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YELLOW - Assess Activities Using Hazard Control Hierarchy, Inspect Equipment before Use, and Wear Personal Protective Equipment

Lesson ID: SC-AMSO-AMES-AMES-2014-0005 (Source: User Submitted)

Originating Organization or Contracting Company: Ames Laboratory

Date: 10/20/2014

Contact: Shawn Nelson 515-294-9769

Classifier:

Reviewer:

Statement: Tasks need to be evaluated using the hazard control hierarchy. It was determined that the work being performed was unnecessary and using the hazard control hierarchy would have eliminated the hazard that caused the injury. Workers need to inspect torch handles, hoses, and connections prior to use and wear appropriate personal protective equipment (PPE). Management needs to ensure that pre-inspections are conducted and PPE is available and used appropriately.

Discussion: On July 21, 2014, at approximately 12:45 pm, a senior technician in the Ames Laboratory Low Temp Lab suffered a second degree burn to the wrist as a result of a standard helium recovery process that involved heating a solid copper rod with a torch. The process performed by the worker involved Inserting a copper rod, at room temperature, into the top of the Dewar to boil-off the remaining liquid helium (approximately 1 to 5 liters) from a nearly empty 250 liter Dewar. Over time, the copper rod will come to the same temperature as the helium and frost are visible on the copper rod sticking out the top. At that point, the copper rod is removed from the Dewar and placed in a designated hot work area on a work bench supported by two fire bricks. An acetylene/air torch is then used to warm the copper rod back to room temperature to be reinserted into the Dewar to speed up the recovery of helium into the bladder system. During the Investigation it was found a flame developed at the hose connection to the torch handle due to a loose connection. It is believed the technician was heating the copper rod unaware that acetylene was leaking at the base of the torch handle. Enough acetylene accumulated and ignited shooting a flame out the base of the torch at the employee's right wrist causing a second degree burn. The technician was not wearing gloves as required when performing torch work. Gloves were available in the room hanging on the wall near the torch.

Analysis: The following activities were contributing causes to this Incident: The employee did not inspect hose connections before use. The employee is a senior technician at the Ames Laboratory with many years of experience in torch use. This may have contributed to complacency believing the connection remained tight after the last use. Even though leather gloves are provided near the torch in the room and training specifies its use, the PPE was not used. While the PPE would not have prevented the fire from occurring, it may have reduced the severity of the injury. Heating of the rod could be performed by another means. Use of an industrial heat gun would provide the same desired effect of bringing the copper rod back to room temperature. Multiple copper rods could be used replacing the frozen rod with one at room temperature. This would eliminate the need for the Low Temp Lab to manually heat the rod. Leave the rod in the Dewar overnight. After the incident, the rod was left in the Dewar overnight providing the same desired effect of emptying the Dewar of helium; eliminating the need to heat the rod entirely.

Recommended Actions: Torch work in the Low Temp Lab was suspended until another means of heating the copper rod or a process to eliminate the heating of the copper rods is developed. An extent of condition was performed. There were thirty three (33) hot work activities identified at the Ames Laboratory. Each activity was evaluated to ensure equipment was in proper working order, PPE was available and appropriate, and that designated hot work areas were being maintained/operated safely. Nine torches were disposed due to age, wear, or no longer needed and six (6) torches were replaced. Ten hoses were disposed due to signs of wear, age, or no longer needed and seven hoses were replaced. Two tinted face shields were disposed because they were scratched and one was warped. Two tinted face shields were replaced. Three tinted goggles were disposed of due to age, wear, lack of elasticity in head strap. Three tinted goggles were replaced. Eight check valves were replaced due to age. Seven O-rings were replaced on torches (did not show signs of cracking) as a precautionary measure. Ten (10) Standard Operating Procedures (SOPs) were revised or developed. Refresher training was conducted for all employees performing hot work at the Ames Laboratory. Wear fire retardant gloves with gauntlets when heating components. Conduct periodic refresher training on hot work techniques and safety practices. The Laboratory Director performed Mandatory All-Hands Meetings for Safety Awareness Discussion.

Savings: N/A

Keywords: fire, burn, HOT WORK, TORCH

Hazard(s): Fire / Smoke / NFPA

ISM Code(s): Perform Work

Work Function(s): Occupational Safety & Health - Personnel Protective Equipment, Welding, Burning Hotwork

References: Occurrence Report SC--AMSO-AMES-AMES-2014-0005, Non-Compliance Tracking NTS--AMSQ-AMES-AMES-2014-0001

Priority Descriptor: Yellow / Caution

Attachments:

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