

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, DC 20555-0001

April 10, 2018

NRC INFORMATION NOTICE 2018-06: DETERMINATION OF MANAGEMENT MEASURES FOR PROCESS ISOLATION CONTROLS DESIGNATED AS ITEMS RELIED ON FOR SAFETY AND IMPLEMENTATION OF ADEQUATE QUALITY ASSURANCE MEASURES FOR PLANT FEATURES AND PROCEDURES

## ADDRESSEES

All holders of, and applicants for, a specific source material license for large quantities of uranium hexafluoride under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40, "Domestic Licensing of Source Material."

All holders of, and applicants for, a fuel facility license under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and all holders of, and applicants for, a construction permit or operating license for a production facility, including a medical isotope facility, under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

## PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of recent operating experience regarding programs and procedures for determining and implementing management measures for isolation controls. These isolation controls may be required to be available and reliable to perform specific safety functions to prevent or mitigate accident sequences.

The NRC expects that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar issues. The suggestions contained in this IN are not NRC requirements; therefore, no specific action is required.

## DESCRIPTION OF CIRCUMSTANCES

In 2016 and 2017, NRC inspectors documented instances of inadequate management measures for isolation controls credited for preventing or mitigating releases of hazardous material at three facilities. Isolation controls, as discussed in this IN, refer to administrative or engineered controls relied upon to isolate or mitigate potential releases of substances that could lead to accidents exceeding the performance requirements in 10 CFR 70.61. Examples include operator actions or isolation valves on processes containing flammable gas or hazardous liquid and gas.

Honeywell Metropolis Works (Honeywell)

NRC Inspection Report 40-3392/2016-005<sup>1</sup> documented an unresolved item (URI) associated with the failure of multiple seismically activated isolation valves during testing, one of which was considered a plant feature and procedure. NRC Inspection Report 40-3392/2017-002<sup>2</sup> included information on the URI with discussion of the licensee's evaluation of the failures. The licensee's evaluation indicated two contributing factors for the valve's mechanical failures: (1) the core spring did not seem strong enough to close the valve after been maintained in the open position for an extended period; and (2) the relatively low testing or cycling frequency of the solenoids. These factors relate to the licensee's preventive maintenance (i.e., management measures) that maintained the design function of the affected valves.

Honeywell replaced, or performed corrective maintenance on, the failed valves and also completed an evaluation to determine the probable causes of the valve failures. The results of the evaluation included initiating corrective actions to: (1) evaluate the testing frequency of seismically-activated solenoid valves; (2) replace all ASCO Model 8316G001 solenoids with Model 8320G184; and (3) visually inspect solenoids in areas where environmental factors such as temperature, humidity, and fluid corrosiveness could prevent the solenoids from performing their function.

Nuclear Fuel Services, Inc. (NFS) and Global Nuclear Fuels – Americas (GNF-A)

In July 2017, NRC inspectors documented a minor violation of 10 CFR 70.62(d), "Management Measures," at NFS for inadequate testing of valves required to isolate bulk chemicals and gases during emergencies in NRC Inspection Report 70-143/2017-006.<sup>3</sup> Similarly, in November 2017, NRC inspectors documented a minor violation at GNF-A for inadequate testing of valves required to isolate flammable and combustible gases upon detection of a leak in NRC Inspection Report 70-1113-2017-006.<sup>4</sup>

NFS and GNF-A concluded that neither preventive maintenance nor functional testing were applicable management measures because the integrated safety analysis (ISA) referenced the administrative action of manually operating the valves as the item relied on for safety (IROFS). In the context of administrative IROFS (i.e., operator actions) neither NFS nor GNF-A included management measures, such as preventive maintenance, for the valves that the operator would operate to fulfil the administrative function. Given that the valves would need to be available and reliable in order to prevent or mitigate the specified accident sequence, the NRC inspectors concluded that NFS and GNF-A did not establish adequate management measures for the valves.

After the NRC inspectors identified the inadequately tested valves, NFS and GNF-A entered the non-compliances into their respective corrective action systems. During the inspection, NFS identified that recent maintenance activities caused some of the valves to be cycled and did not identify adverse conditions in those valves.

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<sup>1</sup> NRC Inspection Report 40-3392/2016-005 dated January 30, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17030A108)

<sup>2</sup> NRC Inspection Report 40-3392/2017-002 dated April 24, 2017 (ADAMS Accession No. ML17115A006)

<sup>3</sup> NRC Inspection Report 70-143/2017-006 dated August 4, 2017 (ADAMS Accession No. ML17216A146)

<sup>4</sup> NRC Inspection Report 70-1113/2017-006 dated December 20, 2017 (ADAMS Accession No. ML17354A197)

## BACKGROUND

In reference to facilities licensed under 10 CFR Part 70 and other facilities that implement management measures, the term “management measures” is defined in 10 CFR Part 70.4, as “the functions performed by the licensee, generally on a continuing basis, that are applied to items relied on for safety, to ensure the items are available and reliable to perform their functions when needed. Management measures include configuration management, maintenance, training and qualifications, procedures, audits and assessments, incident investigations, records management, and other quality assurance elements.”

Subpart H of 10 CFR Part 70, codifies the requirement for management measures in 10 CFR 70.61(e) and 70.62(d). Paragraph 70.61(e) establishes the performance requirement of designating IROFS and ensuring those IROFS are available and reliable to perform their intended functions when needed. Paragraph 70.62(d) designates management measures as the mechanism for complying with all the performance requirements of 10 CFR 70.61, including 10 CFR 70.61(e).

Paragraph 70.62(d) states, “...Each applicant or licensee shall establish management measures to ensure compliance with the performance requirements of § 70.61... The management measures shall ensure that engineered and administrative controls and control systems that are identified as items relied on for safety pursuant to § 70.61(e) of this subpart are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of § 70.61 of this subpart.”

In reference to Honeywell (licensed to operate in accordance with 10 CFR Part 40), Confirmatory Order EA-12-157<sup>5</sup> requires, in part, that quality assurance (QA) measures are developed and implemented for modifications made to the facility that address identified vulnerabilities to external events such as natural hazard phenomena. At a minimum, the QA measures must address design, procurement, inspections and tests, installation, document control, procedures and drawings, and records.

## DISCUSSION

Although Honeywell established QA measures, the seismically activated solenoid-operated isolation valves still failed during testing. As discussed above, the licensee’s evaluation indicated that weakening of the core spring and relatively low testing or cycling frequency of the solenoids contributed to the valve failure. In addition, without additional testing and/or preventive maintenance, a manufacturer-reported failure rate may change if valves are installed in operational environments that are different than were used in the manufacturer’s evaluation. For instance, if the failure rate of a solenoid valve is based upon low humidity, moderate temperatures, a pH neutral environment, and minimal stress on the core spring, then installing and operating the valve under different conditions may increase the failure rate and, therefore, warrant additional testing and/or preventive maintenance.

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<sup>5</sup> Section IV.2. “Honeywell shall develop, implement, and have available for NRC inspection the quality assurance measures for the modifications referred to in Item 1.c [refers to documentation of the design bases for the proposed modifications to the Metropolis Works facility that were needed to define and provide the safety basis for external events and revise the facility emergency response plan]. These quality assurance measures shall address, at a minimum, the following areas: design, procurement, inspections and tests, installation, document control, procedures and drawings, and records.” Dated October 15, 2012, ADAMS Accession No. ML12289A800.

For licensees that operate under 10 CFR Part 70 requirements, considering only the operator action as the IROFS may result in the failure to establish management measures for the equipment or components needed to prevent or mitigate the associated accident sequence. In this scenario, an operator could initiate the safety action, (e.g., manually closing a valve) but the failure of the valve (e.g., due to a lack of preventive maintenance) would render the safety action ineffective in preventing or mitigating the accident sequence. The circumstances discussed above emphasize how weaknesses in the identification of management measures in the licensees' ISA programs led to non-compliances with the referenced provisions of 10 CFR Part 70, Subpart H. Without implementing management measures for the valves, the licensees lacked a basis for the overall reliability and availability of the IROFS. For the minor violations discussed above, the NRC inspectors cited the failure to meet 10 CFR 70.62(d) which requires licensees to maintain IROFS available and reliable to perform their intended safety function.

To ensure compliance with 10 CFR 70.61(e) and 70.62(d), licensees must implement management measures for controls required for the functionality of IROFS. The operating experience referenced in this IN suggests that there may be administrative controls that are dependent on engineered components to perform a safety function and that those components may not be subject to adequate QA or management measures to ensure the administrative controls are effective.

## CONTACTS

Please direct any questions about this matter to the technical contacts listed below.

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Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under NRC Library.

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**ADAMS Accession No.: ML18029A105**

\*concurring via email

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