DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 14, 1997

TO:	G. W. Cunningham, Technical Director
FROM:	Jim McConnell and Harry Waugh, Pantex Site Representatives
SUBJECT:	Pantex Plant Activity Report for Week Ending February 7, 1997.

1. DNFSB Activity Summary: Jim McConnell was on site all week. Harry Waugh was on travel to Los Alamos for the B53 Archiving Conference Monday through Wednesday. Staff member Farid Bamdad was on site this week observing the W69 Dismantlement NESS.

2. Issue Follow-Up:

a. Safety Basis for Radiography:Design Agency data on the response of main charge detonators to radiographically-generated charge build up states that, "From this highly conservative model, a 40,000 rad dose could produce as much as 37.5 milli joules of stored electrical energy in the detonator cable. This energy level approaches the threshold for an optimal firing set configuration for the most sensitive main charge detonators." The same letter also stated, "Radiography of weapon assemblies . . . is judged to be conservatively safe if the total dose to the weapon assembly/subassembly does not exceed 1000 rads in any single dose or accumulated doses for any one radiographic series." Pantex and the Radiography Operations Restart Project Team interpreted the Design Agency data as stating that exposure up to 40,000 rads is safe. Therefore, Pantex concluded that there is a large safety margin if actual exposures are limited to 1000 rads. This assumption appeared to support the use of administrative controls to prevent an overexposure. It would take over two hours to accumulate 40,000 rads on a weapon if it is maintained at least four meters from the linear accelerator head. Normal radiograph shots last about five minutes.

   The Detonator experts from LANL and LLNL now indicate that previous interpretations of their data were incorrect and non-conservative. The Design Agency letter states, "At the 1000 rad storage limit the stored energy is reduced to 23.4 micro joules. Experiments conducted on detonator/cable assemblies charged with comparable energies confirm this to be insufficient to burn the detonator bridge to the open state, thus assuring a safe response." Recent communications with LANL and LLNL indicate that they can not assure a safe response at doses above 1000 rads. Since it could take as little as about four minutes to reach 1000 rads (at four meters) it is unclear if operations without safety class engineered shutdown features are adequate. Subsequently, the labs have indicated that they can "support" a control limit as high as 7500 rads (i.e., about 30 minutes of exposure).

   On the other hand, Design Agency data appears to support that the charge built up during radiography dissipates much quicker than previously assumed. The Design Agency data stated that a four hour delay period in between each 1000 rad exposure was required to allow the charge to recombine. This was based on an assumed HE resistivity of $1x10^{16}$ OHM-centimeters. MHC has some empirical data that the resistivity of HE is closer to $1x10^{9}$ OHM-centimeters. Based on this data, the Design Agencies have decreased the wait time between shots from four hours to five minutes. The labs are continuing to work on improving the model of charge build-up in a sphere of HE. It appears that this problem will take one of two tracks depending on design Agency results:

   1. The phenomenon of charge build-up and main charge detonation is credible at some dose. Given the potential consequence (particularly if more than one detonator actuates), if the time to achieve this dose is on the order of minutes, the linacs must be redesigned to add high-quality engineered safety features -- this would take many months. If the time is on the order of hours, then the current efforts may still be valid -- the current plan will take at least several more weeks.

2. The phenomenon is not possible. The Basis for Interim Operations will have to be updated to resolve the positive USQ then radiography operations could resume. This should only require a week or two after the labs complete their work.

b. W79 Dismantlement Status:ARDEC has released their report on the tests performed on the propellant from six W79 rocket motors. These rocket motors were removed from weapons which had been exposed to the most severe environment of any W79 in the stockpile. While a copy of the report will not be available to us until next week, the W79 Project team indicated that the average 2-NDPA stabilizer level was 0.7 percent and the standard deviation was 0.02. Reportedly, this indicates that the motors will not be a problem if stored for almost eighty years in their current environment. The W79 Project Team provided other data on the status and proposed plan to start dismantling W79s. The Weapons Program Readiness Review to support removing MC 3395s is scheduled for March 4. The Readiness Assessment to support DMSO dissolution try- outs using Type 6B trainers in Building 12-98 Cell 2 is scheduled for April 4, 1997.

3. Future Activities:

a. .February 18-21 - W68 Dismantlement NESS continues
b. February 18-21 - W80 NESS Revalidation continues
c. March 5 - B83 Program Meeting
d. March 25 - W79 MC3395 Removal begins (change)
e. March 25-27 - W56 Milestone 2 Meeting @ DOE-AL
f. April 4 - W79 DMSO Check Out RA starts
g. April 7-25 - W87 WPRR
h. April 9 - Quarterly Production Meeting
i. May 15 - M&H AT-400A Corporate ORR begins (estimate)
j. June ? - DOE AT-400A ORR (following conclusion of M&H ORR)

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