

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 2, 1995

MEMORANDUM FOR: G. W. Cunningham, Technical Director**COPIES:** Board Members**FROM:** Daniel G. Ogg, Program Manager, INEL**SUBJECT:** Fuel Transfers and the New Waste Calcining Facility, Idaho
National Engineering Laboratory, Idaho Chemical Processing Plant,
Report of Site Visit, March 28-30, 1995

1. **Purpose:** This memorandum documents the results of the Defense Nuclear Facilities Safety Board (Board) staff visit to the Idaho National Engineering Laboratory (INEL). The review focused on conduct of operations during fuel transfers, and the New Waste Calcining Facility (NWCF) Turnaround Program at the Idaho Chemical Processing Plant (ICPP). A follow-up was also conducted to review corrective actions at the High Level Waste Tank Farm Replacement (HLWTFR) Upgrade Project. The review team included staff members Daniel Ogg and Randall Robinson, and outside expert David Boyd.
2. **Summary:**
 - a. The Board's staff observed a fuel transfer from the North Basin of the CPP-603 facility to the CPP-666 facility. Portions of three operating procedures were completed in the course of the fuel transfer and were followed step-by-step and performed as written. However, a number of inconsistencies, inaccuracies, and omissions were noted in the procedures.
 - b. The NWCF Turnaround Program, established to integrate all preparations for the restart of the NWCF, has improved the coordination and scheduling of construction and maintenance work. However, the High Level Liquid Waste Evaporator (HLLWE) construction is currently behind schedule. The job is being worked on two shifts, six days a week and is expected to be complete by the end of July 1995 as scheduled to support the restart of the NWCF.
 - c. At the HLWTFR Upgrade Project, corrective actions for occurrence reports and other deficiencies that were previously noted by the Board's staff have now been addressed in a satisfactory manner. Management for the construction project appears to be more aware of and sensitive to radiological protection and contamination control issues.

3. **Background:** In accordance with the Notice of Noncompliance from the state of Idaho, and as approved by the Department of Energy-Idaho Operations Office (DOE-ID), fuel transfers from the CPP-603 North and Middle fuel basins to the CPP-666 basin resumed in early March, 1995. Original movement of fuel from CPP-603 to CPP-666 began in the fall of 1993 and was observed by the Board's staff. Transfer of the current batch of 189 fuel handling units is to be complete by December 31, 1995.

The NWCF, which processes liquid high-level waste (HLW), completed its last operational campaign in the spring of 1994. Several upgrades and repairs are being made to the facility, and a NWCF Turnaround Program has been established to ensure that the facility will be restarted within the time frame mandated by the state of Idaho. Lockheed Idaho Technologies Company (LITCO) plans to restart the NWCF by February 1997 and finish processing the remaining HLW, accumulated from spent fuel reprocessing, partially blended with sodium bearing waste (SBW) from the HLW tank farm. A larger volume of SBW will also be treated at the NWCF after a suitable processing method for the sodium waste has been chosen.

4. **Discussion:**

- a. Spent Fuel Transfers: On March 29, 1995, the Board's staff received briefings on the status and schedule of spent nuclear fuel transfers from the CPP-603 fuel basins to the CPP-666 Fuel Storage Area (FSA). Overall, LITCO remains ahead of schedule with their planning and movement of spent fuel. The staff then spent the day observing a transfer of fuel from the North Basin of CPP-603 to CPP-666. Fuel transfer operations were conducted in a formal manner and were found, by the staff, to be adequate from a conduct of operations point of view.

The staff observed that there were some inaccuracies and omissions in the procedures. These inconsistencies included a lack of specificity in the instructions for independent verifications and in the performance of prerequisites. In some cases the procedures did not meet the requirements as listed in the Standard Operating Procedures (SOPs) issued by the contractor. Specific deficiencies noted by the Board's staff are listed in Attachment A.

- b. NWCF Turnaround Program: The staff received briefings on the preparations being made for the start-up of the HLLWE and the restart of the NWCF. These efforts include a large number of separate but related construction and maintenance projects that have been integrated in the NWCF Turnaround Program. The next major milestone in the Program is the start-up of the new HLLWE, which will begin volume reduction of SBW from the tank farm in early 1996. The construction of the HLLWE is 80 percent complete, but is behind schedule and additional shift coverage has been added; now two shifts per day, six days per week.

Still unresolved is the identification of an acceptable method for treating the remaining SBW. The current NWCF chemical flowsheet is designed for HLW from fuel reprocessing, and will be used in the next calciner operational campaign. Some of the SBW can be blended with HLW from fuel reprocessing and still allow the NWCF to operate within its normal parameters. Excess sodium can cause gumming of the calcine in the calcining facility and in the calcine solids storage facilities (bin sets). Once the last of the HLW from fuel reprocessing is processed, the NWCF process will have to be modified to accommodate the higher levels of sodium in the SBW, but such a modified process has yet to be selected.

The NWCF can remain operating using the default process which incorporates the addition of larger amounts of aluminum nitrate nonahydrate (ANN) to the feed. This method of processing would significantly increase the volume of calcined waste and is an undesirable alternative. LITCO stated that processing would continue using this default method until a better alternative was found.

LITCO is examining potential new treatment options for the remaining SBW in the tank farm and have narrowed the alternatives down to three processes. One process involves the use of a sugar additive to allow a larger inventory of sodium during calcining. A second process would raise the temperature of the calciner to 700-800°C to more completely oxidize the sodium. The third option would use a rotary kiln to process the SBW. Investigation of these options is continuing and the Board's staff intends to closely follow this effort.

- c. HLWTFR Upgrade Project: Substantial management changes have taken place in the HLWTFR Upgrade Project, including the release of the past subcontractor, Industrial/Amelco, and the assignment of a new DOE-ID project manager to the project. Current management attention and scheduling appear adequate to ensure that a safe work environment will be maintained and that the project will stay on schedule to support the HLLWE start-up.

The staff conducted a follow-up review with DOE and LITCO management to discuss corrective actions from occurrence reports and other previously unresolved issues related to radiological controls at the tank farm. Action was taken to clearly post the frisking station at the exit of the tank farm to instruct all workers to remove cloth booties prior to frisking. The used foot coverings are then frisked separately by a radiological controls technician. Radiological postings have been surveyed and made consistent throughout the tank farm. Several inconsistencies in the Radiological Work Permit (RWP) were acknowledged, and a new revision to the RWP was issued to clarify the requirements for stay times, description of work, and reference between the RWP and the job order.

5. **Future Staff Reviews**: The staff will continue to review the start-up efforts for the HLLWE and the restart of the NWCF. As further information becomes available on the chemical

processing methods proposed for treating sodium bearing waste, the staff will evaluate that information. Further reviews of fuel transfers and construction activities in the tank farm will be scheduled as technical issues arise.

Observations of fuel transfer operations, CPP-603, March 29, 1995

1. Portions of CPOP 4.5.4.10 Rev. 39, Load Fuel from CPP-603 North and Middle Basins for Transfer, were observed being performed on March 29, 1995.
 - a. Operators had the current revision of the procedure in hand and performed it step-by-step as written.
 - b. Step 4.3.22, requires that two operators independently verify the serial number of the bucket in the charger. The procedure is not clear on how operations personnel inside a contamination control area perform independent verifications. In this case, the operators doing the verification verbally relayed their observation of the serial number to the person in charge (PIC). The PIC then verified the serial number against the number listed in Section II of form WINCO-4154X, and the operators signed for the serial number after exiting the controlled area. This practice may compromise an independent verification.

WINCO Standard Operating Procedure, (SOP) WP-28 (Verifications) requires that the individuals performing the verification check be separated by time and distance and that they certify by signature or initials that the component condition meets specified requirements.

- c. Several prerequisites in Section 3 of CPOP 4.5.4.10 were actually checked during the performance of later steps in the procedure. An example is the check of the charger preventive maintenance, Prerequisite 3.2. The check was made inside the contamination control area after personnel had entered the area to perform the procedure. The reason for this practice is understood, but it is inconsistent with SOP PO.16-A3, Procedure Use, which states that a procedure is to be performed only after all associated precautions, limitations and prerequisites have been met.
- d. Prerequisite 3.4 concerns the "repackaging pan" which in other documentation is referred to as the "containment pan" and the "transfer pan."
- e. Prerequisite 3.7 requires that, prior to initiation of fuel transfer operations, the CPP-603 fuel storage basins must be independently checked to ensure that no visible fuel is out of approved storage. This is inconsistent with Step 4.2.5 which directs field handling supervision to ensure that the CPP-603 basins bi-monthly inspection has been completed satisfactorily within the last two months. Both steps lack specificity by not referencing the applicable procedure for conducting the inspection such as CPOP 4.5.5.36 Rev. 8, Inspect CPP-603 North and Middle Basins.

- f. Prerequisites 3.1, 3.3 and 3.5 include requirements for load tests of a crane and hoists "prior to first use or following replacement or extensive repairs of any load-bearing component." Documentation is not referenced for information to determine if load tests are required.
- g. Step 4.2.1 requires that a pre-job briefing be completed as part of preoperational checks. The briefing checklist include a radiological section. The RWP for the transfer has a note to conduct a pre-job briefing at the start of initial operations and for new personnel after that, but not as part of all pre-job briefings.
- h. Step 4.3.9 concerns an independent verification that the charger drawer is fully closed and that the safety bar is in place and secured. The procedure lacks specificity on how to check the bar is properly secured. During performance of the procedure an alert operator questioned a difference in the arrangement of washers on the two securing pins, and work was properly stopped until this could be resolved. A controlled drawing was not available showing the correct configuration of the securing bar pins and washers. (These components had been disassembled the previous night to trouble shoot an abnormally high radiation reading coming from the bottom of the charger.) This comment also applies to step 4.6.13.
- i. Steps 4.3.10 and 4.4.2 repeat Step 4.2.5 and Prerequisites 3.7 concerning independently verifying that no visible fuel is present in the north transfer station or out of approved storage.
- j. Step 4.3.15 positions the charger to the east limit. As observed being performed, this action relies on operation of a limit switch to stop movement of the crane.
- k. Step 4.3.17 concerns lowering the charger until lid lift bars are approximately one foot above lid removing rails. The crane operator relies on a mark on the crane cable to determine the proper position. Use of an operator aid on the cable is not mentioned. A similar comment applies to step 4.6.4.
- l. Section 4.5 concerns repackaging the FHU. The snare tool was initially inoperative following a cable replacement the previous night, and this stopped work temporarily. Post-maintenance testing had therefore been ineffective. A jammed washer was determined to be the cause of the problem. Special instructions on use of the chain fall to position the tool vertically were promulgated separately and not incorporated in the procedure by document change request (DCR).
- m. At about Step 4.5.9 no requirement is stated for an operator to wear a safety harness with attached lanyard when working over the transfer station.
- n. Step 4.6.7 does not specify the action to be taken if the radiological controls technician detects a gamma radiation reading above a specified level.

