



SAFETY ALERT NOTIFICATION

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.

OPERATION:	Chino Hydromet		Incident:	X
ISSUED BY:	Brittany Varela, Chino Hydromet Manager		Injury:	
DATE:	10/3/14 & 10/7/14		Property Damage:	
TIME:			Process Loss:	X
LOCATION/DEPARTMENT:	Chino Leach Stockpile - Lampbright 7055 A-Line			
INCIDENT DESCRIPTION:	<p>On the morning of October 3, an FCX employee and three contractors were working around an HDPE drip line system on the Lampbright stockpile when they were exposed to a hazardous gas. All four were transported via mine rescue to the local emergency room, they were evaluated and ultimately released.</p> <p>Mine personnel immediately gathered up various air monitoring equipment and appropriate PPE to test for numerous gases (CO, H₂S, O₂, SO₂) and LEL. Air monitoring in the immediate area of the event began approximately two hours after the incident occurred and throughout the day. In addition, air monitors capable of data logging for the various gases were strategically placed for monitoring overnight into the next day. The results of this testing on October 3rd through 4th did not indicate levels immediately dangerous to human health. As a result, it was determined the stockpile could be accessed safely if personnel worked in pairs, wore personal air monitors (Bumble Bee) and carried two-way radios. In addition, the site delayed personnel access until any potential temperature inversion had dissipated. Over the next two days, Leach maintenance contractors and FCX employees were trained on the use of the personal air monitors and the new stockpile access procedures. No access was allowed on the surface of the stockpile until training was completed.</p> <p>On October 7, a small crew of contractors and FCX personnel accessed the stockpile and began normal leach pad maintenance activities including drip-line repairs and pipeline flushing. Shortly after noon, two contractor employees complained of feeling ill, were transported to the emergency room for evaluation and were released later that day. Following this incident, mine personnel accessed the site and additional testing was conducted. Again, the air monitoring results were negative which led to a decision to shut-down the stockpile to all personnel.</p>			
DETAILS OF INJURY TYPE:	From the descriptions of the personnel affected, it was evident, that the exposure was from inhalation. The evidence suggests the employees were exposed to NO ₂ gas from off-spec acid that was supplied to the mine from an external source.			
POTENTIAL FOR INJURY:	Fatality	Lost Time	Permanent Disability	Other Potential
	X			
PROBABLE DIRECT CAUSES:	<ol style="list-style-type: none"> 1. The existence of an 800 foot length ('dead leg') of 24 inch diameter HDPE pipe at the highest point in the pipeline where gasses could collect in the system. It was confirmed that this configuration provided an opportunity for gas to collect in this area of the line and be released during the process of flushing or repairing the line. 2. Acid quality – evidence suggests that poor quality or off-spec acid was received 			

	<p>and introduced into the mine leach system. A potential contaminant in sulfuric acid is nitrates, which can result in the generation of NO and NO₂ when diluted below 70% strength. Although monitoring for NO₂ was not conducted on October 3rd or October 7th, negative readings for CO were recorded on two air sampling monitors on October 3rd. Per the air monitor manufacturer, negative readings for CO is an indication of sensor interference from the presence of NO₂. It was also confirmed that acid containing nitrates exceeding purchasing specifications was discovered at the Morenci mine on October 22nd. Dilution testing of this acid at the FCX Central Analytical Services lab produced the evolution of NO_x gas. Based on this information and the addition of nine railcars of fertilizer grade acid being introduced into the system a few days prior to the October 3rd event, it is highly probable that one or more of these rail cars contained high nitrate levels. When these nitrates were diluted into the raffinate, NO and NO₂ gas was generated and trapped in the 800 feet of the HDPE pipeline.</p> <p>3. Weather conditions – On the day of the event there was virtually no wind and an inversion existed which could have held gases in concentration at the surface where employees were working.</p>
<p>IMMEDIATE CORRECTIVE ACTION:</p>	<ol style="list-style-type: none">1. Employees were evacuated from stockpile, stockpile monitoring was conducted, stockpile operations were shutdown, investigation continued until causes determined.2. Multi-media sampling plan was developed and executed to include the various solutions, soils, and gases around the area where the exposure occurred.3. The 800-foot 'dead leg' was removed and an air relief valve (ARV) installed at the end of the pipeline. This allows any gas accumulated in the pipeline to be released as it is generated instead of building up over time and released when valves are flushed.4. Developed a process for monitoring incoming sulfuric acid to determine it meets internal specifications. This includes reviewing the certificate of analysis (COA) and visual observation of the color (Color Chart was developed and communicated to all FCX acid customers). A lab was set up to perform on-site NO_x titration of all supplied acid. Acid that is cloudy or dark or assays ≥300 parts per million (ppm) (0.03%) NO_x will be quarantined and quality confirmed at an outside lab. If the levels are >300ppm, the rail car may be rejected and returned to the acid supplier.5. Implemented a process and training to ensure that anyone working on the Lampbright stockpile is wearing a personal air monitor that will alarm for O₂, CO₂, NO₂, SO₂, and H₂S. In addition, all personnel carry an escape hood that will be deployed if alarm levels from the personal air monitoring dictate escape6. Strategically installed wind socks on the Leach stockpiles so personnel can visually determine wind direction and strength to plan evacuation routes.
<p>REQUIRED ACTIONS:</p>	<ol style="list-style-type: none">1. Tailgate incident with all personnel2. Install and continuously monitor for NO₂, SO₂, and H₂S at acid dilution areas. These areas will have an audible and visual alarm and will be tied into the SX control room.3. Communicate incident and findings to all FCX sites.

Fixed Monitors for NO₂, SO₂, H₂S

Manufacturer	Model	Description	Measuring Range	Initial Alarm Set Point	Calibration
Mine Safety Appliance Company	A-Ultima X3 E1M3000025119 110000	Mine Safety Appliances Company-Ultima X3 Technology Sensors H ₂ S	H ₂ S: 0 - 100 ppm	10 ppm	Monthly
Mine Safety Appliance Company	A-Ultima X3 E1M3000025119 110000	Mine Safety Appliances Company-Ultima X3 Technology Sensor SO ₂	SO ₂ : 0 - 100 ppm	2 ppm	Monthly
Mine Safety Appliance Company	A-Ultima X3 E1M30000201121 110000	Mine Safety Appliances Company-Ultima X3 Technology Sensor NO ₂	NO ₂ : 0 - 10 ppm	3 ppm	Monthly

Initial alarm set points are set in accordance to FCX Hazardous Gas Monitoring Systems and Apparatenances which are at/or below the Occupational Exposure Limits (OEL).

Mobile Monitors for H₂S, SO₂, CO₂, NO₂, O₂

Manufacturer	Model	Description	Measuring Range	Initial Alarm Set Point	Calibration	Bump Test
Industrial Scientific	MX6 iBrid	Industrial Scientific MX6 iBrid Sensor H ₂ S	H ₂ S: 0 - 500 ppm	10 ppm	Monthly	Daily
Industrial Scientific	MX6 iBrid	Industrial Scientific MX6 iBrid Sensor SO ₂	SO ₂ : 0 - 150 ppm	2 ppm	Monthly	Daily
Industrial Scientific	MX6 iBrid	Industrial Scientific MX6 iBrid Sensor CO ₂	CO ₂ : 0 - 5% Vol.	0.5% Vol.	Monthly	Daily
Industrial Scientific	MX6 iBrid	Industrial Scientific MX6 iBrid Sensor NO ₂	NO ₂ : 0 - 150 ppm	3 ppm	Monthly	Daily
Industrial Scientific	MX6 iBrid	Industrial Scientific MX6 iBrid Sensor O ₂	O ₂ : 0 - 30% Vol.	19.5 % Vol.(Low) or 23.5% Vol. (High)	Monthly	Daily

Initial alarm set points are set by Industrial Scientific which are at/or below the Occupational Exposure Limits (OEL).

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.