



U.S. Department of Energy  
**Office of River Protection**

P.O. Box 450, MSIN H6-60  
Richland, Washington 99352

JAN 09 2006

05-ESQ-093

Mr. Edward S. Aromi, President  
and Chief Executive Officer  
CH2M HILL Hanford Group, Inc.  
Richland, Washington 99352

Dear Mr. Aromi:

CONTRACT NO. DE-AC27-99RL14047 – ASSESSMENT REPORT A-05-ESQ-TANKFARM-012 – RADIOLOGICAL SAFETY TRAINING PROGRAM, NOVEMBER 14 THROUGH 29, 2005

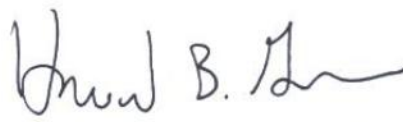
This letter forwards the results (Attachment) of the U.S. Department of Energy, Office of River Protection (ORP) assessment performed from November 14 through 29, 2005, of the CH2M HILL Hanford Group, Inc. (CH2M HILL) Radiological Safety Training Program (the Program).

With the exception of one Finding, the assessor determined the Program met regulatory and contract requirements. The assessor noted several program improvements, identified one Finding (A-05-ESQ-TANKFARM-012-F01), and made two Observations. The Finding dealt with training records deficiencies. CH2M HILL issued a Problem Evaluation Report with corrective actions and a schedule for completion; therefore, no response to the Finding is required. The observations dealt with lack of a qualification card for CH2M HILL Health Physics Technicians (HPT) and HPTs not utilizing EnergX's survey completion and documentation performance demonstration room. ORP does not require responses to these Observations.

Because EnergX provides training for all Hanford Site contractors, the assessor included two other Observations for improvement based on EnergX's training performance.

If you have any questions, please contact me, or your staff may call Robert C. Barr, Director, Office of Environmental Safety and Quality, (509) 376-7851.

Sincerely,

*For*   
Roy J. Schepens, Manager  
Office of River Protection

ESQ:LRM

Attachment

cc: See page 2

U. S. DEPARTMENT OF ENERGY  
Office of River Protection  
Environmental, Safety and Quality

ASSESSMENT: Radiological Safety Training Program

REPORT: A-05-ESQ-TANKFARM-012

FACILITY: CH2M HILL Hanford Group, Inc. Tank Farms

LOCATION: Hanford Site

Dates: November 14 through 29, 2005

ASSESSOR: Larry R. McKay, Assessor

APPROVED BY: Patrick P. Carier, Team Lead  
Verification and Confirmation

## **Executive Summary**

The U.S. Department of Energy, Office of River Protection (ORP) evaluated the CH2M HILL Hanford Group, Inc. (CH2M HILL) Radiological Safety Training Program (the Program) from November 14 through 29, 2005. The assessor evaluated implementing procedures; examined records; interviewed staff members who managed and implemented the Program; and made field observations to determine the adequacy and effectiveness of the Program since the last ORP surveillance in April 2003. With the exception of one Finding, the assessor determined the Program met regulatory and contract requirements. The assessor noted several improvements in the Program, identified one Finding, and made two Observations for Program improvement described in the Enclosure to this Attachment.

Since our May 2004 assessment, CH2M HILL improved the Radiological Safety Training Program by developing qualification cards for members of the As Low As Reasonably Achievable Joint Review Group and the CH2M HILL Radiological Control Forum. CH2M HILL also has taken concerted corrective action to improve quality of completed survey records in recent months, including promulgation of Study Guide HR2018F "Completing a Radiological Survey Report" for Health Physics Technician (HPT) requalification training.

The Finding dealt with training record deficiencies. The two Observations dealt with lack of a qualification card for CH2M HILL HPTs and CH2M HILL HPTs not utilizing EnergX's survey completion and documentation performance demonstration room.

Because EnergX provides training for all Hanford Site contractors, the assessor included the following Observations based on EnergX's training performance: EnergX did not have enough Eberline RO-20 survey instruments to enable individual CH2M HILL HPT On-the-Job Evaluations and EnergX Radiological Worker Computer-Based Training had outdated information. The assessor will forward the EnergX issues to the Richland Operations Office Radiological Control Manager for action.

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## List of Acronyms

ALARA	As Low As Reasonably Achievable
AJRG	ALARA Joint Review Group
ATS	Analytical Technical Services
CAM	Continuous Air Monitor
CBT	Computer-Based Training
CH2M HILL	CH2M HILL Hanford Group, Inc.
CTA	Company Technical Authority
DNFSB	Defense Nuclear Facility Safety Board Site Representative.
DOE	U.S. Department of Energy
FHI	Fluor Hanford, Inc.
HPT	Health Physics Technician
OJE	On-the-job evaluation
ORP	Office of River Protection
the Program	Radiological Safety Training Program
RadCon	Radiological Control
RL	Richland Operations Office
RWP	Radiation Work Permit
WFO	Waste Feed Operations

## **Radiological Control (RadCon) Assessment Radiological Safety Training Program**

### **Scope**

From November 14 through 19, 2005, the U.S. Department of Energy (DOE), Office of River Protection (ORP) evaluated the CH2M HILL Hanford Group, Inc. (CH2M HILL) Radiological Safety Training Program (the Program). The assessor evaluated procedures, examined records, interviewed staff members who managed and implemented the Program, and made field observations to determine the adequacy and effectiveness of the Program since the last ORP surveillance in April 2003. Requirements, records, and interview details are provided in Assessment Note A-05-ESQ-TANKFARM-012-01.

### **Details**

The assessor evaluated the Program to the applicable requirements and guidance from the documents listed in Assessment Note A-05-ESQ-TANKFARM-012-01.

The assessor interviewed the following 12 CH2M HILL and EnergX management and staff employees cognizant of, and responsible for, implementation of the Program:

- CH2M HILL Company Technical authority (CTA) – Training;
- CH2M HILL Health Physicists (3);
- EnergX RadCon Instructors – Health Physics Technician (HPT) Requalification (3);
- EnergX RadCon Instructors – Radiological Worker Requalification (4); and
- Fluor Hanford, Inc. (FHI) Senior Training Specialist.

The assessor also made field observations of requalification training for HPTs and Radiological Worker II, and conducted a special training records search at the request of a Defense Nuclear Facility Safety Board (DNFSB) Site Representative.

### **Results**

The assessor reviewed the governing implementing procedures and records, conducted interviews, made field observations and found the Program effective and, with the exception of one Finding, met regulatory and procedure requirements. The assessor noted several Program improvements, identified one Finding, and made two Observations (Areas for Improvement). For information only, the assessor noted two Observations

(Areas for Improvement) that dealt with EnergX's training performance. Details are provided below.

CH2M HILL implemented a number of improvements in the Radiological Safety Training Program since the ORP May 2004 assessment. CH2M HILL has created qualification cards for members of the CH2M HILL As Low As Reasonably Achievable Joint Review Group (AJRG) and CH2M HILL RadCon Forum. In addition, CH2M HILL has taken concerted corrective action to improve quality of completed survey records in recent months, including promulgation of Study Guide HR2018F "Completing a Radiological Survey Report" for HPT requalification training.

The assessor identified one Finding concerning training records:

Finding A-05-ESQ-TANKFARM-012-F01 - Training completion records were not properly completed.

The assessor examined a random sample of 12 completed "Training Completion Records (Form A)" for Waste Feed Operations (WFO) HPT training, and found they were not properly completed. The assessor identified deficiencies including missing dates and signatures for students; un-timely submittal of completed record material to Training Records; "verification by proxy" (the subordinate performed a performance evaluation for the supervisor); and some quality errors (improper correction of erroneous entries).

Observation (Area for Improvement) - Lack of a qualification card for all CH2M HILL HPTs.

ORP Training Assessment A-05-ESQ-TANKFARM-004 (April 2005) included a Finding on the lack of CH2M HILL qualification cards for HPTs. The assessor researched this issue and determined that CH2M HILL utilized the Integrated Training Electronic Matrix system to record HPT training and qualification records in lieu of a qualification card. While CH2M HILL recently had developed stand-alone qualification cards for several groups, including qualification cards for members of the AJRG and CH2M HILL RadCon Forum, they have not created qualification cards for HPTs, with the exception of Analytical Technical Services (ATS). Technicians working in ATS complete individual qualification cards; these cards are lacking in WFO and Closure Operations. According to the CTA – Training and RadCon Director, the qualification card was issued on December 8, 2005, and a phased implementation period was planned for incumbent HPTs.

Observation (Improvement Area) - CH2M HILL HPTs are not benefiting from EnergX's survey completion performance demonstration room.

At the Hanford Training Center, EnergX has outfitted a performance demonstration room, designed to improve HPT completion and documentation of radiological surveys. The assessor noted the creative features that had been included. The assessor interviewed the CH2M HILL Director, RadCon and learned CH2M HILL HPTs were not currently

utilizing this room due to a labor disagreement. CH2M HILL had not negotiated the use of this room for “performance demonstrations” with the Hanford Atomic Metal Trades Council prior to use. CH2M HILL HPTs did use the room in its current configuration as a practical training exercise during the HR-2018 HPT “cycle” retraining. This practical training exercise included the collection and documentation of radiological data. EnergX instructors reviewed practice survey documentation and provided the HPTs immediate feedback in the form of required corrections. To successfully complete the exercise the HPT had to produce an error-free survey report.

The assessor found the room to be a valuable asset not being utilized by CH2M HILL during the current cycle. Because of its potential value, CH2M HILL should consider future use of this room for HPT retraining.

Observation (Improvement Area) - EnergX did not borrow an adequate supply of Eberline RO-20 survey instruments to enable individual HPT on-the-job evaluations (OJE).

During the C-202 RadCon event (multiple personnel contaminations due to discharge from air line) one of the HPTs involved in the event stated that he was unfamiliar with the Eberline RO-20 ion chamber survey instruments.

At the entry meeting for the assessment, the DNFSB Site Representative asked the assessor to determine if the HPT had been qualified on the RO-20 instrument. The assessor examined completed, official training records and determined that the HPT had been qualified on the RO-2, RO-3, and RO-7 instruments, but had not completed the OJE for the RO-20 model.

In an interview with the lead EnergX Instructor, he noted there was an insufficient supply of RO-20s to enable each HPT to complete the OJE. After discussing this issue with the Central and Project CH2M HILL RadCon Directors, the assessor determined that adequate RO-20s are available, but EnergX has not asked to borrow these instruments. After the assessment, CH2M HILL resolved the RO-20 inventory problem.

The CTA – Training told the assessor during the exit meeting that the next cycle of HPT requalification training would include RO-20 OJEs. At this time of this assessment RO-20 OJEs had not been performed. After the assessment, CH2M HILL began performing OJEs of its HPTs in CH2M HILL training facilities, to qualify all CH2M HILL HPTs on the Eberline RO-20 instrument.

Observation (Improvement Area) - EnergX’s Radiological Worker Computer-Based Training (CBT) contained errors and outdated Information.

The assessor evaluated the Radiological Worker II CBT at the Hazardous Materials Management and Emergency Response Facility. He identified several pieces of information that were either incorrect or outdated (see Enclosure). EnergX, a subcontractor to FHI and the DOE Richland Operations Office (RL) RadCon Manager,



provides oversight of FHI and its subcontractors. The RL RadCon Manager agreed to take the action for this Observation; no CH2M HILL action is required.

### Special Training Records Search

During a critique, an HPT involved in the C-202 multi-personnel contamination event (Mobile Retrieval System, September 21, 2005) acknowledged unfamiliarity with the Eberline RO-20 survey instrument. In response to the request by the DNFSB Site Representative to determine if the HPT had been trained and qualified on this instrument, the assessor examined the HPT's training records. The assessor found that the HPT had been trained, but not qualified (see Observation, above, on insufficient numbers of RO-20s for OJEs) on the RO-20 instrument. With objective evidence of HPT training, the assessor could not support the statement that the HPT was not familiar with the instrument. See Assessment Note A-05-ESQ-TANKFARM-012-01 for details.

### **Conclusions:**

Based on review of records and procedures, interviews with CH2M HILL and EnergX staff, and field observations of HPT "cycle training" and Radiological Worker II requalification training, the assessor concluded the training program demonstrated records deficiencies (a Finding) but is otherwise compliant with regulations and procedures. Improvements to the program have been made since the last surveillance (April 2003). For example, qualification cards for some CH2M HILL employees, efforts to improve the quality of radiological survey documentation, and proactive measures such as training effectiveness evaluations by the CTA – Training. The assessor identified four Observations for improvement:

- Lack of a qualification card for all CH2M HILL HPTs;
- CH2M HILL HPTs were not using the survey completion and documentation performance demonstration room during the current cycle;
- EnergX did not borrow enough Eberline RO-20 survey instruments to enable individual HPT OJEs (EnergX action); and
- EnergX's Radiological Worker CBT contained errors and outdated Information (EnergX action).

The CH2M HILL CTA – Training agreed with the Finding and Observations.

### **Open Items**

A-05-ESQ-TANKFARM-012-F01	Finding	Training completion records were not properly completed.
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**Closed Items**

None

**Discussed Items**

None

**Signatures**

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Larry R. McKay, Assessor

Date

**A-05-ESQ-TANKFARM-012-01**  
**CH2M HILL Radiological Safety Training**  
Larry. R. McKay.  
November 14 through 29, 2005

**Comments on EnergX's Radiological Worker Computer-Based Training**  
**November 16, 2005**

1. Positive Comments:
  - a. The overall quality of the presentation is excellent, with professional narration (and a variety of narrators), colorful graphics, and state-of-the-art animation.
  - b. Terminal objectives and a summary for each lesson are provided.
  - c. A summary slide presented immediately before the pre-test provided an opportunity for student review.
  - d. The “drag-and-drop” posting exercise (Radiological Postings and Controls module) is an effective tool to gauge student understanding.
  - e. Similarly, the “Select the Protective clothing” and “What’s Wrong with this Picture” (Radiological Worker II Practical Training) are excellent exercises.
2. Areas for Improvement:

**Introduction**

- a. The program refers to the “PHMC” scope and “PHMC” Integrated Safety Management System, but this training is delivered to all Hanford Site Radiological Workers, not just those working for Fluor Hanford, Inc. (the Project Hanford Management Contractor).

**Radiological Fundamentals**

- a. The 10<sup>th</sup> slide beginning “So, when you hear the term ‘cpm,’ it means...” has a sentence that states the Ludlum detector primarily responds to alpha radiation. That is not necessarily correct, as Ludlum manufactures a wide variety of radiological survey instruments, many of which are designed to detect beta-gamma, not alpha, radiation.
- b. The slides on “Types of Ionizing Radiation” use the term “alpha” when “alpha radiation” would be more appropriate. The same comment pertains to “beta” and “beta radiation” later in the module.
- c. The “Radiation Dose Units” module’s millirem slide, 2<sup>nd</sup> sentence, is grammatically not a sentence (no subject and verb).
- d. Lessons Learned for As Low As Reasonably Achievable (ALARA) are provided as a separate button.

## **Biological Effects**

- a. The “Acute v. Chronic” slide should be revised to read “Acute v. Chronic Dose” or “Acute v. Chronic Effect.”
- b. The “Radiation Sickness” slide states that at doses at and above 100,000 mrem (100 rem) about half the people will experience nausea due to damage of the intestinal lining. In fact, intestinal lining damage has a threshold of about 400,000 mrem (400 rem). The slide text should be revised to delete the term “due to damage of the intestinal lining.”
- c. The “Chronic Radiation Exposure” slide has narration that mentions “chronic radiation dose.” Either the slide or the narration should be revised to use consistent terminology.

## **ALARA Program**

- a. The “Work Procedures” module, 3<sup>rd</sup> slide has a sentence “Similar documents may be used by other site contractors.” The use of the word “other” is not appropriate.
- b. The Post-Test, Item 11 of 13 concerns Stop Work Orders, but the material is not covered in the module.

## **Radiation Limits**

- a. The “Hanford Doses” slide has 2001 dose distribution data. Data from at least 2004 should be available. The slide should be updated.

## **Radiological Postings and Control**

- a. The “RWP” slide that has hot words linked to other contractors’ Radiation Work Permit (RWP) includes the instruction to “click” the hot words. In fact a “double-click” is required. The word “click” should be revised to read “double-click.”
- b. The “Rad. Area Access – RWI” slide states that access to a Radiation Area requires an RWP. That is not the case for some Hanford contractors. The sentence should be verified by consultation with all Hanford contractors and, if found to be in error, deleted from the module.
- c. The “High Contamination Area” slide states that the posting requirements include the words “Danger High Contamination Area.” The photograph of the area shows a posting with the word “Caution” instead of “Danger.” This is potentially confusing to the student. In fact, 10 CFR 835 allows either “Danger” or “Caution.” The text should be revised to include this information.
- d. The “Airborne Radioactivity Area” slide mentions “CHG.” The current abbreviation for CH2M HILL Hanford Group, Inc. is “CH2M HILL.”

## **Radiological Emergencies**

- a. In the first slide, “CH2M Hill” should read “CH2M HILL.”
- b. In the “ALARMS” module, the 3<sup>rd</sup> slide has a photograph of an old Continuous Air Monitor that is obsolete. A current vintage Continuous Air Monitor (CAM) is used in later modules (the Eberline AMS-3). Replacing the “boat anchor” CAM photo with an AMS-3 photograph would make the module more current.
- c. The “Rescue and Recovery” module erroneously states the numerical limits of 25 rem for life-saving operations. In fact, current regulations place no numerical limit on this activity, nor a 10 rem limit on saving essential equipment in an accident/emergency condition.
- d. In the Post-Test, Question 8 of 8 mentions the DOE emergency dose “guideline,” but the module text mentions the “limit.” The term “limit” should be replaced by the term “guideline” in the module text.

## **Personnel Monitoring Programs**

- a. The slide describing appropriate response to supplemental dosimetry readings has two steps which appear to be redundant: 1. Warn others in the general area; 2. Alert others in the area.
- b. The slides on Diethylenetriaminepentaacetate should include the term “chelation” or “chelating agent” for completeness, plus a sentence or two on the basic mode of action.

## **Radiological Worker II Practical Training**

- a. There is a reference to the “Alpha Survey Video” but this video is not included in the training.

## **Radioactive Contamination Control**

- a. The title slide reads “Contamination” not “Contamination Control.”

## **Questions at End of Training Course**

- a) The 6<sup>th</sup> question is not a sentence (no subject and verb): “From your experience, would this training be improved if additional guidelines for dressing in two sets of protective clothing and using respiratory protection?”

## **Other Comments**

- a) The self-survey portion of this course is outdated (October 2002) and should be updated.
- b) The issue of whether to wear the Thermoluminescent Dosimeter badge inside or outside protective clothing is a real issue, but it was not addressed in the training.
- c) The course makes little mention of electronic dosimetry, which is increasingly used by Hanford Radiological Workers.
- d) The student manual for Course 020701/020001 Radiological Worker I & II Initial is dated October 2002 and some material is dated or incorrect. In three years, numerous changes have occurred in the practice of Radiological Control on the Hanford Site; those changes should be reflected in Radiological Worker I/II training materials.