**Department of Energy**
Washington, DC 20585

December 9, 2011

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Mr. Chairman:

In your October 6, 2011, letter, the Defense Nuclear Facilities Safety Board (Board) informed the Department of Energy (DOE) of the results from the July 2011 staff review that focused on the CH2M Hill Plateau Remediation Company (CHPRC) Waste Encapsulation and Storage Facility (WESF) maintenance program. Your letter requested a report and briefing within 60 days that included DOE's assessment of the effectiveness of the contractor's actions to address the issues identified.

Enclosed is the WESF corrective action plan (CAP), which is structured to address the six key areas identified in your staff's review. DOE worked extensively with the contractor to ensure they developed a rigorous CAP and believes it will be effective.

In conjunction with correcting these specific issues, on October 17, 2011, CHPRC, with oversight from the Richland Operations Office, initiated a Management Assessment of both the WESF and Canister Storage Building nuclear operations to review the in-process corrective actions for the Board-identified deficiencies, and to further evaluate the six key areas of concern.

Deficiencies identified by the Board along with the CHPRC Management Assessment findings and observations are being used to support completion of a formal causal analysis to address an overall weakness related to WESF's use and quality of technical procedures. This approach will ensure human performance and the extent-of-condition factors are adequately investigated and corrected from a broader standpoint. The causal analysis is scheduled for completion by the end of December 2011. Resulting corrective actions will be included as part of the WESF CAP. Additionally, the causal analysis will be presented at the CHPRC Executive Safety Review Board as a learning tool for other organizations to review for extent-of-condition across CHPRC.

DOE recognizes the importance of continuous improvement in these key areas and will remain diligent in its overall focus on nuclear operations. The contractor and DOE will perform facility evaluations of all other active CHPRC nuclear facilities over the next year to enhance oversight programs, including the Contractor Assurance System, to improve self-identification of issues.

We plan to schedule a briefing for you in mid-January 2012. The additional time will allow us to more productively analyze the effectiveness of the contractor's actions, which are still underway. In this briefing, DOE and CHPRC will update the Board on the contractor's actions for the issues your staff identified and those identified during the recent DOE/contractor extent-of-condition assessment. DOE and contractor actions to enhance oversight and the Department's long-term strategy for WESF will also be addressed.

If you have any further questions, please contact me or Mr. Matthew Moury, Deputy Assistant Secretary for Safety and Security Program, at (202) 586-5151.

Sincerely,

David Huizenga

David Huizenga
Acting Assistant Secretary for
Environmental Management

Enclosure

cc: R. Lagdon, S-5
M. Campagnone, HS-1.1
M. McCormick, RL
M. Moury, EM-20

# Corrective Action Plan in Response to the Defense Nuclear Facilities Safety Board Conduct of Maintenance Review of WESF DNFSB Letter Dated October 6, 2011

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| ***Monitoring of Design Features*** | | | |
| I | WESF personnel do not perform formal (i.e., documented and scheduled) periodic reviews or monitoring activities to confirm that all design features have not degraded and are still capable of performing their safety functions. One example is that WESF operators do not check or test the safety-significant pool fill piping that must be operable in an emergency situation to provide a means of getting water to the pools through a fire hose. After the staff raised this issue during its review, WESF management committed to evaluate the concern. | 1. Appendix B of the current WESF Technical Safety Requirement (TSRs) document (HNF-8759, Rev 6) lists the WESF Design Features (DFs). Periodic inspections are being developed for these DFs as identified below. Preventive Maintenance/Surveillance activities will be issued 12/14/2011. Inspections will be tracked as a part of the periodic maintenance program and will be performed as described below.<br>a. Area 2 structure (hot cells, canyon, hot and cold manipulator repair shop, operating gallery, service gallery, and aqueous make up room); Area 3 structure (pool cells); Pool Cell drain line, sump lines, and circulation piping; Pool Cell bridge crane, catwalk, support structures - Periodic inspections will include:<br>i. Annual visual inspection for structural degradation (pipe tunnel is a high radiation area; personnel will not access this area to perform an inspection of the piping).<br>ii. Annual review of facility modification work packages to ensure a design feature was not inadvertently degraded.<br>iii. Seismic analysis and facility structural review every 10 years to ensure analysis conclusions remain valid.<br>b. Pool Cell cleaning system -<br>i. The operating procedure that covers assembly of the pool cell cleaning system will include verification of correct installation to protect the DF. This will confirm that the system will perform its safety function each time the cleaning system is assembled.<br>c. Pool Cell area north doorway - Periodic inspection will include: | 1. Due on 12/14/2011<br><br>This activity was last completed in FY2011 and included items i, ii, and iii. |

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| | | i. Annual visual inspection of north door and surrounding area to ensure door is accessible and not damaged. Door will be operated to verify it is functional for purging hydrogen from the pool cells in an emergency. | The pool cell door has been operationally tested in FY2011. |
| | | d. Pool Cell 12 emergency fill pipe - Periodic testing will include: | |
| | | i. Annually perform a visual verification (e.g., video scope) that the fill pipe is clear and connect a standard fire hose to the fill pipe to verify it can be connected in an emergency. | This activity was completed FY 2012. |
| | | e. Pool Cell air dilution ports - Periodic inspection will include: | |
| | | i. Annual visual inspection of air dilution ports for pool cells that store capsules to ensure they are not plugged. Air dilution ports are currently inspected annually. | Last inspection was performed June 2011. |
| | | f. Hollow equipment used in active pool cells – Periodic inspection will include: | |
| | | i. Annual visual inspection of pool cell tongs to ensure holes along shaft are not plugged. Procedures that direct the use of this equipment include cautions to ensure that the equipment is water-filled during use. | |
| | | g. Capsules - The cesium and strontium capsules are required to be welded and constructed of stainless steel. These characteristics were confirmed during capsule processing and no additional capsules are being produced. A test for capsule integrity is performed using the inner capsule movement test. This test is performed on 20% of the capsules every 2 years such that all capsules are tested over a 10-year period. | Capsule integrity testing is current with scheduled frequency. |
| | | h. WESF Ion Exchange Module (WIXM) vent -The WIXM vent is not credited as a design feature in any | Due on |

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| | | of the accident analyses; a description of the vent function was removed in the 2011 annual update to the WESF safety basis that has been submitted to DOE-RL for approval.<br>i. Beneficial Uses Shipping System (BUSS) cask - Since there are no future plans to ship capsules using the BUSS cask, use of the cask and identification of the cask as a design feature was removed from the 2011 annual update to the safety basis that is currently submitted to DOE-RL for approval.<br><br>2. Perform a baseline inspection of the following passive design features: pool cell cleaning system (b), pool cell area north doorway (c), pool cell 12 emergency fill pipe (d), and hollow equipment used in active pool cells (f). The remaining were completed as described above and do not require a baseline activity to be performed. | 12/14/2011<br><br>Due on 12/14/2011<br><br>Due on 03/15/2012 |
| ***Compliance with Procedures*** | | | |
| II | The Board's staff found several elements of the LWFS operations and maintenance program at WESF to be deficient. Chief among these deficiencies was the quality and use of technical procedures. Specific issues are discussed individually below following the overall summary.<br><br>Additionally, the CHPRC management assessment of Nuclear Operations at WESF and CSB completed on 11/03/11 identified similar issues related to the quality of procedures at both WESF and CSB and weaknesses in compliance with procedures (application of Conduct of Operations practices) in both facilities.<br><br>**The specific findings and observations from the assessment are being tracked in the CHPRC corrective action management system. However, the overarching corrective actions are included here. Additionally, these actions are** | 1. Assigned and relocated a Conduct of Work Mentor to WESF to focus on overall Conduct of Operations and Maintenance including procedure usage, compliance, labeling, and personal accountability (compensatory measure).<br><br>2. Commenced weekly WESF Conduct of Work meetings attended by WESF personnel and led by LWFS Facility Director to provide a face-to-face open forum for setting expectations, discussing issues, and fostering team support of the actions necessary to improve performance (compensatory measure).<br><br>3. Additional Senior Supervisory Oversight has been assigned from other facilities within Waste and Fuels Management Project to provide an outside perspective to aid in self-identification of areas for improvement | 1. Complete<br><br>2. Complete<br><br>3. Complete |

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| | **credited for improving performance in the areas of execution of work and quality of procedures, but are not repeated in the remaining individual sections.** | (compensatory measure). | |
| | | 4. Continued resetting expectation that, prior to use in the field, each procedure will have a workability review to ensure the procedure has the required specificity, can be performed as written, and does not rely too much on skill of the craft. Procedures that cannot be worked as written are not to be used in the facility until corrected (compensatory measure). | 4. Complete |
| | | 5. Provided a procedure compliance brief to all WESF facility and maintenance personnel, including Radiological Control Technicians (RCTs), on the requirements to perform procedure steps as written and to document the performance as required. If neither can be performed, then a stop work must be exercised until the procedure can be performed. Directed Field Work Supervisors to add this discussion to their daily pre-job briefs for the specific work planned for that day. | 5. Complete |
| | | 6. Management has re-emphasized the CHPRC company-wide expectations for ISMS/EMS implementation to reinforce formality of Conduct of Operations and Maintenance. ISMS/EMS expectations have been posted in the operating base station, break room, and pre-evolution brief room as a readily available briefing tool to include:<br>• Issue a Stop Work for imminent safety hazard<br>• Adhere to Conduct of Operations requirements<br>• Demonstrate a questioning attitude<br>• Comply with procedures and any written instructions that define how to do a task<br>o If a procedure or written instructions cannot be | 6. Complete |

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| | | followed, stop and get clarification or correction before proceeding on that specific activity. | |
| III | WESF surveillance personnel failed to properly identify readings out of normal range for Technical Safety Requirement (TSR) parameters on data sheets for pool cell water levels and hot cell ventilation. | 1. Revised WESF procedure EO-040-001, *Pool Cell Surveillance*, to correct the normal operating range of the pool cells.<br><br>2. Provided briefing to all WESF Nuclear Chemical Operators (NCOs) regarding expected response to out-of-specification readings.<br><br>3. Changed and implemented WESF procedure EO-040-004, *Perform SOE Surveillance*, to correct negative pressure (vacuum) readings.<br><br>4. Revised WESF procedure EO-040-004, *Perform SOE Surveillance*, to address potential human performance set up factors throughout the document.<br><br>5. Briefed the requirements contained in the administrative procedures (PRC-PRO-OP-40120, *Shift Routines and Operating Practices*, and WMP-331, Section 3.28, *WESF Shift Routines and Operating Practices*) for shift routines and operating practices on identifying readings out of normal range with all WESF Stationary Operating Engineers (SOEs). | 1. Complete<br><br>2. Complete<br><br>3. Complete<br><br>4. Complete<br><br>5. Complete |
| IV | A TSR surveillance requires pool cell water levels to be verified and documented weekly, along with the date and method of verification. WESF personnel are not recording the method of verification as there is no place to record it on the data sheet. | 1. Revised WESF procedure EO-040-001, *Pool Cell Surveillance*, to specify the acceptable methods of verification and to provide specific criteria to document if an alternate method of verification is used.<br><br>2. Briefed WESF NCOs on the changes to this procedure. | 1. Complete<br><br>2. Complete |
| V | The data sheet for automated personnel monitor inspections requires the radiological control technician to verify, through a meter on the automated personnel monitor, that there is | 1. Corrected automated personnel monitor inspection and source check data sheet. | 1. Complete |

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| | evidence of an outlet flow. Some automated personnel monitors indicate no flow, but the radiological control technicians accept and work around this known abnormal condition by instead verifying the presence of an outlet flow using the inlet flow gauge and the gas bottle regulator. | 2. Briefed WESF RCT personnel on the changes to the procedure. | 2. Complete |
| VI | Workers skipped steps that could not be performed as written and performed actions that were not documented in the continuous-use procedure to function test the WESF stack radiation monitor system. | 1. Revise WESF stack radiation monitor functional test procedure to eliminate the steps that could not be performed as written.<br><br>2. Brief WESF Instrument Technicians on the changes to the procedure.<br><br>3. Refer to overall Conduct of Operations corrective actions outlined in Issue Statement II. | 1. Due on 12/16/2011<br><br>2. Due on 12/28/2011<br><br>3. See Issue Statement II |
| ***Execution of Work*** | | | |
| VII | Workers recently found wet detector wires in the K3 exhaust ventilation system. The wires dried when the workers opened the system to perform repairs. The operators returned the instrument to service without determining the source of the moisture. | Discussion:<br>This detector discussed in this observation is a radiation detector that is used to monitor the radiation levels on the K3 HEPA filter, which is located below grade in a concrete vault. The detectors are located below the vault cover blocks and are inserted into place through penetrations built into the cover blocks. These instruments have had a history of operating issues due to condensation. Troubleshooting of this system to date has identified that the most likely cause of the problem is between the detector and the junction box on top of the vault, which cannot be entered due to high radiation. A replacement instrument with better performance characteristics is being pursued, but one has not been located to date.<br><br>In the incident noted, the work package instructions were to replace a wire harness that was thought to be contributing to the problem. However, when the work team went to perform the work, the detector was noted to be operating properly, thus the work was not performed and the detector was returned to service. The detector continued to operate for | |

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| | | several weeks before it again failed. The detector is currently out-of-service and is scheduled to be changed out. The harness will be replaced at the same time.<br>Facility personnel should have questioned the need to perform a documented retest before placing the instrument back into service. This will be addressed as a part of the overall Conduct of Operations improvements efforts outlined in Issue Statement 2.<br><br>1. Replaced the failed detector and harness.<br><br>2. This issue has been entered into our corrective action management system to track the long-term solution for resolving the condensation issue.<br><br>Additionally, this observation is believed to have been made based upon review of the WESF vital safety system quarterly health report, CHPRC-01076, Rev 2, which provided minimal discussion as to the cause of the moisture or the corrective actions being pursued. The corrective actions listed below will emphasize the importance of complete documentation.<br><br>3. Briefed the following expectations with the WESF System Engineers:<br>a. Documentation of engineering decisions in a retrievable format is important to ensure that:<br>o Equipment history is thorough and complete<br>o Events can be easily reconstructed in the future<br>o Rework is avoided<br>b. Documentation should include enough information that a knowledgeable person can understand the issue and the conclusion reached. Assumptions used in the decision process need to be clear.<br>c. Any time an engineer makes a decision or reviews | <br><br><br><br><br><br><br><br>1. Complete<br><br>2. Complete<br><br><br><br><br><br><br><br><br><br><br><br>3. Complete |

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| | | something in the field, that decision or review needs to be annotated in the work package. | |
| VIII | During a TSR surveillance, the operator failed to recognize out-of-range readings on pressure gauges until the Board's staff pointed them out. The operator also failed to note as a concern on the data sheet that a gauge reading was off-scale. | 1. Issued Timely Order to clarify vacuum readings and requirement to red circle readings until the procedure revision is issued (compensatory measure).<br>2. Briefed SOEs on the Timely Order.<br>3. Revised procedure to clarify that the readings are vacuum and the associated readings are negative values.<br>4. Briefed the requirements contained in the administrative procedures (PRC-PRO-OP-40120, *Shift Routines and Operating Practices*, and WMP-331, Section 3.28, *WESF Shift Routines and Operating Practices*) for shift routines and operating practices on identifying readings out of normal range with all WESF SOEs. | 1. Complete<br>2. Complete<br>3. Complete<br>4. Complete |
| IX | During a surveillance round, an operator indicated that he did not understand how to read a complex gauge (with three different scales) on the M-2 pool cell beta monitor, as required by the data sheet. Therefore, he entered a reading from a remote computer monitor. | 1. Installed operator aid, in accordance with PRC-PRO-OP-40125, *Operator Aid Postings*, to support reading the meter (compensatory measure).<br>2. Revised the surveillance procedure to provide direction for obtaining field reading by ensuring the field instrument is set to the proper scale. Additionally, the revision supports obtaining reading from the field meter or from a remote computer monitor.<br>3. Reviewed WESF NCO training package for adequacy of content related to knowledge and use of this meter as well as other unique types of surveillance instruments.<br>4. Revise training package as necessary based upon review of effectiveness completed in corrective action 3 above. | 1. Complete<br>2. Complete<br>3. Due on 03/30/2012<br>4. Due on 04/30/2012 |

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| | | 5. Provide the training delta identified in corrective action 3 above to the WESF NCOs. | |
| ***Quality of Procedures*** | | | |
| X | Post-maintenance testing may be performed by operators or crafts personnel using maintenance procedures, but the maintenance procedures do not designate the responsible position/individual if not a craftsperson. This situation is contrary to a contractor standard that "the single user format should be used when the majority of the steps in a procedure are performed by one discipline or craft. Those steps performed by other disciplines are identified at the beginning of the affected step." | Discussion:<br>Maintenance procedures are currently written in accordance with "the single user format" as required by PRC-STD-MS-40241, *CH2M HILL Plateau Remediation Company Procedures Standards*.<br><br>However, this standard is not applicable to maintenance work packages developed under PRC-PRO-WKM-12115, *Work Management.* Following review of the issue, CHPRC sees value of the single user format for some work packages and will implement that approach with the following corrective actions.<br><br>1. Update PRC-PRO-WKM-12116, *Work Planning Guide*, to reflect format requirements for "single user" planned work instructions to identify alternate craft responsibilities similar to the format described in PRC-STD-MS-40241, *CH2M HILL PRC Procedures Standards*. Provide criteria for when the "single user" format is necessary.<br><br>2. Provide brief to all planners on the "single user" format requirements through required reading. | 1. Due on 01/31/2012<br><br>2. Due on 02/28/2012 |
| XI | The staff noted numerous cases in which equipment identifiers in a procedure (surveillance forms, data sheets, checklists) were missing or did not match physical labels or touch screen readouts. | Discussion:<br>*CHPRC Procedure Validation Checklist* (Site Form A-6004-595) includes labeling and equipment identification as part of the procedure validation process. The weakness identified in this area is directly tied to Conduct of Operations. As such, the overall actions outlined in Issue Statement II will also improve performance in this area. | |

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| | | 1. Walked down SOE rounds by Operations and Engineering to verify all labeling and data sheets and identify the components required for correction.<br><br>2. Walked down NCO rounds by Operations and Engineering to verify all labeling and data sheets correctly identify the components required for data entry and to identify all deficient equipment identifiers.<br><br>3. Replace deficient equipment identifiers and/or revise surveillance data sheets.<br><br>4. Include refresher training on the procedure validation process in WESF continuing training. | 1. Complete<br><br>2. Complete<br><br>3. Due on 1/29/2012<br><br>4. Due on 4/30/2012 |
| XII | The daily Radiological Control Data Sheet for remote surveillance of area radiation monitors does not highlight the TSR-related equipment (3 of 13 area radiation monitors). A CHPRC procedure requires that "critical steps [e.g., TSR level surveillance steps] are adequately emphasized." | Discussion:<br>Although 3 of the 13 area radiation monitors are designated as safety significant pieces of equipment, the readings being taken on the daily Radiological Control Data Sheet are not TSR readings. They are being taken for trending purposes only as requested by the responsible System Engineer.<br><br>1. The Radiological Control Data Sheets have been revised to reflect the readings are not TSR-related readings and the facility RCTs have been briefed. | 1. Complete |
| ***Facility-Specific Training*** | | | |
| XIII | No formal facility-specific system/equipment training is offered or required for crafts personnel because, as stated by CHPRC management, the contractor hires only journeymen who undergo general site training through the apprenticeship program. DOE Guide 433.1-1 states that the "training organization should maintain maintenance training programs that address specific facility needs." In addition, DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities,* | Discussion:<br>WESF maintenance personnel are required to attend facility specific Safety Basis training. Following review of the Issue Statement with respect to the WESF Safety Basis training, it was noted that improvements to training content need to be made to better capture CRD O 426.2, Section 4.b.(3)(b) requirements (Items 1, 2, 3 in corrective action 2 below).<br><br>1. Develop facility-specific system training for WESF | 1. Due on |

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| | requires that "personnel who perform work on engineered safety features as identified in the facility Documented Safety Analysis must be trained on those systems/components, including systems having a direct impact on the safe operation of the facility." The Board's staff believes all maintenance personnel need to receive facility-specific training on facility systems that reflect variations in facility type, purpose, and design.<br><br>The aging workforce at WESF creates a compelling need for specific training on facility SSCs. In the near future, the LWFS/WESF maintenance organization expects to lose four crafts personnel, four work planners, and two qualified supervisors (about 25 percent of the LWFS maintenance workforce) through retirement or reassignment, and many others at WESF will be eligible for retirement in the near term. The staff believes workforce turnover at WESF will need to be managed prudently to ensure that knowledgeable and experienced personnel are available to maintain the WESF safety systems. | maintenance personnel to include DOE O 426.2 requirement: "System training must, at a minimum, include the following elements: 1) Purpose of the system; 2) General description of the system including major components, relationship to other systems, and all safety implications associated with working on the system; and 3 ) Related industry and facility-specific experience."<br><br>2. Update the maintenance personnel training profiles to require the facility specific training as developed in corrective action 1.<br><br>3. Train all WESF facility maintenance personnel on the facility specific system training developed in corrective action 1. | 01/31/2012<br><br>2. Due on 02/15/2012<br><br>3. Due on 02/28/2012 |
| ***Contractor Oversight Program*** | | | |
| XIV | The contractor has performed 18 formal assessments during the past 2 years that encompassed elements of the WESF maintenance program. CHPRC personnel noted that no findings from their management assessments or independent assessment were related to WESF maintenance activities, and that only one minor opportunity for improvement (a procedure change) was identified during 11 management observations of maintenance activities at WESF. These results indicate to the staff that the contractor's oversight program may not be optimally effective or critical. Given the significant issues identified by the staff during this 3-day review, it may be advisable for DOE to evaluate the rigor with which the contractor performs its program assessments. | 1. Conduct a Nuclear Operations Management Assessment of WESF and CSB with DOE-RL oversight using both program and independent assessment personnel. Develop Lines of Inquiry with input from DOE-RL staff based on the issues identified in the referenced DNFSB letter. The purpose of the assessment is to identify the extent of condition within the Waste and Fuels area. During the CHPRC management assessment of Nuclear Operations at WESF and CSB completed on 11/03/2011, similar types of issues were identified and the results and lessons learned are being factored into similar assessments (see corrective action 4 for this area).<br><br>2. Perform a causal analysis to identify why the assessment | 1. Complete<br><br>2. Due on |

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| | | process failed to identify the WESF issues referenced in the DNFSB letter. Include in the causal analysis the extent of condition for self-assessment activities across CHPRC. Provide the results and recommended corrective actions to the CHPRC Executive Safety Review Board for approval.<br><br>3. Implement the ESRB-approved corrective actions including strategy for maintenance oversight of nuclear facilities based upon the work performed in the facility as identified in the causal analysis across CHPRC.<br><br>4. Using the revised assessment process based on the results of the cause analysis above, use a graded approach to perform Nuclear Operations Assessments at remaining CHPRC nuclear facilities/projects as part of annual assessment plan.<br><br>5. Perform an effectiveness review of the completed corrective actions. | 12/31/2011<br><br>3. Due on 3/31/2012<br><br>4. Due on 12/31/2012<br><br>5. Due on 12/31/2012 |