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

October 13, 2021

MEMORANDUM TO: Matthew W. Sunseri, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

FROM: Raymond Furstenau, Director **/RA/**
Office of Nuclear Regulatory Research

SUBJECT: STAFF RESPONSE TO ACRS LETTER, DATED JULY 26, 2021, IN REGARD TO PROPOSED REVISION 5 TO REGULATORY GUIDE 1.9, APPLICATION AND TESTING OF ONSITE EMERGENCY ALTERNATING CURRENT POWER SOURCES IN NUCLEAR POWER PLANTS

The purpose of this memorandum is to provide the U.S. Nuclear Regulatory Commission (NRC) staff's response to the Advisory Committee on Reactor Safeguards (ACRS) letter dated July 26, 2021, (Agencywide Document Access and Management System (ADAMS) Accession Number: ML21202A149) on the proposed Revision 5 to Regulatory Guide 1.9, "Application and Testing of Onsite Emergency Alternating Current Power Sources in Nuclear Power Plants."

During the 687th meeting of the Advisory Committee on Reactor Safeguards, July 7-9, 2021, ACRS reviewed "Proposed Draft Regulatory Guide (RG) 1.9, Revision 5." In addition, ACRS Digital Instrumentation and Control (DI&C) Systems Subcommittee (SC) reviewed this matter on June 25, 2021. In a letter dated, July 26, 2021, the ACRS provided conclusions and recommendations on proposed Revision 5 of RG 1.9. The staff reviewed the conclusions and recommendations, and the staff's responses are described below:

Conclusion and Recommendation 1:

> *For Alternating Current (AC) Sources Other than Emergency Diesel Generators (EDGs) and Combustion Turbine Generators (CTGs), RG 1.9, Revision 5, Section C.1 becomes the default standard. In the absence of an industry standard, the regulatory guidance for AC Sources Other than EDGs and CTGs is not consistent in defining functional criteria with that provided by the industry standards and regulatory guidance for EDGs and CTGs. RG 1.9, Section C.1 should be structured and expanded to be consistent with applicable guidance in the Institute of Electrical and Electronics Engineers (IEEE) Standards (Stds.) for EDGs and CTGs.*

NRC Staff Response 1:

The staff appreciates the feedback from the ACRS and will revise RG 1.9, as follows:

CONTACTS: Liliana Ramadan, NRR/DEX
301-415-2463

Stanley Gardocki, RES/DE
301-415-1067

IEEE Std 387- 2017, “IEEE Standard for Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations,” and IEEE Std 2420 - 2019, “IEEE Standard for Combustion Turbine Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations,” contain the following sections: Overview, Normative References, Definitions, Principal Design Criteria, Factory Production Testing, Qualification Requirements, and Site Testing.

To better clarify expectations for other potential onsite emergency AC power sources, the staff will revise Section C.1 and label the regulatory positions as “Principal Design Criteria,” “Qualification,” and “Testability” (which will combine elements of IEEE sections, “Factory Production Testing” and “Site Testing”). In addition, staff evaluated IEEE Stds. 387 and 2420, Sections 1, 2, 5, 6, and 7 in detail for additional functional criteria and will add functional criteria with respect to the design, qualification, and testing of emergency power sources used in onsite AC electric power systems for nuclear power plants and facilities in accordance with NRC regulations, specifically those addressed in NRC regulations to ensure consistency in defining functional criteria. Examples of added functional criteria include: 1) the definition of start demands, start demand failures, load run demands, and load run demand failures, and 2) the demonstration under light-load and no-load operation, dynamic load performance criteria for voltage and frequency under step load application or removal.

Conclusion and Recommendation 2:

> *For consistency, the definitions for ratings in Sections C.1 and C.3 should use the definition derived in IEEE Std. 387-2017. Consistency of rating definitions is even more important when applied to AC Sources Other than EDGs and CTGs since they will involve technologies much different from conventional sources, including possible energy storage systems which must also provide power capability and duration consistent with EDGs and CTGs.*

NRC Staff Response 2:

The staff appreciates this feedback from the ACRS. Staff is revising Sections C.1 and C.3, defining continuous rating and nameplate capacity consistent with definitions in Section 3 of IEEE Std. 387, ensuring alignment in all three sections. The rating/nameplate capacity, typically expressed in kilovolt-amperes (kVA) and kilowatts (kW), is defined as the electric power capability that the unit can maintain in a specified environment and is stamped on its name plate and/or described in its specification. The continuous rating is defined as the electric power output capability that the unit can maintain in the service environment for 8760 hours of operation per year with only scheduled outages for maintenance. Thus, staff will revise the RG to ensure consistency in the definition of rating/nameplate capacity and continuous rating in all three sections.

NRC Staff Response to other comments:

The staff also reviewed the feedback regarding the term “mission time” and will consider alternate language to avoid problematic interpretations during Reactor Oversight Program inspections.

The staff appreciates the Committee’s effort to promptly and thoroughly evaluate the staff's regulatory guidance. Staff will continue communications with ACRS before issuing a new version of proposed Revision 5 to RG 1.9 as a Draft RG for public comment.

SUBJECT: STAFF RESPONSE TO ACRS LETTER, DATED JULY 26, 2021, IN REGARD TO PROPOSED REVISION 5 TO REGULATORY GUIDE 1.9, APPLICATION AND TESTING OF ONSITE EMERGENCY ALTERNATING CURRENT POWER SOURCES IN NUCLEAR POWER PLANTS October 13, 2021

Reference Ticket: OEDO-21-00413

DISTRIBUTION:
PUBLIC
SECY
CTR Resource
S. Moore, ACRS
K. Miller, RES
L. Ramadan, NRR
J. Bowen, RES
C. Johnson, NRR
B. Correll, NRR
C. Antonescu, ACRS
L. Burkhart, ACRS
RidsNrrDex Resource
RidsNrrOd Resource
RidsNrrMailCenter Resource
RidsOgcMailCenter Resource
RidsResOd Resource
RidsResDE Resource
RidsEdoMailCenter Resource
RidsACRS_MailCTR Resource

ADAMS Accession Nos: Package: ML21221A273, Memo: ML21277A254

OFFICE	RES/DE/RGPMB	NRR/DEX/EEEB	NRR/DEX/EEEB	NRR/DEX/ELTB
NAME	S. Gardocki	S. Ray	W. Morton	J. Johnston
DATE	10/5/2021	10/5/2021	10/5/2021	10/5/2021
OFFICE	RES/DE/IEEEB	RES/DE/RPMB	RES/DE	NRR/DEX
NAME	C. Cook	M. Rahimi	L. Lund	E. Benner
DATE	10/5/2021	10/6/2021	10/8/21	10/6/2021
OFFICE	RES			
NAME	R. Furstenau			
DATE	10/13/21			

All concurrence received via email
OFFICIAL RECORD COPY