



## Department of Energy

Washington, DC 20585

July 12, 2021

Dr. Paul Kearns  
Laboratory Director  
UChicago Argonne, LLC  
Argonne National Laboratory  
9700 S. Cass Avenue  
Lemont, Illinois 60439

NEL-2021-01

Dear Dr. Kearns:

The U.S. Department of Energy (DOE) Office of Enterprise Assessments' Office of Enforcement has evaluated an incident in which a sub-contractor employee entered an area designated as a Very High Radiation Area (VHRA) at Argonne National Laboratory. VHRAs are required to be controlled to prevent unauthorized or inadvertent access to ensure that employees do not exceed their 10 C.F.R. Part 835 dose limits in a short period of time resulting in potential adverse health effects. Based on this evaluation, the Office of Enforcement identified concerns that warrant management attention by UChicago Argonne, LLC (UChicago Argonne).

On December 5, 2020, a protective force sub-contractor employee unlocked an exterior door of Building 206 that was posted as a "Controlled Area" and entered the building. This area did not have radiation levels higher than background. Subsequently, the employee opened an unlocked interior fire door to the high bay that was posted "Grave Danger Very High Radiation Area" while the radiation source, an x-ray machine, was energized. An interlock on the high bay entry door automatically shut down the x-ray machine located in an annex room to the high bay, which eliminated the source of radiation in the high bay before the employee entry. The employee's dosimeter indicated no dose from this event.

In November 2020, UChicago Argonne performed an ALARA [as low as reasonably achievable] review and documented their engineering and administrative controls for this activity in an Intra-Laboratory Memo titled *Real-time X-Ray Machine Commission in Building 206 ALARA Design Review*. The memo identified that "an interlock system to interrupt the generation of x-rays in case of an unauthorized entry to the Building 206 High Bay...will satisfy the requirements of 10 CFR 835.502, [*High and very high radiation areas*]." This interlock functioned as designed and was implemented consistent with the 10 C.F.R. §835.502(b) requirement for physical controls for access to a high radiation area. However, the Office of Enforcement is concerned that the ALARA design



review did not identify additional measures<sup>1</sup>, consistent with 10 C.F.R. §835.502(c), to prevent unauthorized or inadvertent access into a VHRA.

After the December 5 event, UChicago Argonne performed a root cause analysis (RCA) and documented the results in INV-2021-09, *Building 206 Administrative Controls Failure – Debriefing Meeting Form*. The RCA’s causal factors focused on what failed from the engineering and administrative controls incorporated for the work activity. However, the RCA did not identify that the Building 206 ALARA Design Review did not establish additional measures, consistent with 10 C.F.R. §835.502(c), to prevent unauthorized or inadvertent access to VHRAs. While a variety of controls could be used for compliance with 10 C.F.R. §835.502(c), the RCA erroneously ruled out some options for controlling access to the VHRA. For example, INV-2021-09 states that “all the high bay doors are fire rated and could not be physically locked per National Fire Protection Association (NFPA) 80, *Standard for Fire Doors and Other Opening Protectives*.” However, because the direction of egress was opposite to the direction traveled by the employee, this statement appears to be erroneous. NFPA 80 allows a fire door to be locked if the lock does not prevent travel in the direction of egress. As a result, UChicago Argonne did not consider additional physical controls (such as locks with positive key control) related to the fire doors that would comply with 10 C.F.R. Part 835 and NFPA 80.

UChicago Argonne *Radiological Safety Program Description (RSPD)*, Section 1.1.1, *Purpose*, states that the RSPD “provides necessary detail to implement the program.” However, Section 7.4.3, *Very High Radiation Areas*, does not provide any details regarding how to implement the additional measures required by 10 C.F.R. §835.502(c). Instead, RSPD Section 7.4.3 paraphrases the requirement from 10 C.F.R. §835.502(c) and then provides two bulleted items. These bulleted items are not additional measures, as they are already required by 10 C.F.R. Part 835 in other sections. Specifically, the bullet to post the area as a VHRA is already required by 10 C.F.R. §835.603, *Radiological areas and radioactive material areas*. Similarly, the bullet to perform a survey upon first entry to an area that is no longer a VHRA is required by 10 C.F.R. §835, Subpart E, *Monitoring of Individuals and Areas*. As a result of this weakness in the RSPD, the physical and administrative controls implemented by UChicago Argonne were not effective in preventing entry to an area that was designated as a VHRA. Consequently, the Office of Enforcement is concerned that UChicago Argonne has not provided adequate guidance in the RSPD on how to implement additional measures to comply with the requirements of 10 C.F.R. §835.502(c).

UChicago Argonne’s initial corrective actions for this event focused on improving communications between work groups, training, and review of additional administrative controls. The initial corrective actions are adequate to address the causal factors identified in the RCA. However, the Office of Enforcement is concerned that the

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<sup>1</sup> DOE Guide 441.1-1C, *Radiation Protection Programs Guide for use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*, identifies “such measures (i.e., physical constraints) should include locking or securing service doors and panels with tamper resistant fasteners or the use of multiple and redundant access controls.”

associated corrective actions did not include: 1) a review of the adequacy of the existing controls, 2) reviews of additional physical and engineering controls to prevent unauthorized or inadvertent access to VHRAs, or 3) modification of implementing procedures to ensure that such reviews are conducted in the future. The Office of Enforcement acknowledges that UChicago Argonne has conducted a common cause analysis of radiation safety events since January 2020 (including a separate February 1, 2021, radiological area entry control event) to identify ways to prevent recurrence.

The Office of Enforcement has elected to issue this Enforcement Letter to convey concerns about: (1) weaknesses in UChicago Argonne's procedures and work planning documents to evaluate and select adequate controls to prevent entry into a VHRA; (2) failure to identify these weaknesses during the causal analysis; and (3) the resulting inadequacies in the identified corrective actions. Issuance of this Enforcement Letter reflects DOE's decision to not pursue further enforcement activity against UChicago Argonne at this time. In coordination with the DOE Office of Science, the Office of Enforcement will continue to monitor UChicago Argonne's efforts to improve radiation protection program performance.

This letter imposes no requirements on UChicago Argonne, and no response is required. If you have any questions, please contact me at (301) 903-4033, or your staff may contact Mr. Jacob M. Miller, Director, Office of Nuclear Safety Enforcement, at (301) 903-7707.

Sincerely,

A handwritten signature in black ink that reads "Kevin L. Dressman". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Kevin L. Dressman  
Director  
Office of Enforcement  
Office of Enterprise Assessments

cc: Joanna Livengood, ASO  
Stu Meredith, ANL