



Department of Energy

Washington, DC 20585

July 13, 2016

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

WEL-2016-03

Dear Dr. Mason:

The Office of Enterprise Assessments' Office of Enforcement has completed an evaluation into the facts and circumstances associated with a January 13, 2016, event in which employees were exposed to elevated levels of ozone at the headworks building of the sewage treatment plant at the Oak Ridge National Laboratory (ORNL). Inhalation of ozone at elevated levels can cause irreversible lung damage. UT-Battelle, LLC (UT-Battelle) documented noncompliances revealed by this event in the Department of Energy's (DOE) Noncompliance Tracking System under report NTS-ORO-ORNL-X10BOPLANT-2016-0002, *Employees Exposed to Ozone during Preparations for Maintenance Task*, dated March 2, 2016. The event and actions leading up to the event reveal potential concerns that warrant management attention related to the hazard identification, assessment, prevention, and abatement requirements in 10 C.F.R. Part 851 (Part 851), *Worker Safety and Health Program*.

On January 13, 2016, two UT-Battelle employees were conducting atmospheric tests in Building 2521 for planned confined space entry when they experienced coughing and burning in their chests. Both employees proceeded to exit the building to get fresh air. The cause of the employees' symptoms was assumed to be related to elevated ozone exposure and one of the employees reentered the building to conduct ozone monitoring without wearing respiratory protection. The monitoring effort revealed elevated levels of ozone. Both employees reported to the health unit and were released the same day.

There are a number of issues of concern related to the event, based on information in UT-Battelle's Causal Analysis Report, *Employees Exposed To Ozone During Preparation For Maintenance Task*, NTS-ORO-ORNL-X10BOPLANT-2016-0002, dated April 13, 2016. UT-Battelle completed a corrective action plan, entitled *Corrective Action Plan for NTS-ORO-ORNL-Z10BOPLANT-2016-0002, "Employees Exposed to Ozone during Preparations for Maintenance Task,"* dated April 27, 2016, addressing causal factors related to the event. A conference call was held on May 5, 2016, with UT-Battelle and DOE's ORNL Site Office and Office of Enforcement to discuss the event, causal analysis report, and



corrective action plan. Related to the event and UT-Battelle's response, the Office of Enforcement has particular concern regarding application of control measures and the response to the event.

1. An ozone exposure event occurred at the ORNL sewage treatment plant in 2005 and UT-Battelle detected ozone in the Building 2521 basement in 2012. While a destruct unit was purchased in 2012 to remove ozone from the contact chamber exhaust, installation was not completed until after this most recent event. Instead, UT-Battelle applied administrative controls, including signage, to address potential employee exposure to ozone. Part 851 requires contractors to select hazard controls based on the following hierarchy: (1) elimination or substitution where feasible and appropriate; (2) engineering controls where feasible and appropriate; (3) work practices and administrative controls that limit work exposure; and (4) personal protective equipment.
2. A UT-Battelle employee was exposed to ozone in excess of an excursion limit during repeated entries into Building 2521 on January 13, 2016. Part 851 requires contractors to ensure that workers are not exposed above the limits in the American Conference of Governmental Industrial Hygienists, Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (2005). The TLVs for ozone are 1 part per million (ppm) as an excursion limit, 0.2 ppm for short-duration (less than or equal to 2 hours), and 0.1 ppm as an 8-hour time weighted average for light duty work. During the event, reported ozone levels in Building 2521 exceeded 0.9 ppm, the operating limit of the ozone monitoring instrument, in some areas.
3. UT-Battelle utilized a monitoring instrument that was inadequate to measure ozone levels for assessing potential worker exposure, as ozone levels exceeded the operating limit of the instrument. Ozone levels may have been substantially higher than 0.9 ppm.
4. UT-Battelle acknowledged that training was insufficient to ensure that employees were aware of the hazards and occupational exposure limits for ozone. However, given the health symptoms exhibited by the personnel and the uncertain conditions in the building during the entries, UT-Battelle's training and response procedures also appear inadequate for entry to potentially hazardous environments.

UT-Battelle should ensure that control measures are selected and implemented consistent with Part 851 requirements for hierarchy of controls, that proper personal protective and monitoring equipment are utilized when needed to address employee exposure, and that employees receive adequate training on proper response to potentially hazardous environments. Despite the deficiencies revealed by this event, DOE has elected to exercise enforcement discretion based on UT-Battelle's post-event analysis and corrective actions. In coordination with the

Office of Science, the Office of Enforcement will continue to monitor UT-Battelle's efforts to maintain a safe and healthful workplace consistent with the requirements of Part 851.

This letter imposes no requirements on UT-Battelle and no response is required. If you have any questions, please contact me at (301) 903-7707, or your staff may contact Dr. Anthony Pierpoint, Acting Director, Office of Worker Safety and Health Enforcement, at (301) 903-0100.

Sincerely,



Steven C. Simonson

Director

Office of Enforcement

Office of Enterprise Assessments

cc: Johnny Moore, DOE-SC OSO
Debbie Jenkins, UT-Battelle, LLC