[DNFSB LETTERHEAD]

May 20, 1992

The Honorable Leo P. Duffy
Assistant Secretary for
Environmental Restoration and
Waste Management
U.S. Department of Energy
Washington, DC 20585

Dear Mr. Duffy:

Enclosed for your consideration and action, where appropriate, are a number of observations concerning the implementation of Recommendations 90-3 and 90-7, the conduct of Tank Farm operations and the use of codes and standards at the Hanford Site. These observations were developed by a member of the Defense Nuclear Facilities Safety Board staff and four of our outside experts (identified in the Enclosure). These observations are based on a review of available documents, and discussions and interviews with Department of Energy (DOE) staff and contractor personnel at Hanford from March 23-27, 1992.

Please consider these observations as you prepare your revised Implementation Plan for Recommendation 90-7.

If you need further information, please let me know.

Sincerely,

John T. Conway
Chairman

Enclosure:

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 1, 1992

MEMORANDUM FOR: Board Members
G.W. Cunningham, Technical Director

FROM: Paul F. Gubanc
Technical Staff, Hanford Team Leader

SUBJECT: Trip Report - Hanford Site Tank Waste Characterization and Operations Review, March 23-27, 1992

A. SUMMARY:

During this trip, one Board staff member and four outside experts (listed in the attachment) visited the Hanford Site to assess activities associated with the characterization of tank farm high level radioactive wastes (HLW) and the operations of the tank farms. Where appropriate, these activities were reviewed for consistency with the Department of Energy's (DOE) Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 90-7. These reviews involved discussions with personnel from the site M&O contractor, Westinghouse Hanford Company (WHC), the Pacific Northwest Laboratory (PNL) and the DOE-Richland (DOE-RL) Field Office. Also reviewed were the DOE-RL and WHC plans for conducting a codes and standards review, consistent with DNFSB Recommendation 90-2, of the Plutonium Finishing Plant (PFP) prior to restart.

The review team concluded that the tank HLW characterization program continues to be delayed in large measure by the lack of adequate lab capacity. Although WHC and PNL have worked together to identify a suite of necessary upgrades to increase throughput, splintered programmatic and funding responsibility within DOE has impeded implementation of these upgrades. For the first time, WHC and PNL demonstrated to the DNFSB staff an integrated understanding of analysis needs and sample processing.

Relative to Tank Farm operations, WHC demonstrated that major equipment and documentation upgrades are underway; however, significant improvements have yet to be effected in operator formality and training. Instances were found of people "living with" problems and frustration was evident with the inadequacy of existing training materials and the lack of system-specific knowledge possessed by instructors. In addition, the DOE-RL Facility Representatives for the Tank Farms are not sufficiently trained or supported to provide effective technical vigilance over these operations.

Significant progress has been made on the subject of codes and standards relative to DNFSB Recommendation 90-2 since the last review of this subject in February 1992. DOE-RL and WHC have started to pull together an integrated site-wide codes and standards program and have worked aggressively to develop a detailed understanding of each of the safety-related DOE

Orders. Support from and integration with DOE Headquarters, however, is still absent.

B. SPECIFICS:

1. Observations Relative to Tank Waste Characterization:

a. Inadequate capacity of the WHC 222-S and the PNL 325 labs was repeatedly cited as a major reason that HLW tank samples were not being obtained and analyzed on a faster schedule. Despite this acknowledgement, lab upgrades to increase throughput are not being aggressively pursued. The review team identified the following reasons as contributing to this problem:

i. Oversight for the execution of waste characterization in the labs is divided amongst at least three different DOE-RL branches. Not one of them is Solely responsible for resolving problems associated with lab support of the HLW characterization program.

ii. According to WHC and PNL, funding of laboratory upgrades is divided over five different Activity Data Sheets (ADSs) which are controlled by at least three DOE-RL branches and two DOE-EM Deputy Assistant Secretaries. Commonality is not reached until the Assistant Secretary for EM.

iii. WHC and PNL have together developed a procurement specification for a Laboratory Information Management System (LIMS) which will facilitate report preparation (the most manpower intensive effort in waste characterization). However, due to a lack of integrated DOE direction, WHC and PNL will procure their systems in separate fiscal years and risk the possibility of obtaining two different systems which may have compatibility problems with each other.

iv. Satisfaction of Tri-Party Agreement and Safety waste characterization milestones (as outlined in the draft Integrated Sampling and Analysis Plan, WHC-EP-0533) depends upon full funding of all requested lab upgrades on an aggressive schedule starting in this fiscal year (i.e., increase total lab capacity by a factor of 3.5 in four years). For the last three years, the labs have received funding for only a portion of the requested upgrades.

v. When asked, both PNL and WHC stated that they had not reviewed the waste characterization program in as much detail with DOE as they had with the DNFSB review team.

Based on the above, the review team has little confidence that the installation of lab upgrades will support the advertised waste characterization program.

b. Since 1989, WHC has pulled 27 sample cores from the tanks. Only five of those cores came from watchlist tanks (two from 101-SY (hydrogen) and three from 112-C (ferrocyanide)). WHC cited the following difficulties as being responsible for their slow progress in sampling watchlist tanks;

   i. technically justifying the safety and environmental impact of performing work in watchlist tanks,

   ii. preparation and approval of the associated safety and environmental documentation,

   iii. lack of an accepted sampling procedure for hard saltcake tank waste (about two-thirds of the tanks contain hard saltcake), and

   iv. inadequate lab analysis capacity.

   WHC indicated that work was aggressively proceeding on development of a hard saltcake sampling technique. Items i. & ii. above, however, were identified as being the largest obstacles to progress.

c. The entire tank waste remediation system is in transition based on a recent WHC reorganization and planning to address single-shell as well as doubleshell tank waste. As part of this transition, WHC developed a matrix (Draft dated 3/20/92) which lists more than 300 tank waste sample analyses versus the six programs requesting them (Safety, Grout, HWVP, Pretreatment/Operations, Retrieval, and SST (i.e., RCRA/CERCLA)). WHC anticipates that this matrix will serve as a building block for the development of an integrated tank waste sample analysis plan. This matrix constitutes a significant improvement in the understanding and integration of the sample analysis program since the team's last review of this subject in January 1992.

d. The SST (RCRA/CERCLA) characterization program is based on analyses which identify what radionuclides and hazardous chemicals leaking from the tanks will be most threatening to public health and safety over a period of 10,000 years. To the DNFSB staff's knowledge, similar pathway analyses have not been performed to demonstrate why leakage from the Hanford SST's is acceptable relative to public health and safety for the interim until those wastes can be removed. The latter would seem a more urgent need than the former.

2. Observations Relative to Tank Farm Conduct of Operations:

   Tank Farm Operations

   a. Based on the inadequacy of existing Safety Analysis Reports, WHC cannot extract a list of all the safety systems for the tank farms. It could also therefore be

concluded that a list of safety-related tank farm preventive maintenance tasks (PMs) also cannot be generated. This conclusion was demonstrated in January 1992 when, over three weeks after noxious vapor concerns "shut down" the tank farms, a list of the safety-related tank farm PMs was still not available to DOE-Headquarters from WHC.

b. The Health Physics and Power Operations personnel who support waste tank farm operations are not part of the waste tank farm operations organization. The review team is concerned that this working arrangement is not adequately responsive to operational requirements. As demonstrated by occurrence report RL-WHC-TANKFARM-1992-0015, a diesel powered air compressor required for the tank farms ran out of fuel due in part to the power operator not feeling responsible for refueling the diesel.

c. There is a lack of consistent, formal operations action to compensate for some inoperative equipment. For example, a long standing defective sump high level alarm was discussed with the shift supervisor who said he reminds an operator every day to make a visual check of the sump. This is in lieu of formally changing the routine or data sheet to include additional action to compensate for the failed equipment. A DOE-RL Facility Representative was also aware of this deficiency and did not take corrective action.

d. WHC demonstrated to the team that significant personnel and physical upgrades are being pursued in the following areas which have a direct bearing on the conduct of operations:

   i. Tank farm piping, instrumentation and electrical systems are not identified by system (e.g., valves are not categorized by systems but only sequentially numbered throughout a facility). WHC is correcting this as part of the tank farm labeling program.

   ii. WHC has assigned a full-time conduct of operations manager to coordinate improvement efforts and has contracted four shift coaches (with plans for a fifth) to work with shift operations personnel to identify and resolve conduct of operations problems.

   iii. The tank farm maintenance backlog is large and increasing (1867 jobs open longer than 90 days) and configuration management deficiencies include a lack of field verified engineering drawings and unique designators for waste tank systems. WHC is working to address these problems through various upgrade programs.

Training

e. The training budget target decreases from $3.2M in FY92 to $0.6M in FY93 and

increases to $3.7M in FY94. There was no clear basis for this one year dip in funding.

f. There is no approved document which sets forth an integrated program for training tank farm operators in fundamentals, facility-specific systems and on-the-job training.

g. Operator performance in the five-week fundamentals course is excluded from job jeopardy considerations. Failing performers are remediated until they pass. In addition, the course is being "descoped" in the areas of chemistry and physics to accommodate many older, long-tenured tank farm operators.

h. Operator training instructors lack sufficient waste tank farm operator experience. Two instructors interviewed lacked knowledge of tank farm operations and systems.

i. Present tank farm on-the-job (OJT) training is considered ineffective based upon the following:

    i. The lead process operators who conduct the OJT are not required to be qualified on evaporator operations or as instructors.

    ii. There is no independent evaluation of trainee's performance on OJT items.

    iii. The present OJT exam bank is based on existing certification manuals which contain a considerable amount of incorrect information (see next item).

j. Significant resources have been expended to upgrade operator certification manuals but an implementation plan has not been developed for their use. All training upgrades have been frozen by Facility Operations until the summer of 1992 apparently due to ongoing labor contract negotiations.

k. There is no maintenance training program for the tank farms. WHC acknowledged that this area has been neglected.

242-A Evaporator (This facility is managed and operated by the WHC Tank Farm operations group.)

l. On February 28, 1992 a water hammer event occurred during testing of the raw water system. Leaks at mechanical joints and overstressing of components may have resulted. Based upon preliminary information, lack of configuration control and lack of clear definition of responsibilities probably contributed to this occurrence.

m. A plan is not in place for training operators on evaporator upgrades. The evaporator operators received only one week of training on the upgrades in early 1991. A valuable training opportunity is being lost by not involving rotating shift operators in the ongoing operational test program.

DOE-RL Facility Representatives

n. During the Board meeting, two different programs were discussed relative to the selection and training of DOE-RL Facility Representatives; a Tank Farm Project Office program and a generic DOE-RL program being developed by Facility Operations. It was not clear how these two efforts are being coordinated within DOE-RL.

o. DOE-RL stated that they had obtained GS-14 pay grades for Facility Representative billets. The review team understands that DOE-RL intends to award these new GS-14 grades only upon satisfactory completion of the new qualification requirements expected to be formalized in June 1992. Prior service as a DOE-RL Facility Representative will not be sufficient in and of itself to merit a GS-14 pay grade.

p. Although site representatives are trained to self-monitor, they are required to be surveyed out of radiation zones and surface contamination areas by WHC health physics personnel. This restricts the free access of a site representative to observe and evaluate WHC activities when WHC Health Physics personnel may not be available to perform monitoring.

q. The two DOE-RL tank farm facility representatives interviewed are knowledgeable in waste tank systems but they have not received instruction in this subject. However, in discussing the occurrences mentioned in items 2.b. and 2.c. above, they did not exhibit an understanding of formal conduct of operations.

3. Observations Relative to Codes and Standards:

a. Subject Matter Experts (SMEs) from DOE-RL and WHC have together reviewed every statement, both mandatory and non-mandatory, of every one of the 43 safety-related DOE Orders referenced in the DP RSAD database. (DOE Order 5480.21 on Unreviewed Safety Questions has not yet been added to the RSAD database.) In so doing they have:

i. minimized future misunderstandings between DOE-RL and WHC on what the Orders require,

ii. identified numerous editorial errors in the DP RSAD database, and

iii. identified numerous instances of statements labeled as non-mandatory

which are not consistent with the spirit of the Order. (Appropriately, DOE-RL and WHC have agreed that such statements will be mandatory for Hanford.)

For some Orders, Hanford personnel expect that this review will require repeating on a facility-specific basis. The above review was specifically oriented for use at the PFP Plutonium Reclamation Facility (PRF).

b. DP-Headquarters has not established a means by which errors identified by DP RSAD users (as discussed above) are formally documented and tracked for correction-in the DP RSAD database. Failure to incorporate corrections will force each DOE field office to perform a redundant editorial validation effort. (This same concern also probably exists with the WASTREN database developed by EM-Headquarters.)

c. WHC has conducted a detailed review comparing the DP RSAD and WASTREN databases and concludes the following:

   i. Both databases used a "linguistic" method to identify mandatory and non-mandatory statements in the DOE Orders (i.e., "should" = nonmandatory and "shall" = mandatory). This method is absent any technical judgement and in some cases does not capture the spirit or intent of the DOE Orders (e.g., DOE Order 5480.19, Conduct of Operations, contains only 8 mandatory and 679 non-mandatory statements).

   ii. The DP RSAD database subdivides statements which contain multiple requirements into individual entries and identifies which of each of these requirements are applicable to DOE Headquarters, DOE Field Offices, and DOE contractors. Unfortunately, DP RSAD is limited to the DOE Orders only.

   iii. The WASTREN database includes many more codes and standards (e.g., Secretary of Energy Notices, Federal Regulations, individual State regulations) but is not near as rigorous as DP RSAD for DOE Orders (i.e., only mandatory statements, as identified above, are included and they are not subdivided into individual requirements).

   The review team concludes that neither the DP RSAD nor the WASTREN databases are sufficient in and of themselves for performing a codes and standards review.

d. DOE-RL and WHC have made significant progress in the area of codes and standards since the prior review of this subject in mid-February 1992. This progress is due primarily to the efforts of a small, dedicated group of DOE-RL, DOE-RL support and WHC contractor personnel. Significant changes are still

expected, however, as the DOE-EM Implementation Plan in response to Recommendation 90-2 is revised and lessons-learned are incorporated. In the interim, however, WHC has commenced site-wide implementation reviews for 15 safety-related DOE Orders.

Attachment

DNFSB Staff and Outside Expert Attendees for Hanford Site Tank Waste Characterization and Operations Review March 23-27, 1992

DNFSB Staff:

Paul Gubanc - Waste Characterization (WC) & Codes and Standards (CS)

Outside Experts:

Dr. Joe Leary - WC
John Straub - WC & CS
Edward E. Dietrich - Tank Farm Operations (TFO) & CS
David S. Boyd - TFO & CS