Department of Energy
Washington, DC 20585

March 10, 2005

Mr. Edward Aromi
[ ]
CH2M Hill Hanford Group, Inc.
P.O. Box 1500
Richland, WA 99352

EA-2005-01

Subject: Preliminary Notice of Violation and Proposed Civil Penalty - $316,250

Dear Mr. Aromi:

This letter refers to the recent investigation by the Department of Energy's (DOE) Office of Price-Anderson Enforcement (OE) at the Hanford Tank Farms of four radiological and operational events occurring during 2003 and 2004. The events included (1) the June 2003 multiple personnel contamination event at the [ ]; (2) the November 2003 Technical Safety Requirement violation during a cross-site waste transfer; (3) the November 2003 valve positioning error during S-112 waste retrieval operations; and (4) the July 2004 extremity exposure during thermocouple removal activities.

An Investigation Summary Report describing the results of that review was issued to you on November 30, 2004. An Enforcement Conference was held on January 26, 2005, in Germantown, Maryland, with you and members of your staff to discuss these findings. A Conference Summary Report is enclosed.

Based upon our evaluation of these issues and information presented by CH2M Hill Hanford, Inc. (CH2M Hill) representatives during the Enforcement Conference, DOE has concluded that violations of DOE's *Nuclear Safety Management* Rule (10 CFR 830) and *Occupational Radiation Protection* Rule (10 CFR 835) have occurred. The violations are described in the enclosed Preliminary Notice of Violation (PNOV).

Section I of the PNOV addresses radiological control violations associated with a contaminated jumper removal from the [ ] Pit. During that event, fifteen workers received minor uptakes of radioactive material when contamination controls established for the work proved ineffective. The OE investigation identified deficiencies with the radiological characterization and planning performed for the work and the failure to aggressively respond to workplace indicators that contamination controls were not effective. This event also highlighted confusion among the CH2M Hill workforce regarding what is involved when placing the work "in a safe condition." This confusion

was not addressed by corrective actions, and subsequently impacted workforce performance in the 2004 thermocouple event.

Section II of the PNOV addresses violations associated with the November 2003 cross-site waste transfer from tank [ ] to tanks [ ]. During this event, active alarms generated by maintenance and flushing activities rendered required leak and backflow preventions systems inoperable; however, this was not adequately recognized prior to initiating and re-starting the transfer.

Section III of the PNOV addresses violations associated with the November 2003 S-112 waste retrieval event. During this event, an inexperienced operating crew unsuccessfully attempted to change modes of the S-112 waste retrieval process from waste transfer to waste recirculation. Despite multiple alarms, the unsuccessful mode change was not recognized until the DOE Facility Representative prompted a returning CH2M Hill Process Engineer.

The OE investigation identified multiple examples of a failure to comply with established operating procedures. These procedures related to the failed mode change, the subsequent alarm response, the formal identification and communication of deficiencies associated with tank level indication, and inadequate testing of software modifications made to the transfer pump low-flow automatic shutdown. An additional violation was identified related to deficiencies associated with the qualification status of one of the involved operators as well as the overall adequacy and depth of the S-112 operator training plan. This training violation also reflects weaknesses in CH2M Hill's implementation of the Farms Routine Operations Training Standard that were identified during a follow-up CH2M Hill specialty assessment of Conduct of Operations.

Section IV of the PNOV addresses violations associated with the July 2004 thermocouple removal extremity exposure event. During this event, a worker received an extremity exposure in excess of CH2M Hill administrative limits when higher than anticipated beta dose rates were encountered as a thermocouple was being withdrawn from tank [ ]. The OE investigation identified that work control procedures developed to support the work activity were inadequate to effectively control the radiological hazard and maintain exposures As Low As is Reasonably Achievable (ALARA). In particular, and as previously demonstrated in the [ ] contamination event, inappropriate radiological survey information was relied on in developing assumptions regarding the radiological hazard of the tank contents. Deficiencies were also noted related to compliance with existing procedures, including the controlling Radiological Work Permit.

During review of the above events, DOE noted with concern that CH2M Hill supervisors were directly associated with or responsible for the non-conservative decision-making that led or contributed to several of the events. Examples include the S-112 event, the [ ] Pit event, and the thermocouple removal event. Deficiencies were also noted in workforce communications and command and control of the worksite.

Section V of the PNOV addresses identified violations of DOE's Quality Improvement requirements. Specific deficiencies were noted in association with the general recurrent nature of several of the events, a non-conservative response to assessment indicators, and the limited nature of corrective actions in response to a prior waste transfer event. With respect to quality improvement, DOE is particularly concerned with the lack of sustained improvement in your nuclear operations over the recent past. The apparent willingness of workers and supervisors to "proceed in the face of uncertainty" (as acknowledged by your own event investigations) demonstrates the need for further improvement in nuclear safety culture. The DOE perception is that CH2M Hill improvement initiatives appear to be driven by and focused on specific events, rather than by more proactive means such as in response to assessments or management initiatives.

In accordance with the *General Statement of Enforcement Policy*, 10 CFR 820, Appendix A, the violations described in the PNOV have been classified as seven Severity Level II problems with an aggregate civil penalty of $316,250. In determining these Severity Levels, DOE considered the actual and potential safety significance associated with each event or issue under consideration and the programmatic and recurring nature of the violations.

With respect to the November 2003 cross-site waste transfer event, DOE has applied 50 percent mitigation based on your self-identification and timely reporting of the event (acknowledging that this occurred over a holiday period). Mitigation for identification and self-reporting for the other violations described in this PNOV was not awarded due to the self-disclosing nature of the events.

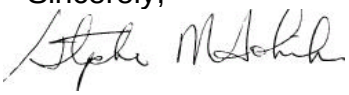
Mitigation for your investigation and corrective actions associated with the events was generally not applied, due to their recurrent nature and the consequent inadequacy of prior corrective actions. With respect to the violations associated with the thermocouple event, mitigation was applied in recognition of the scope of your investigation and the final Common Cause Analysis. Mitigation was also applied for corrective actions associated with the cross-site waste transfer event. Consistent with recent enforcement actions, however, mitigation was limited to 25 percent to reflect our overall concerns in the quality improvement area.

You are required to respond to this letter and to follow the instructions specified in the enclosed PNOV when preparing your response. Your response should document any additional specific actions taken to date. Corrective actions will be tracked in the reports filed in the Noncompliance Tracking System (NTS). You should enter into the NTS (1) any additional actions you plan to take to prevent recurrence, and (2) the target completion dates of such actions.

After reviewing your response to the PNOV, including your proposed corrective actions entered into the NTS, DOE will determine whether further enforcement action is

necessary to ensure compliance with DOE nuclear safety requirements. DOE will continue to monitor completion of corrective actions until these matters are resolved.

Sincerely,



Stephen M. Sohinki
Director
Office of Price-Anderson Enforcement

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Enclosures:
Preliminary Notice of Violation
Enforcement Conference Summary
List of Attendees

cc: J. Shaw, EH-1
R. Shearer, EH-1
A. Patterson, EH-1
M. Zacchero, EH-1
L. Young, EH-1
T. Weadock, EH-6
R. Day, EH-6
H. Wilchins, EH-6
Docket Clerk, EH-6
R. Lagdon, EH-31
P. Golan, EM-1
T. Krietz, EM-22
L. Vaughn, EM-3.2
R. Schepens, DOE-ORP
P. Carier, DOE-ORP PAAA Coordinator
C. Anderson, CH2M Hill PAAA Coordinator

Preliminary Notice of Violation
and
Proposed Imposition of Civil Penalty

CH2M Hill Hanford Group, Inc.
Hanford Tank Farms

EA 2005-01

As a result of a Department of Energy (DOE) evaluation of four radiological and/or operational events at the Hanford Tank Farms, multiple violations of DOE nuclear safety requirements were identified. The events included (1) the June 2003 personnel contamination event at the [ ]Pit; (2) the November 2003 Technical Safety Requirement (TSR) violation during performance of a cross-site waste transfer; (3) the November 2003 valve positioning error during S-112 waste retrieval operations; and (4) the July 2004 extremity exposure in excess of administrative dose limits occurring during a thermocouple removal.

In accordance with 10 CFR 820, Appendix A, *General Statement of Enforcement Policy,* the violations are listed below. Citations specifically citing the quality assurance criteria of 10 CFR 830.122 represent a violation of 830.121(a), which requires compliance with those criteria.

I. Violations Identified During the Investigation of the [ ] Pit Multiple Personnel Contamination Event

10 CFR 835.1102(b), *Control of areas*, requires that areas in which contamination levels exceed specified values "…shall be controlled in a manner commensurate with the physical and chemical constituents of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels."

Contrary to the above, deficiencies associated with work planning and the recognition of changing radiological conditions resulted in an inadequate level of control of contamination levels in the [ ] Pit on June 25, 2003. These deficiencies included the following:

A. No radiological survey was performed to quantify removable contamination levels in the [ ] Pit prior to the work. Planning personnel instead relied on prior experience and their knowledge that the pit was highly contaminated. Planning

personnel also assumed transuranic isotopes would not be a consideration during the pit work; this assumption later proved to be inaccurate.

B. Non-conservative values for radiological contamination levels were assumed in calculations of predicted airborne radioactivity and containment specification for the pit work activity. In the absence of actual radiological survey data, and despite the belief by CH2M Hill health physics staff that contamination levels in the pit would be in the millions of disintegrations per minute per 100 square centimeters (dpm/100 cm^2), calculations predicting potential airborne radioactivity and required level of containment assumed contamination levels were <100,000 dpm/100 cm^2. This level was assumed to reflect the use of a sealant that was applied to increase the stability of the contamination. DOE noted that if a more realistic value for removable contamination was used in the calculations, a higher level of containment for the work activity would have been assigned.

C. Indications that radiological controls were not adequate to control the work were not aggressively pursued. On June 24, 2003, the day prior to the contamination event, workers noted the presence of a dry powder material falling out of a rigid jumper as it was removed, indicating that the sealant had not effectively reached all areas. Additionally, airborne radioactivity surveys taken during the afternoon of June 24, 2003, identified an elevated alpha air activity value of 0.54 Derived Air Concentrations (DAC). This elevated level was discussed during the June 25, 2003, pre-job meeting, and workers were cautioned to avoid sloppy work practices and take more care in executing the planned work activities. However, no actions were taken to either post the pit as an Airborne Radioactivity Area or prescribe the use of respiratory protection in accordance with the recommendations of various CH2M Hill procedures, e.g. the CH2M Hill Radiological Control Manual and Radiation Work Permit procedure.

This violation constitutes a Severity Level II problem.
Civil Penalty - $55,000

II. Violations Identified During the Cross-Site Waste Transfer Event

10 CFR 830.201*, Performance of work*, requires contractors to perform work "…in accordance with the safety basis for a hazard category 1, 2 or 3 DOE nuclear facility and, in particular, with the hazard controls that ensure adequate protection of workers, the public and the environment."

Contrary to the above, during the performance of a cross-site waste transfer (SY-102 to AP-107/AP-108) initiated on November 15, 2003, work was not performed in accordance with the leak detection and backflow prevention requirements of the TSR. Examples include the following:

A. HNF-SD-WM-TSR-006 revision 3 section 3.1, *Waste Transfer Systems,* Limiting Condition of Operation (LCO) 3.1.1, Transfer Leak Detection Systems, requires that one of two transfer leak detection systems be operable when waste transfer-associated structures are physically connected to an active waste transfer pump not under an administrative lock. On November 15, 2003, a cross-site waste transfer

from SY-102 to AP-107/AP-108 was initiated with the AN Farm leak detectors (the intended leak detection system for the transfer) in an inoperable condition. CH2M Hill personnel failed to take actions required by the LCO.

B. HNF-SD-WM-TSR-006 revision 3 Section 3.1, *Waste Transfer Systems,* Limiting Condition of Operation (LCO) 3.1.2, Backflow Prevention Systems, requires that one of three backflow preventions systems be provided when non-waste transfer systems are physically connected to an active waste transfer pump not under an administrative lock. On November 17, 2003, a cross-site waste transfer from SY-102 to AP-107/AP-108 was re-started with the AP Flush Pit Pressure system (the intended backflow prevention system for the transfer) in an inoperable condition. CH2M Hill personnel failed to take actions required by the LCO.

Collectively, these violations constitute a Severity Level II Problem.
Civil Penalty - $13,750

III. Violations Identified During the Investigation of the S-112 Waste Retrieval Event

A. Work Processes

10 CFR 830.122(e)(1), *Criterion 5–Performance/Work Processes*, requires contractors to perform work "…consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."

Contrary to the above, during or in relation to the S-112 waste retrieval operation mode transfer event occurring on November 25, 2003, several examples were identified in which applicable procedures were not followed. Specific examples include the following:

1. In the switch from S-112 transfer to recirculating mode, operating procedure TO-410-900, revision A-12, *Perform [ ] Waste Retrieval Pumping*, step 5.8.19.3 requires the operator to "Position valve [ ] to RECIRC." Contrary to this requirement, while attempting to switch to recirculation mode on November 25, 2003, the operator failed to position valve [ ] to the RECIRC position.

2. Tank farm alarm response procedure ARP-T-371-00001 revision A-5, *Respond to Retrieval Alarms at [ ] Farms*, contains alarm response requirements for various waste retrieval alarms. Required immediate actions for both the "Waste Flow Low" alarm and the "Waste Density High" alarm include acknowledging the alarm, and notifying the shift manager/retrieval Operating Engineer (OE) of the alarm. The "Waste Flow Low" alarm response also requires ensuring that the retrieval pump is shut down.

   Contrary to these requirements, during the S-112 retrieval event on November 25, 2003, the operators failed to notify the shift manager/retrieval OE of the received

Waste Flow Low and Waste Density High alarms and also failed to shut down the retrieval pump in response to the Waste Flow Low alarm.

3. Procedure TFC-ESHQ-Q_C-C-01 revision B-3, *Problem Evaluation Request*, describes the use of the Problem Evaluation Request (PER) system. Section 1.0 identifies that the PER process "…ensures that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective materials and equipment, abnormal occurrences, and non-conformances are promptly identified and corrected." Section 3.8 of the procedure requires all CH2M Hill personnel to identify and report adverse conditions or concerns.

   Procedure TFC-OPS-OPER-C-07 revision A-2, *Turnover of Shift Responsibility*, establishes the shift turnover process. Section 4.2.5 of the procedure requires off-going personnel to "…review and discuss with on-coming personnel information noted on the round sheets, shift turnover sheet, status board, and pertinent information from other documents and forms related to facility operations and activities." Section 4.2.10 requires the Shift Manager or line manager to conduct a shift briefing which includes a discussion of "equipment malfunction/failure since last shift."

   Contrary to the above requirements, reliability deficiencies with the [ ] tank level indication (ENRAF) readings were not formally reported and documented in a PER. Additionally, these deficiencies were not formally documented and/or communicated to the on-coming waste retrieval operators on November 25, 2003. Subsequent interviews identified that although several of the process engineers and the more experienced operators were aware of the ENRAF reliability issues, they had not been formally communicated to all operations staff, including the supervisory OE.

4. The CH2M Hill *Quality Assurance Program Description*, TFC-PLN-02, revision A-3, section 2.6.2.2.3 discusses controls applicable to nuclear facility-related computer software. Section 2.6.2.2.3.a requires that software verification and validation activities shall "…ensure that the software adequately and correctly performs all intended functions."

   Contrary to this requirement, subsequent to modifications completed during November 2003, the software associated with the low flow interlock was not adequately tested nor verified to ensure that the software correctly performed all intended functions. As a result, during the S-112 mode transfer event on November 25, 2003, automatic shut down of the transfer pump on low flow conditions did not occur.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $55,000

B. Training

10 CFR 830.122(b) (1) *Criterion 2 - Management/Personnel Training and Qualification,* requires contractors to "…train and qualify personnel to be capable of performing their assigned work." 10 CFR 830.122(b) (2) requires contractors to "…provide continuing training to personnel to maintain their job proficiency."

Contrary to the above, the following training deficiencies were identified in relation to the S-112 waste retrieval event:

1. The *S-112 Saltcake Waste Retrieval Project Training Plan* (7A300-03-03, revision 1) included the following specific requirements for S-112 operator qualification:

   - Current Nuclear Chemical Operator (NCO) Routines Certification
   - Attendance at the S-112 retrieval system briefing presented during operator continuing training
   - Completion of an S-112 Systems Overview session, which included a walk down of the system and operating procedures.

   Subsequent to the S-112 retrieval event on November 25, 2003, it was determined that one of the S-112 operators involved in the event had not completed the system walk down portion of the Overview training, based on his restricted access to the tank farms.

2. The level of training established for the S-112 operators was inadequate to ensure effective operations. The *S-112 Saltcake Waste Retrieval Project Training Plan* (7A300-03-03, revision 1) established a familiarization-level training for S-112 operators, which did not include requirements for specific On-The-Job Training (OJT) or performance demonstrations. As stated in the Training Plan, this level of training was deemed sufficient based on the similarity of the S-112 operator tasks to those already covered in the NCO Routines Certification.

   Subsequent to the S-112 event on November 25, 2003, and the attempted system restart on December 2, 2003, CH2M Hill concluded that the level of training provided to the S-112 operators was inadequate to ensure the competency of all retrieval operators. As identified in the CH2M Hill investigation, an underlying assumption in the development of the S-112 training was that the S-112 retrieval activities were similar to previously conducted saltwell pumping activities, and that the former saltwell pumping operators would be conducting the S-112 retrieval. No prerequisites for saltwell pumping certification were included in the Training Plan; however, a subsequent reduction in force resulted in the transfer of NCOs with no prior saltwell pumping experience into the S-112 resource pool.

3. A Conduct of Operations Specialty Assessment (FY2004-CP-S-0094) performed by CH2M Hill in December, 2003, identified additional training deficiencies associated with implementation of the primary training standard for operators (Tank Farm Routine Operations). The assessment identified a number of deficiencies associated with the training materials, course depth, and proficiency and continuing training. Specific examples include the following:

   - Use of an outdated Job Task Analysis and OJT card
   - Significant decrease in classroom training (120 to 40 hours), with no decrease in scope. The assessors questioned whether the topical areas were consequently treated with appropriate depth.
   - Required demonstration of only a limited amount (<20 percent) of operating and emergency procedures
   - Delinquencies in maintaining monthly proficiency requirements
   - Poor operator attendance at continuing training cycles.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $55,000

IV. Violations Identified During the Investigation of the Thermocouple Removal Extremity Exposure Event

A. Procedural Adequacy

10 CFR 830.122(e)(1), *Criterion 5 - Performance/Work Processes*, requires contractors to perform work "…consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."

10 CFR 835.104, *Written procedures*, requires that written procedures "…shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards."

Contrary to the above, deficiencies were identified in relation to the thermocouple removal extremity exposure event of July 22, 2004, in which work control procedures (including documents developed to support or control radiological work) were not adequate to effectively control the associated radiological hazards. Specific examples include the following:

1. CH2M Hill procedure TFC-ESHQ-RP_RWP-C-03 revision B-1, *ALARA Work Planning*, section 4.3, requires the Support Health Physicist and Field Work Supervisor (SHP/FWS) to "…ensure procedures are developed and implemented

to assure work is commensurate with existing and potential radiological hazards created by the activity…."

Contrary to this requirement, specific information regarding the tank [ ] radiological inventory and contents was not obtained and utilized in the development of the work procedure, the As Low As is Reasonably Achievable (ALARA) Management Worksheet (AMW) and the Radiation Work Permit (RWP) for the thermocouple removal activity. This information was not readily available on the Tank Waste Information Network System, and no further efforts were made to obtain it. Instead, planning was based on historical radiological survey information obtained from adjacent tanks/pits.

CH2M Hill personnel investigating the event were subsequently able to identify document HNF-4215, *Hazard Evaluation for 244-CR Vault*, which indicated that Sr-90 values in tank [ ] ranged from approximately 30 to 4000 times the Sr-90 values in the other [ ] vault tanks. Although specific tank characterization data was not known during the work planning, a conservative work planning approach was not used (as indicated below) to compensate for the lack of data.

2. Procedure TFC-ESHQ-RP_RWP-C-03 revision B-1, *ALARA Work Planning,* contains additional requirements applicable to the radiological review and approval of work documents. Section 4.3.8.e requires that the SHP/FWS ensure work documents governing work where personnel may be exposed to beta radiation specify precautions for minimizing and monitoring beta exposure. The section also requires that such work documents specify when beta radiation surveys are required. Section 4.3.13.c requires that the SHP/FWS verify engineered barriers for minimizing contamination of equipment will perform, or have performed their intended function, before relying on the barrier.

   These procedural requirements were not effectively implemented in the work documents applicable to the thermocouple removal work activity. The thermocouple removal was controlled by Work Document (WD) 2W-02-00767, RWP 2W-160 revision 001, and AMW 717. Although all of these documents included general survey requirements to support the work activity, none of the documents specifically identified the need for or contained a hold point for beta radiation surveys on equipment as it was removed from the tank. Although both the WD and AMW identified the need to use the spray wash assembly to decontaminate equipment removed from the tank, neither of the documents contained any requirements to verify the effectiveness of the wash assembly (through survey or monitoring of flow rates). Additionally, the WD allowed the use of hand taping to wrap and secure the plastic sleeving around the thermocouple. Performing this operation by hand maximized the operator's hand contact with the thermocouple and unnecessarily increased extremity dose.

Collectively, these violations constitute a Severity Level II Problem.
Civil Penalty - $41,250

B. Procedure Implementation

10 CFR 835.104, *Written procedures*, requires that written procedures "…shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards."

Contrary to the above, several examples of procedural noncompliance were noted in association with the thermocouple removal extremity exposure event occurring on July 22, 2004. These examples included the following:

1. The Tank Farms *Radiological Control Manual* (HNF-5183, revision 1), article 211.4, requires that no person shall be allowed to go above the facility Administrative Control Level (ACL) without the prior approvals specified in Table H2-1. Table H2-1 requires approval of a level 3 line manager and the Radiological Control Manager (RCM) to exceed the extremity ACL of 15 rem.

   During the thermocouple removal event, one of the operators received an extremity dose of 22 rem without prior approval by a level 3 line manager and the RCM.

2. CH2M Hill procedure TFC-ESHQ-RP_RWP-C-04 revision B-5, *Radiological Work Permits*, section 4.11 indicates that work will be suspended when the RWP limiting conditions are exceeded for Job-specific RWPs.

   Job-specific RWP 2W-160 revision 001, "*Remove obsolete equipment from pits/risers, size reduction and associated pit work*" was the controlling RWP for the thermocouple removal activity on July 22, 2004. That RWP includes a limiting condition dose rate for extremities of equal to or greater than 6000 mrem/hour.

   During the thermocouple removal on July 22, 2004, contact and general area beta dose rates in excess of 50,000 mrad/hour (equivalent to 50,000 mrem/hour) were measured originating from contamination deposits on the thermocouple. These dose rates exceeded the top range of the instrument used to perform the survey. Work was briefly halted, but then resumed to "put the job in a safe condition." Subsequent work activities included completion of the thermocouple withdrawal and sleeve taping, and landing the thermocouple on an adjacent trailer (activities apparently directed at placing the work in a safe condition). However, subsequent activities also included removal of the riser top hat and installation of the flange.

3. RWP 2W-160 included additional requirements that were applicable to the thermocouple removal activity. For conditions when beta dose rates exceed 500 mrad/hr at 30 centimeters, the RWP required implementation of a combination of beta radiation controls, including adding a layer of plastic or rubber shielding, use of a personnel face shield or similar protection, and use of heavy rubber gloves. The RWP further required individuals handling

waste-contacted material to wear dosimeter finger rings. The RWP further included a requirement for personnel to wear alarming electronic dosimeters for work in High Radiation Areas.

During the thermocouple removal activity on July 22, 2004, beta dose rate conditions exceeded 500 mrad/hr at 30 centimeters but no additional beta controls (shielding, gloves) were implemented in accordance with the RWP. Although operators handling the thermocouple wore dosimeter finger rings, the Health Physics Technicians performing surveys of the thermocouple (requiring direct or close hand proximity) did not wear finger rings to directly monitor extremity exposure. Additionally, none of the workers were wearing alarming electronic dosimeters since area conditions were not anticipated to exceed High Radiation Area thresholds.

Collectively, these violations constitute a Severity Level II Problem.
Civil Penalty - $41,250

V. Quality Improvement Deficiencies

10 CFR 830.122 (c*), Criterion 3—Management/Quality Improvement*, requires that the contractor "…(1) Establish and implement processes to detect and prevent quality problems. (2) Identify, control, and correct items, services, and processes that do not meet established requirements. (3) Identify the causes of problems and work to prevent recurrence as a part of correcting the problem."

Contrary to the above, with relation to the events discussed in the above sections, CH2M Hill's processes to identify causes and correct quality problems were not effectively established and implemented. Specific examples include the following:

A. Both the DOE and the CH2M Hill investigation into the above-referenced events identified them as exhibiting recurrent weaknesses, indicating prior corrective actions have been ineffective in preventing recurrence. The DOE investigation noted common deficiencies in hazard identification, lack of inquisitive attitude, poor conduct of operations, and willingness to proceed in the face of uncertainty. CH2M Hill's Common Cause Analysis, issued in November 2004, provided a more detailed review of thirteen prior CH2M Hill operational or radiological events. That review identified eight "common causal factors" associated with the reviewed events, citing weaknesses in hazard identification and control, training, command and control, and incorporation of lessons-learned. As a notable example, both the DOE and CH2M Hill investigation of the thermocouple removal event noted it to be similar to the [ ] Pit contamination event. Both events displayed weaknesses in hazard recognition, command and control of the work site, and confusion regarding the "safe work condition." The CH2M Hill Common Cause analysis specifically identified that the compensatory and corrective actions taken in response to the 01A Pit event were less than adequate and failed to address issues identified in the investigation of the event.

B. Indicators of deficient conduct of operations performance related to S-112 retrieval operations were not effectively recognized nor addressed. During the initial period of S-112 operations prior to the November 2003 event, three Management Observation Program (MOP) assessments were conducted reviewing conduct of operations and shift turnover. One of the three MOPs identified positive results. However, the other two documented performance issues (failure to appropriately enter alarm response procedure, problems with shift turnover and area control) with some similarity to those exhibited during the November 2003 event. The performance deficiencies observed during the MOPs were considered to be localized issues and corrected on the spot; however, no effort was made to determine if the issues were broader in scope.

C. As part of their investigation into the cross-site waste transfer event occurring on November 15-17, 2003, CH2M Hill identified four separate events over the prior year containing similar issues related to alarms and valve verifications prior to transfer. One of the events, occurring in June 2003, involved the conduct of waste transfers while the [ ] service water pressure switch alarm was active. CH2M Hill personnel indicated that corrective actions associated with the June 2003 event were scoped to focus on the service water pressure switch alarm issue, and that broader corrective actions may have prevented the subject cross-site transfer event.

Collectively, these violations constitute a Severity Level II Problem.
Civil Penalty - $55,000

Pursuant to the provisions of 10 CFR 820.24, CH2M Hill is hereby required, within 30 days of the date of this Preliminary Notice of Violation (PNOV), to submit a written reply by overnight carrier to the Director, Office of Price-Anderson Enforcement, Attention: Office of the Docketing Clerk, EH-6, 270 Corporate Square Building, U.S, Department of Energy, 19901 Germantown Road, Germantown, MD 20874-12190. Copies should also be sent to the Manager of the DOE Office of River Protection and to the Assistant Secretary for Environmental Management. This reply should be clearly marked as a "Reply to a Preliminary Notice of Violation" and should include the following for each violation: (1) admission or denial of the alleged violations; (2) any facts set forth which are not correct; and (3) the reasons for the violations if admitted, or if denied, the basis for the denial. Corrective actions that have been or will be taken to avoid further violations will be delineated with target and completion dates in DOE's Noncompliance Tracking System. In the event the violations set forth in this PNOV are admitted, this Notice will constitute a Final Order in compliance with the requirements of 10 CFR 820.24.

Any request for remission or further mitigation of civil penalty must be accompanied by a substantive justification demonstrating extenuating circumstances or other reasons why the assessed penalty should not be paid in full. Within 30 days after the issuance of the PNOV and civil penalty, unless the violations are denied, or remission or additional mitigation is requested, CH2M Hill shall pay the civil penalty of $316,250 imposed under section 234a of the Act by check, draft, or money order payable to the Treasurer of the United States (Account 891099) mailed to the Director, Office of Price-Anderson Enforcement, Attention: Office of the Docketing Clerk, at the above address.

If CH2M Hill should fail to answer within the time specified, the contractor will be issued an order imposing the civil penalty. Should additional mitigation of the proposed civil penalty be requested, CH2M Hill should address the adjustment factors described in section IX of 10 CFR 820, Appendix A.

Stephen M. Sohinki
Director
Office of Price-Anderson Enforcement

Dated at Washington, DC,
this 10th day of March 2005

ENFORCEMENT CONFERENCE SUMMARY

Tank Farms Operational and Radiological Work Deficiencies

On January 26, 2005, the Department of Energy's Office of Price-Anderson Enforcement (OE) held an Enforcement Conference with CH2M Hill Hanford Group, Inc. (CH2M Hill) in Germantown Maryland. The meeting was called to discuss the facts, circumstances, and corrective actions pertaining to four events at the Tank Farms involving operational and radiological work deficiencies.

Mr. Stephen Sohinki, Director of the Office of Price-Anderson Enforcement, called the meeting to order. Mr. Sohinki stated that OE had convened the meeting to (1) address the issues discussed in the November 30, 2004 Investigation Summary Report; (2) discuss corrective actions taken to prevent recurrence; and (3) discuss mitigation factors for OE consideration. Information and key areas discussed at the conference are summarized below, and material provided by CH2M Hill during the conference was incorporated into the docket.

Mr. David Amerine, Executive Vice President and Deputy Nuclear Business Group CH2M Hill, began the contractor presentation by providing a corporate perspective of nuclear safety at the Tank Farms. Mr. Victor Pizzuto, Senior Vice President for Nuclear Operations, then gave an overview of Tank Farm activities as well as a senior management perspective of the issues associated with the four events under investigation. In his presentation Mr. Pizzuto recognized the importance of the issues, expressed the CH2M Hill commitment to nuclear safety culture improvement, noted that three of the four events were reported as management concerns or programmatic issues, and cited progress being made at the Tank Farms to improve operations.

Mr. Ryan Dodd, Vice President for Closure Operations, then discussed the S-112 retrieval pumping event. Mr. Dodd began by covering the history of S-112 retrieval operations, followed by a discussion of deficiencies identified during follow-on investigations, root cause analysis, corrective actions taken, mitigation factors, and safety significance of the event.

Ms. Vikki Wagner, Waste Feed Operations Shift Operations Senior Technical Assistant, discussed the cross-site transfer shutdown event and associated Technical Safety Requirement violation. After highlighting the event, Ms. Wagner discussed the compensatory actions taken, causal analysis, corrective actions taken, safety significance of the event, and mitigation factors.

Mr. Edward Adams, Radiation Control Director, discussed the AW-01A Pit jumper removal and personnel contamination event. Mr. Adams opened by covering the history of waste transfer pit activities and followed with discussions of work planning activities in preparation for AW-01A Pit jumper removal, execution of the work package for the jumper removal, failure observed in the jumper removal process, corrective actions taken, and safety significance of the event.

Mr. Ryan Dodd then gave a presentation of the thermocouple removal overexposure event. Mr. Dodd initiated his presentation by discussing the background associated with the 244-CR vault. Additional discussions addressed the event timeline, deficiencies identified through investigation, compensatory measures taken in response to the event, event causal analysis, corrective actions taken following the event, mitigation factors, and safety significance of the event.

Mr. Richard Higgins, Vice President for Performance Assurance, then discussed the CH2M Hill effort to examine the potential for common causes among a series of operational events at the Tank Farms. Mr. Higgins discussed the initial CH2M Hill effort using an outside contractor to assist in the effort and why the final report was ultimately rejected. He continued by stating that the effort was reinitiated and expanded to include thirteen events and from this new effort eight common causes were identified. Mr. Higgins then detailed a path forward stemming from the common cause report.

Mr. Victor Pizzuto then discussed CH2M Hill quality improvement initiatives and actions related to work processes, assessment programs, corrective action management systems, and nuclear safety culture. Mr. Pizzuto followed this discussion by delineating the CH2M Hill basis for enforcement discretion and penalty mitigation. Mr. Edward Aromi, President and General Manager, then closed the CH2M Hill presentation by stating the CH2M Hill commitment to continued nuclear safety performance improvement.

Mr. Sohinki stated that OE would consider the information presented by CH2M Hill together with the entire record when OE undertakes its enforcement deliberations. Mr. Sohinki then adjourned the conference.

January 26, 2005

CH2M Hill Hanford Group, Inc.
Tank Farms Operational and Radiological Work Deficiencies

List of Attendees

Office of Price-Anderson Enforcement

Stephen M. Sohinki, Director
Howard M. Wilchins, Counsel
Anthony A. Weadock, Senior Enforcement Specialist
Richard E. Day, Senior Enforcement Specialist

Office of Environmental Management

Terry Krietz, Environment Safety Manager

DOE-Office of River Protection

Roy J. Schepens, Manager
T. Zack Smith, Acting Assistant Manager
Patrick Carier, PAAA Coordinator

CH2M Hill Hanford Group, Inc.

Edward S. Aromi, President & General Manager
Dale Allen, Acting Deputy General Manger
Vic Pizzuto, Senior Vice President, Nuclear Operations
Ryan A. Dodd, Vice President, Closure Operations
Rich Higgins, Vice President, Performance Assurance
Craig Anderson, PAAA Director
Ed Adams, Director, RadCon Program
Vikki Wagner, Senior Technical Advisor, Waste Feed Operations

CH2M Hill, Inc.

Robert C. Iotti, President, Nuclear Business Group
Dave Amerine, Executive Vice President and Deputy Nuclear Business Group (via telecon)
R. Keith Christopher, Senior Vice President, Health, Safety and Quality Assurance