DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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May 7, 1999

Mr. Greg Rudy, Manager
Savannah River Operations Office
Department of Energy
P. O. Box A
Aiken, South Carolina 29802

Dear Mr. Rudy:

The Defense Nuclear Facilities Safety Board routinely reviews operational data for defense nuclear facilities in accordance with 42 U.S.C. § 2286a. Recent reports in the Occurrence Reporting and Processing System at the Savannah River Site (SRS) reveal a negative trend in work control at the site. Since January 1999, a series of occurrences at SRS has resulted from the failure to implement controls identified as necessary for safe operation of the site's facilities. If not corrected, this inadequate implementation of work controls could significantly degrade the safety posture of those facilities.

Such occurrences can be prevented only if the underlying causes are addressed. Although SRS prepared a corrective action plan for each of these occurrences, a broader review has apparently not been undertaken to identify and address their underlying causes. Unless a systematic understanding of those causes is developed and the identified weaknesses are corrected, these work control deficiencies are likely to persist.

The enclosure to this letter provides summary information on representative occurrences during 1999 that demonstrate the above negative trend. If you have any questions on this matter, please do not hesitate to call me.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.

Enclosure

Enclosure
Recent Savannah River Site Work Control Occurrences

1. FB-Line

Date: January 7, 1999
ORPS* #: SR--WSRC-FBLINE-1999-0003
Description: During sorting of slag and crucible, in preparation for transferring material to F-Canyon, an error was discovered involving completion of a procedural nuclear safety control step. An inner can was placed into the wrong outer container during sorting and there were errors in the administrative data recorded in the operating procedure. No criticality safety limits were violated and no other safety issues resulted from this error. The occurrence was caused by personnel error in that the procedure was not followed properly.

Date: April 8, 1999
ORPS #: SR--WSRC-FBLINE-1999-0010
Description: On April 8, 1999, a separations operator entered Coupling Operating Room to perform a refrigerated wash on the C4C column using the Cation Refrigerated Wash procedure in preparation for performing a vent flush on the column. A system alignment checklist for the cation system was reviewed during the preplan meeting, and no deviations were identified that would affect the refrigerated wash. The operator began performing the procedure, and after 35 minutes received a high level alarm for the C-8 tank. After making field verifications, the operator discovered that valve 732 (C4C column to C-8 tank isolation) was cautioned tagged in the open position, instead of being in the closed position. The refrigerated wash was inadvertently transferred to the C-8 tank instead of the 9.7 tank.

2. HB-Line

Date: January 5, 1999
ORPS #: SR--WSRC-HBLINE-1999-0001
Description: On January 5, 1999, two waste pails were found to not be in an approved storage location. The Nuclear Criticality Safety Double Contingency Analysis requires two independent verifications of authorized storage location, available capacity, and proper storage location identification. A new waste array was being established, but had not been approved. The operator and independent verifier assumed the array had been approved.

Date: April 5, 1999
ORPS #: SR-WSRC-HBLINE-1999-0011
Description: On April 1, 1999, five pails of TRU waste were placed in storage without assaying for Pu-239 mass as required by the HB-Line Nuclear Criticality Safety Double Contingency Analysis (DCA). An HB-Line operator mistakenly assayed the waste for Pu-238 instead of Pu-239. As part of the Nuclear Criticality Safety Evaluation, a

criticality scenario that involves inadvertently storing too much fissile material was analyzed and two controls were identified. The first control is an assay of each pail to verify that the mass of Pu-239 is acceptable for the intended storage location. The second control is an independent verification of the Pu-239 mass by a second operator. However, this verification at HB-Line is based on a single assay using a Segmented Gamma Scanner (SGS). In this case, the first operator mistakenly selected Pu-238 on the SGS instrument and failed to notice the error on the instrument printout. The independent verification by a second operator also failed to notice the incorrect isotope on the SGS printout. The error was not recognized until five days later when a facility engineer reviewed the SGS results. After the error was recognized, the five pails were moved to a safe configuration using a special procedure.

3. F-Canyon

Date: February 7, 1999
ORPS #: SR--WSRC-FCAN-1999-003
Description: During routine housekeeping activities, the 254-5F #1 diesel generator was inadvertently switched to the idle position by the Auxiliary Systems Operator. The cloth being used by the operator caught on and inadvertently repositioned a toggle switch for the diesel generator. Switching the diesel generator to the idle position caused the operating canyon exhaust fan to shut down and the standby canyon exhaust fan to come on line. The cause of the occurrence was classified to be inattention to detail by operating personnel.

Date: February 10, 1999
ORPS #: SR--WSRC-FCAN-1999-0004
Description: While charging FB-Line cabinet sweepings in the 6.1 dissolver on February 6, 1999, the off-gas flow alarm light was observed to be illuminated. Charging was stopped until the actual off-gas flow was verified, and the alarm was reset. This alarm had been activated during pre-charging activities (occurs when the dissolver port covers are removed in accordance with the procedure) and the audible alarm had been acknowledged, but the operator failed to recognize the need to reset the alarm light. The procedure did not include a step to reset the alarm light. The chart recording was reviewed and the actual off-gas flow was verified to be above required limits during the entire charging evolution.

Date: March 19, 1999
ORPS #: SR--WSRC-FCAN-1999-0008
Description: The dominant chemical accident scenario for F-Canyon is identified as mixing of 64% nitric acid with 40% ferrous sulfamate. The F-Canyon Basis for Interim Operation (BIO) requires the piping configuration be physically controlled to prevent mixing of these chemical. An operating procedure drawing showed a blank in the piping that connected the ferrous sulfamate tank to the nitric acid tank to accomplish the physical

control of piping configuration. Facility drawings did not show the line and therefore did not indicate the need for a blank. A review was conducted of authorization basis design features that do not have periodic surveillances because of the March 5, 1999, H-Canyon occurrence involving safety blanks. This review found that there was a line between the tanks and an orifice was installed in it instead of a blank.

Date: April 2, 1999
ORPS #: SR--WSRC-FCAN-1999-0011
Description: While operating the 6.4 dissolver using the F7-5 alternate lobe blower, it was determined that the 6.4 dissolver was operating on stack jet instead of lobe blower. Preliminary investigation indicated that a key type selector switch for the alternate lobe blower was not in the correct position. This incorrect lineup caused a loss of off-gas flow environmental monitoring. The immediate action upon noting the problem was to shutdown the dissolver and verify no release of radioactivity.

4. H-Canyon

Date: January 21, 1999
ORPS # SR--WSRC-HCAN-1999-0003
Description: The H-Canyon Double Contingency Analysis (DCA) contains scenarios for precipitation of uranium in A-Line storage tanks due to exceeding the uranium-dibutyl phosphate (U-DBP) solubility limit. These scenarios are controlled by maintaining several parameters including the concentration of nitric acid (a minimum) and dibutyl phosphate (DBP) (a maximum). Defense 1 for scenario D.4-7 requires periodic sampling to verify these parameters. The nitric acid concentration in tank E3-2 was found to be outside the DCA limit. The procedure for using this tank for storing uranium solutions did not consider the impact of flush water existing in the tank upon the nitric acid concentration of storage solutions. Flush solutions were transferred to tank E3-2 in July and October 1998. In December 1998 diluted uranium solution was transferred into tank E3-2. The tank was sampled on January 4, 1999, and results received on January 20, 1999, indicated that the nitric acid concentration was less than the DCA limit.

Date: February 21, 1999
ORPS #: SR--WSRC-HCAN-1999-0008
Description: On February 20, 1999, material was transferred from tank 8.2 to tank 8.5 using a One Time Only procedure. The next day it was discovered that the transfer had been performed prior to completing the setup section required by another One Time Only procedure used for the transfer set up. This latter procedure required, that after establishment and independent verification of the route by crane operators, the crane supervisor was to verify the establishment of the route and notify the Shift Operations Manager. The two steps required to be performed by the crane supervisor had not been accomplished prior to the initiation of the transfer.

Date: March 5, 1999
ORPS #: SR--WSRC-HCAN-1999-0013
Description: As a part of the red-oil controls, the Basis for Interim Operation (BIO) requires the transfer jets for two box decanters be blanked with safety-class blanks. This provides for the proper operation of the decanters to ensure subsequent evaporator feed does not contain excessive organic material. As part of the Phase III startup preparations, it was discovered that these blanks were not installed. Evidently, the documented walkdown of the blanks prior to Phase I startup was ineffective. There was no requirement for periodic surveillance.

Date: March 11, 1999
ORPS #: SR--WSRC-HCAN-1999-0015
Description: On March 11, 1999, it was discovered that no representative sample results had been obtained from a High Activity Waste (HAW) feed tank prior to feeding the 9.1E evaporator. Sampling of the feed tank and verifying the fissile material mass is credited as a single contingency parameter to prevent over batching the first stage HAW evaporator.

Date: April 1, 1999
ORPS #: SR--WSRC-HCAN-1999-0019
Description: On April 1, 1999, it was discovered that a pressure gauge was installed in the wrong system without an adequate lockout. While performing repairs during a facility steam outage on March 24, 1999, a pressure gauge was installed that was not covered by a lockout. The work package replaced pressure gauge (HB-037), maintenance personnel replaced the prescribed HB-037 gauge, which was an instrument air gauge on the 11H sump instrumentation loop. The instrument air system was not isolated by the lockout referenced in the Work Clearance Permit (WCP). The intended gauge was the steam pressure gauge for the jet which was not adequately identified.

5. K-Reactor

Date: February 18, 1999
ORPS #: SR--WSRC-REACK-1999-005
Description: On February 17, 1999 a lockout was established for removal of the 108-1 Building air dryer valve 560. Work was completed after the lockout was established. Later that day, a project engineer observed that a lock on air dryer valve 577 was unlocked (open). This valve was one of the lockout points for the lockout. It was determined that this event was caused by personnel inattention.

Date: April 8, 1999
ORPS #: SR--WSRC-REACK-1999-0016
Description: During the cutting of electrical leads to support removal of a motor control center, an energized 110 volt line was inadvertently cut. The heater supplied by this 110 volt line was not detected during field walkdowns. Neither the heaters or the power

source were identified on the drawings referenced in the work package. No injuries occurred as a result of this event. Equipment was placed in a safe condition. A critique was held on 4-8-99, 1630 hours to categorize this occurrence.

6. Tritium

Date: April 8, 1999
ORPS #: SR--WSRC-TRIT-1999-0006
Description: During work to modify the fire system in the 233-H Facility to a wet pipe system, a hydrostatic test was performed by construction personnel. On April 7, 1999, the Room 54 portion of the fire was tested and a leak was discovered. As permitted by the test document, construction personnel proceeded to disassemble Room 54 piping to repair the leak. The operations personnel in the Control Room were not notified at the time the leak was discovered. Later the same day, a fire protection engineer discovered that the room 54 system had been dismantled and reported this to Control Room personnel. It was discovered that the operations personnel were not aware of the scope of repair and had not placed the plant into the proper configuration to support the disassembly of the fire system piping in Room 54.

7. Tank Farms

Date: January 3, 1999
ORPS # SR--WSRC-FTANK-1999-0001
Description: On January 3, 1999, during heavy rain, an F Pump Pit-1 high level alarm was received from the high level bubbler. This activated a general alarm to which an operator responded. When the operator reached the control room from where the alarm originated, it was observed that the sump level also was above the alarm set point for the pump pit conductivity probe. This alarm had not activated and was declared out of service. During a follow up critique for this occurrence it was found that the conductivity probe failed a routine functional check on January 1, 1999, and was taken out of service and repaired. It was not considered to be degraded safety class equipment and therefore was not reported at that time. It was later determined that, although the failed component was not designated as a safety class piece of equipment, its failure affected the functionality of safety class equipment.

Date: March 2, 1999
ORPS # SR-WSRC-FTANK-1999-0007
Description: On March 1, 1999, the Coppus Blower on tank 6 used as a purge exhaust ventilation system was shutdown. The expiration date on the label for the HEPA filter DOP test was unreadable. The Shift Manager was unable to determine if the DOP test was within the acceptable frequency. On March 3rd the Shift Manager was able to contact the DOP test crew and was informed that the tank 6 Purge Exhaust Portable

operated outside the requirements of Manual 5Q1.8 to conduct DOP testing of portable equipment every six months.

8. Defense Waste Processing Facility

Date: February 6, 1999
ORPS #: SR--WSRC-WVIT-1999-0004
Description: The Zone 1 ventilation systems provide ventilation for process areas with a high potential for contamination in the vitrification building, and consist of an air supply system and an exhaust system. The Zone 1 exhaust system includes four safety class centrifugal exhaust fans located in the 292-S fan house with three normally operating and one in standby. On February 6, 1999, the Shift Technical Engineer (STE) was performing the weekly seismic and temporary equipment walkdown when he found scaffolding positioned over each of the four Zone 1 exhaust fans. The STE determined that the scaffolding did not meet the seismic design requirements in the applicable procedure which caused the four Zone 1 exhaust fans to be considered inoperable. The riggers who built the scaffolding were directed to meet seismic requirements and tagged it as meeting requirements, but the scaffolding did not meet the seismic requirements.

Date: April 16, 1999
ORPS #: SR--WSRC-WVIT-1999-0010
Description: During the period of April 1, 1999, through April 16, 1999, seven respirators with improper filter cartridges attached were issued for use in a radiologically controlled area. Radiological work required a HEPA filter cartridge. The seven respirators improperly issued for radiological work and accepted by the users, contained organic filter cartridges.

* Occurrence Reporting and Processing System (ORPS)