



U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUN 06 2008

08-ESQ-076

Mr. John C. Fulton, President
and Chief Executive Officer
CH2M HILL Hanford Group, Inc.
2440 Stevens Center Place
Richland, Washington 99354

Dear Mr. Fulton:

CONTRACT NO. DE-AC27-99RL14047 – HIGH RADIATION AREA PROGRAM
IMPLEMENTATION CONCERN

Reference: HNF-5183, "Tank Farms Radiological Controls Manual."

This letter forwards the results of the U.S. Department of Energy, Office of River Protection surveillance of the High Radiation Area program and implementation conducted in April, 2008.

The surveillance found three Findings and one Concern. Problems in this area have repeatedly been documented and management actions to correct the problem have been ineffective.

Within 30 days of receipt of this letter, CH2M HILL Hanford Group, Inc. (CH2M HILL) should respond to the surveillance finding. CH2M HILL's response should include:

- The cause(s) of the finding;
- The corrective actions that have been taken to control or remove any adverse impact from non-compliant conditions (remedial actions) and the results achieved;
- The corrective actions that will be taken to identify the extent of condition, correct the cause(s), and prevent further findings; and
- The date when all corrective actions will be completed, verified, and compliance to applicable requirements achieved.

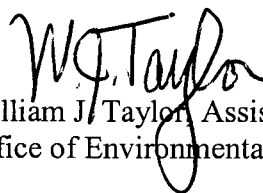
Mr. John C. Fulton
08-ESQ-076

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If you have any questions, please contact me, or your staff may contact Jason A. Armstrong, Verification and Confirmation Division, (509) 372-0787.

Sincerely,



William J. Taylor, Assistant Manager
Office of Environmental Safety and Quality

ESQ:JAA

Attachment

cc w/attach:
CH2M HILL Correspondence

**Office of River Protection
Surveillance Report**

Division: Office of Environmental Safety and Quality

Surveillants: Jason Armstrong, Richard Jansons

Surveillance Number: S-08-ESQ-TANKFARM-006

Date Completed: April 23, 2008

Organization: U.S. Department of Energy, Office of River Protection, Tank Farms Project, CH2M HILL Group, Inc.

Facilities: Base Operations, Closure Operations, 222-S Laboratories

Title: High Radiation Area Program Implementation

Surveillance Scope:

The surveillance evaluated CH2M HILL Group, Inc.'s (CH2M HILL) implementation of the High Radiation Area (HRA) program in accordance with U.S. Department of Energy (DOE) requirements, Tank Farms Radiological Control Manual, Integrated Safety Management and applicable implementing procedures. In addition, this surveillance evaluated Problem Evaluation Reports (PER) relating to HRA issues.

Surveillance Summary:

The surveillance evaluated the HRA program (Phase I) and program implementation (Phase II). The CH2M HILL HRA program (Phase I) is adequate and found to have satisfactory management systems in order to execute the program. However, the surveillants identified three findings that led to an overall concern for the implementation (Phase II) of the HRA program. Many of the findings and the concern in this report are due to unsatisfactory to marginal program implementation by CH2M HILL Operations groups. Examples of Operations deficiencies include unlocked and accessible HRAs, key control deficiencies, inadequate postings, inventory

mis-matches and documentation inconsistencies, barrier degradation, and failure to conduct critiques or root cause analysis to prevent recurrence. Although Radiation Protection program weaknesses were present, if CH2M HILL Operations groups had implemented the program as written, a satisfactory HRA would have resulted. DOE Office of River Protection (ORP) recognizes that CH2M HILL Radiological Control Organizations have self-identified many of the issues cited in this report, however, CH2M HILL Operations have not taken ownership and implemented actions to prevent recurrence in the field.

Assessment Results:

HRA controls are vital to prevent unplanned exposures. Without a rigorous HRA program in place, unauthorized or inadvertent access to HRAs can lead to unplanned exposures. As such, the HRA program implementation is crucial to a well-functioning radiological control program. Several HRA issues were identified by both DOE ORP and CH2M HILL personnel over the past several months, prompting ORP to evaluate the effectiveness of CH2M HILL's High and Very High HRA Program implementation. The most significant recent examples of these issues include:

- HRA was left unlocked;
- HRA identified by CH2M HILL during normal work operations was left inadequately posted and controlled; and
- HRA keys are not controlled according to procedures.

Numerous examples of inadequate HRA controls were noted by the assessment team, indicating that re-occurring weak program implementation exists in the CH2M HILL's HRA program. Examples were found of unlocked and accessible HRAs. Some cases were found where HRAs were secured with plastic ties or sagging orange netting which would not preclude inadvertent entry into the HRA. In some instances, HRA postings were missing or incorrectly placed, such that the high radiation conditions were outside the HRA-posted area. Keys controlling access to HRAs were found to be missing, not identified with specific HRAs in all cases, and not logged in or out as required by implementing procedures. Inventories of HRAs maintained by Operations groups and their associated Radiological Control organizations did not match.

Previous assessment reports identified similar issues. In December 2006, the CH2M HILL assessment organization conducted an independent assessment of the entry, exit, and posting controls for radiological areas and labeling controls for radioactive material (specialty assessment report FY-2007-SH&Q-S0308). That report found HRA implementation and key control to be non-compliant. The causes to these deficiencies were not corrected and as a result,

were found again during the current assessment. In addition, the 2006 assessment team found that problems identified in the 2004 triennial radiological entry, exit, and posting controls assessment were not corrected. The 2006 report states, in part, "The lack of improvement in long-term corrective action was a strong contributor to the recurrence of several problems that were identified during the [2006] assessment."

Key control is a critical element of the HRA program. This surveillance identified a number of instances of keys not being adequately tracked by the key control system. The inadequate control of HRA keys has been a longstanding problem in CH2M HILL. Inadequate control of keys was identified by CH2M HILL in January and again in December 2006. ORP identified four keys for HRAs were not in the key enclosure and not checked out in December 2007. Unsatisfactory implementation of the key control program is likely to result in inadequately controlled HRAs in the future and could result in unnecessary and unplanned radiation exposure.

The assessment team found previous Corrective Actions have been ineffective and not completed to address previous HRA issues. The CH2M HILL contractor has not, in most cases, conducted critiques of events as required by the Tank Farms Radiological Control Manual, Article 351, to allow consistent, full gathering of facts to formulate corrective actions to prevent recurrence. If critiques in accordance with Article 351 were conducted, a timelier, full gathering of the facts could have led to a better understanding of the root and contributing causes, resulting in more comprehensive and effective corrective actions; this meeting the intent of Integrated Safety Management System Continuous Feedback and Improvement which has not occurred over the last two years.

Surveillance Results:

The surveillants reviewed the following documents:

HNF-5183, Tank Farms Radiological Control Manual;

TFC-OPS-OPER-C-04, Access and Key Control for Tank Farm Facilities, Revision B-7;

TFC-ESHQ-RP_MON-C-11, High Radiation Areas Physical Access Controls, Revision A-7;

PER-2006-0837;

PER-2006-1722;

PER-2007-0862;

PER-2007-2324;

PER-2008-0010;

PER-2008-0483;

PER-2008-0487;

PER-2008-0729;

PER-2008-0745;

PER-2008-0738; and

CH2M HILL Independent Assessment FY-2007-SH&Q-S0308, "Radiological Entry/Exit and Posting/Labeling Programs."

Document Reviews

HNF-5183, Revision 2, Tank Farms Radiological Control Manual

The surveillants reviewed HNF-5183 to determine CH2M HILL commitments for controlling access to the HRAs. The following commitments, in part, are detailed below from the Tank Farms Radiological Control Manual:

- Physical controls to prevent inadvertent or unauthorized access to High and Very High HRAs should be maintained in accordance with Appendix 3B.
- The number, issue, and use of keys shall [835.502(b)(4)] be strictly controlled where locked entryways are used to control access to High and Very High HRA. [Radiation Protection Program Commitment (RPP) # 117]
- The Radiological Control Organization should maintain an inventory of High and Very High HRAs.
- Weekly inspections of the physical access controls to High and Very High HRAs should be made to verify controls are adequate to prevent unauthorized entry. For stand-by or inactive facilities inspection of the perimeter physical controls is adequate providing, upon entry, the internal physical access controls are verified.

- Written procedures shall [835.501(c)] be implemented to ensure the effectiveness and operability of barricades, devices, alarms, and locks. [RPP #108] Determination of the effectiveness of these control devices should also consider individual training and response.

Appendix 3B has the following commitments:

1. One or more of the following controls should be used for each entrance or access point to an HRA and shall [835.502(b)] be used for each entrance or access point to an HRA where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem (0.01 sievert) in any one hour at 30 centimeters from the source or from any surface the radiation penetrates:
 - a. A control device that prevents entry to the area when high radiation levels exist or that, upon entry, causes the radiation level to be reduced below the level that defines a HRA; [RPP # 114]
 - b. A device that functions automatically to prevent use or operation of the radiation source or field while individuals are in the area; [RPP # 115]
 - c. A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the HRA and the supervisor of the activity are made aware of the entry; [RPP # 116]
 - d. Entryways that are locked. During periods when access to the area is required, positive control over each entry is maintained; [RPP # 117]
 - e. Continuous direct or electronic surveillance that is capable of preventing unauthorized entry; [RPP # 118] and
 - f. A control device that will automatically generate audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source. [RPP # 119]
2. In addition to the above requirements, additional measures shall [835.502(c)] be implemented to ensure individuals are not able to gain unauthorized or inadvertent access to Very High HRAs when dose rates are in excess of the posting requirements of Table 2-3.[RPP # 120]
3. No control(s) shall [835.502(d)] be established in a High or Very High HRA that would prevent rapid evacuation of personnel. [RPP # 121]

TFC-OPS-OPER-C-04, Revision B-7, Access and Key Control for Tank Farm Facilities

The surveillants reviewed TFC-OPS-OPER-C-04 to determine CH2M HILL Operations for controlling access and keys to Tank Farm HRAs. The following commitment was identified in Section 4.1, Step 16:

- Maintain the Tank Farm Security Key Issuance Log (A-6003-461) and documentation pertaining to the key control program. The Tank Farm Security Key Issuance Log shall contain the following information: printed name of key holder, Hanford Identification (HID) number, key holder's signature, company name of key holder, on PopFon (Y/N), destination, field transfer, date issued, time issued, issuing custodian's initials, date returned, time returned, and key custodian initials.

TFC-ESHQ-RP_MON-C-11, Revision A-7

The surveillants reviewed TFC-ESHQ-RP_MON-C-11 to determine CH2M HILL Radiological Control commitment for controlling access and keys to Tank Farm HRAs. The following commitment was identified in Section 4.2, Step 9:

- Fill out the key control log in accordance with TFC-OPS-OPER-C-04 and obtain any access keys.

Interviews

Radiological Controls Program Manager

222-S Health Physics Supervisor

222-S Lead Radiological Control Technician

222-S Radiological Control Technicians

222-S Laboratory Operations Manager

222-S Laboratory Leader

Closure Operations Shift Operations Manager

Base Operations Shift Manager

Closure Operations Radiological Control Manager

Base Operations Radiological Control Manager

Base Operations Radiological Control Technicians

Base Operations Health Physics Supervisor

Conclusion:

The surveillants concluded that CH2M HILL has a well-written, thorough HRA program but line management implementation of the requirements of the Tank Farms Radiological Control Manual, Operations procedures, and Radiological Control requirements or procedures is marginal at best. Many of the findings and the concern in this report are due to poor program implementation by CH2M HILL Operations groups. A review of PERs, field inspections of key logs and inventories, incomplete CH2M HILL independent assessment corrective actions, and interviews with personnel indicate that HRA program is less than adequate. Although Radiation Protection program weaknesses were present, if CH2M HILL Operations groups had implemented the program as written, a satisfactory HRA would have resulted.

Concern S-08-ESQ-TANKFARM-006-C01: The CH2M HILL Operations groups have not implemented the company-approved HRA program to prevent unauthorized or inadvertent access to HRAs which could lead to unplanned exposures. Issues identified in this assessment were similar to and in some cases were previously identified by CH2M HILL and ORP personnel. Actions to address these issues were not effective in preventing recurrence and providing long lasting improvement to this program.

Discussion:

The Assessment team found numerous issues indicating that recurring weak program implementation exists in the CH2M HILL's HRA program that could lead to unauthorized or inadvertent access to HRAs which could lead to an unplanned exposure. Examples include:

- unlocked and accessible HRAs;
- HRAs were secured with plastic ties or sagging orange netting which would not preclude inadvertent entry into the HRA;
- HRA postings were missing or incorrectly placed, such that the high radiation conditions were outside the HRA-posted area;
- keys controlling access to HRAs were found to be missing, not identified with specific HRAs, and not logged in or out by the controlling authority; and
- inventory of HRAs maintained by Operations groups and their associated Radiological Control organizations did not match.

Previous assessment reports and PERs identified similar issues. In many cases, CH2M HILL operations did not identify the causes of problems and work to prevent recurrence as part of correcting the problem. As a result, deficiencies were not corrected and were found again during the current assessment. CH2M HILL operations has not, in most cases, conducted critiques of events as required by the Tank Farms Radiological Control Manual, Article 351, to allow consistent, full gathering of facts to formulate corrective actions to prevent recurrence.

The CH2M HILL Performance Analysis Report for First Quarter 2008, Section 3.4, last paragraph states, "A collective significance review of PERs initiated in the last 12 months revealed that the number of PERs related to the management of high radiation areas may indicate an adverse condition warranting further evaluation. PER-2008-0750 was generated to document the issue and a formal assessment has been scheduled to evaluate its significance and extent of condition."

Generating PER-2008-0750 and scheduling a formal assessment is a step toward recognizing a significant problem exists. However, over the past several months ORP personnel have repeatedly questioned CH2M HILL personnel about the HRA deficiencies and proposed corrective actions.

- On March 28, 2008, ORP personnel met with CH2M HILL Performance Assurance who said that, while the number of HRA issues is a problem, there was not a statistical trend identified.
- In early March, ORP personnel asked why an effectiveness assessment on the implementation of administrative processes dealing with HRA key control and the effectiveness of the process in meeting the intent of 835.502(b)(4) and the Radiation Protection Program (RPP) hadn't been completed.
- On March 4, the Waste Feed Operations Radiological Control Manager informed ORP personnel a critique was scheduled for an HRA event. After several critique meetings were rescheduled, the meeting was finally cancelled.

CH2M HILL management has not proactively investigated the HRA issues identified over the past months, identified causes for the issues, or worked to prevent recurrence.

Finding S-08-ESQ-TANKFARM-006-F01: Tank Farm HRA keys are not maintained under positive control.

Requirements:

HNF-5183, Tank Farms Radiological Control Manual, Article 334.7, states, "The number, issue and use of keys shall [835.502(b)(4)] be strictly controlled where locked entryways are used to control access to High and Very High Radiation Areas. [RPP # 117]"

TFC-OPS-OPER-C-04, "Access and Key Control for Tank Farm Facilities," Revision B-7, Section 4.1, Step 16 states, "Maintain the Tank Farm Security Key Issuance Log (A-6003-461)

and documentation pertaining to the key control program. The Tank Farm Security Key Issuance Log shall contain the following information: printed name of key holder, HID number, key holder's signature, company name of key holder, on PopFon (Y/N), destination, field transfer, date issued, time issued, issuing custodian's initials, date returned, time returned, and key custodian initials."

TFC-ESHQ-RP_MON-C-11, "High Radiation Areas Physical Access Controls," Revision A-7, Section 4.2, Step 9 stated, "Fill out the key control log in accordance with TFC-OPS-OPER-C-04 and obtain any access keys."

Discussion:

- On April 16, 2008, ORP personnel found apparent conflicts between the HRA inventory lists maintained by Operations and the 222-S Radiological Control Organization during a walk-down of HRA keys at the 222-S Laboratory. The HRA Inventory maintained by 222-S Operations includes 24 HRA accesses, whereas the 222-S Radiological Control Organization maintains an HRA inventory that includes 27 HRA accesses. However, during subsequent discussions, 222-S Management prepared and presented ORP assessors with a crosswalk of the indexes that demonstrated the differences between the inventory lists were the result of some areas utilizing locks that use the same key. This confirmed the two inventories were consistent in identifying the areas needing to be controlled. However, until the inventory cross-walk was prepared, 222-S Operations and Radiological Control personnel were unable to verify HRAs on one list were the same HRA described on another list in all cases.
- Procedure TFC-ESHQ-RP_MON-C-11, "High Radiation Areas Physical Access Controls" requires HRA key controls to be in accordance with TFC-OPS-OPER-C-04. Contrary to this requirement, 222-S Labs does not control keys in accordance with that procedure.
- On April 9, 2008, ORP staff conducted a surveillance of the Base Operations HRA inventory and key control log. One HRA key (#155) was missing from the lockbox and not checked out on the log sheet or the shift operations logbook. Personnel at the Base Operations shift office stated the key had been given to Closure Operations, but no log entries were made. ORP conducted further investigations into this issue and found that the key may have been in the custody of Closure Operations and re-named key 235. However, the CH2M HILL Operations personnel in the Closure Operations shift office had no log entries or knowledge of whether key 155 was actually received from Base Operations or if, in fact, key 155 was not key 235.

Subsequent discussions with the CH2M HILL RPP Manager indicated key 155 was not ultimately given to Closure Operations. He reported key 235 was added to Closure Operations HRA key control box as the replacement lock placed at T-101 to eliminate the use of a gold Lock-and-Tag lock that had been incorrectly used as an HRA lock (as previously identified by ORP). The RPP Manager said he was told that lock/key 155 was dispatched from Base Operations to be used as the replacement lock at T-101 because the Closure Operations work release station could not locate any unused HRA locks. While the lock/key 155 was in route from Base Operations to Closure Operations, the Closure group found some unused HRA

locks/keys, including #235. They contacted Base Operations personnel and turned the delivery of lock/key 155 around and ended up placing key 235 at T-101 and removing the gold L/T lock.

Further discussions with the Base Operations Shift Operations Manager (SOM) identified that Key 155 had actually been given to the Closure Operations SOM. The Closure Operations SOM returned the lock/key sometime on swing shift and left the key on the Base Operations key control administrator's desk, where it was found the next morning. Although lock/Key 155 was not deployed as a locking mechanism for an HRA in this case, the key was labeled and included in the Base Operations key inventory as an HRA key and was not controlled in accordance with the procedure.

- On March 18, 2008, during a cursory check of the HRA key log at the West Area Work Release Station, the ORP Facility Representative found that keys 232 and 233 were checked out on March 10, 2008 but were not logged in upon return. This issue is documented in PER-2008-0729. The keys were found in the lock-box.
 - On December 17, 2007, ORP personnel found access control keys for four HRAs were not in the key enclosure and were also not checked out. After review by the Shift Manager, one key was found within the enclosure but was not adequately labeled. The remaining keys were found to be at the Waste Feed Operations shift office. This issue is documented in PER-2007-2324.
 - In April 2008, ORP personnel found that HRA keys at Base Operations are logged in and out via a form titled "High Radiation Area Sign Out (Shift Office Key Box)." This form is not in accordance with TFC-OPS-OPER-C-04, "Access and Key Control for Tank Farm Facilities," Form A-6003-461. As a result, not all forms in use include holder's HID number, destination, and acknowledgement by the key custodian for the key return as required by OPER-C-04 and documented on Form A-6003-461.
 - In April 2008, ORP personnel found that HRA keys at Closure Operations are logged in and out via a form titled "Tank Farm Security Key Issuance Log for High Radiation Areas." This form is not in accordance with TFC-OPS-OPER-C-04, "Access and Key Control for Tank Farm Facilities," Form A-6003-461. As a result, not all forms in use include holder's HID number, destination, and acknowledgement by the key custodian for the key issuance as required by OPER-C-04 and documented on Form A-6003-461. TFC-ESHQ-RP_MON-C-11, "High Radiation Areas Physical Access Controls," specifies TFC-OPS-OPER-C-04, "Access and Key Control for Tank Farm Facilities," be used to control the number, issue, and use of High and Very High HRA keys.
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Finding S-08-ESQ-TANKFARM-006-F02: HRAs are not always posted, physically controlled, or guarded as required.

Requirements:

Tank Farms Radiological Control Manual, Article 231.14 states, "14. Areas may be excepted from the posting requirements of this Manual for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures [835.604(a)]. [RPP # 137 & 138]"

Tank Farms Radiological Control Manual, Articles 234.1 and 234.2, state, in part:

- "1. Areas shall [835.603] be posted to alert personnel to the presence of external radiation in accordance with Table 2-3 and Article 231. [RPP # 131 & 132]
2. Dose rate measurements used to determine criteria for Radiation Areas should be made at a distance of 30 centimeters from the radiation source or from any surface through which the radiation penetrates."

Tank Farms Radiological Control Manual, HRA Dose Rate Criteria from Table 2-3 is "[greater than or equal to] 0.1 rem/hr at 30 cm and [less than or equal to 500 rad/hr at 100 cm."

Tank Farms Radiological Control Manual, Article 334.2 states, "2. Physical controls to prevent inadvertent or unauthorized access to High and Very High Radiation Areas should be maintained in accordance with Appendix 3B."

Tank Farms Radiological Control Manual, Articles 334.7 and 334.8 states:

- "7. The number, issue and use of keys shall [835.502(b)(4)] be strictly controlled where locked entryways are used to control access to High and Very High Radiation Areas. [RPP # 117]
8. The Radiological Control Organization should maintain an inventory of High and Very High Radiation Areas."

TFC-ESHQ-RP_MON-C-11, "High Radiation Area Physical Access Controls," Revision A-7, Section 4.2, Step 20, Note 3 states, "Use of nylon or plastic type wire ties (tie wraps) is unacceptable. Use of a metal self-fastening banding device is acceptable."

Discussion:

- At approximately 0920 hours on Wednesday, April 9, 2008, two CH2M HILL Base Operations Radiological Control Technicians (RCT) found 120 mrem/hour at 30 cm from the riser as part of their weekly surveillance. The RCTs recognized this as an unposted HRA.

The area meeting the requirements for an HRA had been left inappropriately posted and controlled for approximately 20 hours. This issue is documented in PER-2008-0745. The following discussion describes event highlights:

On Tuesday, April 8, 2008, CH2M HILL Base Operations personnel appropriately established an HRA around a corrosion probe located at 241-AN-102 tank. After surveying the area, the contractor established an HRA approximately five feet radius around the corrosion probe riser because radiation levels exceeded the 100 mrem/hour at 30 centimeter HRA posting criteria.

CH2M HILL personnel performed work on the riser in accordance with approved work control documents. When the work was complete for the day, workers bolted a temporary flange to the riser. The Lead RCT surveyed the area and reported a post-job dose rate of 120 mrem/hour at 30 cm to the CH2M HILL RCT Supervisor prior to exiting the area (see PER-2008-0738).

The RCT Supervisor incorrectly directed the CH2M HILL Operations Supervisor to remove the HRA boundary and to only post the top of the riser flange with a HRA sign, even though greater than 100 mrem/hr existed 30 cm from the flange. This was complete at approximately 1430 on Tuesday.

On Wednesday, April 9, 2008, after being identified by the RCTs, CH2M HILL personnel installed temporary shielding on top of the riser and reduced the dose rate to levels below posting requirements for an HRA.

- On January 3, 2008, a CH2M HILL Radiological Control Technician found the HRA signs missing from the south side of the 241-AW exhauster. This issue is documented in PER-2008-0010.
- On March 3, 2008, a CH2M HILL Radiological Control Technician found the HRA at the 241-AW exhauster unsecured such that unauthorized access could be gained without positive controls. This issue is documented in PER-2008-0487.
- On March 3, 2008, at approximately 0930, the HRA at the S-102 lay down area was found by CH2M HILL personnel to be unlocked. This issue is documented in PER-2008-0483.
- On April 4, 2008, an ORP assessor found the SY-102 HRA fence held together on the North West corner with plastic wire ties. The use of plastic ties is a non-compliance with TFC-ESHQ-RP_MON-C-11 for a High or Very High HRA access control device or lock. Although the procedure does not specifically prohibit the use of plastic wire ties for holding a fence together, the fact that the use is prohibited from use as an access control device demonstrates the unacceptability of using the plastic to hold the fence together. This issue is documented in PER-2008-0729.
- On July 27, 2007, a HRA created during the 241-S-102 dilution hose rupture was not physically posted as a HRA within the eight-hour period allowed by 10 Code of Federal

Regulations (CFR) 835. The HRA was maintained under access control and guards established during subsequent recovery entries.

- On May 9, 2007, CH2M HILL personnel found an open gate in 241-SY Farm Prefabricated Pump Pit with four HRA signs hanging upside down. Two of the signs had the “High Radiation Area” wording facing outward and two had their backs facing outward. The sign positioning was immediately corrected. This issue is documented in PER-2007-0862.
- In September 2006, two unidentified HRAs were found during an investigative survey of 241-SX-110 and 241-SX-111 Breather Filters. The highest dose rate was 150 mrem/hr at 30 cm. In both cases, the HRAs had previously been covered with lead blankets. This issue is documented in PER-2006-1722.

The extent of condition review consisted of a search through the PER system for previous examples of recurring HRAs caused by a slipped lead blanket covering an HRA. The extent of conditions did not include looking for other lead-covered HRAs in the field, evaluating the practice of using lead blankets, methods of securing lead blankets, and routines for temporary shielding to ensure the integrity of the shielding package.

New radial filters were installed on 241-SX-110 and 241-SX-111 and the HRA was removed on March 16, 2007.

- In April 2006, a Radiological Control Technician conducting a pre-job radiation survey discovered an HRA that was not posted or guarded (242-A Filter Building). The RCT controlled the area until it was fenced off and posted. This issue is documented on PER-2006-0837. A radiological survey was conducted on May 9, 2006, “to determine the conditions of the area for long term corrective actions.” During performance of re-surveying it was determined that the condition identified in the PER no longer existed. The area was down-posted.

Interviews with the RCT Supervisor of the RCTs who originally found the unposted HRA validated the HRA was present. During discussions with the RCT Supervisor, the Supervisor said the RCT who down-posted the HRA was not shown and did not communicate with the two RCTs who found the problem.

No further investigation, extent of conditions or other corrective actions were taken. Although an RCT Supervisor and two RCTs found the HRA condition, no investigation, critique, fact finding, or management oversight was provided to determine why the RCT performing the subsequent survey could not find the HRA, or if the HRA was still, in fact, present in a location unknown to the down-posting RCT.

Finding S-08-ESQ-TANKFARM-006-F03: Corrective Actions were not effective and not completed to address previous HRA issues.

Requirements:

Tank Farms Radiological Control Manual, Article 351 states, "Critiques are meetings of the personnel knowledgeable about an event (either a success or an abnormal event) to document a chronological listing of the facts. The purpose of the critique is not to assign blame, but to establish and record the facts.

1. Critiques should be conducted for successes and abnormal events.
2. Critique leaders should be trained in the required elements of the critique process and the appropriate methods of conducting and controlling the critique.
3. Critique meetings should be conducted as soon as practicable after the event or situation is stabilized, or after a successful evolution is completed. Critiques of abnormal events should preferably be conducted before involved personnel leave for the day.
4. At a minimum, the general critique process should include the following elements:
 - a. Formal meetings, chaired by a critique leader;
 - b. Attendance by all who can contribute;
 - c. Personal statement forms completed by selected personnel before the meeting;
 - d. Attendance records;
 - e. Minutes, recorded and signed by the critique leader and all contributors;
 - f. Personal statements, signed and attached to the meeting minutes;
 - g. A listing of the facts in chronological order; and
 - h. Supporting materials, including documents, records, photographs, parts and logs, maintained by the critique leader.
5. Evaluation of complex evolutions or events may require multiple critiques."

10 CFR 830.122(b)(3), "Identify the causes of problems and work to prevent recurrence as part of correcting the problem;" and

Title 48, Federal Acquisition Regulations System, Part 970.5204-2, "Integration of Environment, Safety and Health into work planning and execution."

Discussion:

- In December 2006, a CH2M HILL assessment found the key for a Radiation Generating Device (RGD) was not controlled in accordance with procedures. The assessment team found an uncontrolled RGD in Building 616. The issue is documented in PER-2006-2122, which was closed in May 2007 by excessing/removing the RGD, and putting Building 616

keys into the key control program. The issue of lack of control of an RGD key capable of generating an HRA was not addressed in the closure actions for this PER.

Building 616 had been recently acquired by Waste Tank Operations. The PER identified in the Causal Analysis section that “personnel/department interactions were not considered when responsibilities for Building 616 were transferred to Waste Services/Operations/Tank Farm Waste Operations manager.” CH2M HILL personnel failed to identify corrective actions to evaluate facility turn-over procedures to ensure responsibility for HRAs was considered.

In December 2007, an ORP assessor found another HRA key control issue caused by improper facility turn-over. He found that access control keys for HRAs under the responsibility of Closure Operations were not in the possession of the Closure Operations shift office. PER-2007-2324, documenting this issue, states “Review the Project Turnover Scoping Document. There is not a heading for RadCon in this checklist. There may be cases where Projects does turn over projects that need a task description or other RadCon documentation developed.” (sic)

CH2M HILL corrective actions failed to prevent an HRA key control issue identified in December 2006 from recurring in December 2007.

- In January 2006, CH2M HILL identified the Closure Operations HRA inventory list and the Closure Operations HRA key rosters were not consistent. Three HRAs in 241-AX Farm were on the inventory list, but not in the key roster. In addition, the 241-C-200 Vessel Skid was a posted HRA, but was not present on the inventory list. These issues are documented on PER-2006-0010.

Recommended corrective actions included:

During next HRA inspection cycle include a verification of what key fits the lock on the HRA and verify that key is included in the HRA key inventory.

Remove all keys from HRA key inventory that are not valid HRA keys.

Verify or develop a mechanism to ensure HRA key inventory and HRA list are maintained current.

For Extent of Condition, the Tank Farm Contractor contacted the Waste Feed Operator (WFO) shift office and WFO Radiological Control Organization to verify similar conditions did not exist. No other company-wide evaluation was conducted. The corrective actions were limited to Closure Operations, and stated:

1. Verify the operability of the key maintained in the shift office for HRA fits the assigned HRA in the field.
2. Remove all keys from the HRA key inventory that are not valid HRA keys.

3. Modify the HRA list sign off sheet to include a column for key number.

The HRA Key Audit was completed approximately 2 ½ months (March 28) following identification of the problem. Eleven key problems (keys mislabeled; HRA key would not open door and no other key found; keys missing) out of a total of 16 identified HRA keys were found. No further corrective actions were identified from the additional problems noted. As noted in this assessment report, CH2M HILL failed to identify and correct the process(es) leading to the deficient conditions.

- HRA keys at Base Operations are logged in and out via a form titled “High Radiation Area Sign Out (Shift Office Key Box).” This form is not in accordance with TFC-OPS-OPER-C-04, “Access and Key Control for Tank Farm Facilities,” Form A-6003-461. As a result, not all forms in use include holder’s HID number, destination, and acknowledgement by the key custodian for the key return as required by OPER-C-04 and documented on Form A-6003-461. TFC-ESHQ-RP_MON-C-11, “High Radiation Areas Physical Access Controls,” specifies TFC-OPS-OPER-C-04, “Access and Key Control for Tank Farm Facilities,” be used to control the number, issue and use of High and Very High HRA keys.

This is a repeat finding from CH2M HILL’s Independent Assessment of Radiological Entry/Exit and Posting/Labeling Programs, (FY-2007-SH&Q-S0308), Issue Number RP-3-O-01. In December 2006, PER-2006-2125 was initiated to address this issue. The PER stated no immediate actions were taken. The recommended corrective action listed on the PER was to evaluate the rigor of the HRA key control program to ensure the HRA keys meet “positive” control expectations.

In response to this PER, and in order to “close” the PER, a CH2M HILL Radiological Control Staff person reviewed key control for WFO in February 2007, and found it compliant. No objective evidence was provided for closure. Field verification of HRA controls was not conducted as part of this assessment. There was no evidence that key Issuance Logs were reviewed, the HRA inventory sheets were reviewed, nor correlated to ensure proper key control. None of the specific items discussed in the body of the assessment were addressed in the follow-up assessment. The PER was closed with no actions taken.

- HRA keys at Closure Operations are logged in and out via a form titled “Tank Farm Security Key Issuance Log for High Radiation Areas.” This form is not in accordance with TFC-OPS-OPER-C-04, “Access and Key Control for Tank Farm Facilities,” Form A-6003-461. As a result, not all forms in use include holder’s HID number, destination, and acknowledgement by the key custodian for the key issuance as required by OPER-C-04 and documented on Form A-6003-461. TFC-ESHQ-RP_MON-C-11, “High Radiation Areas Physical Access Controls,” specifies TFC-OPS-OPER-C-04, “Access and Key Control for Tank Farm Facilities,” be used to control the number, issue and use of High and Very High HRA keys.

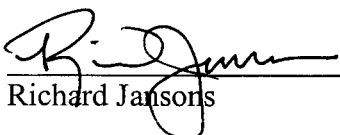
This finding is similar to the issue identified in CH2M HILL's Independent Assessment of Radiological Entry/Exit and Posting/Labeling Programs, (FY-2007-SH&Q-S0308), Issue Number RP-3-O-01. In December 2006, PER-2006-2125 was initiated to address the issue. No extent of condition review was conducted in association with this PER, thus CH2M HILL failed to self-identify and correct this issue.

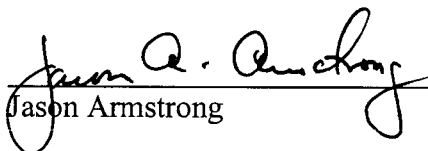
- On April 9, 2008, ORP staff conducted a surveillance of the Base Operations HRA inventory and key control log. One HRA key (#155) was missing from the lockbox and not checked out on the log sheet or the shift operations logbook. The failure to maintain positive control of HRA keys is a repeat issue previously identified by ORP in December 2007 (PER-2007-2324) and March 2008 (PER-2008-0729).

Management Debriefed:

Mark C. Brown, Director, Tank Farms Operations Division
Kenneth A. Hoar, Director, Verification and Confirmation Division
William J. Taylor, Assistant Manager, Environmental Safety and Quality Division

Surveillants:


Richard Jansons


Jason Armstrong

Biographies:**Jason A. Armstrong:**

Mr. Armstrong is a Senior Health Physicist with the U.S. Department of Energy (DOE), Office of River Protection (ORP). He has primary responsibility for contractor oversight of radiological control programs at the Tank Farms and the Waste Treatment and Immobilization Plant.

Mr. Armstrong joined the ORP from the DOE Brookhaven Site Office where he was a Facility Representative and Program Manager for Radiation Protection, Nuclear Safety, Integrated Safety Management, and Event & Issues Management.

Mr. Armstrong has 16 years nuclear experience. Prior to joining the DOE, Mr. Armstrong was the Deputy Radiation Protection Manager for a commercial nuclear power utility, Radiation Safety Manager for a major oil well logging company, Senior Radiological Engineer for reactor decommissioning projects at the Hanford Site, and a radiological control technician at several nuclear power utilities. Mr. Armstrong has extensive experience leading and participating in review teams. Mr. Armstrong has been trained by the Institute of Nuclear Power Operations for performing evaluations of Plant Maintenance, Human Performance, Corrective Action Management, and Work Planning. Mr. Armstrong has lead reviews for radiation protection, corrective action management, human performance, Integrated Safety Management System implementation, and nuclear safety, including the review and approval of a Documented Safety Analysis for the D&D of the Brookhaven Graphite Research Reactor, High Flux Beam Reactor, and operations at a waste management facility.

Mr. Armstrong has a B.S. in Radiation Health Physics from Oregon State University, is a Certified Health Physicist and earned registry by the National Registry of Radiation Protection Technologists.

Richard Jansons:

Richard Jansons is a Senior Radiological Control Consultant for the U.S. Department of Energy through Project Assistance Corporation. He has over 24 years experience in the nuclear industry. As an NQA-1 Lead Auditor, he has performed dozens of Operational Readiness Reviews, Readiness Assessments, Integrated Safety Management System Audits, surveillances, and programmatic assessments in the areas of Radiological Control, Emergency Management, Training, and Operations.

His experience includes service in the U.S. Navy Nuclear Submarine service as a Mechanical Operator and Engineering Lab Technician. Following his military service, he was the radio-analytical laboratory supervisor at the Nevada Test Site, and then moved to Westinghouse Hanford's Radiological Control Organization. During his years at Hanford, he has qualified and served as a Lead Senior Radiological Control Technician, Technical Instructor, Radiological

Control First Line Supervisor, and Radiological Control Manager. He has earned registry by the National Registry of Radiation Protection Technologists.

His formal training includes U.S. Navy courses, including Naval Nuclear Propulsion School and Prototype training, Engineering Laboratory Technician Training, and Quality Assurance Inspector/Supervisor School. He has attended many corporate and university courses in Health Physics. He earned a Certificate in Emergency Management from Western Washington University.
