

Bruce Hamilton, Chairman
Jessie H. Roberson
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**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



December 4, 2019

The Honorable Dan Brouillette
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Brouillette:

The Defense Nuclear Facilities Safety Board completed a review of the Oak Ridge Oxide Processing (OROP) campaign at Oak Ridge National Laboratory. As part of the OROP campaign, selected uranium-233 materials from Building 3019 will be transferred and processed in Building 2026.

The Board's initial review of the safety basis and criticality safety evaluation for the OROP campaign identified an inconsistency with the implementation of nuclear criticality safety requirements from Department of Energy (DOE) Order 420.1C, *Nuclear Criticality Safety*, and American National Standards Institute/American Nuclear Society (ANSI/ANS) 8.1, *Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors*. The OROP campaign did not include an adequate safety margin between the selected operational mass limit and the identified subcritical mass limit to process uranium-233 materials.

The contractor has developed additional analyses to establish a new subcritical mass limit for uranium-233, but the analyses are incomplete. The lowest uranium-233 and water mixture density value is not a conservative representation of an abnormal condition under which to determine a minimum critical mass for a homogenous mixture. Thus, the analyses are not sufficient to show that the entire process will be subcritical under both normal and credible abnormal conditions as required by DOE Order 420.1C. The Board has concluded that the identified subcritical mass limit may be appropriate for the selected material and this process, but DOE should consider improving the technical documentation to meet its cited order and standard in order to ensure that adequate protection for this campaign can be maintained going forward.

Yours truly,

A handwritten signature in black ink, appearing to read "Bruce Hamilton", is written over a horizontal line.

Bruce Hamilton
Chairman

c: Mr. Joe Olencz