

## Response to SDAA Audit Question

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**Question Number:** A-11.3-2

**Receipt Date:** 05/30/2023

**Question:**

COL Item 11.3-1 does not provide the language provided by COL Item 11.2-3 that clarifies the purpose of the Cost Benefit Analysis to conform with the regulatory requirements in 10 CFR Appendix I. In addition, it does not specify the guidance document of RG 1.110 for performing this analysis. NRC staff is seeking clarification on if the COL Item 11.3-1 will use RG 1.110 in performing this Cost Benefit Analysis.

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**Response:**

NuScale has revised COL Item 11.3-1 to add reference to RG 1.110 in performing a Cost Benefit Analysis.

Markups of the affected changes, as described in the response, are provided below:

2 percent, the inlet stream to the GRWS automatically isolates and a nitrogen purge valve automatically opens to purge the GRWS with nitrogen. The hydrogen monitor ensures detection of a maximum concentration of 4 percent with notification of a high-high alarm. The high alarm at approximately one-half of the maximum oxygen concentration includes a local, WMCR and MCR notification.

The design of the gas analyzer instruments is to be non-sparking. Gas analyzers have sensor checks, functional checks, and calibrations performed in accordance with vendor recommendations.

### 11.3.2.2 Malfunction Analysis

Table 11.3-3 provides a summary of a malfunction analysis of the GRWS.

### 11.3.2.3 Design Safety Evaluation

The GRWS complies with the following GDC found in 10 CFR Part 50, Appendix A:

- GDC 2 as it relates to structures and components of the GRWS using the guidance of RG 1.143 for the seismic, safety, and quality classifications
- GDC 3 as it relates to protecting the GRWS from the effects of a detonation of a hydrogen-oxygen mixture by preventing such mixtures from occurring
- GDC 60 as it relates to the design of the GRWS to control releases of radioactive gaseous effluents generated during normal reactor operations, including AOOs
- GDC 61 as it relates to radioactive waste systems being designed to provide for adequate safety under normal and postulated accident conditions, and designed with suitable shielding for radiation protection and with appropriate containment, confinement, and filtering systems

There are design features that comply with the requirements of 10 CFR 20.1406 following the guidance of RG 4.21, to minimize contamination of the facility and the environment, facilitate eventual decommissioning, and minimize the generation of radioactive waste. Section 12.3.6 provides additional details.

The gaseous radioactive waste structures, systems, and components design complies with the codes and standards provided in RG 1.143, Table 1 through 4. The applicable design criteria from RG1.143, Table 2, Table 3 and Table 4 are used in the design analysis of the GRWS components. The safety classification for the GRWS components applies to components, up to and including the nearest isolation device. Table 11.3-2 provides the design parameters of major components, including safety classification and operating conditions.

### 11.3.2.4 Site-Specific Cost-Benefit Analysis

COL Item 11.3-1: An applicant that references the NuScale Power Plant US460 standard design will perform a site-specific cost-benefit analysis [using the guidance in Regulatory Guide 1.110](#).

#### 11.3.2.5 Seismic Design

The gaseous radioactive waste equipment and piping classification complies with RG 1.143. Section 3.7 describes the RWB seismic design.

#### 11.3.3 Radioactive Effluent Releases

Technical Report TR-123242 (Reference 11.3-1) describes the gaseous radioactive effluent release methodology, inputs, and results.

Table 11.3-5 tabulates the results of the radioactive effluent calculation and demonstrate compliance with the limits from 10 CFR 20, Appendix B, Table 2. The comparison demonstrates that the overall expected gaseous releases are within the release limits.

The GASPAR II Code is used to calculate the maximum individual doses at the exclusion area boundary. Table 11.3-6 tabulates the input parameters. Table 11.3-7 tabulates the resultant doses and demonstrates compliance with the limits of 10 CFR 50 Appendix I.

COL Item 11.3-2: An applicant that references the NuScale Power Plant US460 standard design will calculate doses to members of the public using the site-specific parameters, compare those gaseous effluent doses to the numerical design objectives of 10 CFR 50, Appendix I, and comply with the requirements of 10 CFR 20.1302 and 40 CFR 190.

#### 11.3.3.1 Radioactive Effluent Releases and Dose Calculation due to Gaseous Radioactive Waste System Leak or Failure

The analysis of a GRWS leak or failure follows the guidance of Branch Technical Position 11-5 and demonstrates compliance with regulatory limits. The dose consequence analysis evaluates a postulated event in which the GRWS fails. The analysis used in determining the radionuclide content of the effluents assumes that 1 percent of the operating fission product inventory in the core is released to the primary coolant. Table 11.3-8 tabulates the release source term. The dose consequences are calculated using the Radionuclide Transport and Removal and Dose (RADTRAD) code using the two-hour exclusion area boundary atmospheric dispersion factor from Table 2.0-1. Table 11.3-8 presents the resultant offsite doses.

COL Item 11.3-3: An applicant that references the NuScale Power Plant US460 standard design will perform an analysis in accordance with Branch Technical Position 11-5 using the site-specific parameters.