FY2017
4TH QUARTER
INL/EXT-17-43652

IDAHO NATIONAL LABORATORY

QUARTERLY OCCURRENCE ANALYSIS

DEEPER LEARNING THROUGH EVENT ANALYSIS

Contents

INL/EXT-17-43652 – *4th Quarter FY-17*

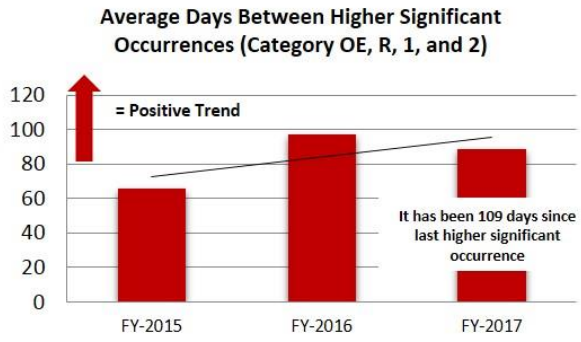
This report is published quarterly by the Idaho National Laboratory (INL) Nuclear Safety, Quality, and Performance Management Organization. The Department of Energy (DOE) Occurrence Reporting and Processing System (ORPS), as prescribed in DOE Order 232.2, "Occurrence Reporting and Processing of Operations Information," requires a quarterly analysis of events, both reportable and not reportable events for the previous 12 months. This report is the analysis of 78 reportable events (16 from 4th quarter [Qtr] of fiscal year [FY]-2017 and 62 from the prior three reporting quarters), as well as 49 other issue reports identified at INL during the past 12 months (14 from this quarter and 35 from the prior three quarters.). These 49 other issues include events found to be not reportable in ORPS and issues or conditions screened as Significant Category A or B conditions.

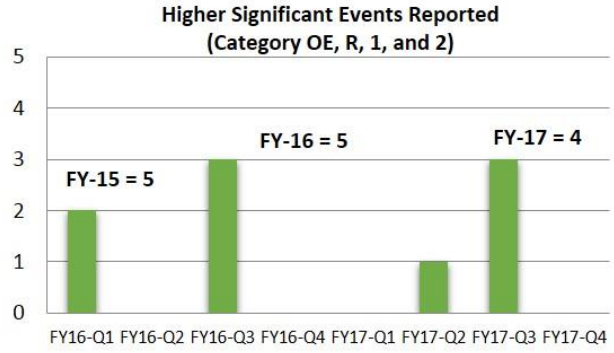
Battelle Energy Alliance (BEA) operates INL under contract DE-AC07-051D14517.

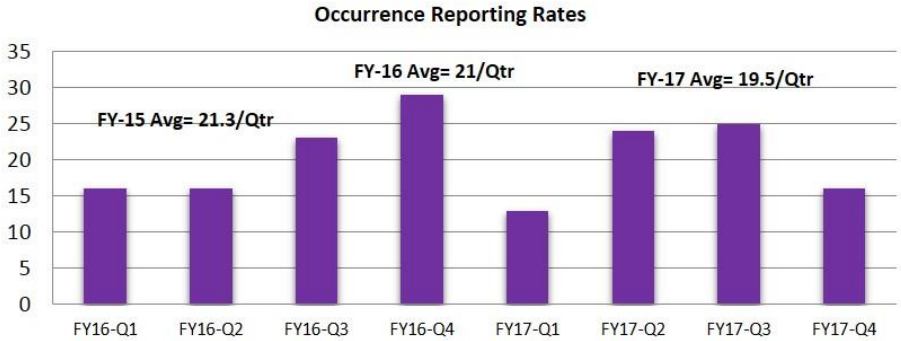
Highlights…

INL reported 16 events this quarter; the number of reported events has remained somewhat steady with an average of 21.3 events reported per quarter in FY-15, 21 per quarter in FY-16, and 19.5 per quarter FY-17. The rate of higher significant events (those reported as Operational Emergencies, Recurring Issues, and/or Significance Categories 1 or 2) is trending somewhat steady. No higher significant events were reported in 4th Qtr FY-17. The average number of days between higher significant occurrences is trending in a positive direction. In FY-15, there was an average of 66 days between higher significant events; this increased to 97 days in FY-16, and is 89 at the end of FY-17. There have been 109 days since the last higher significant event occurred.

This quarterly analysis reviews reportable and non-reportable events and provides a summary of Lessons Learned issued by INL.







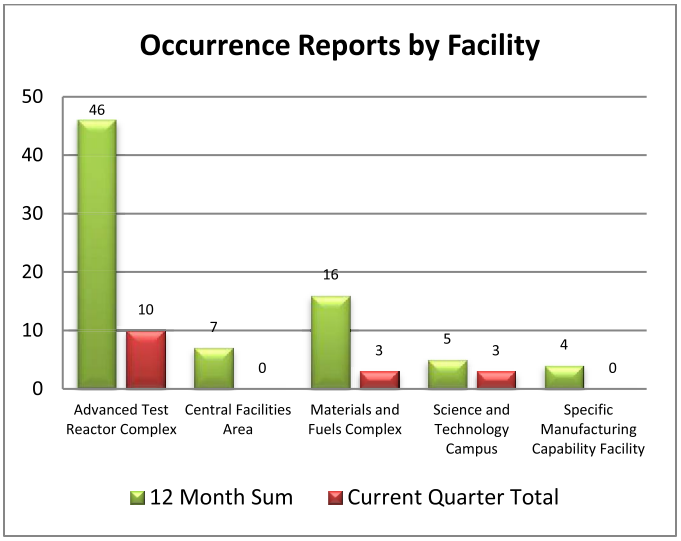
From July 1, 2017, through September 30, 2017, INL reported 16 new events to DOE in accordance with DOE Order 232.2. These events were analyzed to determine commonalities related to: Operational Emergencies (Group 1), Personnel Safety and Health (Group 2), Nuclear Safety Basis (Group 3), Facility Status (Group 4), Environmental (Group 5), Contamination and Radiation Control (Group 6), Nuclear Explosive Safety (Group 7), Packaging and Transportation (Group 8), Noncompliance Notifications (Group 9), and Management Concerns (Group 10).

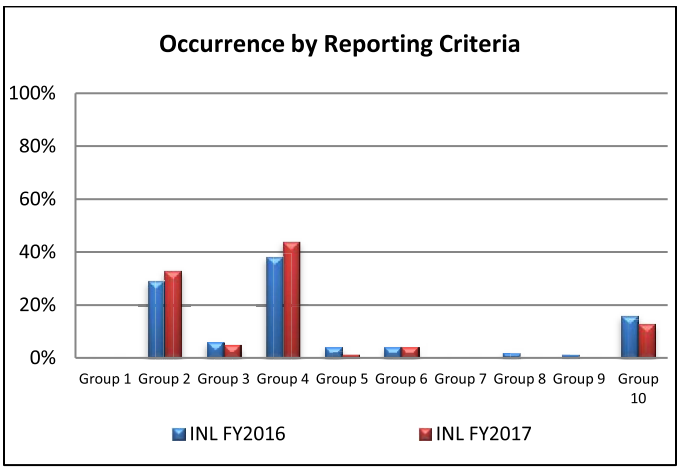
In addition, INL reported 12 events through Initial Notification Reports and in INL's local issues tracking software (i.e., LabWay) that did not meet ORPS reporting thresholds.

TREND SNAPSHOT

Occurrences by Facility: During the reporting quarter, the Advanced Test Reactor (ATR) Complex reported 10 of the 16 events (62.5%) that occurred. Six of these were associated with performance degradations of Safety Class or Safety Significant Components (SSC). The ATR Complex has reported 28 events under the performance degradation criteria in the last 12 months. ATR Complex management is aware of the conditions and is monitoring reactor systems via System Health reports. Additional action will be taken if deemed necessary. The Materials and Fuels Complex (MFC) and the Science and Technology Campus (STC) each reported 3 of the 16 events.

Reporting Criteria: INL continues to experience most events in Groups 2 and 4. The most common Group 2 events in the last 12 months were related to unexpected discoveries of hazardous energy and personnel injuries. The most commonly occurring Group 4 events were related to performance dedregation of safety class SSCs.



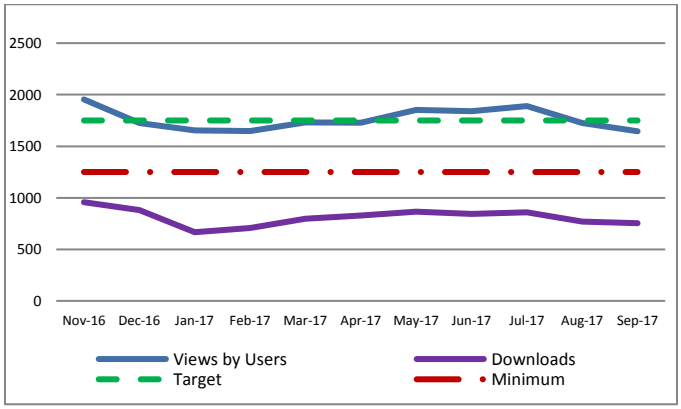


TREND SNAPSHOT

Lessons Learned: Although the total Lessons Learned content views for 4th Qtr FY-17 fell below the goal of 1750 views per month, use of the Lessons Learned Program still remains strong with views staying between 1645 and 1891 per month. Six new INL lessons learned were published during the quarter with a total of 41 published in FY-2017.

The INL Lessons Learned Program is a key part of the feedback and improvement process required by DOE. INL uses the OPEXShare platform (www.opexshare.doe.gov) to facilitate the sharing of information and operational experience.

Operational excellence requires the use of internal and external operating experience information to minimize the likelihood of undesirable behaviors and promote noteworthy practices. Lessons learned are systematically evaluated and implemented to continuously improve performance. INL embraces the philosophy that lessons learned are lessons applied. This is demonstrated through actions taken on other's lessons learned shared such as those described in the success stories reported herein.



Lessons learned generated by INL are shared internally, and when necessary, are shared across the complex through the DOE Headquarters Lessons Learned Program. During 4th Qtr FY-17, INL shared the following four lessons, one general information report, and one success story.

- Lessons Learned INL-2017-0029, Electrical Cable Damage at Remote Handled Low Level Waste Excavation
- Lessons Learned INL-2017-0030, Revisit Hazards, Controls Associated with Active Vehicle Barriers
- Lessons Learned INL-2017-0031, FCF Inadequate Zero Energy Check During Maintenance
- Lessons Learned INL-2017-0032, Volatile Chemical Evaporates from Container
- General Information INL-2017-0034, Idaho National Laboratory Quarterly Occurrence Analysis, 3rd Quarter FY-2017
- Success Story, Mechanical Door Failure Operating Experience Prevents Possible Injury

The lessons learned and success story are summarized below.

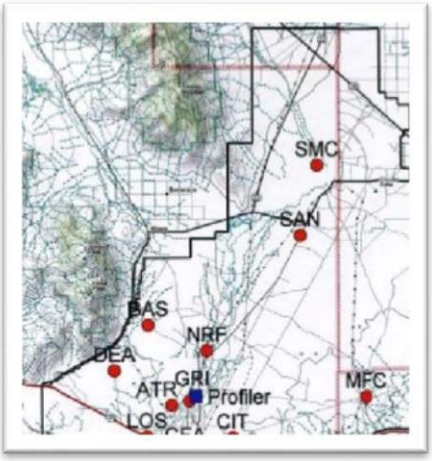
Electrical Cable Damaged at Remote Handled Low Level Waste Excavation

Lesson INL-2017-0029

In 1992 the DOE Field Office initiated a National Oceanic and Atmospheric Administration (NOAA) Weather Project to install and/or upgrade NOAA meteorological monitoring stations in the vicinity of the INL Site. Much of the current NOAA tower network and monitoring stations were installed and/or upgraded in 1992 and 1993 across the INL Site and in Idaho Falls.

One of the 13 stations on the INL Site was installed outside the perimeter fencing near the southwest corner of the ATR Complex with a 120 volt (V) electrical service connection. However, following completion of the NOAA Weather Project, plant drawings and/or schematics were not updated to reflect installation of the buried electrical lines.

In 2014, the Remote Handled Low-Level Waste (RHLLW) Facility initiated construction outside the perimeter fencing near the south west corner of the ATR Complex. On June 26, 2014, a subsurface investigator and the project manager agreed to exempt the area from a subsurface investigation, believing the area was in fact "greenfield," a term related to or denoting previously undeveloped sites planned for either development or exploitation. The investigator indicated that a similar exemption had been taken for work on the MFC sewer lagoons.



On August 28, 2014 an INL subsurface investigation was completed. The subsurface investigator invoked an exemption defined in LWP-7202, “Subsurface Investigations,” that negates the need to perform a subsurface investigation. The subsurface investigation form was marked not applicable (N/A) under the description of the excavation survey performed. The investigator described that "for the location of this work, a Subsurface investigation is not needed based on the reasonably obtained fact the area is a green-field site and has no documented history of disturbance in the area".

A second subsurface investigation was performed June 29, 2015, to address additional excavation activities in a new area but still within the "greenfield" site. This was not a full in depth investigation as the surveyed area had already been deemed as a green-field. However, the investigation did indicate areas of concern, which were believed to be debris fields. Hand digging verified that the areas were in fact piles of debris and that no structures or utilities were present at the sites. Neither of the area of concern sites were located near the area where the NOAA power cable was ultimately encountered.

During the summer of 2016, excavation activities for the RHLLW facility began and on August 29, 2016, an excavator operator struck and damaged a buried electrical cable located near the ATR perimeter fencing.

Issues:

- The cable’s location was unknown prior to this activity due to poor configuration management and communication between co-located and supporting organizations.
- The procedure used to determine the level of subsurface investigation did not adequately address:
    - ‘Green field’ areas in the context of excavation and/or surface penetrations
    - Appropriate levels of documented justification for exemptions to performing a subsurface investigation
    - Sufficient guidance for lines of demarcation when defining areas of concern or authorization for excavation.

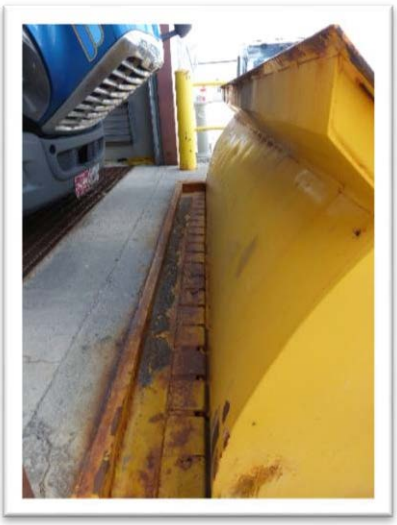
What We Can Learn:

- Subsurface investigation procedures are written to establish requirements and criteria for surface penetrations and safe excavation work; however, as seen at INL, they may not properly address “green field” or undeveloped areas. This oversight may result in personnel invoking exemptions without first thoroughly exploring all information and fully understanding activities that may have taken place in the past.
- Configuration management practices in the past may not have been to the same standards that are present today. As such, appropriate engineering justification and facility management concurrence would help to ensure adequate safety margins are procedurally established prior to excavation or surface penetration work.

Revisit Hazards, Controls Associated with Active Vehicle Barriers

Lesson INL-2017-0030

On the morning of June 14, 2017, a delivery truck driver was closing the hood of his truck and preparing to enter the ATR Complex through the Vehicle Monitoring Facility (VMF) when he was struck in the back of the leg by a descending active vehicle barrier. The Security Police Officer who was processing the driver through the VMF lowered the barrier without first verifying the area around the barrier was clear of equipment and personnel.



The delivery truck driver suffered significant injury to his lower right leg as a result of being struck by the barrier. In describing the event, the driver stated that the front of the truck was very near the active vehicle barrier. In order to close the hood, he placed the toes of his right foot on the edge of the barrier opening. This action placed his right heel in the barrier's downward path of travel.

This barrier has been successfully operated for 30 years, processing 20-50 vehicles into and out of the ATR complex each day. The unmitigated hazards associated with the barrier had been accepted and a deviation from a safe environment had been normalized.

Issues:

- Engineered controls were not in place. There is no safety interlock to prevent motion of the active vehicle barrier if someone were in the travel path of the barrier. In addition, administrative barriers such as warnings or markings were not used. Posted exclusion areas could have warned personnel of the hazard present with the active vehicle barrier.
- Administrative controls, such as procedures and training, were not effective to prevent this event. The barrier operating procedure did not provide adequate instruction to address keeping a vehicle a safe distance from the vehicle safety barrier, nor did it clearly define responsibilities to ensure safe entry of a vehicle into the VMF. As a result, the driver was allowed to park close to the vehicle barrier.
- Adequate training for the type of barrier being operated was not provided to the Security Police Officer, nor was the driver trained or briefed on what to expect when he arrived at the ATR Complex, or how vehicles are processed through the VMF.

What We Can Learn:

- Exhaust all reasonable means to eliminate or mitigate hazards through engineered controls rather than relying on administrative controls.
- Ensure administrative controls adequately address all hazards. In this case, security controls were addressed but safety controls were not adequately addressed.
- Ensure training is thorough and demonstrated as effective through follow-up management observations.
- Legacy work practices should be scrutinized even if a process is historically successful. Maintain a questioning attitude at all times and exercise stop work authority.

Volatile Chemical Evaporates from Container

Lesson INL-2017-0032

A program environmental lead Laboratory Space Coordinator and Waste Management personnel were following up on general action and performing an assessment of Waste Management Satellite Accumulation Areas (SAAs) at the Energy Innovation Laboratory (EIL). An empty container was observed inside of a flammable storage cabinet. The empty container was a 5 gallon Nalgene carboy with one large cap and a small vent cap, a label containing the words "Hazardous Waste" and a unique ID number.

The SAA inventory log was evaluated and indicated three entries for this 5 gallon carboy, totaling 650 mL of spent toluene. The container was inspected by the laboratory space coordinator and determined to be intact with the caps securely in place. Upon further inspection, it was discovered that one cap could be tightened with more effort for a better seal. Since the log sheet contained no details of the toluene being removed, transferred or emptied from the carboy, it was concluded the toluene waste may have evaporated from the carboy. It is not known if the cause of toluene evaporating was due to the incomplete sealing of the cap, the relatively small volume of the toluene versus the large headspace in the carboy, or an incompatibility between the plastic carboy container and the spent toluene waste. No malformation of the container was observed.

What We Can Learn:

When storing volatile chemicals perform the following to

minimize the evaporation of the chemical:

- Ensure the proper type of container is used for the waste type. Take into account the vapor pressure, volume and chemical constituents of the waste.
- Ensure the container lid/bungs are adequately secured.
- Disposition volatile waste chemicals in a timely manner.

FCF Inadequate Zero Energy Check during Maintenance

Lesson INL-2017-0031

The MFC Utilities and Infrastructure Support division performed a lockout/tagout (LOTO) on the steam and condensate system at the source of the hazard – a boiler in the Experimental Breeder Reactor (EBR) building. A week later, the Fuel Conditioning Facility (FCF) performed local LOTOs on steam and condensate isolations to support maintenance efforts. Approximately three weeks later, it was discovered that zero energy checks performed on the LOTOs did not meet MFC management's expectations because, at the time of the check, there was no energy present to support validation of isolation.

Issues:

- A zero energy check was credited without the ability to prove energy had been actively removed by the intended isolation point (impact of tagging downstream of off-line systems).
- Any changes to major systems under LOTO that affect multiple facilities need to be communicated and coordinated adequately to ensure common utilities are adequately isolated and controlled with LOTO.
- Isolation of a portion of a system that already has the hazardous energy removed must be monitored during work. Additionally, work must be stopped and boundaries must be re-verified prior to reintroduction of the hazardous energy at the boundary.

What We Can Learn:

- Designing a proper zero energy check requires the ability to prove the isolation point has performed its function to remove energy.
- Ensure that appropriate disciplines are represented during the LOTO planning process to adequately address isolation of all energy sources and document in the LOTO record sheet comments section.
- Maintaining a questioning attitude can be challenging when directly observing work for which you are about to participate. Self-Checking and asking for a Peer Check can be helpful to mitigate error likely precursors and latent conditions.
- Frequent self-evaluation of working conditions is a good practice especially with changing conditions and/or overlapping or sequential work activities.

Success Story – Mechanical Door Failure Operating Experience Prevents Possible Injury

After receiving and sharing operating experience OE-3-2014-03, "Mechanical Door Failures," in March of 2015, measures were put into place at INL to ensure that employees were not in the direct line of fire in case of overhead door failure. Several months later, those measures prevented INL personnel from being injured.

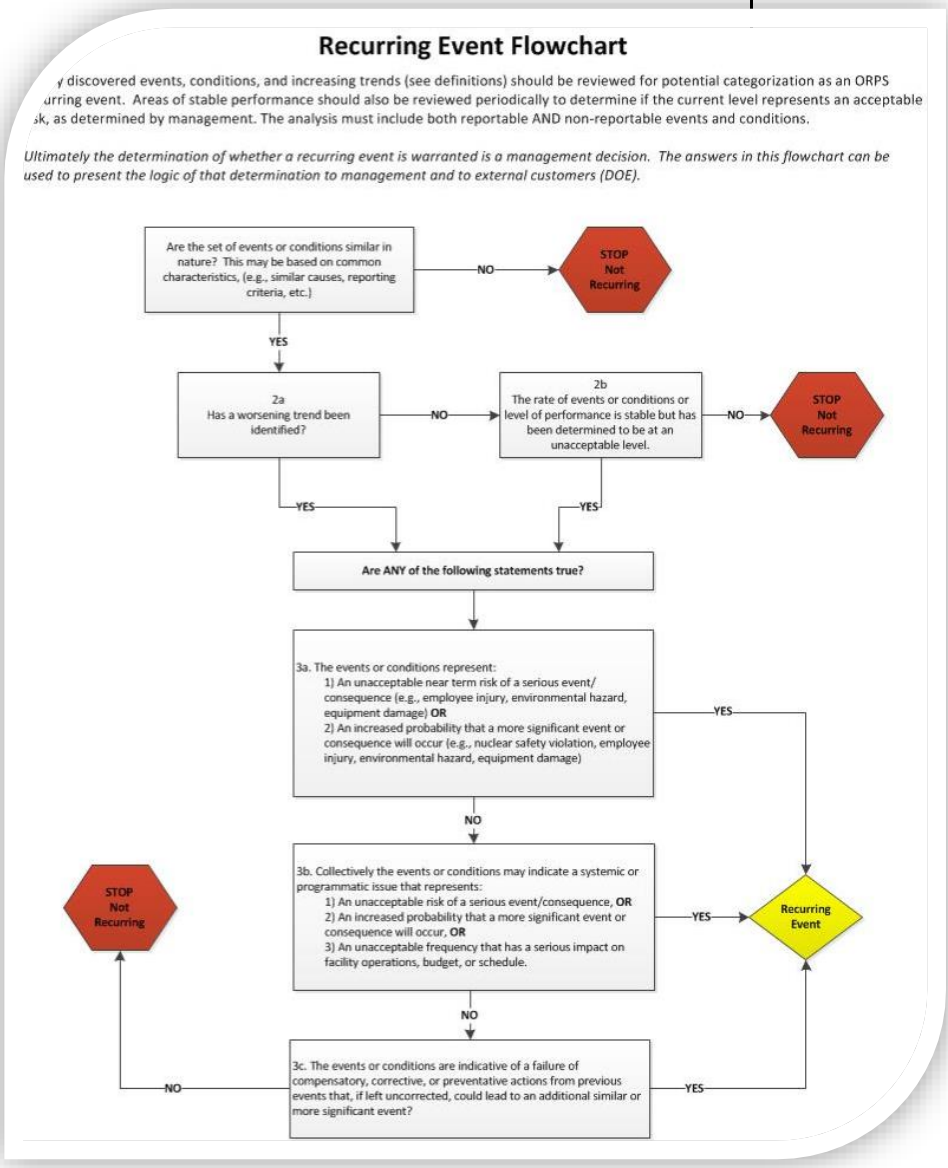
On October 26th, 2015, the Hot Fuel Examination Facility (HFEF) south roll-up door experienced a mechanical failure. The operator running the door controls pressed the "close" button to shut the door. As the door approached approximately 6 feet from the ground, a sprocket disengaged from the motor above the operator's head. The door dropped closed and the sprocket fell, landing approximately 2 feet from the operator. Because of the measures put in place, the operator was not in the vicinity of being struck by falling parts.

The actions taken to address concerns raised in the operating experience, are credited with the prevention of possible injury to workers who were in the area when the sprocket fell.

What We Can Learn:

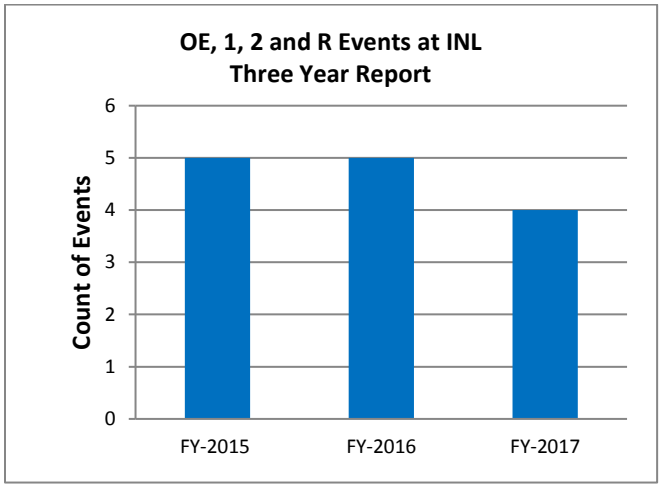
Organizational learning must be embraced. When the operating experience was shared with MFC personnel, they were instructed to not walk under a roll-up door when it was being operated. To serve as a reminder, warnings signs were posted adjacent to roll-up doors to inform personnel of the potential hazard.

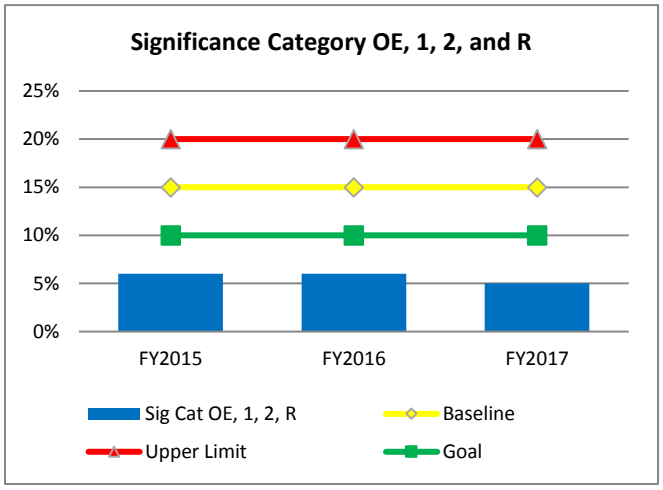
4th QUARTER FY-17 IDENTIFICATION OF RECURRING EVENTS



A review of recent operational performance data did not identify any events that would be noted as "recurring".

No additional patterns were noted with the 78 reportable and 49 non-reportable events that occurred at INL during the past 12 months.





INL established a set of performance metrics to monitor events by their significance. Baseline data were derived from complex-wide reporting of 5,630 events in the ORPS database between 2009 and August 2014. INL's goal is to experience a downward trend in the number of higher significant events including Significance Category OE, 1, 2, and R occurring at INL.

At the end of FY-17, INL reported fewer higher significant events than in previous two years. In addition to seeing a slight decline in the occurrence of higher significant events, INL has seen an increase in the number of days between these events. At the end of the quarter, 109 days had passed since the last higher significant event occurred.

INL's performance metrics are as follows:

- **Green**: Less than 10% of the events reported at INL are Significance Category OE, 1, 2, and R.
- **Yellow**: Greater than 10% and less than 20% of the events reported at INL are Significance Category OE, 1, 2, or R.
- **Red**: Greater than 20% of the events reported at INL are Significance Category OE, 1, 2, and R.
- Control Limits for Significance Category OE, 1, 2, and R events were set at +10% of the baseline.

INL also monitors events to determine if INL reporting is similar with reporting at other DOE facilities. Of the events reported at INL during FY-17, 46% were reported as Significance Category 3 (this is slightly higher than the complex baseline average of 43%) and 49% were reported as Significance Category 4 (higher than the complex baseline of 42%).

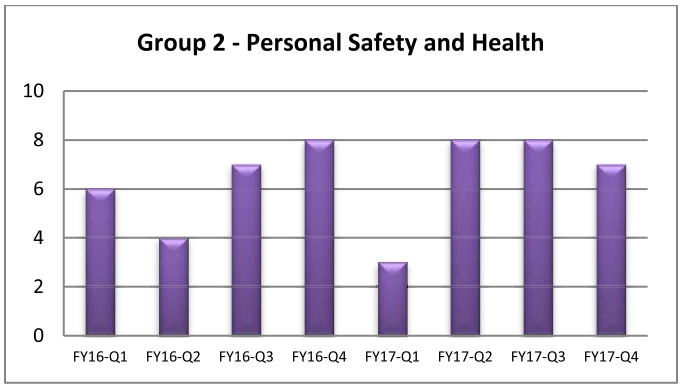
4th QUARTER FY-17 GROUP 1 – OPERATIONAL EMERGENCIES

No operational emergencies were reported at INL during 4th Qtr FY-17. The last operational emergency at INL was reported in April 2012 when boron triflouride gas leaked from a neutron detector (NE-ID--BEA-INLLABS-2012-0003). The rate of occurrences of operational emergencies continues to trend at zero.

4th QUARTER FY-17 GROUP 2 – PERSONNEL SAFETY AND HEALTH

TREND SNAPSHOT

Personnel Safety and Health Events: During 4th Qtr FY-17, there were seven reportable events related to personnel safety and health (e.g., occupational injuries, occupational exposures, fires, explosions, or hazardous energy events). Four additional non-reportable events were communicated via Initial Notification Reports and are related to this group's reporting criteria. There was a slight decline in the number of reportable and non reportable events since last quarter.



The reportable and non-reportable events occurring during 4th Qtr FY-17 are summarized below:

Failure to Follow Lockout/Tagout Process during Quality Assurance Inspection at ATR

NE-ID--BEA-ATR-2017-0034 (Significance Category 4)

A Quality Assurance (QA) inspector was called to perform a "fit-up" inspection at the M-15 pressurizing pump location in building TRA-689 at the ATR Complex. The inspector prepared for the requested inspection and proceeded to the work area to perform the inspection. The inspector did not have the work order in hand and did not recognize that there was a LOTO in place for the job. The LOTO work group acceptance had been completed for the QA work group but the QA inspector subsequently made this entry, and two more entries, without hanging a personal lock and tag.

Later that day, the inspector realized his mistake and reported the error to his supervisor and to the ATR Shift Supervisor. The energy source had been isolated and controlled and no worker exposure occurred.

What We Can Learn:

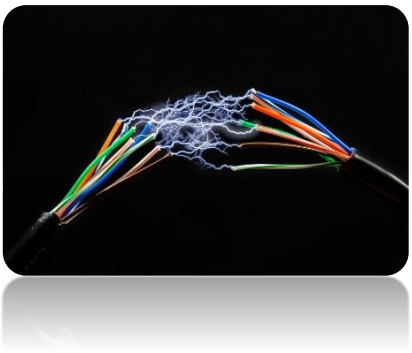
Managers should ensure that personnel have been properly briefed on the work they are tasked to perform. In addition, employees should maintain a questioning attitude and ensure they fully understand the hazards associated with the work they are doing.

Electrical Spark in the M-6 Emergency Diesel Generator Under-Voltage Relay Cabinet at ATR

NE-ID--BEA-ATR-2017-0035 (Significance Category 3)

A utility area operator (UAO) was working with an electrical engineer to investigate a LOTO. The individuals were tracing a conduit that runs through the M-6 emergency diesel generator (EDG) under-voltage relay cabinet. This cabinet is opened monthly to initiate an under-voltage signal to test the functionality of the EDG. The individuals observed an electrical spark between the wire bundle and the inside of the cabinet when the door was opened beyond 90 degrees. Electricians investigating the spark found a place on two wires where the insulation has been worn off due to years of rubbing against the lip of the cabinet door.

Work was stopped, a caution tag was placed on the cabinet door and the area immediately in front of the cabinet was posted. A piece of electrical tape was placed on the lip of the cabinet door to prevent further contact. An operability review was conducted and found the M-6 EDG, a technical safety requirements (TSR)-related piece of equipment, as operable.



The individuals investigating the LOTO did not “break the plane” of the under-voltage relay cabinet nor did the UAO feel an electrical shock at any time.

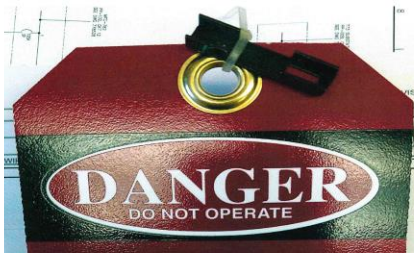
What We Can Learn:

Being aware of your surroundings has been proven to reduce accidents and injuries. The ATR UAO and engineer were keenly aware of their surroundings and noticed the electrical problem before it harmed personnel working in the area.

Lockout/Tagout Tag Inadvertently Falls From Breaker

NE-ID--BEA-MFC-2017-0006 (Significance Category 3)

In early August 2017, a LOTO was installed using a "zip tie" on a common trip bar for a ground fault circuit interrupter (GFCI) breaker. The trip bar is used to connect two single-pole breakers into one double-pole breaker. The GFCI breakers were located inside a breaker panel at the MFC. Due to the configuration of the breaker, a standard lockout device could not be used and "tag only" isolation is acceptable in certain situations by the INL LOTO procedure.



The morning of September 19, 2017, during a pre-job walkdown, the MFC-725 building manager discovered that the GFCI breaker LOTO tag had fallen from its installed location on the breaker. The breaker connection trip bar had become dislodged from the two single-pole breakers. When the tag was discovered, it was still zip tied to the trip-bar.

The breaker was still in the required de-energized position and it is unclear when the tag was dislodged.

What We Can Learn:

Alternative methods for energy isolation should be thoroughly explored *before* relying on a tag only LOTO. In addition, core human performance improvement tools such as having a questioning attitude and taking a minute to think about the actions you are going to take, would likely have identified an aftermarket lockout device to provide positive control of the electrical hazard.

Unqualified Individual Performed Worker under Lockout/Tagout

NE-ID--BEA-MFC-2017-0007 (Significance Category 4)

A simple LOTO to prevent mechanical motion was performed by a subcontract employee who was not qualified as an Authorized Employee Simple (AES). The noncompliance was discovered during review of the worker's qualifications. The worker thought he was qualified to hang his personal lock and tag since he had taken LOTO escort training several months prior to performing work. However, his LOTO AES qualification had expired nine months prior to him working on the Simple LOTO.

The subcontract superintendent did not verify the LOTO qualifications of the worker prior to assigning him the task. Secondary to the noncompliance, when the qualification lapse was discovered, the building manager directed the individual to remove his personal lock and tag from the installed simple LOTO. This was done without following the requirements for removal of personal tags and locks by LOTO escorted personnel. At no time were personnel exposed to hazardous energy sources.

What We Can Learn:

Management has a responsibility to ensure that workers are trained and qualified to perform work for which they are assigned; likewise, workers have a responsibility to ensure that they have had the proper training and hold the proper qualifications to perform that work. With training records readily available, it is easy to take a few minutes to log into the TRAIN database and verify individuals assigned to perform work are qualified to do so.

Electrical Arc in Junction Box

NE-ID--BEA-STC-2017-0001 (Significance Category 3)

Two subcontract employees were installing conduit in the ceiling of Willow Creek Building (WCB) room 616, when they noticed an uncovered junction box containing two wires (208 and 120 V). They decided to place a cover on the box to meet electrical code and in doing so one employee noticed a slight electrical arc from one of the looped wires to the metal junction box. The employee did not feel a shock and the breaker did not trip. A follow-up investigation identified a nick in one of the wires that allowed the bare wire to come in contact with the metal junction box.

What We Can Learn:

This event underscores the importance of using a step back to re-assess hazards associated with the task when conditions change.

Administrative Lockout/Tagout Error

NE-ID--BEA-STC-2017-0002 (Significance Category 4)

LOTOs were installed on the parking lot lights at WCB and the EIL to support the cutting and demolition of concrete adjacent to the lots. After completion of the job, the WCB Facility Area Specialist (FAS) was requested to do final removal of the LOTO at WCB.

During the removal of the LOTO the FAS identified that an administrative error had had been made in the LOTO record sheets at WCB and the EIL. The LOTO record sheet for the WCB job was inadvertently placed with the job lock box for the EIL and personal locks were removed from the EIL job lock box rather than the WCB box. The FAS stopped the work on both jobs and did not remove the job lock from either box. At no time were the isolation devices removed from either location. No personnel were exposed to hazardous energy sources.

What We Can Learn:

Pay attention to details and take the time to make sure you've completed work correctly. Ask someone to review your work and take their feedback seriously, do work in small chunks, verifying each part as you perform it and most importantly, treat each task as if it is the most important think you will do that day – and then act that way.

Lockout/Tagout Qualification had Expired

NE-ID--BEA-STC-2017-0003 (Significance Category 4)

During the performance of a Management Observation on the Fire Riser Five-Year Preventive Maintenance (PM) at the INL Research Center (IRC) 605, a discussion was held on the LOTO process and the required training to start work. After performing the Management Observation the training was verified in the Training Records and Information Network (TRAIN) system and it was found that the LOTO qualification for one of the Life Safety Systems employees had expired in 2015. However, this employee had most recently performed work under a LOTO in September 2017.

What We Can Learn:

- Training organizations should consider developing and distributing qualification cards or use communications other than email to notify employees when their qualifications are going to lapse. Reminders of upcoming qualification expiration dates are often sent via e-mail; however, persons in operations and/or support organizations, such as Life Safety Systems, are not able to routinely check their e-mail.

- Managers or their support staff should monitor and ensure employees are receiving the training they need to perform their job safely and compliantly.
- Employees need to take personal responsibility for their training and ensure that they have the appropriate training to perform the job they are assigned.

Other Non-Reportable Events

CO 2017-1818

Researchers were baking out a new, empty ceramic crucible in the furnace in the inert glovebox in the Engineering Development Building, MFC-789. The activity was being performed in accordance with LI-784, "Laboratory Specific Research and Development Activities in MFC 768B 768TD & 789," for the purpose of removing impurities and moisture from the manufacturing process. The process was performed at 550°C for one hour. Upon completion of the bake-out operation, the researcher returned to the facility and noticed

an unfamiliar odor. The researcher was monitoring the process remotely from his office.

The researcher and laboratory space coordinator briefly looked through the facility for the source of the odor and determined that it was most likely coming from the crucible bake-out process, specifically the vacuum pump discharge. The employees then exited the facility and contacted the laboratory manager who instructed the researcher and laboratory space coordinator to contact Industrial Hygiene and MFC facility management and then contacted Nuclear Science and Technology operations lead. The industrial hygienist roped off the glovebox room and took swipe samples for contaminates. No contaminates were found.

What We Can Learn:
If something does not look right, or in this case smell, right, then it is best to immediately exit the area and contact the appropriate personnel to investigate the problem.

CO 2017-2010

Fuel Manufacturing Facility (FMF) operators were operating the sodium separation system band saw in an inert atmosphere in the special nuclear material (SNM) glovebox to process a Sandia National Laboratory primary containment vessel. During band saw cutting, operators noticed smoke exiting from the band saw motor. The operator immediately stopped and unplugged the band saw. The operator then notified other personnel in the area. The manual fire alarm was pulled and the facility was evacuated.

The INL Fire Department responded and entered the facility to investigate the source of smoke and found no evidence of fire or heat using heat imagery equipment. About three hours later, the INL Fire Department performed a second visual investigation and found no evidence of fire. The facility was then released for normal access.

There was no fire in the glovebox; however, had there been a breach of the glovebox due to a fire, contamination levels in the glovebox are low enough that the effect to the facility would be minimal.

What We Can Learn:
It is always best to err on the side of caution. Personnel in FMF took the appropriate actions when they saw smoke coming from the band saw. They stopped work, isolated the electrical supply to the saw, notified the INL Fire Department, and evacuated the area.

CO 2017-2051

On August 16, 2017 the ATR Complex Training Building (TRA-679) was evacuated in response to a manual fire alarm activation. The ATR shift supervisor had received a report of an acrid odor in the simulator area of TRA-679. The plant foreman and utility area supervisor were dispatched to investigate. The utility area supervisor could not detect any evidence of fire but, as a precautionary measure, initiated INL Fire Department response by means of the manual fire alarm. The INL Fire Department responded and confirmed that there was no fire, and released the building for normal access. ATR operations management and the DOE facility representative were notified.

What We Can Learn:
As with the event reported at FMF (CO 2017-2010), ATR Complex personnel took precautionary measures to ensure personnel were safe in the event there was an actual fire.

CO 2017-2336

Professional riggers were transferring a 4,500 pound lathe using a floor crane and maintaining a lift height of less than two inches above the floor, when the lifting sling failed. The load dropped to the floor without adverse consequences to people or the facility.

The sling was rated for 12,800 pounds in the configuration used. Proper work control and briefing were followed and workers were safely positioned away from the load in accordance with rigging practices. An initial investigation shows that the sling failed cleanly, mid-length between the hook and the equipment because the sharp edges on the lathe were not identified and mitigated.

What We Can Learn:
A comprehensive evaluation of lifting surfaces should be performed to ensure there are no sharp edges that could damage the lifting equipment. The failure to perform this comprehensive inspection resulted in an unidentified sharp surface that led to the sling being cut and the load falling.

The following best practices prevented an off-normal condition from having a consequential impact to MFC personnel, equipment, or facilities:

- Pre-use inspections were completed on the rigging and the crane – Nothing abnormal was noted
- Lift height of the equipment was limited to less than two inches above the floor throughout the move
- Workers were safely positioned away from the load
- Adequate safety load margins were selected

- The job had proper work control, briefing to workers, and work release.

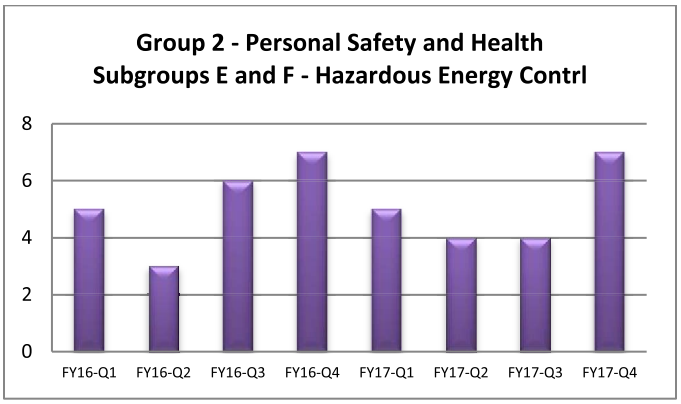
ANALYSIS FOR RECURRING EVENTS:
The number of events reported under Group 2 decreased since last quarter; however, all seven events reported this quarter were related to hazardous energy control. This represents an uptick in similar events over the past three quarters.

A review of the 17 events reported under Group 2 Subgroups E and F over the last twelve months found that eight involved subcontractors including three of the events from this quarter; however, upon review, no commonalities that would be indicative of an adverse trend or recurring event were identified with subcontracted work. Of the 17 events, nine events resulted from a failure to follow hazardous energy control processes.

The INL LOTO subject matter expert (SME) also noted the trend and performed additional analysis of the "severity" of the reported events. While severity is trending in the right direction the overall number of LOTO events is concerning. The SME reported that INL management recently completed a round of focused management observations in September 2017. This activity resulted in the identification of the two qualification related events reported this quarter.

In addition to the focused observations, the trend was also discussed in the recently issued LOTO newsletter as a Hot Topic and a call for action for all employees to verify their qualification status. The SME is currently collecting data to quantify the number of LOTOs performed during the 4th quarter. The SME also noted that a similar trend was identified last fiscal year during the same quarter. This commonality is being investigated to see if events are tied to an increase in work load at the end of the fiscal year and/or number of LOTOs executed during this time frame.

An analysis of LOTO training and how it relates to human performance improvement was performed by the conduct of operations functional lead and the human performance improvement lead.

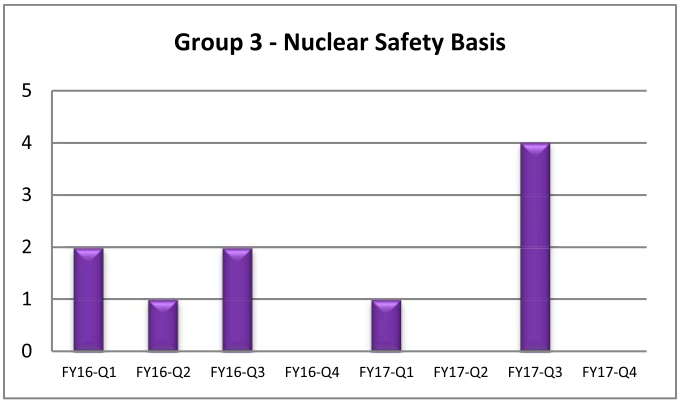


Finally, a review of the eight other events in this reporting group over the past 12 months was performed. These included seven occupational injuries and one fire. No commonalities exist with the occupational injuries that would warrant declaration of a recurring event.

4th QUARTER FY-17 GROUP 3 – NUCLEAR SAFETY BASIS EVENTS

TREND SNAPSHOT

Nuclear Safety Basis Events: There were no nuclear safety basis event reported during 4th Qtr FY-17. During the past 12 months, five events have been reported under this group's reporting criteria; four were identifed at the ATR Complex and one at MFC. An analysis of the events did not reveal any commonalities that would indicate a recurring trend or recurring events.



The number of events reported under these criteria is trending downward over the last two years. There were no events reported under this group's reporting criteria during the 4th Qtr FY-17.

Other Non-Reportable Events

There were no additional non-reportable events related to nuclear safety basis problems documented in LabWay during 4th Qtr FY-17.

ANALYSIS FOR RECURRING EVENTS:

Five events have been reported under these criteria during the past 12 months; none were reported this quarter. Three of the events occurred at the ATR Complex and one at MFC. A review of the events found no commonalities that would warrant reporting as a recurring condition or problem.

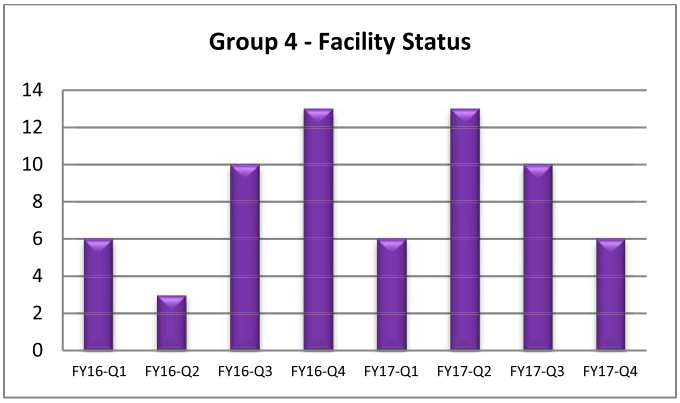
4th QUARTER FY-17 GROUP 4 – FACILITY STATUS EVENTS

TREND SNAPSHOT

Facility Status Events: Facility status events accounted for 44% of the events reported in FY17. The number of events reported under these criteria decreased from 13 in the 2nd Quarter FY17, to 10 last quarter and six this quarter. The rate of occurrence of facility status events is trending slightly upward over the past two years. All six events reported this quarter occurred at the ATR Complex. All of the ATR Complex events were related to performance degradation of Safety Class (SC) or safety significant (SS) structure, system, or component (SSC). Over the past 12 months, 35 events have been reported at INL under this group;s reporting criteria, with 32 of these events occurring at the ATR Complex.

Of the Group 4 events reported in the past 12 months, 80% have been reported as performance degradation of an SC or SS SSC, all of which occurred at the ATR Complex. ATR Plant and Project Engineering continue to monitor the health of safety related systems and that of systems important to safety. Safety System Report Cards are issued monthly and, if

necessary, ATR Engineering initiates action to address any concerns.



The six events reported under the Group 4 – Facility Status criteria during 4th Qtr FY-17 are summarized below.

Erratic Indication on ATRC Neutron Level Channel B during Reactor Startup Preparations

NE-ID--BEA-ATR-2017-0037 (Significance Category 4)
On August 22, 2017, Operating Procedure (OP)-1.2, "ATRC Startup," was exited at step 5.10.2 due to erratic indication on ATRC Neutron Level Channel B. The weekly Neutron Level calibration check Technical Safety Requirements (TSR) surveillance was in progress as part of the preparation for Reactor startup. When the ZERO-OPERATE-CALIBRATE switch was placed in the CALIBRATE position, and SCRAM circuits reset, Trouble Monitor alarms were received and the Neutron Level Channel B analog power meter began oscillating between the high gain (NL) and the low gain (NF) ranges causing a SCRAM signal. Work was stopped and the startup procedure was exited. The ATRC Shutdown procedure, OP-2.2, was entered and completed. The ATRC was shut down at the time the abnormal indications were observed. An actual unsafe condition did not exist.

Failure of Advanced Test Reactor Primary Coolant Pump LOCA Trip Circuit Relay

NE-ID--BEA-ATR-2017-0038 (Significance Category 4)
The “A” relay in the M-7 PCP breaker cubicle was identified as failed on August 22, 2017 and the ATR Shift Supervisor was notified that a failed relay in the M-7 Primary Coolant Pump (PCP) cubicle is a part of the Loss of Coolant Accident (LOCA) pump trip circuit. Initially the failure was believed to only affect indication during testing; however, the ATR Operations Assistant Manager requested Engineering to investigate and confirm the effect the failure would have on the LOCA pump shutoff system.

ATR Log Count Rate Monitor Channel 1 Failure

NE-ID--BEA-ATR-2017-0039 (Significance Category 4)
The ATR Shift Supervisor was notified by the reactor instrument control technician that the log count rate monitor Channel 1 local indication on the amplifier drawer had failed, rendering the instrument inoperable. ATR was in a maintenance outage and the core was defueled at the time of failure. The log count rate monitor is not required to be operable with the core defueled.

Damage to the Advanced Test Reactor Working Canal Parapet during 2-Ton Crane Use

NE-ID--BEA-ATR-2017-0040 (Significance Category 3)
The ATR 2-ton reactor room floor operated crane was being used to remove a drop chute handling tool from the canal. While the tool was being lifted, it caught on the experiment storage rack mounted on the west wall of the working canal pulling three concrete anchors from the parapet and causing minor damage to the parapet, and unknown damage to the experiment storage rack.

The experiment storage rack is held down on the storage stand mounting pins using three hex head bolts screwed into concrete anchors on the top of the canal parapet. The experiment storage rack was raised approximately 1 to 2 inches, tearing the concrete anchors out of the top surface of the parapet. When the crane was lowered, the experiment storage rack returned to its normal position. The rack was not being used for fissile material storage at the time of the event, and damage to the canal concrete is well above the water line and appears superficial.

What We Can Learn:
A sufficient number of spotters should be assigned to observe all sides of moving cranes, especially in congested areas and where obstructions are present.

Advanced Test Reactor #4 Deep Well Pump Trip

NE-ID--BEA-ATR-2017-0041 (Significance Category 4)
The ATR control room received an annunciator alarm, Low Level Raw Water Storage Tank, due to Deep Well Pump (DWP) No. 4 tripping off from an unknown power supply anomaly. ATR TSR-186, LCO-3.2.14.2, “Emergency Firewater Injection Supply System,” (EFIS), requires DWPs to be operable when the reactor vessel contains irradiated fuel elements. At the time of discovery, ATR was shut down and defueled. The EFIS to the reactor vessel was not required to be operable.

Redundant deep well pumps are available to supply raw water inventory needs. Deep Well Pump No. 3 was started to maintain raw water inventory and investigation into the DWP No. 4 trip was initiated.

Failure of Advanced Test Reactor M-7 Primary Coolant Pump Motor Starter

NE-ID--BEA-ATR-2017-0042 (Significance Category 4)
The M-7 PCP motor starter failed to start the PCP when a start signal was initiated from the distributed control system. Primary coolant system startup was in progress at the time of the failure. The safety function of the PCP motor starts is to trip the pump. This function is required to be operable during power operation or when more than one PCP is running.

Following initial evaluation by ATR electricians, the motor starter was determined to have an unknown failure and was declared inoperable. ATR was shut down and no other PCPs were running at the time. The PCP shutoff system was not required to be operable.

Other Non-Reportable Events

There were two additional non-reportable events related to facility status problems reported during 4th Qtr FY-17. They are summarized below.

LP-CO 2017-0398

A security police officer inadvertently activated (lowered) a traffic control drop arm gate at an INL vehicle ingress point. The arm made contact with a dump truck as it was proceeding through lane No. 1 at INL Gate 1. As engineered, when the drop arm contacted the dump truck, the arm immediately reversed and raised back to the up position. There was moderate damage to the drop arm but none to the dump truck. The drop arm has been replaced and traffic is continuing through lane No. 1.

What We Can Learn:
Do not get in a hurry or become complacent when performing routine tasks. Doing so can result in the right action being taken at the wrong time.

CO 2017-2201
An ATR shift supervisor was notified that the ATR confinement system had been unintentionally breached during installation work of a heating and ventilating system modification. An ATR system engineer had been checking progress of work to install a ventilation modification that required opening penetrations in existing heating and ventilation supply ducts. During his inspection, the engineer noted that a hole for a new duct had been cut into the supply duct outside of the confinement boundary dampers, causing an opening in the confinement system that could not be isolated. The engineer directed the craftsman performing the work to change the location of the penetration to the other side of the isolation damper and to patch the incorrect hole with a sheet metal plate and silicone sealant. The ATR plant foreman and ATR Control Room supervisor were notified.

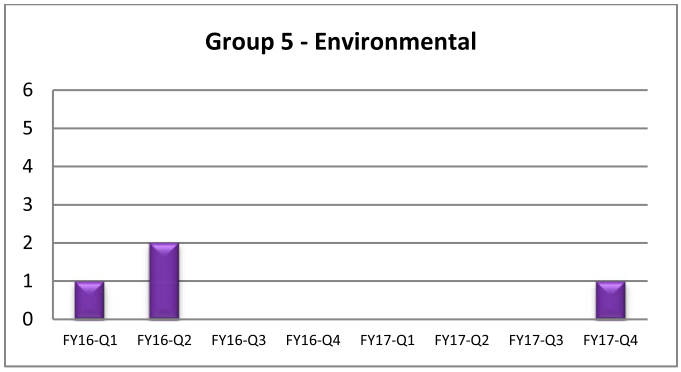
What We Can Learn:
It is important to walk down maintenance activities prior to commencing work to ensure the work being performed does not introduce new hazards or create adverse conditions in the facility. It is also equally important to monitor work activities to ensure they are being performed correctly.

ANALYSIS FOR RECURRING EVENTS:
A review of 35 facility status occurrences that were reported in the last 12 months was performed. Thirty-two occurred at ATR of which, four were related to confinement doors (e.g. latch failures, seal leaks) and one was related to an EDG at the ATR Complex. On a case-by-case basis, ATR management evaluates the need to develop a preventive maintenance package to minimize the recurrence of common failures associated with confinement doors.

Twenty-eight of the events in the past 12 months were the result of degradation of a SC or SSC; all were discovered at ATR, primarily during preparation for reactor restart. As stated earlier, ATR management has identified this trend and is monitoring performance degradations via system health reports. Additional action will be taken if deemed necessary.

TREND SNAPSHOT

Environmental Events: There was one environmental release reported under this group's reporting critieria during 4th Qtr FY-17. Two non-reportable events also occurred during this reporting period. The rate of occurrence of environmental events over the past two years continues to trend downward.



The one reportable event occurring during the 4th Qtr FY-17 is summarized below.

Wet Layup Chemical Spill at the Advanced Test Reactor Complex

NE-ID--BEA-ATR-2017-0036 (Significance Category 4)
While draining layup chemicals from the secondary coolant system and high-demineralized water heat exchangers, approximately 600 gallons of water containing wet layup chemicals leaked onto the ground between ATR Complex buildings TRA-671 and TRA-771. Chemicals used in wet layup are Biosperse 250 and Protecsol 649L corrosion inhibitor. Personnel discovered the spill and closed a ball valve by TRA-671; the spill stopped.

The water was discharged to the surface area Northwest of TRA-671 and was restricted to the ATR Complex premises and did not discharge to a surface water body. The chemical products used in the secondary coolant system have three constituents that have reportable quantities (RQs): cupric nitrate anhydrous (CAS#3251-23-8, 0.19% of Biosperse product, RQ equals 100 pounds), ammonium benzoate (CAS# 1863-63-4, 5.0% of Protecsol product, RQ equals 5,000 pounds), and Nickel (CAS#7440-02-0, <1% of Protecsol product, RQ equals 100 pounds).

Based on calculations, all chemical releases were below the RQ as follows: cupric nitrate anhydrous equals 0.002 pounds (below 100 pounds RQ), ammonium benzoate equals 1.008 pounds (below 5,000 pound RQ), and nickel equals 0.2016 pounds (below 100 pounds RQ).

Other Non-Reportable Events

There were two non-reportable event related to environmental problems or conditions during 4th Qtr FY-17. They are summarized below.

CO 2017-1719
Site-wide facility and operations Laborers were spraying weeds at Central Facilities Area when they breached the 50 foot "No Spray" boundary near the CF-642 deep well building. Work was stopped and INL management, the INL Environmental organization, and DOE were notified. The condition did not represent a reportable environmental incident. A sign that read "Deep Well" had been posted in the area but was knocked over during the winter months. The missing sign went unnoticed until the event. After the event, the sign was replaced.

What We Can Learn:
Facilities with outdoor signage should consider attaching signs to posts and periodically inspecting the signs to ensure they are still in place and legible. These inspections are especially important after the winter months when access to remote locations can be hindered and also following high wind events.

CO 2017-1794
An MFC electrical engineer was evaluating a failed breaker that had been previously removed from a facility. While conducting the evaluation in his office, he observed some white fibers that were released from the breaker housing. Industrial Hygiene was notified and determined the material was potentially asbestos. The office was posted as a no entry

area; adjoining offices that were on the same ventilation system were vacated and posted. Ventilation was secured. It was then discovered that an electrical shop area where the breaker had some maintenance performed may also contain fibers. This was verified and the area was posted and ventilation to this area was also secured. Samples of the material were taken for analysis. Due to the small amounts of fibers observed any exposures would be negligible.

Laboratory analysis showed that the asbestos was below the limit of 0.1 fiber/cc based on the National Institute for Occupational Safety and Health (NIOSH) method 7400. The filter samples came back as all <0.1 fibers/cubic centimeter to make the determination that no asbestos was present.

Asbestos bulk analysis was determined to be below the limit of 1% based on NIOSH method 7400. The bulk samples came back as ND or no asbestos was detected to make the determination no asbestos was present.

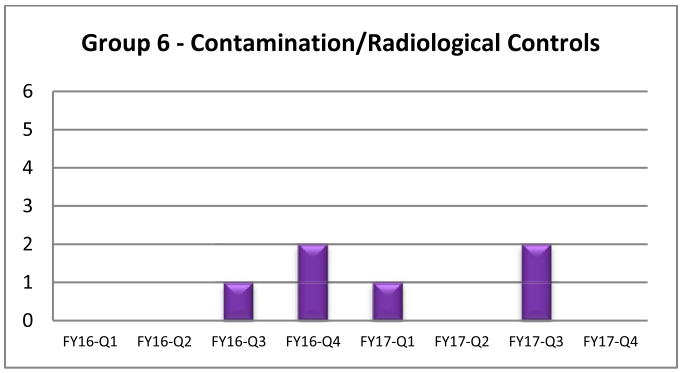
What We Can Learn:
The engineer who discovered what he believe to be asbestos fibers to appropriate action to ensure the potential for the spread of asbestos contamination was eliminated.

ANALYSIS FOR RECURRING EVENTS:
The reportable event this quarter is the only event in the 12 months. No adverse trends or recurring conditions are noted regarding events in this reporting criteria.

4th QUARTER FY-17 GROUP 6 – CONTAMINATION/RADIATION CONTROL EVENTS

TREND SNAPSHOT

Contamination/Radiation Events: There were no reportable events related to contamination/radiation control reported in 4th Qtr FY-17. The rate of these types of events is trending slightly updards over the past two years. INL Radiological Controls Management is addressing this trend through focused Management Observations to help reinforce desired behaviors when performing radiological work. In addition, dynamic learning activities working in radiological hoods has been developed and is being implemented. There were two non-reportable events related to contamination/radiological controls documented this quarter.



No contamination/radiological controls events were reported during 4th Qtr FY-17; however, there were two non reportable events. The non-reportable events are summarized below.

Other Non-Reportable Events

CO-2017-1927

A radiological spill occurred due to a failed heat seal on a waste bag. Operations personnel were transferring transuranic contaminated waste out of the transfer port in the clean side of the Advanced Fuel Cycle Initiative glovebox and placing it into a 55 gallon drum. After the seventh and final waste bag was surveyed, as it was being removed from the transfer port the operator noticed the waste had shifted causing the heat seal to fail. This resulted in a breach of the outer waste bag.

The operator slowly placed the waste on a transfer cart. All personnel evacuated the affected area and immediately entered the personnel contamination monitor to be surveyed for contamination. No contamination was detected on the

personnel and no constant air monitoring alarms were present.

One health physics technician and one operator donned personnel protective equipment and powered air purifying respirators and entered the affected area. They bagged the waste item and placed it into a 55 gallon drum. Surveys of the affected area found approximately 350 disintegrations per minute (dpm) alpha on the floor and approximately 113000 dpm alpha on the surface of the transfer cart. The floor was deconned to less than detectable and the transfer cart was bagged for disposal. All contamination was contained within the affected area and no personnel were contaminated. The affected area was posted as an Airborne Radioactivity Area/High Contamination Area.

What We Can Learn:
It is important to thoroughly inspect seams after heat sealing bags containing contaminated materials. Equally important is the practice of double bagging the material to provide an additional defense to prevent the spread of contamination.

CO-2017-2114
FMF personnel were removing waste from the SNM glovebox associated the sodium separation system. This waste consisted of the primary containment vessel components that were removed from the experiment prior to processing through the sodium separation system. As the main body of the primary containment vessel (a 6 inch diameter pipe) was being passed out through the 8 inch diameter bag out port, the pipe inadvertently rubbed the sleeve material against the bag out port ring causing a small abrasion tear (approximately 1/8 inch) in the sleeve material.

The area constant air monitor did not alarm and all personnel surveyed using a personnel contamination monitor upon exit from the south work room with no detectable contamination. The facility responded in accordance with abnormal response procedure MFC-ONRI-0001, "MFC All Facilities Response to MFC Anomalies," Section 5. The south work room was posted as an Airborne Radiation Area/Contamination Area until initial results of the air samples were completed.

Air sample results indicated 0 dpm alpha and beta upon initial count with an iSolo instrument; no contamination was found outside of the SNM glovebox. Therefore, there was no impact to personnel, the facility, the public, or the environment occurred.

What We Can Learn:

- Sharp objects/tools that can tear, puncture or cut gloves or bag out sleeves must be handled carefully because of the potential of a containment breach. Package broken glass or any sharp object that is being discarded in a metal container or use tape to cover the object's sharp edges.

- Attention to detail and prompt response prevented the small abrasion from causing a large contamination concern. Personnel immediately recognized the tear and took appropriate actions to put the facility in a safe configuration.

  Some tips to performing self-checks include:
  - Stop to think about what you are about to do to ensure you perform well and avoid potential problems.
  - Know when to stop.
  - Understand what outcomes to expect and what needs to occur to realize those outcomes.

ANALYSIS FOR RECURRING EVENTS:
There have been three reportable and seven non-reportable events under the Radiation/Contamination reporting criteria during the past 12 months. Two of the three reportable events were related to personnel contamination. A notable increase in non-reportable radiological control violations has been occurring and has been recognized by INL Radiological Control personnel. Actions to address the adverse trend, including the requirement to use human performance tools, additional briefing of workers in a radiological buffer or radiological materials area, and a worker's recommitment to radiological safety have been taken. This trend will be monitored and additional actions taken if necessary.

4th QUARTER FY-17 GROUP 7 – NUCLEAR EXPLOSIVE SAFETY EVENTS

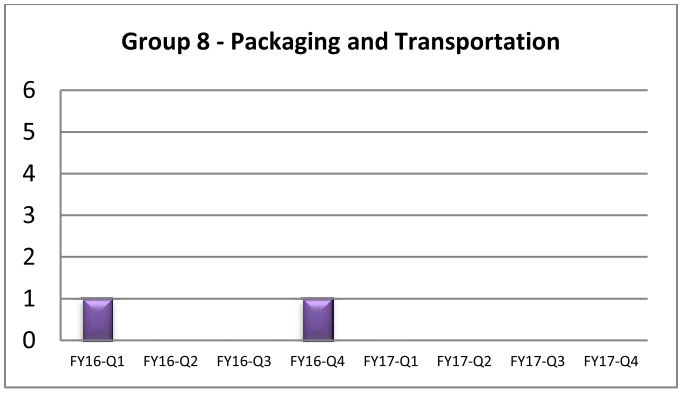
TREND SNAPSHOT

Nuclear Explosive Safety Events: There were no events related to nuclear explosive safety during 4th Qtr FY-17. BEA has never reported an event under this group's reporting criteria since taking over the contract for INL in 2005.

4th QUARTER FY-17 GROUP 8 – PACKAGING AND TRANSPORTATION EVENTS

TREND SNAPSHOT

Packaging and Transportation Events: There were no reportable events related to packaging and transportation during 4th Qtr FY-17. The rate of occurrence of P&T issues is trending downward over the last 12 months. There was one non-reportable event related to packaging and transporation during the 4th Qtr FY-17.



INL rarely experiences reportable events under this group's reporting criteria. There were no reportable events during the 4th Qtr FY-17; however, one event occurred that did not meet ORPS reporting criteria but were related to packaging and transportation. This event is summarized below.

Other Non-Reportable Events

CO-2017-2369

In the HFEF Decontamination Cell, 36 gallon can No. 2 (ID# MFC170201) was loaded with material that had been packaged in a 45 gallon can approximately 10 years prior. Can No, 2 was expected to be declared remote handled transuranic (TRU) waste after being loaded and then transferred out of the Decontamination Cell to the MFC Treatment Storage Disposal Facility (TSDF) using an outpack Cask.

After packaging of Can No. 2 was completed, an engineering calculation and analysis report (ECAR) documenting an evaluation of the material contained in can No. 2 was prepared and approved. Can #2 was loaded into the Outpack Cask in anticipation of transferring it to the MFC TSDF. During review of the ECAR by the TSDF organization, discrepancies were noted between the ECAR calculated SNM and the Safeguards records for SNM. This discrepancy led to a more detailed investigation of the material which resulted in discovery of new information that indicated that the contents contained Resource Conservation and Recovery Act (RCRA) regulated constituents. The HFEF NFM was notified and stopped work with the loaded outpack Cask / 36 gallon can No. 2.

After completion of the Fact Finding Meeting and a review of procedures and requirements, it was determined that no violation or non-compliance occurred in association with the improper loading of the can as the can was still being managed as material containing SNM and not completed disposition as waste.

What We Can Learn

It is always in ones best interest to have his or her work checked by a second competent person. This event shows that second checks and peer reviews are successful in identifying errors in calculations and paperwork.

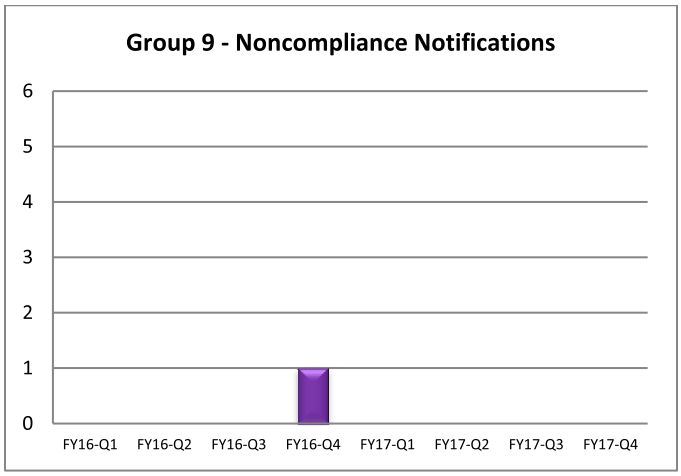
ANALYSIS FOR RECURRING EVENTS:

INL has not reported any events under this reporting criteria during the last 12 months. There is no indication of an adverse trend or recurring problems associated with P&T activities at INL.

4th QUARTER FY-17 GROUP 9 – NONCOMPLIANCE NOTIFICATIONS EVENTS

TREND SNAPSHOT

Noncompliance Notification Events: Noncompliance notification events are reported when INL receives written notification from an outside regulatory agency that the site or an INL facility is considered to be in noncompliance with a schedule or requirement. INL did not receive any noncompliance notifications during the 4th Qtr Fy-17. The two-year trend data for these types of events is trending steady near zero.



INL has not reported any event under this criteria during the last twelve months.

Other Non-Reportable Events

There were no additional non-reportable events related to noncompliance notifications reported during 4th Qtr FY-17.

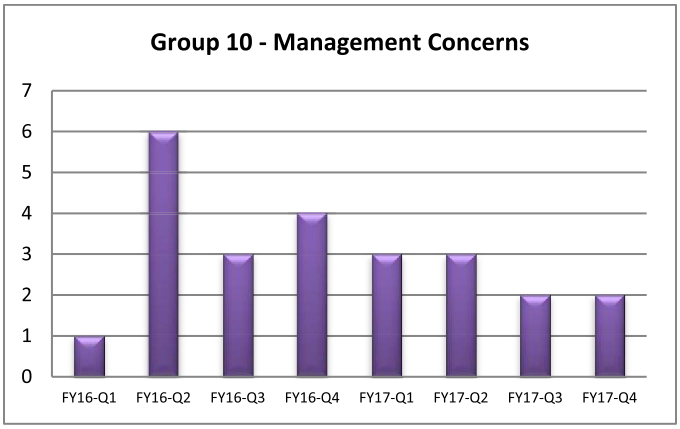
ANALYSIS FOR RECURRING EVENTS:

INL has reported one event in these reporting criteria during the last 24 months. There is no indication of an adverse trend or recurring problems associated with noncompliance notification reportable events at INL.

TREND SNAPSHOT

Management Concerns and Issues: INL reported one near-miss in this reporting group during 4th Qtr FY-17. One additional non-reportable management concern was identified during 4th Qtr FY-17. The rate of occurrence of repotable management concerns continues to trend downward over the past two years. This upwards trend is positive as it shows INL management willingness to report near-misses and share information from events that do not meet other reporting criteria. During the past 12 months, INL has reported 12 events under this group's reporting criteria.

INL has reported 13% of all events in FY-17 under Group 10, Management Concern, reporting criteria including two this reporting period. The rate of occurrence of events reported under this criteria has been trending downward over the past two years.



The two events reported during 4th Qtr FY-17 are summarized below.

Inadequate Experiment Safety Analysis for Boise State University Experiment

NE-ID--BEA-ATR-2017-0043 (Significance Category 3)
In September 2017, a review of the Boise State University (BSU) Experiment Safety Analysis (ESA) revealed an error. The BSU experiment consists of a radiation facility (holder) that contains three experiment baskets. The ESA handling requirements were for the holder assembly with baskets installed, but were not supported by the Thermal Analysis (ECAR-2992). The Thermal Analysis only analyzed handling an individual experiment basket.

The BSU experiment has not been irradiated and is still controlled under the BSU Compliance to the Generic ESA.

What We Can Learn:
Assumptions were made during ESA development that were not confirmed during the analysis review. In addition, a clear definition of the configuration being analyzed was not provided in the ECAR. Error prevention tools such as experiment safety analyses and Safety and Operations Review Committee reviews and checking of assumptions can be better used to help identify similar problems.

Inadequate Zero Energy Check during Steam and Condensation Isolation

NE-ID--BEA-FCF-2017-0002 (Significance Category 4)
MFC had isolated and locked and tagged the steam and condensate system at the boiler in the Experimental Breeder Reactor (EBR) building for the season. Fuel Conditioning Facility (FCF) personnel performed local LOTOs on steam and condensate isolations to support maintenance efforts. It was discovered that zero energy checks performed on the LOTOs were suspect because energy was not present at the time of the check to support validation of isolation through a proper zero energy check and exclusive control was not provided by the downstream LOTOs.

What We Can Learn:
See Lessons Learned INL-2017-0031.

Other Non-Reportable Events

There was one additional non-reportable event that is being addressed as management concern and is as follows:

CO-2017-2369
Two conditions identified during the past year indicate the procurement of items for DOE Hazard Category 1, 2 & 3 facilities, classified as safety related, safety class and/or safety significant were not compliant to requirements

established in the INL Quality Assurance program description document, PDD-13000, "Quality Assurance Program Description". When considered in combination, it appears a potential programmatic deficiency site wide with regard to nuclear procurement(s) and the procedures used to execute that work have resulted in challenges to demonstrate full compliance to our quality program requirements. These conditions were self-identified and the connection between them was established through collaboration within the INL team.

The first condition (CO-2016-2925) indicates a failure to fully specify the supplier requirements for safety related, safety class, and/or safety significant items as required by PDD-13000. Although the contract documents invoked the entire NQA-1 standard for the contracted work, they were accompanied by a form (Form 414.12F, "AMSE NQA-1 2008 with NAQ-1A-2009 Addenda Applicability Matrix,") that was, in some cases, misinterpreted by the supplier as exempting the work from certain NQA-1 requirements.

The following actions have been implemented to mitigate this condition:

- The items listed in CO-2016-2925 were reviewed and steps taken to bring the acceptance of those items into compliance with the program requirements
- The quality level determination process (LWP-13014, "Determining Quality Levels") was revised to eliminate risk to confusing activity levels with quality levels for items
- Procedure LWP-4501, " Preparation and Control of Procurement Documents," was cancelled in July 2017
- Improvements in the procurement process have been initiated at MFC through the formation of a Nuclear Material Acquisition Team
- Implemented standardized Form 414.12F comprehensive of the scope of work.

The second condition (CO-2017-0417) indicates a failure to implement the INL quality assurance program requirements by procuring commercial items performing a safety function without the benefit of commercial grade dedication to the specificity of NQA-1 2008/2009a, Subpart 2.14. Based on the description and the research of this condition thus far, items procured for nuclear applications were specified, inspected and post installation tested to verify they were operationally acceptable, but did not meet the level of documentation produced and rigor required by PDD-13000.

The following actions have been implemented to mitigate this condition:

- Interim process measures have been put in place to prevent further issues
- Technical Evaluations were performed for the operating facilities at ATR and MFC to provide reasonable assurance no challenges exist to operability and safety of the facilities
- An "Extent of Condition Plan" was developed and is in process to identify the specific items of concern based on risk
- Commercial Grade Dedication training was developed and is being conducted site wide to ensure consistent application of the requirements
- Procedure changes have been initiated to eliminate further risk

There is no actual impact to the safety and health of the employees, public or environment.

ANALYSIS FOR RECURRING EVENTS:
During the past 12 months, there have been 10 events that did not meet ORPS reporting thresholds, but were reported as management concerns or were categorized as near misses to a more significant event. The four events reported as not meeting ORPS reporting thresholds were as follows:

1. Equipment Removed From Complex without Required Radiological Surveys
2. Issues Identified During Cask Lifting Operations at the Remote-Handled Low-Level Waste Facility
3. Radiological Equipment and Sealed Check Sources Stolen from Vehicle.
4. Inadequate Zero Energy Check during Steam and Condensate Isolation

Six events that were reported as near misses during the past 12 months include the following:

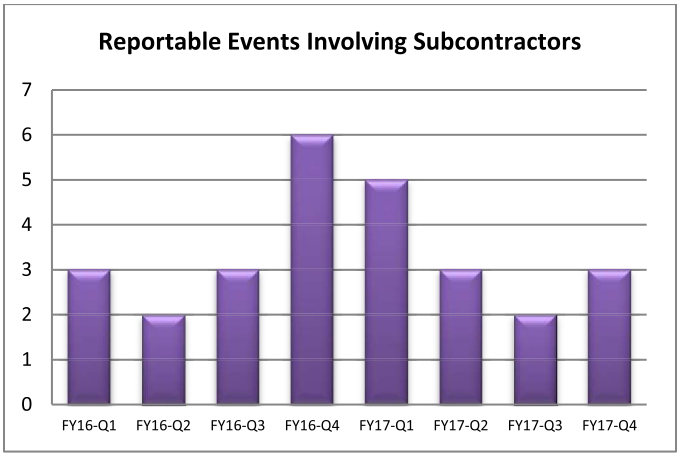
1. Measuring Tape Contacts Electrical Twist Lock Outlet
2. LOTO Near Miss at the ATR Complex
3. Magnet Release of 191-lb Plate during Lift
4. Failure to Install Flux Monitor Wires with Accident Tolerant Fuel Experiments in the Advanced Test Reactor
5. Wireless Communication Enclosure Dislodges from Ceiling Striking Employee
6. Inadequate Experiment Safety Analysis for Boise State University Experiment

After reviewing each event, there was no indication of an adverse trend or recurring problem associated with any of the events reported as management concerns or near misses over the past 12 months.

4th QUARTER FY-17 EVENTS INVOLVING SUBCONTRACTORS

TREND SNAPSHOT

Events Involving Subcontractors: Three of the reportable events reported during the 4th Qtr FY-17 involved subcontract employees. The number of reportable occurrences involving subcontractors is trending steady over the past 24 months. Seventeen percent of events in FY-17 involved subcontractors.



There were 13 ORPS reportable events involving subcontractors during the past 12 months, including following three reported this quarter.

- An Unqualified Individual Performed Work Under Lockout/Tagout
- Electrical Arc in Junction Box
- Administrative Lockout/Tagout Error

ANALYSIS FOR RECURRING EVENTS:
Last quarter, INL identified an adverse trend associated with subcontracted work. Facilities and Site Services management continues to address concerns associated with subcontract work. The events of the past 12 months where subcontractors were involved were reviewed for similarities; no new trends were identified.

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INL Nuclear Safety, Quality, and Performance Management Expectations

Idaho National Laboratory (INL) envisions changing the world's energy future and securing our critical infrastructure. INL's mission is to discover, demonstrate, and secure innovative nuclear energy solutions, other clean energy options, and critical infrastructure. Quality and Performance Management plays a critical role in supporting the INL mission. Our mission is to:

Ensure we, as a Laboratory, know how we are doing and that we are improving our performance.

Own and manage the Laboratory Issues Management System.

Provide high-quality quality assurance program support for research and operations.

Provide effective independent oversight.

"In order to be successful, we must be leaders, we must be competent, and we must be accountable. We must also exhibit the INL values of excellence, integrity, ownership, and teamwork".