



Department of Energy

Washington, DC 20585

May 14, 2015

Dr. Thomas Mason
Laboratory Director
UT-Battelle, LLC
1201 Oak Ridge Turnpike
Suite 100
Oak Ridge, Tennessee 37830

NCO-2015-01

Dear Dr. Mason:

The Office of Enterprise Assessments' Office of Enforcement completed its investigation into the facts and circumstances associated with the airborne contamination release and radiological uptake by seven individuals, which occurred on August 25, 2014, during size reduction of uranium metal alloy items in Building 3525 at Oak Ridge National Laboratory (ORNL). UT-Battelle, LLC (UT-Battelle) documented this event in DOE's Noncompliance Tracking System under report NTS-ORO--ORNL-X10BOPLANT-2014-0005, dated November 12, 2014.

On August 25, 2014, an unexpected airborne contamination release occurred in a posted contamination area during size reduction and repackaging of highly enriched uranium (HEU) metal alloy items. The workers were entered into the bioassay program and it was later determined, through dose assessment, that seven workers received an acute occupational inhalation uptake of HEU. The total committed effective dose was determined to be at or below 5 percent of the regulatory limit for all eight workers involved in this work evolution. This event was determined to be of low safety significance based on actual consequences, but due to the uncertainty in the hazards associated with the material and inadequate work controls, this event could have resulted in moderate safety consequences. The inaccurate assumptions and conclusions about the material, failure to stop work or modify hazard controls when encountering unexpected removable contamination, and inadequate event response were significant contributors to this event. However, UT-Battelle's actions since the event, both completed and planned, as well as senior management's attention, focus, and transparency, have been extensive and appropriate. Consequently, the Office of Enforcement has high confidence that UT-Battelle's corrective actions will prevent future recurrence of similar events.

In accordance with 10 C.F.R. § 820.23, *Consent Order*, the Office of Enforcement has elected to resolve any potential noncompliances with requirements enforceable under 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*, through execution of



a Consent Order. In deciding to enter into this Consent Order, DOE placed considerable weight on UT-Battelle's post-event actions including: (1) a thorough and self-critical event investigation and causal analysis, (2) timely and conservative reporting to the ORNL Site Office and the Office of Enforcement, (3) prompt compensatory actions, (4) comprehensive corrective actions, and (5) senior management's commitment to laboratory safety, recurrence prevention, and continuous improvement.

DOE reserves the right to re-open this investigation if DOE later becomes aware that UT-Battelle provided any false or materially inaccurate information. Further, the Office of Enforcement may pursue additional enforcement activity if there is a recurrence of nuclear safety deficiencies similar to those identified in this Consent Order, or a failure to complete all action items prescribed in the Consent Order (or other related actions that UT-Battelle subsequently determines to be necessary) to prevent recurrence of the identified issues. The Office of Enforcement, the Office of Science, and the ORNL Site Office will continue to closely monitor UT-Battelle's implementation of DOE nuclear safety and occupational radiation protection requirements until the issues associated with this Consent Order are fully resolved.

Enclosed please find two signed copies of the Consent Order. Please sign both, keep one for your records, and return the other copy to the Office of Enforcement within 1 week from the date of receipt. Please follow all instructions specified in the enclosure. By signing this Consent Order, you agree to comply with all of the terms, including payment of the monetary remedy, specified in section IV of the Consent Order and in the manner prescribed therein.

Should you have any questions, please contact me at (301) 903-7707, or your staff may contact Mr. Jon Thompson, Director, Office of Nuclear Safety Enforcement, at (301) 903-1134.

Sincerely,



Steven C. Simonson
Director
Office of Enforcement
Office of Enterprise Assessments

Enclosure: Consent Order (NCO-2015-01)

cc: Johnny Moore, SC-OSO
Michele Branton, SC-OSO
Debbie Jenkins, UT-Battelle

In the matter of) Report No. NTS-ORO--ORNL-X10BOPLANT-2014-0005
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UT-Battelle, LLC)
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) Consent Order NCO-2015-01

CONSENT ORDER INCORPORATING AGREEMENT BETWEEN THE U.S.
DEPARTMENT OF ENERGY AND UT-BATTELLE, LLC

I

UT-Battelle, LLC (UT-Battelle) is responsible for the management and operation for the Department of Energy's Oak Ridge National Laboratory (ORNL). UT-Battelle is the prime contractor under Contract No. DE-AC05-00OR22725 (Contract) entered into with the DOE ORNL Site Office.

II

On August 25, 2014, an unexpected airborne contamination release occurred in a posted contamination area during size reduction and repackaging of highly enriched uranium (HEU) metal alloy items. The event occurred on the 2.5 level of the ORNL Irradiated Fuels Examination Laboratory (Building 3525), causing two distant continuous air monitors to alarm on the 2.0 level. Initially, the facility's whole body contamination monitors indicated no contamination for the eight workers involved in this activity; however, subsequently nasal smears indicated positive alpha activity for three workers. The eight workers were entered into the bioassay program and it was later determined, through dose assessment, that seven workers received an acute occupational inhalation uptake of HEU. The total committed effective dose was determined to be at or below 5 percent of the regulatory limit for all workers involved in this work evolution; the maximally exposed individual was assigned a dose of 230 millirem. Isotopic analysis of the smears and continuous air monitor filters identified that the predominant alpha activity was from uranium-234.

The work was related to a project that required coordination between personnel from UT-Battelle and the National Nuclear Security Administration's (NNSA) Y-12 National Security Complex (Y-12) and entailed shipping HEU from Y-12 to ORNL Building 3525 for size reduction and repackaging. Due to the legacy nature of the material and its classification level, UT-Battelle received only general information on the composition and physical characteristics of the material. The shear used for the size reduction operation was located in an enclosure to contain and collect cutting fines, shards, and any small pieces. Although the enclosure was fitted for point ventilation to minimize airborne contamination, none was utilized; the shear could also have been placed inside an available glovebox to contain any airborne contamination. However,

this more conservative control was not implemented because the work planning process had concluded that, based on the known material characteristics, there was no possibility of airborne contamination and some possibility of only minor surface contamination. These turned out to be erroneous conclusions based on incomplete knowledge of the material. When higher-than-expected radiological surface contamination was observed, UT-Battelle did not revisit its work planning conclusions, modify the work controls, or provide additional personal protective equipment (PPE) to workers. Instead, UT-Battelle modified the radiation work permit to allow for increased surface contamination. The UT-Battelle staff did not recognize the potential for release of uranium-234, which can result in a higher dose than the uranium-235 or uranium-238 assumed during the work planning process. The radiation work permit for this project did not specify any respiratory protection or airborne monitoring requirements, and security requirements specified that items be under escort at all times. When the continuous air monitors alarmed during the operation, workers' egress was delayed because of their failure to believe the alarm and the fact that the material could not be left unattended due to security requirements. During recovery, workers re-entered the area without appropriate PPE or any individual or area monitoring, thereby further increasing the potential for worker exposure.

UT-Battelle's causal analysis of this event determined that the root cause was the incorrect dismissal of the potential for airborne contamination, which resulted in inadequate work planning and inadequate contamination control during the work evolution. The causal analysis also identified 11 contributing causes, including lack of understanding of the material type and form, lack of experience in size reduction, inadequate work planning and control, suboptimal event response and recovery, conflicting requirements, and failure to modify hazard controls when unexpected contamination was encountered.

UT-Battelle voluntarily reported potential noncompliances associated with this event into the DOE Noncompliance Tracking System (NTS) in report NTS-ORO--ORNL-X10BOPLANT-2014-0005, *Unexpected Airborne Radioactivity*.

On January 16, 2015, pursuant to 10 C.F.R. § 820.21(a), and based on the NTS report and discussions with the ORNL Site Office and the Office of Science, the Office of Enforcement initiated an investigation into the August 25, 2014 event. The Office of Enforcement's investigation identified several potential noncompliances with DOE nuclear safety and occupational radiation protection requirements. Specific deficiencies were evident in the areas of written procedures, design and control, training and qualifications, air monitoring, and control of areas.

In a January 23, 2015, letter to the Office of Enforcement, UT-Battelle requested a Consent Order based on the following: (a) consistent history of noncompliance reporting, (b) strong radiological program performance, (c) prompt and thorough reporting, (d) comprehensive investigation and causal analysis, (e) timely corrective actions addressing underlying cultural contributors, and (f) transparent and open communication.

III

Pursuant to 10 C.F.R. § 820.23, at any time during enforcement proceedings, DOE may resolve any or all outstanding issues with a Consent Order if the settlement is consistent with the objectives of the Atomic Energy Act of 1954, as amended, and DOE nuclear safety requirements enforceable under 10 C.F.R. Part 820, *Procedural Rules for the DOE Nuclear Activities*.

To resolve potential noncompliances with DOE nuclear safety requirements and in consideration of UT-Battelle's investigation, causal analyses, and associated corrective actions taken since the submission of the NTS report referenced above, which DOE found to be comprehensive and appropriate, DOE has elected to enter into settlement. DOE and UT-Battelle have reached agreement to resolve this matter through execution of this Consent Order.

IV

Accordingly, the terms of this Consent Order are as follows:

In consideration of the mutual agreements set forth in this section, the sufficiency and adequacy of which are acknowledged by DOE and UT-Battelle (hereinafter the "Parties"), the following terms represent agreement by the authorized representatives of the Parties to resolve by settlement the potential noncompliances at ORNL, in lieu of an enforcement action that DOE may issue pursuant to 10 C.F.R. § 820.24.

1. UT-Battelle shall fully complete and implement all corrective actions previously committed to in its corrective action plan (CAP) and entered into NTS. UT-Battelle shall ensure that its planned CAP commitments address the following areas of emphasis:
 - a. UT-Battelle shall arrange for an independent party (outside of UT-Battelle) to conduct its planned effectiveness review of the corrective actions taken to address these issues, and will provide the results to the Office of Enforcement, the Office of Science, and the ORNL Site Office within 20 months of the Effective Date of this Consent Order as defined in item 4 below.
 - b. UT-Battelle shall ensure that the planned laboratory director guidance update, policy changes, and revised pre-job briefing requirements include direction on balancing potentially conflicting safety and security requirements. UT-Battelle management shall consider the appropriate use of "need to know" with respect to the information necessary to determine the hazards and controls associated with work performed for various customers.
 - c. UT-Battelle shall ensure that its planned training programs include training for workers and managers regarding re-entry into contaminated areas, including proper PPE, individual and area monitoring, controlled entry, and area posting requirements. In addition, UT-Battelle management shall ensure that it provides clear guidance and adequately trains workers regarding stop work authority and to develop a questioning attitude with respect to initial assumptions and a positive nuclear safety culture.

2. UT-Battelle shall pay the amount of \$112,500 reflecting an agreed upon monetary remedy in lieu of the issuance of an enforcement action with the proposed imposition of a civil penalty pursuant to 10 C.F.R. § 820.24.
3. UT-Battelle agrees to return a signed copy of this Consent Order, within 1 week from the date of receipt, to the address provided in item 5 below.
4. The Effective Date of this Consent Order shall be the date upon which UT-Battelle signs this Consent Order.
5. UT-Battelle shall remit the monetary remedy of \$112,500 by check, draft, or money order payable to the Treasurer of the United States (Account Number 891099) within 30 calendar days after the Effective Date of this Consent Order. Payment shall be sent by overnight carrier to:

Director, Office of Enforcement
Attention: Office of the Docketing Clerk, EA-10
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874-1290

6. This Consent Order shall constitute a full and final settlement of the potential noncompliances identified in the referenced NTS reports, subject to the following:
 - (a) UT-Battelle's payment of the monetary remedy in accordance with item 5 above; and
 - (b) UT-Battelle's completion of all actions set forth in item 1 above to the satisfaction of the Office of Enterprise Assessments' Office of Enforcement.
7. Neither the monetary remedy nor any costs, as defined in the Federal Acquisition Regulation, 48 C.F.R. § 31.205-47, incurred by, for, or on behalf of UT-Battelle relating to coordination and cooperation with DOE concerning the investigation of matters covered by this Consent Order, shall be considered allowable costs under the Contract. However, costs incurred by, for, or on behalf of UT-Battelle relating to the development and implementation of corrective actions, including costs associated with the effectiveness review required under item 1 above, may be considered allowable costs under the Contract.
8. This Consent Order does not preclude DOE from re-opening the investigation or issuing an enforcement action under 10 C.F.R. § 820.24 with respect to a potential noncompliance if:
 - (a) after the Effective Date (as defined in item 4 above), DOE becomes aware of any false or materially inaccurate facts or information provided by UT-Battelle;
 - (b) there is a recurrence of nuclear safety deficiencies similar to those identified above; or
 - (c) UT-Battelle fails to complete all actions identified in item 1 above in a timely and effective manner to prevent recurrence of the identified issues.
9. Any modification to this Consent Order requires the written consent of both Parties.

10. UT-Battelle waives any and all rights to appeal or otherwise seek judicial or administrative review of the terms of this Consent Order. DOE retains the right to judicially enforce the provisions of this Consent Order by all available legal means.
11. This Consent Order is issued pursuant to DOE's authority under Section 234A of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2282a), and the implementing provisions of 10 C.F.R. Part 820 governing enforcement of DOE nuclear safety requirements.
12. Pursuant to 10 C.F.R. § 820.23(d), this Consent Order shall become a Final Order 30 calendar days after the signed copy, referenced in item 3 above, is filed by the Office of Enforcement's Office of the Docketing Clerk unless the Secretary of Energy files a rejection of the Consent Order or a modified Consent Order.

On behalf of my respective organization, I hereby agree to and accept the terms of the foregoing Consent Order.

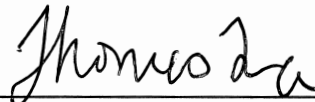
FOR U.S. Department of Energy

FOR UT-Battelle, LLC



Date 05/14/15

Steven C. Simonson
 Director
 Office of Enforcement
 Office of Enterprise Assessments



Date 5/20/15

Thomas Mason
 Laboratory Director, ORNL
 UT-Battelle, LLC