

FY2016
1ST QUARTER
INL/EXT-16-37777

IDAHO NATIONAL
LABORATORY
QUARTERLY
OCCURRENCE
ANALYSIS

DEEPER LEARNING THROUGH
EVENT ANALYSIS

Contents

INL Occurrence Trend Snapshots.....	3
1 st Qtr FY-16 KEY LESSONS LEARNED ISSUED BY INL ORGANIZATIONS	4
1 st Qtr FY-16 IDENTIFICATION OF RECURRING EVENTS	8
1 st Qtr FY-16 ANALYSIS OF PERFORMANCE COMPARED TO OTHER COMPLEX REPORTING	9
1 st Qtr FY-16 GROUP 1 – OPERATIONAL EMERGENCIES	10
1 st Qtr FY-16 GROUP 2 – PERSONNEL SAFETY AND HEALTH.....	10
1 st Qtr FY-15 GROUP 3 - NUCLEAR SAFETY BASIS EVENTS	15
1 st Qtr FY-16 GROUP 4 - FACILITY STATUS EVENTS	17
1 st Qtr FY-16 GROUP 6 - CONTAMINATION/RADIATION CONTROL EVENTS.....	20
1 st Qtr FY-16 GROUP 5 - ENVIRONMENTAL EVENTS	21
1 st Qtr FY-16 GROUP 6 - CONTAMINATION/RADIATION CONTROL EVENTS.....	23
1 st Qtr FY-16 GROUP 7 – NUCLEAR EXPLOSIVE SAFETY EVENTS	23
1 st Qtr FY-16 GROUP 8 - PACKAGING AND TRANSPORTATION EVENTS	24
1 st Qtr FY-16 GROUP 9 - NONCOMPLIANCE NOTIFICATIONS EVENTS	25
1 st Qtr FY-16 GROUP 10 - MANAGEMENT CONCERNS AND ISSUES.....	26
1 st Qtr FY-16 EVENTS INVOLVING SUBCONTRACTORS.....	27
1 st Qtr FY-16 ANALYSIS OF CAUSES OF REPORTABLE EVENTS	28
1 st Qtr FY-16 ANALYSIS OF IOPAC TRENDING ANALYSIS	29

INL/EXT-16-3777

FY-16 1st Quarter

This report is published quarterly by the Idaho National Laboratory (INL) 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 74 reportable events (16 from the 1st Qtr FY-16 and 58 from the prior three reporting quarters), as well as 35 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 (15 from this quarter and 20 from the prior three quarters).

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

Highlights...

The INL reported 16 events this quarter. The quarterly average number of reportable events at the INL has increased from 15 in FY-14 to 21.3 in FY-15. Thirty five percent of the 1st Qtr FY16 events were associated with personal safety and health.

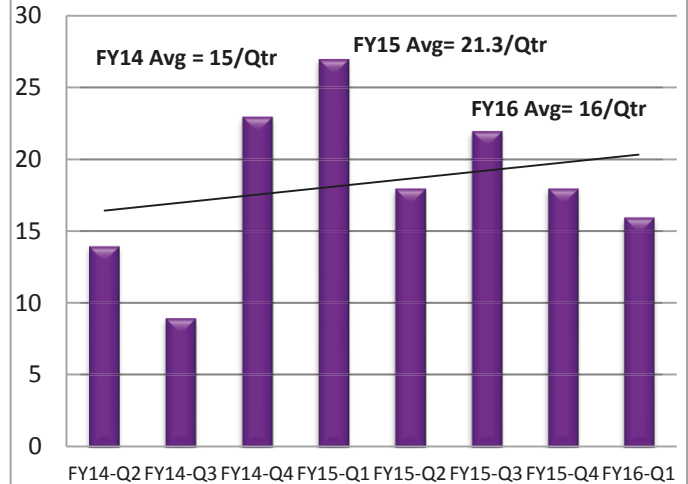
The rate of significant events (those reported as Operational Emergencies, Recurring Issues, and/or Significance Categories 1 or 2) continues to trend downward however, in the 1st Qtr FY16, two significance category 2 events were reported..

Over the past 24 months, the average number of days between significant occurrences continues to increase, indicating that significant events are occurring less frequently. An increase in the number of days between significant events is a positive trend.

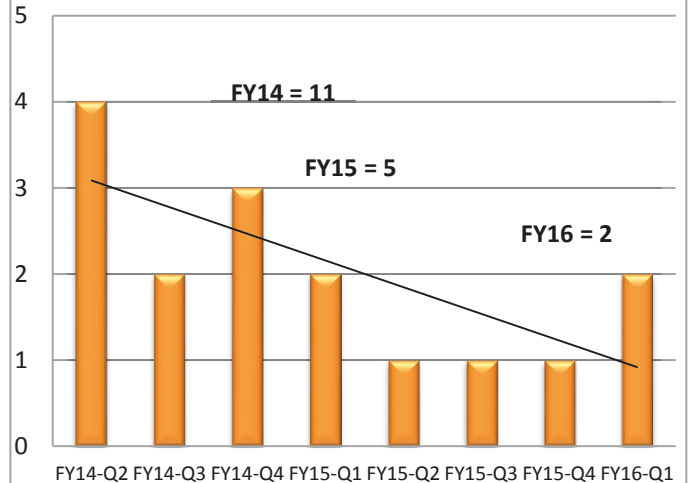
This quarterly analysis reviews those events that were reportable through ORPS, events that did not meet ORPS reporting thresholds, some conditions tracked in LabWay, and the causes of reportable events.

The report also provides a summary of the more significant Lessons Learned issued by INL.

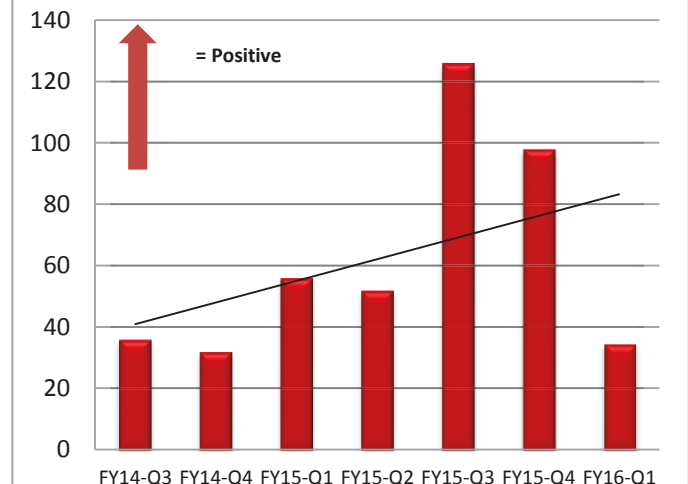
Occurrence Reporting Rates through the 4th Qtr FY15



Significant Occurrences Reported (Category OE, R, 1, and 2)



Average Days Between Significant Occurrences (Category OE, R, 1, and 2)



INL Occurrence Trend Snapshots

From October 1, 2015 through December 31, 2015, 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 (P&T) (Group 8), Noncompliance Notifications (Group 9), and Management Concerns (Group 10).

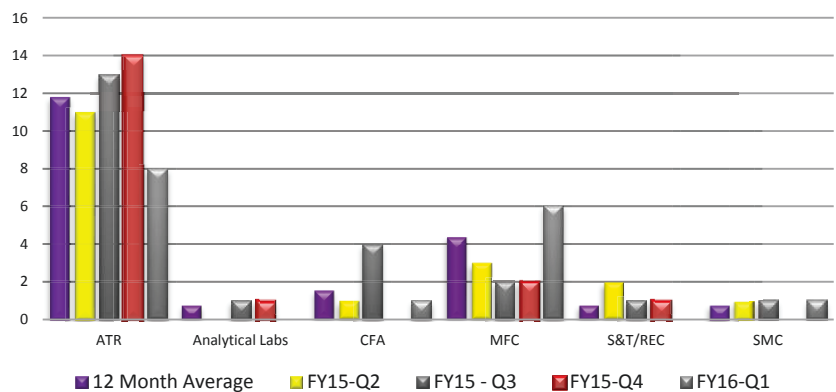
In addition, INL reported 15 events and conditions through Initial Notification Reports (INRs) and INL's local issues tracking software (LabWay) that did not meet ORPS reporting thresholds.

TREND SNAPSHOT

Occurrences by Facility: During the reporting quarter, ATR saw a slight increase in the number of events reported. The number of events reported at ATR this quarter was higher than the average number reported during the past 12 months. All other areas saw a steady rate or a decline in the number of events reported.

ATR has reported 60% of the events in the past 12 months; MFC has reported 19%.

Occurrence Reports by Facility

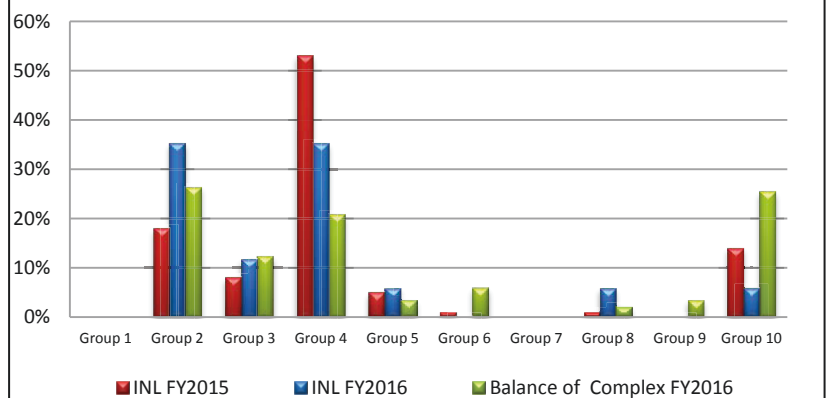


TREND SNAPSHOT

Occurrences by Reporting Criteria:

During the 1st Qtr FY-16, INL has experienced the majority of events related to: Group 2, Personnel Safety and Health (35%); Group 4, Facility Status (35%); and Group 3, Nuclear Safety Basis (12%). Comparative analysis to the balance of the DOE complex is shown in the chart to the right and is explained in each section of the report that follows. In FY-16 year to date, the balance of the DOE Complex reports the majority of events in Group 2 and Group 10, Management Concerns (both 26%), followed by Group 4 (21%), and Group 3 (12%).

Occurrence by Reporting Criteria



SNAPSHOT

Lessons Learned Events: The use of Lessons Learned through OPEXShare showed improvement with an additional 93 employees registering to receive Lessons Learned. On average, INL employees visited the OPEXShare database approximately 1500 each month. INL organizations are using the lessons to improve operations at the Laboratory through active internalization (e.g., using lessons at meetings, incorporating lesson into work documents, and issuing the lesson as a required reading assignment). INL issued nine lessons learned during the quarter.

The INL Lessons Learned Program is an integral part of the feedback and improvement processes required by DOE. Operational excellence requires the use of internal and external operating experience information (OEI) 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.

During the 1st Qtr FY-16, INL used internally generated and/or shared lessons from other sites to improve operations and learn from other's events or mistakes. Nine lessons were internally generated and entered into OPEXShare to be shared with all INL organizations. Several of the lessons shared by INL are summarized below:

X-Ray Radiation for High Potential Testing of Vacuum Circuit Breakers

Lesson 2015-0035

During an investigation into an Arc Flash event at the Idaho National Laboratory, a concern was identified involving potential x-ray hazards generated during high-potential testing of vacuum tube breakers. The hazard was identified in the work package; however, it was not discussed or addressed in the work controls and was not reviewed by Radiological Control. X-rays in vacuum interrupters are produced only with open contacts and are insignificant at normal operating voltages. The exposure is also at low levels during high-potential testing if test personnel remain at distances appropriate for the test voltage involved.

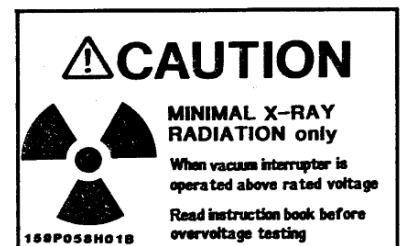
Adequate precautions such as shielding (vacuum bottle material/ enclosure) and standoff distance are used to protect personnel against possible higher x-radiation occurrences due

to incorrect contact spacing or to inadvertent application of excess voltages.

The preventative maintenance work package identified that x-ray radiation was present during vacuum breaker testing without further explanation of why x-rays are generated during testing and the risks. When the question arose, there was a general lack of knowledge on when and why x-rays are present and the risks and mitigating actions to be taken related to the hazard.

It was not clear to involved personnel that the basis for the panel standoff and the cover closure was both for electrical safety and radiological dose minimization.

To bridge this information gap, a briefing was provided to INL Power Management linemen and supervision that



discussed how x-rays are produced, how design minimizes exposure during high potential testing, and how shielding and standoff distance are used to protect personnel during normal operation and possible high x-radiation occurrences due to incorrect contact spacing or the inadvertent application of excess voltages.

What We Can Learn:

- Work planning for legacy work processes should be scrutinized, even if historically very successful, to ask more questions, and potentially mitigate previously accepted hazards.

- Hazard identification, analysis, and mitigation need to be reviewed periodically, documented, and communicated to those involved in the activity.

Failure of Seams in Zytron® 100 Level D Coveralls

Lesson 2015-0038

On three separate occasions at the Materials Fuels Complex, It was discovered that multiple sets of Zytron® 100 Level D coveralls had stressed and /or incomplete stitching on the seams. The stressed and/or torn seams were found in multiple lot numbers. The holes were sizeable with a diameter roughly the size of a pea.



Notifications were made to management and the coveralls were rejected for use. INL Procurement was also notified of

the issue and will contact Kappler®, the manufacturer of Zytron®, on solutions and mitigations.

What We Can Learn:

- Coverall seams should be inspected carefully prior to use.
- During inspection, attention should be given to areas where the stitching appears to be closer together, as this will create a reduction in strength of the material.
- Flawed coveralls should be removed from service and facility management should be immediately notified to prevent other items from being used.

Unexpected Sentinel Response and Failure to Self-Check

Lesson 2015-0034

On September 14, 2015, a Radiological Control Technician (RCT) and a Utility Area Operator at the Advanced Test Reactor prepared to pull an Evaporation Pond Inlet sample. The RCT logged onto the Radiation Work Permit (RWP) at a Sentinel station earlier that morning without any problems. When the Operator logged onto an RWP at the same Sentinel station, it was believed that he logged in without any issues as well. The Operator and the RCT then commenced performing the sample pull. Upon completion of the job the

Operator attempted to log out of the RWP; however, the Sentinel station was still on the screen indicating, "Access granted, please remove your dosimeter from the reader." The Operator looked at his Electronic Dosimeter and it read "PAUSE," indicating that the dosimeter he had obtained was not logged into the system. The RCT tried to log off and the Sentinel station prompted the RCT that he had the wrong dosimeter, this led the RCT to believe the system was experiencing computer problems. Proper notifications were made to computer support personnel who couldn't find anything wrong with the system. Radiological Engineering manually logged the Operator out of the system.

Two days later, the same RCT found a dosimeter hidden under some paperwork on top of the computer tower next to the Sentinel station. At a prior date, the RCT noticed a dosimeter with a low battery so he set it on top of the computer tower to prevent it from being used. The hidden dosimeter was the same dosimeter that was used/programed when the Operator initially logged in to the RWP on September 14. This indicated that the Operator had entered



the radiation area with a dosimeter that was not programed for work, which was a violation of the RWP. The dosimeter with the low battery was still in

the on position and assigned to the Operator when the RCT found it. The RCT notified his immediate supervisor of the situation.

Some issues that were encountered include: (1) a failure to verify that the dosimeter was in the on position (no self-check); (2) when problems occurred during RWP log out an assumption was made that the computer program was the issue when it was not. Conduct of operations principles stress that you should always believe your instruments until they are proven to be incorrect; (3) poor housekeeping practices led to another programed dosimeter hidden under papers on top of the computer tower; and (4) the RCT assumed the dosimeter was not programed because it had a low battery.

What We Can Learn:

- Perform a Self-Check to verify your dosimeter is on and set points are in accordance with the RWP.
- Prior to entering posted radiological areas, ensure your dosimeter is operating correctly and maintain awareness of your dose while working and upon exit of the area.

- A dosimeter indicating a low battery should be placed out-of-service in a location away from both the Sentinel reader and in-service dosimeters.
- Maintain a clean work station; proper housekeeping ensures other dosimeters will not affect the programming of your dosimeter during the logging on or off process.
- Understand that frequency cross-talk between Sentinel electronic dosimeters can occur if multiple dosimeters are within 30 cm of the dosimeter reader.
- Communicate effectively by understanding and asking questions when trying to identify or resolve problems. Late reporting of issues could adversely affect the health and safety of the public or workers, the environment, Department of Energy (DOE) missions, or the credibility of DOE and the Idaho National Laboratory.

Proceeding in the Face of Uncertainty Creates Work Delay

Lesson 2015-0038

Work was being performed at the Advanced Test Reactor (ATR) to remove a specialized flow tube and replace it with a standard flow tube. This job is performed infrequently and prior to the job briefing the Job Supervisor informed ATR Operations Management that he was uncomfortable performing the job and asked for an experienced operator to assist him. The experienced operator who was asked to assist the job supervisor was not available when installation of the standard flow tube started, the job supervisor proceeded without the operator to perform a procedure step that read: "IF a closure sleeve is installed, THEN perform the following..." Not being familiar with the closure sleeve and associating it with replacement of an In-PileTube (IPT), the job supervisor assumed it was not part of the procedure and marked the step not-applicable. This step was perceived as a conditional statement and therefore, concurrence was not required.

The next step was installation of the flow tube key into the IPT internal keyway. The crew assumed the key lined up with the keyway based on a note in the procedure. Even though the note is vague and confusing a consensus was reached on where the internal IPT keyway was located.

Personnel then attempted to lower the flow tube in the IPT; however, they were unable to get it completely seated. The flow tube was about 6" above the IPT and the job supervisor determined that work could no longer continue. Work was stopped and notifications were made to management.

A week later, a mechanic involved in the job was attending training and discussed the issue with a Maintenance Training representative. The discussion revealed that the closure sleeve had not been removed as required. The Maintenance Training representative notified the job supervisor, who then notified ATR Operations Management. A recovery plan was initiated.

Issues:

- Experienced personnel were not available for the entire job evolution.
- The job supervisor proceeded when uncertain about job conditions and procedures.
- Assumptions were made including:
 - The closure sleeve was associated with the IPT.
 - The position of the IPT internal keyway.
 - Mark on top of the flow tube may be incorrect.
 - The piston rings on the bottom of the flow tube may need further lubrication.

What Can We Learn?

- More effort needs to be made to positively determine the condition of the equipment as a basis for evaluating conditional statements in procedures.
- Do not proceed in the face of uncertainty, regardless of how much or how little the uncertainty is. ANY uncertainty needs to be resolved prior to moving forward.
- Use experienced resources to validate decisions made on conditional steps to help ensure the correct actions are being taken.

Attention to Detail with On-the-Job Training

Lesson 2015-0040

Idaho National Laboratory On-the-Job (OJT) Training is a process used to ensure a newly qualifying trainee is trained to perform the tasks of their job. Experienced and qualified employees are assigned as instructors by Line Management to conduct OJT using a defined process. At the completion of the OJT, instructor signature validates the trainee's ability to perform that task safely and correctly. In a recent assessment it was found that there were instances where OJT qualification cards were signed off by individuals NOT qualified as an OJT instructor. When assigned as an OJT instructor, the individual needs to ensure they hold a current OJT qualification and are knowledgeable to perform the task adequately. Not doing so could potentially lead to employees not having the competencies to perform safe and efficient work.

What We Can Learn:

- Following procedures and processes as written is important. A qualification card is a process that needs to be followed as directed so unqualified employees are not signing off on new trainees OJT qualifications.
- Qualified OJT instructors are accountable to ensure new qualifying personnel have the knowledge and skills to perform their job properly.
- Signatures are important.
Ensure the assigned OJT instructor has current and valid qualifications so they are able to conduct the training as written in LWP-12009.

*Tell me and I'll forget.
Teach me and I remember.
Involve me and I learn.*

- Benjamin Franklin

Lockout/Tagout – Don't Forget the Key

Lesson 2015-0042

On the morning of December 14, 2015, subcontractor employees at the Materials and Fuels Complex (MFC) were preparing to perform work which required a Lockout/Tagout (LO/TO). One of the subcontract employees needed to perform work under escorted LO/TO. The employee was recently hired and this was his first week of work and his first LO/TO work being performed at INL. When the escorted employee placed his lock, he removed it from his belt loop, hung it on the group lock box and proceeded to lock it. His LO/TO escort for the evolution heard the lock click which indicated to him that the evolution had been complete and both employees then proceeded with their work. Later in the day an MFC employee noticed that a lock on the lock box had a key in it.

The subcontract employee under escorted LO/TO had failed to remove the key from his personal lock. Additionally, the escort heard the lock click, but did not visually verify the evolution had been completed in accordance with company procedures.



What We Can Learn:

- Newly trained and qualified employees warrant extra oversight in their work performance especially in areas where safety is concerned.
- When we are performing work, we sometimes overlook the little things that we believe are a “given” for the situation. Diligence and attention to the small details is essential. Trust but verify, especially with inexperienced employees.
- During construction activities, peer-to-peer reviews on escorted LO/TO evolutions should be performed to ensure that the little details are not being overlooked.
- Subcontractors acknowledge that they have become reliant on the training required and provided by INL, including LO/TO, and realize they need to reinforce and emphasize the importance of these various processes to their newly hired employees.

INL Identifies Waste Shipping Violations on Waste Sent to Nevada National Security Site – Further Shipments Suspended

Lesson 2015-0042

On October 7, 2015, the National Nuclear Security Administration Nevada Field Office suspended Idaho National Laboratory (INL) from disposing waste at the Nevada National Security Site (NNSS). The decision to suspend the shipping of waste was the result of three separate waste shipments containing fissile waste packaged in shipping containers that had not been identified on the approved waste profile and packaged in a manner that was not compliant with the NNSS Waste Acceptance Criteria (WAC). Three separate shipments each containing one non-compliant shipping container were made from INL to NNSS on September 23, 2014, January 12, 2015, and April 7, 2015. In planning for a fourth shipment, the Waste Disposition Specialist (WDS) that coordinated the earlier shipments challenged his previous method to certify the waste for disposition at NNSS. In early September 2015,

the WDS shared the concern with Management. On September 23, 2015, it was determined by the Waste Certification Official and disclosed to BEA management and DOE that the three previous shipments were non-compliant. In response to the discovery, INL completed an Extent of Conditions review which assessed all waste containers shipped to NNSS from September 2014 thru September 2015. Aside from the three identified noncompliant shipping containers, all others were found compliant with the NNSS WAC.

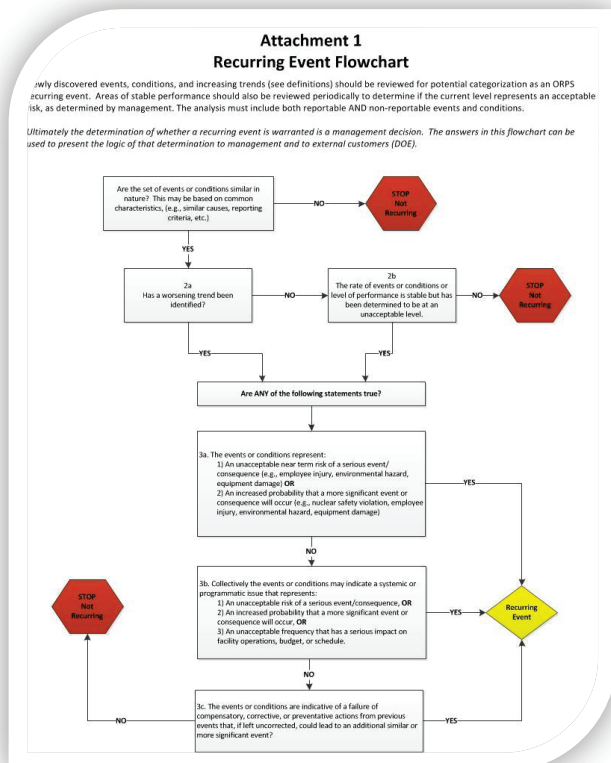
Issues: Results of the Cause Analysis for this event identified the following:

- Personnel involved in the event were trained and qualified but their training did not prepare them to fully understand the NNSS WAC and the INL waste profile.
- Waste Management did not ensure their expectations to elevate concerns were understood and enforced.
- Waste Management procedures did not ensure personnel verified that shipping containers and shipping methods were compliant.
- Waste personnel did not comply with Waste Management procedures.
- Required reviews were not clearly delineated in procedures.

- There was a lack of questioning attitude used by waste personnel.
- There was no feedback provided to Management when problems were first encountered.
- Waste Generator Services Management and the Waste Certification Official were not provided adequate information to assess a change from shipping under normal procedural options to an option not normally used.

What We Can Learn:

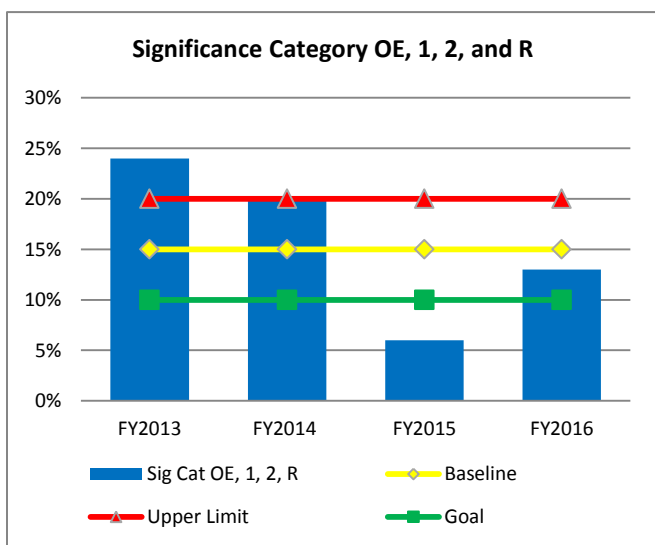
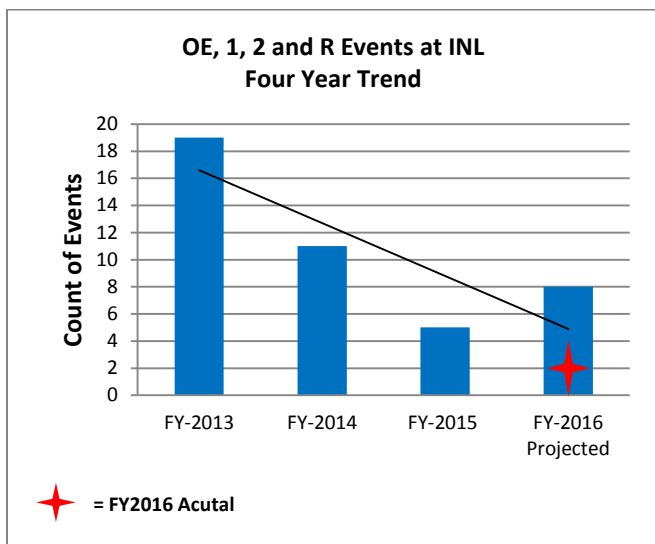
- Programs should periodically re-evaluate job duties, procedures, checklists, and infrequently performed or complex functions for continual improvement, conduct of operations, and training needs.
- Processes should include adequate criteria for the review of shipment activities that strengthen the process to identify errors before waste is shipped.
- Management should reinforce the need to elevate concerns and questions without fear of retaliation. And finally, management should clarify the expectation to seek technical or management support when complex situations are encountered.



1st Qtr FY-16 IDENTIFICATION OF RECURRING EVENTS

Training on the use of the recurring events flowchart included in Laboratory Wide Procedure (LWP) 9301, *Event Investigation and Occurrence Reporting* was completed during the 1st Qtr FY-16. INL Facility Managers are using the flowchart to assess events for recurrence. During the 1st Qtr FY-16, INL facility managers did not find any events to be recurring.

1st Qtr FY-16 ANALYSIS OF PERFORMANCE COMPARED TO OTHER COMPLEX REPORTING



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 was 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 Significance Category OE,

1, 2, and R events occurring at INL. INL's performance metrics are as follows:

Green: Less than 10% of the events reported at INL are significant (OE, Sig Cat, 1, 2, or R); **Yellow:** Greater than 10% and less than 20% of the events reported at INL are significant (OE, Sig Cat 1, 2, or R); and **Red:** Greater than 20% of the events reported at INL are significant (OE, Sig Cat, 1, 2, or R). Control Limits for Significance Category OE, 1, 2, and R events were set at +10% of 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 first chart to the left, INL continues to experience a downward trend in the number of significant events (Sig Cat OE, 1, 2, and R) occurring at the INL over the past four years, with INL seeing fewer significant events than reported last fiscal year. During the 1st Qtr FY-16, INL reported two Significance Category 2 events. If this trend continues, INL will report more significant events than last year. This trend will continue to be monitored and actions will be taken if necessary.

During FY-13 and FY-14, INL reported a greater percentage of events reported as significant (Sig Cat OE, 1, 2, and R), as compared to other DOE facilities (see second chart). However, during FY-15, INL met the goal of less than 10% of events reported at INL as significant events. In the 1st Qtr FY-16, INL 13% of all reportable events at INL were significant.

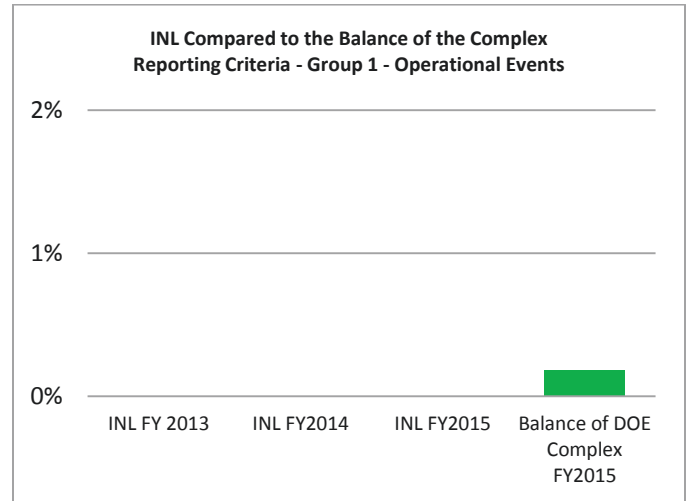
Additionally, 43% of events reported at INL during the 1st Qtr FY-16 were Significance Category 3 (This is higher than the complex baseline average of 43%) and 38% were Significance Category 4 (lower than the complex baseline of 42%).

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

1st Qtr FY-16 GROUP 1 – OPERATIONAL EMERGENCIES

There were no operational emergencies reported during the 1st quarter of FY-16. The last operational emergency at INL was reported in April 2012, when boron trifluoride 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. So far in FY-16, two Operational Emergencies were reported throughout the DOE Complex, equating to roughly 0.2% of the total events reported.

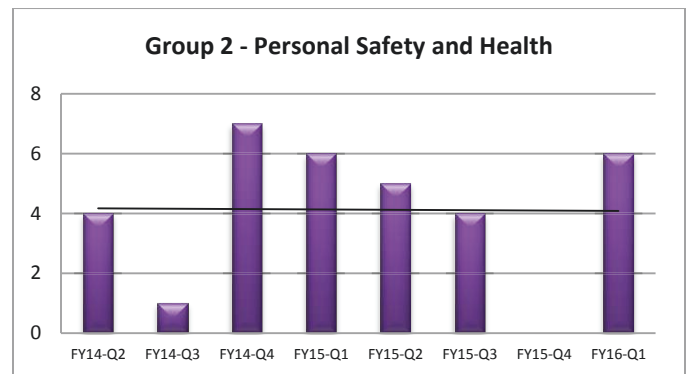
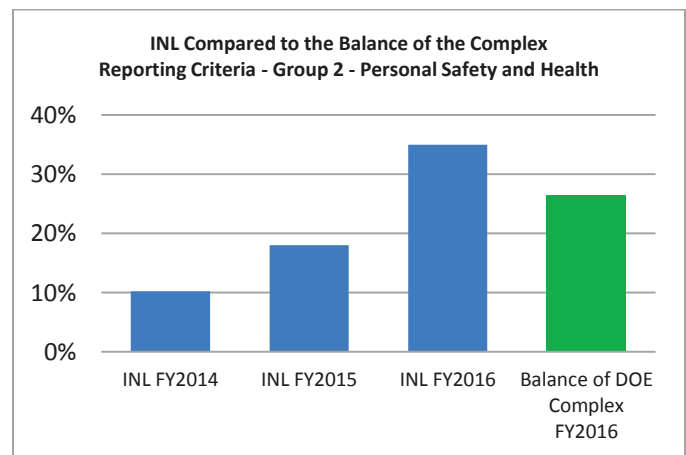


1st Qtr FY-16 GROUP 2 – PERSONNEL SAFETY AND HEALTH

TREND SNAPSHOT

Personnel Safety and Health Events: During the 1st Qtr FY-16, there were six reportable events related to personnel safety and health (e.g., occupational injuries, occupational exposures, fires, explosions, or hazardous energy). In addition, eight events were reported via INRs or directly into LabWay that did not meet the ORPS thresholds, but were related to criteria in this reporting group. This increase over last quarter has caused the rate of occurrence of reportable personnel safety and health events to be a flat trend.

When compared to the balance of the DOE complex, the rate of occurrence of Group 2 events at INL was higher than that reported elsewhere in the complex during the 1st Qtr FY-16. In this reporting quarter, 35% of INL's reportable events were reported under Personnel Safety and Health criteria. In comparison, 26% of those reported across the DOE complex fell into this reporting group.



The events (both reportable and non-reportable) during the 1st Qtr FY-16 are summarized below:

ATR Production Control Employee Stepped off of Sidewalk Resulting in Knee Injury

NE-ID--BEA-ATR-2015-0043 (Significance Category 3)

An ATR Production Control employee was walking from building Test Reactor Area (TRA) 670 to TRA-1608 when he stepped off of the sidewalk onto an unpaved area. The sidewalk points in a southeast direction. To the northwest of where the sidewalk and road intersect is an approximate 3-inch drop to an unpaved, soft, gravel-filled area. The employee stepped off of the sidewalk onto the unpaved area, hyperextending his right leg.

The employee was taken to the Central Facility Area (CFA) Medical facility for evaluation and was released to return to work with some restrictions. The employee was able to perform all assigned duties. Upon return to the CFA Medical facility for a follow-up visit the CFA doctor referred him for magnetic resonance imaging (MRI). The results of the MRI were reviewed by the CFA doctor who referred him to an orthopedic doctor; the orthopedic doctor recommended surgery to repair the injury.

What We Can Learn:

This event highlights the need for increased awareness to surroundings and maintaining situational awareness for routine low risk tasks such as traveling between buildings. Walking in the middle of the sidewalk, being aware of transition points, and staying on approved, designated walkways could have prevented this injury.

Improper Entry into Electrical Disconnect Cabinet at the Advanced Test Reactor

NE-ID--BEA-ATR -2015-0047 (Significance Category 4)

On 9 December 2015, ATR management determined that at an ATR Auxiliary operator had opened an electrical cabinet in TRA-670 without properly following the hazardous energy control program. The employee opened the cabinet to perform an inspection following discovery of an acrid odor and loud noise resulting in a trip of an upstream circuit breaker. The operator and his supervisor had verified that the upstream supply breaker was open during their initial investigation, but the breaker was not locked or tagged open, nor had required hazard mitigation and personnel protective equipment been considered. At no time was the operator exposed to hazardous energy.

What We Can Learn:

We must always stop before jumping in to troubleshooting/investigation activities. Personnel should have stopped to

identify and mitigate the hazards before proceeding with their investigation into the cause of the odor and noise.

Lockout Tagout Cleared Prior to Components being Operationally Intact

NE-ID--BEA-HFEF-2015-0004 (Significance Category 4)

MFC personnel discovered that a portion of the Hot Fuel Examination Facility (HFEF) fixed air sampling system was not properly guarded.

Investigation determined that preventative maintenance on the



vacuum pumps identified a seized electric motor for the pump system. The mechanic rationalized that there was no hazard with the motor as it was seized, cleared his LOTO and restore the other three vacuum pumps to service. However,



he did not replace the guards on the seized motor. Without the motor guards being installed, the mechanic inappropriately exited

the LOTO procedure prior to the equipment being operationally intact.

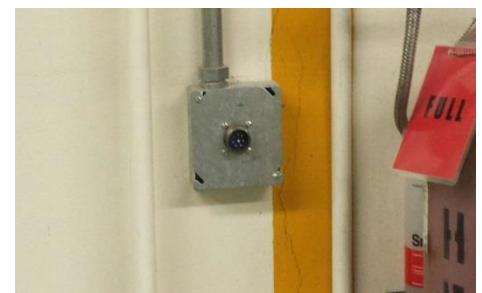
What We Can Learn:

If there is a potential that a hazard exists it must be mitigated. Procedure use and adherence, effective communication practices and a questioning attitude will help ensure safe and efficient facility operations.

120 Volt Electrical Energy Discovered on Male Amphenol Connector

NE-ID--BEA-MFC-2015-0004 (Significance Category 3)

On November 24, an Instrumentation and Controls (I&C) technician at the HFEF discovered 120v AC electrical energy on an unprotected



male Amphenol connector. The connector was previously used to supply a continuous air monitor (CAM) that had been removed from the facility prior to June 2015. The I&C technician recalled this potential legacy issue on electrical

energy control with HFEF CAMs while performing work at the I&C shop. After raising the question to his Foreman, he initiated an investigation and made the discovery.

On 12-1-2015, during an extent of conditions review, Zero Power Physics Reactor (ZPPR) management was notified that a 120v AC electrical energy was discovered on an unprotected male Amphenol connector. This connector was previously used to supply obsolete radiation protection equipment that had been removed from the facility in May 2015. Additional investigation identified a total of 7 connectors that were powered in the ZPPR facility.

The cause of the deficient conditions was found to be inadequate legacy design/wiring which resulted in exposing 120 volt electrical when the Amphenol was disconnected.

What We Can Learn:

- When removing/disconnecting equipment, performing a self check/STAR for the potential to expose hazards can mitigate the hazard before it is released from your control.
- The CAM/RAM became obsolete and all of the CAM/RAM's were replaced with a more modern unit. Work to remove legacy conduit and wire should typically coincide with the removal of equipment. A questioning attitude and more effective communication could have helped identify the creation of the hazardous electrical source when the CAM/RAM was disconnected.
- Because of their commitment to safety, the I&C technician and his foreman followed up on a "hunch" to ensure that fellow MFC personnel are not exposed to a hazardous electrical source.

Personal Key Left in Lockout Tagout Lock on Lockbox

NE-ID--BEA-MFC-2015-0005 (Significance Category 4)

An MFC Infrastructure and Support Building Manager was performing a walk-down of an upgrade to building MFC-782 at the Materials and Fuels Complex (MFC) and discovered that a worker had left the key to his personal Lockout/Tagout (LOTO) lock in the lock, which had been hung on the LOTO lock box. A lessons learned was issued as a result of this event. The lesson has been described on page 7 of this report.

Personnel within Electrical Flash Boundary without Controls

NE-ID--BEA-SMC-2015-0003 (Significance Category 3)

The Specific Manufacturing Capability (SMC) Operations Manager was touring the facility when he discovered a Cincinnati Inc. laser subcontractor and three Battelle Energy Alliance (BEA) personnel within the electrical flash boundary

of one of SMC's industrial lasers without controls such as Personal Protective Equipment (PPE) or Lockout/Tagout (LO/TO). The subcontractor was in the process of describing planned troubleshooting work that he would need to perform the following day so that the activity could be conducted safely. To facilitate his discussion, the group had opened a panel on the laser machine and did not recognize that they were within the flash protection boundary of a 480 volt control board. Electrical safety practices require controls for entry into this boundary, such as LO/TO or PPE and specialized training.

What We Can Learn:

Personnel may become complacent when they are performing activities that do not seem inherently dangerous such as troubleshooting, investigating, or planning work activities. We must always stop before jumping in to these types of activities to ensure that all hazards have been identified and mitigated.

CO 2015-4062

An electromechanical technician from the Research and Development (R&D) services organization was assisting with the removal of a pellet die in the Energy Systems Laboratory (ESL) Bioenergy Systems Laboratory (also known as the Process Demonstration Unit (PDU)) high bay. The employee was in the process of moving the cone and die when he noted that the dust was getting thick on the surfaces he was working on. The employee decided to walk over and get the vacuum hose that was on the floor inside the pellet mill enclosure. He bent down to pick up the vacuum hose and hit his head on a piece of unistrut supporting a steam line inside the enclosure.

He showed the Principal Researcher who informed him he had a laceration on his scalp. The injured employee was taken to medical where he received five staples to close the laceration on his scalp.

What We Can Learn:

A walk down of the area revealed that had the employee been wearing a "bump cap" or hard hat he would not have been injured. Employees who are working in areas with low overhead should wear personal protective equipment to ensure their safety in the event they inadvertently come in contact with overhead equipment or management should wrap low hanging equipment with foam to prevent injury in case of contact.

CO 2015-4138

An ATR Maintenance Mechanic was injured on the ATR reactor top during preparation for the Palm Drive Unit (PDU) installation. The worker lifted the hinged lid on a metal storage box within the ATR Reactor Top tool storage trailer ("White House"). He reached into the box to retrieve tools and materials for the activity and after reaching into the box, the lid fell and struck him on the top of his head. The injury began bleeding, at which time RadCon personnel coordinated the exit from the reactor top. There was no personnel contamination. The worker was transported to the Central Facility Area (CFA) medical facility for evaluation and treatment which required 6 staples to close the laceration. The employee was released to return to work and will report to CFA Medical for a follow-up evaluation.

What We Can Learn:

In our daily lives we perform many tasks over and over such that they become routine in nature. By becoming routine, we as humans tend to become complacent and no longer ask the "what-if" questions prior to performing simple tasks such as opening a box with a metal lid.

We need recognize the situations in which complacency can come into play and focus our minds and eyes on the task at hand by asking the "what-if" questions.

CO 2015-4199

An ATR employee was performing inspections on the reactor main floor in TRA-670 in accordance with Work Order (WO) 220955. With the help of another inspector, he was attempting to turn a rack containing a full roll of blotter paper in a position to allow the paper to be rolled off of the rack. During the evolution, he felt a light twinge in his upper right back adjacent to the right shoulder blade. While driving home that evening he felt a light discomfort in the same area and took a couple of ibuprofen tablets. When returning to work the next morning he felt the same discomfort and experienced intermittent pain and slight numbness in his right hand. The employee reported the condition to supervision at their daily morning meeting and was immediately taken to the Central Facility Area (CFA) medical facility for evaluation.

What We Can Learn:

Better flexibility may improve your performance in physical activities and decrease your risk of injuries by helping your joints



move through their full range of motion, enabling your muscles to work most effectively. Participating in daily stretching, balancing, and strength building activities can improve your overall health and lower your chance of workplace injury.

CO 2015-4230

While walking to their work destination inside the ATR Complex, an employee had debris blow into their eye. The employee began experiencing discomfort in the eye and was taken to the Central Facility Area (CFA) medical facility for evaluation where it was determined the employee had an abrasion across the pupil of their eye. An appointment was made with a private Ophthalmologist for further evaluation and the employee was sent home.

CO 2015-4428

FMF operators were operating the Sodium Separation System (SSS) in the Special Nuclear Material (SNM) Glovebox for post maintenance testing of a new control cable that was installed. During the post maintenance testing an operator noticed smoke escaping from the insulation wrapped around the sodium fill line. The operator immediately notified other personnel in the area and operated the emergency shutdown switch for the SSS. All nuclear material and sodium had been secured previous to testing. During an investigation into the event, the source of the smoke was determined to be due to a malfunction in a fan coil unit located in room 215. The fan coil unit caused the motor to overheat, melting the wires and conduit, and causing breaker #4 in LP-514 to trip.

What We Can Learn:

Attention to detail during post maintenance testing was key to identifying the faulty fan coil. Prompt response prevented the situation from becoming worse.

CO 2015-4496

An ATR Auxiliary operator noted an acrid odor followed by a loud pop in the switch panel area of the ATR diesel generator room. The source of the odor was found to be the HVS-5 pre-heater control disconnect panel 670-DSW-243. Use of an infrared thermometer on the panel door indicated an elevated temperature of 135 degrees F. Operators investigated the upstream power supply to the panel, and found the supply breaker to be in the tripped state. The INL Fire Department was notified and responded to investigate. No fire was found.

Subsequently, Operations personnel continued to investigate the source of the smoke/smell with the intent of identifying

the issue prior to shift change. The Operator believed that there was no hazard because the supply breaker had tripped. Operations personnel opened the electrical panel and discovered damage inside.

What We Can Learn:

The hazards were not identified nor verified to be secured with a zero energy check and a proper LO/TO was not in place prior to opening the panel.

The most important take away from this issue is that nothing is so important that anyone needs to put themselves at risk of being hurt or killed. We all want to do our best and we take great pride and ownership in operating INL facilities. However, no one ever needs to risk their own safety in our day to day operations.

CO 2015-4508

Life Safety Systems (LSS) technicians were reconnecting a carbon dioxide (CO₂) bottle when a threaded nipple sheared off causing the inner Schrader valve to remain open, and subsequently discharge the CO₂ bottle. The ~100lb bottle is part of the Analytical Laboratory Hot Cell fire suppression system. The system had previously been removed from service via a Temporary Modification Request to support a hot cell entry. As a precaution personnel in the affected area immediately evacuated per the briefing. One of the LSS technicians pulled a building fire alarm to warn others of the discharge. Facility management was notified and the fire department responded. Once access was restored to the facility it was ensured that the CO₂ system was placed in a safe configuration. The amount of CO₂ that was capable of being discharged from the bottle had previously been evaluated by IH and determined to be of low safety significance as briefed thus the event was found not reportable.

Some of the issues present during performance of work included:

- Work was performed on a configuration managed SSC using the wrong work control (A Planned Work Order is required for systems under a TM).
- Communication between the AL and LSS did not address how the system would be taken out of service, the significance of the TM or, the rigor required for the work control due to the TM.
- Work Control developed by LSS does not require AL Systems Engineer and Nuclear Facility Manager review or approval.

- There is inconsistent understanding and application of roles and responsibilities with facility equipment maintained by LSS personnel. This creates an error-likely situation in the application of hazard identification/mitigation and work.

What We Can Learn:

- *Engage a Questioning Attitude:* Question why other organizations performing work in your facility (LSS, Security, RadCon, Safeguards, Maintenance, Research, Subcontract work, etc.) operate to different controls/standards. Ensure they meet expectations established for your facility.
- *Ownership:* Know your facility equipment and processes well so you can recognize when something, someone, or some process is different. Know the expectations for performing work, perform to those expectations and, mentor others to those expectations.
- *Roles and Responsibilities:* Approve, release, engage in work only after all participants are fully knowledgeable about their roles and responsibilities.
- *Communication:* Be cognizant that different work organizations have different concerns for the work they perform and may do things differently. Communicate what you know is important so they know it is important too

CO 2015-4567

On December 16th, 2015 a researcher was preparing to process wood chips through the PDU Bale Grinder (BG480) under Laboratory Instruction LI-1725. He was checking the status of the grinder (pre-job walk around) when he found the in feed belt was frozen so that it wouldn't move. The grinder has a steel bar that is used to manually move the belt to free the ice. The operator set the bar vertically against the grinder while he put on gloves. While doing so, he dropped one glove and as he reached down to pick it up, the bar tipped over and struck his head causing a laceration. The Researcher contacted his supervisor, who then escorted him to INL medical where he received eight stitches in his scalp.

What We Can Learn:

As with CO 2015-4062, a walk down of the area revealed that had the employee been wearing a "bump cap" or hard hat he would not have been injured. Personnel should continually evaluate their work areas to assess for unmitigated hazard.

ANALYSIS FOR RECURRING EVENTS:

Personnel Safety and Health occurrences are the second most frequently reported event type, accounting for 15 reportable events in the last 12 months. Five of the events resulted in personnel injury; four from slips, trips, or falls and one injury sustained while moving a heavy fire rated lateral file cabinet. None of the personnel injuries were found to be recurring or similar in nature.

Two of the events were the result of an unexpected discovery of an uncontrolled hazardous energy source (either electrical

or other source). Seven of the reportable events were the result of a failure to follow a hazardous energy control process. Analysis of these events did not find them to be recurring or similar in nature.

In addition to the 15 reportable events, there were eight non-reportable events during the past year that were associated with ORPS Group 2 – Employee Safety and Health criteria. A review of these eight events found no recurring themes or problem of a similar nature.

1st Qtr FY-15 GROUP 3 - NUCLEAR SAFETY BASIS EVENTS

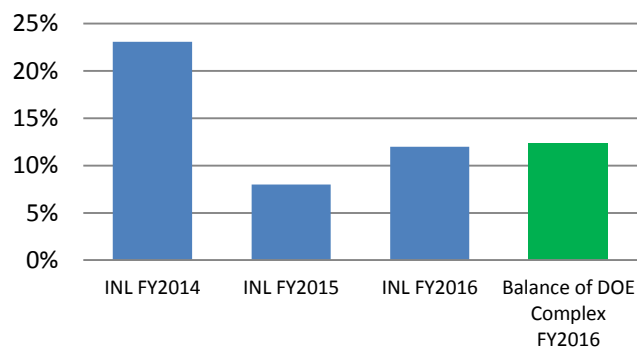
TREND SNAPSHOT

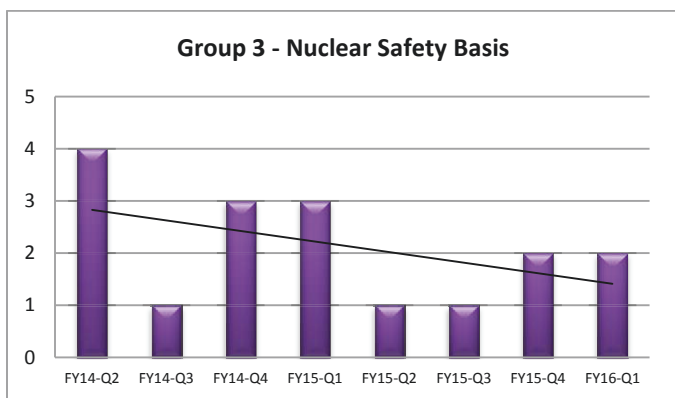
Nuclear Safety Basis Events: Two nuclear safety basis events were reported in the 1st Qtr FY-16. The rate of occurrence of nuclear safety basis events continues to tend downward over the past two years. During the past 12 months, six events have been reported under this criteria; two were identified at ATR and four at MFC facilities. Two were the result of a negative Unreviewed Safety Question (USQ), two were determinations of positive USQs, and two were due to a violation of a credited hazard control. **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 has reported an identical percentage of events under the Group 3 - Nuclear Safety Basis criteria, than the rest of the complex. In the 1st Qtr FY-16, 12% of INL's and the balance of the DOE complex events were reported under Nuclear Safety Basis criteria.

The number of INL events reported under this criteria continues to trend downward over two years. In the 1st Qtr FY-16, Nuclear Safety Basis events were the third most frequently reported event type at INL, accounting for two reportable events this quarter, and six in the past 12 months. The two events reported during the 1st Qtr FY-16 are summarized below.

INL Compared to the Balance of the Complex
Reporting Criteria - Group 3 - Nuclear Safety Basis





Declaration of a Positive Unreviewed Safety Question (USQ) Concerning Loop Flow Reduction Due to Loss of Commercial Power

NE-ID--BEA-ATR-2015-0041 (Significance Category 2)

On 29 October 2015, a Potential Inadequacy of the Safety Basis (PISA) was declared at ATR concerning a loss of commercial power event with partial experiment loop flow coastdown. The ATR safety basis analyses for events initiated by a loss of commercial power (Safety Analysis Report (SAR)-153, Section 15.3) do not model the simultaneous flow reduction in the experiment loops. Scoping analysis identified that a reduction in the experiment loop flow, due to coastdown of loop pump(s) powered by commercial power, may result in experiment loop voiding and, thereby, an increase in reactor power prior to reactor scram. A loss of commercial power (flow coastdown) event concurrent with an increase in reactor power may not be enveloped by the existing Chapter 15 accident analyses for loss of commercial power events or the Condition 2 flow coastdown analyses performed for experiments.

All analysis for this condition is found in ATR Complex-USQ-2015-508, "Loss of Commercial Power Event with Partial Experiment Loop Flow Coastdown" and in ECAR-3078, "Analysis of a Loss of Commercial Power Accident Including the Effects of Reactivity Insertion from the Experiment Loops".

Criticality Violation Due to Exceeding Total Fissile Mass Limit in a Fuel Bottle Container

NE-ID--BEA-FCF-2015-0001 (Significance Category 2)

The HFEF-6 cask, containing 2 SF56 cans with fuel bottles was shipped from the Idaho Nuclear Technology and Engineering Center (INTEC) to the Fuel Conditioning Facility (FCF) in accordance with Plan (PLN) 3524.

The sealed bottles were transferred to the air then into an argon hot cell to be tested for the presence of water and cut open to retrieve the fuel elements. On 11/25/15 at 1245, a bottle was cut open and was found empty and did not contain the fuel elements listed on the inventory sheet. When another bottle was cut open, it had twice the number of elements listed on the inventory, accounting for the missing elements. All elements for the subassembly were accounted for.

The doubling of elements in the one bottle resulted in the facility exceeding the total fissile limit allowed for a bottle listed in the criticality safety list, LST-390, for the Fuel Conditioning Facility. In addition, the element count exceeded the allowed 12 elements in a bottle specified by the transportation plan, PLN-3524. This condition resulted in a positive USQ (MFC-USQ-2015-1437).

Lessons learned from this event will be shared next quarter.

Other Non-Reportable Events

There were no additional non-reportable events related to nuclear safety basis problems documented in LabWay during the 1st Qtr FY-16.

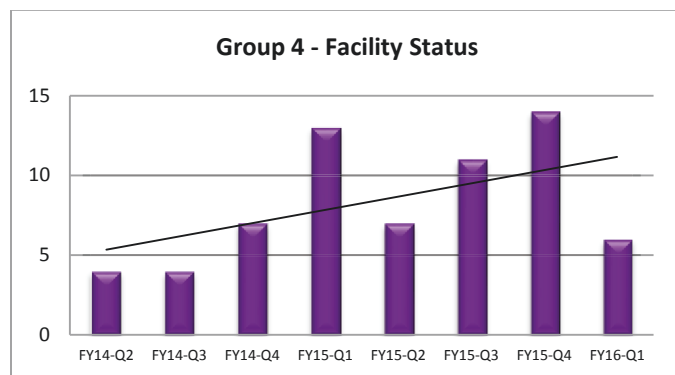
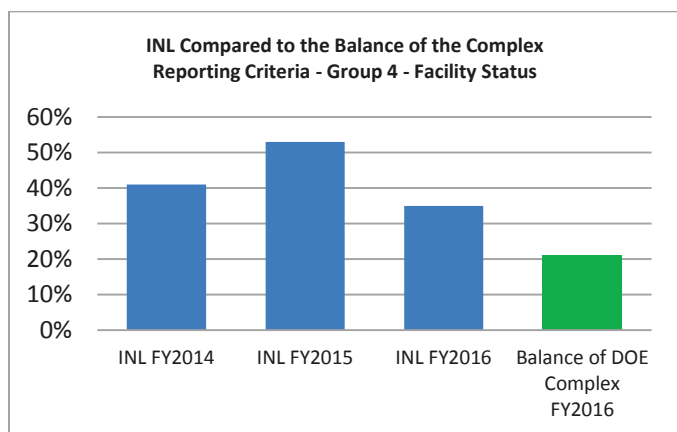
ANALYSIS FOR RECURRING EVENTS:

The majority of events reported under the nuclear safety basis criteria over the past year are directly attributed to increased rigor in assessing safety of the ATR. Analysis of events reported under the ORPS Group 3 – Nuclear Safety Basis criteria, did not identify any recurring themes or problems.

TREND SNAPSHOT

Facility Status Events: Facility status events accounted for 35% of the events reported in the 1st Qtr FY-16. The number of events reported under this criteria decreased from last quarter (14 to 6) however the rate of occurrence of facility status events continues to trend upwards over the past two years. Five of the events this quarter occurred at ATR and one at SSPSF. Of these six events, one was related to discovery of a potential suspect counterfeit bolt, four for performance degradation of Safety Class (SC) or Safety Significant (SS) Structure System or Component (SSC), the last event was due to a facility evacuation. Thirty-four events have been reported at the INL under this reporting criteria over the past 12 months; 33 at ATR, and one at SSPSF.

The percentage of occurrence of Group 4 – Facility Status events at INL, is higher than that of the balance of the DOE Complex (35% vs 21% in the 1st Qtr FY-16) and has been steadily increasing since FY-13. Forty-eight percent of the Group 4 events since FY-13 have been reported as performance degradation of a safety class Structure, System or Component (SSC) when it was not required to be in service; all of which occurred at ATR. These events are anticipated and have occurred during reactor shutdown and most often discovered during testing of equipment for restart.



The six events reported under the Group 4 – Facility Status criteria during the 1st Qtr FY-16, are summarized below. Four additional not reportable events were reported into LabWay during this quarter. These events are also discussed below.

Potential Suspect Counterfeit Bolts Found on the GE-100 Cask Overpack at the ATR

NE-ID--BEA-ATR-2015-0040 (Significance Category 3)

The GE-100 cask overpack was being installed in preparation for shipment to the Material and Fuels Complex (MFC), per Detailed Operating Procedure (DOP)-4.8.36, "Loading/Unloading The GE-100 Series Cask."

During the installation, personnel from the ATR Quality organization could not verify that the bolts for securing the overpack to the pallet base met the American Society for Testing and Materials (ASTM) specifications due to the bolt heads being painted. The bolts were rejected and new bolts were obtained and installed to complete the shipment. Approximately one week later, the paint was removed from

the rejected bolts and a quality inspection determined the bolts to be suspect.

What We Can Learn: Although it is a reportable event, discovery and correction of suspect counterfeit parts is a positive attribute of a safety conscious work environment. Developing and maintaining a culture that supports questioning attitudes and attention to detail can prevent serious problems from manifesting.

ATR Plant Protective System Inlet Pressure High Channel "C" Failed

NE-ID--BEA-ATR-2015-0042 (Significance Category 3)
The Advanced Test Reactor (ATR) Plant Protective System (PPS) Inlet Pressure High Channel "C" failed the Surveillance and Test System (SATS) test. Inlet pressure instrumentation is part of the pressurizing and gland seal pump shutdown system. ATR Technical Safety Requirements (TSR)-186 Limiting Condition for Operation (LCO)- 3.2.3.2, Pressurizing and Gland Seal Pump Shutdown System, requires this shutdown system to be operable during POWER OPERATION, LOW POWER OPERATION, PRESSURIZED STANDBY and PRESSURIZED SHUTDOWN. ATR was in PRESSURIZED STANDBY at the time of discovery.

Actions per LCO-3.2.3.2.A were taken that placed inlet pressure instrumentation in "1 out of 2 trip logic". These actions, allowed by TSR-186, were taken within the allowed COMPLETION TIME.

Broken Roll Pin on TRA-633-1 Firewater Pump Discharge Valve BF-10-31

NE-ID--BEA-ATR-2015-0044 (Significance Category 4)
During the performance of Detailed Operating Procedure (DOP)-8.3.2, "Emergency Firewater Pumps In-service Functional Test," the valve handle roll pin on the 633-1 firewater pump discharge valve BF-10-31 sheared off leaving the valve in the shut position. The procedure was exited and the valve left in the shut position. This firewater pump was not required for the plant conditions.

Advanced Test Reactor 674-M-6 Diesel Generator Tripped on Reverse VARS

NE-ID--BEA-ATR-2015-0045 (Significance Category 3)
The 674-M-6 diesel generator was being started for the monthly surveillance per Detailed Operating Procedure (DOP)-8.3.1, "Standby Diesel and Equipment Operational Test." The diesel generator automatically shut down due to a "Reverse Volts, Amps, Reactives Shutdown (VARS)."

674-M-6 diesel generator was declared inoperable and ATR

Engineering was contacted to investigate the cause of the trip. A second attempt to start the diesel generator was successful and DOP-8.3.1 was completed satisfactorily.

Operability of the 674-M-6 diesel generator is a Safety Analysis Report (SAR) commitment to provide defense-in-depth to the ATR 480 Volt Diesel Bus Battery-Backed Power system. SAR-153, Addendum 9 allows 14 days of continuous inoperable time before a reactor scram when 674-M-6 and 670-M-42 diesel generators are out-of-service and 670-M-43 diesel generator is in a standby condition.

Advanced Test Reactor Firewater Pump 633-1 Failed Battery

NE-ID--BEA-ATR-2015-0046 (Significance Category 4)
During the performance of Work Order 223730, 633-1 Diesel Firewater Pump Battery Quarterly Inspection, it was determined that battery bank #2, cell #3, has a low specific gravity and elevated temperature. 633-1 firewater pump was removed from service and battery bank #2 was electrically disconnected. The control switch for 633-1 was placed in the off position.

SSPSF Low Oxygen Alarm due to Liquid Nitrogen Leak

NE-ID--BEA-ATR-2015-0001 (Significance Category 3)
On December 16th, 2015, SSPSF personnel were performing Thermal Vacuum Chamber operations in which a Thermal Control Unit, fed by Liquid Nitrogen for chamber temperature control, was operating. The chamber had reached the designated temperature set point (0° C) when personnel noted Liquid Nitrogen leaking from a physically inaccessible area of piping that should have been gaseous nitrogen.

Personnel immediately actuated the emergency stop and left the room to isolate the Liquid Nitrogen dewars (located outside the facility). The room oxygen monitors subsequently alarmed three minutes later, which evacuated the remainder of the facility as a precaution.

Facility operations personnel with support of the TVAC SME performed an investigation to determine possible leak locations and the source of the LN2. An investigation determined the liquid was dripping from a small orifice between the insulation end cap and longitudinal insulation due to a failed or defective part. A maintenance request was initiated to repair the system.

Other Non-Reportable Events

There were four additional non-reportable event related to facility status reported during the 1st Qtr FY-16. They are as follows:

CO-2015-4027

At 21:00 SFO Utility Operator reported to BEA Management that the TAN-614 electric fire pump had a broken air vent fitting causing an uncontrolled water discharge into building. The system was secured and repaired.

CO-2015-4375

The ATR Ventilation Engineer representative notified ATR Management of a possible installed open conduit penetrating the ATR confinement. Investigation revealed a ¾” conduit which ran from the ATR Control Room into the ATR canal. Technical Safety Requirements (TSR)-186, Limiting Conditions for Operation (LCO)-3.8.1 – Confinement Requirements, Action C - Any unsealed penetration of the CONFINEMENT not evaluated by a building leak rate test or addressed in Conditions A, was entered and the need for an extent of conditions for similar penetrations in the reactor building was identified.

SMC-CO-2015-0278

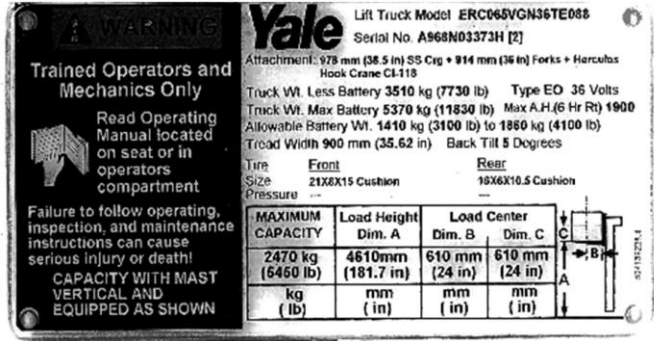
While performing assigned Senior Supervisory Watch (SSW) duties, the SSW observed a job to relocate an 18,800 pound granite inspection table. Once the load had been lifted, the SSW asked the operator to verify the weight from the Dyno on the forklift. When no dyno was located, the foreman recognized they were not using the forklift specified in the work order. The foreman immediately stopped work, the correct forklift was brought in and the task was completed without further incident.

The SMC Operations Manager was notified of the issue and questioned the maximum limit and instructed shift operations to place an Out-of-Service (OOS) tag on the first lift pending further evaluations from the SME. The lift was tagged Out-of-Service with instructions to have the SMC Hoisting & Rigging Subject Matter Expert (SME) evaluate a path forward concerning this lift.

Calculations were performed the following week when all required personnel returned to work. The forklift used initially was rated at 20,000 pounds at a load center of 24 inches. The width of the table places its load center at 37 inches thus downgrading the initial 20,000 lifting limit. It was determined that the 20,000 pound limit was exceeded by approximately 2,400 lbs. This is based on information (weight) stamped on the granite table and available at this time.

What We Can Learn: Supervision should ensure that Equipment Operators are knowledgeable of equipment

manufacturer's data plate information for rated load capacities and load centers. Forklift Equipment Operators should always consider not only the rated load capacity of the forklift or equipment, but also the load center should be determined for each movement. This is as important and essential to the lift.



CO-2015-4631

The Manipulator Repair Group (MRG) at MFC was removing a broken System 50 manipulator (in-cell, remote end) for repairs when it was observed that the lifting bail on the manipulator had failed dropping the manipulator ~3/4” back onto the mounting bracket/gear package. The MRG technician stopped work, contacted his foreman who discussed the issue with the process foreman. A decision was made to place the equipment in a safe configuration by reattaching the manipulator to the mounting bracket/gear package. As the MRG technician was re-engaging the locking mechanism, he observed unexpected movement of the manipulator and stopped work. Shortly after, the manipulator released from its mounting bracket/gear package and fell to the cell floor. All work was stopped and the area was secured.

ANALYSIS FOR RECURRING EVENTS:

A review of the 38 Facility Status occurrences that were reported in the last 12 months was performed. Three of the events were associated with an ATR diesel generator; one when a generator failed to load, one related to a protection relay failure, and one when the generator tripped on a reverse VARS. There were no similarities noted in these events that would indicate they are recurring. Three events were related to ATR confinement doors with no similarities noted. An additional three events involved an ATR MP-3000 protection relay failure or loss of memory. There is nothing to indicate that the actions taken in the first event failed to prevent the other events. Ten events were associated with various pumps at ATR but a review of these ten events did not reveal any similarities that would indicate a recurring event or problem is present.

Thirty-two of the events in the past 12 months were the result of degradation of a safety class or safety significant component; 25 of the events occurred when the component was not required to be operable. All were discovered at the ATR, primarily during preparation for the reactor restart. Many of the events occurred because frequent foot traffic to the facility caused degradation of door seals and latches. Additional problems were discovered because extended

shutdown of equipment resulted in loss of backup battery capabilities.

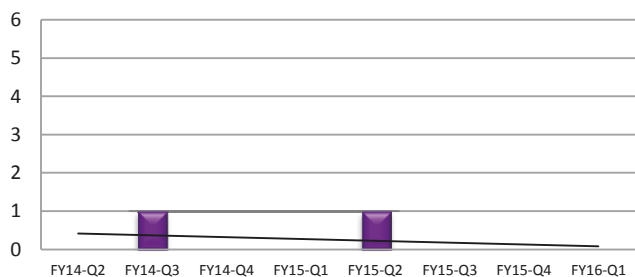
Neither the ORPS Technical Lead nor ATR management identified any recurring events with the Facility Safety events reported this quarter.

1st Qtr FY-16 GROUP 6 - CONTAMINATION/RADIATION CONTROL EVENTS

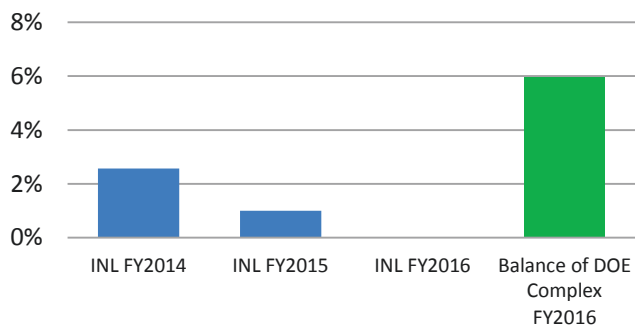
TREND SNAPSHOT

Contamination/Radiation Events: There were no reportable events related to contamination/radiation control reported in the 1st Qtr FY-16. The rate of these types of events is trending steady near zero over the past two years. During the last 12 months, only one reportable event was entered in ORPS under this reporting criteria. There were no additional non-reportable event documented this quarter.

Group 6 - Contamination/Radiological Controls



INL Compared to the Balance of the Complex Reporting Criteria - Group 6 - Contamination/Radiation



The balance of the DOE complex has reported 6% of events under the same criteria. Events related to contamination and/or radiation control are some of the least reported event types at INL; these have only accounted for one event at INL in the last 12 months.

ANALYSIS FOR RECURRING EVENTS:

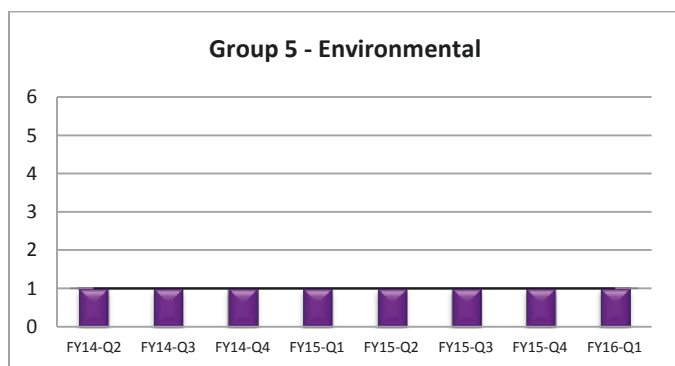
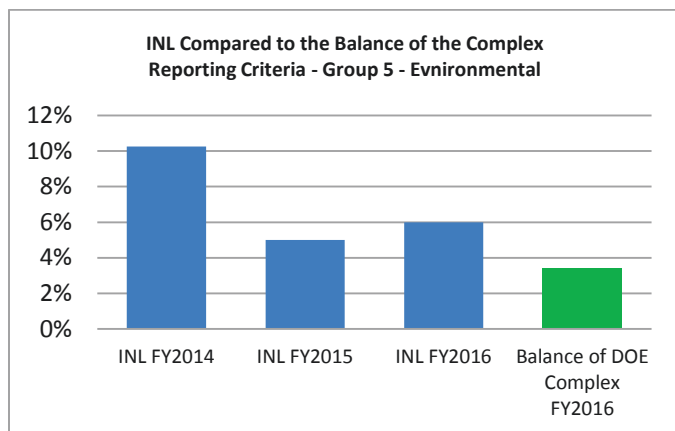
There has only been one reportable event under the Radiation/Contamination reporting criteria the past 12 months and three non-reportable events. A review of these four events identified no commonalities, no adverse trend, and no recurring problems.

None of the events reported at INL during FY-16 were reported under Group 6 Contamination/Radiation criteria.

TREND SNAPSHOT

Environmental Events: There was one environmental event reported in the 1st Qtr FY-16. The rate of occurrence of environmental events is steady.

When compared to the balance of the DOE complex, the percentage of occurrence of Group 5, environmental events reported at INL is slightly higher than that of the balance of the DOE Complex (6% compared to 3% during FY-16). Aside from one new event that occurred this reporting quarter, all of the environmental events reported during the last two years have been related to 40 CFR Part 63, Subpart ZZZZ (also known as Quad Z) requirement changes.



The one event reported in the 1st Qtr FY-16 is described as follows:

CFA-601 Diesel Fuel Oil Spill

NE-ID--BEA-CFA-2015-0006 (Significance Category 4)

On December 16, 2015, a fuel hose from a power take off pump on a diesel fuel delivery truck over-pressurized causing

the fuel line to rupture spilling about 1000 gallons of diesel to the asphalt. Workers contained the diesel fuel to the asphalt and concrete and successfully prevented any diesel discharge to storm drains or the environment. One worker had just completed dispensing fuel to a nearby vehicle, and left the truck running to charge the battery. The pump was left on as is normal in the other fuel pumping vehicles. Minutes later it was noticed that fuel was leaking from the bottom of the fuel tank; the worker immediately shut off the truck and activated the emergency shut off valve successfully isolating the leak.

A hazardous material cleanup team from the Central Facilities Area (CFA) Fire Station arrived to assist in clean-up activities. Workers pumped the contained diesel into 55 and 85 gallon drums and applied top soil to the spill area to absorb any residual liquid.

The Spill Notification Team was called and determined that this event did not meet the definition of "petroleum release" that would require reporting to regulatory agencies because the diesel fuel did not reach soil, groundwater, or surface water. Safety professionals were consulted for the initial recovery activities, WGS and BEA personnel were consulted on disposal options for the absorbent and diesel fuel. The constituents that compose diesel were also evaluated to determine if there was an airborne release, and no reportable quantities (RQs) were exceeded.

During the investigation into the spill, it was discovered that the truck manufacturer vendor manual contains a statement warning the operator to not run the pump for more than 15 seconds (deadheaded). It is the normal craft action to start the truck, and engage the PTO (drives the pump) and then exit the vehicle to commence the fuel dispensing activities. These activities could take upwards of 45 seconds to perform prior to opening the fuel valve and dispensing the fuel. It is also normal operations for the equipment operators to leave the pump engaged for several minutes at times.

All other vehicles the EO's are aware of have pressure relief valves associated with the PTO/pump that redirects fuel to the tank during this evolution. This truck was delivered without that capability. It is a positive displacement pump with no pressure relief line to recirculate pressurized fuel back to the storage tank when the pump is turned on with the dispensing handle closed. The truck was placed Out of Service with a "Hold Card" pending engineering evaluation.

What We Can Learn:

Don't automatically assume all equipment operates in a similar manner. When new equipment is brought on site, you must ensure personnel understand the manner in which it

will be operated. And, if possible management should avoid placing employees in error likely situations by ensuring like equipment operates in a like manner.

Other Non-Reportable Events

There were no additional non-reportable events related to environmental problems reported during the 1st Qtr FY-16.

ANALYSIS FOR RECURRING EVENTS:

No adverse trends or recurring problems were noted with the events that have been reported over the past 12 months. The seven similar events are the result of changes to 40 CFR Part 63.

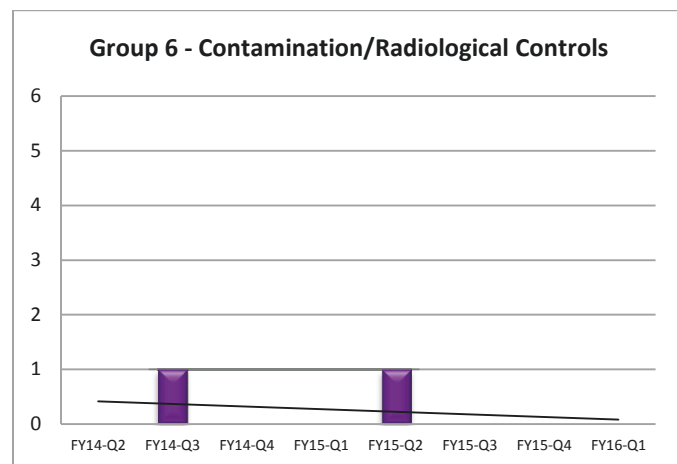
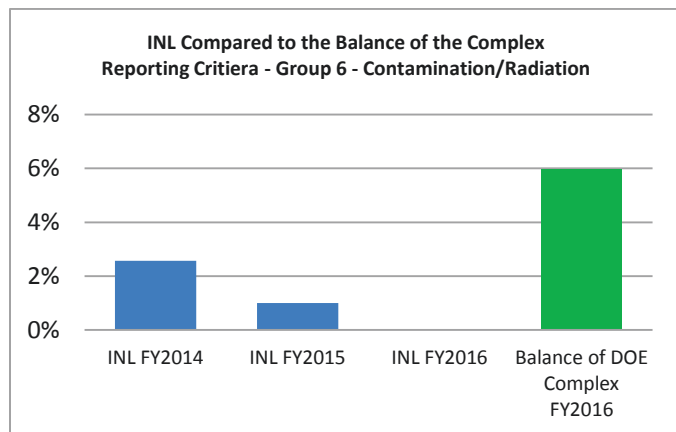


1st Qtr FY-16 GROUP 6 - CONTAMINATION/RADIATION CONTROL EVENTS

TREND SNAPSHOT

Contamination/Radiation Events: There were no reportable events related to contamination/radiation control reported in the 1st Qtr FY-16. The rate of these types of events is trending steady near zero over the past two years. During the last 12 months, only one reportable event was entered in ORPS under this reporting criteria. There were no additional non-reportable event documented this quarter.

None of the events reported at INL during the 1st Qtr FY-16 were reported under Group 6 Contamination/Radiation criteria. The balance of the DOE complex has reported 6% of events under the same criteria. Events related to contamination and/or radiation control are some of the least reported event types at INL; these have only accounted for one event at INL in the last 12 months.



ANALYSIS FOR RECURRING EVENTS:

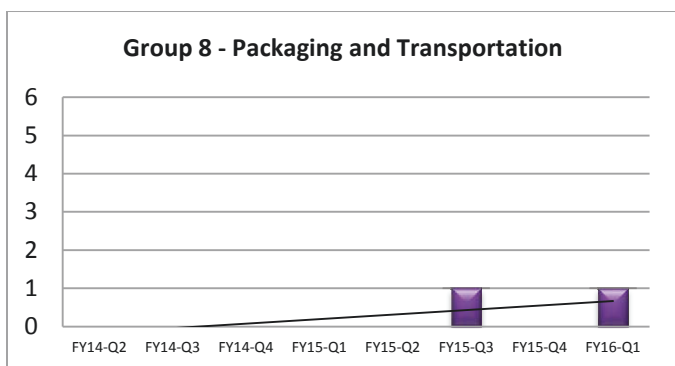
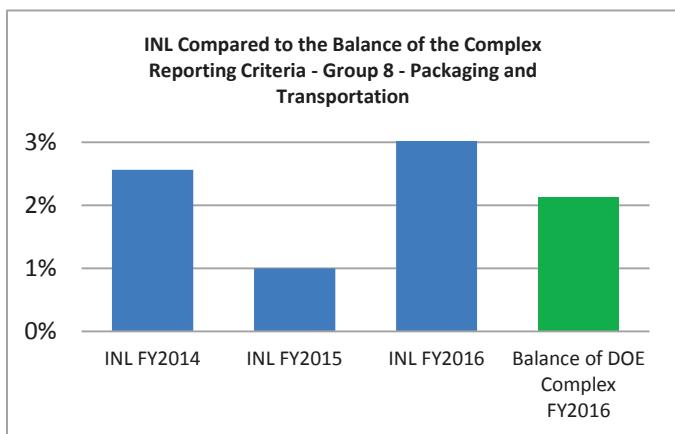
There has only been one reportable event under the Radiation/Contamination reporting criteria the past 12 months and three non-reportable events. A review of these four events identified no commonalities, no adverse trend, and no recurring problems.

1st Qtr FY-16 GROUP 7 – NUCLEAR EXPLOSIVE SAFETY EVENTS

There were no events related to nuclear explosive safety during the 1st quarter FY-16. BEA has never reported an event under this reporting criteria since taking over the contract for the Laboratory in 2005. There were also no events reported under the Group 7 – Nuclear Explosive Safety Events criteria across the DOE Complex so far during FY-16.

TREND SNAPSHOT

P&T Events: There was one reportable P&T event reported during the 1st Qtr FY-16. The rate of occurrence of P&T issues is slightly increasing. Over the past 12 months, there have only been two P&T-related reportable events documented in ORPS. One additional non-reportable events occurred during the 1st Qtr FY-16.



INL rarely reports events under Group 8 P&T criteria however; there was one event this reporting period. When compared to the balance of the DOE Complex in FY-16, 6% of all INL reportable events documented in ORPS were related to P&T, compared to 2% across the DOE Complex.

The reportable event has already been described in the discussion for Group 3 events. The criticality violation due to exceeding the total fissile mass limit in a fuel bottle container was also reportable under the packaging and transportation criteria. The two non-reportable events that occurred during the 1st Qtr FY-16 are summarized below.

Other Non-Reportable Events

CO 2015-3774

BEA was verbally notified by Nevada National Security Site (NNSS) that receipt of BEA Low Level Radioactive Waste (LLW) at NNSS will be suspended pending further review as a result of three past shipments with containers not specified on the approved waste stream profile. The containers of concern were DOT specification USA/9979/AF-96 drums. A total of three 9979 specification containers had been shipped to NNSS for disposal. This event, and the lessons we can learn from it, have already been described in the Lessons Learned section of this report and will not be repeated here.

Other Non-Reportable Events

CO 2015-4164

During an incoming shipment survey of the empty cask received from Savannah River Site, smearable contamination on the external surfaces of the package was discovered with levels up to 4,608 disintegrations per minute (dpm) per 100 centimeters squared (cm²) beta-gamma and <20 dpm/100cm² alpha (results after smear dried). Notifications were made to Radiological Controls Management, ATR Management and DOE and the cask was covered with plastic, labeled and posted as a contamination area under the plastic. The contamination levels obtained by the Savannah River site prior to shipping the cask to INL indicated <200 dpm/100cm² beta-gamma and <20 dpm/100cm² alpha.

The smears were sent to the Radiation Measurement Laboratory (RML) for isotopic analysis. The analysis showed the cask to be contaminated with Cesium (Cs) 137. The shipping trailer with cask was moved to the ATR building RTC-670 air lock where it was, resurveyed and wrapped with a cover to ensure its protection in all anticipated weather conditions.

This event was initially categorized under Group 8, Packaging and Transportation, however upon further review it was determined that this event did not meet any specific reporting requirements of DOE O 232.2 and the event was retracted.

What We Can Learn:

Due diligence always pays off especially when working in a hazardous environment. There are reasons we conduct

surveys upon accepting materials at INL just as there are reasons we survey materials before sending them off site.

ANALYSIS FOR RECURRING EVENTS:

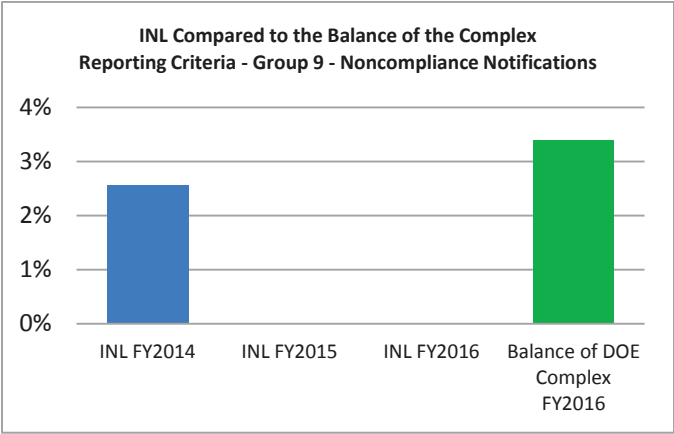
There is no indication of an adverse trend or recurring problems associated with P&T activities at INL.

1st Qtr FY-16 GROUP 9 - NONCOMPLIANCE NOTIFICATIONS EVENTS

TREND SNAPSHOT

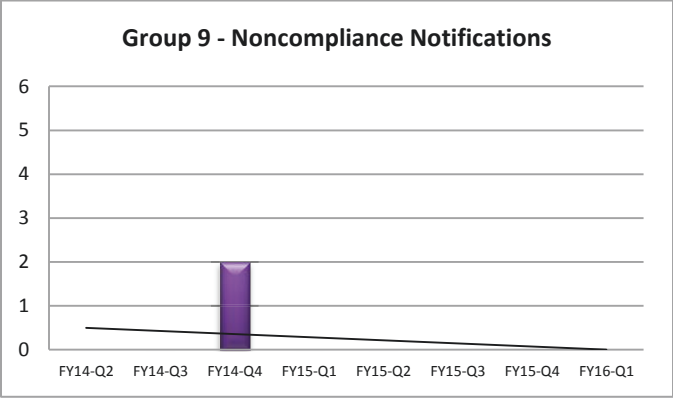
Noncompliance Notification Events: Noncompliance notification events are reported when the INL receives written notification from an outside regulatory agency that the site or an INL facility is considered to be in noncompliance with a schedule or requirement. Over the past 12 months, the INL has not been issued any noncompliance notifications and has not received such a notification since 2014. There were no events reported under this criteria during the 1st Qtr FY-16. The two year trend data for these types of events shows a decreasing trend.

Slightly over three percent of the events occurring during FY-16, throughout the balance of the DOE Complex, were reported under these reporting criteria. None were reported by INL in the 1st Qtr FY-16.



Other Non-Reportable Events

There were no additional non-reportable events related to noncompliance notifications reported during the 1st Qtr FY-16.



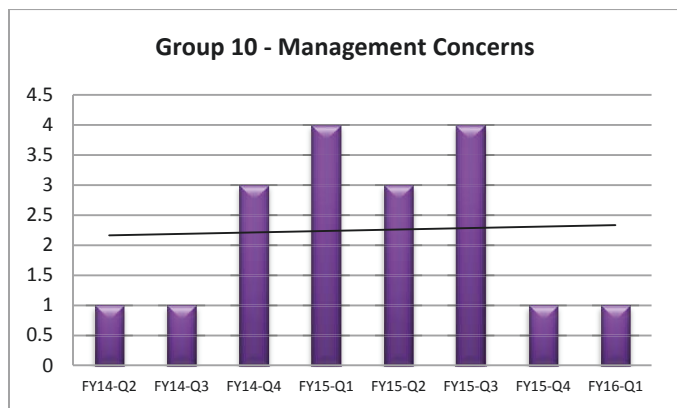
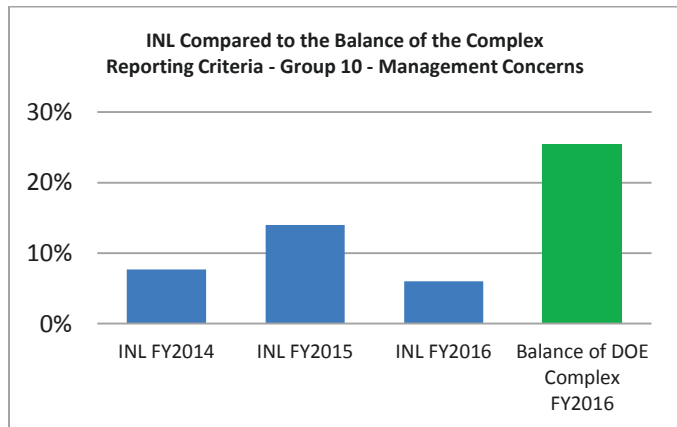
ANALYSIS FOR RECURRING EVENTS:

As stated in previous quarterly reports, 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: One event was reported during the 1st Qtr FY-16, under reporting criteria for a management concern or issue. The rate of occurrence of reportable management concerns is trending slightly upwards over the past two years. During the past 12 months, INL has reported nine events under Group 10 management concerns.

The balance of the DOE complex reported 26% of all events from the 1st Qtr FY-16 under Group 10 Management Concern criteria. In comparison, INL has reported 6% of all events under the criteria.



The one event reported during the 1st Qtr FY-16 is summarized below:

Failure of Facility South Roll-Up Door

NE-ID--BEA-HFEF-2015-0003 (Significance Category 3)

On October 26th, 2015, at approximately 0805 the HFEF facility south roll-up door experienced a mechanical failure.

The facility 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 facility operator's head. The door dropped closed and the sprocket fell landing approximately 2 feet from the facility operator. While sufficient barriers were in place to protect the operator from the falling door, there were no barriers to protect the operator from the falling sprocket.



Investigation by the subcontractor and HFEF personnel determined that one

or both set screws holding the sprocket on the motor drive shaft had not been properly installed and torqued. Failure to properly torque the set screws caused the door drive sprocket to disengage from the door motor shaft which allowed the door to fall in an uncontrolled manner. The investigation also found that the work was performed as skill-of-the-craft and that verification of completion of important work steps is not required or performed.

What We Can Learn: It is important to employ a process that ensures critical evolutions / parameters (load bearing parts of the door installation) are successfully completed. For example a work package signoff or a second independent check by a qualified individual can be used to ensure proper installation of critical / load bearing parts.

Other Non-Reportable Events

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

ANALYSIS FOR RECURRING EVENTS:

During the past 12 months, there have been nine 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. Three events reported as not meeting thresholds were:

- ATR Transmitter Drain Header Burst During Venting
- Identification of a Recurring Theme within the INL Power Management Group
- REC Fiber Optic Upgrade

Six additional events have been reported as near misses during the past 12 months. These include:

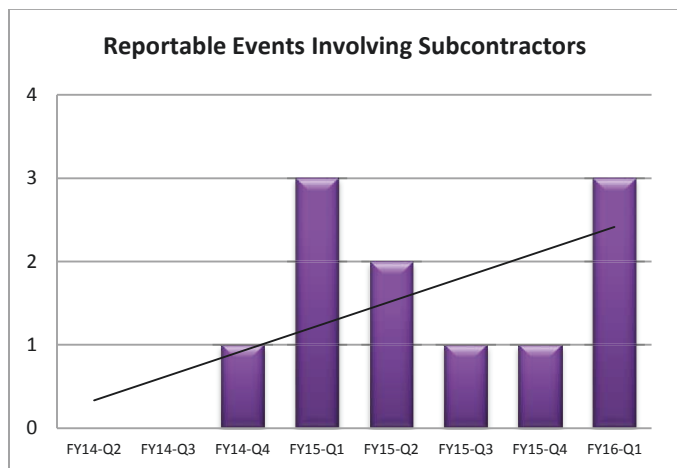
- Worker Exposed to Fall Hazard During Crane Preventative Maintenance
- TRA-666 Safety & Tritium Applied Research Facility Sample Shipment
- Electrical Arc Due to Partition Adjustment
- Arc Flash at the CFA Substation
- Wild Land Fire Response Electrical Hazard Near Miss
- Failure of Facility South Roll-Up Door.

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

1st Qtr FY-16 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 due to three events in the 1st Qtr FY-15 and two events in the 2nd Qtr FY-15 and three events in the 1st Qtr FY-16. During FY-16, 19% of INL's reportable events involved subcontractors. In comparison, 12% of events occurring throughout the balance of the DOE complex involved subcontracted personnel.



There have been seven ORPS reportable events involving subcontractors during the past 12 months. This quarter, the failure of the facility roll-up door at HFEF, the personal key

left in the lockbox, and the incident where personnel entered the electrical flash boundary at SMC all involved subcontract personnel.

ANALYSIS FOR RECURRING EVENTS:

The events of the past year were reviewed for similarities; none were identified. One subcontractor has been involved in two of the seven events during the last 12 months; however, there is no indication of a recurring problem or adverse trend associated with this subcontractor. Additionally, there is no indication of an adverse trend or recurring problem associated with any of the events involving subcontract personnel that have occurred over the last 12 months.

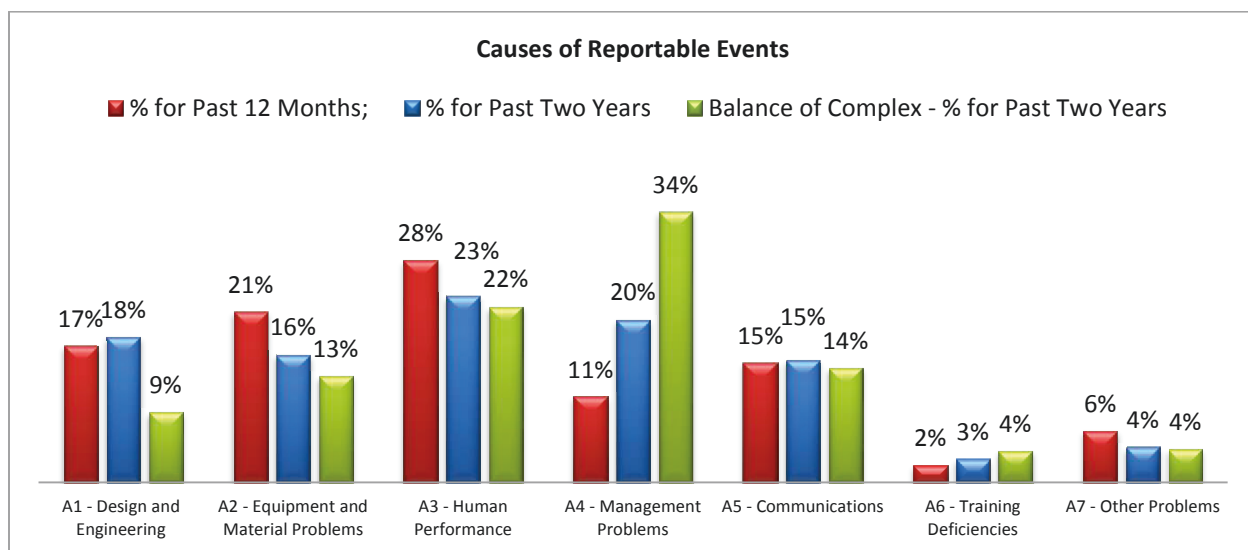
1st Qtr FY-16 ANALYSIS OF CAUSES OF REPORTABLE EVENTS

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 was reviewed to determine causes over the last 12 months and the past 24 months. Cause codes are not required to be entered into ORPS for Significance Category 4 events, so data from those events is not included in this analysis.

The analysis shows that the majority of causes over the last 12 months can be attributed to less-than-adequate human performance (A3) and secondly by equipment or material problems (A2). INL has seen a reduction in events cause by management problems when comparing the past 12 months

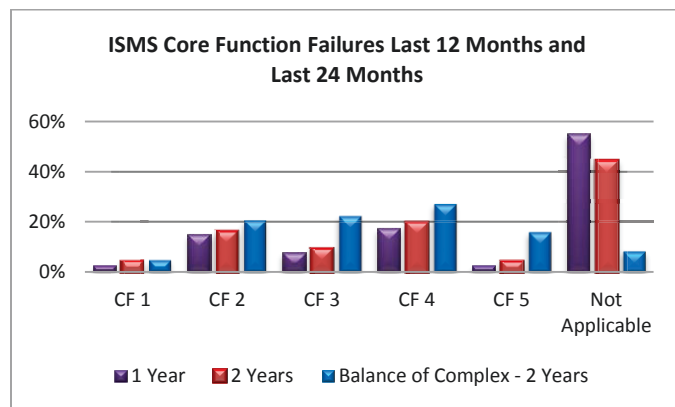
to the past 24. Successful mentoring and oversight, achieved by having management spend time in the field, watching work, and addressing incorrect behaviors before they lead to events will help drive the rate of human-performance events down.

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 the balance of the Complex reported 34% of the events occurred due, in part, to management problems followed by 22% of events caused by less-than-adequate human performance.



In addition to evaluating the cause of events, INL analyzes each reportable event to identify where we failed to effectively implement the five Integrated Safety Management System (ISMS) core functions. The chart below shows all reportable events that have occurred over two separate intervals; the past 12 months, and 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:

- 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, 55% of INL reportable events indicated no known failures of the ISMS process. These events include equipment problems and discovery of suspect counterfeit parts among other events. Eighteen percent of the events

indicated problems with Core Function 4 – Perform Work within Controls. This is a 2% decrease from the two year comparison. These metrics will continue to be monitored to ensure INL is effectively implementing the ISMS program.

The INL MOP has been enhanced so that it can enable safe, secure, efficient, and effective work performance through regular, purposeful, and documented management presence, where and when employees perform work. This is achieved by management personally observing work activities and

communicating with employees to solicit input and provide mentoring, coaching, and timely feedback on behaviors. This program strengthens application of Core Function 4 and is almost fully implemented across the INL.

1st Qtr FY-16 ANALYSIS OF IOPAC TRENDING ANALYSIS

TREND SNAPSHOT

IOPAC Trending Analysis: The INL Integrated Operations Performance Analyses Committee (IOPAC) was formed by the INL Operations Council to provide a forum to discuss Laboratory-wide trends (both adverse and positive) with a goal of elevating Laboratory level risks to the Operations Council. This was done at the mission centers. During the 4th Qtr FY-15, the IOPAC changed hands and, with the transfer of responsibility, a change of approach in analysis. The new path forward has been defined and implemented and provides a forum for Management System and key operational program leads to discuss adverse and positive trends noted in implementation of systems/programs at INL.

An example of the newly implemented IOPAC dialogue starter board is shown to the right. The IOPAC summary for the 1st Qtr FY-16 included the following updates from the 4th Qtr FY-15.

UPDATES

- Lack of QE Resources available for EES&T and NHS
 - Mitigation: Posting forthcoming for shared resource for EEST/NHS
 - **Update:** Candidates are being interviewed. This posting was possible because of funding secured from EES&T, NHS and Waste programs.
- Batteries and lightbulb disposal issues due to lack of understanding
 - Mitigation: localized trainings offered at ATR and MFC (available to all where issues identified); all mission centers informed of issue through IOPAC
 - **Update:** Training provided; additional disposal containers have been provided. Improvements noted and will continue to monitor for sustained improvement.

Example IOPAC Dialogue Starter Board

Functional Area	Contact	EEST	NHS	NS&T	ATR	MFC	TREAT	F&SS	SMC	Lab Protection	Lab-Wide	Overall
Research MS	POC											
Contractor Assurance MS	POC											
Environmental MS	POC											
HC (Training)	POC											
Occupational Safety and Health MS	POC											
Quality MS	POC											
Radiological MS	POC											
Work Management MS	POC											
HPI	POC											
Lessons Learned	POC											
Issues Management	POC											
Self Assessment	POC											
Management Observations	POC											
LOTO	POC											
Hoisting and Rigging	POC											
Conduct of Operations	POC											
Electrical Safety	POC											
SDRP	POC											
Significant Events (ORPs)	POC											
VP/LEST	POC											
ISMS	POC											

Purple = I have something to discuss
 Orange = All is going well
 White = Not enough information to make a judgement

- RCRA permitting and late notification to facilities of impact
 - Mitigation: Lessons Learned for Environmental to engage Mission Organizations earlier in process; MFC responding to ensure appropriate personnel have HAZWOPER training
 - **Update:** Engagement at working level improving. Actions entered in LabWay and working.
- Integrated Assessment System (IAS) sunset and ensuring the records within IAS are transferred to EDMS; Currently evaluating path forward. Will provide status next quarter
 - **Update:** Link from IAS to EDMS has been disabled; Assessment Coordinators have been informed. Working for mass transfer solution prior to sun-setting IAS; IM will provide resource mid March to build mass transfer link
- Work Control related issues at ATR showed an increase in work schedule impacts entered to support trend reporting
 - Mitigation: Improved communication and drove integration into work planning; currently tracking work delays to better improve the scheduling process
 - **Update:** The initial increase was due to new criteria utilized to help mature trending. The use of trending data has helped to focus on areas of success and areas to continue to improve. ATR will continue to monitor to ensure progress is sustained

NEW GOOD PRACTICES AND BEHAVIORS NOTED:

- EES&T discussion on what can be learned from a cyber occurrence: provide and make readily available low capacity/low cost thumb drives for presentations to eliminate risk of introducing virus. IM discussing the potential placement of USB scanners so they are readily available
- F&SS continuing internal and independent assessments for Arc Flash Corrective Actions to ensure no drift is occurring (above and beyond the Corrective Action Plan)
- Localized efforts target injury rates (see below)
- Lab Protection (Security Systems) is seeking independent reviews of work packages to identify risks/assess quality
- Conduct of Operations working with Research Community to develop a proposed standard for work authorization process; engaging ISMS program lead in discussion

NEW CONCERNS TO MONITOR OR MITIGATE:

- LabWay “Blindsides”: In some cases the LabWay tool is being used to communicate a concern that should be immediately addressed rather than a more prompt notification to line management or the appropriate TPOC. Some were using it as a “complaint” tool.
 - **Mitigation:** The fundamentals of issues management are based in effective and appropriate communication. A renewing focus on expectations of communications via Performance Analysts and will monitor for specific coaching opportunities. We do not want to discourage folks from utilizing the tool so will balance coaching/positive behaviors
- Lag time occurs when DOE rejects closure of DOE-identified issues via Zeus. Rejected issues were identified in the Quarterly Evaluation Report (QER) each quarter; potentially 4 month delay
 - **Mitigation:** This issue is related to non-facility centric Mission Centers, i.e., not an issue at ATR/MFC where Facility Representatives work closely with Performance Analysts and Facility Managers. For non-facility centric Mission Centers, Quality & Performance Management (QPM) is working with DOE-ID to improve communications when issue resolution is rejected. DOE-ID now provides a status of DOE-ID findings via Zeus monthly in addition to a post quarter summary in QER. QPM and Performance Analysts (PAs) will monitor to ensure this mitigation is effective.
- Evaluation of closure evidence in LabWay found examples where proper documentation was lacking
 - **Mitigation:** Continue to work with Performance Analysts to correct behaviors/ensure closure evidence is provided
- Negative trend in releases to environment and consequently notifications to the Department of Environmental Quality (DEQ) increasing
 - **Mitigation:** Environmental is working with Mission Centers to determine causes of releases and actively assessing appropriate mitigations
- The discussion on IAS records led to subsequent discussions of a potential issue with INL Data Systems and compliance with Software Quality Assurance (SQA) requirements.

- **Mitigation:** Players are engaging in continued discussions to ensure we are all in agreement on INL requirements
- Discussion on adverse trends being included in reports and communication to all impacted/involved parties not happening. Risk: potential blindsides and the appearance we are not on the same page.
 - **Mitigation:** IOPAC will develop potential resolutions. QPM has lead.
- TRCR and DART; progressing downward however a challenge remains with employees maintaining situational awareness
 - Current examples of best practices/mitigations:
 - Manual Material Handling: Lab Protection has adhered labels to equipment identifying the weight and when requires more than one person to lift
 - Fitness for Duty related injuries; Re-injury of previous condition: F&SS

invited Dr. Curtis to tour Big Shop (and plan other functional areas) so medical staff will understand work prior to release individuals back to work following STD.

- F&SS requiring all staff to attend the Back and Shoulder School
- ORPS negative trend in Prompt Reporting: INL Management is notifying DOE Fac Reps when an event is first discovered however, in some cases, they are not following through with a notification once the event is determined reportable (prompt notification following categorization).
 - **Mitigation:** Share with appropriate personnel performing ORPS categorization and reporting to reinforce the importance of timely notification to DOE-ID when events are found to be reportable.

INL Quality and Performance Management Expectations

INL has a vision to change the world's energy future and secure 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 Lab know how we are doing and are improving our performance.
- Own and manage the Laboratory Issues Management System.
- Provide high quality QA 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."

– Chris Hott, Director – INL Quality and Performance Management

Prepared by Lisbeth Mitchell for

Idaho National Laboratory
INL Quality and Performance
Management

P. O. Box 1625, Mail Stop 3206
Idaho Falls, ID 83415

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