

**NSNFP Strategy Meeting**  
August 26<sup>th</sup> and 27<sup>th</sup>, 2008  
Las Vegas, NV

To: Distribution

From: Sandy Birk / Barb Beller

Subject: NSNFP Strategy Meeting Minutes

The NSNFP SNF and HLW Strategy Meeting was held on August 26<sup>th</sup> and 27<sup>th</sup>, 2008 in Las Vegas. The presentations made at this meeting will be posted on the NSNFP web site. Because of this, these minutes will only provide summary information and an introduction to the presentations. A list of action items that came out of this meeting is also provided.

**1. Introductions and Opening Remarks (Jan Hagers, NSNFP)**

Jan welcomed everyone to the meeting on behalf of Barb Beller (NSNFP), who could not attend the meeting. People introduced themselves to others in the meeting.

**2. Welcome and Key Initiatives (Gary Deleon, DOE-EM)**

DOE-EM is working on a Strategic Plan that would contain high level SNF and HLW goals and a plan/vision for what should be done in the future. EM continues to support the YMP LA process and the upcoming RAIs and contentions. The processing of aluminum clad SNF at SRS is tied to the Pu disposition in H-Canyon. If SRS could process all of the aluminum SNF and ship the non-aluminum SNF to the INL, they could essentially get out of the SNF business. A packaging and shipping facility for DOE SNF would have to be established at the INL but this would not be needed at SRS. The budget has an impact on what could be done.

**3. Actions from March 2008 Meeting (Sandy Birk, NSNFP)**

All of the previous actions were completed except the following:

1. Establish a top level process to address 10CFR21 reporting requirements (EM and RW). EM is currently assisting RW with the development of 10CFR21 reporting requirements and/or process. This action will remain open until RW issues formal reporting requirements. (Bob Toro, DOE-EM)
2. Discuss the approval process for DOE submittals to NRC with DOE General Counsel. (Jan Hagers, DOE-ID/Gary Deleon, DOE-EM HQ) – Ongoing

**4. Status of License Application (LA) (Todd Shrader, DOE-RW)**

The LA was submitted to the NRC on June 3<sup>rd</sup>. (*After this meeting the NRC docketed the LA on September 8<sup>th</sup>*). An LA update is planned for late September and it could involve ~200 changed pages. None of these changes directly affect EM information. Future updates are planned for every six months during the 18-month SER development period. An automated Requests for Additional Information (RAI) process and procedures are being developed and Mock RAIs will be presented as part of the training process. RAI

and contention training will be provided to people at the Strategy Meeting this afternoon. It has been estimated that there could be as many as 2,000 RAIs and up to 1,200 contentions that would be addressed by the YMP with the support of EM and others. *(A Mock RAI was given to EM during the Strategy Meeting and it dealt with the schedule to complete the analysis work of the higher Pu loaded vitrified HLW glass. John Owen and Mark Keefer (SRS) were at the Strategy Meeting and provided the response to the Mock RAI.)*

#### **5. Status of Nevada Petition Regarding Incomplete LA (George Hellstrom, OGC)**

The contention by the State of Nevada regarding an incomplete LA was rejected by the NRC.

#### **6. Status of Transportation Cask for DOE SNF/HLW (Steve Schmid, BSC)**

Vendors are currently working on the TAD and TAD aging overpacks. The plan is to have the initial TAD systems certified and available by 2011. Cask activity will begin in about three years.

#### **7. DOE EM/Site Support for RAI Process (Jim Linhart, NSNFP)**

Henry Loo has an EM site, DOE-EM HQ and NSNFP distribution list that was used to distribute LA and SEIS sections for review. This list will be used to distribute RAIs and contentions but will first be sent out for review and updating. For Category 1 RAIs (editorial type requests), the NSNFP will respond with assistance from EM sites or DOE-EM HQ as needed. For Category 2 RAIs (more technical in nature), the NSNFP will coordinate the response with assistance from EM sites and DOE-EM HQ. If a specific EM site is needed for assistance, they will be requested to provide support but EM and NSNFP management will be copied on the request so that they would be informed. Other EM sites might also be copied so that they would know what types of questions are being asked in case similar questions are asked of them in the future. The YMP RAI response procedure includes support from EM and others. Jim Linhart and Henry Loo will prepare a write-up of the RAI and contention support process that will be implemented by EM in relation to the existing YMP RAI response procedure and it will be distributed to EM for review and concurrence.

#### **8. Quality Assurance (Bob Toro, DOE-EM / Don Armour, NSNFP)**

The DOE-EM HQ QA Program was revised in 2008 and approved by EM-1. The EM strategy is to establish a single, integrated EM-Complex QA program and ensure consistent implementation across all EM assets. This would include (1) consistent interpretation and implementation of DOE O 414.1C, (2) EM QA Corporate Board, (3) QA managers established at major sites, (4) flow down of QA requirements and EM-1 expectation from federal to contractor staff and (5) EM centralized training. NQA-1, 2004 would be adopted as the EM Corporate QA consensus standard and EM corporate QA expectations would be established. The EM Corporate QA Program would be written to ensure minimal impact to existing NQA-1 based QA Programs and to easily accommodate existing specialty QA Programs such as the RW QARD.

QARD Rev. 20 is to be implemented by October 1, 2008. On March 20, 2008 EM-60 (Dae Chung) issued a memo directing EM SNF and HLW sites to comply with QARD Rev. 20. The status of the FY-08 EM/RW QA audits was provided and a schedule for the FY-09 audits was also provided. Guidance from RW on how to implement 10 CFR Part 21, in relation to the YMP, was requested.

Don Armour reported that he had been in Australia reviewing the controls and QA Program for the company that would be performing the HIP testing of calcine. It is important to make sure that the necessary QA steps are in place before the testing begins so that the results could be used to support a path forward for the disposition of calcine.

### **9. Technology Development (Al Baione, DOE-EM)**

The EM-21 Multi-Year Program Plan (MYPP) development process was presented. The goal is to provide a defensible list of Waste Processing tasks that address key site needs and to develop a structured, consistent and robust process for program management decision making. A prioritization process was piloted on waste processing tasks in FY-08 and used again on planned FY-09 activities. This process is especially important as EM budgets provide limited resources to support our diverse programs. The MYPP portfolio review process also includes monthly status updates, external technical review of selected projects, and mid-year and year-end reviews of all funded projects with a focus on the high dollar projects.

### **10. Hanford WTP Status (Albert Kruger, DOE-ORP)**

The Waste Treatment and Immobilization Plant (WTP) is the world's largest radioactive waste treatment plant and will be used to treat Hanford underground tank waste. In previous Strategy Meetings, the status of WTP construction was provided. This presentation focused on HLW glass formulation. Once you have read the presentation you will see how relatively complex the glass formulation process is and all of the issues that must be considered. It was said that work so far has shown that Hanford may be able to produce vitrified HLW with waste loadings as high as 60% but they have already discussed this with the YMP and currently the maximum value that has been analyzed for repository acceptance is 45%.

Albert asked what the status is of the melter and process vessels at West Valley. Jim Linhart said that he would check with David Gray (DOE-WV) and Jim sent out an e-mail following this meeting which gave the status of the West Valley melter, the melter feed hold tank, and the chemical feed mixing tank. *(All three are still at West Valley in their respective steel containers waiting the processing of Waste Determination documents before they are sent off-site.)* Jim also said in this meeting that lessons learned from the D&D effort at West Valley had been documented a couple of years ago in a "draft" D&D paper prepared by the NSNFP, West Valley and DOE-EM HQ. This "draft" D&D paper will be provided via a separate e-mail as information.

### **11. INL Calcine Status (Jan Hagers, DOE-ID)**

Calcine is a granular HLW that is also classified as a hazardous waste (RCRA). Approximately 4,400 cubic meters of calcine are currently stored in 43 stainless steel bins. Since the calcine was produced from different HLW feeds, it is in layers inside of the bins and some layers could be from Zr SNF processing and other could be from Al SNF processing or a combination of Zr/Al SNF processing (co-disposal). Per an Idaho Settlement Agreement milestone, DOE-ID will issue a dual-path NEPA ROD for the treatment technologies for calcine by December 31, 2009. One path, and the preferred alternative, is direct disposal (calcine placed in canisters without treatment) and the other path is for some type of treatment. Treatment processes of the calcine include hot isostatic pressing (HIP), steam reforming and vitrification. TSPA modeling of non-treated calcine was completed by the INL using the YMP FEIS model. This modeling showed that the calcine did not exceed the repository boundary limit over the 1M year period. HIP process testing is being conducted in Australia and offers the advantage of a volume reduction. If additives are not added to the calcine, the HIP process could reduce the volume of calcine to be shipped to the repository by up to 50%. The conceptual design of the pneumatic retrieval process to remove the calcine from the storage bins has been demonstrated.

All of the treated calcine waste forms require RCRA delisting. Preparation of a RCRA Part B Permit requires significant (~30%) process and facility design and there is insufficient time and funding to produce a competent application for any option other than baseline direct disposal. Currently, proceeding with petitioning EPA for direct disposal is on hold. Nevertheless, the INL would like to re-analyze the direct disposal of calcine using the LA TSPA model in lieu of the YMP FEIS version formerly used in case a decision is made to submit the petition to EPA in the future (to be consistent with the LA as submitted). The LA TSPA model is now available to the public, therefore DOE-ID would like to use the LA TSPA model to “update” the calcine direct disposal petition. DOE-ID has already discussed the RCRA issue concerning calcine with Region 10 of the EPA and would eventually like to discuss it with EPA HQ.

## **12. SRS HLW and Pu Material Status (John Owen and Mark Keefer, SRS)**

The vitrification process has filled 2,566 HLW canisters through August 19<sup>th</sup> and over 10 million pounds of HLW glass have been produced. They are currently processing Sludge Batch 4, which is high in aluminum. Melter 2 has been in operation since March 2003 and Melter 3 is ready as a spare. Melter 4 components are being constructed but the construction contract for the Melter 4 vessel and frame has not been awarded. The saltstone process has processed 1.35M gallons to date for the interim salt processing campaign (ARP/MCU). The Salt Waste Processing Facility (SWPF) will be ready for hot operation on September, 2012 and 98M gallons of salt solution will be processed at a rate of 5.5M gallons per year. The CD-3 construction approval is scheduled for late 2008.

For Pu disposition, the 2006 baseline is full vitrification of 13 MT of waste Pu (can-in-canisters). The cans of Pu would be placed in a HLW canister and filled with HLW at the DWPF. Alternatives have been evaluated as follows: (1) continue with the can-in-canister process, (2) convert the waste Pu to MOX, (3) canyon processing of the Pu and

then mix it with a sludge batch and feed it to the DWPF, (4) a combination of the three above.

Issues and challenges include: (1) tank closure, (2) tanks space management contingent upon SWPF startup, (3) construction and startup of the SWPF, (4) impact of high Al sludge on production rates, (5) total canister production and (6) availability of the Federal Repository.

SRS had planned to disposition 13 MT of waste Pu as lanthanide glass in cans within HLW canisters filled with vitrified glass (can-in-canister concept). Because of budget and mission changes, they are now evaluating the disposition of 5 MT of waste Pu by blending the Pu and Gadolinium into the HLW sludge tank and sending it to the vitrification facility. The original 13 MT of Pu would be dispositioned as follows: 7.8 MT to MOX, 0.2 MT to WIPP, and 5 MT through H-Canyon and from there into the sludge tank. To implement this blending process, the HLW canisters could have a Pu loading of up to 5,400 grams/meter<sup>3</sup>.

The YMP LA analyzed the HLW waste forms that were provided and for SRS they determined that a waste form containing 897 grams/meter<sup>3</sup> of fissile material (uranium and Pu) was acceptable for the repository preclosure criticality. This is not a fissile limit but only the amount that was analyzed. Therefore, the 5,400 grams/meter<sup>3</sup> amount needs to be analyzed for acceptance into the repository. A path forward to complete this work is as follows:

1. The NSNFP plans to run the YMP TSPA model, geochemistry analysis, and complete the postclosure criticality analyses to evaluate the 5,400 grams/meter<sup>3</sup> loading and this work could be completed near the end of FY-09 or early in FY-10.
2. The NSNFP will be working with the YMP during this evaluation process to ensure that the sets of analyses to be run will be adequate to document acceptability of the higher loaded SRS canisters in the repository.
3. Once this analysis work is completed, the YMP will be asked to evaluate and approve of the analysis so that the 5,400 grams/meter<sup>3</sup> loading can be placed in the LA.
4. If the 5,400 grams/meter<sup>3</sup> loading is determined not to be acceptable, for some reason, SRS will take the necessary steps to adjust this waste form as needed. Lanthanide glass for the disposition of Pu remains an option.

### **13. Hanford SNF Status (Sen Moy, DOE-RL)**

There are currently 386 MCOs being stored at the Canister Storage Building (CSB). Two additional MCOs require removal from the K-Basin. Small quantities of SNF (found fuel) have been discovered in various burial grounds and this SNF is currently being transferred to K-Basin for consolidation with other single-pass reactor fuel. Upon completion of moving the final MCOs to the CSB, the K-Basin repackaging capability will cease due to decommissioning activities. Once K-Basin has been shut down, any additional found fuel will be placed in Found Fuel Containers and sent to the 200 Area

Interim Storage Area. This SNF would later to repackaged into DOE standardized canisters for disposition to the repository.

#### **14. INL SNF Status (Jan Hagers, DOE-ID)**

The INL manages 262.8 MTHM of DOE-owned SNF at the INTEC facility and expects to receive an additional 21.6 MTHM of SNF from various domestic and foreign reactors and an additional 1.5 MTHM of SNF from the INL ATR reactor. Per the Idaho Settlement Agreement, the INL plans to transport their SNF and the SNF at Fort St. Vrain, Colorado to the repository by 2035 in DOE standardized canisters from a modified existing facility or from a newly built facility. A critical decision for establishing a SNF packaging capability for the INL is planned for 2009, subject to adequate funding. DOE-ID is in the process of transferring the Foster Wheeler Idaho Spent Fuel facility license to DOE.

The INL is transferring SNF from wet to dry storage, which is planned for completion in 2009. If the fuel swap is implemented with SRS, the CPP-603 IFSF crane would be updated in 2009/2010. The Fort St. Vrain and the Three Mile Island ISFSI licenses expire in 2011 and 2019 respectively and DOE-ID will process a license renewal application to extend these licenses. The INL SNF FY-09 budget is at \$14,084K. DOE-ID is working toward establishing a collaborative technical exchange with Hungary.

#### **15. SRS SNF Status (Bill Swift, SRS)**

SRS received 16 Foreign Research Reactor (FRR) and 19 Domestic Research Reactor (DRR) casks in FY-08 and plan to receive 16 FRR and 15 DRR casks in FY-09. May 2019 is the planned end of all receipts. If the SNF fuel swap were to be implemented, transfers of SNF would start April 2011 and be completed by FY-19. The aluminum (Al) SNF at the INL would be transferred via an estimated 146 shipments to SRS (1944 EM ATR assemblies, 410 EM MTR assemblies and 1608 NE ATR assemblies). Non-aluminum SNF at SRS would be transferred via an estimated 114 shipments to the INL. The processing of the Al SNF in the SRS H-Canyon would take place from the 3<sup>rd</sup> Quarter of FY-10 through the end of FY-19. Approval of the SNF fuel swap with funding needs to be provided before the swap could be implemented.

#### **16. Update on MCO (Brett Carlsen, NSNFP)**

Approximately 400 MCOs have been loaded and existing analyses (deterministic) and test results demonstrate that MCOs can be safely stored, handled, transported and emplaced in a repository. LLNL performed a simplified fragility analysis to estimate failure probability rates of a MCO as a function of strain. This fragility analysis required MCO peak strains to be less than about 14% and the likelihood of a breach of an MCO was not found to be sufficiently low. Repository scenarios included drops of the MCO on its bottom but also drops of heavy objects like the MCO lifting grapple on the head of the MCO.

The NSNFP determined that the peak strains to the MCO from a heavy object drop onto its head would occur in the thinnest portion of the cap wall where it meets the shell. In this same region of peak strain, the shell has a threaded collar that mates to the locking

ring. The NSNFP has completed some preliminary analyses (modeling) of the head of the MCO under various drop scenarios. A grapple was conservatively modeled as a 6" diameter rigid body. A drop of a 4,000-lb grapple (approximate weight of the Hanford grapple) in the center of the head gave a peak strain of 12% (less than the 14% limit determined by LLNL). The worst case scenario was to drop an 8,000-lb grapple (grapple weight estimated by BSC) on the edge of the MCO and this resulted in a peak strain of 35% (although the average through-wall strain was ~23%). This is a somewhat unlikely scenario in that the grapple is twice the weight of the actual Hanford grapple and it would be most difficult to drop the grapple on the edge of the MCO since the walls of the cask and the waste package would keep the grapple more in the center of the MCO. However, an 8,000-lb grapple weighs less than a MCO or HLW canister, which could also be dropped on top of an MCO if something like the indexing plate (mentioned below) is not used to protect the top of the MCO.

The NSNFP plans to complete the remaining MCO analyses in FY-09 although new issues that arise could extend the work into FY-10. This analysis can be done for an estimated cost of less than \$1M and is expected to significantly reduce, if not eliminate, the need for implementation of more costly design solutions. The NSNFP noted that failure of a portion of the threaded section of the MCO does not necessarily result in loss of containment (i.e. breach the fuel cavity) and expose the SNF inside. Significant deformation of a large portion of the threaded section would have to occur to allow sufficient lifting of the shield plug below to compromise the seal and allow a leak path into the fuel cavity. The NSNFP feels that a MCO breach is unlikely for peak strain up to ~50% and this would bound the worst case peak strain of 35%. Design solutions could also provide assistance to the MCO for the analyses work such as follows:

- Small repository facility transfer bell – limit the angle of the vertical drop.
- Indexing plate – to cover the holes within the cask or the waste package so that canisters can't be dropped on top of canisters.
- MCO belly band – to add support to the MCO in the threaded area. A ¼" thick x 6" high band was previously looked at and it was determined to be helpful. A thicker band would be even more helpful and, if lengthened to extend above the top of the MCO, could act like an impact skirt.
- Impact limiters in the bottom of the cask or waste package.

The results of this work could be of benefit to those designing the cask.

### **17. DOE Waste Acceptance Compliance (Henry Loo, NSNFP)**

The NSNFP is working on a *Yucca Mountain Compliance Approach for the Disposal of DOE SNF and HLW Document* that would show EM sites what requirements they have to meet in the LA before sending HLW and SNF to the repository. For HLW material, existing documents such as the WAPS, WCP and WQR already show them the requirements that must be met however the LA could have different requirements (based on the analyses reported in the LA) than are shown in these documents. For example, the 1996 version of the WAPS (which is currently being revised) shows a fissile Pu limit of 2,500 grams/cubic meter. The LA preclosure criticality analysis did not determine a maximum amount of allowed Pu concentration, but evaluated and approved the waste

forms provided by each HLW site and the amount of fissile material (uranium and Pu) analyzed. For example SRS HLW was analyzed for 897 grams/cubic meter.

The Compliance Approach document could be most applicable to DOE SNF as apposed to HLW. Information from this process could help EM sites better plan for SNF packaging, for SNF interim storage and monitoring, and for data package preparation for each canister. The NSNFP plans to work with BSC and RW to ensure that this process is consistent with RW's Technical Requirements Manual. The draft of this document could be completed in October 2008 and meetings with EM, NSNFP, EM sites, RW and others could begin in November 2008.

### **18. YMP Technical Requirements Manual (Jack Bailey, BSC)**

BSC is working on a related document to support Licensing Specifications that must accompany the issuance of the License to Receive and Posses titled the *Technical Requirements Manual*. This document will include the list of the waste forms that have been analyzed in the LA. Analysis in the LA would therefore control acceptance at the Yucca Mountain Site (i.e., pickup at owner sites). A tracking list will be created to determine the work that needs to be completed for a specific waste form to be accepted. For example, DOE SNF was put into groups for criticality analyses and at least one SNF type within each group was analyzed for criticality. Therefore the criticality analysis methodology and acceptance criteria have been established. The remaining SNF within that group still have to be analyzed for criticality to show that they are bounded by the SNF criticality analyses that have already been completed, or identify the need for a new analysis. Other receipt acceptance criteria will also be listed in this document such as waste form packaging and drying/inerting (if applicable). When this manual has been completed and approved by the NRC as part of the Receive and Possess License Specifications, it would identify which waste forms are acceptable to the repository at that time and which criteria future waste forms must meet to be acceptable in the future. BSC indicated that they had not planned to begin work on this document for at least a year.

### **19. HLW WAPS (Tony Kluk, DOE-EM)**

The WAPS was developed to list technical specifications for acceptance of borosilicate HLW waste forms by RW for disposal at the repository. It was last revised (Revision 2) in December 1996. Revision 3 of the WAPS was issued in May 2008 for review. Comments received (~468 comments) are in the process of being resolved (*now estimated to be completed some time in October*). How to address the concentration limit for Pu in vitrified HLW is being worked and the historical method of using 0.5 MTHM per HLW canister is being evaluated.

### **20. Next Meeting**

Jan Hagers and Sandy Birk thanked everyone for their support of this meeting. It was suggested that the next meeting be held in Washington, DC in April to get more involvement from HQ and YMP Licensing Support Office (LSO) folks stationed in the DC area. The NRC had said that ~80% of their RAIs could be submitted to the YMP by

April 1<sup>st</sup> so having a meeting after April 1<sup>st</sup> would seem more appropriate. April is cherry blossom time in DC so a meeting at that time would have to be planned in advance.

## **21. Action Items**

### **A. From March 2008 Strategy Meeting**

1. Establish a top level process to address 10CFR21 reporting requirements (EM and RW). EM is currently assisting RW with the development of 10CFR21 reporting requirements and/or process. This action will remain open until RW issues formal reporting requirements. (Bob Toro, DOE-EM)
2. Discuss the approval process for DOE submittals to NRC with DOE General Counsel. (Jan Hagers, DOE-ID/Gary Deleon, DOE-EM HQ) – Ongoing

### **B. From this Strategy Meeting**

3. Develop a write-up of the RAI and contention support process that will be implemented by EM in relation to the existing YMP RAI response procedure and distribute it to EM. (Jim Linhart/Henry Loo, NSNFP) *(This write-up was completed and sent to DOE-EM HQ and the NSNFP on 9/19/08. This action has been completed.)*
4. Send out the LA distribution list for updating of those who need to remain on distribution to support the RAI and contention process. (Jim Linhart/Henry Loo, NSNFP) *(Henry Loo sent this out for review on 9/16/08 and he updated it with the feedback provided. This action has been completed.)*
5. Check on whether the DOE EM Corporate QA program relates to other programs. That program will be applicable to the departmental elements that provide input to the programs that conduct nuclear work within the next couple of months. They will specify that in future documentation. (Bob Toro, DOE-EM HQ)
6. To enhance communications, a request was made that presenters provide notes and slides to invitees prior to the meeting. Also prior to future meetings, advise presenters of which version of software to use in developing presentations. (Sandy Birk, NSNFP)
7. Hitesh Nigam requested that something be developed to show what is needed for all different waste forms so they can be included in the LA. (Henry Loo, NSNFP) *(This is being worked by the NSNFP with their preparation of the Yucca Mountain Compliance Approach for the Disposal of DOE SNF and HLW Document. See Item #17 above)*

### **Concurrences:**

Sandy Birk, NSNFP

Barb Beller, NSNFP