

NRC INSPECTION MANUAL

NMSS

INSPECTION PROCEDURE 85313

ALARM RESOLUTION

PROGRAM APPLICABILITY: 2681

85313-01 INSPECTION OBJECTIVE

Confirm that anomalies potentially indicative of SSNM losses are promptly investigated to resolve the nature and cause of any MC&A alarm. The investigation process must provide (1) a rapid determination of whether an actual loss of five or more formula kilograms occurred and (2) timely generation of information to aid in the recovery of SSNM in the event of an actual loss.

85313-02 INSPECTION REQUIREMENTS

The alarm resolution systems must comply with all applicable NRC regulations and safeguards license conditions. The FNMCP contains general commitments relative to alarms resolution. By inspection determine whether:

02.01 The nature and cause of all MC&A alarms were resolved within the approved time periods. [74.57(b)]

02.02 The MC&A licensing unit at NRC Headquarters was notified of any MC&A alarm that remained unresolved beyond the time period specified for its resolution in the licensee's FNMCP. Notification occurred within 24 hours except when a holiday or weekend intervened in which case the notification occurred on the next scheduled workday. The licensee may consider an alarm to be resolved if

- a. Clerical or computational error was found that clearly was the cause for the alarm. [74.57(c)(1)]
- b. An assignable cause for the alarm was identified or it was substantiated that no material loss had occurred. [74.57(c)(2)]

02.03 If a material loss has occurred, the licensee determined the amount of SSNM lost and took corrective action to:

- a. Return out-of-place SSNM, if possible, to its appropriate place. [74.57(d)(1)]

- b. Update and correct associated records. [74.57(d)(2)]
- c. Modify the MC&A system, if appropriate, to prevent similar future occurrence. [74.57(d)(3)]

02.04 The licensee has the capability to rapidly assess the validity of alleged thefts. [74.57(e)]

02.05 All abrupt loss detection estimates that exceeded five formula kilograms of SSNM resulted in:

- a. Suspension of material processing operations related to the alarm until completion of planned alarm resolution activities, unless the suspension of operations adversely affected the ability to resolve the alarm. Operation of continuous processes may continue for 24 hours from the time of the occurrence of the alarm during which time checks shall be made for mistakes in records or calculations that could have caused the alarm. [74.57(f)(1)]
- b. Telephonic notification by the licensee to the MC&A licensing unit at NRC Headquarters within 24 hours that an MC&A alarm resolution procedure has been initiated. [74.57(f)(2)]

02.06 The NRC Operations Center was notified within one hour of discovery of any loss or theft or other unlawful diversion of special nuclear material which the licensee is licensed to possess, or any incident in which an attempt has been made to commit a theft or unlawful diversion of special nuclear material. The requirement does not pertain to measured discards or inventory difference (ID) quantities. [74.11]

02.07 The licensee investigated and took corrective actions for each shipper/receiver difference that exceeded twice the estimated standard deviation of the difference estimator and the larger of 0.5 percent of the amount of SSNM in the container, lot or shipment, as appropriate, or 50 grams of SSNM. [74.59(h)]

02.08 During physical inventories, the licensee calculates the ID, estimates the standard error of the inventory difference (SEID). The licensee has investigated and reported any SEID estimate that is 0.1 percent or more of active inventory and any ID that exceeded three times the standard error and 200 grams of plutonium or uranium-233 or 300 grams of uranium-235. [74.59(f)(1)(i)]

85313-03 INSPECTION GUIDANCE

03.01 Regulations. 74.57

03.02 Regulatory Guides and Reports. NUREG-1280, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment, Section 3, "Alarm Resolution."

03.03 Criteria. The inspector's review determines whether the procedures have been developed to meet the commitments in the FNMCP, responsibilities have been assigned for the investigation activities, and that the procedures address the most likely causes of alarms. Because the expected frequency of alarms indicating a 5 FKG loss is very small, the inspection of alarm resolution capability should focus on the system characteristics and flexibility to respond to unusual events. The inspector, in

assessing this capability, needs to consider the effectiveness of the quality assurance measures required by 74.59 and the experience of the resolution personnel in evaluating process conditions.

Pre-inspection Activities. To prepare for the inspection, the inspector should review the specific portions of the FNMCP and the safeguards license conditions for the planned inspection activities; review the previous inspection report for the site; review any unresolved or followup items to be addressed during the inspection; and review any communications (including information notices and bulletins) with the facility since the last inspection.

Post Inspection Activities. Followup is conducted as described in Manual Chapter 92701 and Inspection Report is generated as described in Manual Chapter 0610.

Evaluation of Resolution of Any Past Alarm Events. The inspector will examine actions taken to resolve any anomalies that have occurred to determine that established procedures were followed and that alarm requirements were observed. Problems encountered in responding to anomalies should have been resolved and remedial actions taken as necessary to meet the FNMCP alarm resolution commitments.

The inspector should determine that the licensee's alarm resolution system is able to respond promptly to alarms indicating a potential loss of SSNM and determine whether the alarm was caused by actual loss or by a system error. The alarm program should also be able to identify the type of system error or innocent cause so that remedial action can be taken. The alarm response should be timely to ensure that alarms are investigated and resolved promptly while memories of events leading up to the alarm are fresh, materials are still available for remeasurement, and fewer changes of process conditions, inventories, in-process holdup, and item locations will have occurred. Prompt resolution will facilitate recovery of "lost" or stolen material.

- a. By reviewing the records of the process monitoring estimators and item monitoring, the inspector determines whether any alarms have occurred. The documentation of resolutions should be reviewed to determine whether a cause was assigned, whether the documentation is available to support the assignment, and whether the resolution was completed within the time periods approved in the FNMCP.

The alarm resolution time commitments ensure a reasonably prompt alarm response. The check of the loss indicator data for clerical mistakes and data errors should normally be completed within 24 hours for any abrupt loss alarm. The maximum time for completion of the resolution procedure for alarms indicating a possible abrupt loss of items that were tamper-safed, encapsulated, or retained in a vault that provided protection equivalent to tamper-safing should normally not exceed 3 calendar days. The maximum time for completion of the resolution procedure for alarms indicating a possible abrupt loss of SSNM in any form or container that was not tamper-safed, encapsulated, or stored in a vault

equivalent to tamper-safing should not normally exceed 3 days. When a tamper-safed or encapsulated item has been compromised, a remeasurement should be immediately undertaken.

The maximum time after the alarm for completing a remeasurement to confirm the contents should normally not exceed two working days. When a vault or CAA providing protection equivalent to tamper-safing has been entered without authorization, when the prescribed vault protection has been compromised, or when other indications of loss of control are discovered, the entire vault contents should be accounted for within 3 calendar days by a piece count and attribute test of all items not tamper-safed or encapsulated, such as by weighing or NDA. Remeasurement should be initiated within one working day. Longer time periods should be explained and justified.

If one or more items are not found in their recorded locations, the licensee should normally declare the item(s) missing if not found or accounted for within 24 hours for Category IA items totalling 5 FKG or more and 3 working days for all other items. A search for a misplaced item that was not tamper-safed or encapsulated should not be terminated without NRC permission until the item is located or evidence of its destruction is obtained, except that a claim that an item was destroyed without recording the fact may be accepted if independent confirmatory evidence of destruction is obtained. Items containing less than 0.05 FKG are exempted from the requirements for confirmatory evidence. Searches for missing items should not be interrupted by idle time such as weekends, holidays, etc.

Review of Alarm Resolution Procedures. The inspector should confirm that resolution procedures are described for alarms that indicate a potential abrupt loss of 5 FKG of SSNM in bulk or item form. Alarm resolution procedures provide a systematic and logical sequence of steps for determining the cause or causes of an alarm. The procedures take into account the expected differences in loss mechanisms and necessary differences in response approaches for in-process materials, items, different material types and different types of unit operations.

The quality of the licensee's loss resolution capability is such that the combination of the material control test and resolution decisions will permit alarms remaining unresolved after investigation to be good indicators of material loss.

- b. The inspector reviews alarm notification procedures to assure that all required information will be reported within the time periods specified in the FNMCP for each type of alarm response. The information to be reported includes the magnitude of the discrepancy indicated by the alarm, the investigation procedure, the status of the investigation, the status of the facility, the planned remedial measures, and the status of SSNM security during the period.

With regard to recurring losses, the licensee must report a significant loss trend within one week of its discovery and the progress of the resulting investigation reported monthly. In conjunction with the inspection activities described in section 3.03.04 of inspection module 85307, the inspector should determine whether any significant trend were identified. The inspector would then determine whether each was appropriately investigated and reported. Each type of alarm response is identified with the corresponding types of material and/or unit processes and the credible innocent causes of the alarm. The decision rules for a conclusion that a particular cause is applicable and that the alarm is resolved are described. A decision rule must generally provide an objective basis for deciding whether or not the data and information acquired up to that point in the alarm assessment supports the hypothesis that the alarm was due to an innocent cause. Each decision rule should be based on the identification of a specific cause or a source of incorrect data that contributed to the alarm level of the loss estimator except that the rule may verify with high probability that no loss has occurred without having identified all contributing causes of the alarm.

- c. As part of the review of alarm resolution, the inspector should verify followup corrective actions. After an alarm has been resolved, the planned corrective action includes MC&A system revisions, if appropriate, that provide reasonable assurance that future alarms having the same or a similar cause will not occur.
- d. Responsiveness Test of the Alarm Resolution System. This requirement can best be inspected by requiring the licensee to perform those activities specified in the FNMCP in response to a simulated hoax call of an alleged theft of SSNM. The scenario of the test would be based on the inspectors review of the licensee's operations.

Review of the SSNM item record system indicates that the records of the identity and location of every item can be updated with sufficient speed to support the commitments that any randomly selected item within a vault can be located within 8 hours, and any item outside a vault can be located within 24 hours. The capability also exists to locate all items within a vault within 72 hours and all items outside a vault or permanently controlled access area within one week.

The emergency inventory capability includes provisions for maintaining the availability of forms, tags, trained personnel, inventory listing, and other items that may be needed to initiate a plant-wide physical inventory within 24 hours.

- e. Alarm reporting requirements are intended to make the NRC aware of potential MC&A discrepancies in a timely manner so that appropriate actions can be initiated. The inspector should review loss detection and alarm resolution records to determine whether NRC should have been notified of any alarms.

When a detection alarm indicates a potential loss in excess of 5 FKG, continuous processing operations related to the alarm must be suspended within 24 hours after the alarm or batch processing operations must be suspended immediately after the alarm or upon completion of the batch in process, and the suspension continued until completion of the planned resolution activities unless the suspension would negatively affect the ability to resolve the alarm. Alternative measures which do not require shutdown may be taken when an alarm occurs, if they are documented in the FNMCP, and are equally effective in protecting information and materials that would be needed during the alarm investigation.

When an actual loss of SSNM is indicated, the quantity of material lost will be estimated and other information which may aid in the recovery of the material, such as the material type, container type and who last had responsibility for the SSNM, will be generated if possible.

- f. Notification of abrupt loss estimates exceeding 5 FKGs must be made to the NRC Operations Center via the Emergency Notification System if the licensee is party to that system. If the Emergency Notification System is inoperative or unavailable, the licensee shall make the required notification via commercial telephone service or other dedicated telephonic system or any other method that will ensure that a report is received within one hour. The exemption of 73.21(g)(3) applies to all telephonic reports required by this section.
- g. The inspector should review the corrective action plans developed for significant shipper/receiver differences and determine whether the actions have been taken. The inspector should compare the licensee's records with the NMMSS reports for close out.

The licensee should have completed the investigation of each statistically significant shipper/receiver differences within 3 months except where the difference exceeds 5 FKG, in which case the discrepancy should be resolved within 30 days.

- h. The inspector reviews the ID calculations for each physical inventory since the last inspection to determine whether calculations were performed as described in the FNMCP and whether any inventory should have been investigated. If any excessive ID should have been investigated and appropriate action taken to identify the cause(s), the inspector should examine the records of the investigation and corrective actions taken. Because the ID is calculated primarily as a quality assurance measure for the loss detection system that use process monitoring and item monitoring, the investigation of an excessive ID should include a review of process monitoring and item monitoring data to identify potential causes and correction discrepancies identified in the data.

03.04 Inspection Activities Flowchart. Figure 1 shows a flow chart of the alarm resolution inspection activities.

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FIGURE 1

ALARM RESOLUTION INSPECTION

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