

Idaho National Laboratory

Quarterly Event Performance Analysis

FY2013 4th Quarter

November 2013



The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

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Quarterly Event Performance Analysis
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Idaho National Laboratory
Idaho Falls, Idaho 83415

<http://www.inl.gov>

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Idaho National Laboratory

Quarterly Event Performance Analysis

DEEPER LEARNING THROUGH EVENT ANALYSIS

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FY2013 4th Quarter

This report is published quarterly by the Idaho National Laboratory (INL) Performance Assurance Organization.

The Department of Energy 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 78 occurrence reports and 15 event reports for events identified at the INL during the period of October 2012 through September 2013.

Battelle Energy Alliance (BEA) operates the INL under contract DE-AC-07-051D14517.

Highlights...

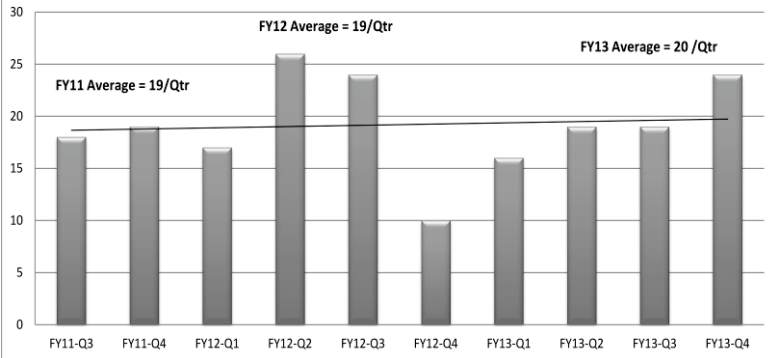
The average number of occurrences reported at the INL per quarter increased slightly to 20 this quarter. In past years it has been reported as between 18 and 19 per quarter. The rate of significant events (those reported as Operational Emergencies, Recurring Issues, and/or Significance Categories 1 or 2) continues to increase with a FY13 total of 19.

The average number of days between significant occurrences continues to trend upwards, which indicates a positive trend.

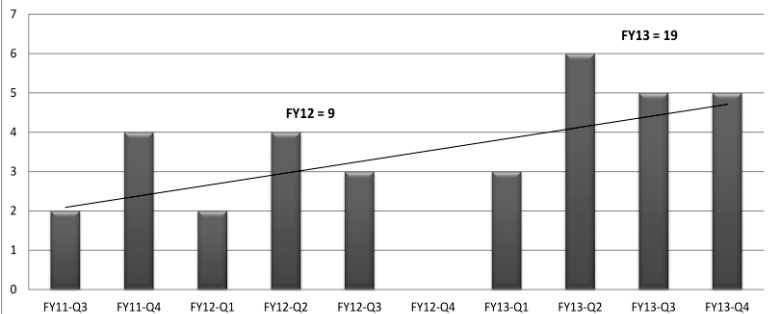
This quarterly analysis reviews those events that were reportable through ORPS, events that did not meet ORPS reporting thresholds, and some deficiencies tracked in the INL issue tracking system. This analysis also looks at the causes of reportable events, and trending performed by the INL Operational Performance Analysis Committee (IOPAC) group.

Finally, this report provides a summary of the more significant Lessons Learned issued by the INL.

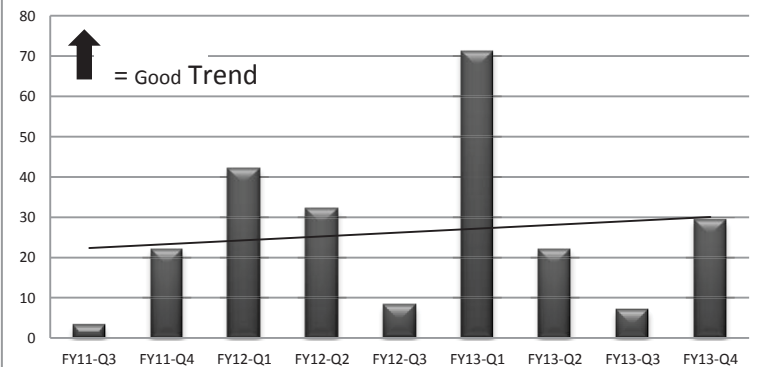
Occurrence Reporting Rates as of FY13 Q4



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



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



Follow Up on Response to DOE: As reported in the 3rd Quarter of FY2013, the Department of Energy Idaho Operations Office (DOE-ID) issued a finding for BEA's failure to identify recurring events for several lockout/tagout (LO/TO) violations and several Technical Safety Requirements (TSR) violations. Actions to address this finding are being tracked under IO-027970. One action item (AI-13623, to create a new definition for recurring events that meets DOE-ID's expectations and to incorporate that definition into INL procedures and guidance documents) remains open. Meetings with DOE-ID have taken place and changes to the procedures are ongoing and scheduled to be complete before the end of the calendar year.

New INL Occurrences

From 7/1/2013 through 9/30/2013, the INL reported 24 new events to DOE, in accordance with DOE Order 231.1B. These events are analyzed to determine commonalities related to: Operational Emergencies (Group 1); Personnel Safety and Health (Group 2); Nuclear Safety Basis (Group 3); Facility Status (Group 4); Environmental (Group 5); Contamination and Radiation Control (Group 6); Nuclear Explosive Safety (Group 7); Packaging and Transportation (Group 8); Noncompliance Notifications (Group 9); and Management Concerns (Group 10).

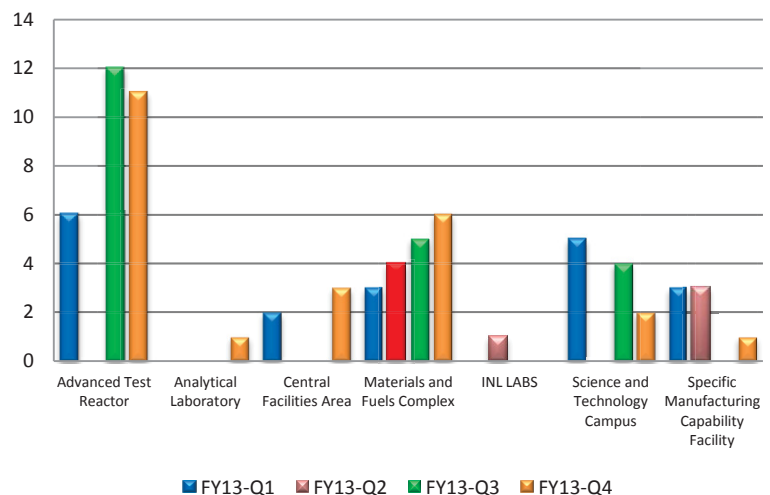
In addition, the INL reported an additional 15 *events* through our local issues tracking software that did not meet ORPS reporting thresholds. These events were reported via the Initial Notification Reporting process or reported directly into the issue tracking software. These events are also discussed and analyzed within this report.

TREND SNAPSHOT

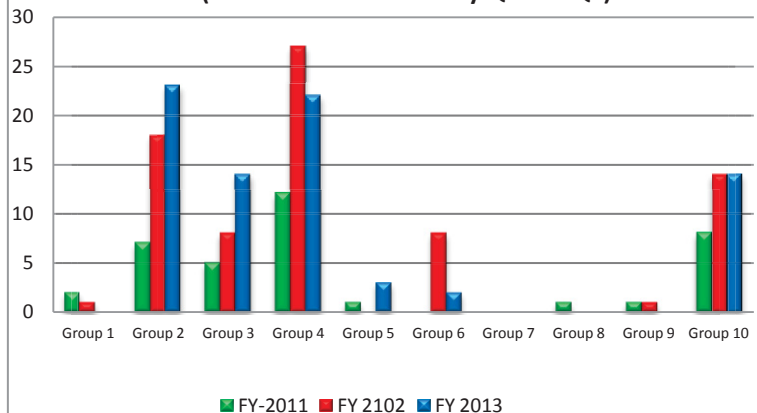
Occurrences by Facility: The Material and Fuels Complex (MFC) saw another increase in the number of reportable events during the 4th Qtr FY13 as compared to the 3rd Qtr FY13, while the Advanced Test Reactor (ATR) saw a small decrease. Because of the nature of work occurring at the ATR and MFC Facilities, it is not unexpected that these facilities report the most number of events.

ATR reported 46% and MFC 25% of the events reported during this reporting quarter. Analysis of the nature and causes of all the reportable events is covered in other sections of this report.

Occurrence Reports by Facility
(Fiscal Year 2013)



Occurrence by Reporting Criteria
(FY-11 Data Includes only Q3 and Q4)



TREND SNAPSHOT

Occurrences by Reporting Criteria: INL continues to experience the majority of events related to personnel safety and health (Group 2), nuclear safety basis (Group 3), facility status (Group 4), and those reported as management concerns (Group 10). Analysis of all reportable events and any noted trends is covered in other sections of this report.

4th Qtr FY13 GROUP 1 - OPERATIONAL EMERGENCIES

There were no operational emergencies reported during the 4th quarter of FY2013. The last operational emergency was reported in April 2012, when boron trifluoride gas leaked from a neutron detector (NE-ID--BEA-INLLABS-2012-0003). This was also the only operational emergency in the last two years. The rate of occurrence of operational emergencies remains constant at zero.

4th Qtr FY13 GROUP 2 - PERSONAL SAFETY AND HEALTH EVENTS

Personnel safety and health occurrences were the most frequently reported event type, accounting for 23 reportable events in the last 12 months. Eight events were reported during the 4th Qtr FY13 and are summarized below. Additionally, six events related to personal safety and health, but that did not meet ORPS reportability, were also reported through the INL issues management software. These events are also summarized below.

Highly Enriched Uranium Turnings in Lathe Catches Fire and was Immediately Extinguished with No Contamination Spread

NE-ID--BEA-TSD-2013-0001 (Significance Category 4)
On July 2, 2013, machining operations of a Highly Enriched Uranium (HEU) pin were being conducted in the Experimental Fuels Facility (EFF) using a HAAS ST10 lathe. The Principal Investigator (PI) was indexing the machining head to the HEU pin. As the carbide tip of the machining head was positioned against the HEU pin a white spark fell into the catch basin in the lathe enclosure where machined turnings are collected. The PI noted a blue glow in the area of the accumulated turnings in the catch basin. The procedure for using the lathe listed this as a potential hazard and identified the necessary controls. The response by the PI was in accordance with the approved procedure; however improvements to lessen the likelihood of recurrence were identified and implemented.

Knee Injury Requiring Surgery after Follow-up Evaluation

NE-ID--BEA-SMC-2013-0004 (Significance Category 3)
While rising from a chair at their workstation, an employee turned slightly and felt a burning sensation in their right knee. The employee notified the Facility Area Supervisor (FAS) and was taken to medical for evaluation. The employee was released to work with restrictions and scheduled for follow-up with a private physician. Approximately two weeks later, the employee's manager was notified that surgery had been scheduled to repair the employee's knee. This met ORPS reporting criteria as a serious occupational injury.

Inadvertent Contact with an Uncontrolled Electrical Hazardous Energy Source – 120V

NE-ID--BEA-HFEF-2013-0003 (Significance Category 2)
While preparing for a pneumatic transfer to a glove box, a Health Physics Technician (HPT) inadvertently contacted an exposed electrical circuit. The employee was installing a radiological meter probe to the transfer piping when his left arm contacted an electrical switch associated with the pneumatic transfer system circuitry resulting in a shock of 120 volts. The exposed electrical circuitry was not readily visible (located at a height greater than eight feet off the ground) and was in use for at least the past 25 years without any known alteration that may have resulted in this condition.

The manner in which the pneumatic transfers were performed was recently changed necessitating a HTP to ascend a ladder and place a probe next to the piping. Hazard assessment walkdowns performed following the procedure change did not reveal the exposed electrical circuit.

Discovery of Un-Mitigated 120V Power Source During Fire Alarm System Upgrades

NE-ID--BEA-FCF-2013-0001 (Significance Category 3)
During the upgrade of the Fuel Conditioning Facility (FCF) fire protection system, operations discovered a blown 1 amp 120V fuse in a programmable logic controller (PLC) that provides an interlock function from the fire protection system. Investigation of the cause for the blown fuse showed a module, with a 120V line to it, had been replaced during the fire protection system upgrade. The work package was not adequate to address all of the electrical hazards and system interconnections associated with the fire alarm system upgrade. The plant drawings showed the 120VAC power to the module and review of the drawings while developing the work instructions failed to recognize the power source and potential electrical hazard. Subsequently, the work order review and approval process also failed to recognize the power source. The correct persons were not involved in

development or approval of the work order. Had a review by facility engineering been initiated, it may have resulted in identification of the 120V power source in the work package.

Black-Body Calibration Source Equipment Malfunctions at CFA Calibration Lab

NE-ID--BEA-CFA-2013-0002 (Significance Category 3)
During insertion of a reference thermocouple into the temperature-monitoring well of an infrared temperature source, an electrical arc occurred between the sheath of the thermocouple wire and the case of the temperature source. No injuries resulted from this incident. A lab technician had started the furnace and set the black-body calibration source to 250 degrees Celsius. A metal Type K Thermocouple was inserted into the furnace to aid in calibration. When inserting the probe, the technician noted some resistance and as he pushed the probe further into the furnace the insertion produced an arc. The lab technician pulled the power plug out of the furnace and disconnected from the wall outlet. The ceramic insulation in the insertion point of the furnace had degraded. The resistance felt when inserting the probe was a sign that something was not right.

Power Lineman Injured While Accessing Bucket on Bucket Truck

NE-ID--BEA-CFA-2013-0001 (Significance Category R)
On 7/23/2013 a Power Management Lineman slipped while accessing the bucket of a lift truck. The lineman fell ~4.5 foot landing on the deck of the truck; the fall resulted in a fracture and a laceration to his left forearm. The event was identical in nature to an accident that occurred in October 2012 resulting in injury to a Power Lineman. Actions taken following the first event were not completed. These actions included sharing the lesson with INL employees who access bucket trucks, and retrofitting the trucks with handholds to ensure safe entry and exit from the bucket.

Subcontractor Bypasses Work Control and Lockout/Tagout Processes at the Advanced Test Reactor

NE-ID--BEA-ATR-2013-0032 (Significance Category 4)
On 9 September 2013, a subcontractor representative for the Ashland Chemical Company came to the ATR to gather data from the Ashland On Guard water monitoring unit (test equipment that Ashland installed to collect data for chemistry control of the ATR secondary system). While collecting data, the Ashland representatives determined the monitoring unit needed to be adjusted and, without informing anyone in Operations, opened the main power breaker on the front of the unit and unplugged the unit power cord from the 480 V

welding receptacle. After adjustments were made, the monitoring unit would not power up and the Ashland representatives requested assistance from the control room supervisor, who sent a process operator to determine what the representatives needed. The process operator found the Ashland representatives with two blown fuses and, believing they had approval to work on their equipment, helped them obtain replacement fuses. With the monitoring unit still de-energized, the fuses were replaced and the unit was powered on. When informed of the actions that had been taken, the Shift Supervisor (SS) immediately stopped work, as he had not authorized any work to be done on the Ashland on guard water monitoring unit. At no time were the Ashland employees exposed to a hazardous energy source.

Failure to Identify All Potential Pressure Sources on Lockout/Tagout at the ATR

NE-ID--BEA-ATR-2013-0025 (Significance Category 3)
On 15 July 2013, Operations personnel completed hanging a LO/TO on experiment loop 1D-N in support of a work order to replace loop pressurizer relief valve. Crafts personnel signed into the LO/TO and completed the replacement of the pressurizer relief valve. They then turned the work package back to Operations for clearing the LO/TO. It was later discovered that one potential pressure source to the pressurizer was not controlled by the LO/TO. During the night shift on 15 July 2013, the senior experiment operator (SEO) and the SS held a discussion on the work order and the LO/TO. Both failed to identify an alternate path of loop make-up water from the loop make-up pumps, through the degassing line.

Other Non Reportable Events

There were six personnel safety and health non-reportable events reported in the INL issues tracking software during the past quarter. These events are as follows:

ICAMS IO-028846

On August 8, 2013, a fire extinguisher discharged in a pickup truck being used to haul project material to a customer. A hissing sound was heard from the back seat as the driver approached Central Facilities Area (CFA) Building CFA-699. The driver noted that a fire extinguisher was discharging. The driver immediately stopped the vehicle, placed it in park and exited. While the driver did smell the contents of the extinguisher; he did not have any visible material on his person. There were no other passengers. The driver suffered no injuries or adverse effects from the extinguishing agent. Examination showed the fire extinguisher was unsecured on

the back seat. The extinguisher seal and pin were found on the opposite side of the seat.

ICAMS IO-029058

On August 19, 2013, a Facilities and Site Services (F&SS) Fitter injured his right index finger while attempting to cut plastic pipe using a pocket knife. The fitter was attempting to cut a section of plastic pipe with a company issued pocket knife when the locking mechanism did not engage. The pocket knife closed onto his right index finger.

ICAMS IO:SMC-002603

On August 26, 2013, the FAS for TAN-679 discovered that a subcontractor employee had performed work under a simple LO/TO before INL personnel had completed the zero energy verification as required by LWP-9400. The task involved cutting and capping a ¼ inch air line in preparation for replacing a door on one of the SMC boilers. The air had been secured, a locking device was installed, and the Authorized Employee and FAS had watched pressure bleed to zero on an air gage. Prior to releasing the LO/TO to the subcontractor, the FAS was awaiting the performance of a Minor Maintenance task to break a fitting to positively verify zero energy. However, the subcontractor, believing that had already been done, also verified zero energy at the gage and by breaking the fitting, he proceeded with the work. This constituted a non-compliance with the LO/TO procedure as well as an SMC Long Term Order requiring an independent review of all LO/TOs prior to work.

ICAMS IO -029383

On August 5, 2013, INL Bus 520 (NRF Pocatello route) struck and injured an elk near the old fire station location

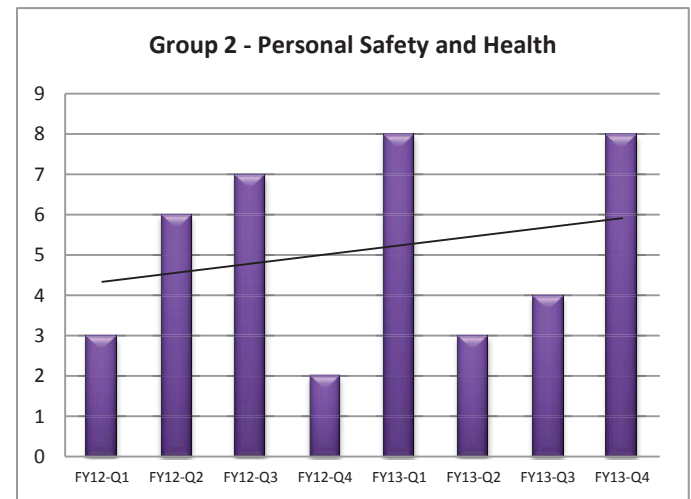
(approximately half-way between INTEC and NRF). No personnel were injured and damage to the bus was limited to broken driver side headlamp and cover.

ICAMS IO -029459

Another bus accident occurred on August 9, 2013, when INL Bus 503 (MFC Shift route) was sideswiped by a privately owned vehicle (POV) on US 20 near the University on-ramp. No personnel were injured during the accident. The driver of the POV was cited for failure to maintain his lane.

ICAMS IO -029490

On August 12, 2013, during the installation of a photo cell power system for the CFA INL monument, several suspect “blasting cap” wires were discovered protruding from landscaping boulders. Explosive expert was notified. Work was curtailed pending further evaluation.



TREND SNAPSHOT

Personnel Safety and Health Events: Personnel safety and health events accounted for 33% of the events reported in ORPS during the 4th Qtr FY13 and 29% of those reported during the fiscal year. The rate of reportable personnel safety and health events continues to trend upwards. Causes of the 4th Qtr FY13 personnel safety events varied but can be primarily attributed to human performance errors including failures to stop when problems arose, giving attention to the wrong issue, and performing less than adequate review of work. These human performance errors were coupled with management errors and procedure problems. **There were no similarities in the personnel safety and health events nor in their causes, organizations, or work groups, that would indicate an adverse trend or recurring problem.**

Nuclear safety basis events were tied for the third most frequently reported event type at the INL, accounting for 14 reportable events in the past 12 months. Two of these events were reported during the 4th Qtr FY13 and are summarized below.

Panel P-11 Safety-Related and Non-Safety Related Cable Separation Result in Positive Unreviewed Safety Question at the ATR

NE-ID--BEA-ATR-2013-0028 (Significance Category 2)

On 12 August 2013, a Potential Inadequacy in the Safety Analysis (PISA) was declared regarding cable separation in the reactor control room panel P-11. Following the discovery of cable separation issues documented in ATR Complex-USQ-2012-778 and ATR Complex-USQ-2013-252, it was determined that additional cabinets in the ATR control room should also be inspected to see if similar problems existed. This inspection revealed that Control Room Panel P-11 contains both Safety-Related Plant Protection System (PPS) and non-Safety-Related cabling in close proximity. This configuration may not meet minimum separation requirements. A USQ Reasonability Determination/PISA was completed and a PISA was found to exist. This physical

configuration of the cable routing has existed since the system was installed in the late 1970s with no degradation/failures caused by the lack of separation.

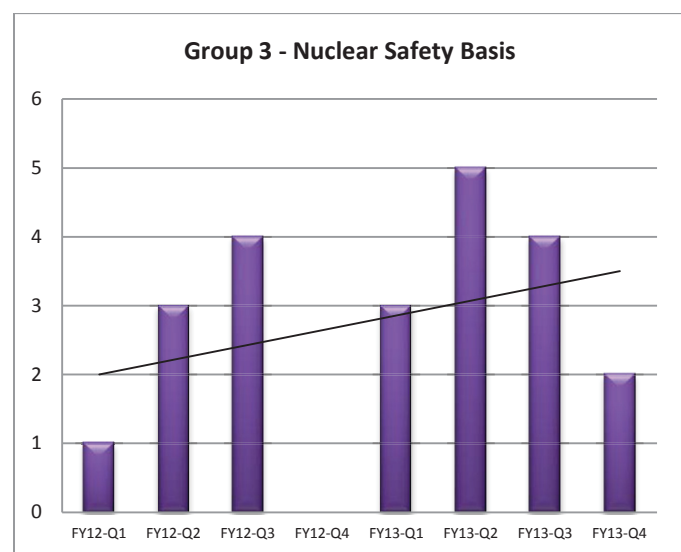
Potential Inadequacy in the Safety Analysis Regarding ATR Spent Fuel Cask Inadequate Dose Consequence

NE-ID--BEA-ATR-2013-0033 (Significance Category 2)

On 25 September 2013, a Potential Inadequacy in the Safety Analysis (PISA) was declared regarding two concerns with the dose consequence analysis performed for the decay heat fuel melting scenario in PLN-936, "Transport Plan for the ATR Spent Fuel Element Transfer Cask." The dose reported in PLN-936, associated with a decay heat accident, may not be accurate for a fuel element with a decay power of 300 watts due to the inappropriate use of linear interpolation to calculate the dose at 300 watts. In addition, PLN-936 does not apply the appropriate level of controls (safety class vs. safety significant) to address the dose consequence to the public.

Other Non Reportable Events

There were no additional non-reportable events related to nuclear safety basis problems reported during the 4th Qtr of FY13.



TREND SNAPSHOT

Nuclear Safety Basis Events: Nuclear safety basis events accounted for 18% of the events reported in FY2013 and 8% of those reported in the 4th Qtr FY13. The number of nuclear safety basis events has dropped for two consecutive quarters, however, the rate of occurrence of nuclear safety basis continues to trend upwards, as indicated in the chart to the left.

During this reporting period, one of the nuclear safety basis events (**NE-ID--BEA-ATR-2013-0028**) was similar in nature to events reported last quarter because it was discovered as a result of a focused extent of conditions review. Aside from this event, there were no similarity between the remaining event and previously reported events that would indicate an adverse trend or recurring problem.

Events related to facility status have been the most frequently reported event type, accounting for 22 reportable events in the past 12 months. Eight facility status events were reported during the 4th Qtr FY13 and are summarized below.

Advanced Test Reactor 674-M-6 Diesel Generator Failed to Start

NE-ID--BEA-ATR-2013-0024 (Significance Category 3)
On 8 July 2013, the 674-M-6 diesel was being started for the monthly surveillance Detailed Operating Procedure (DOP) 8.3.1, "Standby Diesel and Equipment Operational Test." The diesel generator did not complete the startup cycle before it shut down on generator differential over-current. M-42 diesel was the running diesel for the ATR reactor with 674-M-6 diesel as emergency backup when it failed its monthly surveillance. Subsequent to the failed surveillance, the M-6 diesel generator was successfully started on three consecutive startup attempts. DOP-8.3.1 was completed satisfactorily.

Unplanned Automatic Scram Due to Operator Error

NE-ID--BEA-NRAD-2013-0002 (Significance Category 3)
While attempting to raise power to 250 kW, the NRAD Reactor Operator overshot the desired power level causing the reactor to automatically scram at the operational limit of 275 kW. The Reactor Supervisor likely caused the over power scram because he adjusted the set point for the potentiometer (without the Reactor Operators concurrence), distracting the Reactor Operator at a critical juncture in leveling power. The Reactor Operator did not follow established practices and remove his hands from the panel and stop the shimming in progress. The distraction resulted in the Reactor Operator inadvertently shimming when looking to his right to discern the distraction. This distraction occurred 1 to 2 seconds before the reactor scrambled.

Failed Relay on M-8 Primary Coolant Pump at the Advanced Test Reactor

NE-ID--BEA-ATR-2013-0026 (Significance Category 4)
On 25 July 2013, while performing Primary Coolant Pump (PCP) Shutoff System Time Response Testing, an Instrument Technician noted that he was not receiving proper indication for M-8 PCP on the test equipment. Further investigation by Electricians noted a sticking relay in the M-8 PCP breaker enclosure. Engineering and Operations confirmed that the

sticking relay, causing improper indication on the test equipment, also provides pump shut off functions in the PCP Shutoff System. The ATR was shut down for scheduled maintenance along with fuel and experiment change out. The primary coolant system was shut down and at atmospheric pressure. ATR TSR-186 Limiting Condition for Operation (LCO) 3.2.3.1, Primary Pump Shutoff System was not required to be operable at the time the sticking relay was noted.

Emergency Firewater Valve GT-10-35 Position Alarm Failure at the Advanced Test Reactor

NE-ID--BEA-ATR-2013-0027 (Significance Category 4)
On 10 August 2013, while performing a valve position alarm check of Emergency Firewater Injection System valve GT-10-35, the position alarm failed to actuate as expected. The valve was verified to operate normally. The alarm check was being performed as part of a routine functional check prior to loading fuel for the 154B-1 operating cycle. ATR TSR-186, Limiting Condition for Operation (LCO)-3.2.1.2, Emergency Firewater Injection Supply System was not required to be operable at the time the deficient alarm was identified.

ATRC Log Count Rate Meter Channel Failure

NE-ID--BEA-ATR-2013-0030 (Significance Category 3)
At 1505 on 19 August 2013, Advanced Test Reactor Complex (ATRC) Log Count Rate Meter (LCRM) channel "A" recorder indication was observed to have been off scale low for approximately 30 minutes during performance of Core Change evolutions in the ATRC. The indication returned to normal within seconds of discovery. During core change activities ATRC Technical Specification Requirements (TSR)-192, Limiting Conditions for Operation (LCO)-3.192.5.2 requires a local LCRM and the ATRC console LCRM recorder to be operable. ATRC Operations personnel were monitoring the local LCRM which is installed on the ATRC canal parapet during core change activities. Upon completion of core change activities, the operators exited the canal parapet contamination zone. They observed that one channel of the console LCRM recorder indicated down scale for a short period of time. TSR-192, LCO-3.192.5.2 was consulted to verify applicability.

ATR M-8 Primary Coolant Pump Discharge Check Valve

NE-ID--BEA-ATR-2013-0031 (Significance Category 4)
On 21 August 2013, the M-8 PCP discharge check valve (CK-A-1-8) position indication remained at 28% open after securing

the pump per DOP-7.3.18, "Primary Coolant Pump Startup," for PCP run-in and check valve response surveillance in the 154B-1 outage. The valve position when the pump was shut down was expected to close to an indication of 0 to 5%. No other PCPs were running when the M-8 pump was secured. Applicability for the requirement for an operable PCP check valve was not in effect at the time of discovery. The M-8 discharge valve was shut to isolate M-8 Primary Coolant Pump and a Technical Safety Requirement tracker was initiated.

Fire in Equipment Room at the Engineering Research Office Building

NE-ID--BEA-STC-2013-0003 (Significance Category 3)
On August 27, 2013, on the Engineering Research and Education Campus (EROB) the EROB Building Specialist noticed smoke and flame inside the elevator equipment room. The Building Specialist contacted the Building Owner representative who was nearby in EROB. Appropriate emergency response actions were taken. Initial investigation by the Idaho Falls Fire Department (IFFD) indicates the cause of the fire was due to recent maintenance on the elevator system/motor that was performed by the building owner's subcontractor. There were no injuries as a result of the fire nor was there damage to government owned equipment. This facility is a leased facility and the lease facility owner representative's subcontractor was performing maintenance on their equipment.

Although this event does not meet the reportability requirements for DOE Order 232.2, (the event was not a result of activities performed by facility personnel or subcontractors in support of facility operations) the fire did impact work at the INL and so was reported through ORPS.

Impaired Fire Alarm Panel in the Engineering and Research Office Building

NE-ID--BEA-STC-2013-0004 (Significance Category 4)
On August 27, 2013, a Life Safety Technician identified a jumper that was inadvertently left installed in the EROB Fire Alarm Panel. This condition was discovered during response actions to the EROB elevator equipment room fire. The jumper prevented the fire alarm signal transmission to the CFA Alarm Center during the event. The jumper was installed during the execution of the Pre-action Sprinkler System Quarterly Inspection and Testing Preventative Maintenance (PM) procedure on August 21, 2013. The jumper is normally installed during execution of this PM to prevent actuation of fire curtains, doors, and elevator hatches during testing.

Other Non Reportable Events

There were six additional non-reportable events reported during the 4th Qtr FY2013 that were attributed to facility status.

ICAMS IO-029059

On August 19, 2013, as part of normal daily operational checks, a Fire Engine Operator was driving one of the fire trucks outside of the MFC Fire Station to conduct once per-shift pre-operational checks. The Fire Engine Operator inadvertently left a storage door on the side of the truck in the raised (open) position. As the Fire Engine Operator was pulling out of the building, the open door struck the overhead door rail and wall support between two of the overhead access doors. The impact damaged the overhead door rail, the support structure of the wall, and the door on the Fire Truck. No injuries resulted from the event. The accident did not impact the ability of the Fire Department to respond to emergencies.

ICAMS IO-028701

On August 4, 2013, a safety concern was raised at ATR regarding cracks and movement in the floor of building MTR-636 (EPI shed). This building is routinely accessed to pull EPI samples and perform radiological surveys.

ICAMS IO-028918

On August 12, 2013, while performing a reactor startup, the ATRC was shut down by manual SCRAM due to Operators taking a conservative action when the indications for approach to critical did not look correct. A normal reactor startup was in progress using an approved operating procedure and the safety rods had been withdrawn to the upper limit. During Outer Shim Control Cylinder (OSCC) withdrawal to the -\$1.00 position, the Operators questioned if the reactor would achieve criticality outside of the allowable reactivity band of -\$1.0 to +\$1.0. The reactor was shut down by manual SCRAM, verified to be in a safe condition, and normal shutdown procedures were completed. Nuclear Engineering validated calculations of reactivity worth developed for the experiments inserted into the core. Validation, using Monte Carlo N-Particle code with updated models, provided additional margin, if needed, to the estimated critical shim prediction. The ATRC reactor completed a successful reactor startup on 13 August 2013 and the criticality data confirmed the initial estimated critical shim prediction was within the required band.

ICAMS IO-028701

On August 19, 2013, the Hot Fuel Examination Facility (HFEF) experienced a loss of normal power due to a fault on clear water sump pump SP-306A, which resulted in tripping the breaker 4-3 at Substation 786. Response actions were taken per HFEF-ONRI-001 to place the facility in a safe configuration. Discovery of the cause of the trip was identified at 1440. Cognizant personnel were briefed of the issues and a path forward to restore normal power was developed. Normal power was restored at 1655. A post job briefing was conducted to discuss actions taken and “breaker coordination” issues that resulted in the substation trip.

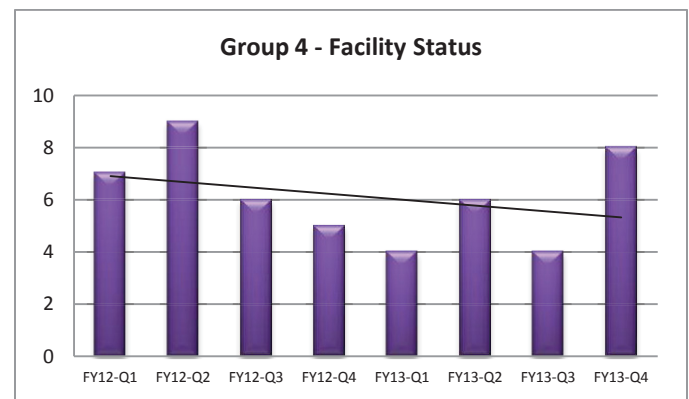
ICAMS IO-029569

On September 12, 2013, equipment was being moved at window 3 in the FCF argon cell to make room for assembly of the electrode assembly for the upcoming electrorefiner run. While operating the EMM, the near slave limit switch and near wall limit switch were over-ridden to allow further carriage movement using a formally designed feature to allow the operation. The EMM carriage was moved against the hard stop at the wall and could not be moved away. Attempts to move it away from the wall were unsuccessful. Work was stopped and notifications to supervision and management were made. A post job review was conducted.

LabWay CO 2013-0217

On September 24, 2013, a slow setback power reduction occurred at the ATR from an indication of high power from #1 quad thermal power. The reactor was at full power when the M-1 secondary pump was started to complete pump run-in checks following maintenance per OMM-7.4.13.1.2, “Secondary Coolant System Operation.” When M-1 pump was started, the primary inlet temperature dropped 2 degrees, causing a higher indicated quad power.

Starting a secondary cooling pump while the reactor is critical may result in a temperature excursion, which may cause the water power calculate to read higher. There was no indication of reactor power change on the wide range or neutron level recorders. The slow setback cleared after 30 seconds with the reactor at ~80% full power. The reactor operator maintained the regulating rod in range as required for a reactor slow setback. Reactor power was restored to full power per DOP-7.2.15, “Reactor Setback,” at 1036.



TREND SNAPSHOT

Facility Status Events: Facility status events accounted for 28% of the events reported in FY2013 and 33% of those reported in the 4th Qtr FY2013. Despite the increase in the number of events reported this past quarter, the rate of occurrence of facility status events continues to trend downward over the past two years. The unplanned automatic scram of the NRAD reported this quarter is similar in nature to an unplanned shutdown of the NRAD that occurred in August 2011 (NE-ID--BEA-NRAD-2011-0002). Both involved less-than-adequate execution of conduct of operations practices. Although these events were similar in nature, they do not represent a recurring issue. To address concerns with conduct of operations, fiscal year 2014 Conduct of Operations Continuing Training will focus on procedure compliance, monitoring conditions, attention to detail, logkeeping, and will include a heavy emphasis on management involvement.

There were no additional similarities in the facility status events related to their causes, organizations, or work group. The analysis performed recognizes no actionable patterns.

Events related to environmental problems are one of the least reported event type, only accounting for three events in the past 12 months – one of which was reported in the 4th Qtr FY13, and all of which are identical in nature and cause but not considered recurring. The new event is described below.

Quarterly Report of Diesel Engine Startup at the Advanced Test Reactor

NE-ID--BEA-ATR-2013-0023 (Significance Category 4)

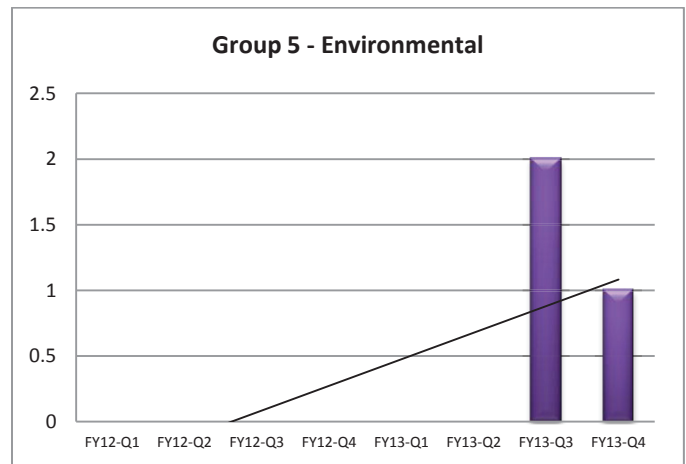
New environmental regulations operation and maintenance requirements for ATR Complex diesel engines are in effect: 40 CFR, part 63, subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for stationary Reciprocating Internal Combustion Engines (RICE), also known as Quad Z. The following ATR engines are non-emergency stationary RICE: generators 670-M-42, 670-M-43, and 674-M-6. Without installation of emissions controls, units 670-M-42, 670-M-43, and 674-M-6 will not meet the new emission standards for hazardous air pollutants beginning 2 May 2013. INL has negotiated with the Idaho Department of Environmental Quality (DEQ) a Voluntary Consent Order (VCO) to replace units 670-M-42 and 670-M-43 with a commercial power based uninterruptible power supply (UPS). When the UPS project is complete in 2015, all three units will be designated as emergency stationary RICE. Every startup of 670-M-42, 670-M-43 and 674-M-6 diesel generators results in an excess emissions event which are not covered in the Voluntary Consent Order. DOE-HQ agreed that a quarterly report is sufficient for reporting these events.

Other Non-Reportable Events

There was one additional non-reportable environmental event reported in the 4th Qtr FY2013 and is summarized below.

IO-028832

On August 5, 2013, the INL Research Center (IRC) Building Specialist was preparing the July monthly pH monitoring report, as required by the Industrial Wastewater Acceptance Permit with the City of Idaho Falls, when he noticed that there was no pH data on the iVu data collection system beginning on July 19. It was determined that, during the execution of a 2-yr PM to replace the batteries in iVu UPS stations, the UPS was not restarted. The Permit requires daily pH readings be recorded at least once per day from the IRC pH building retention tank.



TREND SNAPSHOT

Environmental Events: Environmental events accounted for only 4% of all events reported in FY13 and 4% of those reported in the 4th Qtr FY13. The rate of occurrence of facility status events trended upwards due to three events reported in the last half of FY13. This is not a concern because all of the events were the result of changes to 40 CFR, part 63, subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for stationary Reciprocating Internal Combustion Engines. **Analysis shows there is nothing that would indicate an adverse trend or recurring problem.**

4th Qtr FY13 GROUP 6 - CONTAMINATION/RADIATION CONTROL EVENTS

Events related to contamination and/or radiation control are some of the least reported event type at the INL, only accounting for two events in the past 12 months. There was one contamination/radiation control event reported in the 4th Qtr FY13. This event is summarized below.

New Chemical Detection Instrument Discovered to Contain a Radioactive Source

NE-ID--BEA-CFA-2013-0003 (Significance Category 3)

On August 28, 2013, the INL Radiological Control Department became aware that a chemical detection instrument had been purchased by the INL Fire Department. The instrument was found to contain 160 uCi, AM-241 source. The ChemPro 100i was procured from Environics USA through the "iBuy" process. The iBuy form was not properly filled out during the procurement process; had it been filled out properly, the system would have alerted Radiological Controls. As such, neither the CFA Radiological Control nor the Source Coordinator was aware of the purchase. Subsequently, a leak test was not performed and the source was not added to the INL Accountable source Inventory as required by LWP-15006, Sections 4.3 and 4.4.

Other Non-Reportable Events

Two additional events were reported through the INL Initial Notification Reporting process during the 4th Qtr FY13, which

did not meet ORPS reportability requirements. These include the following:

IO-029309

On August 29, 2013, what appeared to be a dried water spot ~2-inches in diameter was noticed on the concrete floor of the MFC Analytical Laboratory basement. The spot was located underneath the exhaust ductwork that is connected to an acid scrubber (the acid scrubber has been decommissioned for ~2 years and is currently connected to a new glovebox that has not been put in service). Surveys were performed and alpha contamination was found at levels of 59 dpm removable and 4990 dpm fixed. The immediate spot was covered and a fixed contamination sticker affixed. Further surveys of the area were performed with no additional contamination found.

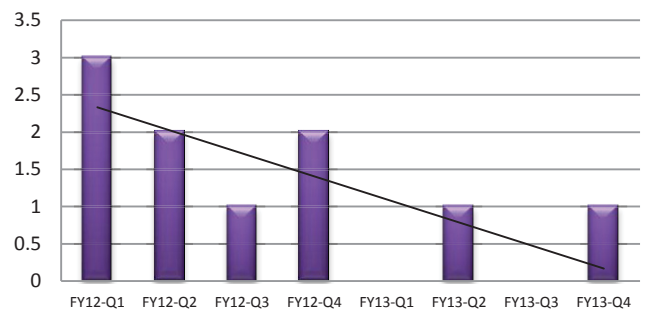
IO-029576

On September 12, 2013, a vendor entered MFC-735 through the east door to ask for information; this resulted in the vendor entering a posted radiological controlled area (RCA) without permission. No radiological activities were taking place at the time. The on-duty security officer escorted him back to his vehicle. The Radiological Control Assistant Manager was notified and determined no radiological condition existed when the driver entered the controlled area. The driver was counseled on his actions.

TREND SNAPSHOT

Contamination/Radiation Events: Contamination and/or radiation events accounted for less than 3% of the events reported in the last 12 months. The rate of occurrence of these events continues to trend downward over the past two years. **Analysis of the events indicate no adverse trend or recurring issue.**

Group 6 - Contamination/Radiological Controls



4th Qtr FY13 GROUP 7 - NUCLEAR EXPLOSIVE SAFETY EVENTS

There were no events related to nuclear explosive safety during the 4th quarter of FY2013. BEA has never reported an event under this reporting criteria since taking over the contract for the INL in 2005.

4th Qtr FY13 GROUP 8 - PACKAGING AND TRANSPORTATION EVENTS

There were no events related to packaging and transportation during the 4th quarter of FY2013. The last reported packaging and transportation event took place at the INL in September 2011, when an incorrect source was found during material evaluation (NE-ID--BEA-INLLABS-2011-0005).

For the purpose of trending, additional analysis was performed on packaging and transportation deficiencies reported through ICAMS during the 4th Qtr FY13, to see if any patterns or similarities exist. There were no packaging and transportation (PT) deficiencies reported in ICAMS during

that time period. There are no adverse trends or recurring issues associated with packaging and transportation events at the INL.

TREND SNAPSHOT

Packaging and Transportation Events: Packaging and transportation events did not account for any of the events reported in ORPS during the last 12 months. The rate of occurrence of these events has remained at zero for the past two years.

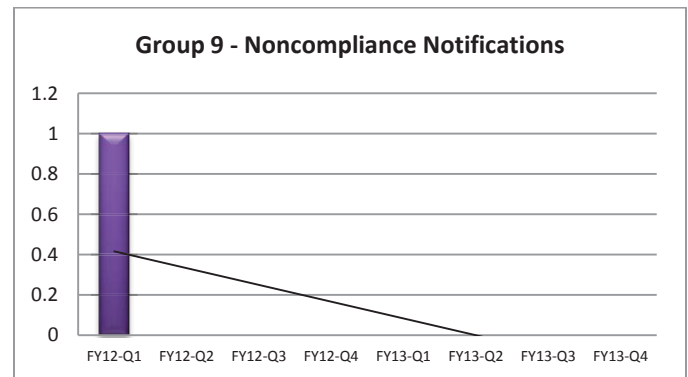
4th Qtr FY13 GROUP 9 - NONCOMPLIANCE NOTIFICATIONS EVENTS

Noncompliance notification events occur 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, zero noncompliance notification events have been reported through ORPS. Additionally, in the past two years, only one noncompliance event has been reported through ORPS (1st Qtr FY13). A review of ICAMS shows that DOE-ID identified 19 deficiencies during the 4th Qtr of FY2013. Of these, the following refers to a failure to implement a Federal Regulation from 10 CFR 1910.

IO-029111

The MFC has failed to adequately implement hand guards on equipment in the EFF. Contrary to the requirements of 10 CFR 1910.212 and local procedures for metal shearing

activities, hand guards were not properly identified, approved, installed, and procedurally controlled. Corrective actions are in place to install approved guards on equipment and to modify procedures to direct evaluation and approval of removal of any guards in the EFF.



TREND SNAPSHOT

Noncompliance Notification Events: Noncompliance notification events have not been reported at the INL since the 1st Qtr FY12. The rate of occurrence of these events has trended downward over the past two years.

Corrective actions to address deficiencies identified by DOE-ID are ongoing. Reportable and non-reportable noncompliance notifications, and those deficiencies related to agencies requiring to report, will continue to be monitored. There were no similarities in the deficiencies reported that would warrant a recurring event notification.

Events reported as management concerns or issues accounted for 17% of the events reported during the 4th Qtr FY13 and 18% of those reported over the past 12 months. Four events were reported as management concerns during the 4th Qtr FY13. These are summarized below.

ATR Firewater Flow Capability Inadequate Surveillance Testing

NE-ID-BEA-ATR-2013-0029 (Significance Category 4)
DOP-8.4.3, "Functional Test of Critical Path Firewater Valves," is used to satisfy TSR-186, Surveillance Requirement (SR)-4.2.1.2.11 to "Perform FUNCTIONAL TEST on connection valves, critical firewater path." On 16 August 2013, the method used in flow testing paths from the Raw Water Overhead Tank and Deepwell #3 was determined to be inadequate. The ATR was shut down, defueled, and depressurized, at the time of discovery; therefore, the firewater injection system was not required. The DOP-8.4.3 was re-written to resolve this issue prior to reactor startup.

Wall Flashing Falls into Building Stairwell

NE-ID-BEA-AL-2013-0002 (Significance Category 4)
On August 29, 2013, the facility foreman and construction superintendent walked down remaining items on an existing construction punch list. During the walk down, it was noted that a piece of flashing used to seal the area between the interior cinder block wall and the roof was not fully seated in the space between the wall and the roof. The foreman requested that this flashing be repositioned as part of the punch list activities. Later that day, the subcontractor was working through that punch list of items when he attempted to push the flashing back in place with his finger and it fell all the way through the open space and into an open stairwell where two individuals had just recently vacated. The opening that the flashing fell through was approximately six inches by eight inches in diameter in the top corner of a 13 foot wall. Due to the height of the wall and the location of the open hole, nothing else fell through the opening nor was there a chance for anything else to fall through it either prior to, during, or after the event.

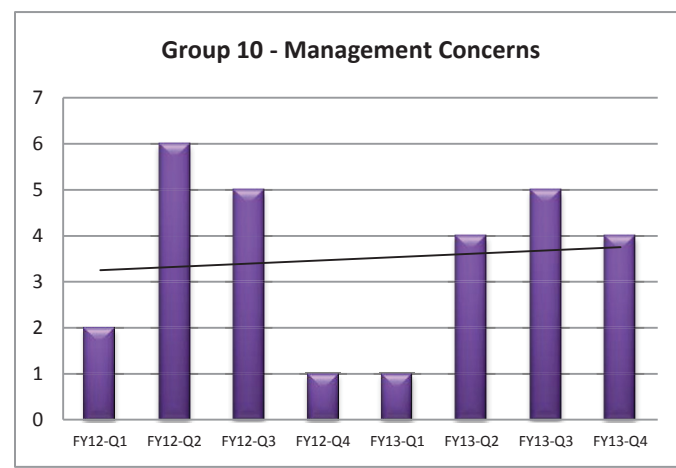
FCF SERA Transfer Cable Cart Damage

NE-ID-BEA-FCF-2013-0002 (Significance Category 2)
On September 25, 2013, a MFC-765 FCF facility operator was potentially exposed to 240 volts AC while storing the electrical cables for the Suited Entry Repair Area (SERA) Bag-In/Bag-Out cart after the power cable for the cart was pinched. The FCF facility operators, with assistance from the

MFC Maintenance Hoisting and Rigging operators, were in the process of removing a welding machine from the basement of the facility. The welding machine was staged on the SERA cart. Once the welding machine was removed from the basement area, the facility operator assigned to position the cart was staging the cart back underneath the bag-in/bag-out port when the wheel of the cart ran over the side of the power cable. The cart had traveled approximately two feet when it stopped moving. The operator looked down to see the cable had been pinched although not severed or showing exposed wiring. The operator notified the crane operator that he had pinched the SERA cord. The FCF foreman was notified and asked the operator if the cart was off. The cart operator misinterpreted that to mean he was to unplug the cable from the cart which he did. This action exposed the cart operator to potentially energized and unshielded cables.

Light Pole in Parking Lot Breaks During High Winds Landing on a Privately Owned Vehicle

NE-ID-BEA-MFC-2013-0004 (Significance Category 3)
On September 30, 2013, a light pole in the Materials and Fuels Complex (MFC) parking lot was severed during high winds in excess of 55 MPH. The light pole landed on a privately owned vehicle, damaging the hood, roof, trunk and breaking out the back window. No personnel were in the vicinity when the light pole fell. A security officer reported the event to the Balance of Plant Operations organization. The Balance of Plant Manager, in coordination with security, maintenance, and safety organization, secured the area, and electrical power to the pole using a LO/TO. A structural integrity inspection was performed on the downed pole once the winds subsided and it was determined that water damage weakened the pole allowing heavy winds to break the pole.



TREND SNAPSHOT

Reportable Management Concerns and Issues Events: There was a slight decrease in the number of management concerns reported during the 4th Qtr FY13 and the rate of occurrence of these events is trending upward over the past two years. This is not necessarily a bad trend as it indicates INL management is willing to report those things that may not otherwise be reported.

Analysis of the events reported over the past 12 months does not indicate existence of any adverse trend or recurring issue.

4th Qtr FY13 EVENTS INVOLVING SUBCONTRACTORS

There have been 16 events involving subcontractors reported through ORPS since October 2011. Three were reported during the 4th Qtr FY13. These have been described in previous sections of this report and include the following:

Wall Flashing Falls into Building Stairwell
NE-ID--BEA-AL-2013-0002 (Significance Category 4)

Subcontractor Bypasses Work Control and Lockout/Tagout Processes at the Advanced Test Reactor

NE-ID--BEA-ATR-2013-0032 (Significance Category 4)

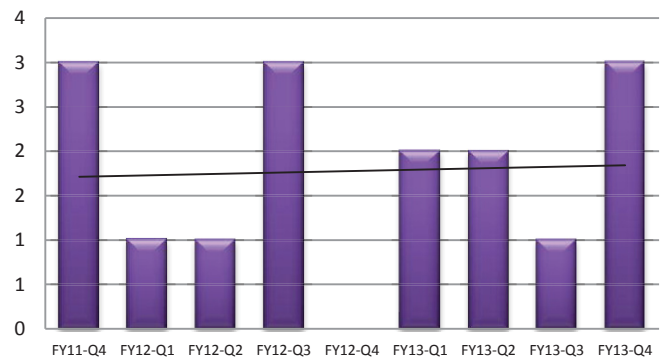
Fire in Equipment Room at the Engineering Research Office Building

NE-ID--BEA-STC-2013-0003 (Significance Category 3)

TREND SNAPSHOT

Events Involving Subcontractors: A review of the ORPS reports data for events involving subcontract personnel shows that there is no trend involving the nature of the events nor the subcontractors involved in the events. The rate of occurrence of events involving subcontract personnel is trending upwards compared to a downward trend last quarter.

Reportable Events Involving Subcontractors



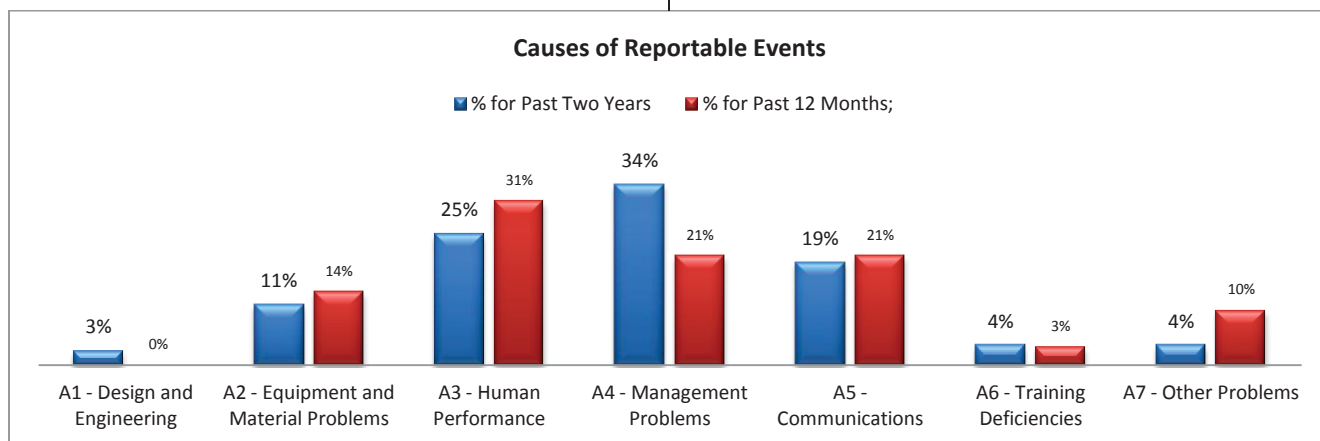
4th Qtr FY13 ANALYSIS OF CAUSES OF REPORTABLE EVENTS

Cause analysis results documented in ORPS were analyzed to determine trends, within the causes identified, over the past two years and during the past 12 months. In the last two years (October 1, 2011 to September 30, 2013), there have been 155 reported events at the INL and 298 codes identified to define the causes of the events.

An analysis of the cause codes over the two year period show that management problems, human performance problems,

and less-than-adequate written communications are most often causal to events. Written communications (such as procedures or work orders) are either incomplete or contain ambiguous instructions. The analysis also shows that management problems exist with change management and human performance errors are occurring in that persons are not checking work or are justifying actions based on previous successes.

The 12 month trend shows a decrease in management problems but an increase in both less-than-adequate performance by workers and less-than-adequate communications.



TREND SNAPSHOT

Causes of Reportable Events: A review of the causes of reportable events shows that there has been a slight change in cause of events over the past two years as events caused by less-than-adequate management dropped during the past 12 months. This can be attributed to increased management oversight through activities such as Senior Supervisory Watch and focused Management Observations.

4th Qtr FY13 RESULTS OF IOPAC TRENDING ANALYSIS

In FY13, the INL assembled a group of representatives from INL facilities and programs to form the IOPAC. The IOPAC established a framework for measuring operational performance and, each month, analyzes issues for commonalities in functions, behaviors, and ISMS core functions. The committee reports to the INL Operations Council and, while right now they are focused on analyzing events at a facility or program level, the committee will mature to eventually propose recommended improvement actions to the operations council. These recommended actions may be for an individual site or program or may be actions intended to facilitate site-wide changes.

The first IOPAC report was presented to the Operations Council in June 2013. The IOPAC identified that problems across the INL are being recognized in the following three main topical areas:

- Work Processes – specifically with document accuracy and procedure compliance
- Leadership and Accountability – often with staffing and training and qualifications
- Personal Accountability

In addition, the two categories where the most prevalent concerns were noted across the site included document accuracy and procedure compliance. This coincides with the analysis of cause documented in the previous section, in that written communications are often less-than-adequate and errors committed by workers are occurring because the worker justifies his or her actions based upon previously successful work evolutions and because the worker is making incorrect assumptions about the tasks they are performing.

Also supporting this analysis is the selection of the most prevalent discipline code, that being associated with Conduct of Operations and a failure to comply with procedures.

Conduct of Operations continuing training for Fiscal Year 2014 will focus on procedure compliance, communications, log keeping, and attention to detail. The INL Work Management System expects to see improvements in implementation of Conduct of Operations principles as a result of this training.

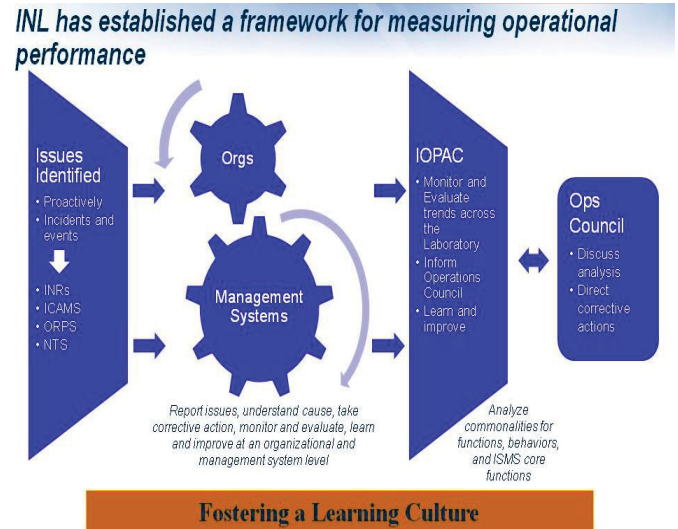


Figure 1 Framework for Measuring Operational Performance

4th Qtr FY13 ANALYSIS OF COMPLETED EFFECTIVENESS REVIEWS

The INL performs effectiveness reviews of more significant issues in order determine the effectiveness of the corrective actions in successfully resolving and preventing recurrence of the problem.

During the 4th Qtr FY13, several key effectiveness reviews were completed by INL organizations during this quarter. The focus of the reviews and their results are summarized below.

MFC Effectiveness Assessment of the ZPPR Plutonium Event IAS13102

This management assessment was performed at the request of MFC senior management to determine the effectiveness of MFC's corrective actions associated with the CPOF (IO-017825) and ZPPR Plutonium event (IO-015639). Special emphasis was placed in the four core areas:

- Work Planning and Controls
- Conduct of Operations
- Radiological Protection
- Management & Organizational Effectiveness

The assessment focused on work observations, interviews and document reviews. Field work was performed over six days in June 2013. A total of over 50 work activities were observed, 40 employees and managers were interviewed and 100 documents were reviewed.

MFC has seen significant improvement in all areas over the past two years. Values and expectations are driving individual behaviors on a regular basis. The assessment team noted a significant increase in alignment of values and expectations across all organizations. Although some criteria were rated as marginally effective, progress was noted and improvement plans were put in place to achieve the desired results.

Special mention was made to the improvements in the use of technical procedures and LO/TO. Both of these areas of Conduct of Operations were rated as highly effective. These areas are the foundation of a strong Conduct of Operations program and MFC has made significant improvement in these areas. The assessment team gave MFC an overall rating of **Effective**.

Effectiveness Review of Corrective Actions for Dropped Shutter Shield at the Hot Fuel Examination Facility (IO-019087) IAS132017

The purpose of this assessment was to review and evaluate the effectiveness of the corrective actions which addressed the dropped shutter shield in HFEF. The assessment concluded that 9 of the 11 corrective actions met the criteria listed and the actions have been effective. Two actions were partially completed.

MFC ZPPR Corrective Actions Review

IAS13559

The Office of Nuclear Assurance performed an additional effectiveness assessment of both the issues identified in the Conditional Payment of Fee (CPOF) letter and those identified following the ZPPR event to evaluate the associated improvements in operations, radiological controls, work planning, and management and organizational effectiveness.

The team found that the actions taken have had a positive effect on worker engagement, and behaviors with Operations, Radiological Protection, and Work Control. Overall, the facility process and behaviors that were observed and displayed by the workforce and managers showed significant improvement from the previous assessment with similar lines of inquiry.

The team concluded that the review area was **Effective**. One issue, as well as opportunities for improvement to further enhance the effectiveness of the actions, were identified and are being addressed by MFC management.

4th Qtr FY13 KEY LESSONS LEARNED ISSUED BY INL ORGANIZATIONS

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 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 prevent recurrence of undesirable conditions and promote noteworthy practices. Lessons learned both positive and negative, are systematically evaluated and implemented to continuously improve performance. During the 4th Qtr FY13, the INL issued five lessons learned, two of which were Yellow (Caution) lessons. No Red (Urgent) lessons were issued by INL. The Yellow lessons are summarized below.

Failure to Perform an Adequate Prejob Brief Results in a Near Miss (YELLOW – 2013-1151)

On 5 June, 2013, failure to perform an adequate pre-job brief resulted in a near miss. While calibrating PPS delta pressure two trip bars failed to maintain the channels tripped. The failure was not detected due to an inadequate brief. The BOPO/OATC was told to expect alarms for tripping the channel A delta pressure. The brief should have included the seven specific alarms that would be received. When the two channels alarmed and then cleared the BOPO/OATC was directed to check why they cleared. The BOPO/OATC called the PPS room and was told it was due to tripping channels. No follow-up was done by the CRS or BOPO/OATC when the alarms were not received again. Having the seven alarms locked in should have been part of the brief. Prior to taking the channel out of service, an observer questioned why the

alarms were not on the board leading to finding the failed trip bars.

Lack of Pre-Planning for Shipping Multiple Experiments in the GE-2000 at the ATR Caused Delay of Scheduled Shipment Date

(YELLOW – 2013-1185)

Readiness assessments are recommended but not required for loading and shipping experiments in the GE-2000 cask in the ATR Canal area. Line management encourages subject matter expert (SME) communications to develop mitigations that address hazards and conflicting controls for loading and shipping the case.

Readiness assessments require the expertise of at least five SMEs and can introduce unique problems and concerns related to loading and shipping the cask with numerous experiments. The first readiness meeting was scheduled by Nuclear Science & Technology (NS&T) shipping SME two weeks prior to the scheduled loading of the cask. Only three SMEs (NS&T, two ATR experiment reps) were in attendance, two SMEs from Design Engineering and ATR operations were absent with no alternates attending for them. The intent of the meeting was to line out a check list for pre-staging cask equipment and non-fissile experiments before cask loading. Each of the three SME's was tasked to make a checklist of needs and controls for the pre-staging efforts.

A second meeting was scheduled with only two of the SMEs in attendance (NS&T and ATR experiments). Due to lack of personnel resources no more meetings were scheduled before the shipping date. The result of less than adequate participation and support was an incomplete pre-planning checklist resulting in a total loss of six days on the project

INL Laboratory Performance Expectations

The INL mission involves performing and deploying world class research that meets the nation's needs in the areas of nuclear energy, other energy, the environment, and national security. Laboratory Performance 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 Laboratory Performance

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DEEPER LEARNING THROUGH EVENT ANALYSIS