

NRC INSPECTION MANUAL

FCOB

INSPECTION PROCEDURE 88065

INCIDENT INVESTIGATION

PROGRAM APPLICABILITY: 2603

88065-01 INSPECTION OBJECTIVES

01.01 To verify that arrangements exist that ensure the systematic and adequate handling of Incident Investigation (II) at the facility. These arrangements should clearly specify what is to be done, by whom, when, and how.

01.02 To determine whether the facility has in place II procedures that ensure a thorough investigation of the incident, including root cause analysis.

01.03 To verify that written incident reports and II reports have been prepared and issued to plant management and the NRC in a timely manner.

01.04 To determine whether the II reports include recommendations that when implemented, will reduce the likelihood of recurrence of the incident.

01.05 To verify that the facility has a management system in place to ensure that II recommendations are, or are being, brought to closure.

88065-02 INSPECTION REQUIREMENTS

02.01 Review the licensee's II program to determine whether the program adequately investigates incidents or near-misses, involving chemical hazards, that could affect operations with Special Nuclear Material (SNM) at the facility. The licensee should establish a II protocol that provides procedures necessary to conduct a thorough investigation of incidents or near-misses involving chemical hazards and SNM.

02.02 Review the II training program to ensure that team members are sufficiently familiar with the techniques and tools to be used.

02.03 Review the licensee's II program to determine whether the licensee has a mechanism in place to update the program through the

incorporation of management-approved recommendations coming out of the inspection elements of the NCPSP (Hazard Identification and Assessment (HIA) or Audit and Inspection program), pertaining to II.

General Guidance

The inspection should be directed at assessing the sufficiency of the II program in addressing incidents or near-misses involving chemical hazards that can affect operations with SNM at the facility. The most common cause of an incident is failure of the management system. The principal objective of an II is to prevent (or reduce the probability of) recurrence.

Specific Guidance

Specific guidance is provided for each of the inspection requirements listed in Section 88065-02, to help the inspector determine whether the licensee's program for II is adequate.

03.01 The licensee's II program should identify and evaluate root causes, identify and evaluate recommendations to reduce the probability of recurrence and/or mitigate potential consequences, and ensure resolution/implementation of recommendations, with proper closure. At least the following should be addressed as relevant:

- a. Categorization of incidents (e.g., as near-miss, minor, medium, and major). Each category should have its own level of investigation specified (e.g., such as no further action required, or setting up (or activating) an investigation committee with one or more experts). A system should be set up to investigate near-misses that might indicate the potential for the occurrence of significant incidents.

The inspector should verify that the licensee has a procedure in place to determine the cut-off points for investigating near-misses. Based on the safety significance, the inspector should look at the selected events to determine whether they were properly classified and addressed by the licensee. In addition, the licensee should have a procedure (such as trending analysis) to review events that fall below the threshold (i.e., below the cut-off for full-fledged investigation). This could provide useful information on inherent deviations from design intent, that exist within the system, which can then be rectified.

- b. Initiation of II within 48 hours (within 24 hours of incident stabilization) to allow collection of evidence (such as fluid samples, values of critical process parameters before and after incident), and interviews with personnel while the incident is still fresh in their minds, etc. This information is often invaluable in correctly determining the root cause of an incident.
- c. Establishment of investigation team comprising, as a minimum: one expert, all persons involved in the incident, as well as other experts necessary to conduct a thorough investigation. Training, both initial and refresher, should be provided to the II team on techniques, methodology, and protocol.

- d. Verify that all incidents have been reported to plant management (and NRC, if appropriate).
- e. Verify that an incident report, including date of incident, description of incident, contributing factors, root cause analysis, findings, and recommendations, has been provided to plant management and NRC, if appropriate, within 30 days of the incident. The American National Standards Institute (ANSI) has established a voluntary consensus standard for personnel injury reports (ANSI Z16.2) which has been in use for over 30 years. An example outline for the II report is attached as Appendix A.
- f. Establishment of a system to promptly address and resolve findings and recommendations of the investigation team. Documentation of resolutions and corrective actions is required.
- g. There should be an implementation schedule available for intended corrective actions. The schedule should be based on a prioritization of actions.
- h. There should be a system for tracking recommendation implementation and closure on a plant-wide basis. Progress, status, and milestone reports should be generated at regular intervals. (The inspector should ask for documented evidence that all management-approved recommendations from previous IIs were implemented in a timely manner.)
- i. The inspector should conduct a field check to verify implementation of recommendations. If any of the management-approved recommendations have not been implemented (or scheduled for implementation), then the inspector should ascertain the reason. The lack of a schedule is an indication of the lack of management commitment.
- j. Relevant investigation findings should be reviewed with all affected personnel, including contractors. In addition, in keeping with the proactive spirit of the NCPSP, it is recommended that findings be shared on an industry-wide basis. This might prevent the recurrence of similar incidents at other facilities and save lives.¹
- k. The "Prevention and Mitigation Elements" of the NCPSP (Standard Operating Procedures, Site-wide Safety Practices, Detection and Monitoring, Training, Management of Change, Maintenance and inspection, Emergency Procedures and Planning), should be updated as required to prevent recurrence of the incident. (The inspector should cross-check with Inspection Manuals for pertinent NCPSP elements.)

¹The Chemical Manufacturers Association (CMA) Responsible Care program emphasizes that responsible sharing of information can be an important factor in maintaining credibility with the local government and communities surrounding a facility.

1. II reports should be retained for a period of at least 5 years. There should be a central location for the storage of II reports and records.

NOTE: NRC may change report retention periods to until the facility has been decommissioned and the license has been terminated.

03.02 Adequate training should be provided to II team members. It is especially important that a suitable number of team members be trained in Root Cause Analysis.

03.03 The II program should include a mechanism for continuous improvement, which leads to the establishment of a dynamic, continuously evolving program.

- a. The licensee should have a mechanism in place to ensure that management-approved recommendations from the HIA study pertaining to II are incorporated into the program.
- b. The licensee should have a mechanism in place to ensure that management-approved recommendations from the audit of the program are addressed in a timely manner.
- c. The licensee should have a mechanism in place for critiquing each team investigation to evaluate how the II program can be upgraded. Deficiencies identified in the program should be rectified in a timely manner.

88065-04 RESOURCE ESTIMATE

An inspection performed using this inspection procedure is estimated to require 8 hours of inspector resources. This estimate is only for the direct inspection effort and does not include preparation for and documentation of the inspection.

88065-05 REFERENCES

Center for Chemical Process Safety, *Guidelines for Investigating Process Incidents*, American Institute of Chemical Engineers, New York, 1992.

Center for Chemical Process Safety, *Guidelines for the Technical Management of Chemical Process Safety*, American Institute of Chemical Engineers, New York, 1989, Chapter 11 pp. 113 - 122.

OSHA, *Process Safety Management of Highly Hazardous Chemicals*, 29 CFR 1910.119 (m), "II."
Chemical Manufacturers Association, *Responsible Care®*, *Process Safety Code of Management Practices*, Washington, 1990.

END

Appendix:

A. Sample II Report Outline

Appendix A

SAMPLE II REPORT OUTLINE

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| Abstract | Summary of events, consequences, causes, and recommendations, 1 page maximum. |
| Background | Overview of process and events preceding incident, background of personnel involved in incident, purpose and scope of investigation. |
| Narrative | Chronological description of event - scenario, sequence, consequences, addressing the "who, what, when, why, where, how" of the incident. |
| Root Causes | Identification, analysis, and discussion of the system-related root causes of the incident. |
| Recommendations | Recommendations for reducing probability of recurrence, minimizing personnel exposure, and mitigating consequences should the incident recur. Some of the most common recommendations made include upgrading plant practices related to: a) management of change, b) maintenance and inspection of safety equipment/devices, c) inherently safe system design (less reliance on human performance), d) establishment of effective management practices, and e) human factors. |
| Other | Miscellaneous supporting information, documents of special interest or value, method of investigation and team membership, photographs, flow sheets, diagrams, relevant Material Safety Data Sheets, calculations, lab reports, bibliography, glossary of terms and acronyms, etc. |

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