

15.0 MANAGEMENT MEASURES

15.7 INCIDENT INVESTIGATIONS

15.7.1 PURPOSE OF REVIEW

The purpose of this review is to establish, with reasonable assurance, that the applicant will have a system in place for the systematic investigation of incidents,¹ assignment and acceptance of corrective actions, and follow-up to ensure completion of the actions. The review should confirm that incidents will be investigated and corrective action taken to prevent (or minimize) their recurrence or their leading to more serious consequences. Furthermore, the review should find that the results of incident investigations will be compared against the Integrated Safety Analysis (ISA) Summary (see SRP Chapter 5.0) to provide assurance that there is continued compliance with the performance requirements contained in 10 CFR Part 70, as proposed.

15.7.2 RESPONSIBILITY FOR REVIEW

Primary: Project Manager

Secondary: Quality Assurance Engineer/Specialist and ISA Reviewers

Supporting: Fuel Cycle Facility Inspector

15.7.3 AREAS OF REVIEW

The staff's review of the license application should encompass the following areas:

- A. The description of the functions, qualifications, and responsibilities of the management person who would lead the investigation team and those of the other team members, the scope of the team's authority and responsibilities, and assurance of cooperation of management.
- B. The team's ability to obtain all the information considered necessary and independence from responsibility for or to the functional area involved in the incident under investigation.
- C. The maintenance of documentation consistent with SRP Section 15.8, "Records Management."
- D. Guidance for the team conducting the investigation on how to apply a reasonable, systematic, structured approach to determine the root cause(s) of the problem.

¹Incidents are unplanned events such as accidents, unexpected transients, equipment malfunctions, and operator error.

Management Measures

- E. The system for comparing the results of the investigation against the ISA.
- F. The system for monitoring to ensure completion of any corrective measures specified, including revisions to the ISA.

15.7.4 ACCEPTANCE CRITERIA

15.7.4.1 Regulatory Requirements

Nuclear Regulatory Commission (U.S.), Washington, D.C. "Domestic Licensing of Special Nuclear Material (10 CFR Part 70)." *Federal Register*: Vol. 64, No. 146. pp. 41338–41357. July 30, 1999.

Specific references are as follows:

- A. In §70.4, "Definitions," the term management measures is defined. Incident investigations are included as a management measure.
- B. In §70.62(d), the applicant or licensee is required to establish management measures to provide continuing assurance of compliance with the performance requirements.
- C. In §70.64(a)(1), the design of new facilities or the design of new processes at existing facilities is required to be developed and implemented in accordance with management measures.
- D. In §70.65(a), the application is required to include a description of the management measures.

15.7.4.2 Regulatory Guidance

There is no specific regulatory guidance for the overall conduct of incident investigations. See the references at the end of this section for guidance on specific aspects of incident management such as corrective action and root cause analysis.

15.7.4.3 Regulatory Acceptance Criteria

As part of the application for construction approval, the applicant should commit to establishing a system for the systematic investigation of incidents, assignment and acceptance of corrective actions, and follow-up to ensure completion of the actions which meets or exceeds the acceptance criteria in Section 15.7.4.

The NRC reviewers should find the license application for operations acceptable if the applicant's system of incident investigations provides reasonable assurance that the regulatory acceptance criteria below are adequately addressed and satisfied. Some of the information

may be referenced to other sections of the SRP, or incorporated by reference, provided that these references are clear and specific.

- A. Acceptability should be based on commitments for the prompt investigation of incidents that include the following elements:
 - i. The establishment of teams to investigate incidents that may occur during operation of the facility, to determine the root cause(s) of the incident, and to recommend corrective actions.
 - ii. The monitoring and documenting of corrective actions (including effectiveness) through completion.
 - iii. The maintenance of documentation so that "lessons learned" may be applied to future operations of the facility. Details of the incident sequence should be compared to incident sequences already considered in the ISA, and actions should be taken to ensure that the ISA includes the evaluation of the risk associated with incidents of the type actually experienced.

- B. Acceptability should be based on the adequacy of the applicant's commitments to establish and use a plan for the investigation of incidents. Acceptability should also be based upon the following acceptance criteria:
 - i. The licensee has described the overall plan and method for investigating incidents. The plan is separate from any required emergency plan.
 - ii. The functions, responsibilities, and scope of authority of investigation teams are documented in the plan.
 - iii. Qualified internal or external investigators are appointed to serve on investigation teams. Each team should include at least one process expert and one team member trained in root cause analysis.
 - iv. The investigation process and investigation team are independent of the line function(s) involved with the incident under investigation, and participants are assured of no retribution from participating in investigations.
 - v. A reasonable, systematic, structured approach is used to determine the root cause(s) of incidents. The level of investigation should be based on a graded approach relative to the severity of the incident.
 - vi. Auditable records and documentation related to incidents, investigations, and root cause analysis are maintained.
 - vii. For each incident, an incident report is prepared that includes a description of the incident, contributing factors, root cause analysis, findings, and recommendations.

Management Measures

Relevant findings should be reviewed with all affected personnel, and the reports should be made available to the NRC on request.

- viii. Documented corrective actions are taken within a reasonable period to resolve findings from incident investigations.

15.7.5 REVIEW PROCEDURES

15.7.5.1 Acceptance Review

The primary reviewer should perform an acceptance review to determine if the license application for operations adequately addresses the specific items in Section 15.7.3, "Areas of Review." If the primary reviewer verifies that incident investigations are adequately addressed, the primary reviewer should accept the application for the safety evaluation in Section 15.7.5.2. If the primary reviewer identifies significant deficiencies in the material provided, the primary reviewer should request that the applicant submit additional information prior to the start of the safety evaluation.

15.7.5.2 Safety Evaluation

For construction approval, the reviewer should determine that the applicant has committed to a system for the systematic investigation of incidents, assignment and acceptance of corrective actions, and follow-up to ensure completion of the actions that will meet or exceed the acceptance criteria in Section 15.7.4.

For a license application for operations and after determining that the application is acceptable for review in accordance with Section 15.7.5.1, the primary reviewer should perform a safety evaluation against the acceptance criteria described in Section 15.7.4. On the basis of its review, the staff may request that the applicant provide additional information or modify the application to meet the acceptance criteria in SRP Section 15.7.4.

The review should determine if the applicant has adequately planned for incident investigations to be conducted with resulting corrective actions to be appropriately implemented.

The primary reviewer should confirm that the organizational structure for incident investigations is consistent with SRP Chapter 4, "Organization and Administration."

The quality assurance secondary reviewer should verify that methods used for determining root causes, the procedures for tracking and implementing the corrective actions, and the process of applying the "lessons learned" to the other operations are appropriate for incident investigations.

The ISA reviewers should verify that the applicant ensures the results of the investigation are compared against the ISA and the necessary follow-up actions occur.

The supporting reviewer(s) should become familiar with pertinent procedures and determine whether planned future and ongoing activities are consistent with them.

15.7.6 EVALUATION FINDINGS

The primary reviewer should document the safety evaluation by preparing material suitable for inclusion in the Safety Evaluation Report (SER). The primary reviewer should describe the review, explain the basis for the findings, and state the conclusions.

The staff could document the safety evaluation for construction approval by stating that the applicant has committed to establishing a system for the systematic investigation of incidents, assignment and acceptance of corrective actions, and follow-up to ensure completion of the actions that meets or exceeds the acceptance criteria in Section 15.7.4.

The staff could document a safety evaluation for the license application for operations as follows:

Based on its review of the license application for operations, [Insert a summary statement of what was evaluated and why the reviewer finds the submittal acceptable,] the NRC staff concluded that the applicant has committed to and established an organization responsible for investigating incidents that occur during operation of the facility, determining the root cause(s) of each incident and taking corrective actions for ensuring a safe facility and safe facility operations in accordance with the acceptance criteria of Section 15.7.4 of the SRP; committed to review the results of the investigation against the ISA; committed to monitoring and documenting corrective actions through completion; and committed to the maintenance of related documentation and apply "lessons learned" to future operations of the facility.

Accordingly, the staff concludes that the applicant's description of the incident investigation process complies with applicable NRC regulations and is adequate.

15.7.7 REFERENCES

- A. Code of Federal Regulations, Title 10, Part 70, Domestic Licensing of Special Nuclear Material, U.S. Government Printing Office, Washington, D.C., 1999.
- B. Proposed 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material; Possession of a Critical Mass of Special Nuclear Material." 64 FRN 41338, July 30, 1999.
- C. Department of Energy (U.S.) (DOE). DOE-STD-1010-92, "Guide to Good Practices for Incorporating Operating Experiences." DOE: Washington, D.C. July 1992.
- D. Department of Energy (U.S.) (DOE). DOE-NE-STD-1004-92, "Root Cause Analysis Guidance Document." DOE: Washington, D.C. February 1992.

Management Measures

- E. Nuclear Regulatory Commission (U.S.) (NRC). NUREG/CR-4616, "Root Causes of Component Failures Program: Methods and Applications." NRC: Washington, D.C. December 1986.
- F. Nuclear Regulatory Commission (U.S.) (NRC). NUREG/CR-5665, "A Systematic Approach to Repetitive Failures." NRC: Washington, D.C. February 1991.
- G. Nuclear Regulatory Commission (U.S.) (NRC), NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action." NRC: Washington, D.C. May 1996.