Department of Energy
Washington, DC 20585

April 25, 2014

Mr. John C. Fulton
President and Chief Executive Officer
CH2M HILL Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352

NEL-2014-01

Dear Mr. Fulton:

The Office of Health, Safety and Security's Office of Enforcement and Oversight has evaluated the facts and circumstances surrounding the discovery of a sealed strontium 90 (Sr-90) radioactive source found outside its shielded assembly, resulting in unexpected radiological doses to four individuals at the Plutonium Finishing Plant (PFP). CH2M HILL Plateau Remediation Company (CHPRC) manages the decontamination and decommissioning of PFP, located at the Hanford Site in Richland, Washington, under a contract with the U.S. Department of Energy (DOE). CHPRC is subject to the provisions of 10 C.F.R. Part 830 (Part 830), *Nuclear Safety Management*, and 10 C.F.R. Part 835 (Part 835), *Occupational Radiation Protection*, pursuant to 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*.

CHPRC documented this event in the DOE Occurrence Reporting and Processing System (ORPS) (EM-RL—CPRC-PFP-2013-0006) on October 28, 2013, and CHPRC reported the nuclear safety noncompliances associated with this event in the DOE Noncompliance Tracking System (NTS-RL-CPRC--PFP-2014-0002) on January 16, 2014.

On September 18, 2013, a PFP source custodian tagged a piece of equipment out of service due to a mechanical issue with the Ion Chamber Check Source jig and placed it in a locked cabinet. On October 16, 2013, a radiation control technician (RCT) found what appeared to be a watch or hearing aid battery on the floor. It was placed on the desk for future disposition, but not before a total of three workers handled it. On October 17, 2013, a fourth worker noticed what appeared to be a magnet on the desk and, upon further examination, determined that it was a sealed radioactive source containing a non-accountable (exempt) quantity of Sr-90 with an activity of 966 microcuries. On October 23, 2013, the event was categorized for ORPS reporting after it was determined that initial field measurements were nonconservative and the actual dose rate was higher than originally measured or anticipated.

The loss of control of the Sr-90 radioactive sealed source revealed potential violations of Parts 830 and 835 requirements. CHPRC identified noncompliances in the work processes quality assurance criterion of its nuclear safety management program, as well as the source control provision of its occupational radiation protection program. The

Office of Enforcement and Oversight also identified potential noncompliances in three additional nuclear safety management program areas (documents and records, quality improvement, and training and qualification) and three occupational radiation protection program areas (workplace controls, radiation safety training, and written procedures). Specific examples identified in CHPRC's causal analysis include:

- Potential material failure from jig degradation over time was a known issue before this event; CHPRC had received this information through both a Radiological Incident Report and a Lessons Learned document issued by another contractor within the DOE community. Instead of removing the item from service, conducting a technical evaluation of the issue, or replacing the potentially degraded jig, CHPRC assigned RCTs to inspect these items but identified no inspection criteria to verify the adequacy of the source container and did not properly train the RCTs to perform these inspections. Despite CHPRC's attempt to ensure that all source jigs with a similar design were immediately controlled and removed from service, CHPRC's preventive actions failed to adequately recognize and account for the potential risk associated with a jig failure.

- PRC-PRO-RP-387, "Sealed Radioactive Source Control," the technical work document that should have provided direction, did not describe a detailed method for the source custodian to tag out, remove from service, and/or repair malfunctioning jigs to ensure sealed source accountability, equipment operability, and control of worker exposures. Lacking detailed, formal guidance, a worker used masking tape to label the device "Do Not Use" and placed it in a locked cabinet until its formal disposition could be determined. While this action was a reasonable attempt by the worker to temporarily control the item and mitigate the hazard, it significantly contributed to the unplanned worker exposures that resulted from this event.

- Source user training for the Hanford Site was not adequate to ensure that users visually recognize the various radioactive sources that are contained within jigs, so users may have had difficulty in properly identifying, categorizing, and controlling these hazards. While sealed radioactive sources are present in many different container shapes and sizes, an effective radiation safety training program should generally include both classroom and on-the-job training utilizing several different sealed sources prior to conducting work.

- Although the rooms were posted as radiological buffer and/or material areas, the workers did not use survey equipment to help determine what the unknown item (source) was, and they did not contact management for notification or assistance. In a known radiation environment, with numerous detection capabilities available, an unknown item should be treated as a radioactive hazard until determined otherwise by means of appropriate detection or monitoring equipment.

- During the initial investigation to support dose analysis, RCTs performed a survey at a distance of one half inch but reported the results as "on contact." When estimating contact doses, a small error in distance can result in a significant

miscalculation of the equivalent dose to an exposed worker. This discrepancy resulted in under-reporting the actual dose rate, which delayed recognition of potential consequences to workers.

The Office of Enforcement and Oversight is issuing this enforcement letter because the facts and circumstances of this occurrence indicate weaknesses in multiple aspects of CHPRC's Part 830 and Part 835 programs. CHPRC's peer-reviewed dose information report indicated that although no occupational dose limits were exceeded as a result of this event, significant worker extremity doses were assigned and documented in individual occupational exposure histories as "special entries." CHPRC's application of the provisions of 10 CFR § 835.205, *Determination of compliance for non-uniform exposure of the skin*, instead of 10 C.F.R. § 835.202, *Occupational dose limits for general employees*, to assign extremity doses for these nonuniform exposures is consistent with nuclear safety requirements. However, it should be noted that CHPRC narrowly avoided exceeding the dose limits of 10 C.F.R. § 835.202, but not because of any particular set of workplace controls.

The Office of Enforcement and Oversight acknowledges CHPRC management's proactive engagement as well as its prompt identification and reporting and systematic analysis and response to this event. Despite the deficiencies revealed by this event, the Office of Enforcement and Oversight is electing to exercise enforcement discretion at this time based on CHPRC's completion of a thorough and wide-ranging root cause evaluation that identified direct, root, and contributing causes, and the development of comprehensive and conservative corrective actions to prevent recurrence, including improvements to the radiation protection program. The Office of Enforcement and Oversight, along with the DOE Office of Environmental Management and the DOE Richland Operations Office, will continue to closely monitor the effectiveness of CHPRC's nuclear safety and radiation protection programs in preventing worker exposures.

No response to this letter is required. If you have any questions, please contact me at (301) 903-2178, or your staff may contact Mr. Steven Simonson, Deputy Director for Enforcement, Office of Enforcement and Oversight, at (301) 903-7707.

Sincerely,

John S. Boulden III
Director
Office of Enforcement and Oversight
Office of Health, Safety and Security

cc: Matthew McCormick, RL
Kyle Rankin, RL
Lynn Nye, CHPRC