



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

P.O. Box 450  
Richland, Washington 99352

04-ESQ-019

Mr. E. S. Aromi, President  
and General Manager  
CH2M HILL Hanford Group, Inc.  
Richland, Washington 99352

Dear Mr. Aromi:

CONTRACT NO. DE-AC27-99RL14047 – ASSESSMENT REPORT A-04-ESQ-TANKFARM-002 – RADIOLOGICAL CONTROL (RADCON) POSTING & LABELING PROGRAM, JANUARY 12 – 29, 2004

This letter forwards the results of the U.S. Department of Energy, Office of River Protection (ORP) assessment of the CH2M HILL Hanford Group, Inc. (CH2M HILL) RadCon Posting & Labeling Program during the period January 12 – 29, 2004. A summary of the assessment is documented in the assessment report (Attachment 1).

The ORP assessment team concluded that additional management attention was warranted in this functional area. ORP and CH2M HILL specialists have historically identified posting and labeling deficiencies in the CH2M HILL program. The team identified three Findings during the assessment:

- Posting & labeling was not assessed at the frequency required by 10 CFR 835.102 (Finding A-04-ESQ-TANKFARM-002-F-01);
- Some signs and labels did not meet the requirements of 10 CFR 835.601(a) and (b), and 10 CFR 835-605 (Finding A-04-ESQ-TANKFARM-002-F-02); and
- Some unsecured, unlabeled lines and hoses crossed a Contamination Area boundary, contrary to the requirements of 10 CFR 835.1102(a) (Finding A-04-ESQ-TANKFARM-002-F-03).

The team identified four Observations, on separate but related issues, during the assessment:

- Varying quality in stanchion fabrication: lighter bases increased the possibility of stanchions being blown over by high winds (Observation A-04-ESQ-TANKFARM-002-O-01);
- The term “down posting” was not defined in a procedure (Observation A-04-ESQ-TANKFARM-002-O-02);
- Long-term storage of plastic wrapped or bagged radioactive material created an unnecessary potential release path for contamination (Observation A-04-ESQ-TANKFARM-002-O-03); and
- Aging Problem Evaluation Reports dealing with posting and labeling issues (Observation A-04-ESQ-TANKFARM-O-04).

The team also identified three areas of strength in the Program:

- An aggressive campaign to improve posting and labeling (e.g., more permanent signs and labels; improve fastening methods);
- Restoration of the Facility Technical Authority: Posting & Labeling (Field Work) position; and
- Improvement in the Radiological Status Boards in the change trailers (current survey information, more permanent and readable maps).

Attachment 2 (Assessment Report A-03-ESQ-TANKFARM-002) documents the details of the assessment.

Within 30 days of receipt of this letter, please respond to the Findings (Attachment 2) and include the corrective actions management will take to resolve the program deficiencies discussed in the attached report. The plan should include actions, responsible individual(s), and due dates.

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

Sincerely,

Roy J. Schepens  
Manager

ESQ:LRM

Attachments: (2)

cc w/attachs:

E. E Bickel, CH2M HILL

R. E. Broz, CH2M HILL

J. M. Hobbs, CH2M HILL

R. R. Loeffler, CH2M HILL

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

ASSESSMENT: RadCon Posting & Labeling

REPORT: A-04-ESQ-TANKFARM-002

FACILITY: CH2M HILL Hanford Group, Inc. (CH2M HILL) Tank Farms

LOCATION: Hanford Site

Dates: January 12 - 29, 2004

ASSESSORS: Larry R. McKay, Lead Assessor  
Frank M. Roddy, Assessor  
Brandon I. Williamson, Assessor

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

## **Radiological Control (RadCon) Posting & Labeling Program for the Period of January 12-29, 2004**

### **Assessment Purpose and Scope**

During the period of January 12-29, 2004, the U. S. Department of Energy, Office of River Protection (ORP), conducted an assessment of the RadCon Posting & Labeling Program of CH2M HILL Hanford Group, Inc. (CH2M HILL, the Contractor). It evaluated the procedural requirements, interviewed those charged with implementing the program, and conducted tours of the tank farms to evaluate current posting & labeling. The requirements for posting & labeling are specified in 10 CFR 835, "Occupational Radiation Protection," and implementing procedures.

### **Significant Observations and Conclusions**

#### **Overall Conclusions**

The ORP assessment team concluded that additional management attention was warranted in this functional area. The team identified three Findings during the assessment:

- Posting & labeling was not assessed at the frequency required by 10 CFR 835.102 (Finding A-04-ESQ-TANKFARM-002-F-01);
- Some signs and labels did not meet the requirements of 10 CFR 835.601(a) and (b), and 10 CFR 835.605 (Finding A-04-ESQ-TANKFARM-002-F-02); and
- Some unsecured, unlabeled lines and hoses crossed a Contamination Area boundary, contrary to the requirements of 10 CFR 835.1102(a) (Finding A-04-ESQ-TANKFARM-002-F-03).

In addition, four Observations point to the need for a more rigorous program:

- Varying quality in stanchion fabrication, an apparent "work turndown" issue;
- A minor procedure deficiency (the term "down posting" was not defined);
- Long-term storage of plastic wrapped or bagged radioactive material creates an unnecessary potential release path for contamination; and
- Problem Evaluation Reports (PER) for posting and labeling issues had an average age of about four months, although some issues could have been closed with minimal effort.

Program strengths included:

- An aggressive campaign to improve posting & labeling (e.g., more permanent signs and labels; improved fastening methods);
- Restoration of the Facility Technical Authority: Posting & Labeling (Field Work) position; and
- Improvement in the Radiological Status Boards in the change trailers (current survey information, more permanent and readable maps).

Details of Findings, Observations and program strengths may be found in the remainder of this assessment report.

ORP and CH2M HILL specialists have historically identified posting & labeling deficiencies in the CH2M HILL program. The assessment team concluded that CH2M HILL should direct greater management attention on resolving these issues.

### **Posting & Labeling**

The team prepared Assessment Note A-04-ESQ-TANKFARM-002-01 which detailed the issues identified below.

- Posting & labeling was not assessed at the frequency required by 10 CFR 835.102 for each major functional element of the Radiation Protection Plan. The latest assessment report provided the assessors was dated December 1999. Consequently, this element was due for reassessment within 36 months, or by December 2002. While a May 2002 corrective action plan for posting & labeling has been completed, the plan was not documented as a 10 CFR 835.102 self-assessment. Consequently, Posting & Labeling was not self-assessed by the required date of December 2002, contrary to the requirements of 10 CFR 835.102. This non-compliant condition resulted in Finding A-04-ESQ-TANKFARM-002-F-01 in the attached Notice of Finding.
- Technical terms used in posting & labeling were not all identified for the user. For example, “Down posting” was not defined in TFC-ESHQ-RP\_MON-C-18, Revision A-1, December 2, 2003, “Radiological Posting,” Section 5.0, but the term was used in Section 4.2. Implementing the procedure step was more difficult because the term was not defined.
- CH2M HILL relied on the PER system not only to identify problems, but also to capture corrective actions for those problems. Over 5,000 PERs were generated in Calendar Year 2003, in a “zero threshold” system (any employee can file a PER). At the time of the assessment, most Posting & Labeling PERs opened since October 2003 remained open. Some of the open PERs documented problems that could have been resolved with minimal effort. The age of the PERs for some relatively simple

posting & labeling issues was almost four months. This condition resulted in Observation A-04-ESQ-TANKFARM-002-O-04 in Assessment Note A-04-ESQ-TANKFARM-002-O-01.

- While the Posting & Labeling Program needs improvement, the practices followed and physical properties of the new signs and labels being used by CH2M HILL have considerably improved. The assessors observed the following improvements:
  - The sign painter/writers used the sign and label miniatures from Appendix 2C from the Tank Farm Radiological Control Manual (TFRCM) to ensure accurate signs and labels are produced;
  - Permanent metal signs were used wherever possible;
  - The new signs are much more weather resistant. The old plastic insert signs have been almost entirely replaced since the weather would tend to make the inserts fall out and become lost;
  - Carabineer clips were used to hold the metal signs to the chains so the signs are not flipped over nor blown away by the wind;
  - Newly redesigned Radioactive Material tags have UV-resistant plastic laminated overlays which have been tested and have been able to remain readable after one year in service in the outside environment;
  - The stanchions used have been improved by adding larger and heavier bases or slotted weights have been fabricated to add to the base of existing stanchions to prevent them from being tipped over in windy conditions; and
  - The use of more UV-resistant Industrial grade “super” Sharpie markers resulted in readable signs after one year of field testing.
- Keeping the Radiological Status Boards in the change trailers updated has been a recurrent problem. The assessors examined the boards and determined that Status Boards in the change trailers have been improved, based on the following observations:
  - The status boards were recently updated in all of the tank farms. All the facilities the assessors toured had current and complete information (AW, AN, 244AR, and T farms);
  - Weekly checks were performed by the lead Health Physics Technicians (HPT) to make sure the boards are updated;
  - Weekly radiation and monthly contamination surveys were performed as required and the information placed on the boards; and

- The boards appeared on the Field Level Manager’s checklists, which helped assure the task of updating the boards was performed.
- CH2M HILL has established alternate working Fridays as housekeeping or cleanup days. This initiative resulted in improved housekeeping in some farms (e.g., AN Tank Farm).
- The assessors toured the AN and AW Tank Farms and observed labels and signs that did not meet the requirements of 10 CFR 835 Sections 601 and 605. The following non-compliant labels and signs were examples that indicated the need for increased management attention and resulted in Finding A-04-ESQ-TANKFARM-002-F-02 in the attached Notice of Finding. Digital photographs for each observation below are shown in Figure 1. Parenthetical references below direct the reader to the correct photograph.

AN Tank Farm

- On a Contamination Area (CA) boundary, three signs overlapped, partially covering the wording on all three signs (Photo 1);
- Near Tank AN101, a non-standard sign hung on the CA containment boundary. It was white, without a radiation trefoil and stated: “HPT required for entry” (Photo 2);
- Near AN105, near pump pit 05B, tape partially obscured a High Radiation Area sign (Photo 3);
- Near fence sign #9, several tags were faded or coming off the storage boxes (Photos 4 & 5); and
- The posting sign was peeling off the white low-level waste (LLW) storage trailer inside the farm near the change trailer (Photo 6).

AW Tank Farm

- Inside the fence, the LLW storage trailer had no posting on it (Photo 7);
- A Radiation Area (RA) sign was partially obscured (Photo 8);
- On the chain around box DST-03-268-02 on the 90-day storage pad, there was inconsistent posting. One side stated RA and the rest stated RA, Radioactive Material Area (RMA) (Photos 9 & 10);
- On box W314-03-351-01 on the 90-day storage pad, the RMA tag was obscured (Photo 11); and

- The Radioactive Material tag was coming off a long plywood box near fence sign #1, resulting in potential loss of valuable information (Photo 12).
- Unsecured, unlabeled lines crossed the CA boundary into a Radiological Buffer Area contrary to the requirements of 10 CFR 835.1102(a) to “...prevent the inadvertent transfer of removable contamination to locations outside of radiological areas...” and identical wording in TFRM Article 337. During a tour of the AN Tank Farm, the assessors observed several unsecured lines crossing the CA boundary at the white containment over AN102 riser 050: an electrical extension cord, a ground wire, a vacuum line, and an orange construction area barrier rope (Photos 13 - 16). This resulted in Finding A-04-ESQ-TANKFARM-002-F-03 in the attached Notice of Finding.
- The team observed stanchions of varying quality and design in the tank farms. The ones with narrower bases tend to tip over in high winds. Slotted weights (typical weight: 26 pounds) have been fabricated to hold the stanchions down. Sourcing is a “work turndown issue” -- fabricate onsite unless the work is turned down, then procure from offsite. Unless this question over sourcing is resolved, there will continue to be stanchions of different design and quality in the tank farms, but, more importantly, unless the heavier-duty stanchions are put into place, problems with stanchions falling over in high winds will persist. This issue resulted in Observation A-04-ESQ-TANKFARM-002-O-02 in Assessment Note A-04-ESQ-TANKFARM-002-001.
- During its tours of the AN and AW Tank Farms, the team observed general storage of plastic bagged and wrapped items. Some items appeared to have been stored more or less permanently. Because of UV-embrittlement of plastic containers, long-term storage may lead to release of the contained contamination. As a result, this practice should be discouraged. This issue resulted in Observations A-04-ESQ-TANKFARM-002-O-03 in Assessment Note A-04-ESQ-TANKFARM-002-001.

**List of Items Opened, Closed and Discussed**

Opened

A-04-ESQ-TANKFARM-002-F-01	Finding	Posting and Labeling was not assessed at the frequency required by 10 CFR 835.102.
A-04-ESQ-TANKFARM-002-F-02	Finding	Some signs and labels did not meet the requirements of 10 CFR 835.601(a) and (b), and 10 CFR 835.605.



A-04-ESQ-TANKFARM-002-F-03

Finding

Some unsecured, unlabeled lines and hoses crossed a Contamination Area boundary, contrary to the requirements of 10 CFR 835.1102(a).

Closed

None

Discussed

None

## Notice of Findings

Section C.2 (d) (2) (iii), “Environmental, Safety, Health & Quality (ESH&Q),” of the Contract<sup>1</sup> requires CH2M HILL Hanford Group, Inc. (CH2M HILL, the Contractor) to

“Carry out all activities in a manner that complies with human health, safety, environmental, and quality regulations; minimizes the generation of wastes, releases or emissions into the atmosphere, and releases to soil and surface or groundwater; and complies with applicable regulatory requirements and DOE directives.”

During performance of an assessment of CH2M HILL’s Radiological Control (RadCon) Posting & Labeling Program, conducted January 12 - 29, 2004, on the Hanford Site, the Office of River Protection (ORP) identified three Findings:

**A-04-ESQ-TANKFARM-002-F-01** - The Triennial Assessment of Posting & Labeling was not conducted at the frequency required by 10 CFR 835.

### **Requirement:**

10 CFR 835, “Occupational Radiation Protection,” Section 102 stated “Internal audits of the radiation protection program, including examination of program content and implementation, shall be conducted through a process that ensures that all functional elements are reviewed no less frequently than every 36 months.”

### **Discussion:**

Contrary to this requirement, CH2M HILL did not conduct an assessment of Posting & Labeling, a major functional element of their Radiation Protection Program, at the frequency required by 10 CFR 835.102.

The latest CH2M HILL assessment of this functional area provided the assessment team was dated December 1999. Consequently, this functional element was due to be reassessed by December 2002, but it was not. Although a May 2002 corrective action plan for Posting & Labeling was completed, the plan was not documented as a 10 CFR 835.102 self-assessment.

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<sup>1</sup> Contract No. DE-AC27-99RL14047, between the U. S. Department of Energy and CH2M HILL Hanford Group, Inc., dated October 1, 1999.

**A-04-ESQ-TANKFARM-002-F-02** - RadCon signs and labels were not posted as required by 10 CFR 835.

**Requirements:**

a. 10 CFR 835, “Occupational Radiation Protection,” Section 601 stated: “(a) Except as otherwise provided in this subpart, postings and labels required by this subpart shall include the standard radiation warning trefoil in black or magenta imposed upon a yellow background.

(b) Signs required by this subpart shall be clearly and conspicuously posted and may include radiological protection instructions.”

b. 10 CFR 835, “Occupational Radiation Protection,” Section 605 stated:

“Except as provided at §835.606, each item or container of radioactive material shall bear a durable, clearly visible label bearing the standard radiation warning trefoil and the words “Caution, Radioactive Material” or “Danger, Radioactive Material.” The label shall also provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers to take precautions to avoid or control exposures.”

**Discussion:**

Contrary to these requirements, the assessors observed that several signs and labels did not meet them. Examples of non-compliant signs and labels are presented as digital photographs in the Assessment Report A-04-ESQ-TANKFARM-002.

**A-04-ESQ-TANKFARM-002-F-03** - Unsecured, unlabeled lines crossed the Contamination Area boundary into a Radiological Buffer Area , potentially spreading contamination outside the Contamination Area.

**Requirements:**

a. 10 CFR 835, “Occupational Radiation Protection,” Section 1102 (a) states:

“Appropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.”

b. "Tank Farm Radiological Control Manual," Article 337 states:

"337. Controlling the Spread of Contamination

The following measures shall [835.1102(a)] be used to prevent the spread of contamination across the boundary of Contamination Areas, High Contamination Areas and Airborne Radioactivity Areas:

... 2. Mark and secure items such as hoses and cords that cross the boundary ..."

**Discussion:**

Contrary to the requirements of 10 CFR 835.1102(a), the assessors identified several instances where contamination spread was not limited by securing and labeling hoses and lines. During a tour of the AN Tank Farm on 1/26/04, the assessors observed unsecured lines crossing the CA boundary at the white containment over AN102 riser 050. The non-compliant examples are listed below:

- an electrical extension cord;
- a ground wire;
- a vacuum line; and
- an orange construction area barrier rope.

Digital photographs of these non-compliant examples are included in the Assessment Report A-04-ESQ-TANKFARM-002.

ORP requests CH2M HILL to provide, within 30 days from the date of the letter that transmitted this Notice, a reply to the Findings above. The reply should include: 1) admission or denial of the Findings; 2) the reason for the Findings, if admitted, and if denied, the reason why; 3) the corrective steps that have been taken and the results achieved; 4) the corrective steps that will be taken to avoid further Findings; and 5) the date when full compliance with the 10 CFR 835 and TFRCM requirements will be achieved. Where good cause is shown, consideration will be given to extending the requested response time.