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June 20, 2022
ACO 22-0049

ATTN: Document Control Desk
John W. Lubinski, Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

American Centrifuge Lead Cascade Facility and American Centrifuge Plant
Docket Numbers 70-7003 and 70-7004; License Numbers SNM-7003 and SNM-2011

Summary of Non-Administrative Changes to the Criticality Computer Code Validation Report

Dear John Lubinski:

In accordance with SNM-2011, *Materials License,* condition 27, American Centrifuge Operating, LLC (ACO) hereby submits to the U.S. Nuclear Regulatory Commission (NRC) a summary of changes to ACO's EE-3101-0013, Rev. 1, *NCS Code Validation of SCALE 6.2.3 and Cross Section Set v7-252 for* k_{eff} *Calculations* as Enclosure 1 of this letter.

These changes have been reviewed in accordance with 10 CFR 70.32 and 10 CFR 70.72 and have been determined not to reduce the margin of subcriticality for safety and not require prior NRC approval. A revised validation report will be available upon request.

If you have any questions regarding this matter, please contact me at (740) 897-3859.

Sincerely,

for K. Fitch

Kelly L. Fitch
Regulatory Manager

NMSS01

cc (with enclosure, unless otherwise noted):
Y. Faraz, NRC HQ (Enclosure)
S. Harlow, DOE HQ
N. Pitoniak, NRC Region II
L. Pitts, NRC Region II (Enclosure)
J. Tobin, NRC HQ (Enclosure)
T. Vukovinsky, NRC Region II

Enclosure 1 to ACO 22-0049

Summary of Changes to EE-3101-0013, Rev. 1, *NCS Code Validation of SCALE 6.2.3 and Cross Section Set v7-252 for* k_{eff} *Calculations*

Information Contained Within
Does Not Contain
Export Controlled Information

Reviewing Official: #1038, ACO
Date: 6/20/2022

Summary of Changes in EE-3101-0013, Rev. 1

1. Added a revision log to the document to provide a mechanism to clearly document the changes made during each revision to the document.

2. Revised the Material Area of Applicability (AoA) provided in Section 9.1 to exclude all standard compositions that use nuclide ID 9001001 (i.e., h-poly, norpar13, paraffin, polyethylene, polyvinylcl, pvc, tbp, and kerosene). These standard compositions are excluded based on SCALE User Notice dated February 26, 2021.

3. Added the SCALE User's Notice, dated February 26, 2021, to the References.

Background Information

The Radiation Safety Information Computational Center (RSICC) issued a SCALE User Notice on February 26, 2021, to communicate an issue in SCALE 6.1.0-6.1.3 and 6.2.0-6.2.4. The User Notice states,

> "A defect has been found in SCALE's h1-poly incoherent elastic scattering which can cause k-eff underprediction approaching 1% in criticality problems with polyethylene as the primary moderator."

The issue was entered into American Centrifuge Operating, LLC's (ACO) Corrective Action Program. In response to the SCALE User Notice, ACO performed a review of nuclear criticality safety (NCS) calculations to identify any case that used standard composition H-POLY. By extension searches for any use of Nuclide ID 9001001 were performed by NCS. The searches included all calculations used to establish the basis for subcriticality and no cases were identified that included Nuclide ID 9001001.

A separate action was established to programmatically prohibit use of standard compositions that use SCALE ID 9001001 (e.g., H-POLY and POLYETHYLENE). A search through the benchmark cases revealed that no case used H-POLY; however, nuclide ID 9001001 was included in cases that use standard composition POLYETHYLENE. That material was included (with nuclide ID 9001001) in benchmarks IMF-022-02, IMF-022-03, IMF-022-04, IMF-022-05, and IMF-022-07. A review of the results for those cases in Table 40 of EE-3101-0013 does not indicate an underprediction in k_{eff}. Since these benchmarks include nuclide ID 9001001, the effect of the cross-section bias for nuclide ID 9001001 is represented to some extent in the bias and bias uncertainty calculated in EE-3101-0013. Nevertheless, the standard compositions that use nuclide ID 9001001 were excluded from the AoA in EE-3101-0013 for conservatism.