FSAR Tier 2 Section 8.3.2.1.1 states that EDSS-MS Channels A & D is specified to preclude unnecessary ECCS valve actuation for a minimum of 24 hours following a postulated LOOP, unless a valid ECCS actuation signal is received. For option 1, SECY 19-0036 states that the capacity, capability and augmented quality level of the dc power system would need to be assessed to demonstrate its high reliability.

1) Clarification: Based on FSAR Tier 2, Section 8.3.2.1.1, as stated above, only EDSS-MS, Channels A & D would be credited under Option 1 and as such, staff would request NuScale to confirm that only channels A&D would be credited and revise the DCA as such. If NuScale confirms that only Channels A & D are credited to preclude unnecessary valve actuation, the questions below only pertain to EDSS-MS Channels A & D.

2) Regulatory Finding: EDSS has sufficient capacity to perform its intended function. [review to be documented in Chp 8 SER]

What is needed for finding: FSAR Tier 2 Section 8.3.2.1.1 discusses the design factors for load growth, temperature correction, and battery aging. FSAR Tier 2 Section 8.3.2.2.3 states that DC equipment sizing was developed from a load list and verified through simulation. To assess capacity, staff would like to audit the equipment sizing studies for the dc system.

Acceptance criteria: confirm that sizing methodology was performed according to the IEEE Std. 485 for the batteries. Staff will confirm that the factors are in accordance with IEEE Std. 485. In addition, staff will review/audit the sizing calculations for the dc system.

3) Regulatory Finding: The EDSS is capable of performing its intended function. [review to be documented in Chp 19 SER]

What is needed to make finding: FSAR Rev 2, Section 8.3.2.1.1 states “An evaluation of the EDSS reliability was performed using the methodology described in Condition of Applicability II.2 of Reference 8.3-1. Using the generic failure probabilities from Section 19.1.4.1.1.5, the EDSS supports the mission requirements with high reliability.” To assess the reliability, staff would like to audit the reliability evaluation that supports that the EDSS is highly reliable. EENB would support an audit conducted by PRA staff.

Acceptance criteria: TBD. Staff will discuss with Chp 19 colleagues to determine what high reliability is.

4) Regulatory Finding: The EDSS is capable of performing its intended function. [review to be documented in Chp 8 SER]

What is needed to make finding: Considering the valve-regulated lead-acid (VRLA) batteries have not been used in NPPs, NuScale’s use of VRLA batteries is a first-of-a-kind use in NPPs. Operating experience in other industries such as telecommunications and Navy has been considered and in these applications, the batteries are cycled regularly, ensuring the availability and reliability of the batteries. However, in the NuScale design, the EDSS batteries would in in standby for long periods of time and as such, the operating experience is not fully applicable. Based on limited operating experience, staff is seeking to understand how NuScale has

demonstrated functionality, since the EDSS would be credited. For example, industry/ vendor data, operating experience or testing could support a demonstration of functionality.

In addition, in response to RAI 08.03.02-1 for the TR, the applicant discusses following IEEE Std. 1491-2012 and IEEE Std. 1635-2012 for battery monitoring and ventilation and thermal management. FSAR Tier 2 Section 8.3.2.1.1 states that battery monitors provide continuous monitoring of EDSS battery performance. For consistency in how other standards are referenced in the DCA, the DCA should be updated to reflect the use of industry consensus on battery monitoring and ventilation and thermal management.

Regarding independence, which is one of the augmented quality attributes, the applicant discussed physical separation in FSAR Tier 2 Section 8.3.2.1.1. Equipment protection and coordination studies is discussed in FSAR Tier 2 Section 8.3.2.2.3 and addresses aspects of EDSS protection from faults. To asses that the EDSS is protected against faults, the staff would like to audit the equipment protection and coordination studies.

Acceptance criteria: Demonstrate that EDSS is capable of performing its intended function through data and/or operating experience of the VRLA batteries. Inclusion of IEEE Std. 1491 & 1635 in the DCA as they are being relied on to address battery monitoring and ventilation in order for the EDSS to perform its intended function. Audit of equipment protection and coordination studies for the EDSS to verify that the EDSS is protected against faults to perform its intended function.

5) Regulatory Finding: EDSS is maintained during operations to perform its intended function. [review to be documented in Chp 8 SER]

What is needed for finding: What programmatic controls are in place to ensure the EDSS is maintained? Is EDSS part of DRAP and/or Maintenance rule program? Staff understands that IEEE Std 1188 will be followed for maintenance and additionally, acceptance testing will be performed per IEEE Stds. 1187 and 1188. FSAR Tier 2 Section 8.3.2.2.2 states

Regulatory Guide 1.129 endorses IEEE Standard 450-2010 (Reference 8.3-6) as an acceptable method of demonstrating compliance with NRC regulations relevant to maintenance, testing, and replacement of VLA batteries. The EDSS uses VRLA batteries and, thus, applies IEEE Standard 1188-2005 (Reference 8.3-18) with the

2014 amendment rather than IEEE Standard 450-2010. However, the regulatory positions of RG 1.129, although directed toward VLA battery installations, are appropriately considered for the VRLA batteries, with clarification described in Reference 8.3-1.

Please discuss in the DCA what is appropriately considered from RG 1.128 and RG 1.129 and whether any exceptions/additions to IEEE Stds 1187 and 1188 are taken. Staff understands that the clarifications are included in the proprietary sections of the TR and for consistency in how other standards are discussed in the DCA, the DCA should be updated to reflect clarifications/exceptions.

Acceptance criteria: Inclusion in DRAP or within Maintenance Rule scope.

6) Regulatory Finding: Augmented quality provisions for the EDSS provide assurance that it is a reliable system. [review to be documented in Chp 17 SER]

What is needed for finding: FSAR Tier 2 Table 3.2-1 addresses the augmented quality attributes for the EDSS. Please discuss the methodology/process to obtain these specific attributes.

Acceptance criteria: Documentation of determination/methodology of augmented quality. EENB staff would assist other QVIB staff in reviewing the augmented quality methodology and attributes.

7) Question: What verification of the capacity and capability of the system will be conducted prior to fuel load and demonstrate the system has been constructed as designed? Staff proposes an ITAAC to demonstrate capacity and capability of the system.

8) The chapter 15 safety analysis does not consider the IAB subject to the single failure criterion. FSAR Section 15.6.6 event examines the inadvertent operation of an ECCS valve as the initiating event. An RVV opening is currently the limiting MCFHR event while the opening of a RRV is the limiting containment pressure event. The other Chapter 15 events do not consider the failure of a single IAB to move to the closed position. To demonstrate that 15.6.6 remains bounding from both a MCHFR and containment pressure perspective, determine the length of time the EDSS needs to provide power to the ECCS values for the other Chapter 15 events. The staff notes the DCA currently assumes EDSS power is assumed to be lost at the time of turbine trip and loss of normal AC power.

The initial conditions of the 15.6.6 event include 102% RTP, RCS temperature biased to 555 deg-F, RCS flow biased low and RCS pressure biased high (1920 psia). The FSAR section 15.2 and 15.4 events can increase RCS average temperature and pressure while in some cases also decreasing RCS flow rate such that it is unclear whether the initial conditions assumed in 15.6.6 remain bounding for determining the MCHFR and maximum containment pressure when coolant is discharged through a single ECCS valve at the time of turbine trip.