



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-ESQ-071

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-008 – RADIOLOGICAL CONTROL (RADCON) INSTRUMENT CALIBRATION & MAINTENANCE PROGRAM, JULY 26 – 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 Instrument Calibration & Maintenance Program during the period July 26 - 29, 2004. A summary of the assessment is documented in the attached assessment report.

The ORP assessors concluded that the Program was generally adequate, with one exception: additional management attention is needed to correct the poor quality of instrument issue and source checking records. In March 2004, the assessment team identified similar problems with Radiological Survey Reports. The assessors identified this single Finding during the assessment:

- Instrument issue and source checking logs contained numerous errors and did not satisfy the procedural requirements for quality (Finding A-04-ESQ-TANKFARM-008-F01).

See the attached Notice of Finding (Attachment 1).

The assessors identified a Program Strength at Analytical Technical Services: an effective computer-aided instrument tracking program (Observation A-04-ESQ-TANKFARM-008-O01).

In addition, the assessors identified nine other Observations, which pointed to the need for more rigor in Instrument Calibration & Maintenance Program records and procedures:

- Inconsistent terminology and references in procedures for calibration and maintenance of instruments (Observation A-04-ESQ-TANKFARM-008-O02);
- Use of Pacific Northwest National Laboratory and Fluor Hanford, Inc. procedures for calibration and maintenance of instruments (Observation A-04-ESQ-TANKFARM-008-O03);
- Quality Assurance data not initially recorded on formal records forms (Observation A-04-ESQ-TANKFARM-008-O04);
- Deficiencies in Radiation Control Instruction Index (Observation A-04-ESQ-TANKFARM-008-O05);

Mr. E. S. Aromi
04-ESQ-071

-2-

- Inadequate operating procedures for instruments (Observation A-04-ESQ-TANKFARM-008-006);
- Lack of inclusion or reference in Radiation Protection Program to contractual agreement for contracted instrument calibration services (Observation A-04-ESQ-TANKFARM-008-007);
- Lack of supervisory review of required instrument records (Observation A-04-ESQ-TANKFARM-008-008);
- Reference to American National Standards Institute N323A as a requirements document (Observation A-04-ESQ-TANKFARM-008-009); and
- Lack of a formal process and documentation for evaluations of “out-of-tolerance” or failed instruments (Observation A-04-ESQ-TANKFARM-008-010).

Attachment 2 (Assessment Report A-03-ESQ-TANKFARM-003) documents the details of the assessment.

Within 30 days of receipt of this letter, please respond to the Findings and Observations, including 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 call Robert C. Barr, Director, Office of Environmental Safety and Quality, (509) 376-7851.

Sincerely,

ESQ:LRM

Roy J. Schepens
Manager

Attachment

cc w/attach:

E. J. Adams, CH2M HILL
E. E. Bickel, CH2M HILL
P. B. Brannan, CH2M HILL
J. M. Hobbs, CH2M HILL
R. R. Loeffler, CH2M HILL
K. A. Benguiat, RL

Notice of Finding

Section C.2 (d) (2) (iii), “Environmental, Safety, Health & Quality (ESH&Q),” of the Contract¹ 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 Instrument Calibration & Maintenance Program, conducted July 26 - 29, 2004, on the Hanford Site, the U.S. Department of Energy (DOE), Office of River Protection (ORP) identified one Finding:

- **A-04-ESQ-TANKFARM-008-F01:** Instrument issue and source checking logs contained numerous errors and did not satisfy the procedural requirements for quality.

Requirements

10 CFR 830, “Nuclear Safety Management,” Subpart A, “Quality Assurance Requirements,” January 10, 2001, established the requirement, in Section 122.(e)(1) 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.”

Section 2.5.2.1, “General Requirements for Work Processes,” of the CH2M HILL Quality Assurance Program Description (QAPD), TFC-PLN-02, Revision A-3, November 19, 2003, specified:

“All activities that can affect the quality, safety, or the environment of CH2M HILL products and services shall be prescribed by, and performed, in accordance with documented, management-approved procedures, instructions, and design documents that meet the requirements of applicable regulatory requirements, DOE orders, technical standards, and administrative controls.

In addition, Procedure TFC-ESHQ-RP_INS-P-01, Revision A, “Performance Testing Alpha and Beta Counting Instruments, October 21, 2003, specified detailed requirements for generating instrument records.

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

Discussion:

Contrary to these requirements, CH2M HILL Health Physics Technicians (HPT) generated instrument issue and source checking records containing numerous deficiencies:

- Missing (blank) entries;
- Missing initial source check date on return/receipt logs;
- Missing HPT initials for “performance test” on daily source check logs;
- Missing “background” information on daily source check logs;
- Inadequate or inappropriate date entries;
- Inadequate entries of HPT initials;
- Lack of HPT signature/initials;
- Inadequate error corrections; and
- Incomplete “instrument type” entries.

ORP requests CH2M HILL to provide, within 30 days from the date of the letter that transmitted this Notice, a reply to the Finding above. The reply should include: 1) admission or denial of the Finding; 2) the reason for the Finding, 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 a further Finding (including the responsible individual); and 5) the date when full compliance with the 10 CFR 830 and the QAPD requirements will be achieved. Where good cause is shown, consideration will be given to extending the requested response time.

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

ASSESSMENT: Instrument Calibration & Maintenance

REPORT: A-04-ESQ-TANKFARM-008

FACILITY: CH2M HILL Hanford Group, Inc. Tank Farms

LOCATION: Hanford Site

Dates: July 26-29, 2004

ASSESSORS: Larry R. McKay, Lead Assessor
Wayne M. Glines, Assessor

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

Instrument Calibration & Maintenance Program for the Period of July 26 – 29, 2004

Assessment Purpose and Scope

—During the period of July 26 - 29, 2004, the U. S. Department of Energy (DOE), Office of River Protection, conducted an assessment of the Instrument Calibration & Maintenance Program (the Program) of CH2M HILL Hanford Group, Inc. (CH2M HILL, ~~the Contractor~~). The assessors evaluated the procedural requirements, interviewed those charged with implementing the Program, and examined instruments and records stored in ~~the~~ tank farms to evaluate ~~current posting & labeling~~ instrument calibration & maintenance. The requirements for Instrument Calibration & Maintenance are specified in 10 CFR 835, “Occupational Radiation Protection” Code of Federal Regulations (CFR), Section 401(b), “Monitoring of Individuals and Areas – General Requirements,” November 14, 1998; the CH2M HILL “Radiation Protection Program” (HNF-MP-5184), Requirements 72-75 and 178, Revision 2, February 28, 2003; and in CH2M HILL implementing procedures.

Significant Observations and Conclusions

Overall Conclusions

The assessors concluded that the Program was generally adequate. However, poor quality instrument issue and source checking records represented a major deficiency in the Program. The team identified this as a Finding and concluded that additional management attention was warranted in this area.

- Instrument issue and source checking logs contained Radiological Survey Reports ~~⊖~~ numerous errors and did not satisfy the procedural requirements for quality (Finding A-04-ESQ-TANKFARM-008-F01).

Note: This is the second Radiological Control (RadCon) Assessment with a Finding about records (see A-04-ESQ-TANKFARM-003, Release of Materials & Equipment, March 8 - 12, 2004), further evidence that additional management concern is warranted.

The assessors identified a Program Strength at Analytical Technical Services (ATS): an effective computer-aided instrument tracking program (Observation A-04-ESQ-TANKFARM-008-O01).

In addition, the assessors identified nine other Observations:

- Inconsistent terminology and references in procedures for calibration and maintenance of instruments (Observation A-04-ESQ-TANKFARM-008-O02);

- Use of Pacific Northwest National Laboratory (PNNL) and Fluor Hanford, Inc. (FHI) procedures for calibration and maintenance of instruments (Observation A-04-ESQ-TANKFARM-008-003);
- Quality Assurance data not initially recorded on formal records forms (Observation A-04-ESQ-TANKFARM-008-004);
- Deficiencies in Radiation Control Instruction Index (Observation A-04-ESQ-TANKFARM-008-005);
- Inadequate operating procedures for instruments (Observation A-04-ESQ-TANKFARM-008-006);
- Lack of inclusion or reference in Radiation Protection Program to contractual agreement for contracted instrument calibration services (Observation A-04-ESQ-TANKFARM-008-007);
- Lack of supervisory review of required instrument records (Observation A-04-ESQ-TANKFARM-008-008);
- Reference to American National Standards Institute (ANSI) N323A as a requirements document (Observation A-04-ESQ-TANKFARM-008-009); and
- Lack of a formal process and documentation for evaluations of “out-of-tolerance” or failed instruments (Observation A-04-ESQ-TANKFARM-008-010).

Details of [the Findings](#) and Observations may be found in the remainder of this assessment report.

The assessors concluded that additional management attention was warranted in this functional area to correct generic RadCon records inadequacies and specific instrument logbook deficiencies.

Assessment Summary

The [team assessors](#) prepared Assessment Note A-04-ESQ-TANKFARM-008-01 which provides the details for each issue summarized below.

Documentation of Instrument Issue & Source Checking

The assessors reviewed over 100 records dealing with instrument issue and source checking and

Radiological Survey Reports identified about 25 instances where CH2M HILL was not complying with the requirements of 10 CFR 830, “Nuclear Safety Management,” Subpart A, “Quality Assurance Requirements,” January 10, 2001, or CH2M HILL Procedure TFC-ESHQ-RP_INS-P-01, Revision A, “Performance Testing Alpha and Beta Counting Instruments, October 21, 2003.

The assessors issued Finding A-04-ESQ-TANKFARM-008-F01 (see attached Notice of Finding) and concluded that increased management attention was needed to resolve deficiencies in these records.

Program Strength

The ATS Radiation Protection Instrument Program at the 222-S Laboratory designated a single Lead Health Physics Technician (HPT) to oversee and maintain day-to-day Program activities. Additionally, the ATS Radiation Protection Instrument Program employed a full-featured, user-friendly computer program, the “RadCon Instrument Tracking Program,” for maintaining Program records and tracking required actions, for periodic instrument calibration. This combination of a single Lead HPT and the RadCon Instrument Tracking Program provided for a high degree of accountability and consistency in the ATS Program. The RadCon Instrument Tracking Program in particular eliminated most of the potential for the types of records’ deficiencies discussed in the Finding above. The assessors made Observation A-04-ESQ-TANKFARM-008-001 to document this Program Strength and concluded that other CH2M HILL projects should strongly consider implementing the RadCon Instrument Tracking Program in their Instrument Programs.

Procedural Weaknesses

The assessors reviewed the procedures governing the issue and source checking of instruments and made six Observations (A-04-ESQ-TANKFARM-O02 through -O07):

- **A-04-ESQ-TANKFARM-008-O02: Inconsistent Terminology and References in Procedures for Calibration and Maintenance of Instruments.**

The assessors identified the following inconsistencies in CH2M HILL procedures:

- In Paragraph 4.1.7 of TFC-EHSQ-RP_INS_P-04, Revision A, Form A-6002-249 is titled “Daily Instrument Source Check/Probe Log”; in Paragraph 4.3.1 A-6002-249 is titled “Daily Instrument Source Check Log;”
- Section 6.0 “Records” of TFC-EHSQ-RP_INS_P-04, Revision A, lists only A-6000-442, “Health Physics Portable Instrument Issue Log,” as records generated during the performance of this procedure. However, procedure also requires generation of Forms A-6000-441, “Health Physics Portable Instrument Receipt/Return Log,” and A-6002-249, “Daily Instrument Source Check Log;”
- In RPP-5779, RCI-80, Revision 3, “Daily Source Check Log” has Form Number A-6002-895, while in TFC-EHSQ-RP_INS_P-04, Revision A, “Daily Source Check Log” has Form Number A-6002-249;” and
- No form number is provided for “Daily Source Check Log” in RPP-5779, RCI-14, Revision 14

- **A-04-ESQ-TANKFARM-008-O03: Use of Pacific Northwest National Laboratory (PNNL) and Fluor Hanford, Inc. (FHI) Procedures for Calibration and Maintenance of Instruments**

The Radiation Control Instruction (RCI) Index dated June 7, 2004, indicated that RCI-15 – 19, RCI 81 – 88, and RCI-92 had been cancelled and referred to applicable sections of PNNL-MA-562 as replacement procedures. PNNL-MA-562 was developed and is maintained by PNNL as a general description of the functionality, operating principles, and generic operating instructions for portable instruments. PNNL-MA-562 does not provide adequate specificity to insure that all requirements, e.g., required records, are met for the CH2M HILL Program.

During the course of this assessment, CH2M HILL reinstated RCI-15 – 19, RCI 81 – 88, and RCI-92. The assessors concluded that the reinstatement of these RCIs resolved this portion of this Observation, because then procedures owned by CH2M HILL governed these activities.

ATS is currently using FHI procedures for operating procedures for portable instruments at the 222-S Laboratory. This is due in part to the recent transition of the 222-S Laboratory from FHI to CH2M HILL.

However, ATS is vulnerable to cancellation or modification of such FHI procedures. Also, FHI procedures do not explicitly incorporate or reference other applicable CH2M HILL procedures, e.g., records keeping procedures, or forms. ATS has developed a Management Plan authorizing and describing use of the FHI procedures for ATS activities. However, this creates an additional administrative level for such procedures which could lead to unnecessary confusion. ATS has developed a path forward for converting from the FHI procedures to CH2M HILL procedures. However, there is currently no established schedule for converting to CH2M HILL procedures.

- **A-04-ESQ-TANKFARM-008-O04: Quality Assurance Data not Initially Recorded on Formal Records Forms**

Sections 4.1.3 and 4.3.3 of TFC-ESHQ-RP_INS_P-01, Revision A, “Performance Testing Alpha and Beta Counting Instruments,” states that for receipt testing and monthly surveillance testing, respectively, results of source counts are initially recorded “on a piece of paper.” These data are required quality assurance data, and although these data are later entered on electronic forms, the initial recording of these data creates a “record.” Accordingly, the initial recording of these data should be on an established, formal form, not “on a piece of paper.”

- **A-04-ESQ-TANKFARM-008-O05: Deficiencies in Radiation Control Instruction Index**

The current RCI Index contains several typographical errors or references to incorrect PNNL-MA-562 sections. Specifically, RCI-16, XETEX Telescan, refers to PNNL-MA-562, Section 34. There is no Section 34 in PNNL-MA-562. The correct reference should be to Section 24. Also, RCI-87, Bench Monitors, refers to PNNL-MA-562, Section 7. The correct reference should be to Section 17. RCI-85 should be entitled “Eberline RO-3B CP” versus the current “Eberline RO-38 CP.”

During the course of this assessment, CH2M HILL reinstated RCI-15 – 19, RCI 81 – 88, and RCI-92, and corrected these deficiencies in the RCI Index. The assessors concluded that the reinstatement of these RCIs and correction of the RCI Index resolved this Observation.

- **A-04-ESQ-TANKFARM-008-006: Inadequate Operating Procedures for Instruments**

CH2M HILL utilized RCI-15 – 19, RCI-81 – 88, and RCI-92, to address the operation of portable instruments. In June 2004, CH2M HILL canceled the RCIs, and referred the users to applicable sections from PNNL-MA-562, “Radiation Protection Instrument Manual.” However, PNNL-MA-562 was issued and is maintained by PNNL to provide a general description of the functionality, operating principles, and generic operating procedures for portable instruments and was not intended to provide specific implementing procedures.

This manual is not designed for, and does not provide, the necessary specificity, e.g., reference to formal records’ forms, for use by specific organizations or activities. As such, the cancellation and replacement of RCIs by reference to sections of PNNL-MA-562 results in inadequate operating procedures for CH2M HILL instruments.

During the course of this assessment, CH2M HILL reinstated RCI-15 – 19, RCI 81 – 88, and RCI-92, deleting the references to PNNL-MA-562. The assessors concluded that the reinstatement of these RCIs resolved this Observation.

- **A-04-ESQ-TANKFARM-008-007: Lack of Inclusion or Reference in Radiation Protection Program to Contractual Agreement for Contracted Instrument Calibration Services**

Section 4 of Implementation Guide DOE G 441.1-7, “Portable Monitoring Instrument Calibration Guide,” states that: “For those activities that rely on contracted organizations to perform calibration services, the River Protection Project should include or make reference to a Memoranda of Agreement with the calibration contractor(s) that assures compliance with applicable DOE requirements. Contrary to this recommendation, HNF-MP-5184, “CH2M HILL Hanford Group, Inc. – Radiation Protection Program,” does not include or make reference to any agreement(s) for contracted radiation measurement instrument calibration services, i.e., current contracted services from PNNL.

Records Weaknesses

- **A-04-ESQ-TANKFARM-008-008: Lack of Supervisory Review of Records**

Based on a review of instrument records, i.e., A-6000-441, Health Physics Portable Instrument Receipt/Return Logs, A-6002-249, Daily Instrument Source Check Logs, A-6002-895, Daily Instrument Source Check Logs, and A-6000-442, Health Physics Portable Instrument Issue Logs, there are no designated spaces for any supervisory reviews for these records. A review of the

applicable operating procedures which generate these records indicated no requirements for any supervisory reviews.

The assessors concluded that the lack of such supervisory reviews contributed to the deficiencies in these records discussed in the Finding above.

- **A-04-ESQ-TANKFARM-008-O09: Use of Applicable Standards for Calibration of Portable Instruments**

Article 562 of HNF-5183, “Tank Farms Radiological Control Manual,” states that both ANSI N323 and ANSI N323A shall be used for calibration of radiological measurement instruments, and lists DOE 5480.4, “Environmental Protection, Safety, and Health Protection Standards,” and the “Hanford Radiological Health and Safety Document (HSD),” as the sources for this requirement. However, DOE 5480.4 and HSD refer only to ANSI N323, neither directs use of ANSI N323A.

Additionally, Requirement 72 of HNF-MP-5184, “CH2M HILL Hanford Group, Inc. – Radiation Protection Program,” states that: “CH2M HILL uses ANSI N323A (Rev. 1997) for portable instruments, and uses ANSI N323 (Rev. 1978) as guidance for other types of monitoring equipment.” Section 4.0 of the Fiscal Year 2002 Statement of Work (SOW) for Services Provided by PNNL’s Instrumentation Services & Technology states that: “All calibrations of portable instruments shall comply with ANSI N323 (1978) ...”

However, Section 7.3 of this SOW also refers to ANSI N323A for quality assurance requirements. Although ANSI N323 and ANSI N323A are functionally equivalent for calibration of portable instruments, there are some minor differences. CH2M HILL requirements documents need to be clear and consistent regarding the applicable standards for calibration of portable instruments.

- **A-04-ESQ-TANKFARM-008-O10: Lack of Formal Process & Documentation for Evaluation of “Out-of-Tolerance” or Failed Instruments**

Article H.4 of the “Hanford Radiological Health and Safety Document,” requires that: “The contractor shall evaluate the potential radiological consequences and document any corrections to the original monitoring results upon determination of the use of an out-of-calibration or failed radiation measurement instrument.” While CH2M HILL is performing such evaluations, there are no procedures for such evaluations, and no formal documentation was being maintained for these evaluations. (This lack of a formal process or documentations was self-identified by CH2M HILL during the assessment).

Conclusion:

The assessors concluded that the operational aspects of the Program (actual calibration and maintenance of instruments) were being conducted in accordance with established requirements, and were adequate to provide reasonable assurance that appropriately calibrated instruments

were being used. The assessors offered the following recommendations for improving the Instrument Calibration & Maintenance Program:

- Significantly improve the documentation of instrument calibration and maintenance records (as evidence by the Finding described above);
- Review and consider the use of the ATS RadCon Instrument Tracking Program for all CH2M HILL projects;
- Ensure consistent use of terminology, references, and form titles for all instrument records and procedures;
- Establish a firm schedule for the timely transition to CH2M HILL procedures for the ATS Radiation Protection Instrument Program;
- Ensure that all quality assurance data are recorded on established, formal records, including initial recording of data during instrument checks;
- Revise HNF-MP-5184, “CH2M HILL Hanford Group, Inc. – Radiation Protection Program,” to include reference(s) to any agreement(s) for contracted instrument calibration services;
- Revise instrument procedures and forms as necessary to require and document supervisory reviews for instrument records; and
- Revise requirements documents as necessary to ensure clear and consistent reference(s) to ANSI N323 or ANSI N323A as the applicable standard for instrument calibration.

List of Items Opened, Closed and Discussed

Opened

A-04-ESQ-TANKFARM-008-F01	Finding	Instrument issue and source checking logs contained Radiological Survey Reports (⊖) numerous errors and did not satisfy the procedural requirements for quality.
---------------------------	---------	---

Closed

None

Discussed

None