FY2017
2ND QUARTER
INL/EXT-17-41832

IDAHO NATIONAL LABORATORY

QUARTERLY OCCURRENCE ANALYSIS

DEEPER LEARNING THROUGH EVENT ANALYSIS

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INL/EXT-17-41832 - *FY-17 2nd Quarter*

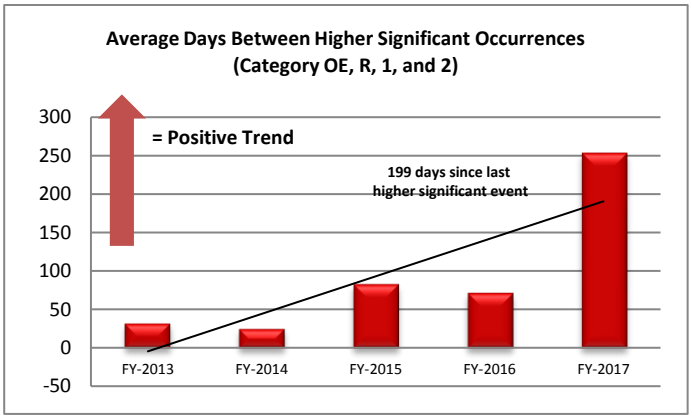
This report is published quarterly by the Idaho National Laboratory (INL) Nuclear Safety, Quality, and Performance Management Organization. The Department of Energy (DOE) Occurrence Reporting and Processing System (ORPS), as prescribed in DOE Order 232.2, "Occurrence Reporting and Processing of Operations Information," requires a quarterly analysis of events, both reportable and not reportable, for the previous 12 months. This report is the analysis of 89 reportable events (24 from 2nd quarter (Qtr) of fiscal year [FY]-2017 and 65 from the prior three reporting quarters), as well as 32 other issue reports (including events found to be not reportable and Significant Category A and B conditions) identified at INL during the past 12 months (seven from this quarter and 25 from the prior three quarters).

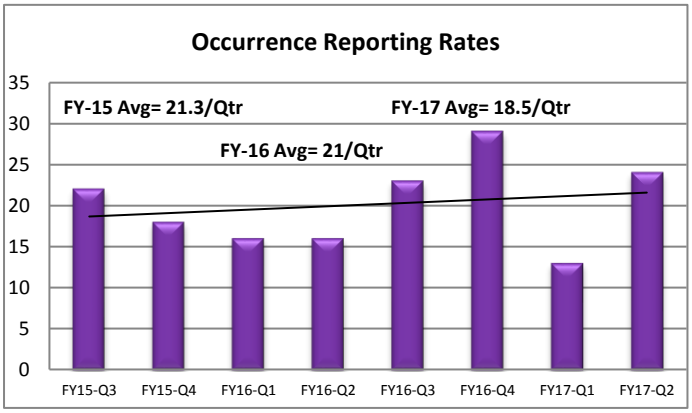
Battelle Energy Alliance (BEA) operates INL under contract DE-AC07-051D14517.

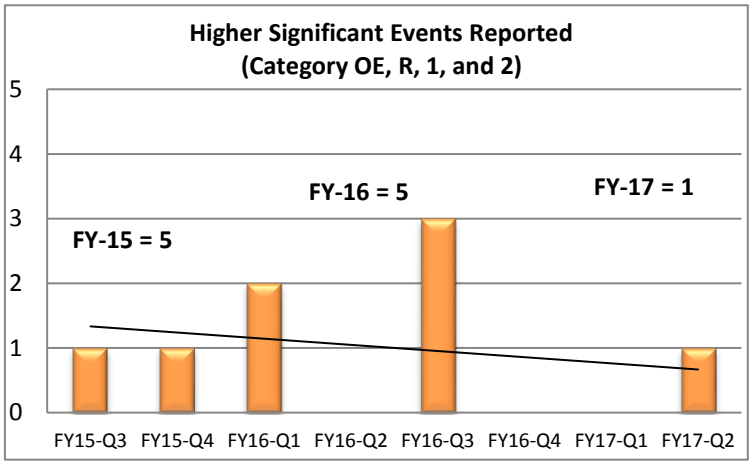
Highlights…

INL reported 24 events this quarter. The average number of events reported each quarter has decreased from 21.3 in FY-15 and 21 in FY-16 to 18.5 so far in FY-17. Thirty three percent of 2nd Qtr FY-17 events were associated with equipment problems. The rate of higher significant events (those reported as Operational Emergencies, Recurring Issues, and/or Significance Categories 1 or 2) continues to trend downward however; one higher significant category event was reported during 2nd Qtr FY-17. Over the past 24 months, the average number of days between significant occurrences is trending in a positive direction. Two hundred and fifty three days had passed between the higher significant event this quarter and the previous event.

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





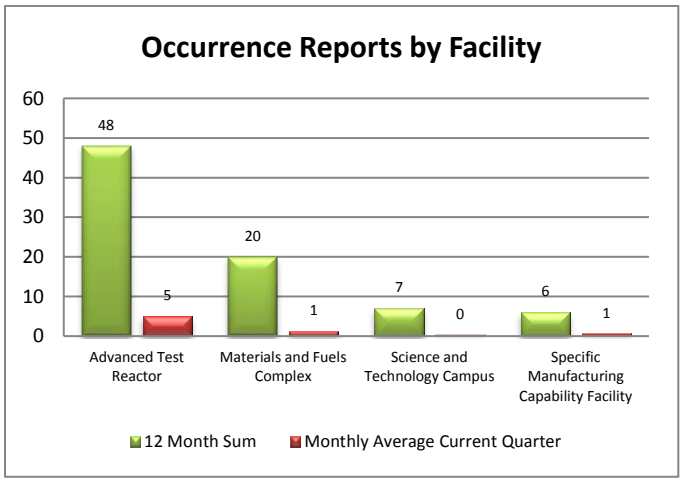


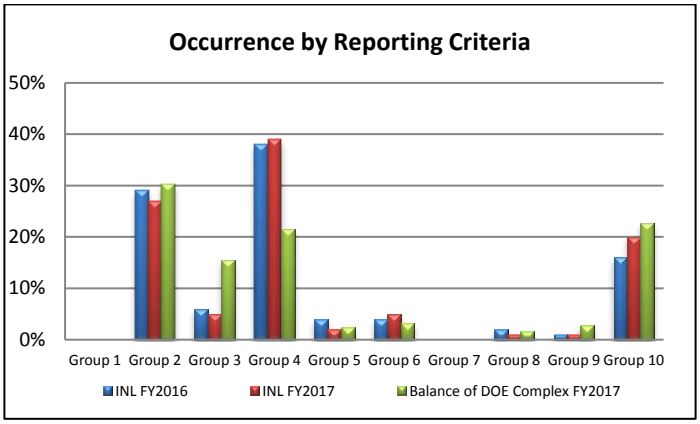
From January 1, 2017, through March 31, 2017, INL reported 24 new events to DOE in accordance with DOE Order 232.2. These events were analyzed to determine commonalities related to: Operational Emergencies (Group 1), Personnel Safety and Health (Group 2), Nuclear Safety Basis (Group 3), Facility Status (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 seven events through Initial Notification Reports and INL's local issues tracking software (i.e. LabWay) that did not meet ORPS reporting thresholds. DOE Order 232.2 requires a quarterly analysis of events, both reportable and not reportable, for the previous 12 months

TREND SNAPSHOT

Occurrences by Facility: During the reporting quarter, the Advanced Test Reactor (ATR) reported 15 of the 24 (63%) events that occurred. Eight of these were associated with performance degradations of Safety Class or Safety Significant Components. This quarterly report combines events reported at the Analytical Laboratory Facilty with those reported at the Materials and Fuels Complex (MFC). This information was reported separately in previous reports.





TREND SNAPSHOT

Occurrences by Reporting Criteria:

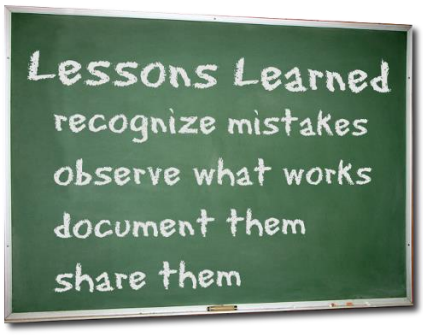
During the 2nd Qtr FY-17, INL experienced the majority of events related to: Group 4 Facility Status (39%), Group 2 Personnel Safety and Health (27%), and Group 10 Management Concerns (20%).

Comparative analysis to the balance of the DOE Complex is shown in the chart above and is explained in each section of the report that follows. The balance of the DOE Complex reports the majority of events in Group 2 (30%), Group 10 (23%), and Group 4 (21%).

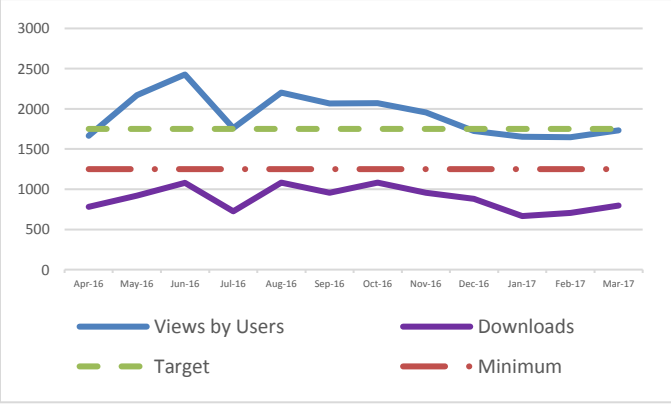
TREND SNAPSHOT

Lessons Learned: OPEXShare average monthly views of lessons learned content during the 2nd quarter of FY-17 shows a slight increase over the 1st quarter of FY-17. However, at 1732 views for a 3-month rolling average, this is still slightly below the goal of 1750 views. Views of lessons learned are starting to trend slightly upward again following the drop taken during the 1st quarter FY-17 which was attributed to the holiday curtailment and less days worked.

The INL Lessons Learned Program is an integral 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 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 shared such as those described in the success stories reported herein.



Lessons generated by INL are shared internally, and when necessary, are shared across the complex through the DOE Headquarters Lessons Learned Program. During 2nd Qtr FY-17, INL shared five lessons, one just-in-time operating experience, and three success stories through the OPEXShare platform, including the following:

- INL-2017-0001, Expired On-the-Job Trainer Qualification Results in TSR Violation
- INL-2017-0002, Barriers for Exposed Hazards were Not Replaced
- INL-2017-0003, Disassembly of Low Energy Energized Components
- INL-2017-0004, Hot Fuel Examination Facility Waste Improperly Packaged
- INL-2017-0006, Foot Injury Results while Breaking in New Safety Boots
- Just-in-Time Operating Experience , INL-2017-0005, Lockout/Tagout Cable Locks
- Success Story, Leaking Radioactive Source Identified Prior to Shipping Off Site
- Success Story, Mechanical Door Failure Operating Experience Prevents Possible Injury
- Success Story, Off-Gas Test Equipment Review Conducted

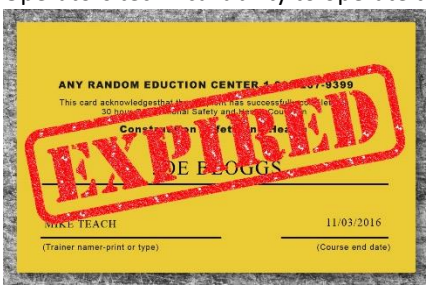
The lessons learned, just-in-time report, and success stories are summarized below:

Expired On-the-Job Trainer Qualification Results in TSR Violation

Lesson 2017-0001

An Experiment Operator for the ATR had signed qualification/certification checklists for trainees even though the operator's On-the-Job Training (OJT) Instructor/Evaluator Qualification had expired. The qualification had expired in 2014, resulting in a period in excess of 2 years where the

Operator, who was an active participant in the training and qualification process, signed checklists for 17 individuals. The Operators technical ability to operate the reactor was never in question however; the Operator's ability to adhere to the rigorous training standards required for OJT and qualification processes and training methodology was in question.



Technical Safety Requirement (TSR-186) states: The minimum allowable ATR staff during reactor operation shall be: An Experiment Operator in the vicinity of the loop control consoles to act on alarms.

Certification for Experiment Operators could not be verified through the established training processes because of the expired OJT Instructor/Evaluator qualification. Therefore, allowing them to stand watch as a certified Experiment Operator during reactor operations was deemed a violation of TSR-186.

ISSUES

Investigation into this event identified the following issues:

- The Operator providing OJT had been receiving expired qualification notifications for 2 years but had assumed an administrative oversight had occurred and did not follow through to investigate the reasons why.
- No individual was responsible for reviewing expired qualifications to determine what qualifications were listed, why the individual was on the list, and if the qualification was needed to perform their job functions.
- ATR operations managers and supervisors were not included on the distribution list for expired qualifications notifications.
- There was a complacency around expired qualifications with some level of acceptance and lack of prioritization from both employees and their leadership teams. This allowed a large backlog of expired qualifications.

What We Can Learn:

- Challenge assumptions. Employees must take responsibility for their own training and ensure qualifications are up to date so that they can perform all required job tasks.
- Systems, such as the training database, should have appropriate checks and balances to ensure multiple persons are notified of lapsed qualifications.
- Managers share responsibility for ensuring direct reports are qualified to do their jobs safely and accurately.
- When back logs grow too large it becomes difficult to prioritize tasks. Attempt to keep back logs at the lowest possible level.

Barriers for Exposed Hazards Were Not Replaced

Lesson 2017-0002

On November 17, 2016, subcontractors were performing work at the Naval Reactor Facility substation, a building that requires keycard access. Work was being conducted under a clearance from INL Power Management and with the aid of insulating blankets to cover exposed areas. Subcontract electricians were performing work in a walk-in electrical cabinet. The door had been removed to allow better access to the work area and signs and barriers were in place to prevent people unfamiliar with project hazards from entering the work area. The area contained exposed energized terminals of 120 VAC and 130 VDC.

During clean-up, at the conclusion of the work day, a worker had moved the barricades to sweep the area and inadvertently forgot to replace them before leaving for the day. The condition was discovered on November 18, 2016, by Naval Reactor Facility personnel and reported to INL Power Management, who immediately responded and barricaded the area.

ISSUES

Investigation into this event identified the following issues:

- Subcontract employees were cleaning up the work area at the end of the day and simply forgot to replace signs and barricades to information others of the hazards.
- Had employees with building access made entry into the substation, they could have potentially come into contact with energized equipment.

What We Can Learn:

- When caught up in a daily routine we can easily lose focus and forget important details that can have a big impact. Diligence and attention to detail is essential to ensuring safe conditions and operations.
- Work team members, both subcontractor and BEA personnel, must reinforce the need to remain cognizant of hazardous exposure to electric shock and the need to maintain vigilance in making sure hazards are conveyed to those unfamiliar with the project by appropriately posting the area.
- While it may require additional time and effort, the best way to adequately protect employees is to replace cabinet doors at the end of each workday.

Disassembly of Low Energy Energized Components

Lesson 2017-0003

On January 19, 2017, a Waste Generator Services Waste Technical Specialist (WTS) was packaging used batteries for disposition. While evaluating a Lithium battery against the waste acceptance criteria for the disposition vendor, the WTS determined the battery exceeded the allowed capacity. In discussions with the generator/researcher, it was suggested that if the battery cells were separated, the individual cells would meet the waste acceptance criteria.

WTS made the decision to separate the cells because disassembly and segregation of the waste is an approved activity performed in accordance with the "Waste Management Routine Field Activities" procedure. The work was low voltage and did not require a lockout/tagout (LO/TO). The WTS removed the battery casing and cut a 5 to 10 wire bundle of battery leads. When the leads were cut, the WTS witnessed a spark "about the size of a golf ball" and a cloud of smoke "about the size of a beach ball."

The WTS immediately stopped disassembly of the battery and stepped back. The battery was placed, by itself, inside a poly drum and notifications were made. The WTS was wearing the required PPE and was not injured during the event.

ISSUES

When the WTS cut the wire bundle, it completed a circuit and shorted several of the individual cells. The controlling document did not specifically address this type of situation and personnel had limited information on the event.

What We Can Learn:

- Caution must be used during disassembly of unfamiliar equipment and potentially energized components. Work must be performed by an electrician, or under the direction of an electrician, even if the component is low energy.
- Specific work controls should be identified when hazards are present and those controls should be incorporated into the applicable procedures.

Foot Injury Results while Breaking in New Safety Shoes

Lesson 2017-0006

An INL employee developed a painful foot condition while breaking in new safety shoes. When the employee received the boots, he was informed by the vendor that the boots could not be returned. In addition, the employee was new to INL and did not understand the need to notify his manager that his boots were causing him discomfort. He did not equate the discomfort with a potential reportable medical case.

When the employee experienced stiff and sore feet on a non-work day, he sought an examination by an off-site specialist. The employee was unaware that his management and/or INL medical needed to be notified of the examination; this was because the employee believed the medical condition was personal in nature and not work related.

ISSUES

The investigation identified the following issues:

- The employee did not inform management there was a problem with the new safety shoes until a serious problem had developed. Additionally, he did not report

having treatment by a personal physician to BEA Medical prior to returning to work.

- In this instance, there was not a clear understanding of the responsibility to report an occupational injury.
- The following three situations played into the employee continuing to wear the work boots:
  - The employee was informed by the shoe vendor he could not return them after purchase.
  - He did not understand that a new shoe voucher could be requested from his manager.
  - Discussions held with co-workers wearing the same boot led the employee to believe it was just a normal uncomfortable break-in period he needed to work through.

What We Can Learn:

- New employees need to understand that "stop when unsure" applies not only to work practices, but to physical discomfort experienced while working, after completing a task, or while wearing any type of personal protective equipment.
- Effective communication may have led to management being notified of the problem before it became a serious medical condition.

Hot Fuel Examination Facility Waste Improperly Packaged

Lesson 2017-0001

On October 24, 2016, at the MFC, a partially filled 4 x 4 x 6 foot waste box was brought to the Hot Fuel Examination Facility (HFEF) for additional waste packaging. The intent of bringing the box to HFEF was to add a waste drum to the box and fill the remaining void space in the box with bags of low-level radioactive waste. The box contained three 55-gallon drums of waste (two from the analytical laboratory and one from HFEF) and a 30-gallon drum full of suspect contaminated metals. To fill the remaining void space in the box, the plan was to add bags of low-level waste reading less than 0.3 millirem per hour (mR/hr) at one meter (de minims).

Waste Generator Services authorized HFEF Operations and Radiological Controls personnel to load de minims waste into the box to fill the void spaces. After the waste box was loaded and the lid installed, it was identified, by reviewing the Radioactive Waste Inventory Sheets that eight of the ten bags of low-level waste loaded into the waste box, exceeded the radiation limit considered de minims.

The waste box was re-opened to recover the over limit bags. As the bags were removed, it was discovered that two of the ten bags removed from the box were not properly documented on a Radioactive Waste Inventory Sheet. The waste box was re-loaded with low-level waste bags that had existing Radioactive Waste Inventory Sheets and that complied with radiation limits. The waste box was then closed.

During the ensuing fact-finding, several issues were identified:

- Eight of the ten bags of low-level waste loaded into the waste box exceeded the 0.3 mR/hr radiation limit considered de minimis and were not approved for shipment by the receiving facility
- Two of the bags of low-level waste loaded into the waste box did not have appropriate packaging paperwork.
- The pre-job briefing for loading the waste box was less-than-adequate. Instructions given for loading low-level waste bags into the waste box were unclear to personnel performing the work. Personnel were instructed to place de minimis low-level waste bags into the box, but the term de minimis was not fully understood by all personnel involved in the work. Personnel assigned to the job after the waste box loading work had begun, did not receive a pre-job briefing.
- Personnel displayed a less-than-adequate questioning attitude. Personnel performing the waste box loading evolution did not stop/pause work to seek clarification when they were unsure of work activity objectives.

What We Can Learn:

- A thorough pre-job briefing is vital for ensuring work objectives are fully understood, even if the task being performed is perceived as simple or routine. Personnel assigned to a work activity that is already underway must receive a pre-job briefing prior to starting work.
- It is important to ensure new or infrequently used terminology is understood by all personnel involved in the work activity. When unsure of terminology or work objectives, workers should not proceed with assigned work.

Just-In-Time Operating Experience – Lockout/Tagout Cable Locks

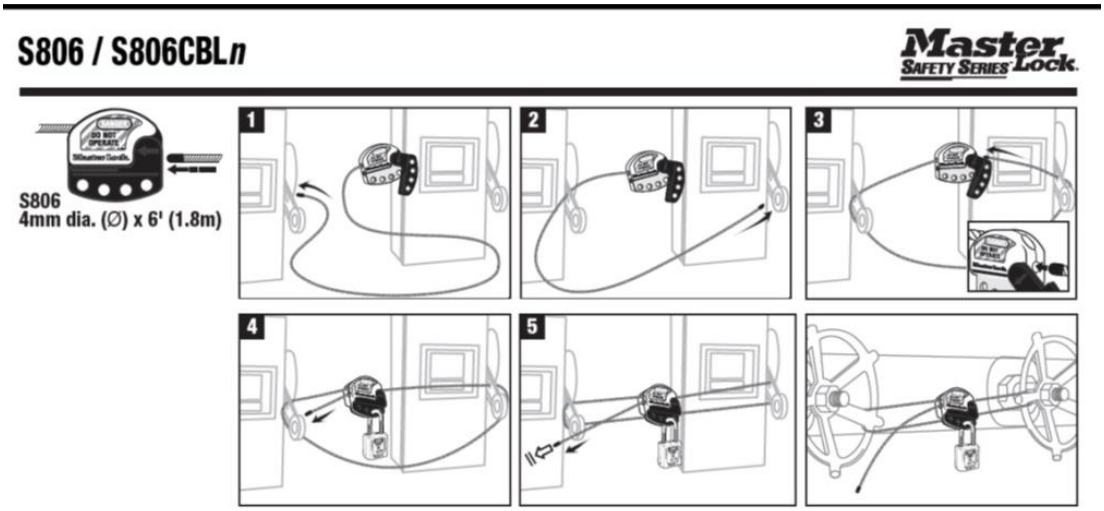
Lesson 2017-0005

A just-in-time operating experience was issued on use of cable locks for LO/TO activities. A cable lock is an extremely useful tool as a LO/TO device; however, it must be used correctly in order to effectively isolate energy. When using the cable lock, the cable must be inserted into the hole in the body in the same direction as the arrow on the body. If the cable is inserted in the opposite direction, the body will not lock the cable in place and the cable lock can be removed without removing the lock.

More information can be found at http://www.masterlock.com/business-use/product/S806CBL15

The photo below shows the correct operation of a cable lock.

The photo below shows an incorrect application of a cable lock.



Success Story – Off-Gas Test Equipment Review Conducted

2017-INL-SS-01

In response to lessons learned titled "Unexpected Gas Release" that details release of a toxic gas at Oak Ridge National Laboratory, a system walk-down was performed in INL's Energy Innovations Laboratory (EIL) LAB B-214. INL off-gas test equipment incorporates gases with similar hazards as those found at Oak Ridge and line management determined the necessity for a follow-up discussion. Of specific concern was the release of toxic gases outside containment.

A walk-down and discussion with the primary researcher indicated that a release is remotely low, barring abnormal hood operation. A loss of hood flow was also identified in the laboratory instruction document and an appropriate response is well understood by those involved. This is a good example of using operating experience to review related equipment for common hazards.

Success Story – Mechanical Door Failure Operating Experience Prevents Possible Injury

2017-INL-SS-01

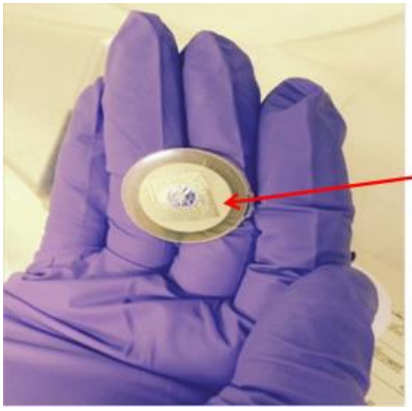
After receiving and sharing OE-3-2014-03, "Mechanical Door Failures," in March 2015, measures were put into place at INL to ensure employees were not in the direct line of fire in case of door failure. The measures prevented personnel from being injured on October 26th, 2015, when an overhead door sprocket came loose and the door dropped to the floor. The corrective measures that were put into place, along with effective communication of those measures, is credited with the prevention of possible injury to workers in the area when the sprocket fell to the floor.

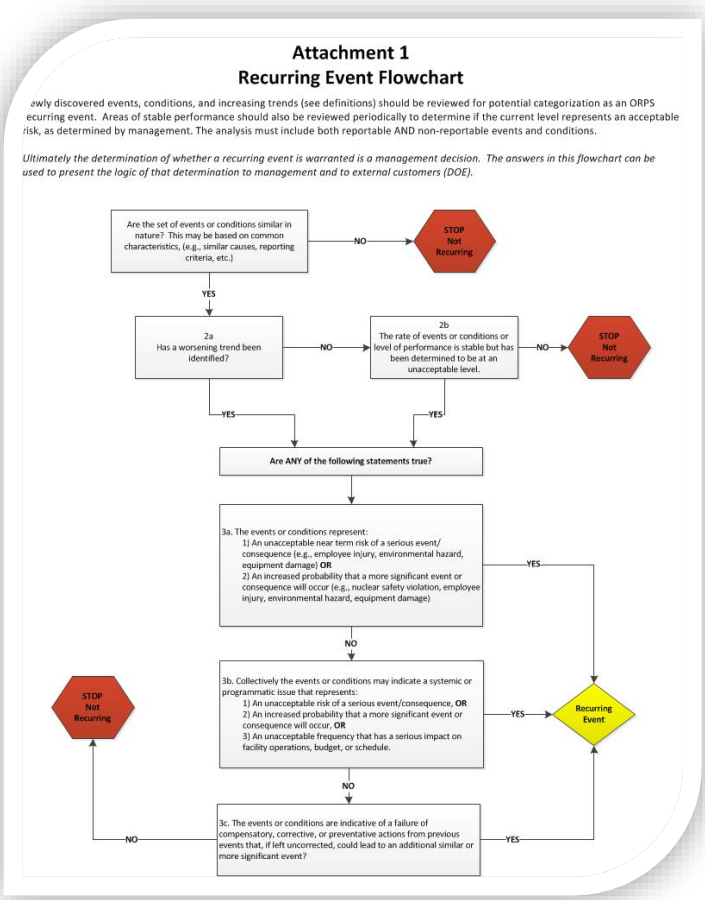
Success Story – Leaking Radioactive Source Identified Prior to Shipping Off-site

2017-INL-SS-02

Responding positively and appropriately to a DOE Operating Experience prevented a leaking exempt Carbon-14 radioactive source from leaving INL and thereby avoiding the likely potential for an off-site spread of contamination. A leak test of an exempt Carbon 14 source performed prior to shipping offsite for use in a demonstration involving local high school students showed the source to be leaking. No contamination was found beyond the source and the source container.

The discovery was due to recent procedure changes by INL Radiological Control in response to a Level 3 Operating Experience report issued by DOE Office of Health, Safety, and Security based on events at Brookhaven National Laboratory and Pacific Northwest National Laboratory in 2012. The OE-3 recommended testing of sealed radioactive sources with unknown pedigree.

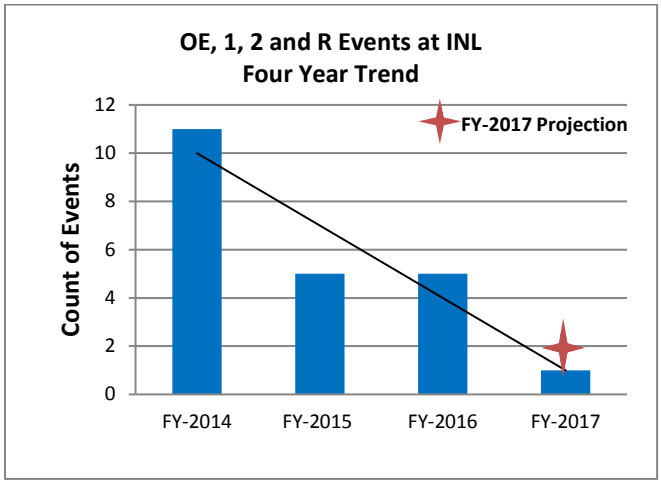


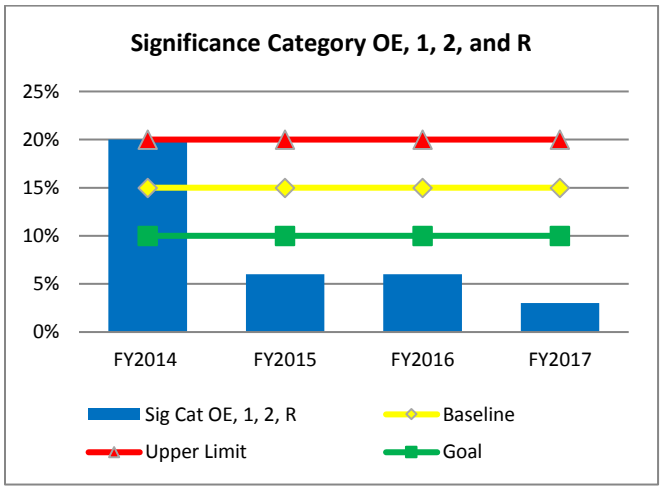


A review of recent operational performance data did not identify any events that would be noted as “recurring;”

The adverse trend regarding work performed by subcontracted personnel and noted by INL F&SS personnel was acted upon. Facilities and Site Services management initiated several assessments to better understand what was contributing to the subcontractor events. Some commonalities were identified and have offered opportunities to initiate action to reverse the trend. These commonalities are discussed in more detail in the discussion of events reported under Group 2 Personnel Safety and Health. The results of the assessments will be thoroughly analyzed and Construction Management will determine a path forward.

No additional patterns were noted with the 89 reportable and 32 non-reportable events reported during the last four quarters.





INL established a set of performance metrics to monitor events by their significance. The measures compare INL events to those reported at other facilities within the DOE Complex. 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 (Sig Cat) OE, 1, 2, and R occurring at INL. INL's performance metrics are as follows:

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

Additionally, INL monitors events by significance category to determine if INL reporting is consistent with reporting at other DOE facilities.

As shown in the chart to the left, INL is experiencing a downward trend in the number of higher significance events occurring at the INL over a 4-year period. So far this fiscal year, INL has reported only one higher significance event. The event occurred this quarter when ATR experienced a SCRAM of the plant protection system due to low primary coolant pump pressure.

During FY-14, INL reported a greater percentage of higher significance events compared to other DOE facilities (see chart to the left). However, this rate has steadily decreased; INL continues to meet its goal of less than 10% of events reported as highly significant.

Additionally, 58% of events reported at INL during FY-17 were Significance Category 3. This is above the complex baseline average of 43%. In addition, 39% were Significance Category 4 (slightly lower than the complex baseline of 42%).

Analysis on how INL measures up to the balance of the DOE complex in each of the reporting criteria groups is provided throughout this report.

2nd QUARTER FY-17 GROUP 1 – OPERATIONAL EMERGENCIES

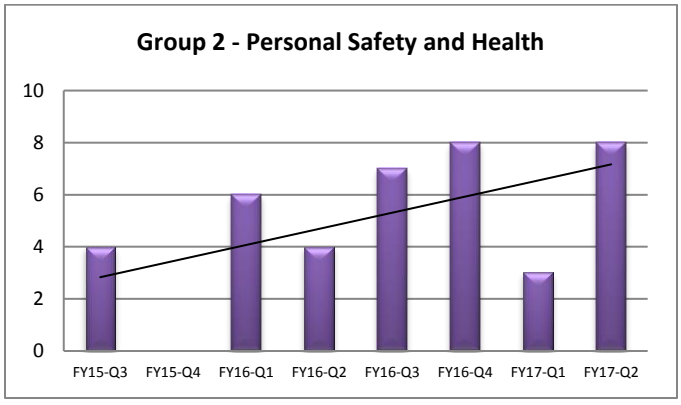
No operational emergencies were reported during the 2nd Qtr FY-17. The last operational emergency at INL was reported in April 2012, when boron triflouride gas leaked from a neutron detector (NE-ID-BEA-INLLABS-2012-0003). The rate of occurrences of operational emergencies continues to trend at zero.

When compared to the balance of the DOE Complex, the rate of occurrence of these types of events at INL is consistent with those reported elsewhere. Thus far in FY-17, one Operational Emergency was reported throughout the DOE Complex, equating to less than 0.5% of the total events reported.

2nd QUARTER FY-17 GROUP 2 – PERSONNEL SAFETY AND HEALTH

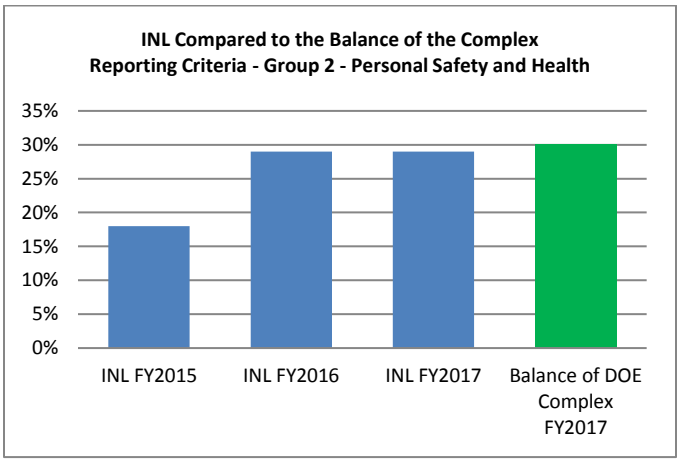
TREND SNAPSHOT

Personnel Safety and Health Events: During 2nd Qtr FY-17, there were eight reportable events related to personnel safety and health (e.g., occupational injuries, occupational exposures, fires, explosions, or hazardous energy). Two additional non-reportable events were communicated via an Initial Notification Report related to criteria in this reporting group. The rate of occurrence of reportable personnel safety and health events continues to trend updwards over the last two years.



Although INL has recently seen an increase in injuries, realized in higher total recordable incident and days away rates, few of these injuries have been reportable. The number of events reported under Group 2 increased since last quarter (i.e. eight events reported this quarter compared to three last quarter).

When compared to the balance of the DOE Complex, the rate of occurrence of Group 2 events at INL was consistent with that reported elsewhere in the complex. During FY-17, INL has reported 29% of events in this reporting group, while the balance of the complex reported 30%.



The reportable and non-reportable events occurring during 2nd Qtr FY-17 are summarized below:

Experiment Engineering Employee Knee Injury at the ATR Complex

NE-ID--BEA-ATR-2017-0007 (Significance Category 3)

An engineer at the ATR Complex experienced a "pop" and immediate pain in his left knee as he twisted to walk around a corner in a hallway. The employee was taken to the ATR dispensary where treatment was provided. The employee was then transported by

INL ambulance to the Eastern Idaho Regional Medical Center for further evaluation. An orthopedic specialist recommended surgical repair to a torn meniscus.

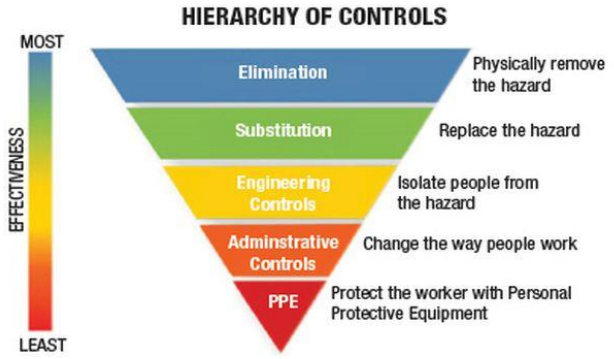
What We Can Learn:
An individual's unrecognized physical weaknesses may place them at increased risk of injury, even when undertaking day-to-day tasks where there is no perceived risk. Lack of a similar prior injury to the same body part often makes it impossible for the individual or medical personnel to recognize any vulnerability.

Failure to Follow Hazardous Energy Control Process at the Advanced Test Reactor

NE-ID--BEA-ATR-2017-0017 (Significance Category 4)
While conducting a walkdown of the 688-M-2 firewater pump maintenance, a DOE Facility Representative identified the 688-M-2 diesel firewater pump was not under LO/TO with Foreign Material Exclusion (FME) covers installed. The battery cables for the diesel engine were removed and in a clamshell lockout device with a simple danger tag; however, no personal lock was applied.

At the time of discovery, no personnel were working on the engine but the exhaust and turbo charger were removed. This is contrary to the requirements in LWP-9400, "Lockouts and Tagouts", Section 4.2.10.1.1, which states: "Leave the equipment locked out and tagged out." The facility representative brought this to the attention of maintenance workers in the room and a personal lock was applied.

What We Can Learn:
We need to ensure we select hazard controls based on the hierarchy of controls established by the Occupational Safety and Health Administration. These include (from the most-effective to the least-effective controls): elimination; substitution; engineering controls; administrative controls (including work practices); and personal protective equipment.



Employee Fall Results in Fractured Elbow

NE-ID--BEA-CFA-2017-0001 (Significance Category 3)
A Supply Chain employee slipped on the ice and fell while walking on the east driveway behind the Central Facilities Area (CFA) building CFA-601. The employee landed on her right elbow, back, and head. The employee was taken to CFA Medical by her supervisor for evaluation. A physician assistant cleansed and dressed a wound on her right elbow. The employee was released to return to work with no restrictions but was instructed to return to CFA Medical the next morning for an X-ray of the elbow.

In the follow-up visit, an X-ray revealed the presence of a fracture in the employee's right elbow. The elbow was immobilized and placed in a soft brace pending further evaluation by an orthopedic specialist. Additionally, the employee indicated she had developed nausea after the fall the previous day. The physician assistant instructed her to not work the remainder of the day in case she had sustained a concussion in the fall. The employee was being evaluated for a possible concussion.

What We Can Learn:
Training personnel on how to properly navigate slippery surfaces via devices such as slip simulators has been proven to reduce slips, trips, and fall accidents by up to 70%. Learning by doing is more effective than lectures or classroom discussions. Personnel who have gone through slip simulator training learn proper slippery surface walking technique first hand, ensuring that by doing it, they will remember it.

Subcontracted Work Issues in Advanced Test Reactor Complex Cafeteria

NE-ID--BEA-CFA-2017-0002 (Significance Category 3)
The ATR Facility Manager contacted INL Project and Construction Management regarding work control used for subcontract work performed in the ATR Complex Cafeteria to repair the soda machine's ice-maker. The Cafeteria subcontract is managed by INL Project and Construction Management as a tenant at the ATR Complex. Approval was given by INL Project and Construction Management for the Pepsi® vendor technician, to come on site to evaluate the failure of the ice-maker. The work was to be performed under

the oversight of the subcontractor lead with the understanding that this was a cord and plug machine and the machine would be unplugged prior to performing any maintenance/repairs. The subcontractor lead conducted a pre-job brief.

Concern by personnel at the ATR Complex was that the work performed was not on the facility schedule and was not walked down with Facility Management for LOTO evaluation. A fact-finding meeting was held the following day, where the subcontract employee stated he did not unplug the machine; however, he had stated that he had not worked on any electrical components. He had only cleaned out a valve with a brush. As a result of this fact-finding meeting, the event was determined to not be ORPS reportable.

Upon further investigation of the event and clarification with the technician after the fact-finding meeting, INL Project and Construction Management found that the technician had changed a solenoid valve and the coil (both with 120-V connections) without unplugging the machine, thereby exposing himself to hazardous energy. A Stop Work was issued on the subcontractor and the event was re-categorized as an ORPS reportable event.

What We Can Learn:
When vendors perform work on site, they may not have not been previously exposed to INL work control processes and INL work control requirements. Ensuring facility personnel understand that vendors are going to perform work and ensuring the vendor understands what they are authorized to do is vital to ensure safe execution of work activities.

Power Cable Exposed while Core Drilling

NE-ID--BEA-MFC-2017-0001 (Significance Category 3)
While core drilling the concrete floor for a facility modification in MFC Building 774, a shunt equipped drill being used by a construction subcontractor encountered an obstruction and automatically shut down. Simultaneously the subcontractor was notified that a 120 volt electrical circuit in the area had lost power. Upon investigation, a breached PVC conduit containing a conductor was observed in the drill hole.

What We Can Learn:
A questioning attitude must be maintained when analyzing hazards during work planning activities, in order to adequately identify all potential hazards and implement appropriate controls.

Fire Fighter Fractures Ankle

NE-ID--BEA-MFC-2017-0002 (Significance Category 3)
An INL firefighter was participating in required daily individual exercise in the evening at MFC Fire Station 2. While performing circuit exercise program, the firefighter was using a Bosu ball (i.e., an inflated rubber hemisphere attached to a rigid platform) for balance training when he slipped and inverted his left ankle. The firefighter reported the injury to his supervisor and was evaluated by INL occupational medical.

The firefighter concluded his shift and then reported to a radiologist the following morning for X-rays. The X-ray revealed the firefighter had a non-displaced or minimally displaced distal avulsion fracture along the inferior margin of the left lateral malleolus. The firefighter has been medically restricted from firefighting pending further evaluation by an orthopedic specialist.

What We Can Learn:
BOSU ball use should be limited to core and upper body exercises including use for push-ups. Personnel should not stand or jump on a BOSU ball. Personnel that choose to use the ball for a workout can sit or kneel on it. A BOSU ball should be inspected prior to use to ensure it is properly inflated and it is free of surface moisture.

Conduit Severed During Demolition Work

NE-ID--BEA-MFC-2017-0003 (Significance Category 3)
Construction workers were performing demolition work to remove a storm drain located south of MFC building 774. The scope of work involved using a jackhammer to remove gray concrete that encompassed the drain. Following removal of the gray concrete, the contractor

inadvertently removed red concrete. Red concrete is placed to indicate proximity to an electrical utility. About this time, contact was made with an electrical conduit and a wire was severed.

Work was immediately stopped and the area was placed in a safe condition. The worker performing the demolition work did not report feeling any shock or seeing any visual indication (arc) of an electrical short.

An investigation into the event revealed that one of the workers questioned his foreman's direction to remove the red concrete but did not exercise his stop work authority when he was instructed to continue.

What We Can Learn:
This event highlights the importance that subcontracted employees understand their rights to exercise stop work authority when faced with uncertainty in work direction.

Shoulder Injury Requiring Surgery

NE-ID--BEA-SMC-2017-0001 (Significance Category 3)
A warehouse technician at the Specific Manufacturing Capability (SMC) facility used the manual (chain actuator) device to open the large roll-up door in the TAN-629 East Hangar when the automatic door opener was out of service. This entailed him and another technician intermittently pulling down on the chain for approximately 30 minutes. Following this activity, he felt some discomfort in his right shoulder, which he attributed to fatigue from operation of the door.

Upon his return to work, and after experiencing no improvement in the discomfort, he reported the condition to the SMC dispensary. He was sent to the CFA main dispensary for evaluation, and then was referred to a private physician for further evaluation. The warehouse technician's management was notified he would require surgery to address joint and muscle damage in his right shoulder.

What We Can Learn:
Two lessons we can learn from this event are the importance of knowing your limitations and knowing when you need to identify alternative ways to accomplish a task.

Other Non-Reportable Events

CO 2017-0444
On March 6, 2017, a LO/TO gang locking hasp and three personal locks and tags were discovered lying on the ground adjacent to panel 670-E-46. The device and tags had been hung on a breaker isolating the hydrogen detector system for the ATR battery rooms as a simple LO/TO. The ATR Plant Foreman secured the area and verified that work was not in progress on the system. Workers were notified, a new locking device was installed, and zero energy checks were performed again.

CO 2017-0587
Preventative Maintenance was performed on the wrong 13.8-KV feeder breaker. This resulted in a loss of power to the Analytic Laboratory (MFC 752). The Analytical Laboratory was not listed on the Outage Notification Form, nor was it prepared for a loss of power. Following the event, a fact-finding meeting was held to understand where the work control process broke down.

What We Can Learn:
Human performance tools can be helpful in detecting and preventing problems. The fact-finding meeting found that communications were less than adequate and the wrong equipment isolation points were identified because of similar nomenclature. To address this, dual verification actions were incorporated into the work package to ensure the correct actions are taking place.

ANALYSIS FOR RECURRING EVENTS:
Personnel Safety and Health occurrences have been one of INL's most frequently reported event type and have accounted for 25 reportable and eight non-reportable events in the past 12 months. During this quarter, four of the reportable events were related to a serious occupational injury and four were related to work with hazardous energy.

Ten of the events over the past 12 months involved subcontract personnel. INL Facilities and Site Services personnel noted this as an adverse trend and initiated several assessments to better understand what was contributing to the events. These assessment were twofold; first, an internal assessment team was chartered to review events to identify

trends, themes, or similarities that may indicate vulnerabilities in the construction management program. Second, an external assessment team was chartered to review the construction management program in areas of organizational effectiveness and safety culture.

Some commonalities were identified and have offered opportunities for initiating action to reverse the trend. These commonalities include time of day the events occurred. All but one of the events occurred after lunch, indicating that a tailgate/pre-job refresher after lunch could prove beneficial in reducing events. Also, half of the events involved core drilling or excavation activities. This suggests that review and strengthening of the subsurface investigation process is needed. Assessment results will be thoroughly analyzed and Construction Management will determine a path forward.

Analysis of the eight non-reportable events that occurred in the past year found that three were the result of LO/TO devices falling off components. Personnel should ensure that LO/TO devices are securely attached prior to starting work.

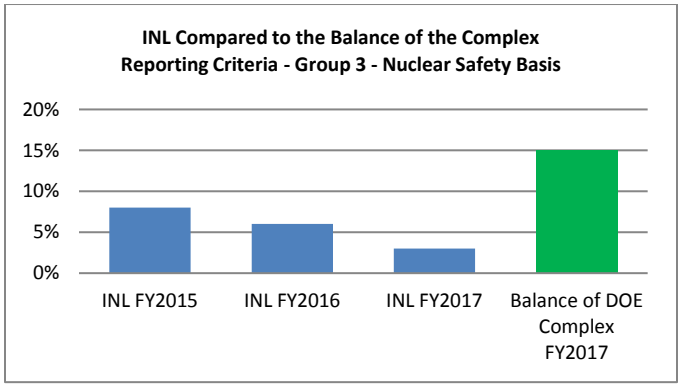
2nd QUARTER FY-17 GROUP 3 – NUCLEAR SAFETY BASIS EVENTS

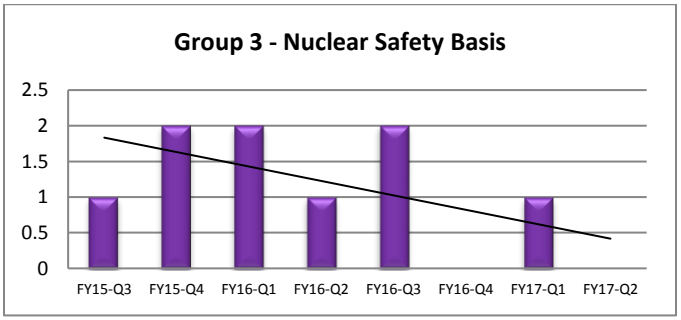
TREND SNAPSHOT

Nuclear Safety Basis Events: There were no nuclear safety basis event reported during 2nd Qtr FY-17. The rate of occurrence of nuclear safety basis events has continued to trend downward over the past two years. During the past 12 months, three events have been reported under these criteria; two were identifed at ATR and one at MFC. An analysis of the events did not reveal any commonalities that would indicate a recurring trend or recurring events.

When compared to the balance of the DOE Complex, INL continues to report a lower percentage of events under the Group 3, Nuclear Safety Basis, criteria than the rest of the complex. So far during FY-17, 3% of INL's events were reported under Nuclear Safety Basis criteria compared to 15% for the balance of the DOE Complex.

The number of events reported under these criteria has continued to trend downward over the last two years.





Other Non-Reportable Events

There were no additional non-reportable events related to nuclear safety basis problems documented in LabWay during 2nd Qtr FY-17.

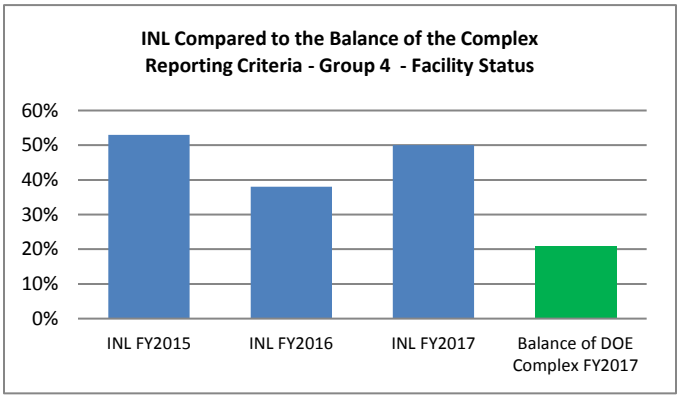
ANALYSIS FOR RECURRING EVENTS:

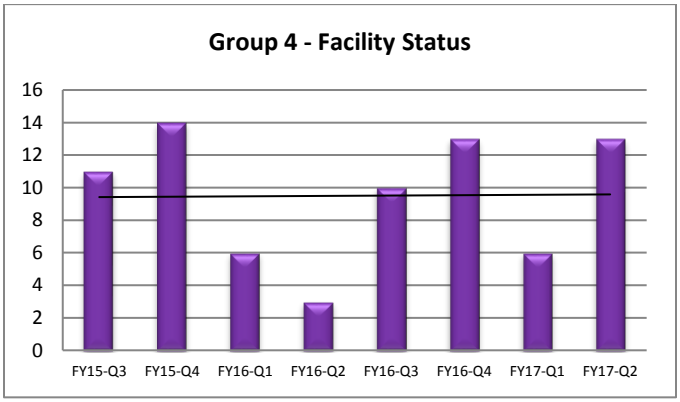
Three events have been reported under these criteria during the past 12 months. The events consisted a TSR administrative control violation related to operator qualifications, inadequate assumptions derived in engineering calculation and analysis, and the failure to follow radiation control monitoring commitments.

TREND SNAPSHOT

Facility Status Events: Facility status events account for 39% of the events reported this fiscal year. The number of events reported under these criteria increased from last quarter from 6 to 13. The rate of occurrence of facility status events has been trending steady over the past two years. Twelve of the 13 events this quarter occurred at the ATR Complex and one occurred at MFC. Nine of the ATR Complex events were related to performance degradation of Safety Class (SC) or Safety Significant (SS) Structure System or Component (SSC) . Forty-two events have been reported at INL under the Group 4 reporting criteria over the past 12 months, with 37 of these occurring at the ATR Complex.

The occurrence percentage of Group 4 events at INL is higher than the balance of the DOE Complex in FY-17 (50% at INL versus 18% throughout the complex). Seventy-nine percent of the Group 4 events in the past 12 months have been reported as performance degradation of an SC or SS SSC, all of which occurred at ATR.





The 13 events reported under the Group 4 – Facility Status criteria during the 2nd Qtr FY-17, are summarized below.

ATR 480 Volt Diesel Uninterruptible Power Supply Battery Inoperable

NE-ID--BEA-ATR-2017-0002 (Significance Category 3)
The specific gravity for the E-1667 battery bank (480-V Diesel Uninterruptible Power Supply (UPS) battery bank) was found to be low out of specification. Electricians were performing weekly battery surveillance in accordance with Detailed Operating Procedure (DOP) 2.8.18, ATR Weekly Battery Bank Surveillance, to satisfy TSR-186 SR 4.4.4.2 at the time of discovery. The E-1667 battery bank was declared inoperable and the facility entered TSR-186 LCO-3.4.4.A actions.

An investigation into the event found that Electricians filled the batteries in the bank to the high level mark to ensure the batteries remained operable during an extended period of work curtailment. This action resulted in dilution of the electrolyte levels below the acceptable specific gravity. Additionally, procedures providing direction to the electricians were inconsistent. Of the eight procedures providing direction for adding water to UPS battery banks, six directed addition of water until the electrolyte level reached "mid-level". The other two procedures said to add water so the level was between the high and low level-marks or as necessary.

What We Can Learn:
Effective communications, written and verbal, are essential to ensuring requirements are consistent throughout the maintenance procedures and training plans. Documentation should contain enough detail to establish the boundaries of the work and personnel should not rely on "tribal knowledge" to perform work evolutions.

ATR South Safety Rod Failure to Insert on Reactor Shutdown

NE-ID--BEA-ATR-2017-0004 (Significance Category 4)
ATR was shut down by manual SCRAM in response to an elevated Primary Coolant System leak rate. While performing immediate actions for a reactor SCRAM, it was discovered that the south Safety Rod failed to fully insert and was stuck at 20.4 inch withdrawn. Immediate actions for a stuck Safety Rod were performed and the reactor was verified to be in a safe condition. Five of the six installed Safety Rods were required to be operable. The Safety Analysis assumes one of the operable rods to stick with five Safety Rods inserted fully in response to the SCRAM.

Failure of ATR Wide Range Neutron Level Channel C

NE-ID--BEA-ATR-2017-0005 (Significance Category 4)
The ATR Control Room Supervisor was notified by the reactor instrument and control technician that the wide-range neutron level channel C had failed. Work was immediately stopped.

At the time of discovery, reactor instrument and control technicians were performing reactor pre-startup checks for the Cycle 160B-1 Xenon restart per DOP-7.1.8, "Reactor Instrument Technician Pre-Startup Checklist." The ATR was shut down at the time of failure, and the wide-range neutron level channel was not required to be operable.

Advanced Test Reactor Confinement Door 43 Latch Failure

NE-ID--BEA-ATR-2017-0008 (Significance Category 3)
ATR confinement door 43 (D-43), a personnel door into the ATR Confinement area, was found to be intermittently sticking within the door assembly. TSR-186, Limiting Conditions for Operation (LCO) 3.8.1, Action Statement B.1 was entered. Maintenance support was requested to troubleshoot and repair the D-43 latch. The actions of TSR-186, LCO-3.8.1 were complete, and the integrity of the confinement was verified and maintained until repairs could be completed. ATR was operating at nominal full power. The confinement system is required to be operable during power operation.

Suspect Bolts Discovered in the TRA-605 Feeder Breaker

NE-ID--BEA-ATR-2017-0009 (Significance Category 4)
During refurbishment of a Square D, DS-416-type breaker, electricians found what appeared to be suspect bolts in various places throughout the breaker. This breaker normally

feeds commercial power to building TRA-605, but had been removed and taken to the electrical shop for refurbishment. It is not known when the bolts were installed or why they were not identified during a Quality Inspection upon receipt of the equipment.

This breaker does not provide service to any safety significant structure, system or component. The suspect bolts were removed from the breaker and replaced with acceptable grade 5 bolts. The suspect bolts are in control of the Quality Assurance organization.

A similar event occurred in August 2015 when suspect counterfeit bolts were identified on a refurbished Westinghouse DS-416 air circuit breaker. ATR management has been informed of the additional event and will take actions if necessary.

Advanced Test Reactor Plant Protection System SCRAM Due to Low Primary Coolant System Pressure from a Primary Coolant Pump Trip

NE-ID--BEA-ATR-2017-0010 (Significance Category 2)
The ATR experienced an automatic reactor SCRAM initiated by the plant protective system due to low primary coolant system pressure. The low pressure condition was caused by a trip of the M-7 primary coolant pump, believed to be caused by the failure of a protective relay associated with the M-7 primary coolant pump motor starter. The loss of a primary coolant pump is an anticipated event in the safety analysis. The ATR plant protective system is designed to trip the reactor at a predetermined set point before conditions degrade to an unsafe point. The watch team entered emergency procedure E-0 (Entry Procedure) and verified that the reactor was in a safe shutdown condition.

Advanced Test Reactor Confinement Door Seal Leak

NE-ID--BEA-ATR-2017-0011 (Significance Category 4)
During inspection of confinement door d-51, and prior to opening the door, a maintenance mechanic heard a small air leak from the pressurized seal on the top of D-51. The mechanic noted the leak in the work order in use and informed the ATR Plant Foreman. The ATR was in a maintenance outage at the time of discovery.

Advanced Test Reactor Evacuation Due to Fire Sprinkler Activation

NE-ID--BEA-ATR-2017-0012 (Significance Category 3)

An Automatic Voice Announcement System (AVAS) warning was initiated and directed evacuation of non-essential personnel from TRA-670 due to water flow in sprinkler system #7 in the Laydown Area. The Laydown Area houses the 480-V diesel bus UPS and the adjacent battery rooms. At the time of the event, the annual battery rundown surveillance test was in progress for the 480 volt diesel UPS battery bank. This test is accomplished with use of a resistive load bank that rejects heat to the immediate vicinity of the load bank.

Investigation revealed that a fire suppression sprinkler head had opened above the load bank, and firewater was being discharged onto the load bank and onto the UPS.

Non-essential personnel evacuated the facility and the operations watch team secured power to the 480-V UPS and attached load bank and opened disconnects for the battery banks. No personnel were in the area at the time of the event, and no personnel were exposed to hazardous energy.

What We Can Learn:

If applicable, any lessons learned will be shared following investigation into the event.

Advanced Test Reactor 480 Volt Uninterruptible Power Supply Inoperable Due to Fire Sprinkler Actuation

NE-ID--BEA-ATR-2017-0013 (Significance Category 4)

On March 6, 2017, water was discovered inside the 480-V diesel bus UPS cabinets. The UPS was undergoing an inspection for damage following actuation of a fire suppression sprinkler head earlier in the day. (NE-ID--BEA-ATR-2017-0012) The UPS had been de-energized following the fire suppression actuation event. The 480-V UPS was declared inoperable. ATR was in a scheduled maintenance outage and the UPS was not required to be operable at the time of the event.

Discovery of Installed Suspect Parts on the Secondary Coolant System in the Advanced Test Reactor

NE-ID--BEA-ATR-2017-0014 (Significance Category 4)

ATR Operations was notified by the Quality Assurance manager that suspect parts may have been installed on the secondary coolant system side of the ATR primary heat exchangers. The parts in question are pipe fittings installed between the shell side of the heat exchangers and the secondary coolant system pressure relief valves. The parts had been properly identified during the work planning process, and had been ordered through use of a purchase-card instead of through the normal requisition process. The parts were received and placed into service without first undergoing the required Quality receipt inspection. The Quality Assurance group began work to verify the appropriate quality level of the parts in question.

The ATR was in a maintenance shutdown and was defueled at the time of discovery. The suspect parts had been installed during the current outage, and there is confidence that the parts in question are of the proper material and quality.

Degradation of Instrument Uninterruptible Power Supply Battery due to a Failed Cell at the ATR

NE-ID--BEA-ATR-2017-0015 (Significance Category 4)

ATR maintenance electricians were performing Detailed Operating Procedure (DOP)-2.8.15, "Instrument Battery Bank 670-E-59 Rundown Test Using UPS 670-E-104." Electricians discontinued the rundown capacity test of the ATR instrument battery bank 670-E-59 when one cell reached its discharged voltage point earlier than expected. The 670-E-59 battery bank capacity was calculated by the System Engineer to be 46.9%. Technical Safety Requirements (TSR)-186 requires the instrument Uninterruptible Power Supply (UPS) battery capacity to be greater than 80% when it is supplying power to TSR-required loads. The ATR was in a maintenance shutdown at the time of discovery and the Instrument UPS was not required to be operable.

Advanced Test Reactor 688-M-2 Firewater Pump Inoperable

NE-ID--BEA-ATR-2017-0016 (Significance Category 4)
During performance of weekly testing on the 688-M-2 diesel-powered firewater pump, a loud noise described as squealing was heard, and the diesel engine lubricating oil pressure was observed to decrease from approximately 48 psig to less than 25 psig. Operators believe the noise was originating from the area of the engine mounted turbo charger.

Operators secured the pump, and notified the ATR Shift Supervisor; Firewater Pump 688-M-2 was declared inoperable. The ATR was in a maintenance shutdown and was defueled at the time of discovery. Technical Safety Requirements (TSR)-186, Limiting Conditions for Operation (LCO)- 3.5.5, requires one firewater pump (688-M-1, 688-M-2, or 633-1) to be operable when irradiated fuel elements are stored in the canal. 633-1 was operable and in a protected condition at the time of discovery.

Uranium Silicide Pellet Oxidation

NE-ID--BEA-FASB-2017-0001 (Significance Category 3)
At MFC in building 787 green (un-sintered) uranium silicide pellets were transferred from the main Reduced Enrichment Research and Test Reactors (RERTR) glovebox to the East Hood B in a sealed container. Uranium silicide pellets were removed from their sealed container, inadvertently exposing the pellets to air causing a rapid oxidation. Per operating procedures, pellets were immediately covered with class-D fire suppressant powder and put in a safe condition. This action isolated the material from any other flammable material while allowing cooling from the oxidation. The facility was evacuated and the Fire Department was notified. Radiological controls personnel surveyed the area and verified there was no spread of contamination.

What We Can Learn:
A preliminary investigation into the event found that due to miscommunication, the container holding un-sintered pellets was inadvertently opened while in the radiological fume hood. This resulted in the operators not knowing which containers to open. Ensuring that the scope of work covers all aspect of the planned work is crucial to ensuring safe operations. Additional lessons will be shared upon completion of the investigation.

Other Non-Reportable Events

There were four additional non-reportable events related to facility status problems reported during 2nd Qtr FY-17. They are as follows:

CO 2017-0010
January 4, 2017, a Site-Wide Facilities and Operations Heavy Equipment Operator was driving a Dumpmaster garbage truck to perform recyclable material transport when the arms of the truck struck the bottom of the INL 20/26 underpass causing damage to the underpass and to the arms of the truck.

INL Fleet Maintenance Mechanics set up a mock event to evaluate the equipment response. They used a second, identical truck, with the forks unfolded partially or fully while the boom arm was at the top position. This mock setting revealed the following;

- The extreme bending of the fork hydraulic rams could only happen if the rams were fully extended. If the rams were only partially extended, then the impact would have bent the rams nearer to retracted position with far less bending.
- Mechanics report that hydraulic rams could not, by design, bleed into the fully extended position, and that the hydraulic pump would have to be turned on to the operation mode and the joy stick manipulated to extend the forks.
- The investigation indicated that the forks would have likely been raised straight up in the air, fully extended and not folded as the driver believed. Damage to the overpass aligns with this finding.

The driver did not recall bumping the joystick. He stated that he felt like there was some “float” in the controls that day. He did not turn in the truck or report his concerns, because it was only a slight change in the feel of the truck during operations. He also stated he had the hydraulic pump turned on to the operation mode to warm up the oil due to the frigid weather. With the pump turned on, there would, by design be no alarm or notification that the forks were in a non-stowed for travel position.

When the repairs were completed and the truck was being tested for return to service, two Mechanics and their Supervisor witnessed the forks slowly rising to an upright position, with no manipulation of the joystick. This occurred when the truck was running and the pump was turned on. It was determined that the air operated control valve was bleeding by allowing the forks to slowly rise. Repairs to the Dumpmaster were performed and the truck was returned to service.

What We Can Learn:
If something just does not seem right, then it likely is not. The driver noticed float in the joystick, which was an indication of problems. Had the driver stopped and questioned the float, the problem may have been detected before it became an issue.

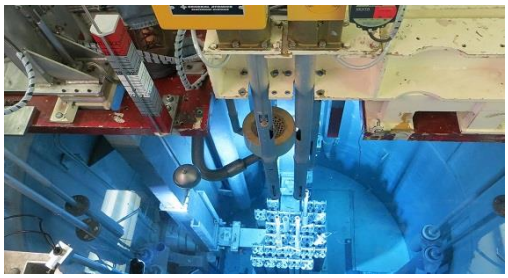
CO 2017-0058
An Air Liquide truck was leaving the MFC Complex via the vehicle gates when the opened inner gate automatically closed for an unknown reason. The gate contacted the truck trailer causing minor damage to the trailer and gate.

CO 2007-0092
A heavy equipment operator prepared to lower the ATR 10-ton hoist block during performance of the annual preventive maintenance (PM) for the purpose of rope and hook inspections. When the hoist was operated, the block proceeded in the upward direction instead of the anticipated downward direction. Before the heavy equipment operator recognized that the hoist was moving in the wrong direction, the block became twisted on the hoist ropes.

Work was immediately stopped and a follow-on initial investigation revealed that approximately one week earlier, during the performance of the same preventative maintenace, ATR Electricians had disconnected leads on all six crane motors to perform motor circuit evaluation (MCE) testing. The electricians had not used the specified wire removal checklist while disconnecting and reconnecting motor leads and had not followed procedures step-by-step.

What We Can Learn:
Use of human performance tools (such as place keeping) can ensure procedure steps are completed as written.

CO 2017-0202



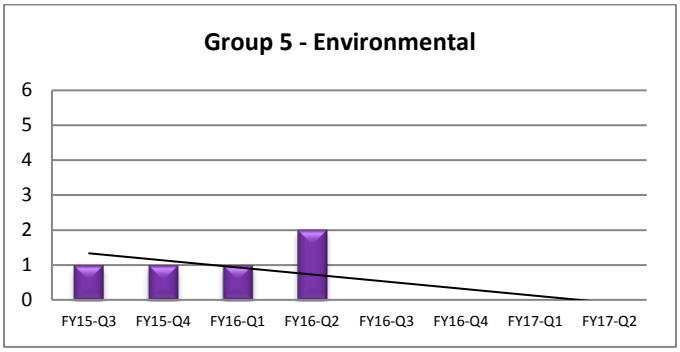
The Neutron Radiography Reactor (NRAD) experienced a Central Control System Watchdog automatic reactor SCRAM during normal operations. NRAD was operating to procedure NRAD-OI-5100 at the time of the event. Review of the history playback of the event indicates that the central control system computer and the user interface terminal computer were processing normally and communicating normally.

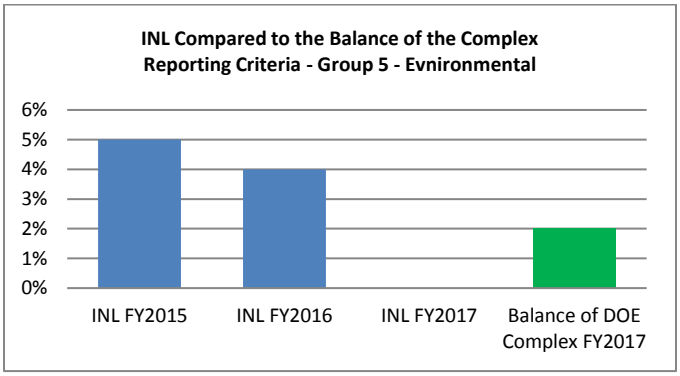
ANALYSIS FOR RECURRING EVENTS:
A review of 42 Facility Status occurrences that were reported in the last 12 months was performed. Two events were related to diesel generators at the ATR Complex and seven events related to ATR Complex confinement doors latches or seals; three of which were related to D-43 and two with D-51. D-43 is a high traffic door and serves as a main door to the ATR reactor floor; thus the door is in continuous use. ATR management is evaluating the need to develop a preventative maintenance package to minimize the recurrence of common failures associated with confinement doors.

Thirty three of the events in the past 12 months were the result of degradation of a safety class or safety significant component; 25 of these occurred when the component was not required to be operable. All of them were discovered at ATR, primarily during preparation for reactor restart.

TREND SNAPSHOT

Environmental Events: There were no environmental releases reported under the Group 5 reporting critieria during 2nd Qtr FY-17. The rate occurrence of environmental events over the past two years continues to trend downward.





When compared to the balance of the DOE Complex, the occurrence percentage of Group 5 events, reported at INL is lower (0% compared to 2% during FY-17).

Other Non-Reportable Events

There were no non-reportable events related to environmental problems or conditions during 2nd Qtr FY-17.

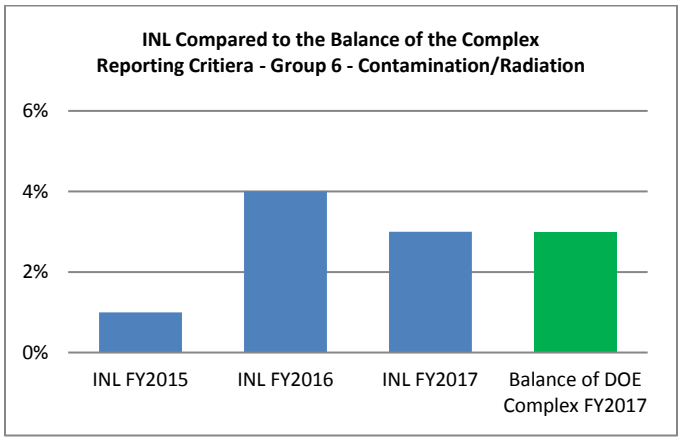
ANALYSIS FOR RECURRING EVENTS:

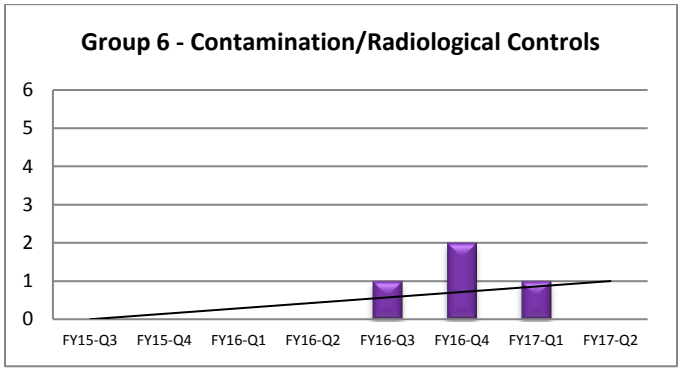
No events have been reported under the Group 5 reporting criteria during the past 12 months. The only other environmental event in the past 12 months was a non-reportable potential National Emissions Standard for Hazardous Air Pollutants (NESHAP) violation that occurred last quarter.

TREND SNAPSHOT

Contamination/Radiation Events: There were no reportable event related to contamination/radiation control reported in 2nd Qtr FY-17. The rate of these types of events is trending slightly updards over the past two years. There was one non-reportable event reported this quarter.

No events reported at INL during 2nd Qtr FY-17 were reported under Group 6 criteria. Both INL and the balance of the DOE complex had 3% of reportable events related to contamination and/or radiation control. There have been four events reported under Group 6 criteria in the last 12 months.





Other Non-Reportable Events

One reportable event related to radiological concerns was reported under Group 10, Management Concerns. The event can be reviewed later in this report. There was one additional non-reportable event related to radiation/contamination reported during 1st Qtr FY-17.

CO-2017-0308

A Radiation Measurements Laboratory (RML) technician discovered suspect legacy equipment located in room A01 of building TRA-604. The equipment appeared to be a radiation detector with a possible internal source. A small portion of what appeared to be a radioactive materials label was visible on the equipment under some black tape. The label indicated 0.03 uCi of Am-241. The equipment was not located in a designated radioactive materials storage area.

The lab technician stopped work and notified INL management of the suspect legacy equipment. A Radiological Controls Technician (RCT) performed surveys (all smears were 1,000 disintegrations per minute (dpm)/100 centimeters squared (cm^2) beta gamma and less than 20 dpm/100 cm^2 alpha. Direct scans were all less than 5,000 dpm/ 100 cm^2 with no detectable alpha).

Item was bagged and relocated to a nearby caged area in TRA-604 that is posted as a radiological buffer area and radioactive materials area.

What We Can Learn:
The label on the equipment indicated it had been last approved for use in 1984. It is not known how long the item was in the room, but it is likely others have overlooked it.

Employees should ensure they are always on the lookout for things that do not belong or things that just do not look right.

ANALYSIS FOR RECURRING EVENTS:
There have been four reportable and six non-reportable events under the Radiation/Contamination reporting criteria the past 12 months. A review of these events identified no commonalities, no adverse trends, and no recurring problems.

2nd QUARTER FY-17 GROUP 7 – NUCLEAR EXPLOSIVE SAFETY EVENTS

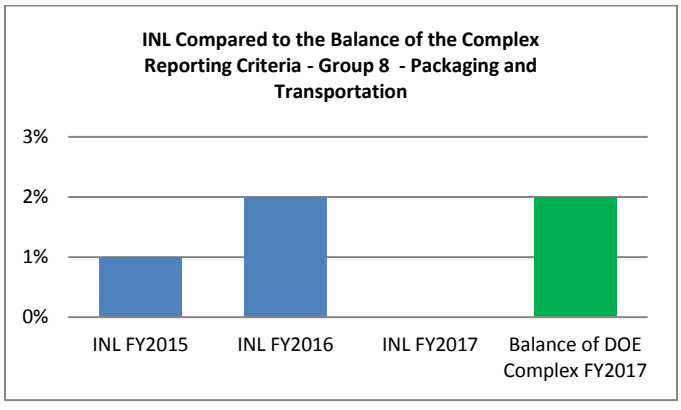
TREND SNAPSHOT

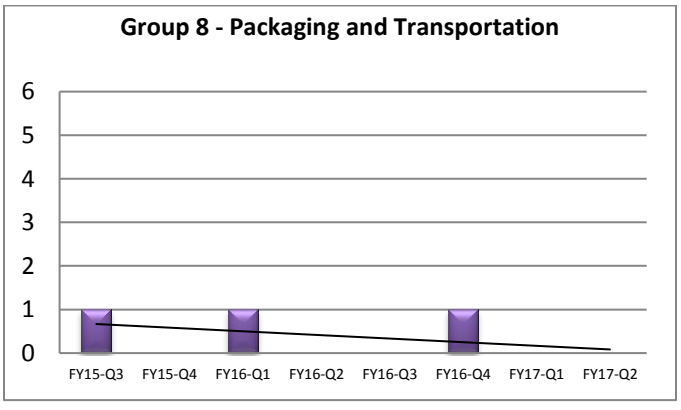
Nuclear Explosive Safety Events: There were no events related to Group 7 – Nuclear Explosive Safety during 2nd Qtr FY-17. BEA has never reported an event under these reporting criteria since taking over the contract for INL in 2005. There also have been no events reported under the Group 7 criteria within the balance of the DOE Complex during FY 2017.

2nd QUARTER FY-17 GROUP 8 – PACKAGING AND TRANSPORTATION EVENTS

TREND SNAPSHOT

Packaging and Transportation Events: There were no reportable Packaging and Transportation (P&T) events reported during 2nd Qtr FY-17. The rate of occurrence of P&T issues is trending downward over the last 12 months. There were also no additional non-reportable events during 1st Qtr FY-17.





INL rarely experiences reportable events under Group 8, Packaging and Transportation, criteria. When compared to the balance of the DOE Complex this quarter, INL is reporting a fewer percentage of events in this reporting group.

Other Non-Reportable Events

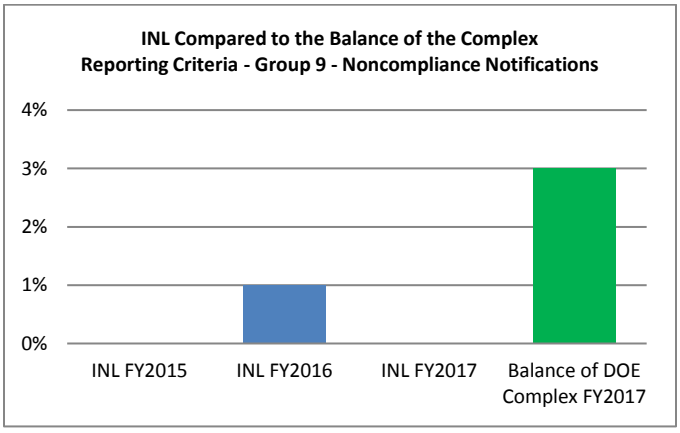
There were no additional non-reportable events related to packaging and transportation activities reported during 2nd Qtr FY-17.

ANALYSIS FOR RECURRING EVENTS:
INL has reported one event under this reporting criteria in the last 12 months. There is no indication of an adverse trend or recurring problems associated with P&T activities at INL.

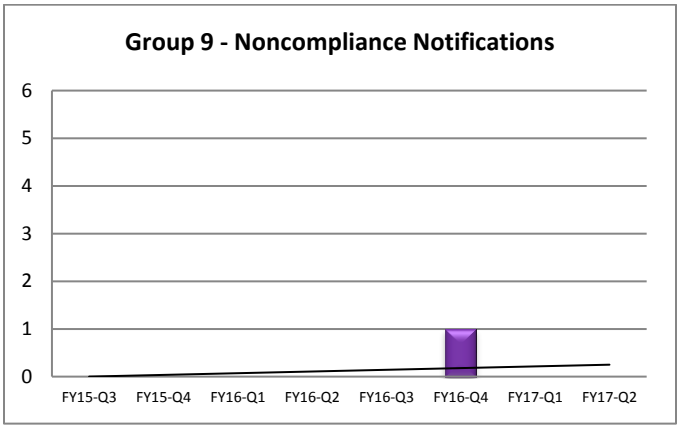
2nd QUARTER FY-17 GROUP 9 – NONCOMPLIANCE NOTIFICATIONS EVENTS

TREND SNAPSHOT

Noncompliance Notification Events: Noncompliance notification events are reported when the 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. This quarter, INL did not receive any noncompliance notifications. The two-year trend data for these types of events shows an increasing trend due to the event reported last in the 4th Qtr FY-16.



Three percent of the events occurring during FY-17 throughout the balance of the DOE Complex were reported under the Group 9 criteria.



Other Non-Reportable Events

There were no additional non-reportable events related to noncompliance notifications reported during 2nd Qtr FY-17.

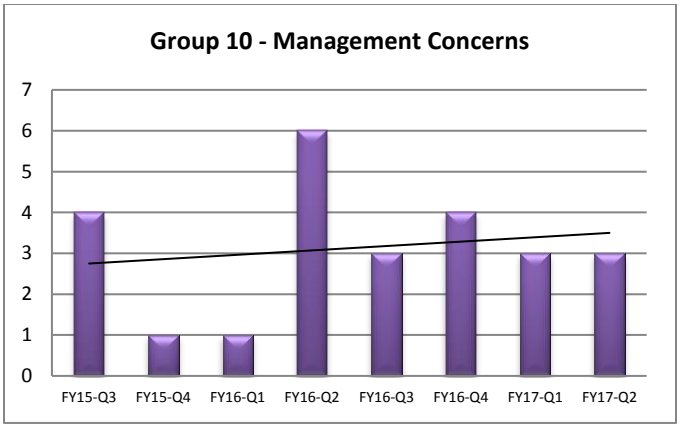
ANALYSIS FOR RECURRING EVENTS:
INL has reported one event in these reporting criteria during the last 12 months. There is no indication of an adverse trend or recurring problems associated with noncompliance notification reportable events at INL.

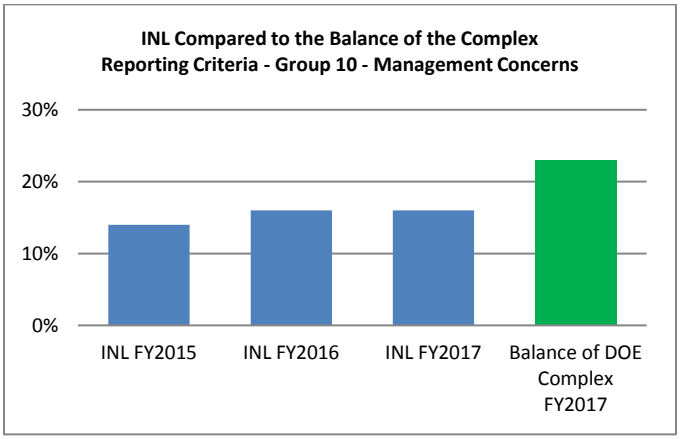
2nd QUARTER FY-17 GROUP 10 – MANAGEMENT CONCERNS AND ISSUES

TREND SNAPSHOT

Management Concerns and Issues: Three events were reported under reporting criteria for a management concern or issue during 2nd Qtr FY-17. The rate of occurrence of reportable management concerns continues to trend slightly upwards over the past two years. During the past 12 months, INL has reported 13 events under Group 10 reporting criteria.

INL has reported 16% of all events in FY-17 under Group 10, Management Concern, criteria. The balance of the DOE Complex has reported 23% under these criteria.





The three events reported during 2nd Qtr FY-17 are summarized below.

Lockout/Tagout Near Miss at the ATR Complex

NE-ID--BEA-ATR-2017-0006 (Significance Category 3)
The ATR Shift Supervisor was notified by Maintenance personnel of a concern with the zero energy checks on a LO/TO for work on the M-102 canal recycle pump,

specifically, that the voltage checks at the disconnect switch had been signed by an ATR auxiliary operator who was not qualified to perform these checks. Work was stopped and an investigation into the issue was initiated. The canal recycle pump had previously been tagged out under another LO/TO and zero energy had been properly verified at that time. The LO/TO of concern was placed prior to removal of the previous LO/TO.

What We Can Learn:
A robust LO/TO program helps to ensure that workers are not exposed to uncontrolled hazards. The failure to properly perform zero energy checks could compromise worker safety. In this case, the energy source had been isolated and controlled and no worker exposure occurred.

Radiological Equipment and Sealed Check Sources Stolen From Vehicle

NE-ID--BEA-INLLABS-2017-0001 (Significance Category 4)
The morning of March 21, 2017, INL personnel with the Energy and Environment Science and Technology (EES&T) organization discovered that equipment had been stolen from a rental vehicle parked in a hotel parking lot in San Antonio, Texas. The vehicle was parked in a location that was deemed to provide adequate security with high walls on two sides, limiting access to the vehicle, and was parked within a line of sight of the hotel's front doors. The hotel also had security personnel that perform parking lot foot patrols.

The equipment was stored in two Pelican brand cases and was described as follows:

- Case 1 - A black Pelican case (15 x 21 x 32-in.), weighing approximately 88 lbs and locked with two key locks. The case had no external markings other than a federal express label. The contents of case 1 included two Ludlum 3030 Alpha/Beta Sample Counters; one plutonium-239 check source (number AH4996). The source activity is reported as 4,224 dpm with an assay date April 7, 2016. The contents also included one cesium-137 check source (number AL9760) with an activity of 121,200 dpm and an assay date of October 12, 2016.
- Case 2 - A black pelican case (13 x 21 x 32-in.), weighing approximately 62 lbs and locked with two key locks. There were no external markings on Case 2 other than a federal express label. The contents of Case 2 included three Ludlum Model 2224 scale rate meters, two Eberline R020-AA dose rate meter, one Ludlum Model Model 3 count rate meter, and one Thermo Scientific Micro Rem AOED dose rate meter.

What We Can Learn:
Learn how to protect vehicles from being burglarized. Taking the following simple steps will help prevent similar events at home and when on travel:

- Always lock your vehicle: A locked vehicle makes it more difficult for a thief to take your valuables.
- Remove valuables: Remove your laptop computer, GPS, and other valuables from your car. An empty car is less likely to draw the attention of a would-be thief.
- Conceal belongings: If you must leave valuables in your vehicle, cover them, place them under the seat, or place them in a closed container. Additionally, security blankets or shields will remove these items from plain view. This will ensure items are not seen through the vehicle's windows.

Magnet Releases 191-Pound Plate during Lift

NE-ID--BEA-SMC-2017-0002 (Significance Category 3)
When an SMC Operations Technician at the Idaho National Laboratory (INL) performed the lift of a metal plate using a single magnet lifting device, it unexpectedly released, causing the 191-lb load to drop 4 ft to the floor. The Technician was standing within 2 ft of the load as it dropped, but was not struck by it. The load caused damage to the adjacent equipment and floor. The magnet was rated for 400 lbs and the material was well within the load rating. Upon further investigation, SMC personnel determined that some debris had adhered to the underside of the magnet, potentially affecting the surface contact between the magnet and the load.

An investigation into the event found that the manufacturer's recommendations regarding performing an inspection of the magnet surface prior to use were not followed. In addition, a single magnet was used for the lift. Typically, when performing lifts of this type, with an asymmetrical center of gravity, two magnets and a spreader bar are used.

What We Can Learn:

- Follow the manufacturer's recommendations for maintenance and inspections of equipment.
- When performing lifts where the center of gravity is not certain, ensure the selected hoisting and rigging gear are sufficient to safely accomplish the lift.

- If you are unsure of a lift, contact a Hoisting and Rigging technical point-of-contact.
- If it does not look right or feel right, do not be afraid to ask questions. It is imperative that we keep a questioning attitude in everything that we do to help ensure the safety of ourselves and our co-workers.

Other Non-Reportable Events

There were no additional non-reportable events that are being addressed as management concerns.

ANALYSIS FOR RECURRING EVENTS:

During the past 12 months, there have been 13 events that did not meet ORPS reporting criteria thresholds, but were reported as management concerns or were categorized as near misses to a more significant event. The eight events reported as not meeting ORPS reporting thresholds were as follows:

1. Fire Alarm Monitoring Capability Interruption
2. Worker Drops Rope and Enters Radiological Buffer Area without Radiological Controls Support
3. Electrical Fire in a Moveable Server Cabinet
4. Radiological Contamination Area Boundary Compromised at the ATR Complex
5. Identification of Adverse Trend in LOTO Events at INL
6. Equipment Removed From Complex without Required Radiological Surveys
7. Issues Identified During Cask Lifting Operations at the Remote-Handled Low-Level Waste Facility
8. Radiological Equipment and Sealed Check Sources Stolen from Vehicle.

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

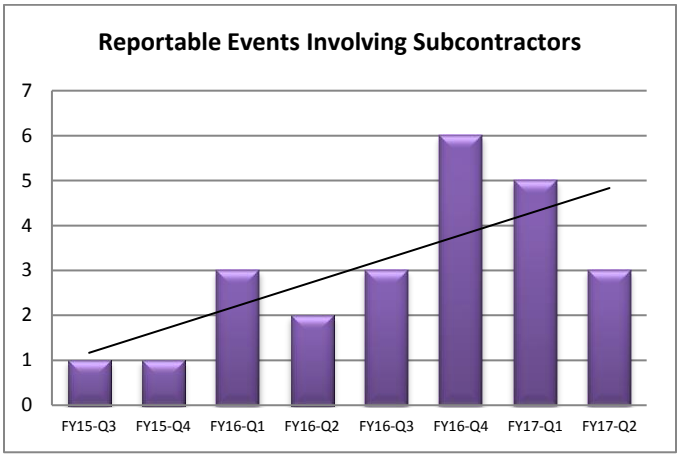
1. Broken Power Cable during Vacuum Excavation at the ATR Complex
2. Worker Sprayed with Herbicide
3. Tape Measurer Contacts Electrical Twist Lock Outlet
4. LOTO Near Miss at the ATR Complex
5. Magnet Release of 191-lb Plate during Lift.

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

2nd QUARTER FY-17 EVENTS INVOLVING SUBCONTRACTORS

TREND SNAPSHOT

Events Involving Subcontractors: Three of the reportable events this quarter involved subcontract employees. The number of reportable occurrences involving subcontractors is trending upwards. In comparison to INL's 22% of events in FY-17 involving subcontractors, only 17% of events occurring throughout the balance of the DOE Complex during the same time period involved subcontracted personnel.



There were 17 ORPS reportable events involving subcontractors during the past 12 months, including three reported this quarter. The three events from this quarter are as follows:

- Subcontracted work issues at the ATR cafeteria
- Core drilling activities that resulted in an exposed power cable
- Conduit that was severed during demolition work.

The adverse trend noted by INL Facilities and Site Services (F&SS) personnel in regard to work performed by subcontractors is discussed under Group 2 – Personnel Safety and Health Analysis for Recurring Events section of this report.

ANALYSIS FOR RECURRING EVENTS:
The events of the past year where subcontractors were involved were reviewed for similarities; none were identified. However, INL identified an adverse trend associated with subcontracted work. This trend was analyzed as described earlier in this report. F&SS management will identify and implement actions to address the concerns noted in the focused assessments.

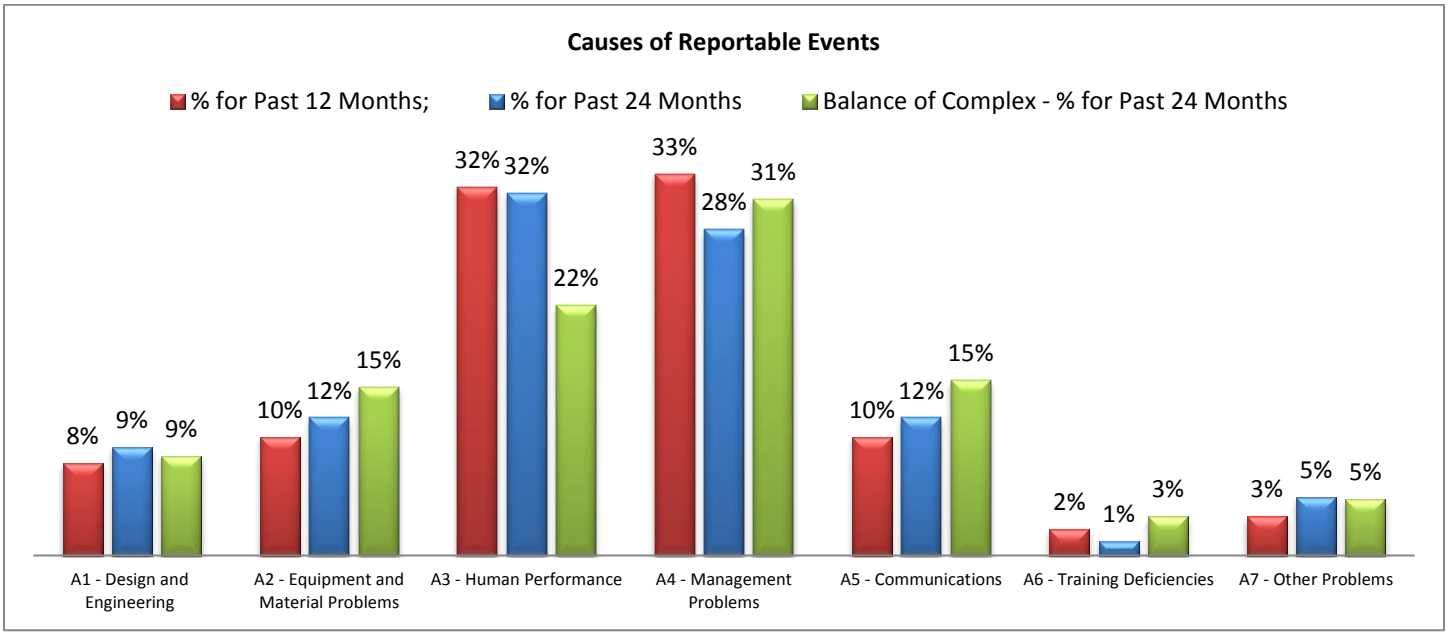
2nd QUARTER FY-17 ANALYSIS OF CAUSES OF REPORTABLE EVENTS

Cause codes documented in ORPS were analyzed through ORPS distribution trend reports to get an understanding of what is causing or contributing to events at INL. The data were reviewed to evaluate causes identified over the last 12 and 24-month periods. Cause codes are not required to be entered into ORPS for Significance Category 4 events; therefore, data from those events are not included in this analysis. Data are also not included from those events that are not yet finalized in ORPS.

The analysis shows that the majority of causes over the last 12 months can be attributed almost equally to management problems (A4) and to less-than-adequate human performance (A3). These criteria remain similar to the data reported last quarter. INL has seen an increase in events caused by management problems when comparing the past 12 months to the past 24 months.

A comparison of the causes of INL events to the causes of events reported by the balance of the DOE Complex for the past two years show that 31% of the reportable events by the balance of the DOE Complex occurred due, in part, to management problems, followed by 22% of events caused by less-than-adequate human performance. These figures have remained somewhat unchanged for the last several reporting periods.

Following implementation of the new DOE Order for occurrence reporting, new metrics will be implemented that will enable INL to evaluate the effectiveness and the value of corrective action plans to ensure corrective actions are appropriate to reduce the risk and likelihood of similar events. When these metrics are implemented, INL will report on them through this quarterly analysis report.



In addition to evaluating event causes, INL analyzes each reportable event to identify opportunities where the laboratory failed to effectively implement the five core functions of the Integrated Safety Management System (ISMS).

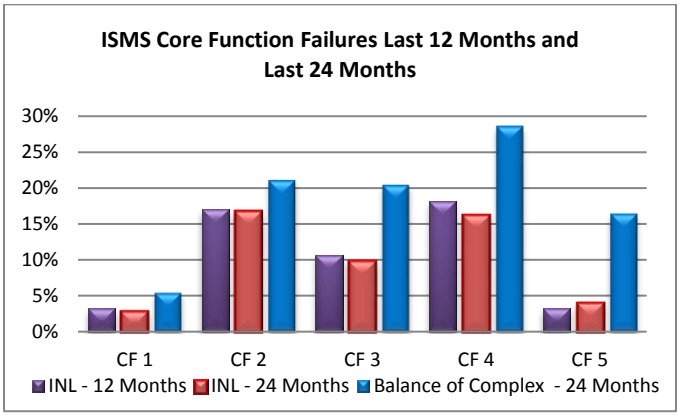
The chart to the right shows the ISMS analysis that has been documented for all reportable events occurring over two separate intervals—(1) the past 12 months and (2) the past 24 months. The chart also compares INL's reporting of ISMS failures to that of the balance of the DOE Complex.

For the purpose of the chart, ISMS Core Functions are defined as the following:

- CF1 – Define the Scope of Work
- CF2 – Identify the Hazards
- CF3 – Develop and Implement Hazard Controls
- CF4 – Perform Work Within Controls
- CF5 – Provide Feedback and Continuous Improvement.

Over the past year, analysis shows that 48% of INL reportable events identified no known failures of the ISMS process. These primarily include events related to equipment problems and the discovery of suspect counterfeit parts.

Analysis also shows that during the last 12-month period, failures most often occurred when performing work within controls (ISMS Core Function 4) and when identify the hazards associated with the job (ISMS Core Function 2). These data are consistent over the last 24 months. Continued management oversight can help strengthen performance in these two areas and is a topic for discussion with the Operations Council.



The balance of the DOE Complex reported that the majority of problems occurred when implementing ISMS Core Function 4 – 29%, Core Function 2 – 21%, and Core Function 3 – 20%.

These metrics will continue to be monitored to ensure INL continues to effectively implement the ISMS program.

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INL Nuclear Safety, Quality, and Performance Management Expectations

INL has a vision of 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 do the following:

- 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."