FREEPORT-McMoRan

SAFETY ALERT NOTIFICATION		Safety Alert #	SA – 2018 - 1
		IMS #	
		OPERATION:	FMA sites
	**Perchloric Acid Hazards & Incidents**	INCIDENT DATE:	
		TIME:	
		TYPE:	
Issued By: **DOHS**	Contact For Additional Details: **Mark Albertsen, Director Corp H&S**		

This is NOT an investigation report. It is a NOTIFICATION of a Significant Incident that has taken place at a Freeport-McMoRan location. The information below is a preliminary assessment and not a formal investigation.

INCIDENT DESCRIPTION

Over the years, we have had incidents relating to the utilization of perchloric acid in FMA Operations. The incidents have resulted in injury by chemical burns, chemical reactions and damage to assets. Two of these events had high potential which resulted in fire and damage to lab facilities. These two are summarized below:

Fort Madison: During maintenance work to dismantle a perchloric acid lab hood, a reaction occurred, which caused a small fire inside the hood and lab area. The initial combustion started on the lab countertop with noted fire damage on the side of the cabinet down to the floor. Ethanol bottles in the area did not catch on fire. Once the fire started, it made contact with the foam between the top membrane and corrugated metal on the roof. There were three contractors and two employees working near when the fire started, but they were able to evacuate the area safely. All employees and contractors were accounted for.

Once the fire was completely extinguished and the atmosphere monitored, the lab was cleared for re-entry. Clean Harbors, a specialized chemical clean-up company, was contracted to come and perform neutralization and testing on the lab hood and ductwork prior to continuing disassembly. Steam was used inside of a controlled area to devolatilize the perchloric crystals, and sodium metabisulfate was used to neutralize the crystals. Once the equipment was steamed and neutralized, the equipment was wiped down and disposed of properly.

TFM: Five employees were working in the digestion room #9 when suddenly they noticed sparks coming from the hood #3. At this time, one of them went out to collect a fire extinguisher, but when he came back heard an explosion. There was dark smoke in the whole room and employees could not access the room. One employee went around the building in order to switch off the fan, but found the scrubber was already on fire.

Emergency response procedure was activated, electricians switched off the power, laboratory personnel reported to the area assembly point and the emergency response team (ERT) reported to the scene and put out the fire.

FATAL RISKS	HEALTH AND SAFETY POLICIES
Fire	N/A
Exposure to Hazardous Substance	Choose an item.
Choose an item.	Choose an item.

OTHER SIGNFICANT RISK (specific to site or task not categorized as global)

Additional buildup of potentially dangerous perchloric acid crystals, noted on external surfaces of hood and ductwork.

PROBABLE DIRECT CAUSES (May or may not apply to all incidents)

- No procedure in place to inspect the inside of the ducting system and other internal hood surfaces. Although proper wash-down procedures were followed, the wash-down system was inadequate and did not properly remove or prevent all crystal buildup.
- During the work to remove the hood, crystal buildup was not wetted per instructions.
- Lab personnel regularly check face velocities on all fume hoods; however, an additional inspection/PM schedule is needed for blower and stack assemblies.
- Inadequate assessment of risk; lack of experience- laboratory personnel may not understand the consequences of buildup of the perchloric crystals in the ductwork and were not aware of the potential impact / appropriate hazard controls.

IMMEDIATE CORRECTIVE ACTION(S)

- At Fort Madison, perchloric acid use has been discontinued.
- The MOC process will be used to fully vet additional controls prior to future perchloric acid use.
- Pursuing with CASC to find an alternative method for insol digestion.
- At TFM, risk register for laboratory activities was not found. This register will be developed and reassessed on a periodic basis.
- Ensure wash down systems and fire suppression systems are effective and functional.

REQUIRED ACTIONS(S)

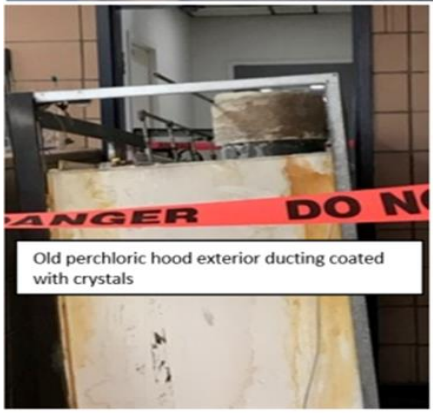
- Engineering/Substitution Controls:
    - Verify high pressure gas cylinders are not in proximity of fume hoods and/or have appropriate engineered controls in place (ie: fire wall, containment, etc)
    - Hood systems (existing and future) must have engineered design criteria for ventilation, equipment & duct layout and wash systems. Appropriate materials of construction for hoods, ductwork, wash systems and scrubber equipment are critical to mitigate risk. The CCI team (Mitch Kruger, Rich Brooks) can assist with these services.
- Administrative Controls:
    - SOP's
    - Education and job training (see attached PP slides)
    - Establish inspection/PM schedule for all fume hood blower and stack assemblies.
    - Preventive maintenance plans
- Consider utilizing specialty chemical clean-up contractors to assess conditions and appropriately clean/decontaminate work surfaces prior to performing maintenance activities
- Communicate expectation to employees and contractors that any job that does not have an established SOP requires a pre-job analysis.
- Utilize CASC/TC as a resource for alternatives to perchloric acid usage.

TFM- Showing the hood from the back view.
The red piping indicates the location of the ventilation ductwork involved in the fire.

TFM- shows a picture of two hoods, while this is the side where sparks of lights had been initially identified.

TFM- Scrubber and ductwork that caught fire

Fort Madison Ops



This is NOT an investigation report. It is a NOTIFICATION of a Significant Incident that has taken place at a Freeport-McMoRan operation and is being communicated to enhance safety awareness should a similar situation exist. The information above is a preliminary assessment of the event and is not a formal investigation.