TECHNICAL EVALUATION REPORT

A Review Of Two Recent Occurrences At The Advanced Test Reactor Involving Subcontractor Activities

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MASTER

Occurrence Reporting And Processing System Reports:
ID--LITC-ATR-1997-0021 and
ID--LITC-ATR-1997-0022

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EXECUTIVE SUMMARY

This report documents the results of a brief, unofficial investigation into two incidents at the Idaho National Engineering and Environmental Laboratory (INEEL) Advanced Test Reactor (ATR) facility, reported on October 25 and 31, 1997. The first event was an unanticipated breach of confinement. The second involved reactor operation with an inoperable seismic scram subsystem, violating the reactor's Technical Specifications. These two incidents have been found to be unrelated.

A third event that occurred on December 16, 1996, is also discussed because of its similarities to the first event listed above. Both of these incidents were unanticipated breaches of confinement, and both involved the work of construction subcontractor personnel.

The cause for the subcontractor related occurrences is a work control process that fails to

effectively interface with LMITCO management. ATR Construction Project managers work sufficiently close with construction subcontractor personnel to understand planned day-to-day activities. They also have sufficient training and understanding of reactor operations to ensure adherence to applicable administrative requirements. However, they may not be sufficiently involved in the work authorization and control process to bridge an apparent communications gap between subcontractor employees and Facility Operations/functional support personnel for work inside the reactor facility.

The cause for the inoperable seismic scram switch (resulting from a disconnected lead) is still under investigation. It does not appear to be subcontractor related.

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PURPOSE

The purpose of this report is to document the results of a brief, unofficial investigation performed at the request of the Department of Energy (DOE) Office of Engineering Assistance and Site Interface, EH-34, into two events that were identified within six days of one another at the INEEL Advanced Test Reactor (ATR) facility. The report documents the investigation of these two events as they relate to similar incidents reported previously at ATR, and as they relate to similar reported occurrences at other DOE facilities.

Objective

The objective of the investigation was to glean information that might be useful to DOE program managers, facility managers, and operating staff in their continuing efforts to decrease the number of preventable occurrences at their facilities.

Background

Two incidents recently occurred at the INEEL ATR facility. One event was an unanticipated breach of confinement, and the other involved reactor operation with the seismic scram subsystem inoperable that violated the facility's Technical Specifications. It appeared on the surface that the two events had similarities in cause, and it was noted that at least one other similar event had occurred within the past year at the same facility.

Method and Scope

The investigation into the two ATR events was performed by detailed reviews of occurrence reports, augmented by discussions with personnel responsible for various aspects of safely operating the ATR facility. The investigation was performed by two people, each having some detailed knowledge of the ATR facility, and one involved on a day-to-day basis in reviewing occurrences reported by operating personnel from across the DOE complex.

The latter performs these reviews for the Defense Programs Office of the Associate Deputy Assistant Secretary for Technical and Environmental Support, DP-45, Special Projects Group.

A Special Projects Group team reviews all occurrence reports issued by DOE facilities on a daily basis. During this daily review, occurrence reports are discussed for assignment to subject matter bins and sub-bins and for classification as significant reports¹. This information is entered into a database program and is used in biweekly and bimonthly reports disseminated throughout the DOE complex for use by operating personnel. Analysis of data has shown that a large number of significant occurrence reports is recorded in the *OSHA/Industrial Hygiene* and *Subcontractor* subject matter bins. For example, approximately 94% of the occurrences recorded under the *OSHA/Industrial Hygiene* subject matter bin are attributable to subcontractor activities. For the last five months (or eleven two-week periods), an average of 24% of the significant reports from all DOE facilities have fallen into the *Subcontractor* bin.

¹ An occurrence report is considered to be significant if the event has particular safety, political, or cost implications. For example, a report is assigned a medium significance if only one barrier to significant injury or exposure remained; if out-patient hospitalization occurred for observation or treatment; or if significant costs were incurred that exceeded the reporting threshold of DOE Order 232.1A. It is assigned a high significance if the occurrence was life threatening or a fatality; if the event was politically sensitive; if the incident involved a major release affecting the environment or an uncontrollable situation, i.e., major fire, flood; or if hospitalization for more than observation was required.

This information is depicted below.

One reason for these results is that the safety culture of subcontractors is not the same as that of the DOE community. Since most of the subcontractors' activities involve construction work, this deficiency is a result of a lack of consistent safety training inherent to a fluctuating work force and previously developed habits.

DISCUSSION OF INVESTIGATIONS

Occurrence Report Number

ID--LITC-ATR-1997-0021—Removal of Halon System Piping Which Penetrated ATR Gas-Tight Confinement Wall Without Follow-up Installation of Temporary Seal

Description Of Occurrence Report

A Lead Senior Reactor Auxiliary Operator while completing a walkdown of changes to the plant facility being made by a construction subcontractor, noticed that five 1-1/2 in. pipes that penetrated the Reactor Data Acquisition System and Reactor Instrument shop rooms were open. A construction subcontractor had recently removed the Halon System distribution piping that connected the halon gas supply bottles outside the ATR reactor building and the eight spiral discharge nozzles inside the building. The Operator understood that the spiral discharge nozzles were open inside the ATR gas confinement and that, if the distribution piping were not sealed, it would breach the gas-tight confinement boundary for the reactor. The Operator reported his concern to the Shift Supervisor.

The opening through the reactor building confinement wall was within the Technical Specification allowable limit of 7 in.². However, work controls for construction subcontractors' work were not effective in preventing the ATR gas-tight confinement from being inadvertently breached. Maintaining gas-tight confinement within allowable leakage limits specified in the ATR Technical Specifications is important to prevent a serious radiological release from the ATR building.

Review Of Causes

The causes of this occurrence seem to be twofold. The first is a lack of recognition by

any of the parties involved that the work would breach confinement. This is an error that occurs occasionally and is not unique. The other cause is more subtle and reflects the limited interface between the plant staff and construction subcontractors and other differences in the two organizations.

Maintenance activities at the ATR and other nuclear facilities at the INEEL are conducted by Lockheed Martin Idaho Technologies Company (LMITCO) employees per Management Control Procedure MCP-2798 that defines Maintenance Work Control for LMITCO and non-Davis-Bacon personnel. This procedure requires rigor, multi-level control, and verification that is typical of the controls used in the rest of the nuclear reactor industry.

Subcontractor construction work within the facility is carefully planned and reviewed with the LMITCO Construction Engineer each day, but the details and requirements are not normally as well documented as they are for work performed by the LMITCO maintenance crafts. As such, other LMITCO personnel, who are in the approval process for authorizing and/or overseeing the functional aspects of the work, do not always understand the day-to-day details well enough to prevent errors, e.g., removal of sealant without the proper authorization, failure to rigorously follow instructions on caution tags, methods for ensuring fall protection requirements are adhered to, methods for attaching unistrut to building/crane support columns are authorized, etc.

The differences in the two types of work control programs are driven by the differences

in the type of work. In-plant maintenance is performed with a staff well trained in safe plant operation and the jobs are commonly repetitive in nature (e.g., calibrations, PMs, and overhauls) that easily accommodate detailed procedures. Subcontractor work typically is a variable activity (e.g., construction and D&D) using building trade labor with minimal training time available. The training emphasis also differs between "skill-of-the-trade" versus "operation of the plant". If the subcontractor were forced to change his work control process to that of the LMITCO client, (eg., step by step procedures) the scope of work would increase dramatically, and the advantage of using a skill based subcontractor would be lost.

As a result of this occurrence and a similar event from last year (ID--LITC-ATR-1996-0031) and discussed later in this report, Construction Management personnel are creating some recommendations for improving the interface between subcontractors and ATR Operations.

Occurrence Report Number

ID--LITC-ATR-1997-0022—Discovery of a Disconnected Electrical Lead on Seismic Scram Switch

Description Of Occurrence Report

At 0745 on 10/31/97, while an ATR Operations staff member was performing an assessment, he was shown the location of the ATRC seismic scram switch (detector) and noted that one of the two leads on the detector was disconnected.

The disconnected lead rendered the seismic scram function for the ATRC inoperable. This subsystem is required by the facility Technical Specifications to be functional during reactor

operation. On October 21, 1997 and October 22, 1997 preventive maintenance was performed using approved procedures that could have revealed or caused the disconnected electrical lead. The electrical lead is secured to the seismic switch by means of a knurled nut that has to be tightened over the lead wire loop. The entire switch assembly is then covered by a box lid that prevents dirt from entering the switch assembly and protects it from damage. When questioned, all ATRC operators stated that they had not noticed the lifted lead and that the seismic switch material condition was satisfactory. Likewise, construction personnel, who were installing conduit for an upgraded security access system, denied having done anything to the switch that might have caused the lead to come off. ATRC is a locked facility with limited access. At the time of this notification report, the cause of the lifted lead is unknown. The reactor had been operated on three occasions since October 22, 1997. An investigation is being performed to attempt to determine the cause of the inoperable seismic switch. A corrective action plan will be developed to resolve the findings from the investigation. The facility will remain shut down until the results of the investigation and completion of the correction action are reviewed by facility management and DOE-ID.

Review Of Causes

The exact cause of this event is unknown at this time. Because the seismic switch is covered by a box lid and the leads are firmly attached to the switch by means of a heavy knurled nut, this event does not appear to be construction related. In fact, no subcontractor personnel were logged into the area during the interval since the last PM.

Occurrence Report Number

ID--LITC-ATR-1996-0031—Removal Of Temporary Seal from 2-in. Reactor Confinement Penetration by Construction Subcontractor Without Proper Approval

[A previous occurrence report of an incident very similar to the first event described above (ID--LITC-ATR-1997-0021) was reported in December 1996. It is described in the following paragraphs].

Description Of Occurrence Report

While pulling wires through a 2-in. electrical conduit, in support of a construction project, an Electrical Apprentice removed a temporary seal from the electrical conduit without obtaining proper authorization from the Operations Shift Supervisor or having processed the required Reactor Programs Penetration Approval Form. The previously installed and sealed 2-in. conduit penetrated a reactor confinement boundary wall.

During the morning on December 16, 1996, the Construction Subcontractor Electrical Foreman and the LMITCO Construction Project Engineer met with the Operations Shift Supervisor and briefed him on what construction work would be ongoing within the ATR facility. The Shift Supervisor was not aware that this was the first day on the job for the sub-tier Electrical Subcontractor and believed that the primary Subcontractor would process the necessary Gas-Tight Penetration Approval Form prior to removing any seals in conduit that penetrated the ATR gas-tight boundary, as he had before.

Late in the morning, the Subcontractor Electrical Foreman instructed an Electrical Apprentice to remove the temporary sealant from the 2-in. conduit and pull wire through it. The

Electrical Foreman believed that based on the morning briefing, he had obtained verbal Shift Supervisor approval to proceed with that task. He was not aware of the need to formally process a Gas-Tight Penetration Approval Form because the primary Subcontractor Superintendent had always performed that function in the past. Caution tags had previously been hung on the conduit, only a few inches away from the temporary sealant, referencing the ATR Technical Specification and warning that removal of the temporary sealant was prohibited. The Electrical Apprentice was aware of the caution tags, but thought that the Shift Supervisor had given authorization to remove the seal and proceeded without contacting the Shift Supervisor.

Upon completion of the wire pull through and the 2-in. conduit penetration, Construction Subcontractor personnel recognized the need to have the temporary seal inspected. When the Shift Supervisor was contacted to perform this inspection, he recognized that the Penetration Approval Form had not been processed, and requested that any further work on pulling wire through the conduit be stopped. Other Subcontractor work was allowed to continue.

Description Of Cause

The direct cause of this event is a communication problem. The early morning Shift Supervisor briefing was very broad-based. The Shift Supervisor understood that wire pulls would be performed, but also expected that the Penetration Approval Form would be processed by the Construction Management and Subcontractor personnel, as it had been hundreds of times before.

The Subcontractor Superintendent understood the need to formally process the Penetration Approval Form for drilling holes through the

confinement, and had done so numerous times in the past, but did not process the form for the sub-tier Electrical Subcontractor, primarily due to inattention to detail, but also because he had not followed through on a question as to whether processing the form was required for only temporary removal of the conduit sealant, as opposed to the requirement for using the form for any drilling through confinement.

LMITCO Construction personnel were fully aware of the need to process the Penetration Approval Forms, but like the Shift Supervisor, believed that the sub-tier Electrical Subcontractor was aware of the requirement and expected the form to be processed prior to removing the sealant from the electrical conduit.

The Electrical Apprentice indicated in a written statement that he had read the caution tag, but believed that his actions were allowed, even though they were not consistent with caution tag instructions. This belief was based on having received direction from his Electrical Foreman to proceed and knowing that a Shift Supervisor briefing had occurred that morning, with an approval to commence work.

Initially this event was believed to be an isolated case and the root cause was identified as "Training Deficiency, Lack of Appropriate Training." The primary Subcontractor Superintendent indicated that the form had always been processed at his level, and above. The Electrical Apprentice was also not fully aware of the need to rigorously follow the caution tag instructions within the reactor facility, and if he could not, to request that the caution tag be removed.

Subsequent related occurrences at ATR (ID--LITC-ATR-1997-0001 on February 6,

1997 and ID--LITC-ATR-1997-0008 on March 4, 1997) indicate that this event was not an isolated case and that the real root cause was lack of construction subcontractor work control.

Evaluation

The Subcontractor failed to comply with the work control process. This was not an intentional error, rather a lack of attention to detail on the part of the Electrical Superintendent, and a lack of training for the Electrical Foreman and the Electrical Apprentice. The pre-job briefing between the Subcontractor and the Shift Supervisor was broad-based and did not cover the specific approval forms that were necessary before removing gas-tight penetration seals. The Shift Supervisor believed it to be unnecessarily repetitious to reiterate the need for processing the same form that the Subcontractor had used more than a hundred times before.

The breach opening through the reactor building confinement wall was well within the allowable Technical Specification limit of 7-in.², and there would have been no impact to the environment beyond that identified in the Reactor Authorization Basis, even if a serious radiological airborne release had occurred during the short time that the conduit sealant was removed. The Technical Specification action statement allowed openings greater than 7-in.² to be created, as long as the openings were verified to be reduced to less than 7-in.² within 24 hours.

Airborne activity levels were normal while this work was in progress and, in fact, would have precluded any construction work inside the reactor confinement if they had been elevated.

There are numerous ways that the construction subcontractor can affect the safety of the facility. Construction work within the facility is carefully planned and reviewed with the LMITCO Construction Engineer each day, but the task specific details are not normally as well documented as for maintenance crafts. Construction personnel typically work to drawings and not detailed work instructions

like maintenance craft personnel. As such, an important form of communication is not available; and this makes it difficult for facility operations and other functional TRA support groups to review the details of planned construction work activities and to provide input to construction subcontractors concerning applicable administrative restrictions.

CONCLUSIONS

The fact that two almost identical incidents (i.e., a subcontractor opening a penetration into the reactor's confinement structure) have occurred within a year's time, indicates that LMITCO's work control processes for subcontractor work are not preventing these occurrences. TRA Construction Project managers work sufficiently close with construction subcontractor personnel to understand planned day-to-day activities. They also have sufficient training/understanding of reactor operations to ensure adherence to applicable administrative requirements. However, they may not be sufficiently involved in the work authorization and control process to bridge an apparent communications gap between subcontractor employees and Facility Operations/functional support personnel for work inside the reactor facility.

Three additional occurrences reported by ATR during 1996/1997 (included in the Appendix) pertain to subcontractor issues. The first—ID--LITC-ATR-1996-0013—deals with a backhoe striking an overhead 240-V power line. The second—ID--LITC-ATR-1997-

0008—deals with subcontractors drilling into crane support columns to attach unistrut supports. The third—ID--LITC-ATR-1997-0001—deals with inadequate fall protection of a welder on a roof. In each of these incidents, the causes are clearly stated, and the corrective actions are properly chosen to correct the problem. Yet, the incidents repeat themselves.

This problem is not specific to the INEEL or ATR; it is occurring throughout the DOE complex on quite a regular basis. One of the underlying reasons for the number of safety and procedure violations of subcontract workers is that the safety culture of subcontractors is not equivalent to that of the DOE community. Since most subcontractors' activities involve construction work, this deficiency is a result of a lack of consistent safety training and a lack of understanding of plant system operation inherent to a building trades workforce. Inadequate supervision by the DOE M&O or construction contractors also contributes to the number of OSHA-related incidents.

LESSONS LEARNED

Construction work is often composed of one-of-a-kind activities that do not lend themselves readily to being organized into standard procedures as surveillance, maintenance, calibration, or overhaul activities do. Additionally, construction work in existing facilities often involves a change in configuration, i.e., a removal of one system or a replacement by another system. As such, exact work planning is almost impossible and probably not cost effective. The contractor must have enough freedom to apply his expertise to the completion of the task, while the facility's construction engineer must make sure that the facility's Operational Safety Requirements or Technical Specifications are not violated. A successful project completion depends to a large extent upon the trust and communication between the facility's construction engineer, the construction contractor supervisor and the operations staff.

While good communications between the construction engineer and the ATR Shift Supervisor is vital to safety, the act of communicating also tends to become merely

one of their many routine duties. In many instances, this communications interface becomes the source of misunderstanding.

The most effective tool of establishing a communication channel between the construction engineer and the construction subcontractor is the pre-job briefing. It is the construction engineer's responsibility to ensure that the construction subcontractor understands all requirements of the assigned tasks.

After a long history of these types of problems, the INEEL Procurement Department has now issued a Subcontractor Requirements Manual that will become a requirement for all future contracts. This manual includes requirements for QA, safety, work control, and other programs that are equivalent to the INEEL internal procedures. It is expected that this new manual will go a long way to end the double standard that now exists. (The manual can be viewed at <http://www.inel.gov/procurement/litco/index.html>).

APPENDIX

Referenced Occurrence Reports

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Balance-of-Plant

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: William W. Gay III

Title: ATR Operations Facility Manager Telephone No.: (208)533-4353

(Facility Manager/Designee)

Name: LEPPERT, YVETTE

Title: PR. ADMIN. ASSOCIATE Telephone No.: (208)533-4563

(Originator/Transmitter)

Name: Charles D. Brooks

Date: 08/07/1996

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID-LITC-ATR-1996-0013
Subcontractor Trackhoe Contacted Overhead Powerline To 240V
Evacuation Siren Circuit

2. REPORT TYPE AND DATE: Date Time
☐ Notification 06/25/1996 1645 MTZ
☐ Initial Update 08/07/1996 1048 MTZ
☐ Latest Update 08/07/1996 1048 MTZ
☒ Final 08/14/1996 0601 MTZ

3. OCCURRENCE CATEGORY:
☐ Emergency ☐ Unusual ☒ Off-Normal ☐ Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
Bldg. TRA670 External Evacuation Siren

8. UCN1?: No 9. PLANT AREA: TRA670 - Outside

10. DATE AND TIME DISCOVERED: 11. DATE AND TIME CATEGORIZED:
06/24/1996 1120 (MTZ) 06/24/1996 1150 (MTZ)

12. DOE NOTIFICATION:

13. OTHER NOTIFICATIONS:

06/24/1996 1150 (MTZ) C. R. Warren DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

Subcontractor Trackhoe Contacted Overhead Powerline To 240V
Evacuation Siren Circuit

15. NATURE OF OCCURRENCE:

- 10) Cross-Category Items
- B. Near Miss Occurrences

16. DESCRIPTION OF OCCURRENCE:

At approximately 1120 hours on June 24, 1996, a trackhoe, operated by a construction subcontractor, struck an overhead power line to a pole-mounted siren. As a result, the weather head (circuit) pulled away from building 670 approximately two to three inches. The power line now sags five to six feet lower than it did originally. The electrical service (240V) was deenergized at the time of the occurrence, but not locked and tagged out.

The trackhoe was removing asphalt and loading it into a dump truck at the time of the incident. A spotter for the trackhoe operator was being utilized, but he was also helping to load the trackhoe bucket by hand.

The evacuation siren was not activated as a result of this incident; therefore, no evacuation of personnel occurred.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The Advanced Test Reactor (ATR) was shutdown for the scheduled Cycle 110A Outage and was not a factor in this event.

18. ACTIVITY CATEGORY:

Construction

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

All trackhoe operations were secured. Notifications were made to the ATR Shift Supervisor, Construction/ Project Management officials, Safety, and DOE-ID representatives. The electrical service to the evacuation siren was then locked and tagged out.

20. DIRECT CAUSE:

- 3) PERSONNEL ERROR
- A. Inattention to Detail

21. CONTRIBUTING CAUSE(S):

22. ROOT CAUSE:

6) MANAGEMENT PROBLEM

A. Inadequate Administrative Control

23. DESCRIPTION OF CAUSE:

The direct cause was determined to be Operator Error, Inattention to Detail. Both the trackhoe operator and the safety spotter failed to realize the significance of the overhead power line and its close proximity to the trackhoe. The operator was in the process of loading asphalt into a dump truck for removal from the area when this incident occurred. During this operation, the boom hinge point of the trackhoe was extended to its highest point, when it came into contact with the electrical service line to the siren. The safety spotter had temporarily left his position to assist the trackhoe operator in loading an oversized piece of material (asphalt) into the bucket and failed to observe the hazard of the trackhoe boom raising.

The root cause of this event is a Management Problem in that administrative controls for the job were inadequate for the hazards involved. The job safety analysis addressed an overhead line, but it failed to place the proper emphasis on the hazard associated with the line. The Construction Management Excavation Checklist, as utilized, placed an emphasis on underground hazards and failed to address above-ground hazards. It was assumed that because the overhead line was visible to all, that everybody recognized the hazard. If the job safety analysis, pre-job briefing, and the Construction Management Excavation Checklist had acknowledged the hazard, then this event would not have occurred.

24. EVALUATION: (By Facility Manager/Designee)

A potential for personnel injury existed during this incident, due to the trackhoe coming into contact with the 240V electrical service line; however, the service line was deenergized at the time of the occurrence.

To help prevent events like this one from recurring, the job safety analysis process will be reevaluated and revised. Additionally, the Construction Management Excavation Checklist has been revised to include above-ground hazards; pre-job briefings now include safety spotter responsibilities.

25. IS FURTHER EVALUATION REQUIRED?: Yes ☐ No ☒

26. CORRECTIVE ACTIONS:

(* = Date added/revised since final report was signed off)

26. CORRECTIVE ACTIONS: (continued)

(* = Date added/revised since final report was signed off)

- 01) A safety meeting for construction subcontractor personnel was held. Safety spotter responsibilities and the DOE/INEL Hoisting and Rigging requirements were discussed at length.

TARGET COMPLETION DATE: 06/25/1996 COMPLETION DATE: 06/25/1996

- 02) The Reactor Programs Construction Management Excavation Checklist was revised to include a review of overhead/above-ground hazards in addition to underground hazards.

TARGET COMPLETION DATE: 06/25/1996 COMPLETION DATE: 06/25/1996

- 03) The LMITCO job-specific Job Safety Analysis for excavations, which was used by the construction subcontractor, has been revised to include overhead/above-ground hazards in addition to underground hazards.

TARGET COMPLETION DATE: 07/01/1996 COMPLETION DATE: 07/01/1996

- 04) Discuss this event in the INEL site-wide monthly Construction Management Area Coordinator Meeting at ICPP.

TARGET COMPLETION DATE: 08/13/1996 *COMPLETION DATE: 08/13/1996

27. IMPACT ON ENVIRONMENT, SAFETY AND HEALTH:

Although there was potential for serious injury, there was no impact to the environment or the safety and health of the workers.

28. PROGRAMMATIC IMPACT:

None

29. IMPACT UPON CODES AND STANDARDS:

None

30. LESSONS LEARNED:

A detailed and thorough assessment of hazards must be performed prior to starting work, and this must be included in the pre-job briefing.

30. LESSONS LEARNED: (continued)
Safety spotters must have no other assigned responsibilities
other than Safety.

31. SIMILAR OCCURRENCE REPORT NUMBERS:
1) None

32. USER FIELD #1:

33. USER FIELD #2:

34. DOE FACILITY REPRESENTATIVE INPUT:

Entered by: Date:

35. DOE PROGRAM MANAGER INPUT:
None.

Entered by: MILLER, LAWRENCE E Date: 08/14/1996

36. SIGNATURES: (FM's original signature on hardcopy)

Approved by: William W. Gay III Date: 08/07/1996
Facility Manager/Designee Telephone No.: (208)533-4353

Approved by: WARREN, CARY R Date: 08/13/1996
DOE Facility Representative/Designee Telephone No.: (208)526-9019

Approved by: MILLER, LAWRENCE E Date: 08/14/1996
DOE Program Manager/Designee Telephone No.: (301)903-3109

ID--LITC-ATR-1996-0031
11/05/1997

Final Report

Page 1

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Category "A" Reactors

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: William W. Gay III

Title: ATR Operations Facility Manager

Telephone No.: (208)533-4353

(Facility Manager/Designee)

Name: OWENS, MARJORIE A

Title: PRINCIPAL ADMIN ASSOCIATE

Telephone No.: (208)533-4563

(Originator/Transmitter)

Name:

Date:

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID--LITC-ATR-1996-0031
Removal Of Temporary Seal From Two-Inch Reactor Confinement
Penetration By Construction Subcontractor Without Proper Approval

2. REPORT TYPE AND DATE: Date Time
☐ Notification 12/17/1996 1643 MTZ
☐ Initial Update 01/28/1997 1711 MTZ
☐ Latest Update 03/31/1997 1524 MTZ
☒ Final 04/03/1997 0640 MTZ

3. OCCURRENCE CATEGORY:
☐ Emergency ☐ Unusual ☒ Off-Normal ☐ Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
Reactor confinement boundary wall

8. UCN1?: No

9. PLANT AREA: TRA-670

10. DATE AND TIME DISCOVERED: 11. DATE AND TIME CATEGORIZED:
12/16/1996 1130 (MTZ) 12/16/1996 1210 (MTZ)

12. DOE NOTIFICATION:

13. OTHER NOTIFICATIONS:

12/16/1996 1210 (MTZ) R. C. Seal DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

Removal Of Temporary Seal From Two-Inch Reactor Confinement
Penetration By Construction Subcontractor Without Proper Approval

15. NATURE OF OCCURRENCE:

- 10) Cross-Category Items
- B. Near Miss Occurrences

16. DESCRIPTION OF OCCURRENCE:

While pulling wires through a two-inch electrical conduit, in support of a construction project, an Electrical Apprentice removed a temporary seal from the electrical conduit without obtaining proper authorization from the Operations Shift Supervisor or having processed the required Reactor Programs Penetration Approval Form. The previously installed and sealed two-inch conduit penetrated a reactor confinement boundary wall. Penetrations through the confinement boundary are limited by ATR Technical Specifications to less than a seven square inch cross sectional area to ensure limited air leakage during reactor operation. In this case, the actual cross sectional area of the opening that was created by removal of the temporary seal was less than seven square inches, i.e., only about 2.5 square inches, but there were no remaining barriers to prevent entering into an ATR Technical Specification action statement. The Technical Specification action statement requires reducing the cross section of openings that penetrate the confinement boundary to less than seven square inches or shutdown the reactor within 24 hours.

During the morning on December 16, 1996, the Construction Subcontractor Electrical Foreman and the LMITCO Construction Project Engineer met with the Operations Shift Supervisor and briefed him on what construction work would be ongoing within the ATR facility. The Subcontractor Electrical Foreman was from a sub-tier Electrical Subcontractor organization, i.e., had been hired to perform the electrical work by the primary Subcontractor for a construction job that primarily involved construction of a building and installation of piping systems. This was the first time that any electrical work had been performed in the ATR building by the sub-tier Electrical Subcontractor, even though the primary Subcontractor had been working on the mechanical portion of the job for several months. As such, Electrical Subcontractor personnel were not as familiar with facility documentation requirements and logistics for doing business within the ATR facility as the primary Subcontractor and LMITCO Construction Project Management personnel. From the morning briefing, the Shift Supervisor and LMITCO Construction Project Engineer understood that there would be general work such as staging of material,

16. DESCRIPTION OF OCCURRENCE:

(continued)

laying out wires, etc. They also understood that wire pulls that would require disturbing gas tight penetration seals (a putty type substance that had been placed inside the previously installed electrical conduit) would be necessary later in the day. The Shift Supervisor was not aware that this was the first day on the job for the sub-tier Electrical Subcontractor and believed that the primary Subcontractor would process the necessary Gas Tight Penetration Approval Form prior to removing any seals in conduit that penetrated the ATR gas tight boundary, as he had before.

Removal of seals of any size through an ATR facility wall is a sensitive evolution, since the reactor confinement is one of the Technical Specification barriers that is designed to limit air leakage from the reactor building in case of a significant airborne radiological release within the building. A Reactor Programs-specific Gas Tight Approval Form was in place to control that kind of work activity; the Construction Subcontractor (but not the sub-tier Electrical Subcontractor) had used the form in excess of a hundred times during the past several months for obtaining formal authorization to drill and install pipe/conduit through gas tight penetrations.

In the late morning, the Subcontractor Electrical Foreman instructed an Electrical Apprentice to remove the temporary sealant from the two-inch conduit and pull wire through it. The Electrical Foreman believed that based on the morning briefing, he had obtained verbal Shift Supervisor approval to proceed with that task. He was not aware of the need to formally process a Gas Tight Penetration Approval Form because the primary Subcontractor Superintendent had always performed that function in the past. Caution tags had previously been hung on the conduit, only a few inches away from the temporary sealant, referencing the ATR Technical Specification and warning that removal of the temporary sealant was prohibited. The Electrical Apprentice was aware of the caution tags, but thought that the Shift Supervisor had given authorization to remove the seal and proceeded without contacting the Shift Supervisor. Had the Shift Supervisor been contacted, Operations personnel would have been requested to remove the caution tag; there was no provision on the caution tag for proceeding with removal of the seal with Shift Supervisor approval. The Subcontractor Electrical Foreman was not aware of the caution tag. The Shift Supervisor, under the assumption that Construction personnel were going to process the Penetration Approval Form, was not aware that the temporary sealant was being removed at that time; therefore, he had no opportunity to ensure and control compliance with the ATR Technical Specification.

Upon completion of the wire pull through the two-inch conduit penetration, Construction Subcontractor personnel recognized the need to have the temporary seal inspected. When the Shift Supervisor was contacted to perform this inspection, he

16. DESCRIPTION OF OCCURRENCE: (continued)
recognized that the Penetration Approval Form had not been processed, and requested that any further work on pulling wire through the conduit be stopped. Other Subcontractor work was allowed to continue.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:
The Advanced Test Reactor (ATR) was operating at nominal Cycle 112A full power.

18. ACTIVITY CATEGORY:
Construction

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:
Appropriate Operations and LMITCO Construction Project Line Management were notified of the problem. A critique of the problem was scheduled for later that day. Work related to pulling wire through electrical conduit that penetrated reactor confinement barriers remained on hold until the cause(s) could be determined and immediate corrective actions taken.

20. DIRECT CAUSE:
3) PERSONNEL ERROR
C. Communication Problem

21. CONTRIBUTING CAUSE(S):
3) PERSONNEL ERROR
B. Procedure Not Used or Used Incorrectly
5) TRAINING DEFICIENCY
A. No Training Provided

22. ROOT CAUSE:
6) MANAGEMENT PROBLEM
A. Inadequate Administrative Control

23. DESCRIPTION OF CAUSE:
Based on the information received in the critique and in follow up written statements from the ATR Shift Supervisor, Subcontractor Electrical Foreman, and Subcontractor Electrical Apprentice, the direct cause of this event is Personnel Error, Communication Problem. The early morning Shift Supervisor briefing was very broad-based. The Shift Supervisor understood that wire pulls would be performed, but also expected that the Penetration Approval Form would be processed by the Construction Subcontractor personnel, as it had been

23. DESCRIPTION OF CAUSE: (continued)

hundreds of times before. This belief is supported by the Shift Supervisor's actions in calling for the form to be processed when notified that the seal had been removed and subsequently replaced.

A contributing cause is Personnel Error, Procedure Not Used or Used Incorrectly. The Subcontractor Superintendent understood the need to formally process the Penetration Approval Form for drilling holes through the confinement, and had done so numerous times in the past, when drilling holes through the confinement boundary for installation of piping and electrical conduit. He did not process the form for the sub-tier Electrical Subcontractor, primarily due to inattention to detail, but also because he had not followed through on a question as to whether processing the form was required for only temporary removal of the conduit sealant, as opposed to the requirement for using the form for any drilling through confinement. He had intended to process the Penetration Approval Forms himself, if required, and had not briefed the sub-tier Electrical Subcontractor on use of the form.

LMITCO Construction personnel were fully aware of the need to process the Penetration Approval Forms, but like the Shift Supervisor, believed that the sub-tier Electrical Subcontractor was aware of the requirement and expected the form to be processed prior to removing the sealant from the electrical conduit.

The Electrical Apprentice indicated in a written statement that he had read the caution tag, but believed that his actions were allowed, even though they were not consistent with caution tag instructions. This belief was based on having received direction from his Electrical Foreman to proceed and knowing that a Shift Supervisor briefing had occurred that morning, with an approval to commence work.

Initially this event was believed to be an isolated case and the root cause was identified as Training Deficiency, Lack of Appropriate Training. The Subcontractor Electrical Foreman and the Electrical Apprentice were not aware of the Penetration Approval Form. The primary Subcontractor Superintendent indicated that the form had always been processed at his level, and above. The Electrical Apprentice was also not fully aware of the need to rigorously follow the caution tag instructions within the reactor facility, and if he could not, to request the caution tag be removed.

Subsequent related occurrences at ATR (ID--LITC-ATR-1997-0001 on February 6, 1997 and ID--LITC-ATR-1997-0008 on March 4, 1997) indicate that this event was not an isolated case and that the real root cause was construction subcontractor work control. Training Deficiency, Lack of Appropriate Training is now identified as a contributing cause.

23. DESCRIPTION OF CAUSE: (continued)

24. EVALUATION: (By Facility Manager/Designee)

The Subcontractor failed to comply with the work control documents. This was not an intentional error, rather a lack of attention to detail on the part of the Electrical Superintendent, and a lack of training for the Electrical Foreman and the Electrical Apprentice. The pre-job briefing between the Subcontractor and the Shift Supervisor was broad-based and did not cover the specific approval forms that were necessary before removing gas tight penetration seals. The Shift Supervisor did not understand that this was the first day on the job for the sub-tier Electrical Subcontractor and believed it to be unnecessarily repetitious to reiterate the need for processing the same form that the Subcontractor had used in excess of a hundred times before.

The breach opening through the reactor building confinement wall was well within the allowable Technical Specification limit of seven square inches, and there would have been no impact to the environment beyond that identified in the Reactor Authorization Basis, even if a serious radiological airborne release had coincidentally occurred during the short time that the conduit sealant was removed. The Technical Specification action statement allowed openings greater than seven square inches to be created, as long as the openings were verified to be reduced to less than seven square inches within 24 hours.

Airborne activity levels were normal while this work was in progress, and in fact, would have precluded any construction work inside the reactor confinement if they had been elevated.

The process by which LMITCO executes work control associated with construction work inside a reactor operating facility needs to be re-evaluated. There are numerous ways that the construction subcontractor can affect the safety of the facility. Construction work within the facility is carefully planned and reviewed with the LMITCO Construction Engineer each day, but the day-to-day details are not normally as well documented as for maintenance crafts. As such, other LMITCO personnel who are in the approval process for authorizing and/or overseeing the functional aspects of the work do not always understand the day-to-day details well enough to prevent errors, e.g., removal of sealant without proper authorization, failure to rigorously follow instructions on caution tags, methods for ensuring fall protection requirements are adhered to, methods for attaching unistrut to building/crane support columns are authorized, etc.

25. IS FURTHER EVALUATION REQUIRED?: Yes ☐ No ☒

26. CORRECTIVE ACTIONS:

(* = Date added/revised since final report was signed off)

26. CORRECTIVE ACTIONS: (continued)

(* = Date added/revised since final report was signed off)

- 01) Prior to performing any further penetration work, train Electrical Subcontractor personnel at all levels of the organization in a toolbox training session on requirements to use the Penetration Approval Form and to provide direction on how to respond to caution tags when encountered prior to performing any further penetration work.

TARGET COMPLETION DATE: 12/17/1996 COMPLETION DATE: 12/17/1996

- 02) Review the process by which LMITCO executes work control associated with construction work inside a reactor facility, and incorporate actions for addressing any identified deficiencies into subcontractor work control documents and/or LMITCO work control processes.

TARGET COMPLETION DATE: 09/30/1997 *COMPLETION DATE: 09/18/1997

27. IMPACT ON ENVIRONMENT, SAFETY AND HEALTH:

None

28. PROGRAMMATIC IMPACT:

None

29. IMPACT UPON CODES AND STANDARDS:

None

30. LESSONS LEARNED:

Rigorous adherence to procedures in a reactor facility is necessary. Communications between work groups, training, and assessment of pre-job briefing comprehension is especially important when people initially come inside the reactor facility. As such, it is important that new work groups inform Operations personnel of the potential lack of familiarity with administrative requirements, so that extra attention and proper Operations oversight can be provided.

31. SIMILAR OCCURRENCE REPORT NUMBERS:

- 1) ID-LITC-ATR-1996-0013

31. SIMILAR OCCURRENCE REPORT NUMBERS:

(continued)

- 2) ID-LITC-ATR-1997-0008
- 3) ORO-MMES-PGDPENVRES-1994-0008
- 4) SR-WSRC-LTA-1994-0084

32. USER FIELD #1:

Construction Subcontractor

33. USER FIELD #2:

34. DOE FACILITY REPRESENTATIVE INPUT:

DOE-ID comments have been incorporated into this report. This report was previously rejected by the DOE HQ Program Manager. Following that rejection the DOE Facility Representative and contractor Facility Manager reviewed the facts relating to the event and expanded the review to include other subcontractor related work control events. This report reflects the results of that review indicating the root cause is management related rather than a training issue.

Entered by: SEAL, ROBERT C

Date: 04/01/1997

35. DOE PROGRAM MANAGER INPUT:

Headquarters Program Manager comments have been incorporated into this report.

Entered by: MILLER, LAWRENCE E

Date: 04/03/1997

36. SIGNATURES: (FM's original signature on hardcopy)

Approved by: William W. Gay III
Facility Manager/Designee

Date: 03/31/1997
Telephone No.: (208)533-4353

Approved by: SEAL, ROBERT C

Date: 04/01/1997
DOE Facility Representative/Designee Telephone No.: (208)526-5373

Approved by: MILLER, LAWRENCE E
DOE Program Manager/Designee

Date: 04/03/1997
Telephone No.: (301)903-3109

ID-LITC-ATR-1997-0001
11/07/1997

Final Report
Page 1

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Category "A" Reactors

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: William W. Gay III

Title: ATR Operations Facility Manager Telephone No.: (208)533-4354

(Facility Manager/Designee)

Name: LEPPERT, YVETTE

Title: PR. ADMIN. ASSOCIATE Telephone No.: (208)533-4563

(Originator/Transmitter)

Name: Charles D. Brooks

Date: 03/24/1997

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID-LITC-ATR-1997-0001
Construction Worker Nears Fall Protection Boundary Without Adequate
Fall Protection While Working On 18 Ft. High Flat Roof

2. REPORT TYPE AND DATE: Date Time
☐ Notification	02/10/1997	1639 MTZ
☐ Initial Update	03/24/1997	1706 MTZ
☐ Latest Update	03/24/1997	1706 MTZ
☒ Final	03/31/1997	1345 MTZ

3. OCCURRENCE CATEGORY:
☐ Emergency ☐ Unusual ☒ Off-Normal ☐ Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
New Radioactive Waste Storage Building

8. UCNI?: No

9. PLANT AREA: TRA-689

10. DATE AND TIME DISCOVERED: 11. DATE AND TIME CATEGORIZED:
02/06/1997 1615 (MTZ) 02/10/1997 1500 (MTZ)

12. DOE NOTIFICATION:

13. OTHER NOTIFICATIONS:

02/10/1997 1500 (MTZ) R. Seal

DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

Construction Worker Nears Fall Protection Boundary Without Adequate
Fall Protection While Working On 18 Ft. High Flat Roof

15. NATURE OF OCCURRENCE:

03) Personnel Safety

C. Safety Concerns

16. DESCRIPTION OF OCCURRENCE:

On February 6, 1997, a LMITCO Construction Engineer was performing a routine safety surveillance of construction work on the new Radioactive Waste Building that has been under construction since April 1996. An iron worker, working for a subtier construction contractor, was tack welding corrugated metal roof decking at prescribed one foot intervals on the 18-ft. high vestibule portion of the building (flat roof). The corrugated metal roof decking had been installed during previous weeks, with construction workers tied off as required, but follow-up tack weld spacing was required to meet construction specifications. The construction worker was on his knees, tack welding the deck and progressing from the center of the roof toward the edges; he was wearing a fall protection harness and was plus or minus a few inches of being within six feet from the edge of the roof. The construction worker's lanyard was not yet secured to the building main tie off point. The LMITCO Construction Engineer brought it to the iron worker's attention that he was not properly tied off. The iron worker stopped welding and asked for assistance from a co-worker to tie off his safety lanyard to the building main tie off point. He indicated that he was aware of the requirement to tie off when he was within six feet of the edge of the roof and had intended to do so; there was no safety barrier or warning line on the roof that alerted him to where the six foot boundary was, and hence, where tie-off became mandatory. In the kneeling position, the worker was not in imminent danger of falling.

OSHA regulations require workers treat the entire roof as requiring tie-off unless some form of barrier or warning line is provided that alerts the worker to when they are within six feet of the edge of the roof. After properly securing his lanyard, the iron worker resumed welding.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The Radioactive Waste Storage Building was under construction with work in progress.

18. ACTIVITY CATEGORY:
Construction

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

The LMITCO Construction Engineer notified the subcontractor project manager and the LMITCO Safety Engineer of the safety problem. An initial Safety Incident Notification Report was issued soon after the incident occurred, i.e., late in the day on February 6, 1997, thereby notifying higher levels of management within the LMITCO Construction Engineer's home organization and DOE-ID Construction representatives.

February 6, 1997 was the last working day of the week, with three days scheduled off for most LMITCO personnel. Reportability of the event in the ORPS system was not considered at the time. As a result, Reactor Programs line management, who normally categorize events of this nature, and DOE-ID TRA Facility Representatives were not informed until the following Monday, and the event was not categorized within the required two hours. DOE-ID Facility Representatives became aware of the safety incident on February 10, 1997, while pursuing the initial Safety Incident Notification Report that was filed on the previous Thursday. When Reactor Programs line management was informed of the OSHA safety problem, the event was investigated on a one-on-one basis and subsequently categorized as an off-normal occurrence, with the initial notification report issued on the same day.

A safety meeting was held by the construction subcontractor on February 10, 1997, emphasizing the importance of wearing the proper fall protection and the need to have a barrier or warning line in place to prevent inadvertently working closer than six feet from the edge of the roof without fall protection. A warning line was painted on the steel deck at seven feet from the edge of the roof, conservatively identifying the boundary for wearing fall protection.

A full critique of the event was conducted on February 20, 1997 to determine if there were other lessons to be learned from this event. At this critique, it was determined that a Safe Work Permit had been issued to control the elevated roof construction work. The Safe Work Permit (SWP) specified that personnel working on the roof installation be tied off, with no reference to the exercise of judgement when approaching 6 feet from the edge of the roof. It was apparent that construction subcontractor personnel were not in verbatim compliance with the SWP requirements.

20. DIRECT CAUSE:
3) PERSONNEL ERROR
B. Procedure Not Used or Used Incorrectly

21. CONTRIBUTING CAUSE(S):

2) PROCEDURE PROBLEM

A. Defective or Inadequate Procedure

22. ROOT CAUSE:

6) MANAGEMENT PROBLEM

E. Policy Not Adequately Defined, Disseminated, or Enforced

23. DESCRIPTION OF CAUSE:

The direct cause for this event was Personnel Error, Procedure Not Used or Used Incorrectly. The iron worker that was tack welding the sections of corrugated roofing to roof beams should have been tied off in accordance with SWP requirements, since the SWP was not written to allow any deviation.

A contributing cause was a Procedure Problem, Defective or Inadequate Procedure. The SWP could have been more flexible in allowing some work in the center of the roof to be performed without being tied off; however, if it was intended that some work be allowed without tie-off, the SWP should have addressed such issues as a safety barrier or warning line being placed a conservative distance (7 feet) from the roof edge, lanyard lengths for the odd configuration of the roof, etc.

The root cause was a Management Problem, Policy Not Adequately Defined, Disseminated, or Enforced. While the construction subcontractor for this job is a reputable firm with a good safety record, the subcontractor was not rigorously defining, disseminating, and enforcing SWP requirements to ensure 100 percent compliance. As a result, construction subcontractor personnel were not sensitive to the necessity for clearly communicating safety requirements in the SWP for ensuring verbatim compliance with the SWP, and for reviewing the safety requirements in detail during pre-job briefings.

24. EVALUATION: (By Facility Manager/Designee)

There was potential for serious injury if the ironworker continued to weld past the six foot barrier and neared the edge of the roof with out fall protection. Since 1995, when a person died at another INEEL facility as a result of a fall, heavy emphasis has been placed by LMITCO on adhering to fall protection safety requirements. In this case, it is not known whether the iron worker had already or would have progressed beyond the six foot boundary. No safety boundary or warning line was in place to prevent that from occurring, and there were no provisions in the subcontractor SWP to allow any work on the roof to be performed without fall protection.

The SWP could have been used by the construction subcontractor as written, but was not. The LMITCO Construction Engineer was aware that the subcontractor was not wearing fall protection

24. EVALUATION: (By Facility Manager/Designee) (continued)

unless working closer than six feet from the edge of the roof, but was not aware that the Construction SWP required using fall protection for all elevated work. The current LMITCO SWP generation, review and approval process does not involve the LMITCO Construction Engineer; this is an apparent flaw in the process. The LMITCO Construction Engineer is the only LMITCO representative who has detailed knowledge of day-to-day activities and who provides day-to-day oversight of subcontractor work activities. As such, that person should be closely involved in all aspects of work control documentation review and approval to ensure pertinent questions have been asked. Questions, such as whether the right safety precautions have been taken, whether the precautions have been incorporated into the scheduled work activities and/or whether work control documents accurately reflect planned work activities should be verified before the work control documents are routed to other LMITCO personnel who are in the review/approval process. More involvement in the SWP process by the Construction Engineer should provide added assurance that the full scope of planned work activities is understood and appropriate safety preventive measures are being taken.

25. IS FURTHER EVALUATION REQUIRED?: Yes [] No [X]

26. CORRECTIVE ACTIONS:

(* = Date added/revised since final report was signed off)

- 01) Conduct general safety training for all subcontractor personnel, with emphasis on wearing fall protection, tie off requirements for this job, rigorous adherence to SWP requirements, need for a questioning attitude during pre-job briefings as to how requirements apply to the job at hand, and a buddy system for looking out for fellow workers.

TARGET COMPLETION DATE: 02/24/1997 COMPLETION DATE: 02/24/1997

- 02) An administrative warning line barrier was painted on the roof and a physical cable barrier was erected at 7 feet from the roof edge to comply with OSHA regulations.

TARGET COMPLETION DATE: 02/13/1997 COMPLETION DATE: 02/13/1997

- 03) A Job Safety Analysis (JSA) was prepared that provided supporting rationale for allowing elevated work to be performed on the center part of the roof (not closer than 6 feet from the edge) without being tied off.

TARGET COMPLETION DATE: 02/10/1997 COMPLETION DATE: 02/10/1997

26. CORRECTIVE ACTIONS: (continued)
(* = Date added/revised since final report was signed off)

- 04) The roof safety cable tie-off point configuration was modified to make it possible to meet full fall protection tie-off requirements with out use of lanyard extensions.

TARGET COMPLETION DATE: 02/24/1997 COMPLETION DATE: 02/24/1997

- 05) Initiate changes to the TRA Construction SWP routing process to provide for LMITCO Construction Management review and approval prior to submitting the document to LMITCO Safety, Radiological Controls, and Facility Operations.

TARGET COMPLETION DATE: 05/01/1997 *COMPLETION DATE: 04/30/1997

27. IMPACT ON ENVIRONMENT, SAFETY AND HEALTH:
None

28. PROGRAMMATIC IMPACT:
None

29. IMPACT UPON CODES AND STANDARDS:
None

30. LESSONS LEARNED:
Fall protection issues identified in this occurrence report are important, but only a subset of overall TRA concerns with construction work control. The construction subcontractor involved in this event has an overall good safety record at TRA; however, this event is one of three construction work control-related occurrences that have arisen with various construction subcontractors at TRA since December 1996. Closer involvement in the detailed planning and the daily oversight of construction work activities are believed necessary to prevent a continuation of this apparent trend.

31. SIMILAR OCCURRENCE REPORT NUMBERS:
1) ID-LITC-ATR-1996-0009

32. USER FIELD #1:
Org. #5436

33. USER FIELD #2:

34. DOE FACILITY REPRESENTATIVE INPUT:
Initial investigation of this event was delayed and cursory, but was eventually completed satisfactorily several days

34. DOE FACILITY REPRESENTATIVE INPUT: (continued)
later.

In addition, the LMITCO safety personnel who performed the initial investigation on February 20, 1997, did not recognize the obvious departure from work control documents and OSHA requirements.

Entered by: SEAL, ROBERT C

Date: 03/26/1997

35. DOE PROGRAM MANAGER INPUT:

Entered by:

Date:

36. SIGNATURES: (FM's original signature on hardcopy)

Approved by: William W. Gay III
Facility Manager/Designee

Date: 03/24/1997
Telephone No.: (208)533-4354

Approved by: SEAL, ROBERT C

Date: 03/26/1997
DOE Facility Representative/Designee Telephone No.: (208)526-5373

Approved by: MILLER, LAWRENCE E
DOE Program Manager/Designee

Date: 03/31/1997
Telephone No.: (301)903-3109

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Category "A" Reactors

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: William W. Gay III

Title: ATR Operations Facility Manager Telephone No.: (208)533-4353

(Facility Manager/Designee)

Name: OWENS, MARJORIE A

Title: PRINCIPAL ADMIN ASSOCIATE Telephone No.: (208)533-4563

(Originator/Transmitter)

Name: Charles D. Brooks

Date: 04/15/1997

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID--LITC-ATR-1997-0008
40-Ton and 30-Ton Building Crane Runway Support Columns Drilled By
Construction Subcontractor For Purpose Of Mounting Unistrut

2. REPORT TYPE AND DATE:	Date	Time
☐ Notification	03/05/1997	1704 MTZ
☐ Initial Update	04/15/1997	1602 MTZ
☐ Latest Update	04/15/1997	1602 MTZ
☒ Final	04/23/1997	1253 MTZ

3. OCCURRENCE CATEGORY:
☐ Emergency ☐ Unusual ☒ Off-Normal ☐ Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
Reactor and canal main floors

8. UCN1?: No

9. PLANT AREA: TRA-670

10. DATE AND TIME DISCOVERED: 03/04/1997 0820 (MTZ) 11. DATE AND TIME CATEGORIZED:
03/04/1997 0837 (MTZ)

12. DOE NOTIFICATION:

13. OTHER NOTIFICATIONS:

03/04/1997 0850 (MTZ) R. C. Seal DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

40-Ton and 30-Ton Building Crane Runway Support Columns Drilled By
Construction Subcontractor For Purpose Of Mounting Unistrut

15. NATURE OF OCCURRENCE:

- 10) Cross-Category Items
- C. Potential Concerns/Issues

16. DESCRIPTION OF OCCURRENCE:

While performing a pre-lift crane inspection for handling a Naval Reactors (NR) experiment handling cask, as required by the DOE Hoisting and Rigging Standard, the Lift Supervisor noticed that unistrut had been attached to one of the twelve 40-ton crane support columns (approximately 40-foot high 24WF110 I-beam) that structurally support the crane runway and the building roof. Two holes had been drilled through the flange portion of one of the columns, near the edge, to accommodate the 1/4-inch unistrut mounting bolts. A follow-up inspection of the other columns revealed two more holes drilled in another 40-ton crane support column (24WF100) by the same contractor. There were a total of four holes in two different columns. The DOE Hoisting and Rigging Standard requires modifications to the crane or supporting structure to be analyzed by a qualified engineer and tested in accordance with the Standard prior to re-use of the crane.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The Advanced Test Reactor was in shutdown mode for the scheduled Cycle 112C-1 Outage.

18. ACTIVITY CATEGORY:

Construction

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

The ATR Shift Supervisor, ATR Operations, Engineering, Maintenance, and Construction line management, as well as the DOE-ID Facility Representative were notified of the problem. Close inspections of the other support columns for the ATR 30-ton canal crane runway, the ATR-C facility crane runway, and the diesel area crane runway were performed and showed that construction subcontractors had recently drilled similar small holes in 30-ton crane and diesel area crane runway support columns for like purposes. The holes in the 40-ton crane runway support columns were drilled by a different

19. IMMEDIATE ACTIONS TAKEN AND RESULTS: (continued)

construction subcontractor than the subcontractor that drilled holes in the 30-ton crane and diesel area crane runway support columns. Also it was apparent that over the years, some welding on the support columns had occurred for the purpose of attaching electrical conduit supports; records found to-date suggests that even though crane load testing has been performed since these modifications, some of the attachments were probably not previously formally analyzed.

The ATR 40-ton crane, 30-ton crane and diesel area cranes were tagged out, pending further evaluation of the problem. An engineering evaluation of these crane support showed that the holes were not at a critical location and would not have any significant effect on compressive, tensile, or bending loads. A subsequent load test was successfully performed on these cranes before restoring them to service.

20. DIRECT CAUSE:

6) MANAGEMENT PROBLEM

E. Policy Not Adequately Defined, Disseminated, or Enforced

21. CONTRIBUTING CAUSE(S):

3) PERSONNEL ERROR

B. Procedure Not Used or Used Incorrectly

22. ROOT CAUSE:

6) MANAGEMENT PROBLEM

A. Inadequate Administrative Control

23. DESCRIPTION OF CAUSE:

The direct cause for one of the construction subcontractors having drilled holes in the 40 ton crane runway column supports was a Management Problem, Policy Not Adequately Defined, Disseminated, or Enforced. The subcontractor work control documents and drawings for the ATR Communication Upgrade construction project did not define any requirements that specified use of clamps to attach unistrut to the crane support columns, nor contain language alerting the subcontractor to the sensitivity of drilling/welding on the 40-ton crane column supports. Even though most of the electrical conduit that passed by the crane support columns were attached using clamps, this was not universally true, and some conduit supports were bolted or welded to the columns.

A contributing cause was a Personnel Error, procedure Not Used or Used Incorrectly. The subcontractor work control documents for the Fire and Life Safety Upgrade construction project did contain specific language that prohibited drilling or welding on the 30-ton and Diesel Area Crane supports. Even so, an employee working for that construction subcontractor, made an

23. DESCRIPTION OF CAUSE: (continued)

apparently unilateral and unauthorized decision to drill into several crane support columns to attach unistrut. The rationale used by this employee to make that decision is not known, since his employment with that construction subcontractor was terminated prior to conducting the critique.

The root cause for this event was a Management Problem, Inadequate Administrative Control. This event and two other recent reportable ATR occurrences supports a conclusion that LMITCO Reactor Programs personnel, who provide oversight of subcontractor work activities, are either not sufficiently involved in day-to-day detailed planning of the work, and/or are not sufficiently involved in daily work authorization to avoid problems that can directly affect reactor facility operations. LMITCO Safety and Operations has review and approval authority for daily work authorization but does not have detailed knowledge of day-to-day work activities. The LMITCO Construction Project Engineer has detailed knowledge of day-to-day activities but may not be adequately involved in authorizing work to start. At least in an operating reactor facility, the construction engineer should be closely involved in all aspects of work control documentation review/approval to ensure pertinent questions have been asked. Questions, such as whether the right safety precautions have been taken, whether the precautions have been incorporated into the scheduled work activities and/or whether work control documents accurately reflect planned work activities should be verified before the work control documents are routed to other interested LMITCO personnel who are in the review/approval process. This involvement would provide added assurance that the full scope of planned work activities is understood and appropriate personnel/facility safety preventive measures are being taken.

In addition, the fact that one subcontractor work control document contained language prohibiting drilling of building crane column supports, but another controlling essentially the same type of construction work in the same reactor facility did not, suggests there may be a deficiency in consistently defining reactor specific construction subcontractor work control requirements in the subcontracts. This deficiency should be addressed as part of Corrective Action (02).

24. EVALUATION: (By Facility Manager/Designee)

Engineering analysis showed that all holes drilled in the various ATR crane support columns by the two construction subcontractors did not cause any weakening of the columns that would limit its original intended design function. If for some reason, there had been compelling reasons for the construction subcontractors to request an engineering evaluation to allow drilling holes of the size and at the same location that they were drilled instead of using clamps, the

24. EVALUATION: (By Facility Manager/Designee) (continued)
engineering evaluation results would have supported the request.

The focus of this report has been on the consequence of drilling into crane support columns because crane modifications require an engineering analysis and/or follow-up crane load testing to meet DOE Hoisting and Rigging Standards; however, drilling and welding on any building support column could have significant consequences. Labeling of crane support columns throughout the building was considered but subsequently dropped as a possible corrective action because of the possibility that it could lead to the belief that drilling into other building support columns is acceptable without prior analysis. Small holes in a strategic location can cause stress risers and/or alter structural safety factors in the unlikely event of an earthquake.

A backwards looking engineering evaluation of other unistrut supports attached to the ATR building structural supports needs to be performed where supporting documentation that authorizes these modifications cannot be found. Work control and/or an awareness of the potential impact of drilling into building and crane supports must also be confirmed or provided for those personnel who are in a position to modify the supports or to control authorization for the modification work. As an interim work control measure, drilling by subcontract personnel on any building walls or supports has been prohibited without prior Shift Supervisor approval. This control measure does not apply to TRA Maintenance crafts since the Maintenance crafts perform work in accordance to pre-approved detailed planning instructions.

25. IS FURTHER EVALUATION REQUIRED?: Yes ☐ No ☒

26. CORRECTIVE ACTIONS:

(* = Date added/revised since final report was signed off)

01) Perform backwards-looking engineering evaluation of ATR building structural supports.

*TARGET COMPLETION DATE: 06/30/1998 COMPLETION DATE: Not given

02) Review the process by which LMITCO monitors and controls (including ensuring consistent and uniform identification of requirements in subcontracts for essentially the same type work) details of a construction project and incorporate actions for addressing any identified deficiencies into LMITCO and/or subcontractor work control documents. (Same action as

26. CORRECTIVE ACTIONS: (continued)
(* = Date added/revised since final report was signed off)

02) for ID-LITC-ATR-1996-0031, Action #2)

TARGET COMPLETION DATE: 09/30/1997 *COMPLETION DATE: 09/23/1997

03) Evaluate construction craft sensitivity to drilling or welding on building or crane column supports without an engineering evaluation and provide interim awareness briefings and/or positive means of work control.

TARGET COMPLETION DATE: 06/30/1997 *COMPLETION DATE: 07/17/1997

04) Take appropriate disciplinary action for person who elected to not follow subcontractor work control procedure.

TARGET COMPLETION DATE: 03/05/1997 COMPLETION DATE: 03/05/1997

05) Brief craft personnel, regardless of plant structural knowledge, on work control and the potential impact of drilling into building and crane supports.

TARGET COMPLETION DATE: 05/08/1997 *COMPLETION DATE: 05/05/1997

27. IMPACT ON ENVIRONMENT, SAFETY AND HEALTH:
None

28. PROGRAMMATIC IMPACT:
None

29. IMPACT UPON CODES AND STANDARDS:
None

30. LESSONS LEARNED:

In one case, work control documents did not alert construction subcontractor personnel to restrictions on drilling into building and crane support columns; in another case, clamping to crane support columns was specified in work control documents but the person doing the work was either unaware of the requirement or chose not to follow it. This problem is another indication that the work control process for construction work within the operating reactor facility personnel needs more attention. Several problems have occurred in recent months, (Reference occurrence reports in block 31) where administrative policy infractions have occurred, thereby either affecting or potentially affecting reactor operations.

In contrast to TRA Maintenance crafts, construction personnel typically work to drawings and not detailed work instructions. As such, an important form of communication is not available;

30. LESSONS LEARNED: (continued)

this makes it more difficult for facility operations and other functional TRA support groups to review the details of planned construction work activity, and to provide input to construction subcontractors concerning applicable administrative restrictions. Imposing requirements on the construction subcontractor to write detailed work instructions for all planned work activity to the same level of detail that is required of TRA Maintenance crafts would be cost prohibitive. TRA Construction Project managers work sufficiently close with construction subcontractor personnel to understand planned day to day activities, and also have sufficient training/understanding of reactor operations to ensure adherence to applicable administrative requirements. However, they may not be sufficiently involved in the work authorization and control process to bridge an apparent communications gap between the subcontractor employees and Facility Operations/functional support personnel for work inside the reactor facility.

31. SIMILAR OCCURRENCE REPORT NUMBERS:

- 1) ID--LITC-ATR-1996-0004
- 2) ID-LITC-ATR-1996-0013
- 3) ID-LITC-ATR-1996-0031

32. USER FIELD #1:

33. USER FIELD #2:

34. DOE FACILITY REPRESENTATIVE INPUT:

DOE-ID comments have been incorporated into this report.

Entered by: SEAL, ROBERT C

Date: 04/18/1997

35. DOE PROGRAM MANAGER INPUT:

Entered by:

Date:

36. SIGNATURES: (FM's original signature on hardcopy)

Approved by: William W. Gay III
Facility Manager/Designee

Date: 04/15/1997
Telephone No.: (208)533-4353

Approved by: SEAL, ROBERT C

Date: 04/18/1997
DOE Facility Representative/Designee Telephone No.: (208)526-5373

Approved by: MILLER, LAWRENCE E
DOE Program Manager/Designee

Date: 04/23/1997
Telephone No.: (301)903-3109

ID-LITC-ATR-1997-0021
11/05/1997

Notification Report
Page 1

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Category "A" Reactors

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: W. W. Gay III

Title: ATR Operations Facility Manager Telephone No.: (208)533-4353

(Facility Manager/Designee)

Name: OWENS, MARJORIE A

Title: PRINCIPAL ADMIN ASSOCIATE Telephone No.: (208)533-4563

(Originator/Transmitter)

Name: C. D. Brooks

Date: 10/27/1997

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID-LITC-ATR-1997-0021
Removal of Halon System Piping Which Penetrated ATR Gas-Tight
Confinement Wall Without Follow-up Installation of Temporary Seal

2. REPORT TYPE AND DATE: Date Time
☒ Notification 10/27/1997 1710 MTZ
☐ Initial Update
☐ Latest Update
☐ Final

3. OCCURRENCE CATEGORY:
☐ Emergency ☐ Unusual ☒ Off-Normal ☐ Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
Halon System, TRA-670 Advanced Test Reactor

8. UCNI?: No

9. PLANT AREA: TRA-670

10. DATE AND TIME DISCOVERED: 11. DATE AND TIME CATEGORIZED:
10/25/1997 1100 (MTZ) 10/25/1997 1100 (MTZ)

12. DOE NOTIFICATION:

13. OTHER NOTIFICATIONS:

10/25/1997 1128 (MTZ) A. Preece	DOE-ID
10/25/1997 1335 (MTZ) R. C. Seal	DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

Removal of Halon System Piping Which Penetrated ATR Gas-Tight Confinement Wall Without Follow-up Installation of Temporary Seal

15. NATURE OF OCCURRENCE:

- 10) Cross-Category Items
- B. Near Miss Occurrences

16. DESCRIPTION OF OCCURRENCE:

While completing a walkdown of changes to the plant facility being made by a construction subcontractor, a Lead Senior Reactor Auxiliary Operator noticed that five 1-1/2 inch pipes that penetrated the Reactor Data Acquisition System and Reactor Instrument shop rooms were open. A construction subcontractor had recently removed the Halon System distribution piping that connected the halon gas supply bottles outside the ATR reactor building and the eight spiral discharge nozzles inside the building. The Operator understood that the spiral discharge nozzles were open inside the ATR gas confinement and that if the distribution piping were not sealed, it would breach the gas-tight confinement boundary for the reactor. At 1100 hours, the operator reported his concern to the Shift Supervisor.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The Advanced Test Reactor (ATR) was operating at the nominal Cycle 114C-1 full power.

18. ACTIVITY CATEGORY:

Construction

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

The shift supervisor investigated the report and ascertained that the halon distribution piping that penetrated the gas-tight boundary wall were not internally sealed. Preliminary calculations showed that the cross-sectional area of the five 1-1/2 inch pipes on the outside of the building was approximately 8.8 square inches, which is greater than the 7 square inches allowed by the ATR Technical Specifications. Based on the open cross-sectional area of the pipes on the outside of the building, the Shift Supervisor declared that the ATR had inadvertently entered an action statement that requires the penetrations be sealed, or that the reactor be manually shut down within 24 hours. The Shift Supervisor immediately requested the pipe penetrations be sealed.

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

(continued)

Threaded pipe plugs were installed on the halon pipe penetrations at 1125 hours, which allowed the ATR to exit the Technical Specification action statement.

Appropriate LMITCO Line Management and DOE-ID were notified of the event. Follow-up investigation of the halon pipe distribution system configuration inside the building showed that each spiral discharge nozzle had an orifice installed inside each nozzle, limiting the cross-sectional area of the pipe to .441 square inches, and the total cross sectional area of all eight spiral discharge nozzles was 3.53 square inches instead of 8.8 square inches. As such, it was determined that ATR had not actually entered a Technical Specification action statement, as earlier believed, but it was only fortuitous that it had not. The Reactor Operations Manager directed that any further work on this construction subcontract be discontinued until the cause is determined and compensatory actions taken to prevent a future similar occurrence.

A critique of the event was scheduled on October 27, 1997, to review work control issues that allowed the halon piping to be removed during reactor operation without ensuring the penetrations were immediately resealed. Results of the critique and investigation of this event will be reported in the final report.

24. EVALUATION: (By Facility Manager/Designee)

The opening through the reactor building confinement wall was within the Technical Specification allowable limit of seven square inches; however, work controls for construction subcontractor work were not effective in preventing the ATR gas-tight confinement from being inadvertently breached. Maintaining gas-tight confinement within allowable leakage limits specified in the ATR Technical Specifications is important to prevent a serious radiological release from the ATR building. The probability of a serious radiological release occurring in the twenty-five minutes between time of discovery and the time that the pipe penetrations were sealed, is extremely low. As identified in the ATR Technical Specification action statement, continued reactor operation was justified, if the pipes penetrations could be sealed within 24 hours. The halon system pipes were open for approximately 92 hours before being discovered as a potential gas-tight confinement problem.

25. IS FURTHER EVALUATION REQUIRED?: Yes ☒ No ☐

IF YES - BEFORE FURTHER OPERATION?: Yes ☐ No ☒

BY WHOM?: Reactor Programs

BY WHEN?:

ID-LITC-ATR-1997-0022
11/05/1997

Notification Report

Page 1

OCCURRENCE REPORT

Advanced Test Reactor

(Name of Facility)

Category "B" Reactors

(Facility Function)

Idaho National Engineering Lab. / Lockheed Idaho Technologies Company

(Name of Laboratory, Site or Organization)

Name: Schuebert, Edmond J.

Title: Technical Leader

Telephone No.: (208)533-4284

(Facility Manager/Designee)

Name: OWENS, MARJORIE A

Title: PRINCIPAL ADMIN ASSOCIATE

Telephone No.: (208)533-4563

(Originator/Transmitter)

Name: C. D. Brooks

Date: 10/31/1997

(Authorized Classifier (AC))

1. OCCURRENCE REPORT NUMBER: ID-LITC-ATR-1997-0022
Discovery of a disconnected electrical lead on Siesmic Scram Switch

2. REPORT TYPE AND DATE: Date Time
☒ [X] Notification 10/31/1997 1207 MTZ
☐ [] Initial Update
☐ [] Latest Update
☐ [] Final

3. OCCURRENCE CATEGORY:
☐ [] Emergency ☒ [X] Unusual ☐ [] Off-Normal ☐ [] Cancelled

4. NUMBER OF OCCURRENCES: 1 ORIG. OR:

5. DIVISION OR PROJECT: Reactor Programs

6. SECRETARIAL OFFICE: NE - Nuclear Energy

7. SYSTEM, BLDG., OR EQUIPMENT:
TRA-670 Advanced Test Reactor Critical Facility

8. UCN?: No

9. PLANT AREA: ATRC

10. DATE AND TIME DISCOVERED: 11. DATE AND TIME CATEGORIZED:
10/31/1997 0745 (MTZ) 10/31/1997 0945 (MTZ)

12. DOE NOTIFICATION:

10/31/1997 1130 (MTZ) Miller, Larry (NE-40) DOE-HQ

13. OTHER NOTIFICATIONS:

10/31/1997 0952 (MTZ) Fursteneau, Raymond DOE-ID

14. SUBJECT OR TITLE OF OCCURRENCE:

Discovery of a disconnected electrical lead on Siesmic Scram Switch

15. NATURE OF OCCURRENCE:

01) Facility Condition

E. Vital System/Component Degradation

16. DESCRIPTION OF OCCURRENCE:

At 0745 on 10/31/97, while showing an ATR Operations staff member who was performing an assessment the location of the ATRC Seismic scram switch (detector), it was noted that one of the two leads on the detector was disconnected.

17. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

The ATRC reactor was shutdown

18. ACTIVITY CATEGORY:

Shutdown

19. IMMEDIATE ACTIONS TAKEN AND RESULTS:

ATR operations management was notified and the facility was maintained in a shutdown condition.

24. EVALUATION: (By Facility Manager/Designee)

The disconnected lead rendered the seismic scram function for the ATRC inoperable. This subsystem is required by the facility Technical Specifications to be functional during reactor operation. On October 21, 1997 and October 22, 1997 preventive maintenance was performed using approved procedures that would have revealed the disconnected electrical lead.

All ATRC operators were questioned and stated that they had not noticed the lifted lead and that the seismic switch material condition was satisfactory. ATRC is a locked facility with limited access. An initial review of the seismic switch area indicated that construction work in the immediate area had been performed to support conduit installation of an updated security access system. At the time of this notification report, the cause of the lifted lead is unknown. The reactor had been operated on three occasions since October 22, 1997. An investigation is being performed to attempt to determine the cause of the inoperable seismic switch. A corrective action plan will be developed to resolve the findings from the investigation. The facility will remain shutdown until the results of the investigation and completion

24. EVALUATION: (By Facility Manager/Designee) (continued)
of the correction action is reviewed by facility management
and DOE-ID.

25. IS FURTHER EVALUATION REQUIRED?: Yes ☒ No ☐

IF YES - BEFORE FURTHER OPERATION?: Yes ☒ No ☐

BY WHOM?: ATR Operations

BY WHEN?: 12/31/1997