

March 12, 2018

Research and Production Company RadICS  
Attention: Anton Andrashov  
RadICS Director  
29 Geroyiv Stalingradu Street  
25009 Kirovohrad, Ukraine

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR "RADICS TOPICAL REPORT" (CAC NO.: MF8411; EPID: L-2016-TOP-0010)

Dear Mr. Andrashov:

By letter dated September 20, 2016 (Agencywide Documents Access and Management System Accession No. ML16274A346), Research and Production Corporation Radiy (RPC Radiy) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report (TR) "RadICS Topical Report." Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review.

The request for additional information (RAI) questions are provided in the enclosure to this letter. These RAI questions reflect the staff review of the documents currently submitted by RPC Radiy. Additional RAI questions may be issued after the staff receives the RPC Radiy phase-two submittals.

In an email exchange between Mr. Mark Burzynski representing RPC Radiy and myself, we agreed that the NRC staff will receive your response to the enclosed RAI questions by April 30, 2018.

If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-7297 or via electronic mail at [Joseph.Holonich@nrc.gov](mailto:Joseph.Holonich@nrc.gov).

Sincerely,

*/RA/*

Joseph J. Holonich, Senior Project Manager  
Licensing Processes Branch  
Division of Licensing Projects  
Office of Nuclear Reactor Regulation

Enclosure:  
RAI questions

Docket No. 99902032

cc: Research and Production Company RadICS  
Attention: Mark Burzynski  
RadICS Licensing Manager  
2036 Marina Cove Dr.  
Hixson, TN 37343

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR "RADICS TOPICAL REPORT" (CAC NO.: MF8411; EPID: L-2016-TOP-0010)  
 DATED: MARCH 12, 2018

**DISTRIBUTION:**

PUBLIC	DMorey, NRR	RidsACRS_MailCTR	MWaters, NRR
RidsNrrDeEicb	RidsNrrDlp	RidsOgcMailCenter	JHolonich, NRR
RStattel, NRR	IJung, NRO	KMott, NRO	RidsNrrLADHarrison

**ADAMS Accession No.: ML18058B946; \*concurred via email**

**NRR-106**

<b>OFFICE</b>	NRR/DLP/PLPB	NRR/DLP/PLPB*	NRR/DE/EICB*	NRO/DEI/ICE	NRR/DLP/PLPB
<b>NAME</b>	JHolonich	DHarrison	MWaters	IJung	DMorey
<b>DATE</b>	03/08/2018	03/08/2018	03/01/2018	03/01/2018	03/13/2018
<b>OFFICE</b>	NRR/DLP/PLPB				
<b>NAME</b>	JHolonich				
<b>DATE</b>	03/12/2018				

**OFFICIAL RECORD COPY**

**U.S. NUCLEAR REGULATORY COMMISSION STAFF**

**REQUEST FOR ADDITIONAL INFORMATION**

**RadICS TOPICAL REPORT**

**RESEARCH AND PRODUCTION CORPORATION RADIY**

**General Questions / System Overview**

The following request for additional information (RAI) questions address Sections D.2.2 and D.3.2, "Information to be provided," of Digital Instrumentation and Controls Interim Staff Guidance (Digital I&C-ISG-06) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110140103). Digital I&C-ISG-06 provides guidance that a submittal should provide sufficient information to allow the U. S. Nuclear Regulatory Commission (NRC) staff to understand and document the adequacy of the systems hardware and software development lifecycles, how the various components are connected, and how these components are being used.

This general RAI section will address the guidance of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (ADAMS Accession No. ML052340534), Appendix 7.1-C, "Guidance for Evaluation of Conformance to Institute of Electrical and Electronics Engineers Std. 603 Review Responsibilities," Section 4, "Safety System Designation," which states that:

- The design basis should address all system functions necessary to fulfill the system's safety intent.
- The information provided for the design basis items should be technically accurate.
- The information provided for the design basis items, taken alone and in combination, should have one and only one interpretation.

**RAI-P1-01**

The NRC staff review was not able to determine and identify the complete purpose, safety function, or sufficient design descriptions of the "Protection Module(s)." Specifically:

- Provide additional RadICS Topical Report (LTR) descriptions to explain and describe the purpose, safety function(s) and operation of each of the protection modules.
- The NRC staff is also not clear if there will be only one type of protection module used or several [i.e., a "special protection module" (refer to Section 6.2.4.1, "RadICS Chassis

External Interfaces”); an electromagnetic protection module; a surge protection module] types. Provide a table list of the various protection modules, their functions, applicability, and if all listed protection modules are a part of the TR generic approval application.

- Section 6.2.2, “RadICS Chassis Configuration,” of the RadICS TR, states that there are “16 physical slots’ for special electromagnetic protection modules for external interfaces.” It is not clear to NRC staff whether these are 16 additional rear chassis slots or if these refer to the same front chassis 16 slots that accept the logic module and input/output (I/O) modules.
- Provide adequate design descriptions of how the protection modules are used to extend protection functions, as stated in Section 6.2.4.1 of the RadICS TR.

#### **RAI-P1-02**

The NRC staff was not able to determine which RadICS TR, Table 6-4, “Summary of Communications Links,” set of communication links the RadICS TR requires to be used to implement (1) chassis communications between different chassis within the same safety division (intra-divisional channel communications) and (2) chassis communications between different chassis that reside in separate safety divisions (inter-channel communications). The NRC staff request additional information to identify the communication links that address items (1) and (2) of this RAI question.

#### **RAI-P1-03**

Section 6.2.5.2.13, “Real Time Unit,” contains design descriptions that state “The Real Time Unit transmits real time data received from an information technology system or the same data from timekeeping chip if original signal is lost to FPGA [field programmable gate array] Unit.” The NRC staff was not able to identify a definition or design description of the RadICS TR terms “information technology system” or “timekeeping chip” as used in the quoted design description. The NRC staff requests additional information to describe and define the listed terms of “information technology system” and “timekeeping chip” as used in the listed design description.

#### **RAI-P1-04**

Section 6.3.2.2, “LVDS [Low-Voltage Differential Signaling] Transceiver Unit,” states that the LVDS unit provides “...full-duplex operation that may be supported with other similar units, located in other modules of the same Chassis.” The NRC staff requests that RadICS provide design descriptions and examples that would provide clarity when stating that the LVDS unit “may be supported with other similar units.”

#### **RAI-P1-05**

Section A.2.1, “RadICS Chassis Configuration,” states that “The qualified RadICS Chassis supports the use of EMI/RFI [electromagnetic interference/radio-frequency interference] protection filters” and that these “filters” are mounted within the chassis at the rear directly behind their respective I/O modules. The NRC staff was not able to identify a definition for these filters or a complete design and functional description of these “protection filters.” The NRC staff requests that RadICS provides a definition and adequate design descriptions of the “protection filters.” In addition, the RadICS TR list several types of “protection modules” (i.e., special electromagnetic protection modules, interface protection modules, electromagnetic interference/surge-protection modules). The NRC staff also requests that RadICS provides definitions and additional design descriptions of the “protection modules,” and to identify which protection modules are to be included with the RadICS TR application request for generic approval.

**RAI-P1-06**

Section 6.3.2.1, "Optical Transceiver Unit," of the RadICS TR, states that "The OPTO [Optical] Unit uses standard optical transceiving interface with associated optical isolation." The NRC staff requests that RadICS submit the definition and design specification of a "standard optical transceiving interface."

**RAI-P1-07**

RadICS LTR Section 6.5, "Redundancy," states that "Redundancy is also achieved by allocating the same functionality to main and standby processing units at the PCB [printed-circuit board] level." The NRC staff was not able to identify TR design descriptions that would define what RadICS TR components are considered main and standby processing units or explain how to configure these processing unit components to achieve the listed redundancy at the PCB level. The NRC staff request RadICS to provide definitions and design descriptions that would describe the main and standby processing units.

**RAI-P1-08**

RadICS TR, Appendix B, "DI&C-ISG-04 Compliance Matrix," Items #8, #12, and #16, list a term called "Safety Operation." The NRC staff was not able to identify a definition or design descriptions that would describe this term. The NRC staff requests that RadICS provide definitions and design descriptions that would describe the term "safety operations."

**RAI-P1-09**

The RadICS TR, Appendix B, "DI&C-ISG-04 Compliance Matrix," states that:

- Communication between safety divisions and non-Class 1E equipment is not allowed while in safety operation....
- Communications ports are monitored and blocked.

The NRC staff requests additional information to describe and explain:

- 1) What RadICS platform system operation criteria determines "safety operation," and
- 2) How communication between safety divisions and non-Class 1E equipment is prevented while in safety operation.