DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 16, 1997

MEMORANDUM FOR: G. W. Cunningham, Technical Director

FROM: J. Kent Fortenberry / Joe Sanders

SUBJECT: SRS Activity Report for Week Ending May 16, 1997

Kent Fortenberry was on annual leave this week. Mike Merritt, Todd Davis and Ralph West were onsite this week reviewing H-Canyon restart activities.

F-Canyon Accident Investigation Status - The investigations by DOE-SR and WSRC to determine the cause of the 17-Rem uptake by the crane operator are progressing. On Thursday, the teams discovered Anti-C's and various tools littering areas in and around the "warm" canyon section 18 cell cover. This condition is being vigorously investigated by WSRC to determine what activity was being performed and by whom. This activity may have been performed without upper management knowledge and the required controls (ie., RWPs and RadCon coverage) were not used.

Distributed Control System (DCS) Misoperation at DWPF Creating a Water Hammer - A water hammer event occurred on Saturday, May 10th at DWPF. The Cooling Tower Water System (CTWS), which removes heat from most plant systems including the melter, was undergoing post-modification testing at the time. During restoration of the CTWS to its normal alignment, a low flow signal was received. This caused two software subroutines to run concurrently on the DCS, rather that sequentially, as was intended. This resulted in software- driven valve position changes which first caused the CTWS to depressurize and then to be exposed to a high pressure supply. This pressure transient caused the water hammer which resulted in some minor damage including rupture of several small copper lines, damage to several pipe hangers, and failure of a chiller gasket. All equipment, including relays that were destroyed from being sprayed with water, have been repaired or replaced, and pouring should begin this weekend. This event was classified as an off-normal occurrence. As a result of this event, the affected software subroutines have been modified so that they may not be run simultaneously and other software subroutines have been reviewed to ensure that interaction cannot occur.

Consolidated Incineration Facility (CIF) Contamination Incident - While operating the Filter Feed System (used to separate suspended ash from the quench solution cooling the incinerator off-gas) at CIF, operators discovered a leak. The operators were unable to rapidly isolate the leak because the ball valves became stuck due to grit (suspended solids) in the valve seat. Isolation was finally achieved after approximately 60 gallons of contaminated liquid was released. However, a valve stem was broken off and several others were bent in the process. Sticking had been noticed in the past on the Quench Recirculation System and the ball valves had been replaced with diaphragm (or "pinch") valves. It is not clear why all affected valves were not changed at that time. DOE-SR has asked that an evaluation be performed at CIF to determine the need for replacing other ball valves during the current outage.

Oxalic Acid Cleaning to Support Future Waste Tank Closure - Oxalic acid cleaning may be required to

remove residual sludge and, for a small number of tanks, zeolite resin heels during future tank closure activities. Zeolite was used as an ion exchange resin for removing cesium from exaporator overheads, and the spent resin was dumped into tanks. Laboratory experiments were performed in the late '70s and early '80s to support waste removal from Tanks 16 and 24 because both experienced leaks. Oxalic acid was found to be the most effective reagent for dissolving sludge while not corroding the carbon steel tank. Three oxalic acid washes using 4wt% acid at 90 deg C proved to be very effective at dissolving sludge from Tank 16 in 1982. Oxalic acid treatment was also applied to 10 kgal of zeolite resin in Tank 24. However, not enough acid was used and it was neutralized prior to removing the solution from the tank. As a result, few conclusions can be drawn.

Partitioning of fissile materials presents a criticality concern when using an acid cleaning process because certain elements are less soluble than others; post-cleaning residual sludge samples from Tank 16 had twice the concentration of plutonium as those taken prior to treatment. As a result, a criticality evaluation is expected to be performed in the next few months to support the potential application of this process for closure of the next two tanks, 18 and 19 (containing resin). Oxalic acid cleaning is expected to cost approximately $800,000 per tank.