



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 1, 2017

MEMORANDUM TO: John Giessner, Director  
Division of Nuclear Materials and Safety  
Region III

FROM: John Tappert, Director */RA/*  
Division of Decommissioning, Uranium Recovery, and Waste Programs  
Office of Nuclear Materials Safety and Safeguards

SUBJECT: RESPONSE TO TECHNICAL ASSISTANCE REQUEST ADDRESSING  
SPECIFIC QUESTIONS RELATED TO THE DECOMMISSIONING OF  
THE BUILDING 140 CYCLOTRON VAULT AT NASA'S JOHN H. GLENN  
RESEARCH CENTER

Please find below a response to the Region III Technical Assistance Request (TAR) (ML17193A925) regarding issues associated with the final status survey report supporting the release of the cyclotron facility, Building 140, at the National Aeronautics and Space Administration's (NASA) John H. Glenn Research Center (GRC) for unrestricted use (ML17159A754). NASA is proposing to remove Building 140, including infrastructure and remaining installed equipment, from its GRC materials license (GRC license). Upon completion of the decommissioning process and release of the building for unrestricted use, NASA plans to demolish the building and dispose of the building and surrounding soils in a landfill. As part of the review process, NRC Region III requested assistance and clarification on issues related to the regulatory process and the use of available guidance documents. Specific questions include:

What regulatory criterion, 10 CFR 20.1402 or 10 CFR 20.2002, should be used to evaluate the proposed licensing action?

Should the dose or derived concentration guideline level (DCGL) of a few millirem per year be based on concentrations of radionuclides associated with the material or the volume of the material being considered for release?

#### 10 CFR 20.1402 AND 10 CFR 20.2002 CRITERIA

As indicated in the submitted documents, NASA requests the NRC approve the decommissioning of Building 140, a radioactive material usage location that contained a cyclotron within a shielded vault and various support areas, and release the building from its GRC license for unrestricted use. In addition, NASA indicates in the introduction section of

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the final status survey report (ML17159A744) that “upon completion of the decommissioning process and unrestricted release of the building and surrounding soils, the building will be demolished and sent for disposal along with surrounding soils.” As discussed in the TAR, NRC Region 3 staff is requesting guidance regarding the process and regulations that should be used to evaluate the requested application to decommission and remove Building 140, including the infrastructure and remaining installed equipment and components, and surrounding soils from the GRC license. Questions focused on whether the release of the building should be based on 10 CFR 20.1402, “Radiological criteria for unrestricted use,” 10 CFR 20.2002, “Method of obtaining approval of proposed disposal procedures,” or some other regulation.

Section G.1.1 of Appendix G of NUREG-1757, Volume 2, “Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria,” Revision 1, provides guidance on how to approach issues such as this one. Additional information and discussions are included in SECY-03-0069, “Results of the License Termination Rule Analysis,” and RIS 2004-08, “Results of the License Termination Rule Analysis.” Considering the information provided in the submittal and NASA’s proposed path forward—release of the building for unrestricted use followed by demolition and disposal—NRC approval should be based on the 10 CFR 20.1402 unrestricted release criterion of no more than 0.25 mSv/y (25 mrem/y) and ALARA. Because NASA’s current plan is to demolish and dispose of the building and surrounding soils *after* the NRC approves the release of the building for unrestricted use, the NRC will have no regulatory authority to oversee the demolition and disposal of the building and surrounding soils. In other words, following release of the building for unrestricted release no NRC regulations for controlling future uses would be maintained and materials in the building at that time of license termination could be used for any purpose, without NRC oversight. As a result, NASA would be allowed to select any path forward for the building without NRC oversight or control. This could include the proposed demolition and disposal but may also include a variety of other options, including repurposing the building for other uses.

It should be noted, however, that evaluating a building to determine if it can be released for unrestricted use requires consideration of reasonably foreseeable land use scenarios, which could include demolition, disposal, and recycling-related activities. Because NASA is considering these reasonably foreseeable land use scenarios as part of its license amendment request that, if granted, would remove Building 140 from the license and release it for unrestricted use, doses associated with these scenarios would be subject to the 0.25 mSv/y (25 mrem/y) requirement in 10 CFR 20.1402.

Section G.1.1 also discusses what materials associated with the licensed area may be considered as part of the building structure and may be included when evaluating the doses associated with unrestricted releases and what materials should be evaluated in accordance with other existing regulatory requirements associated with the removal of material (e.g., 10 CFR 20.2002). Materials that may be left onsite and be included in the doses evaluated for license termination include “building structures” and “systems and components” attached to the building. The other types of materials should be removed from the site prior to license termination pursuant to 10 CFR 20.2002 or similar approval processes. Removal of these

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materials, which would occur prior to license termination, would be evaluated on a case-by-case basis and be required to meet the few mrem/y criterion as outlined in Section 15.11 of NUREG-1757, Volume 1, Revision 2, and RIS 2004-08.

#### USING DOSE CONVERSION FACTORS (DCFs) PUBLISHED IN NUREG-1640

NASA proposes to use the DCFs from NUREG-1640, "Radiological Assessments for Clearance of Materials from Nuclear Facilities," and the ratio of disposed material (i.e., concrete and steel) to the total mass processed per year to assess the dose to individuals associated with disposal of materials associated with the cyclotron facility after release of Building 140 for unrestricted use. NUREG-1640 was originally developed to support rulemaking efforts and was not intended to be used as a reference document containing scenario-specific parameter values that could be used in place of site-specific parameter values. Industry practices change over time and can impact the values included in the document, especially considering that the most recent version of the NUREG was published almost twenty years ago. For example, trends such as the recycling and reuse of materials results in less material being sent to disposal facilities. As a result, the "dilution factor" used by the licensee may not be accurate and would require further justification beyond just referencing processes documented in NUREG-1640.

As for the concerns brought forward in the TAR, a licensee is permitted to use NUREG-1640 when evaluating reasonably foreseeable scenarios to identify the critical group (see Appendix I of NUREG-1757, Volume 2, Revision 1) associated with a site to meet the dose requirements in 10 CFR 20.1402. The document can provide relative information on offsite dose scenarios that may be able to be screened out or in as the critical group. In addition, the licensee should also be evaluating onsite scenarios when determining the critical group. If the critical group is determined to be associated with an offsite reuse or disposal scenario developed in NUREG-1640, the licensee should either provide independently-determined parameter values when evaluating doses associated with the scenario or provide sufficient justification for use of the values included in NUREG-1640. As for the specific question regarding DCFs, NRC staff agree that if the licensee is able to provide sufficient justification for using the DCFs published in NUREG-1640 then they should be based on concentrations of radioactive material and not the volume of material being released.

#### CONCLUSIONS

As discussed above, NASA is requesting that the NRC approve the decommissioning of Building 140 at the GRC. Upon release, NASA is proposing to demolish and dispose of the building and surrounding soil at a landfill. As discussed in Section G.1.1 of NUREG-1757, Volume 2, Revision 1, since this approach involves decommissioning and release of the building for unrestricted use prior to demolition and disposal, the applicable dose limit associated with this licensing action is the 0.25 mSv/y (25 mrem/y) and ALARA requirement in 10 CFR 20.1402. Upon completion of this licensing action the NRC no longer has control over that portion of the site and NASA would be able to proceed with demolition and disposal or any other path forward without NRC oversight.

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As for the use of NUREG-1640, the scenarios and specific parameter values provided in the document were not intended for use in place of site-specific values for individual sites. Licensees are permitted to use the scenarios discussed in NUREG-1640 when evaluating whether reasonably foreseeable land use scenarios associated with a site meet the dose requirements in 10 CFR 20.1402 but they must provide independently-determined parameter values or sufficient justification for the use of the values included in NUREG-1640. If a licensee is able to justify the use of the values provided in NUREG-1640 then they should be applied as intended. In the case of DCFs, they should be associated with radionuclide concentrations and the use of "dilution factors" would require sufficient justification.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning the above, please contact Adam Schwartzman at (301) 415-8172 or via email at [Adam.Schwartzman@nrc.gov](mailto:Adam.Schwartzman@nrc.gov).

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**ML17226A088**

<b>OFFICE</b>	DUWP	DUWP	OGC	DUWP
<b>NAME</b>	ASchwartzman	CMcKenney	EHouseman	JTappert
<b>DATE</b>	8/14/17	8/15/17	8/31/17	9/1/17