



Department of Energy

Washington, DC 20585

November 18, 2004

Dr. Jeffrey Wadsworth, []
Oak Ridge National Laboratory
UT-Battelle, LLC
P.O. Box 2008
Oak Ridge, TN 37831-6255

EA-2004-09

Subject: Preliminary Notice of Violation and Proposed Imposition of Civil Penalty
\$55,000

Dear Dr. Wadsworth:

This letter refers to the Department of Energy's (DOE) Office of Price-Anderson Enforcement's recent investigation of the facts and circumstances surrounding the October 6, 2003, Building [] Hot Cell (HC) 1 Radiological Spill event.

An Investigation Summary Report describing the results of that review was issued to you on August 9, 2004. An Enforcement Conference was held on September 30, 2004, in Germantown, Maryland, with you and members of your staff to discuss these findings. A Conference Summary Report is enclosed.

Based on our evaluation of these issues, including information that you provided during the Enforcement Conference, DOE has concluded that violations of the Price-Anderson Amendments Act (PAAA) Radiological Protection Rule (10 CFR 835) and Quality Assurance Rule (10 CFR 830 Subpart A) have occurred. The violations are described in the enclosed Preliminary Notice of Violation (PNOV).

Section I of the enclosed PNOV describes work process and quality improvement deficiencies that contributed to the occurrence of the radiological spill from HC 1 in Building []. These deficiencies involved failures to raise concerns with the performance of HC drains into a proper quality problem resolution process, when those problems became known in 2000 and subsequently. Additionally, the deficiencies involved work process issues including failures to (1) develop required hazards analysis and controls for the HC material disposal work; (2) properly plan and coordinate the material disposal activities; (3) establish adequate surveillance and maintenance procedures for the HC drains; and (4) provide adequate HC operating procedures to include use of the HC drains. As a result, a spill of contaminated water occurred that was not noticed by the HC operators. Of particular concern to DOE were the informal controls and non-conservative decisions in planning for this work activity.

Section II addresses violations associated with the UT-Battelle immediate response to the spill by a Radiological Control Technician (RCT) and Facility Supervisor. The violations include failures on their part to (1) demonstrate proper As Low As is Reasonably Achievable (ALARA) considerations when dealing with an unknown spill; (2) follow established procedural requirements for various conditions that occurred in this event; and (3) properly respond to the Continuous Alpha Air Monitor (CAAM) alarm that occurred during their attempted cleanup activities. As a result, both the RCT and Facility Supervisor received unplanned radiological doses. Fortunately, these exposures were not large, but they could have been more significant if the individuals had delayed further in leaving the area. Of particular concern is the relative informality demonstrated in responding to the spill, the lack of the desired questioning attitude concerning conditions found, and the apparent expediency they thought they needed even though the circumstances of the spill were not known.

In accordance with the General Statement of Enforcement Policy, 10 CFR 820, Appendix A, the violations described in the sections of the PNOV have been classified according to severity level. The violations in Section I of the PNOV have been classified collectively as a Severity Level II problem based on the several deficiencies in properly analyzing and controlling the hazards, planning and coordinating the work activities, establishing adequate procedural controls, and failing to take steps to correct the HC drain deficiency. The violations in Section II have been collectively classified as a Severity Level II problem, based on the several ALARA and work control deficiencies in responding to the spill event. In determining the severity level of these violations, DOE considered the actual or potential safety significance associated with the events or issues under consideration.

To emphasize the importance of maintaining facilities and equipment, ensuring a proper safety culture, establishing proper safety controls, and rigorously following procedural requirements for DOE nuclear activities, I am issuing the enclosed PNOV and Proposed Civil Penalty in the amount of \$55,000. The specific detail of the associated civil penalty is provided with each violation. For the violations in Sections I and II, DOE has determined that no mitigation is warranted for timely self-identification and reporting since the problems were disclosed by the spill event. However, DOE has applied 50 percent mitigation to the violations for your corrective actions based on the broad and rigorous investigation of the event by UT-Battelle, the prompt compensatory measures, the extent-of-condition reviews, the comprehensive corrective actions, and the in-depth effectiveness review of corrective actions while these were still in the process of being implemented.

An underlying issue illustrated by this event and identified by UT-Battelle in your investigation is the safety culture problem within the organization. At the enforcement conference, you described a number of steps being taken to address these safety culture concerns, including recruiting new managers with the desired safety culture perspective, frequent sessions with workers to communicate expectations, personal involvement of senior management in responding to events and problems to reinforce the desired safety culture, and taking steps to hold managers and workers accountable

when they do not meet these articulated expectations. DOE acknowledges these as positive actions, and encourages UT-Battelle to take steps to ensure the safety culture improvements are lasting. Actions should be taken to properly institutionalize behavior expectations and establishing performance metrics and performance feedback mechanisms for these issues to ensure these safety culture improvements are sustained. Such further steps should be communicated to the DOE Oak Ridge Operations Office; including the DOE Oak Ridge PAAA coordinator.

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 Noncompliance Tracking System (NTS). You should enter into the NTS (1) any additional actions you plan to take to prevent recurrence and (2) the anticipated 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.

Sincerely,



for 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
P. Rodrik, EH-6
Docket Clerk, EH-6
R. Lagdon, EH-31

R. Orbach, SC-1
B. Parks, SC PAAA Coordinator
A. Acton, IG-33
G. Boyd, DOE-ORO
R. Brown, DOE-ORO
G. Malosh, DOE-ORO
L. Kelly, DOE-ORO
J. Moore, DOE-ORO
M. Branton, DOE-ORO
R. Casteel, ORO PAAA Coordinator
W. Madia, UT-Battelle
J. Smith, ORNL
J. Yoder, ORNL PAAA Coordinator
R. Azzaro, DNFSB

**Preliminary Notice of Violation
and
Proposed Imposition of Civil Penalty**

UT-Battelle
Oak Ridge National Laboratory

EA-2004-09

As a result of the Department of Energy's (DOE) Office of Price-Anderson Enforcement's investigation of the October 6, 2003, Building [] Hot Cell (HC) 1 Radiological Spill event, violations of nuclear safety requirements were identified. In accordance with 10 CFR 820, Appendix A, "General Statement of Enforcement Policy," the violations are listed below.

I. Violations Involving Quality Improvement and Work Control Deficiencies that Contributed to the Unplanned Spill of Contaminated Water

A. 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, steps were not taken to identify the causes of the problems with the HC drains and to prevent recurrence. Specifically, Oak Ridge National Laboratory-Non-reactor Nuclear Facilities Division's (ORNL-NNFD) "Conduct of Operations" implementing guideline, issued June 2002, and predecessor guidelines stipulates that prompt action shall be taken to investigate the cause of abnormal indications so that prompt corrective action can occur. It also requires that a job request be initiated to correct an equipment deficiency. As early as 2000 questions were raised by Building [] operations personnel on the performance of the drains. These questions included the slow draining of the HCs in comparison to drains from laboratories. However, no quality problem resolution documentation was initiated, such as a Maintenance Job Request, to formally evaluate the potential problem and establish appropriate corrective actions.

B. Work Control Deficiencies

10 CFR 830.122 (e), *Criterion 5 – Performance/Work Processes* requires that the contractor “(1) 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, preparation for the 3027 Vault material disposal work, conduct of the material disposal work, and general maintenance and operation of the HC were not performed 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. Examples include the following:

1. ORNL failed to develop an adequate hazards analysis for the receipt and disposal of Building 3027 Vault nuclear material. ORNL procedure *Research Hazard Analysis and Control System – Work Control*, dated September 30, 2003, required preparation of a Research Safety Summary (RSS), which is an activity hazards analysis, for activities in ORNL research facilities. ORNL, in planning the 3027 Vault material disposal work, incorrectly concluded that an existing general RSS (RSS 567.1) adequately covered the waste disposal work. However, RSS 567.1 stated that it applied to research, development, and validation of analytical methodology for the characterization of waste. Its scope does not state that it covers dissolution and denaturing of material as part of waste disposal operations.
2. ORNL did not have adequate surveillance and preventative maintenance procedures for the HC drains to ensure acceptable drain performance, although such maintenance and surveillance occurred for ORNL Laboratory drains. No procedures were established for periodic maintenance to treat the drains to remove any potential material build-up. Additionally, no procedures were established for routine surveillance to promptly detect any degradation of drain performance and permit corrective actions before an overflow condition occurred.
3. ORNL did not have adequate operating procedures for the HCs. No operating procedures were established to address operational controls for use of the HC process drains and monitoring of drain instrumentation to verify proper drain flow, or to specify data recording requirements.
4. ORNL did not implement adequate work control steps to coordinate and communicate the work that would be occurring. At the time of this incident, ORNL relied upon the Plan-of-the-Day (POD) meeting to discuss work in the facility. However, the POD sessions did not discuss in detail this dissolution and

denaturing work or the potential hazards associated with the work such as alpha contamination, and the sessions did not include all required parties in attendance when this work was discussed.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - \$27,500

II. Violations Involving ALARA and Work Control Deficiencies in ORNL's Initial Response to the Hot Cell Spill

A. ALARA Radiological Control Deficiencies

10 CFR 835.1001 requires that "For specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain radiation exposures ALARA" (As Low As is Reasonably Achievable).

Contrary to the above, once the spill was detected, ORNL failed to take adequate actions to ensure exposures were maintained ALARA. Examples are as follow:

1. Timely evacuation did not occur. ORNL *Emergency Operating Procedure for the Radioactive Materials Analytical Laboratory (RMAL), Building []*, CASD-OP-RML-FM03, dated May 25, 2001, requires evacuation of the immediate area upon activation of a Continuous Alpha Air Monitor (CAAM) alarm. The RCT and Facility Supervisor initially received a Caution Alarm and, shortly after that, a CAAM High Alarm but they took about two minutes to leave the room following the Caution Alarm. The two minutes is not timely evacuation for such an alarm and is inconsistent with ALARA, particularly since they were not wearing respirators at the time.
2. Inadequate surveys and characterization of the spill were conducted before attempting cleanup. The RCT surveyed the spill using a beta-gamma meter, and obtained readings that were judged to be within normal background levels for that room. However, no survey for alpha radiation was performed, despite alpha-related contamination being processed in HC 1.
3. Inadequate assumptions were made on conditions and potential hazards associated with the spill when it was discovered: Consistent with ALARA practices, ORNL Procedure CASD-OP-RML-AD01, *Work Policies and Practices, Radioactive Materials Analytical Laboratory (RMAL), Building []*, June 30, 2003, requires that any spill of liquids in a laboratory where radioactive materials are handled be considered as radioactive until proven otherwise. The RCT and Facility Supervisor assumed, without basis, that levels of alpha would be consistent with levels of beta-gamma. Since beta-gamma measurements were low, they believed there was minimal alpha radiation and proceeded with the cleanup activities without adequately proving or demonstrating their assumptions consistent with both ALARA practices and site requirements.

4. The RCT and Facility Supervisor did not don respirators when remaining in the area for a few minutes following the CAAM alarm. ORNL *Radiological Support Services Radiation Respiratory Protection* procedure dated August 30, 2002, revision 3, requires that during non-routine operations, emergencies, or response to radiological alarms, respiratory protection is appropriate where real or potential airborne radioactivity exists. After the CAAM alarm had sounded, thus indicating airborne radioactivity, the RCT stayed in the area to perform a swipe, and both the RCT and Facility Supervisor stayed in the area long enough to remove anti-C clothing without respirators.

B. Work Control Deficiencies

10 CFR 830.122 (e), *Criterion 5 – Performance/Work Processes* requires that the contractor “(1) 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, UT-Battelle failed to adequately develop and implement the following administrative controls including written procedures and requirements:


1. Workers used an inappropriate Radiological Work Permit (RWP) for spill cleanup. RWP []-11546 revision 2, dated September 22, 2003, stated that it was for “Routine lab activities.” However, a spill is an abnormal condition, not a routine lab activity. A spill-related RWP would have included the cautions and protective measures tailored to the conditions, including proper personal protective equipment (PPE), respirator protection and other safety controls based on the characterization of the spill.
2. Procedure *Responding to and Cleanup of Spills*, dated December 11, 2002, part of ORNL’s Standard Based Management System-Emergency Management Procedures, does not adequately address the need to conduct sufficient surveys of spills to determine levels of contamination and characterization of contamination before attempting cleanup operations.
3. Procedure *Initial Spill Response*, dated December 11, 2002, requires that, as part of the initial spill response “A person who observes a spill or release initiates Stop Work, if needed, and notifies the Laboratory Shift Superintendent (LSS)... .” However, neither the RCT nor the Facility Supervisor notified the LSS prior to attempting cleanup efforts.
4. Procedure *Initial Spill Response*, dated December 11, 2002, also requires that “The LSS and/or ORNL spill response team will take the subsequent actions to control the event.” Also, procedure *Spill Cleanup*, dated December 11, 2002, requires that the LSS coordinate the cleanup of spills. However, in this case the RCT and Facility Supervisor attempted the cleanup without allowing the LSS to control the event or coordinate the cleanup activity.

5. No precautions or controls were established by ORNL for use of shop vacuums in radiological areas. In this case the RCT and Facility Supervisor attempted the cleanup using a standard shop vacuum.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - \$27,500

Pursuant to the provisions of 10 CFR 820.24, UT-Battelle, LLC is hereby required within 30 days of the date of this Preliminary Notice of Violation (PNOV), to submit a written statement or explanation 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 Oak Ridge Operations Office Manager. 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 asserted to be incorrect; 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 should 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 Notice of Violation 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. Should additional mitigation of the proposed civil penalty be requested, UT-Battelle should address the adjustment factors described in section IX of 10 CFR 820, Appendix A. Within 30 days after the issuance of the PNOV and proposed civil penalty, unless the violations are denied, or remission or additional mitigation is requested, UT-Battelle shall pay the civil penalty of \$55,000 imposed under section 234a of the Atomic Energy 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 UT-Battelle should fail to answer within the time specified, the contractor will be issued an order imposing the civil penalty.


for Stephen M. Sohinki
Director
Office of Price-Anderson Enforcement

Dated at Washington, DC,
this 18th day of November 2004

Enforcement Conference Summary

UT-Battelle, LLC
Oak Ridge National Laboratory
ORNL Building [] Hot Cell 1 Radiological Spill Event
(NTS-ORO--ORNL-X10BOPLANT-2003-0009)

On September 30, 2004, the Office of Price-Anderson Enforcement (OE) held an Enforcement Conference with UT-Battelle concerning an event at Oak Ridge National Laboratory (ORNL), in Germantown, Maryland. The meeting was called to discuss the facts, circumstances, and corrective actions pertaining to nuclear safety issues associated with a radiological spill on October 6, 2003, from Hot Cell 1 in Building [], and breakdowns in the response to the spill by ORNL personnel.

Mr. Stephen M. 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 noted in the August 9, 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 UT-Battelle during the conference was incorporated into the docket.

Mr. William Madia, Executive Vice President for Laboratory Operations of Battelle Memorial Institute began the presentation by providing Battelle's expectations on safety, and emphasized that safety is a core value of UT-Battelle. Dr. Jeff Wadsworth, UT-Battelle President and CEO, ORNL Laboratory Director and Mr. Jeff Smith, UT-Battelle Executive Vice President for Operations continued the presentations for the Laboratory.

UT-Battelle summarized the challenges they inherited when they assumed operational responsibility for ORNL in April 2000, and noted specifically that the safety culture was the toughest challenge they faced. UT-Battelle also outlined the strategy they are implementing to address these broad challenges, including steps to consolidate nonreactor nuclear facility operation into a single division. Other steps included changes in management in various facilities and divisions. Those changes were occurring at the time of this event. Various process improvement, physical plant changes, and financial changes in this general improvement initiative remain to be completed.

UT-Battelle then provided perspective on the Building [] Hot Cell 1 Radiological Spill event including a description of the steps taken to analyze the event and identify its causes. An investigation concluded that degraded equipment performance was known and accepted without investigation and correction, with the root cause being the safety culture issues that had been allowed to continue.

Additionally, UT-Battelle described their extent-of-condition review at other facilities. That review was subsequently expanded when a self-initiated effectiveness assessment determined that a broader extent-of-condition review was required. UT-Battelle also outlined the corrective actions established as a result of this event. These actions included the following:

- Correcting the physical condition of the drain line;
- Developing better coordination steps on waste tank level instrumentation with the Waste Operations Center (operated by another contractor);
- Developing extensive lessons learned to share with other ORNL facilities;
- Revising and enhancing the spill response procedure;
- Revising and enhancing the research work control process;
- Transferring operational responsibility for Building [] to the Nonreactor Nuclear Facility Division (NNFD), including better definition of roles and responsibilities, formalized plan-of-the-Day meetings, a full maintenance program for NNFD, and qualification cards for Building [] personnel;
- Establishing a policy on use of vacuum cleaners in radiological areas;
- Enhancing radiological training;
- Establishing a radiological practices standardization plan; and taking steps to better hold personnel accountable for performance issues.

Dr. Wadsworth then concluded the UT-Battelle presentation by addressing their perspective on mitigation. The summary noted the immediate critique conducted, the prompt compensatory measures taken, the formal investigation that identified underlying cultural issues, the comprehensive corrective actions, and the assessment of corrective action effectiveness. He noted that UT-Battelle is continuing to assess the effectiveness of corrective actions and continuing to address operational performance that does not meet management expectations. In addition he is committed to bring operational discipline to nuclear and radiological operations. He also described the personal steps he has been taking to drive improvement in the safety culture.

UT-Battelle had no factual accuracy issues with the OE -Investigation Summary Report.

Mr. Sohinki stated that OE would consider the information presented by UT-Battelle together with the entire record when OE undertakes its enforcement deliberations. Mr. Sohinki then adjourned the conference. A list of attendees at the conference is attached.

Enforcement Conference Attendees

September 30, 2004

ORNL Building [] Hot Cell Radiological Spill

DOE – Office of Price-Anderson Enforcement

Stephen Sohinki, Director
Howard Wilchins, Senior Litigator
Peter Rodrik, Enforcement Specialist
Ronald Collins, Enforcement Specialist
Hank George, Technical Advisor

DOE – Office of Science

Barry Parks, PAAA Coordinator

DOE – Oak Ridge Operations Office

Roger Casteel, PAAA Coordinator
Johnny Moore, Deputy Assistant Manager for Science

Battelle Memorial Institute

William Madia, Executive Vice President for Laboratory Operations
Guy Cunningham, Associate General Counsel

UT-Battelle

Jeff Wadsworth, President and CEO, ORNL Laboratory Director
Jeff Smith, Executive Vice President for Operations
Kelly Beierschmitt, Vice President for Environment, Safety, Health and Quality
Scott Branham, Director of Audit and Assessment
Herb Debban, Vice President for Facilities and Operations
Steve Porter, Vice President and General Counsel
Crystal Schrof, Senior Assistant General Counsel