

Environment, Safety, Health, and Assurance (ESH&A) Fiscal Year 2014 Trend Analysis

An annual trend analysis is performed to determine common occurrences or prevailing events that should be addressed with additional inspections, training, reviews, policies, lessons learned, etc. The following sources of information were reviewed for trend analysis from FY2010 to FY2014:

- Employee Safety and Security Concerns
- Independent Walk-Through Findings
- Program / Department Walk-Through Findings
- Walk-About (walk-throughs exterior to buildings) Findings
- Plant Protection Discrepancy Reports
- Injury and Illness Data
- Event Reporting (including potentially reportable events, Topical Appraisals and Issues, DOE / External Reviews, etc.)
- Causal Factors of Ames Local Events

Summary Statement

Compared to the 4 year averages, the trend analysis determined there were increases in Safety and Security Concerns, a slight decrease in Walk-Through Findings, a decrease in Discrepancy Reports, an increase in total reported Injuries/Illnesses and OSHA Recordable injuries, and an increase in Categorized Events.

Ames Lab is encouraged with the number of Safety and Security Concerns reported. This indicates a greater involvement by the staff in identifying concerns. The decrease in walk-through findings is negligible and is expected to fluctuate with new activities and educating new people on Ames Laboratory expectations. Walk-About findings also increased, however not all findings had direct safety concern. Although there was decrease in discrepancies reported by Plant Protection compared to the 4-year average, there was an increase of 34% from the previous fiscal year. While the total number of categorized events increased, most were categorized as Ames Local events that do not meet the threshold of reporting to DOE and a few others did not meet the threshold of Ames Local events. Again, the Laboratory views this as a positive indicator that our staff is comfortable in reporting events and engaged in the safety programs of the Laboratory. Importantly, trending assists with identifying systematics, useful in understanding where resources should be directed to strengthen our programs.

Employee Safety and Security Concerns

Table 1 lists the total number and types of Employee Safety and Security Concerns. The Ames Laboratory actively encourages employees to communicate employee safety and security concerns to ESH&A. All concerns are investigated, evaluated, brought to a reasonable resolution, and communicated back to the person who voiced the concern. Although there was a significant increase in “General Safety” concerns, the risks associated with the concerns were negligible (i.e., bike inside, missing hat and missing sunscreen, paint odors). The types of concerns recorded in FY2014 include:

- Three concerns of phones not working when ISU transitioned to Voice of Internet Protocol (VOIP). Two of the concerns were communicated by the same person.
- Odor concern from a chemical laboratory. The chemical was non-toxic; the employee was not using a fume hood. Employee reminded to use a fume hood.
- Long term power outage due to degraded infrastructure.
- Bike being stored in graduate student’s office.

- Intermittent internal door problems with CCURE.
- Missing hat and later missing sunscreen.
- Although the stairs for the entrance to Spedding are compliant with OSHA regulations, it was suggested another railing be installed at the lower level (2 stairs).
- It is determined that toluene degrades squeeze bottles sooner than other solvents.
- Concern for shielding with Transmission Electron Microscopy (TEM) due to pregnancy. Equipment was evaluated by RSO and factory representative and equipment verified safe.
- Concern of safety when loading and unloading large Dewar's onto flatbed trucks.
- Supervisor not sure what he is supposed to do when an injury occurs to an employee. Methods of communicating responsibilities evaluated and determined to be appropriate. Supervisor did not read distributed communications (i.e., Annual Retrain Memo, instructions given to employee from Occupational Medicine when employee injured, procedures posted on-line).
- On-going concern about pedestrian safety when crossing Pammel Road. ISU FP&M installed high visibility signs indicating pedestrian crossing.
- Yellowish/dry substance at lip of wall cabinet in a chemistry lab that has been vacated for months.
- Odor concern due to Facilities and Engineering Services painting in TASF. ESH&A requested the HVAC be placed into 100% fresh air instead of recirculating conditioned air.
- Restraining strap missing on Dewar transport dolly.
- Two rooms for lactation had poor cleanliness and lack of privacy.
- ISU Facilities Planning & Management worker not wearing personal protective equipment (i.e., safety glasses, hard hat, & hearing protection) when repairing collapsed sewer pipe for Wilhelm Hall.
- Storage of portable ladder in Spedding hallway by Facilities & Engineering Services.
- Subcontractor on ladder in front of door without warning sign or tape.
- Doors difficult to open from TASF to Spedding due to HVAC pressure differences creating a vacuum affect.
- Pedestrian collisions at intersections in Spedding hallways; traffic mirrors were suggested.

Table 1 - Employee Safety and Security Concerns							
Category	FY10	FY11	FY12	FY13	4-Year Average	FY14	% Change from 4-Year Average
Administrative	3	1	1	0	1.25	1	20% Decrease
Chemical Spills	0	0	0	0	0	0	None
Fire Safety	0	2	0	0	0.50	0	100 % Decrease
General Safety	6	2	2	8	4.5	15	233% Increase
Industrial Hygiene	3	0	0	0	.75	1	33% Decrease
Environmental	2	0	0	0	.50	0	100% Decrease
Security	0	1	1	0	.50	1	100% Increase
Radiological	0	1	1	0	.50	1	100% Increase
Traffic Safety	0	0	0	0	0	0	None
Property Management	1	0	1	1	0.75	1	33% Increase
Other (non-safety)	0	0	0	0	0	1	Increase
Odors	0	0	0	0	0	2	Increase
Total Concerns	15	7	6	9	9.25	23	149% Increase

Independent Walk-Through Findings

FY14 had a 4% decrease in findings compared to the 4-year average.

Industrial Hygiene findings decreased this year which was opposite from the past two years. It is perceived that the labeling requirements of secondary containers are becoming better understood and accepted by researchers. However, there still continues to be labeling issues throughout the Laboratory.

As in years past, some findings would not be cited by OSHA or EPA. This is due to Ames Laboratory aiming higher than meeting “the minimum standards”. The OSHA and EPA regulations are intended to be a basic minimum for compliance and the expectation of Ames Laboratory and the Walk-Through Team is to be best in class. Frequently, the Walk-Through Team will identify Level 3 Findings (best management practices) and elevate them to Level 2 Finding - Moderate Significance to ensure they are communicated, tracked, and corrected. The severity of the findings overall has been minimal. No High Hazard Findings have been identified since June 2003.

There were no Noteworthy Practices identified. Noteworthy Practices are conditions, which, in the judgment of the walk-through specialists, are examples of excellence and have application to other areas of the Laboratory.

There continues to be a high level of participation with the Ames Site Office Representative, member(s) of the Executive Council, Purchasing and Property Services Manager, and an ISU Environment, Health, & Safety Representative. The Laboratory Director has made it a point to participate on every walk-through when not on travel. This is a tremendous strength of the Independent Walk-Through Program. It shows top management support to all levels of employees, demonstrates openness to the Site Office, avoids duplicating walk-throughs, and lends additional perspectives from the ISU side of operations.

Although there have been increases by percentage in some categories of findings (e.g., Emergency Planning), the actual total number of findings in those specific categories is not of major concern. The overall numbers of findings are down compared to the last two years of walk-throughs. The Independent Walk-Through Program has proven to be an effective tool to communicate and educate requirements, promote expectations, and measure compliance within Ames Laboratory. No major concerns are apparent.

Table 2 - Independent Walk-Through Findings

Categories	FY10	FY11	FY12	FY 13	4-Year Average	FY14	% Change from 4-Year Average
Admin. Controls	0	2	2	1	1.25	1	20% Decrease
Comp. Gases	5	5	6	9	6.25	11	76% Increase
Confined Space Entry	0	0	0	0	0	0	None
Electrical Safety	45	39	55	39	44.5	43	3% Decrease
Emergency Planning	1	2	2	4	2.25	5	122% Increase
Environmental	15	6	11	12	11	10	9% Decrease
Fire Safety	9	1	8	10	7	7	None
General Safety	29	35	50	34	37	31	16% Decrease
Hoisting & Rigging	0	0	0	0	0	0	None
Hazard Communication	1	1	3	0	1.25	1	20% Decrease
Industrial Hygiene	36	21	42	43	35.5	27	24% Decrease
Infrastructure	0	1	0	1	.50	2	300% Increase
Ladder Safety	2	0	1	0	.75	1	33% Increase
Laser Safety	1	0	0	0	.25	2	700% Increase
Life Safety Code	2	2	1	0	1.25	0	Decrease
Lockout/Tagout	0	0	1	0	.25	0	Decrease
Machine Guarding	1	1	2	3	1.75	3	71% Increase
PPE	4	5	2	10	5.25	4	24% Decrease
Plumbing	0	0	0	0	0	0	None
Procedural	0	0	0	0	0	1	Increase
Property Management	3	13	5	11	8	6	25% Decrease
Radiation	0	0	0	0	0	1	Increase
Respiratory	3	1	8	8	5	6	20% Increase
Training	0	0	0	0	0	0	None
Totals	157	135	199	185	169	162	4% Decrease
Noteworthy Practices	0	0	3	4	1.75	0	Decrease

Program / Department Walk-Through Findings

The information collected from the program/department walk-throughs is requested in percentage (not the total number of findings). Specific comparisons (number of findings), cannot be made to the Independent Walk-Through Findings, but general observations on the type of concerns identified can be ascertained. The largest category of findings observed was “Electrical” and the second largest was “General Safety”, however there was a decrease compared to the 4-year average. There was 100% participation with all programs and departments reporting their findings. No concerns are apparent.

Walk-About (Walk-Through exterior to buildings) Findings

Walkabouts (inspections of building roofs, yards, sidewalks, exterior doors and windows) have been performed annually since 2005. The goal of the Walk-About is to identify potential safety hazards and violations that are not identified during the Independent Walk-Through Program. No High Hazard Findings have been identified to date. Some of the findings were merely suggestions to remove unused/obsolete equipment or problems that are not of concern presently but, if not corrected in the future, could become an issue. This year the Ames Site Office Representative participated on the Walk-About.

Year	Concerns
2009	5
2010	9
2011	6
2012	7
2013	7
2014	16

The findings this year included the following:

1. Removing unused satellite dish and antennas on Spedding (suggestion). This was put on a list by F&ES to be removed in the future.
2. Removing the hoist on the roof of Spedding (suggestion). This was put on a list by F&ES to be removed in the future.
3. A GFCI on the roof of Spedding was infested with bees. Corrected.
4. Cardboard boxes (one labeled Corrosive) were observed in the window well (outside) room 42 Spedding. According to the Group Leader, a chipmunk had fallen through the grating and could not get out. The occupants of the office decided to build makeshift stairs using empty boxes so the chipmunk could escape. Boxes removed the same day.
5. Bushes were obscuring and making access difficult to the Fire Department connections of Spedding Hall. Bushes trimmed.
6. A Ground Fault Circuit Interrupter duplex outside TASF did not trip when tested. GFCI replaced.
7. One of the vertical posts for the railings entering TASF (ramp) had rusted through and was not providing support.
8. The flag indicating the location of the TASF Fire Department connection had deteriorated and needed to be replaced. Flag replaced.
9. The base of a railing was broken at Gilman Hall (non-Ames Lab). It was submitted to ISU Facilities Planning and Management (FP&M) and corrected immediately.
10. Bushes were beginning to encroach on the stairs of a secondary exit. Bushes trimmed.
11. A Ground Fault Circuit Interrupter duplex outside Metals Development did not trip when tested. GFCI replaced.
12. Bushes were beginning to obscure a Post Indicator Valve (PIV) outside Metals Development. Bushes trimmed.
13. Trees were beginning to overhang the Metals Development building. This is not a safety issue however it was brought to the attention of Facilities and Engineering Services to be addressed. Tree branches trimmed.
14. Cinder blocks were being used for steps from one level of the Metals Development roof to another. The steps were not uniform and the stability questionable so they were removed. Cinder blocks removed.
15. Door card information for the Paint and Air Conditioning Building was faded and needed to be updated. Door card information updated in database and card replaced.
16. Recommended the abandoned wind turbine be replaced (suggestion). This was put on a list by F&ES to be removed in the future.

As with the Independent Walk-Throughs, some of the findings would not be cited by OSHA and are categorized as best management practices. The Walk-About provides a great opportunity to identify other areas of concern including deteriorating infrastructure such as dried or missing caulking on windows, ground erosion, removal/trimming of bushes and trees, etc. The cooperation of Facilities and Engineering

Services as well as ISU Facilities Planning and Management continues to be outstanding. No concerns are apparent.

Discrepancy Reports

Discrepancy reports are issued by the Plant Protection staff during facility tours. The total discrepancies continue to decrease, 14% over the 4-year average. However, there was a 34% increase from the previous year. This increase is believed to be a result of new guards that have different strengths in identifying hazards and having a questioning attitude.

The organization(s) responsible for the discrepancies are notified via Plant Protection / ESH&A for follow-up and correction. The Industrial Safety Specialist, who manages Plant Protection, also reviews the discrepancies on a monthly basis.

For the third year in a row, the most notable decrease is “Coffee Pots On and Hot”. This decrease is due, in part, to coffee pots being an emphasis and asking owners of coffee pots to replace their units with the type that turn off automatically after a set time period. This has helped tremendously avoiding coffee from evaporating out. The increases in “Equipment Malfunction” discrepancies are issues such as water leaks from equipment, blinking exit signs, etc. None of the discrepancies were of high risk and the guards are performing the tasks asked of them. No concerns are apparent.

Category	FY10	FY11	FY12	FY13	4-Year Average	FY14	% Change from 4-Year Average
Coffee Pots On & Hot	49	24	8	7	22	3	86% Decrease
Soldering Pen/Iron on & hot	6	2	1	0	2.25	0	100% Decrease
Unsecured Gas Cylinder	21	13	12	2	12	7	42% Decrease
Natural Gas Valve On	8	7	15	4	8.50	1	88% Decrease
Main Cylinder Valve Open	16	5	3	2	6.50	0	100% Decrease
Uncapped Cylinder	8	8	11	9	9	10	11% Increase
Unattended Flame	1	1	1	0	0.75	0	100% Decrease
Obstructed Hallway / Door	15	12	3	2	8	14	75% Increase
Unsecured Door	84	54	63	51	63	24	62% Decrease
Hood Sash / Set Back	105	95	127	66	98.25	77	22% Decrease
Improper / Incompatible Storage	2	6	1	0	2.25	2	11% Decrease
Equipment Malfunction	7	4	5	4	5	24	380% Increase
Window Open	6	3	6	2	4.25	0	100% Decrease
Obstructed Fire Extinguisher	0	0	0	0	0	10	Increase
Miscellaneous	32	24	16	21	23.25	55	137% Increase
Total Discrepancies	360	258	272	170	265	227	14% Decrease

Injury and Illness Data

There were eighteen (18) incidents reported to Occupational Medicine. Three of those incidents were employees that did not have an injury (possible arsenic inhalation exposure) in which employees reported for evaluation as a precautionary measure. Eleven (11) incidents were first-aid cases. The Laboratory encourages all incidents including first-aid cases be reported to ensure first aid cases do not become worse and to make certain accident investigations are performed to prevent recurrence. There were four (4) injuries in FY14 meeting the threshold of OSHA Recordable (medical treatment beyond first aid) and hence reportable into DOE CAIRS (Computerized Accident/Injury Reporting System). Three of the OSHA cases were also DART (Days Away, Restricted, or Transferred) cases.

1. Finger abrasion while cleaning an empty lab
2. Hand abrasion while working with research equipment
3. Chemical exposure to wrist while using solvent to remove glue. Few drops reached skin between gloves and lab coat
4. Abrasion to arm while working with research equipment
5. Possible Arsenic exposure (no injury-no treatment)
6. Possible Arsenic exposure (no injury-no treatment)
7. Possible Arsenic exposure (no injury-no treatment)
8. Sprained ankle when descending wet stairs in Gilman
- 9. Skin irritation (latex allergy), CAIRS (Prescription Meds)**
10. Electric Shock-touched positive and negative prongs when plugging in equipment (no injury-no treatment)
11. Glass splinter (thumb) while fixing sample holder
12. Splinter (index finger) when descending portable wooden ladder
13. Chemical splash to eye when lid came off of hexane squeeze bottle (wearing safety glasses)
- 14. Broken hip due to fall out of truck, CAIRS and DART, Surgery, 47 Lost Work Days and 55 Restricted Work Days**
15. Contusion to head due to co-worker carrying equipment cover
- 16. Burn due to loose hose/torch connection and lack of PPE, CAIRS and DART – 6 Lost Work Days, 23 Restricted Work Days**
- 17. Shoulder Strain while moving records boxes, CAIRS and DART – 10 Restricted Work Days (Prescription Meds)**
18. Abrasion to hand when working around an alignment tool (no treatment)

The Laboratory continues to stress safety/accident prevention in General Employee Training (GET) for new hires, topic specific training, and refresher training.

It is not uncommon to have OSHA Recordable cases; however the severity of two of the cases, the factors leading up to the cases, and the resulting DART cases is a trend that was not favorable. Due to the increase in DART Cases, the severity of the two cases (e.g., broken hip and wrist burn) and the shipping events (to be discussed later in this report), the Laboratory Director held mandatory All-Hands Safety Meetings to discuss the importance of safety and compliance. This was the first mandatory safety meeting in over 20 years. The communication between the Director and the audience was very informative and beneficial. The Director continues to send Laboratory-wide safety messages stressing the importance of safety and the expectation for all employees to maintain a safe and healthful workplace. An extent of work condition was performed for all hot work activities and various corrective actions/improvements were implemented.

Table 5 - Injury and Illness Data

Type of Injury / Illness	FY10	FY11	FY12	FY13	4-Year Average	FY14	% Change from 4-Year Average
Contusion / Abrasions	1	2	1	3	1.75	3	71% Increase
Burns	1	2	0	2	1.25	1(1)	20% Decrease
Chemical Exposure	0	2	2	0	1	5	400% Increase
Fracture	0	1 (1)	0	0	.25 (.25)	1(1)	300% Increase
Laceration	0	3 (3)	3	0	1.5 (.75)	1	33% Decrease
Puncture						1	Increase
Acute Musculoskeletal Injury	2 (1)	1 (1)	0	1(1)	1 (.75)	2(1)	167% Increase
Miscellaneous:							
Hematoma	0	1 (1)	0	0	.25 (.25)	0	Decrease
Standard Threshold Shift (Hearing Loss)	0	0	0	1(1)	.25 (.25)	0	Decrease
Bee Sting	0	0	0	0	0	0	
Splinter	1	0	0	1(1)	.5 (.25)	2	300% Increase
Dislocated Finger	0	0	0	1(1)	.25 (.25)	0	Decrease
Latex Allergy (hands)	0	0	0	0	0	1(1)	Increase
Electric Shock	0	0	0	0	0	1	Increase
Total	5	12	6	9	8	18	125% Increase
OSHA Recordable	2	6	0	4	3	4	33% Increase
Non-OSHA Recordable	3	6	6	5	5	14	180% Increase
Lost Work Days –LWD	0	28	0	9	9.25	53	473% Increase
Restricted Work Days – RWD	12	6	0	44	15.5	88	468% Increase
Total of LWD and RWD	12	34	0	53	24.75	141	470% Increase
DART Case Rate	.22	.45	0	.24	.23	.73	217% Increase
Total Recordable Case Rate (TRCR)	.44	1.34	0	.94	.68	.94	38% Increase

() indicates OSHA Recordable Injury
DART indicates Days Away, Restricted, and/or Transferred

Event Categorizations

The Laboratory utilizes information from a broad variety of sources which are reviewed against external and local reporting criteria. The sources include employee safety and security concerns, injuries and illnesses, assessment results, and operational data. Monthly, a reminder is sent to the Event Screening Team asking if there was anything out of the norm that should be investigated. The Screening Team is comprised of a member of the Executive Council, Industrial Safety Specialist, Industrial Hygienist, Plant Protection Manager, Radiations Safety Officer, Environmental Specialist, Facilities and Engineering Services Engineer, Materials and Transportation Supervisor, and a Systems Analyst.

As indicated in Table 6, there were four (4) incidents reported to the Occurrence Reporting Processing System (ORPS). Four (4) injuries reported to the Computerized Accident Incident Reporting System (CAIRS). One of the CAIRS incidents was reported also as an ORPS and another CAIRS incident was reported into ORPS and the Noncompliance Tracking System (NTS).

Table 6 - Event Reporting Summary (FY)

Categories	2010	2011	2012	2013	4-Year Average	2014	% Change from 4-Year Average
Occurrence Reports (ORPS)	4 (*)	3 (*)	2	1	2.5	4(*1)	60% Increase
Noncompliance Tracking System (NTS)	0	0	1	0	.25	1(#1)	300% Increase
Incidents of Security Concern (ISC)	0	0	0	0	0	0	None
Accident and Injury (CAIRS)	2 (*)	6 (*)	0	4	3	4(*1)(#1)	33% Increase
Ames Local (AL)	64	55	45	36	50	61	22% Increase
Other (below Ames Lab reporting threshold)	13	18	17	8	14	7	50% Decrease
Total Events Screened	83	82	65	49	69.75	77	10% Increase

(* = Combination ORPS / CAIRS)

(# = Combination CAIRS/ORPS/NTS)

The following are the events categorized in FY 2014:

Table 7 – Event Categorizations

Cat. #	Date	Title	Conclusion
E13-050	10/31/2013	Chronic Beryllium Disease Prevention Plan and Annual Review – Topical Appraisal	Ames Local-ORPS
E13-051	10/30/2013	Loss of Electrical Service, TASF, HWH, Shops	Ames Local-ORPS
E13-053	11/22/2013	Superficial Laceration of Knuckle of 3 rd Finger – left	Ames Local-CAIRS
E13-054	11/25/2013	Loss of Electrical Service, Lab wide	Ames Local-CAIRS
E13-055	12/2/2013	Copy Write Infringement – Downloading HBO show	Ames Local-ISC
E13-056	12/4/2013	Craftsman in Occupational Medicine During Lunch Unescorted	Ames Local-ISC
E13-057	12/4/2013	Attempt to Steal Professional Identity Andrea Spiker	Ames Local-ISC
E13-058	12/18/2013	Small cuts to right hand	Ames Local-CAIRS
E13-059	12/19/2013	Static Electric Shock to Ear from Phone	Not Reportable (ORPS, NTS, ISC or Local)
E13-060	12/20/2013	Fall in TASF Parking from Personal Vehicle	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-001	1/21/2014	IOSH On-Site to Inspect Mid-Iowa Environmental (Asbestos Abatement Contractor)	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-002	1/23/2014	Chilled Water Line Break at TASF	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-003	1/29/2014	Chemical Burn – Left Wrist	Ames Local-CAIRS
E14-004	2/7/2014	Fire Alarm Metals Development	Ames Local-ORPS
E14-005	2/5/2014	Scratch – left arm	Ames Local-CAIRS
E14-006	2/13/2014	Johanshir Golchin Harassment	Ames Local-ISC
E14-007	2/13/2014	Mercury Clean-Up	Ames Local-ORPS
E14-008	10/31/2013	Mercury Clean-Up	Ames Local-ORPS
E14-009	10/31/2013	Iron / Arsenic Breach	ORPS
E14-010	2/17/2014	Slip and Fall in Gilman Stairwell	Ames Local-CAIRS
E14-011	2/21/2014	Electrical Shock	Ames Local-CAIRS

Table 7 – Event Categorizations

Cat. #	Date	Title	Conclusion
E14-012	2/17/2014	Rash on Hands - Suspect Latex Allergy	CAIRS
E14-013	2/25/2014	Improper Shipment of Chemicals, Contaminated Materials, and Compressed Gases	ORPS
E14-014	3/6/2014	Zaffarano Fire Alarm (false alarm)	Ames Local-ORPS
E14-015	3/11/2014	Sliver (glass) in Finger	Ames Local-CAIRS
E14-016	3/26/2014	Working on HF System in 147 Metals Development During Off Hours	Ames Local-ORPS
E14-017	4/14/2014	Mercury Chloride Contacts Aluminum Foil - Possible Exposure	Ames Local-CAIRS
E14-018	4/15/2014	Threatening Phone Call to Warehouse	Ames Local-ISC
E14-019	4/11/2014	Heartbleed Exploit Affected Ames Laboratory	Ames Local-ISC
E14-020	4/17/2014	Contractor Hot Work W/O By-Passing Simplex	Ames Local-ORPS
E14-021	4/21/2014	Zaffarano Fire Alarm (false alarm)	Ames Local-ORPS
E14-022	4/15/2014	Improper Shipment of Mercury Chloride (HgCl ₂)	ORPS (R)
E14-023	5/9/2014	B34 SPH Lithium Fire	Ames Local-ORPS
E14-024	5/2/2014	Transmission Electron Microscope (TEM) Shielding Concern for Pregnant Woman	Ames Local-ORPS
E14-025	5/5/2014	Johanshir Golchin -1995 Cancer Cluster Survey Information Request	Ames Local-ORPS
E14-026	5/8/2014	Zaffarano Water Leak	Ames Local-ORPS
E14-027	5/21/2014	Carbon Monoxide Alarm	Ames Local-ORPS
E14-028	5/30/2014	Fire in Sweeney Hall	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-029	6/6/2014	Small Methylene Chloride Spill in 274 Metals Development Fume Hood	Ames Local-ORPS
E14-030	6/5/2014	Ames Lab Phone Outage	Ames Local-ORPS
E14-031	6/11/2014	Wood Splinter in Index Finger	Ames Local-CAIRS
E14-032	6/6/2014	Contractor Terms and Conditions Updated	Ames Local-ORPS
E14-033	6/18/2014	Ames Lab Phone Outage	Ames Local-ORPS
E14-034	6/24/2014	Eye Discomfort Concern	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-035	6/25/2014	Personal Computer Compromise and Possible Theft	Ames Local-ISC
E14-036	6/30/2014	Power Loss	Ames Local-ORPS
E14-037	6/30/2014	False Fire Alarm in Spedding	Ames Local-ORPS
E14-038	7/1/2014	Heat Transfer Fluid Spill	Ames Local-ORPS
E14-039	7/6/2014	False Fire Alarm in Metals Development	Ames Local-ORPS
E14-040	6/30/2014	Chemical Splatter to Face & Eyes (wearing safety glasses)	Ames Local-CAIRS
E14-041	7/8/2014	Employee Injury – Fall from Rental Truck	CAIRS
E14-042	7/14/2014	False Fire Alarm in Metals Development	Ames Local-ORPS
E14-043	7/21/2014	Skin Burn from Torch	CAIRS, ORPS, & NTS
E14-044	7/17/2014	Forehead Contusion	Ames Local-CAIRS
E14-045	7/23/2014	Brittany Prater, Unauthorized Interviews/Filming	Ames Local-ISC
E14-046	7/29/2014	Visiting Scientist using Unlicensed Software	Not Reportable (ORPS, NTS, ISC, CAIRS or Local)
E14-047	7/29/2014	Shoulder (Thoracic) Strain	CAIRS
E14-048	8/4/2014	Puncture to Fingertip from Point of Alignment Tool	Ames Local-CAIRS
E14-049	8/4/2014	Radiation Protection Program Audit Findings	Ames Local-NTS
E14-050	9/4/2014	Collapsed Sewer Pipe – HWH	Ames Local-ORPS
E14-051	9/22/2014	Construction Safety Assessment of the Sensitive Instrument Facility	Ames Local-ORPS
E14-052	9/26/2014	Door Card Database Topical Appraisal	Ames Local-ORPS

Table 7 – Event Categorizations

Cat. #	Date	Title	Conclusion
E14-053	9/26/2014	Confined Space Entry Program Topical Appraisal	Ames Local-ORPS
E14-054	9/29/2014	RPP Function Element – Emergency Exposure Situations – Topical Appraisal	Ames Local-ORPS
E14-055	9/29/2014	RPP Functional Element – Nuclear Accident Dosimetry – Topical Appraisal	Ames Local-ORPS
E14-056	9/26/2014	Simplex Fire System – Topical Appraisal	Ames Local-ORPS
E14-057	9/29/2014	RPP Functional Element – Organization and Administration – Topical Appraisal	Ames Local-ORPS
E14-058	9/29/2014	Annual Review of HF Activity	Ames Local-ORPS
E14-059	9/30/2014	Topical Appraisal of Chemical Inventory Process	Ames Local-ORPS
E14-061	9/10/2014	RPP Functional Area Review, Records – Topical Appraisal	Ames Local-ORPS
E14-062	9/24/2014	RPP Functional Area Review Reported to Individuals – Topical Appraisal	Ames Local-ORPS

The Reportable Events, Table 8, provides specific details on the reportable events since FY2004.

Table 8 - Reportable Events (FY)

Year	Type	Identification	Date	Title	Description
FY 2004	ORPS	2004-0001	1-29-04	Electrical Contact	Researcher contacts 110 VAC when trying to reduce the clicking noise of an electrical contact / relay within the interlock box.
FY 2005	ORPS	2004-0002	12-20-04	Suspect / Counterfeit Bolts	While performing a Readiness Review, suspect / counterfeit bolts (non load bearing) was discovered.
	ORPS	2005-0001	2-1-05	Potential High Voltage Exposure	A visiting scientist (not supported by SC Funding) assembled a prototype research system before seeking Readiness Review.
	ORPS	2005-0002	4-20-05	Flash Hazard Analysis Accuracy Questioned	During the SC Electrical Safety Review, the consultant questioned the accuracy of the analysis.
	ORPS	2005-0003	8-10-05	Software Issue Found in Fire Alarm System	A smoke detector in building alarmed at the fire panel and central station but did not activate the alarms.
FY 2006	ISC	ISC – IMI 3(#19) Incident # 51451	2-17-06	System Intrusion	An intruder allegedly from force.coe.neu.edu used a real username/password to access gateway.cmpgroup.ameslab.gov.
FY 2007	ORPS	2007-0001	12-29-06	Smolder /Smoke in Renovation Area	A small crack in the concrete floor between two buildings allowed a spark from plasma-arc cutting to reach expansion joint material.
	ORPS	2007-0002	7-27-07	Electrical Conduit Penetration	Conduit penetrated by screw during roofing operations.
FY 2008	ORPS	2007-0003	10-4-07	Switch Failure – Fire Alarm System	During annual fire alarm system test and fire drill, the Wilhelm Hall over-ride switch failed.
	ORPS	2008-0001	4-23-08	Suspect /Counterfeit Bolts	After review of a lessons learned, the man-lifts were reviewed with one having suspect/counterfeit bolts.
	ORPS	2008-0002	5-16-08	Hydrofluoric Acid SAD Procedure Deviation	A larger cylinder of Hydrofluoric Acid was purchased & installed contrary to the Safety Analysis Document and Standard Operating Procedure.
	ORPS	2008-0003	7-3-08	HVAC Vent Unexpectedly Drops	HVAC Upgrade Project a wall vent was not verified that it was removed before removing supply duct.
FY 2009	ORPS & CAIRS	2008-0004	10-24-08	Elbow Injury (Fracture)	An Engineer while applying pressure on opposing wrenches dislodged a bone in the elbow from a previous non-work related injury.
	ORPS & NTS	2009-0001	5-18-09	Beryllium Contamination Found	As a result of performing wipe sampling in preparation for a fume hood exhaust stack lining

Table 8 - Reportable Events (FY)

Year	Type	Identification	Date	Title	Description
					project, beryllium was discovered above the DOE Limits
	ORPS	2009-0002	9-25-09	Water Service Impairment (Fire Safety) at Service Buildings (ARRA)	ARRA funds stimulus money was appropriated to remodel a portion of the Campus warehouse to provide needed space for the storage of record. Subcontractor determined that the 4 inch water service was inadequate for the sprinkler system.
FY 2010	ORPS	2009-0003	10-7-09	Electric Shock	While assembling components of the biomass auger reactor, the student received an electric shock. Activity in space leased by Ames Lab by non employee.
	ORPS	2009-0004	12-1-09	Fire of UPS	Fire was detected involving a UPS System for the Scalable Computing Lab.
	ORPS & CAIRS	2010-0001	6-8-10	Dropped UPS on Dock	Delivering a (UPS) unit to loading dock, employees dropped it on its side. As the unit fell, one employee jumped out of the way resulting in neck strain that required prescription muscle relaxer and restricted work duty.
	ORPS	2010-0002	6-18-10	Rad and BE Discovery	Elevated radiological readings were discovered in recessed area at the tops of some doors.
	CAIRS	2010-0002	8-27-10	ARRA Contractor Injury (hernia)	While lifting a door frame into place, contractor pain in his groin. Determined to be hernia requiring surgery.
FY 2011	ORPS & CAIRS	2011-0001	1-3-11	Broken Arm & Ankle and Dislocated Elbow	Employee fell downstairs at ISU Library. Steps in good condition.
	ORPS	2011-0002(R)	1-6-11	Recurring Injuries	Custodians falling during floor stripping and waxing activities.
	ORPS	2011-0003	9-12-11	Cut Conduit	Contractor performing demolition cut into a concealed conduit with 110 VAC.
FY 2012	ORPS	2012-0001	2-16-12	Suspect/Counterfeit and Defective Parts	Three ratchet strap assemblies were found to have S/CI bolts installed and a suspect bolt on a platform lift was found the same day during inspections
	ORPS	2012-0002	6-29-12	Switchgear Fire	Electrical switchgear in 244 Metals Development failed and caused a fire and evacuating of the building for the day. The fire was quenched using a CO2 extinguisher.
	NTS	2012-0001	8-22-12	Lapse of Registered Nurse License	Supervising nurse reported that license had expired December 15, 2011.
FY 2013	ORPS	2013-0001	1-3-13	Suspect/Counterfeit Defective Items	Six ratchet strap assemblies were found to have SC/I bolts installed
	CAIRS	13-005	6-12-13	Standard Threshold Shift (STS)	Hearing loss over time.
	CAIRS	13-007	8-13-13	Dislocated Finger	Fall down stairs.
	CAIRS	13-009	9-9-13	Lumbar Strain	Moving filing cabinet improperly.
	CAIRS	13-052	9-15-13	Metal Sliver in Finger	Metal splinter in finger requiring Lidocaine to numb finger and scalpel to open wound.
FY 2014	ORPS	14-009	10-31-13	Iron/Arsenic Breach	Work was performed outside the scope of the activities approved in the Readiness Review
	CAIRS	14-012	2-17-14	Rash on Hands	Suspected latex allergy. Individual was not working with irritants; when switched to Nitrile gloves and symptoms went away.
	ORPS	14-013	2-25-14	Improper Shipment of Chemical, Contaminated Materials &	A scientist loaded equipment and materials from the Synchrotron Radiation Center at University of Wisconsin and delivered it to Ames Lab.

Table 8 - Reportable Events (FY)

Year	Type	Identification	Date	Title	Description
				Compressed Gases	
	ORPS(R)	14-022	4-15-14	Improper shipment of Mercury Chloride	Scientist ships quantity of mercury chloride in personal vehicle greater than that allowed by DOT from Ames Lab to Argonne.
	CAIRS	14-041	7-8-14	Fall from Rental Truck	Employee exiting passenger side of truck misses step and falls to parking lot resulting in broken hip.
	CAIRS, ORPS, & NTS	14-043	7-21-14	Burn from torch	Employee using torch to head copper rod does not inspect equipment, does not use gloves, and process unnecessary.
	CAIRS	14-047	7-29-14	Shoulder strain	Employee moving records boxes strains shoulder. Sent off-site for evaluation and doctor prescribes muscle relaxer.

Root Cause Analysis

As detailed in tables 9 and 10, TapRoot analysis is performed on Reportable Events and causal analysis is performed on Ames Local Events (events below reporting threshold). The results TapRoot and causal analysis is used to identify trends which would be used to determine if additional efforts are needed towards problems with Design/Engineering, Equipment/Material, Human Performance, Management, Communications, and Training. The results of this analysis are also used to develop appropriate corrective actions. The definition of Root Cause Analysis is “The search for the best practices and/or missing knowledge that will keep a problem from recurring.”

TapRoot Root Cause Analysis

TapRoot is a formal (standardized) method used at Ames Laboratory to investigate and determine causal factors for significant events (those beyond Ames Local Events). TapRoot was chosen because it was suggested by the Ames Site Office and it is also used by other DOE National Laboratories. The use of TapRoot at Ames Laboratory began in 2004 for Reportable Events (i.e., CAIRS, ORPS, NTS and ISC [Incidents of Security Concern]). Table 9 lists the causal analysis associated with each reportable event. Although there are similar causal analyses, they are different groups, issues, and results. No trends are apparent.

Table 9 - TapRoot Analysis of Reportable Events

Event Number	ORPS Description	Causal Analysis
ORPS 2004 - 001	Electrical Shock - Group Leader not authorized to remove cover.	A5 – Communication
ORPS 2004 - 002	Suspect Bolts - Equipment sent from Manufacturer with suspect bolts	A1 – Design / Engineering Problem
ORPS 2005 - 001	Potential High Voltage Exposure	A3 – Human Performance
ORPS 2005 - 002	Accuracy of Flash Analysis Questioned	A1 - Design / Equipment Problem
ORPS 2005 - 003	Fire Alarm Annunciation Failed to Activate	A2 – Equipment / Material Problem
ISC- IMI-3(#19) #51451	Condensed Matter Physics SSH Incident	A4 – Management Problem
ORPS 2007 - 0001	Smoke – Smoldering Event in Graphics Renovation	A2 – Equipment Problem
ORPS 2007 - 0002	Electrical Conduit Penetration at Warehouse	A3 – Human Performance

Table 9 - TapRoot Analysis of Reportable Events

Event Number	ORPS Description	Causal Analysis
ORPS 2007 – 0003	Wilhelm Hall Annunciators Did Not Activate During Fire Drill	A2 - Equipment / Material Problem
ORPS 2008 - 0001	Suspect / Counterfeit Parts on Man-lift	A2 - Equipment / Material Problem
ORPS 2008 - 0002	Hydrofluoric Acid Procedure Deviation	A3 - Human Performance
ORPS 2008 - 0003	HVAC Upgrade Project – Wall Vent Fell Onto Desk	A4- Management Problem
ORPS 2008 - 0004 and CAIRS	Elbow Injury (Fracture)	None Deemed Appropriate – Legacy Injury
ORPS 2009 - 0001 and NTS	Beryllium Contamination Found	A7 - Other Problem
ORPS 2009 - 0002	Water Service Impairment (Fire Safety) at Service Buildings	A2 - Equipment / Material Problem
ORPS 2009 - 0003	Electric Shock (non-Ames Lab employee in leased space)	A4 - Management Problem
ORPS 2009 - 0004	Fire in UPS Unit	A2- Equipment / Material Problem
ORPS 2010 - 0001 and CAIRS	Dropped UPS Unit	A4- Management Problem
ORPS 2010 - 0002	Rad Beryllium Discovery in Tops of Doors	A4 - Management Problem
ORPS 2011 - 0001 and CAIRS	Broken Ankle, Broken Arm, Dislocated Elbow at ISU Library	A3 - Human Performance
ORPS 2011 -0002 (R)	Floor Maintenance Injuries (Recurring)	A4 - Management Problem
ORPS 2011 - 0003	Energized 110 Volt Conduit Cut	A3 - Human Performance
ORPS 2012-0001	Suspect/Counterfeit and Defective Parts	A2 - Equipment / Material Problem
ORPS 2012-0002	Switchgear Fire	A2 - Equipment / Material Problem
NTS 2012-0001	Lapse of Registered Nurse License	A3 - Human Performance
ORPS 2013-0001	Six ratchet strap assemblies were found to have SC/I bolts installed	A2- Equipment / Material Problem
CAIRS 2013-005	Standard Threshold Shift (STS) – Hearing Loss	A1 - Design/Equipment Problem
CAIRS 2013-007	Dislocated Finger - An additional railing, although not required by Code, would be desirable.	A1 - Design/Equipment Problem
CAIRS 2013-009	Lumbar Strain - Use proper lifting equipment instead of lifting.	A3 - Human Performance
CAIRS 2013-052	Metal Sliver in Finger	A3 - Human Performance
ORPS 2014-0001	Iron / Arsenic Breach	A3 - Human Performance
CAIRS 2014-007	Latex Allergy	A3 - Human Performance
ORPS 2014-0002	Improper shipment of chemicals, contaminated materials, and compressed gas	A4 – Management Problem
ORPS 2014-0003 (R)	Improper shipment of Mercury Chloride	A4 – Management Problem
CAIRS 2014-013	Employee fall from rental truck – broken hip	A3 - Human Performance
CAIRS 2014-015 ORPS 2014-0005 NTS 2014-0001	Burn from torch	A4 – Management Problem
CAIRS 2014-015	Shoulder strain	A4 – Management Problem

Causal Analysis of Ames Local Events

Causal Analysis is an abbreviated version of TapRoot. Causal Analysis of Ames Local Events started in May of 2004. An Ames Local Event is one which does not meet the threshold of reportability to DOE or OSHA, but warrants further investigation and potentially the development of corrective actions. The Laboratory also includes non-recordable injuries and illnesses (Ames Local-CAIRS) as an opportunity to ensure injuries/illnesses are investigated, evaluated, and potential corrective actions are documented and

tracked. Furthermore, Ames Local Events are evaluated for recurrence (trending). Ames Laboratory views the causal analysis (investigation and analysis) program as a proactive opportunity to address concerns and develop corrective actions to prevent minor concerns which could be a precursor to more severe events and injuries.

Table 10 lists the causal factors identified for Ames Local events for FY2010 through FY2014. The predominant causal factor identified is “A3-Human Performance Less Than Adequate” from DOE Guide 232.2. Causal factor A3 is generally consistent with the numbers generated annually since 2004.

Table 10 - Causal Factors of Ames Local Events							
Causal Factor	FY10	FY11	FY12	FY13	4-Year Average	FY14	% Change from 4-Yr Average
A1- Design/Engineering Problem	3	1	0	1	1.25	2	60% Increase
A2- Equipment/Material Problem	15	7	9	8	9.75	10	2.6% Increase
A3- Human Performance Less Than Adequate	14	14	13	14	13.75	11	20% Decrease
A4- Management Problem	4	10	7	2	5.75	4	30% Decrease
A5- Communications Less Than Adequate	4	2	2	2	2.5	6	140% Increase
A6- Training Deficiency	0	2	0	0	.5	1	100% Increase
A7- Other Problem (External Phenomena, Radiation/Hazardous Material Problem)	2	1	2	1	1.5	2	33% Increase