developed as a function of the Definitive Design effort for the W-460 project.

7. *How long will material of each type be kept in single-barrier containers prior to completing the 3013 packaging?*

The IPMP and its associated addendum plan to package the stabilized materials into single-barrier BTS cans, and the BTS cans into DOE-STD-3013 compliant containers, in sequence with little or no delay. Of course, there may be some delay due to operational and vault storage considerations, but the delay would not be considered significant.

IV.B. Plutonium and Neptunium Solutions Stabilization at Savannah River Site

8. *The Recommendation 94-1 Implementation Plan states that plutonium and neptunium solutions will be stabilized by conversion to a low-fired oxide in HB-Line Phase II. Startup of this facility, originally scheduled for early 1999, was delayed in fiscal year 1999 because of funding issues. The December 1998 implementation plan update identified a July 2001 startup date. Recent information from the site indicates that startup has been further delayed to December 2001. On what date does DOE expect to start stabilizing plutonium solutions in HB-Line Phase II? Will this facility receive adequate priority to maintain this startup date?*

The HB-Line Phase II schedule has recently been re-evaluated based on receiving adequate funding in FY00 and FY01. Based on recent budget information, the startup date for Phase II is 12/01.

9. *What is the plan and schedule for subsequent packaging and storage of plutonium and neptunium oxide in HB-Line?*

The Pu-239 solutions will be converted to an oxide in HB-Line Phase II and will be shipped to 235-F for repackaging to meet the 3013 storage standard, if this capability is provided there rather than in the APSF. If the NE ROD concerning nuclear R&D and isotope production, currently expected to be issued December 2000, selects a site for domestic production of Pu-238 or a site for storage of the Np-237 oxide, the Np oxide product from HB-Line will be packaged to meet or exceed shipping requirements to allow it to be shipped to the selected site. Because of the ingrowth of Protectinium-233, the Np must be shipped within 90 days of being converted to an oxide to reduce radiation exposure. If a site is not chosen for Pu-238 production or storage, then the material will be shipped to 235-F for long term storage. The material will then have to be repackaged in accordance with DOE-STD-3013-96.

3. *Given the delays identified in question 1 and the potential for additional delays, what measures [have] been taken reduce the risk associated with storing these solutions in H-Canyon?*

Materials in storage in H-Canyon are continuously monitored. The current Authorization Basis contains controls for both long-term and short-term storage of solutions. Materials have been successfully stored in H-Canyon for several years using long-term storage controls. Controls include concentration and level monitoring, Boron-10 poison, tank isolation, hydrogen controls, and leak detection. Delays in stabilizing will not require the need to identify additional controls. With the controls in place, the current delays do not increase the risk of storing this material.

4. *How is DOE ensuring that the contractor is adequately and appropriately staffed to support material stabilization activities at SRS while addressing emerging programs and issues?*

The FY 2000 Congressional budget request supports material stabilization activities.

5. *What is the status of the H-Canyon facility infrastructure including critical spare parts? Do infrastructure issues have the potential for affecting plutonium and neptunium stabilization? How is DOE identifying and mitigating risk that may effect plutonium and neptunium stabilization?*

Neither the FY 1999 budget nor the FY 2000 Congressional budget request fully support all desired infrastructure upgrades or critical spare parts, and there is the potential for equipment failures resulting in outages while equipment is fixed or procured. However, requirements contained in Authorization Basis documents will be maintained.

V. Stabilization, Packaging, and Storage of Plutonium to DOE-STD-3013-96

DOE plans to stabilize and package plutonium at SRS have been in flux since January 1999, when DOE suspended the APSF project. DOE has postponed by about a year, proposing a new schedule, to allow time for developing a preliminary design using an existing facility (235-F). It appears that DOE may slip the stabilization and packaging commitment, for budgetary reasons, by as much as 4 years (i.e., from May 2002 to July 2006).

1. *Why is such a schedule slippage acceptable from a risk reduction standpoint, considering risk to public, the workers, and the environment?*

The safety posture at the Savannah River Site facilities are based on the requirements defined in the Authorization Basis documents which identifies controls for processing and storage of materials. The requirements identified in these documents are not time dependent. Therefore, a delay in the stabilization of the "at risk" material does not require additional compensatory measures to ensure safety. However, if indications exist that additional controls are necessary, these will be evaluated and implemented.

2. *Why is it that DOE cannot provide a reasonably firm schedule for this Recommendation 94-1 Commitment? What actions are required to allow DOE to make a firm commitment?*

DOE has suspended the APSF project due to evaluations of the ability to integrate the storage facility with the disposition facilities and due to concerns with the increase in the cost of constructing the facility. DOE continues this evaluation, but at the same time is also evaluating installation of the stabilization and packaging equipment in the 235-F facility. A decision concerning construction of APSF will be made in March 2000 subsequent to completion of pre-conceptual work on the 235-F stabilization and storage option, which is expected in December 1999. The purpose of this pre-conceptual work is to determine the feasibility of safely performing plutonium stabilization and packaging in 235-F. This pre-conceptual effort includes such activities as verifying the adequacy of the existing ventilation system, material flow path, seismic qualification of the building, radiation exposure to workers, equipment layout, and security issues. If the decision is to cancel the APSF subproject and pursue the 235-F option

instead, then the Department will propose deletion of this commitment from the 94-1 program and provide a new commitment for the 235-F activities.

3. *How dependent is this course of action on when the plutonium disposition facilities become available?*

This course of action is not dependent on when plutonium disposition facilities become available.

4. *There may be potential for delay in design, construction, and startup of the plutonium disposition facilities. Considering the current facilities at Hanford, SRS and elsewhere in the complex and the current course of action, how long a delay could be tolerated before it would make sense to build a new facility, such as APSF?*

The 5,000 storage positions that would have been provided by APSF, together with the 3,000 positions in K-Area, would have accommodated all plutonium from SRS, Hanford and Rocky Flats. If APSF is not constructed, then K-Area and 235-F will provide space for storage of all SRS and Rocky Flats material. Hanford material would then remain at Hanford pending shipment for disposition, unless additional storage space is made available at SRS. From a pure cost perspective, it would make sense to build a new facility if the cost of constructing the new facility would be recouped before it was shutdown. The length of delay in startup of disposition that could be tolerated is dependent on many factors, including the cost of modifying and operating 235-F, the cost of modifications and operation of Hanford vault space, and the operating costs of K-Area. The Department is still evaluating plutonium storage and plans to make a decision on this matter by March 2000.

VI. Interface with Fissile Materials Disposition (MD) Programs

1. What is the potential for delay for the plutonium disposition facilities?

There are several sources of potential delay for the plutonium disposition facilities: (1) A bilateral agreement with Russia to disposition plutonium, which is planned for October 1999, may not be achieved in time in order to start construction on plutonium disposition facilities sometime in FY 2002; (2) DWPF may not provide the required radiation barrier for the immobilization facility product by FY2008; (3) Evolving requirements for the high level waste repository may require additional qualification tests for the immobilized product, which may delay startup of operations; (4) completion of design may result in a larger than anticipated facility that may delay completion of any one or more facilities; (5) The NRC licensing of the client reactors may take longer than anticipated delaying start-up of the MOX fuel fabrication facility.

2. *Has MD done a programmatic risk assessment to evaluate potential impacts (consistent with current DOE guidance on project management)? From a programmatic risk*

standpoint, how much longer than currently anticipated could DOE be required to use existing, aging plutonium processing and storage facilities throughout the complex?

A programmatic risk assessment was done for the hybrid plutonium disposition technologies (MOX Reactors and immobilization) The risk assessment concluded that of the three separate plutonium disposition facilities the immobilization facility could be faced with the longest delay, estimated to be three years. This would suggest that plutonium storage facilities supporting the immobilization facility could be required up to year 2022, based on a currently planned start of operations in FY 2008 and a ten year operating campaign.

3. *How are functions and requirements being identified for the new MD facilities? Specifically, how is DOE ensuring that authorization basis identifies the functions and requirements important to safety?*

Facility functions and requirements are developed through the use of a system engineering approach. The objectives of the MD Strategic Plan are transformed into program level general requirements, which in turn define program/project level technical functions and requirements for a generic conceptual design report for a facility. The conceptual design report requirements form the basis for the requirements of a site-project for a facility.

The authorization basis for a facility is expected to comprise a set of documents that define and prescribe the basis for operating that facility. Safety analysis reports translate facility functional requirements into facility safety design parameters and requirements and these evolve into safety operating parameters or safety technical requirements for operation. A review team will be constituted to review the safety analysis reports and prepare a safety evaluation report.

4. *Once functions and requirements are identified, how are they being controlled and by whom? How is the lead responsibility being assigned to each? What process is being used to ensure that information flows freely across the numerous organization and contractual boundaries?*

MD controls program level functions and requirements via MD quality assurance procedures. The architect-engineer controls project level functions and requirements via his quality assurance controls requirements. Functions and requirements for the immobilization product are controlled by RW quality assurance procedures and a Memorandum of Agreement with RW. MD controls the exchange of information between organizations via interface control document and procedures.

Lead responsibilities for a project are defined in the project execution plan in accordance with DOE M41 1, 1, "Manual of Safety Management Functions, Responsibilities, and Authorities". Authorization protocols will be prepared between the designated site, the architect-engineer, and the DOE program office in accordance with DOE G450.4A Integrated Safety Management Guide".

The DOE technical manager/project manager presides at monthly meetings with the project

participants to review the progress of the project. The DOE technical manager/project manager also presides at weekly telecons with the project participants to exchange information and address issues as they arise in a timely manner. Meeting notes are distributed to the participants.

5. *What site-specific information must be identified early to define safety-related requirements? Who is responsible for this and by when?*

The site-specific information that will be identified early to define safety-related requirements are the characteristics of natural phenomena hazards and other hazards that may be present on the site that may affect the safety of operations. The Architect-Engineer will be responsible to identify what site-specific safety-related hazards need to be considered in consultation with site personnel. The site then prepares the site-specific information in time to begin the preparation of the hazards and preliminary safety reports.

6. *The Pit Disassembly and Conversion Facility (PDCF) is a good example, since it is further along than the other MD facilities. Regardless of which site is chosen, how will DOE ensure that the architect-engineer (Raytheon), the process designer (LANL/LLNL), the safety analysis group (Pacific Northwest National Laboratories), and the operator (probably SRS) are in close communication to ensure safety and operations issues are identified early and appropriately addressed?*

The architect-engineer has been assigned the responsibility for the preparation of the safety analysis reports. The safety analysis reports will be prepared in accordance with procedure(s) that define the roles and responsibilities of each of the design team members and how safety-related information is controlled. The architect-engineer and the safety analysis group are part of a contractual team for which the Raytheon project manager is assigned the responsibility for ensuring close communication between members of the architect design team. The overall coordination between the process designer, the operator and the architect engineer rests with the DOE technical manager, although specific and detailed information exchange between the design team will be coordinated by the architect-engineer project manager.

7. *What will be the process for documenting such issues, obtaining consensus, and reaching closure?*

We expect that the procedures associated with the preparation of the preliminary safety analysis report will include, as part of the control of safety-related information, the means to document issues, obtain consensus, and reach closure. We expect that an essential part of the procedure will include a means to report the status of individual issues from the time they are identified to the time they are closed. This status report on safety-related issues will be distributed to key project team members and to the responsible DOE group director.

8. *SRS has a relatively mature system for analyzing hazards, identifying safety systems and operational concerns, and developing design criteria. If SRS is indeed chosen, what should be the role of the SRS infrastructure, practices, and procedures in confirming that the designs are adequate, particularly in the conceptual design phase when many key*

decisions are made that affect safety?

If SRS were elected as the site for the plutonium disposition mission, SRS practices and procedures would be used to the extent practical for the pit disassembly and conversion and the immobilization facilities. The use of SRS practices and procedures would need to be reviewed for their applicability for the MOX fuel fabrication facility. Detailed discussions will be initiated to define necessary infrastructure, and procedures.