

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 29, 2006

**MEMORANDUM FOR:** J. Kent Fortenberry, Technical Director  
**FROM:** J. S. Contardi/M.T. Sautman, SRS Site Representatives  
**SUBJECT:** SRS Report for Week Ending December 29, 2006

**H-Canyon:** In order to address ammonium nitrate buildup on the hot canyon Process Vessel Vent (PVV) filters, the filters were flushed twice with acid. (See 12/08/06 Site Rep weekly report). Recovery actions have been performed that will allow the resumption of the High and Low Activity Waste systems and first and second cycle in the near future. A Potential Inadequacy in the Safety Analysis was also declared because the alternate purge rate (in case the PVV system fails) for H-Canyon neutralization tanks required by the Technical Safety Requirement may not be adequate to address both hydrogen and ammonia vapor flammability hazards. This was later determined to be a Positive Unreviewed Safety Question.

**Solid Waste Management Facility:** Sampling indicates that 33% of unvented transuranic (TRU) waste drums initially contain greater than 12% hydrogen ( $H_2$ ) and 14% of the drums initially contain between 4 and 12%  $H_2$ . The lower flammability limit (LFL) for  $H_2$  is 4%. In addition to installing a filtered vent, the current requirement is to purge any drum containing  $>4\%$   $H_2$  with nitrogen until the  $H_2$  concentration has been reduced below 1%. After performing a risk-benefit analysis, the contractor has submitted a revised Justification for Continued Operations (JCO) that proposes only purging drums containing  $>12\%$   $H_2$  and then only purging until the  $H_2$  concentration drops below 8%. These vented, but still flammable, drums would be handled and moved using unvented drum controls and stored in concrete culverts or in barricaded hold areas until sampling confirms the headspace is nonflammable. The contractor is proposing this change because there is currently a backlog of 2000+ unvented TRU drums in culverts and this would allow more drums to be vented quicker because fewer drums would be purged and the average purge time would drop from 26 to 8 hours. The contractor also believes that it takes at least 12%  $H_2$  before a deflagration is energetic enough to eject the drum lid or breach a drum. In addition, 15 drums initially containing  $>12\%$   $H_2$  and  $<1\%$  oxygen will be vented, but not purged, so they can be used in a test to determine the time required for  $H_2$  to dissipate to nonflammable concentrations. The JCO includes several additional compensatory controls for handling these vented drums whose headspaces still are above the LFL. While this proposal does result in some increased risk in handling recently vented drums (e.g., a fire inside the drum), it may allow the population of unvented drums to be eliminated 2+ years earlier. One point to keep in mind is that the current practice often only temporarily reduced the head space gas below flammable levels. Past tests found that even when drums were purged to below 1%  $H_2$ , the  $H_2$  levels often bounced back above the LFL within a couple of days as  $H_2$  diffused out of the waste matrix back into the drum headspace. This bounce back above the LFL lasted for weeks and happened with drums with initial  $H_2$  concentrations as low as 6%.

**HB Line:** An investigation to determine the cause of excessive vibration at one of the dissolvers led to the discovery that the bolts securing the agitator had broken off. In addition one of the agitator impeller blades had also broken off. The agitator has been removed and will be examined at the Savannah River National Laboratory to determine the failure mechanism.