



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

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

06-ESQ-086

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

Dear Mr. Spears:

CONTRACT NO. DE-AC27-99RL14047 – ASSESSMENT REPORT A-06-ESQ-TANKFARM-005 – EMBRYO/FETUS DOSE LIMITS, JUNE 5 THROUGH 9, 2006

This letter forwards the results (Attachment) of the U.S. Department of Energy, Office of River Protection (ORP) assessment performed from June 5 through 9, 2006, to evaluate the CH2M HILL Hanford Group, Inc. (CH2M HILL) process and procedures for controlling embryo/fetus dose limits.

The assessor determined the CH2M HILL process met regulatory and contract requirements, and functioned effectively to control embryo/fetus dose as required by 10 CFR 835, Section 206.

The assessor had no Findings, noted one Good Practice, and made four Observations. The Good Practice involved periodic, formal assessments of Pacific Northwest National Laboratory's dosimetry and records services under the Radiological Control Subcontractor Oversight Program. The Observations dealt with implementing procedure weaknesses (including failure to adopt several of the DOE Program Guide 441.1-6 elements or use the term "declared pregnant worker") and several enhancement issues (not clearly identifying the point-of-contact for embryo/fetus limits; lack of a formal CH2M HILL policy on limiting prenatal dose; and the lack of guidance on preparing Declarations of Pregnancy and Withdrawals of Declarations of Pregnancy).

Please provide a formal response to the observations within 30 days of receipt of this letter. The response should include corrective actions to be taken, actionees, and due dates.

Mr. M. S. Spears  
06-ESQ-086

-2-

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

Sincerely,

ESQ:LRM

Roy J. Schepens, Manager  
Office of River Protection

Attachment

cc w/attach:

E. J. Adams, CH2M HILL  
C. E. Armstrong, CH2M HILL  
C. K. Bean, CH2M HILL  
E. E. Bickel, CH2M HILL  
P. B. Brannan, CH2M HILL  
T. E. Bratvold, CH2M HILL  
F. M. Ito, CH2M HILL  
M. S. McGrory, CH2M HILL  
C. R. Ungerecht, PAC  
G. M. Wemhoff, PAC  
Administrative Record  
CH2M Correspondence

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

ASSESSMENT: Embryo/Fetus Dose Limits

REPORT: A-06-ESQ-TANKFARM-005

FACILITY: CH2M HILL Hanford Group, Inc. Tank Farms

LOCATION: Hanford Site

DATES: June 5 through 9, 2006

ASSESSOR: Larry R. McKay

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

## Executive Summary

The U.S. Department of Energy (DOE), Office of River Protection (ORP) evaluated the CH2M HILL Hanford Group, Inc. (CH2M HILL) process and procedures for controlling embryo/fetus dose limits against established requirements and guidance from June 5 through 9, 2006.

The assessor reviewed implementing procedure TFC-ESHQ-RP-DOS-C-06, "Declaring Personal Pregnancy," Revision A-1, October 28, 2005, for content and accuracy; evaluated the interface between CH2M HILL and Pacific Northwest National Laboratory (PNNL) procedures; examined records; reviewed an April 2005 CH2M HILL Independent Assessment on embryo/fetus limits; evaluated EnergX training to Radiological Workers on embryo/fetus limits; and interviewed staff members responsible for the process.

The assessor concluded the CH2M HILL program associated with embryo/fetus dose limits met minimum regulatory and contract requirements. He identified no Findings, noted a Good Practice, and made four Observations. The Good Practice involved conducting periodic assessments of PNNL dosimetry and records services. The following observations dealt with improving procedure content and quality which includes adopting several DOE Program Guide 441.1-6 elements to:

- Clearly identifying the point-of-contact for embryo/fetus limits;
- Incorporate standard industry terminology in applicable CH2M HILL policies and procedures, such as "declared pregnant worker;"
- Place the Declared Pregnant Worker Policy on CH2M HILL Web Site; and
- Prepare guidance for Declarations of Pregnancy and Withdrawals of Declarations of Pregnancy.

ORP requests CH2M HILL to provide a formal response to these observations within 30 days of receipt of this letter. The response should include corrective actions to be taken, actionees, and due dates.

Assessment details are described in this report and in Assessment Note A-06-ESQ-TANKFARM-005-01.

# Table of Contents

<b>Executive Summary .....</b>	<b>ii</b>
<b>Table of Contents .....</b>	<b>iii</b>
<b>List of Acronyms .....</b>	<b>iv</b>
<b>Scope.....</b>	<b>5</b>
<b>Details.....</b>	<b>5</b>
<b>Results .....</b>	<b>6</b>
<b>Open Items.....</b>	<b>9</b>
<b>Closed Items .....</b>	<b>10</b>
<b>Discussed Items .....</b>	<b>10</b>
<b>Signature.....</b>	<b>10</b>

## **List of Acronyms**

CH2M HILL	CH2M HILL Hanford Group, Inc.
CTA	Company Technical Authority
DOE	U.S. Department of Energy
ORP	Office of River Protection
PNNL	Pacific Northwest National Laboratory
RadCon	Radiological Control

## **Radiological Control (RadCon) Assessment Embryo/Fetus Dose Limits**

### **Scope**

A U.S. Department of Energy (DOE), Office of River Protection assessor evaluated the CH2M HILL Hanford Group, Inc. (CH2M HILL) process and procedures for controlling embryo/fetus dose limits against established requirements and guidance from June 5 through 9, 2006.

The assessor reviewed implementing procedures for content and accuracy; evaluated the interface between CH2M HILL and Pacific Northwest National Laboratory (PNNL) procedures; examined records; reviewed an April 2005 CH2M HILL Independent Assessment on embryo/fetus limits; evaluated EnergX training to Radiological Workers on embryo/fetus limits; and interviewed staff members responsible for the process.

### **Details**

10 CFR 835 specifies embryo/fetus dose limits in Section 206 and record-keeping requirements in Section 702. DOE published two Program Guides to aid in implementing these limits: DOE G 441.1-6, "Evaluation and Control Radiation to the Embryo/Fetus Guide," April 29, 1999, and DOE G 441.1-11, "Occupational Radiation Protection Record-Keeping and Reporting Guide," May 20, 1999.

CH2M HILL procedure TFC-ESHQ-RP-DOS-C-06, "Declaring Personal Pregnancy," Revision A-1, October 28, 2005, described the program controls. PNNL maintained dose records as prescribed by Hanford Dosimetry Operations Procedure, HRRP-02, "Pregnant Radiation Workers," Revision 3.1, January 2006.

The CH2M HILL RadCon Program provided direction for implementing the embryo/fetus dose limits. The respective RadCon Directors in the three projects - Analytical Technical Services, Closure Operations, and Waste Feed Operations - monitored declared pregnant worker doses to ensure the limits were not exceeded.

The assessor interviewed the following CH2M HILL and PNNL staff who were responsible for program implementation:

CH2M HILL RadCon Program  
RadCon Director  
Health Physicist (2)

PNNL, Dosimetry Operations  
Radiation Records Manager

At the time of this assessment, CH2M HILL or its 148 active subcontractors had no declared pregnant women radiation workers. PNNL radiation records accurately reflected that fact.

The assessor examined the official PNNL records of all Declared Pregnant Workers employed by CH2M HILL or its subcontractors for Calendar Years 2004 & 2005 (there were four women). The assessor also reviewed implementing procedure TFC-ESHQ-RP-DOS-C-06, "Declaring Personal Pregnancy," Revision A-1, October 28, 2005, and PNNL implementing procedure HRRP-02, "Pregnant Radiation Workers," Revision 3.1, January 2006 to evaluate the adequacy of the procedures and their interface.

The assessor reviewed the lesson plans for the training EnergX delivered to all Hanford Radiological Workers on embryo/fetus dose limits and the CH2M HILL evaluation "Independent Assessment of Limits for the Embryo/Fetus and Emergency Exposure Programs," E. J. Millikin, 72200-EJM-05-007, April 27, 2005.

Assessment Note A-06-ESQ-TANKFARM-005-01 contains interview and records review details.

## **Results**

The assessor concluded:

- CH2M HILL effectively implemented controls that met minimum regulatory and contract requirements;
- CH2M HILL and PNNL implementing procedures complied with the requirements of 10 CFR 835, Sections 206 and 702, and provided adequate interface with each other but had several weakness (observations, below);
- The official PNNL records of Declared Pregnant Workers examined were accurate, legible, and complete;
- The April 27, 2005, CH2M HILL Independent Assessment was thorough in evaluating this program; and
- The EnergX training material addressed all regulatory requirements of embryo/fetus dose controls. The published lesson plans contained no information on the special circumstance where a declared pregnant worker not covered by 10 CFR 835.901 training requirements could potentially receive an embryo/fetal dose of greater than the 0.5 rem limit (DOE G-441.1-6, Section 4.5 Training).

The assessor identified no Findings, noted one Good Practice, and made four Observations, as described below.



### **Good Practice:**

In December 2005, the CH2M HILL RadCon Program Director published the RadCon Subcontractor Oversight Plan, which directed his staff to conduct formal, periodic assessments of PNNL dosimetry and records services. Other Hanford Site contractors have not periodically performed such formal assessments. The assessor considered this a good practice consistent with being a demanding and proactive customer.

### **Observation: Improvements to Consider for CH2M HILL Implementing Procedure**

The assessor compared implementing procedure TFC-ESHQ-RP-DOS-C-06, “Declaring Personal Pregnancy,” Revision A-1, October 28, 2005, against 10 CFR 835 and the two DOE Program Guides (DOE G 441.1-6, “Evaluation and Control Radiation to the Embryo/ Fetus Guide,” April 29, 1999, and DOE G 441.1-11, “Occupational Radiation Protection Record-Keeping and Reporting Guide,” May 20, 1999) and noted several areas for improvement:

- The procedure did not use the standard terminology “declared pregnant worker,” used in the nuclear industry. CH2M HILL used the terms “declared employee” and “pregnant employee” instead. The term “declared pregnant worker” was defined in 10 CFR 835, Section 2 Definitions and was also used in both the 10 CFR 835 Program Guides, above;

The use of conventional terminology would clarify the implementing procedure and bring it into agreement with the DOE Program Guides.

- The procedure did not capture the following elements of Program Guide 441.1-6:
  - Counseling of workers (Program Guide 441.1-6, Section 4.3);
  - Worker training (Program Guide 441.1-6, Section 4.5); and
  - Record-keeping and Reporting (Program Guide 441.1-5, Section 4.6).
- The CH2M HILL procedure did not reference PNNL implementing procedure HRRP-02, “Pregnant Radiation Workers,” Revision 3.1, January 2006 for record-keeping and reporting. Since both procedures are related, this reference was needed; and
- The procedure did not notify the user that embryo/fetus dose records were covered by the Privacy Act and must be controlled as specified in the Act.

### **Observation: Point-of-Contact for Embryo/Fetus Limits Not Clearly Identified**

In practice, the focal point for embryo/fetus dose controls was the Health Physicist serving as Company Technical Authority (CTA) for Internal Dosimetry. Another Health Physicist, serving as CTA for Area and Personnel Dosimetry assisted. The assessor determined that:

- The implementing procedure did not clearly identify the CTA for Internal Dosimetry as the single point-of-contact;
- During an interview, the PNNL Radiation Records Manager incorrectly identified the CTA for Area and Personnel Dosimetry as the primary point-of-contact; and
- The “Company Technical Authorities and Facility Points of Contact” web page did not include the topic of embryo/fetus limits nor specify the CTA or backup person responsible for implementing the limits.

To avoid confusion and better serve CH2M HILL female employees, CH2M HILL should identify a single point-of-contact for implementing embryo/fetus limits, and add this topic to the list of CTAs/backup persons on the web page.

**Observation: The CH2M HILL Web Site Policies Page Did Not Include the Declared Pregnant Worker Policy**

The training which EnergX delivered to all Hanford Radiological Workers referenced the “...Hanford Site policy concerning prenatal radiation exposure...” A copy of a formal policy was not found during the assessment. The assessor concluded there was no current, formal Hanford Policy on prenatal dose controls.

The assessor recommended and the CH2M HILL RadCon Director agreed to take this issue to the Hanford RadCon Forum for further discussion. The Hanford RadCon Forum is a body populated by Hanford contractor RadCon managers who discuss matters of common RadCon interest. DOE representatives (non-voting members) typically work issues through their contractor counterparts (voting members).

A unified Hanford Site policy would serve to raise the visibility of the importance of proper prenatal dose controls.

**Observation: No Guidance Was Provided for Declared Pregnant Workers on Preparing Declaration of Pregnancy or Withdrawal of Declaration of Pregnancy Memoranda**

The assessor found the implementing procedure states “Notify your direct manager in writing...,” in the form of a memorandum. The procedure specified no content requirements for the written notification. The assessor discovered during the records review one pregnant CH2M HILL employee submitted a Withdrawal of Declaration of Pregnancy memorandum addressing her manager only by his first name, and containing her incomplete name and an ambiguous date.

Declarations of Pregnancy and Withdrawals of Declarations of Pregnancy must be complete and accurate to assure protection is provided. DOE Program Guide 441.1-6 provides model memoranda for Declaration of Pregnancy (Appendix A) and Withdrawal of Pregnancy Declaration (Appendix B).

CH2M HILL should consider placing these model forms on the CH2M HILL Web Site under a “Declared Pregnant Worker” category, to help assure consistency and accuracy in the content of these memoranda.

**Conclusions:**

The assessor concluded, based on review of records and procedures and interviews with CH2M HILL and PNNL staff, CH2M HILL had implemented the required embryo/fetus dose limits. The CH2M HILL and PNNL procedures met minimum requirements and could be strengthened by addressing all the elements of DOE Program Guide 441.1-6. Training delivered to Radiological Workers on the Hanford Site addressed the 10 CFR 835 embryo/fetus dose limits requirements.

The assessor noted one Good Practice (RadCon Subcontractor Oversight Program) and made four continuous improvement Observations. The observations dealt with improving procedure content and quality by adopting several of the DOE Program Guide 441.1-6 elements that include the following:

- Clearly identifying the point-of-contact for embryo/fetus limits;
- Incorporating standard industry terminology in applicable CH2M HILL policies and procedures, such as “declared pregnant worker;”
- Placing the Declared Pregnant Worker Policy on CH2M HILL Web Site; and
- Preparing guidance for Declarations of Pregnancy and Withdrawals of Declarations of Pregnancy.

**Open Items**

Observation A-06-ESQ-TANKFARM-005-001	Improvements to consider for CH2M HILL Implementing Procedure
Observation A-06-ESQ-TANKFARM-005-002	Point-of-Contact for Embryo/Fetus Limits not clearly identified
Observation A-06-ESQ-TANKFARM-005-003	The CH2M HILL Website Policies Page did not include the Declared Pregnant Worker Policy
Observation A-06-ESQ-TANKFARM-005-004	No Guidance was provided for Declared Pregnant Workers on preparing Declaration of Pregnancy or Withdrawal of Declaration of Pregnancy Memoranda

**Closed Items**

None

**Discussed Items**

None

**Signature**

---

Larry R. McKay, Assessor

Date