OFFICE OF INSPECTOR GENERAL

U.S. Department of Energy

AUDIT REPORT

OAI-L-17-02 November 2016

NUCLEAR SAFETY AT NAVAL REACTORS' FACILITIES

Department of Energy
Washington, DC 20585

November 7, 2016

MEMORANDUM FOR THE MANAGER, NAVAL REACTORS LABORATORY FIELD OFFICE

FROM: Jack Rouch
Deputy Assistant Inspector General
for Audits
Office of Inspector General

SUBJECT: INFORMATION: Audit Report on "Nuclear Safety at Naval Reactors' Facilities"

BACKGROUND

The Naval Nuclear Propulsion Program provides militarily effective nuclear propulsion plants and ensures their safe, reliable, and long-lived operation. A joint effort between the Department of Energy and the Department of the Navy, the Program conducts its mission at four federally owned sites operated by Bechtel Marine Propulsion Corporation, a management and operating contractor. Under Title 50 United States Code (U.S.C.) Sections 2406 and 2511, the Program's Director is responsible for the safety of reactors and naval nuclear propulsion plants, and control of the associated radiation and radioactivity. This responsibility includes prescribing and enforcing standards and regulations for these areas as they affect the environment and the safety and health of workers, operators, and the general public.

In August 2015, the Office of Inspector General (OIG) received a complaint alleging that the Program had not (1) developed an adequate safety basis[1] for all of its nuclear facilities, (2) updated existing safety basis documents, or (3) followed Department safety regulations when making major modifications to nuclear facilities. Given the importance of safety associated with the Program's operations, we initiated this audit to determine whether the Program had adequate safety policies, procedures, and practices in place for nuclear materials and facilities.

RESULTS OF AUDIT

Although nothing came to our attention to indicate that the Program lacked adequate safety policies, procedures, and practices for nuclear materials and facilities, we identified an opportunity for the Program to strengthen its safety posture by addressing differences between its

[1] Safety basis documents describe the safety analysis and hazard controls that provide reasonable assurance that a nuclear facility can be operated safely in a manner that adequately protects workers, the public, and the environment.

policies and procedures and comparable Federal and Department requirements. To the extent that the Program acknowledged the need to evaluate possible improvements in its policies and procedures, we partially substantiated the second allegation. We did not substantiate the other two allegations.

In particular, the Program had developed and implemented policies and procedures to address key elements of a safety basis, such as:

- Preventing the accumulation of quantities of materials that could create a criticality (uncontrolled nuclear chain reaction);

- Monitoring and preventing radiological exposures to employees, the public, and the environment; and

- Maintaining quantities of nuclear materials as low as reasonably achievable to conduct its mission work.

We found that the policies and procedures were generally consistent with Department requirements such as Title 10 Code of Federal Regulations (CFR) 830, *Nuclear Safety Management*, and Department Order 420.1C, *Facility Safety*. Because the Program is a joint effort with the Department of the Navy and the Director has responsibility for Program safety standards and regulations under 50 U.S.C., the Program is generally provided the flexibility to comply with Department requirements in the manner deemed appropriate by the Director. Even though 10 CFR 830 specifically states that it does not apply to the Program, the Department requirements provide a good benchmark for evaluating the Program's policies and procedures.

In addition to policies and procedures, the Program had developed training for radiological workers and manuals that addressed nuclear criticality safety, radiological controls, and emergency response at its laboratories. Further, at its nuclear reactor site, the Program had developed and implemented reactor safety analyses and operating procedures using Nuclear Regulatory Commission (NRC) requirements as a guide. When we compared the Program's nuclear reactor safety basis documents to the NRC requirements, we concluded that the intent of the requirements had been adequately addressed. Program officials also indicated that these provisions had been reviewed by and were positively received by the NRC.

We also found that the Program had periodically reviewed and updated safety basis documents for existing facilities when requirements changed. Additionally, we determined that the Program had made adjustments to its safety basis documents, as required by its policies and procedures, in instances where modifications had been made to a nuclear facility. We noted that as components to the facility were upgraded and/or taken out of service, changes had been made to the safety basis documents to account for factors such as limits of material quantities and radiological controls.

Gap Analysis and Employee Concerns

The Program informed us that, in the interest of continuous improvement, a comprehensive comparison between its safety policies and procedures and comparable nuclear safety management requirements of 10 CFR 830 had been conducted in 2011. This comparison showed differences, several of which were considered worthy of further study and potential refinements to Program policies and procedures. The overall conclusion of the Program's analysis was that the existing Program practices produced a safety posture at least equivalent to the posture of a facility following verbatim requirements of the 10 CFR 830. However, the analysis and subsequent crosswalk highlighted a number of differences or "gaps" between Program policies and procedures and requirements of 10 CFR 830. These gaps included several "major differences" and a series of additional minor issues such as terminology clarifications. Officials advised at the time of our audit that evaluation of these gaps and implementation of any resulting improvements were not considered urgent.

We found that Program management had completed actions on two of the major differences. Specifically, the Program had taken action to categorize its facilities according to the severity of accidents and established a process for a preliminary safety analysis in planning new nuclear facilities, requirements of 10 CFR 830 that Program officials determined should be implemented. However, Program officials had not addressed other major differences between the requirements. Specifically, they had not fully considered the need to:

- Consolidate the processes for addressing unreviewed safety questions, which would better document the appropriate level of oversight and review for safety questions raised by employees that involve potential changes to the safety basis of a facility or for deficiencies in the safety basis;

- Consolidate all safety basis documentation at each site into one document; and

- Consolidate technical safety requirements in one location for suitable personnel reference.

Further, during the course of our audit, we became aware that the complainant who submitted the allegation to the OIG had informed the Program of similar concerns in May 2015 while still employed within the organization. Program officials indicated that they had worked closely with the (now former) employee to answer and resolve the concerns. Specifically, Program officials stated that senior management held a number of discussions with the employee and had directed the employee to submit the concerns in writing, and as a result, they had elevated the issue into an official employee concern. Additionally, as part of its official process to respond to the employee's concerns, the Program created a formal action plan to update its 2011 crosswalk comparison, identify potential gaps, and evaluate possible improvements to the nuclear facility safety process.

According to Program officials, prior to resigning in July 2015, the employee had agreed that the Program's proposed actions would sufficiently address the concerns. Even though the Program

had intended to finalize and implement the formal action plan in a prompt manner, higher Program priorities delayed actions until 2017.

Nonetheless, we noted that the Program continuously took steps to address the employee's concerns. For example, the employee raised concerns that the Program's Safety Assessment Documents failed to identify key components of the safety system. After conducting an analysis, the Program concluded that further consideration was warranted to address some of the elements of 10 CFR 830. For example, the Program's Safety Assessment Documents only included analyses of potential exposures to the public at the boundary of the site, whereas the Department's Standard 3009-2014 requires a more comprehensive analysis of on-site consequences. As a result, the Program indicated that they were considering discontinuing the Safety Assessment Documents and opting instead to adopt the Department's Standard 3009-2014 to meet established safety requirements. This effort also has been delayed pending higher Program priorities as described above.

Path Forward

While nothing came to our attention to indicate the Program lacked adequate safety policies, procedures, and practices for nuclear materials and facilities safety, we suggest that the Manager, Naval Reactors Laboratory Field Office, direct its Contractor to finalize, obtain approval of, and implement its formal action plan to address any substantive gaps between its policies and procedures and requirements of 10 CFR 830, *Nuclear Safety Management*. We discussed this suggestion with Program officials who indicated that a formal action plan was in place and would be implemented once resources became available.

Attachments

cc: Deputy Secretary
Administrator for the National Nuclear Security Administration
Chief of Staff

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

The objective of this audit was to determine whether the Naval Nuclear Propulsion Program had adequate safety policies, procedures, and practices in place for nuclear materials and facilities.

SCOPE

The audit was conducted from January 2016 to November 2016 at the Bettis and Knolls Atomic Power Laboratories in Pittsburgh, Pennsylvania, and Schenectady, New York; and it included interviews with officials from the Kesselring Site located in West Milton, New York. The scope included a review of nuclear facility safety policies between 2011 and 2016. The audit was conducted under the Office of Inspector General project number A16PT018.

METHODOLOGY

To accomplish our audit objective, we:

- Reviewed laws, regulations, policies, and procedures related to safety programs at nuclear facilities.
- Reviewed Program-specific manuals and other criteria, such as the Nuclear Regulatory Commission Regulatory Guide 1.70.
- Reviewed prior reports issued by the Office of Inspector General and the Government Accountability Office.
- Reviewed audits, assessments, surveillances, and incident reports conducted by the Naval Reactors Laboratory Field Office and Bechtel Marine Propulsion Corporation.
- Interviewed Federal officials and management and operating contractor officials to discuss implementation of the nuclear safety program, audits and assessments, and oversight; results of conducted crosswalks to Federal and Department requirements; and actions taken specific to the allegation.
- Interviewed the source of the allegation to discuss the concerns with the Program's nuclear facility safety policies.
- Obtained and reviewed facility-specific nuclear safety plans and requirements and conducted a crosswalk analysis to Federal and Department regulations.
- Obtained and reviewed the Program's analyses to categorize facilities according to the severity of an accident.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provided a reasonable basis for our findings and conclusions based on our audit objective. Accordingly, we assessed significant internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed compliance with the *GPRA Modernization Act of 2010* and found that the Program's implementation of the Act did not include specific performance measures related to nuclear facility safety. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. Finally, we did not rely on computer-processed data to satisfy our objective.

An exit conference was held with management on October 31, 2016.

PRIOR REPORTS

- Audit Report on *Follow-up on Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory* (DOE/IG-0941, July 2015). This report found that the Los Alamos National Laboratory (Los Alamos) had acted to improve nuclear safety; however, it continued to have problems in fully implementing a number of critical nuclear safety management requirements. Specifically, Los Alamos had not always developed safety basis documents that met the National Nuclear Security Administration's expectations to ensure that nuclear hazards had been fully identified and that mitigation controls had been implemented. Furthermore, issues identified in the annual updates to the safety bases for two nuclear facilities, and significant and long-standing nuclear safety deficiencies, had not been resolved.

- Audit Report on *Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory* (DOE/IG-0837, August 2010). This report disclosed that Los Alamos continued to have problems with implementing a number of critical nuclear safety management measures. For example, Los Alamos had not updated or fully implemented safety analyses for 5 of its 14 nuclear facilities to ensure that hazards had been fully identified and controls implemented to mitigate nuclear hazards. Further, design information about safety systems had not been adequately maintained to ensure that they met technical requirements. The report also disclosed that Los Alamos had not demonstrated that operational tests of nuclear safety systems were completed to verify operability after modifications were made to the systems. Furthermore, Los Alamos had not demonstrated that it had validated the efficacy of corrective actions and had not fully resolved long-standing issues involving noncompliance with established hazard controls.

FEEDBACK

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