Department of Energy
National Nuclear Security Administration
Washington, DC 20585

February 23, 2004

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, D.C. 20004-2901

Dear Mr. Chairman:

The purpose of this letter is to follow up on a commitment that we made to you in my letter of October 17, 2002, concerning the installation and testing of a seismic monitoring system for use in the Tritium Extraction Facility (TEF) currently under construction at the National Nuclear Security Administration's Savannah River Site Office (SRSO). Westinghouse Savannah River Company (WSRC) has completed the installation and testing of a prototype seismic alarm system in Building 233-H, an existing Defense Programs facility at the SRSO. The seismic monitoring system installation and testing was accomplished in an existing facility in order to determine the optimum location, correct model of detector for this application, and the appropriate response from the "in-facility" workers to the associated alarms. The WSRC report is enclosed for your information. The results of the testing of this system have been discussed with your staff during a TEF construction review that was held in December 2003.

The seismic monitoring system in Building 233-H has performed acceptably. This same system will be installed in the TEF as a portion of the worker protection system for this facility.

I would like to thank you and your staff for the continued interest in the TEF and look forward to maintaining our relationship during the completion of construction and the testing phase of this project. If we can be of further assistance, please contact me or have your staff contact Phil Pizzariello at (301) 903-7736.

Sincerely,

Everet H. Beckner
Deputy Administrator
for Defense Programs

Enclosure

cc w/enclosure:
M. Whitaker, DR-1

WESTINGHOUSE SAVANNAH RIVER COMPANY

INTEROFFICE MEMORANDUM

DATE: 1/21/04

OBU-DPT-2004-00013
10080/DOE/ADM 17-32.a
Until removed from service
KWs: Seismic Monitor, TEF
Org. Code: X5000

TO: Bobby Smith

FROM: Randy Davis

UNCLASSIFIED
DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION
ADC & Reviewing Official S.J. Maurek, TED (Name and Title)
Date: 1/22/04

Seismic Monitor System Installation and Testing in 233-H

As committed to in a letter from Evert Beckner to John Conway on October 17, 2002, NNSA has competed the installation and testing of a seismic monitoring system in the 233-H facility at SRS. Testing was completed in October of 2003. This report summarizes implementation of this system.

Design/Function

The monitor consists of two Saturn Model S-001 seismic switches that provide contact closure when acceleration is detected. A setpoint of 0.025g has been selected. Two switches are provided so that one can be removed for maintenance and the system will continue to function. Closure of the switch contact causes activation of all process Room Tritium Alarms (lights and horns) via the Health Protection Programmable Logic Controller (HP-PLC). Corridor and non-process room Tritium Alarms are not activated. Additionally, an alarm is received in the Control Room at the Operator Control Console (OCC) to alert control room personnel of the potential for a seismic event.

Activation of the seismic switch (accelerometer) provides up to 20 seconds (depending on distance from the seismic event) notice before damaging earthquake acceleration is experienced. The interior walls and doors of Building 233-H and TEF are not seismically qualified. Evacuation of workers from process rooms before damaging acceleration could jamb doors minimizes the risk for facility workers.

Testing

Testing of the system hardware as well as integration into the HP-PLC software logic was performed. Each seismic switch was tested by placing it in the test position and verifying all process Room Tritium Alarms were activated. The switch was reset and it was

verified that the alarm cleared. Calibration of the accelerometer setpoint was performed by the switch vendor. Testing was also performed to verify proper selection of the active switch since there are two switches available. There were no unexpected problems or lessons learned from the test program.

Procedures

An Emergency Operating Procedure (EOP) was developed for the response to this alarm. An EOP was selected since the reaction time to this alarm has to be extremely quick (less than 20 seconds) to maximize protection provided. EOP actions have to be committed to memory. The EOP has been revised several times based on feedback obtained from the drills and shift briefs.

Training

All shift personnel were trained to respond to the alarm. Since facility personnel are already trained to evacuate in the event of a process Room Tritium Alarm, minimal additional training was required. Shift briefs were conducted to make operators aware of the system configuration and expected alarm responses. Drills were conducted to assess knowledge and performance. As discussed above, feedback from drill execution was used to revise procedures and actions.

Drills

The drills conducted demonstrated it is practically impossible to do much more than evacuate personnel from process rooms and prop open doors to critical rooms (such as the control room) in the case facility abandonment is required. Attempts were made to incorporate area wide actions into initial procedures and drills. This posed problems in establishing proceduralized actions for the entire area population to take without knowing the severity of the event or the extent of the surrounding damage. Attempts to do this resulted in confusion and did not reduce risk for area workers. It was therefore decided that protective actions for area workers would not commence until the seismic event was over so that the surrounding conditions and surviving protective features could be considered.

The drills confirm it is likely personnel will be able to exit process rooms within 20 seconds. It also demonstrated control room personnel are able to complete the immediate actions per the EOP once a change to the control room alarm is made.

Lessons Learned

As a result of lessons learned from the drill program, the EOP was simplified. The actions were limited to propping open the 233-H control room door (in the event abandonment was needed) and to dispatching an operator to any room where plastic suit work was in progress to prop open the door to the corridor as well as notifying personnel in that room to evacuate. The normal procedure otherwise is for the standby person to

place their suit top on and wait for instructions in the room when a Room Tritium Alarm is received.

An additional lesson learned was that the method of alarming in the control room was not optimum. As discussed above, the original design alerted control room personnel via the normal Operator Control Console. During one of the drills, the time it took to respond to the alarm was well in excess of 20 seconds, as it was not distinguished from other alarms in the control room. During the drill there were several other process evolutions going on and it took approximately 60 seconds to notice the seismic monitor alarm had activated. An action has been taken to provide a more noticeable alarm in the control room.

While the entire system has been operational since August 2003, the sensors have been active since June 2003. No false alarms have been received during this time. It was discovered however, if the case was tapped at just the right location, the switches could be made to trip. Therefore, fabrication of a protective guard was initiated as a precaution to prevent inadvertent tripping.

Summary

The seismic monitoring system has been successfully installed, tested and made operational in 233-H. There are a few lessons learned that will be used for the implementation in TEF, however the overall system meets all expectations.

cc: D. W. Bickley, 233-14H
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[redacted]
J. E. Marra, 246-H
C. H. Ramsey, 233-35H
248-H Document Control