POLICY ISSUE
Notation Vote

November 5, 2015   SECY-15-0141

FOR: The Commissioners

FROM: Victor M. McCree
                Executive Director for Operations

SUBJECT: DENIAL OF PETITION FOR RULEMAKING REQUESTING AMENDMENTS
                REGARDING PROGRAMMABLE LOGIC COMPUTERS (PRM-73-17)

PURPOSE:

To obtain Commission approval to publish the enclosed *Federal Register* notice (FRN)
(Enclosure 1) denying a petition for rulemaking (PRM) submitted by Mr. Alan Morris (the
petitioner) (Enclosure 2). This paper does not address any new commitments or resource
implications.

DISCUSSION:

The petitioner filed a petition for rulemaking (PRM-73-17) with the Commission on
March 14, 2013, as supplemented through December 19, 2013 (Agencywide Documents
Access and Management System (ADAMS) Accession No. ML14016A458). The petitioner
requests that the Commission amend its regulations in Part 73 of Title 10 of the *Code of Federal
Regulations* (10 CFR) to require "new-design programmable logic computers" to be installed in
the control systems of nuclear power plants to block malware attacks on the industrial control
systems of those facilities. In addition, the petitioner requests that the nuclear power plant staff
be trained "in the programming and handling of the non-rewriteable memories." A notice of
acceptance and docketing of the PRM was published in the *Federal Register* on
February 7, 2014 (79 FR 7406).[1]

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[1] The Notice of Acceptance and Docketing of the PRM did not seek public comment.

Petition

The petitioner argues that the U.S. Nuclear Regulatory Commission (NRC) should require "new-design programmable logic computers" to be installed in the control systems of critical infrastructure facilities (e.g., nuclear power plants) in order to "block malware attacks on the industrial control systems of those facilities." The petitioner also states that nuclear power plant staff should be trained to maintain and secure records of all memory programming, and recommends maintenance in secure storage of programmed memories that may be again employed, as "the control systems of critical facilities are essentially steady-state." The petitioner states that the proposed action would "[r]educe impact on quality of the natural and social environments by stopping disastrous events at critical facilities."

The NRC staff sent a letter to the petitioner on June 12, 2014 (ADAMS Accession No. ML14120A006), requesting additional information about the petition. The staff requested that the petitioner indicate the inadequacies in the NRC's current regulatory approach (e.g., performance-based, programmatic) and framework (e.g., cyber security rule (10 CFR 73.54, Protection of Digital Computer and Communication Systems and Networks," and Regulatory Guide 5.71, "Cyber Security Programs for Nuclear Facilities" (ADAMS Accession No. ML090340159)) that would be remedied by the petitioner's proposed rulemaking. The staff also asked in the letter if a programmable logic computer (PLC) with the petitioner's patented write-once, read-many (WORM) media had been installed in any operating facility, nuclear or non-nuclear. The petitioner responded to the NRC letter in a series of e-mails dated June 18, 2014, and June 19, 2014 (ADAMS Accession Nos. ML14181B296, ML14181B276, ML14181B286, and ML14181B270).

The NRC staff reviewed the petition and the responses to the staff's questions. From this review, NRC staff identified and evaluated the three issues that were raised by the petitioner:

1. PLCs currently installed in U.S. nuclear facilities are vulnerable to malware attacks that could negatively affect or challenge plant safety and control systems.

2. By using the petitioner's patented PLC design, nuclear safety and control systems are safe from malware attacks.

3. Nuclear power plant staff should be trained to maintain and secure records of all memory programming, and recommends maintenance in the secure storage of programmed memories, as specified in this petition, that may be again employed as "the control systems of critical facilities are essentially steady-state."

The NRC addressed each of these issues in the enclosed FRN.

NRC Evaluation of Petition Issues:

The NRC disagrees with Issue 1 of the petition because the petitioner discounts the NRC's regulations in 10 CFR Part 73.54, (e.g., the cyber security rule), which establish a series of overall performance-based requirements for nuclear power plants to ensure that the functions of digital computers, communication systems, and networks are protected from cyber attack. Licensees are required to protect digital computers, communications systems, and networks associated with the following:

1) Safety-related and important-to-safety functions;
2) Security functions;
3) Emergency preparedness functions, including offsite communications; and
4) Support systems and equipment which, if compromised, would adversely impact safety, security, or emergency preparedness (SSEP) functions.

The power reactor licensees are required to submit their cyber security plans for NRC review and approval. The NRC-approved cyber security plans, which implement the licensee's cyber security programs, significantly reduce the possibility that a PLC installed at a nuclear power reactor site would be vulnerable to a malware attack that would negatively impact or challenge the plant's safety and control systems.

The NRC also disagrees with Issue 2 because the approach recommended in the petition does not take into account other attacks (e.g., indefensible phishing attacks) that could be made, or the defense-in-depth strategies that are the basis for the current regulatory approach, and presumes that a "one size fits all" solution would be adequate for the wide variety of industrial control systems and safety systems used in nuclear power plants. As required in § 73.54(c)(2), licensees are to design their cyber security programs to apply and maintain an integrated defense-in-depth protective strategy to ensure the capabilities to detect, prevent, respond to, mitigate, and recover from cyber attacks. A defense-in-depth strategy represents a documented collection of complementary and redundant security controls that establish multiple layers of protection to safeguard critical digital assets. Under a defense-in-depth strategy, the failure of a single protective strategy would not result in the compromise of an SSEP function.

In response to the staff's June 12, 2014, letter, the petitioner provided no information as to how the "new-design programmable logic computers" would comply with the requirements in § 73.54 for use in the safety systems and control systems of a nuclear power plant. Also, the petitioner stated that his WORM media PLCs are not currently used in any facility (either nuclear or non-nuclear) and, therefore, have not been proven reliable or able to perform their intended function.

Lastly, the NRC disagrees with Issue 3 because the petition does not take into account the awareness and training requirements each nuclear power licensee must ensure as part of their comprehensive cyber security program as stated in § 73.54. The NRC requires, in § 73.54(d)(1), that each nuclear reactor licensee ensure, as part of its cyber security program, that appropriate facility personnel, including contractors, are aware of the cyber security requirements and that they receive the necessary training to perform their assigned duties and responsibilities. Paragraph 73.54(d)(3) also requires each licensee to evaluate all modifications to assets identified in § 73.54(a)(1) (i.e., SSEP functions) before their implementation to ensure that the cyber security performance objectives are maintained.

RECOMMENDATION:

The NRC staff has reviewed the petition and recommends that the Commission deny the petition for the reasons summarized in this document and described in more detail in the FRN. The NRC staff does not find that the petitioner provided a sufficient basis for changing the existing regulations. The NRC staff further concludes that the petitioner failed to present any significant new information or arguments that would support the requested changes, nor has it been demonstrated that a need exists for a new provision requiring the petitioner's new-design programmable logic computers.

The NRC staff requests the Commission's approval to publish the FRN denying PRM-73-17.

The enclosed letter for signature by the Secretary of the Commission (Enclosure 3) informs the petitioner of the Commission's decision to deny PRM-73-17. The NRC staff will inform the appropriate Congressional committees.

COORDINATION:

The Office of the General Counsel has reviewed this package and has no legal objection to the denial of this petition.

/RA by Michael R. Johnson for/

Victor M. McCree
Executive Director
 for Operations

Enclosures:
1. *Federal Register* notice
2. Petition filed by Mr. Alan Morris
3. Letter to the petitioner

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ADAMS Accession Nos: ML14309A228 (Package), ML14309A221 (SECY Paper), ML14309A223 (FRN),), ML14016A458 (Mr. Alan Morris Petition)

*concurrence via email

OFFICE	NRR/DPR/PRMB	NRR/DPR/PRMB	NRR/DPR/PRMB	NRR/DPR/DD	NRR/DPR/D	NRR/DE/D*
NAME	NJordan	GLappert	TInverso	AMoshseni	LKokajko	JLubinski
DATE	7/28/2015	7/28/2015	7/28/2015	7/31/2015	8/4/2015	8/10/2015
OFFICE	ADM*	NRO/D	NSIR/D	OGC*	NRR/D	EDO
NAME	CBladey	GTracy	BHolian	MSpencer	WDean	VMcCree(MJohnson for)
DATE	8/24/2015	8/25/2015	8/24/2015	10/1/2015	10/20/2015	11/05/2015
OFFICE	SECY					
NAME	AVietti-Cook					
DATE	/ /2015					

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