Critical Risk Management

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March 2018

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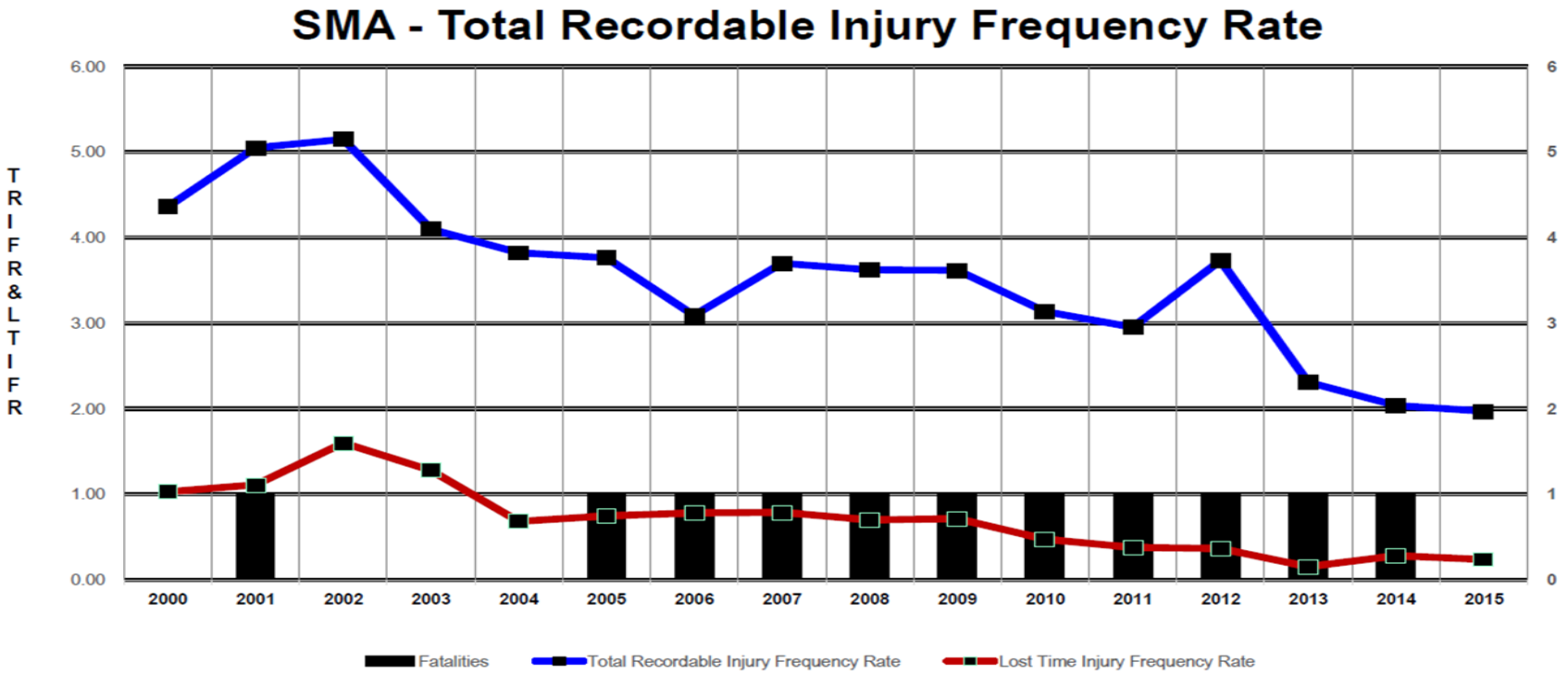
Critical Risk Management

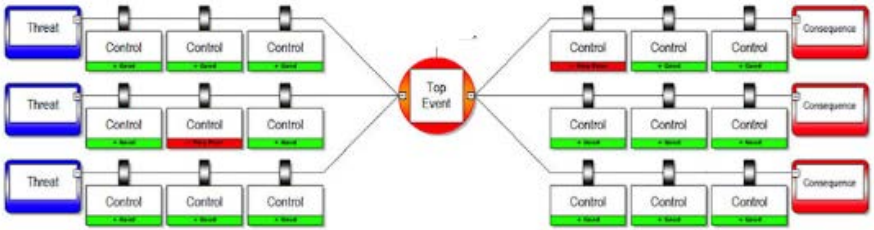
- Why?
- What we encountered along the way
  - Learnings
  - Challenges
  - Successes
- Take Home Message

Trends


SMA - Total Recordable Injury Frequency Rate
TRIFR&LTIFR
6.00
5.00
4.00
3.00
2.00
1.00
0.00
6
5
4
3
2
1
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Fatalities
Total Recordable Injury Frequency Rate
Lost Time Injury Frequency Rate

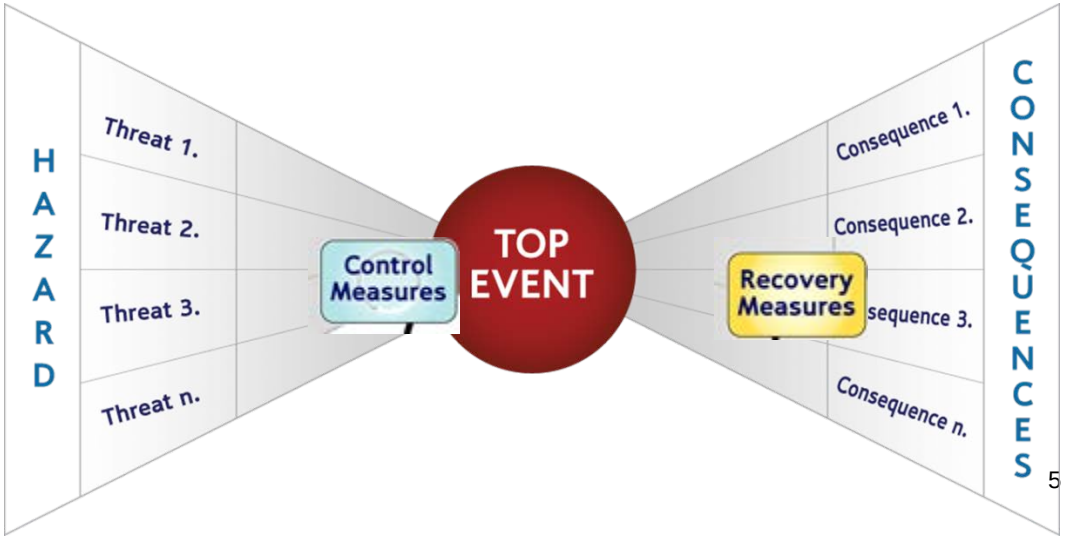
Plan

- ICMM
- Bowtie Analysis Tool
- Identified the top 10 hazards



Bowtie Analysis Tool – analysis of a specific unwanted event.

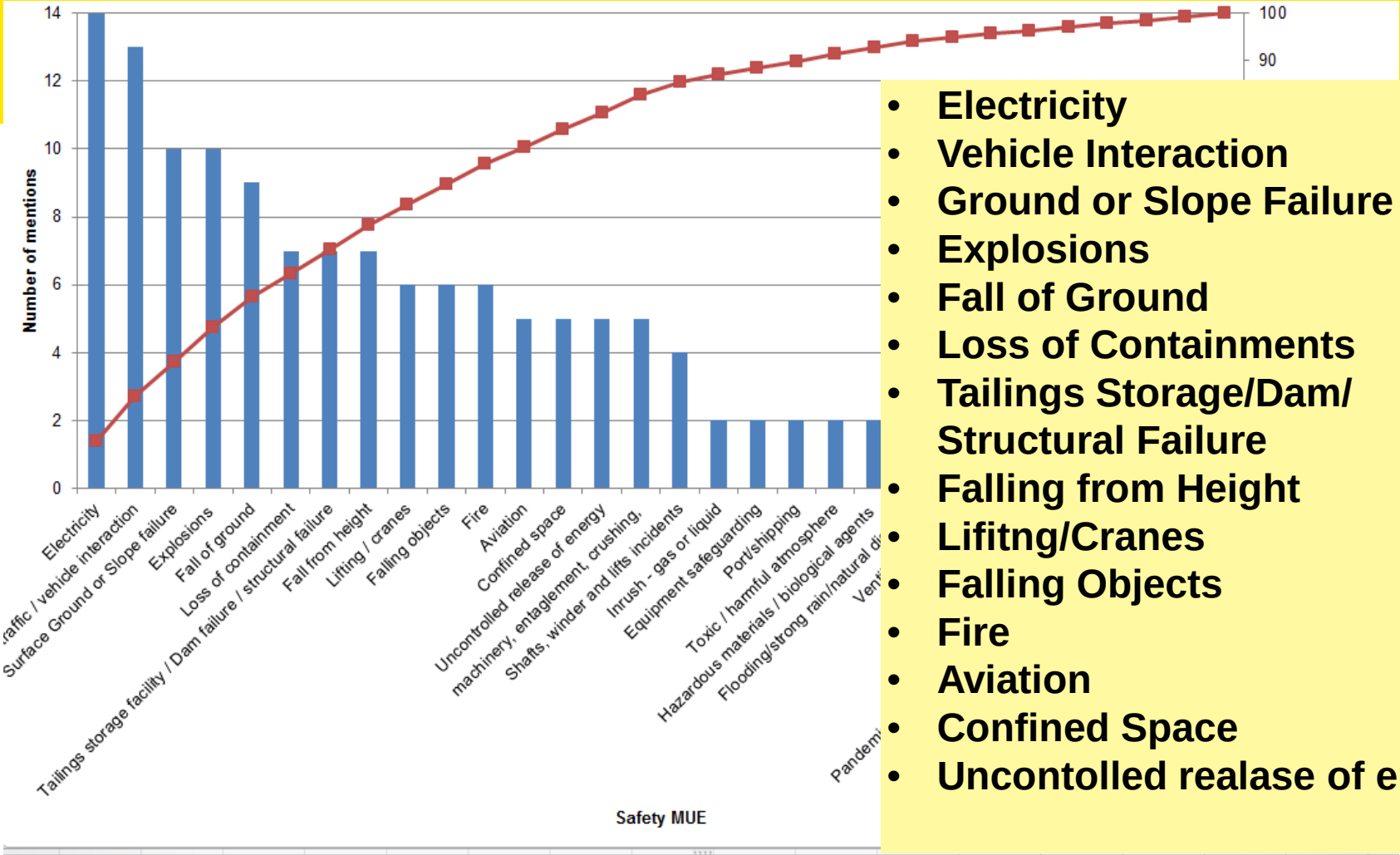
- Identify the top Material Unwanted Event
- Describe Hazard and what controls are in place to prevent the release of the hazard
- Recovery measure – what is in place to minimize the effect or impact of the hazard



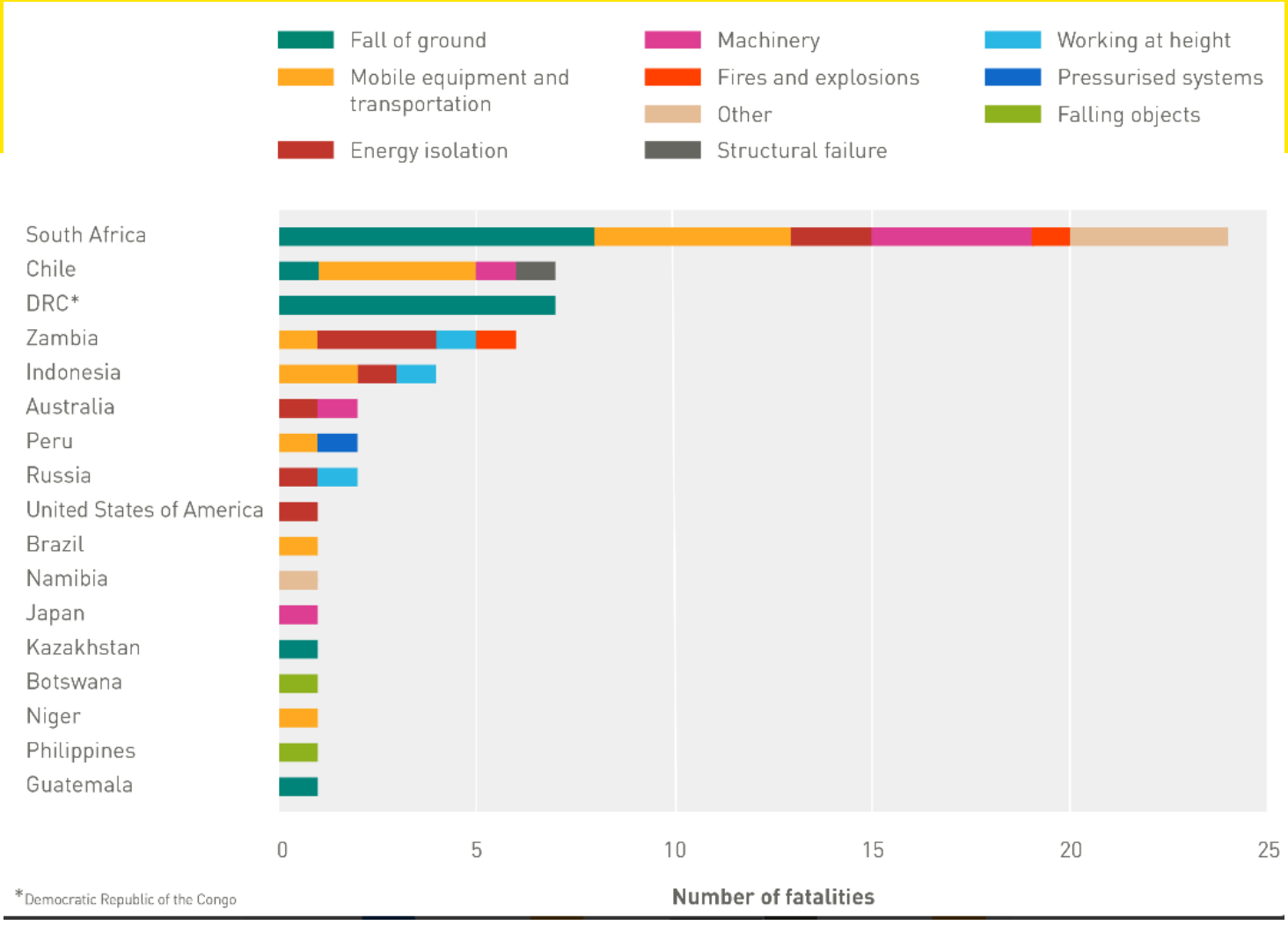
Critical Hazards

Top 10 Critical Unwanted Events at McClean lake are:

- Contact with Hot Surface
- **Electrical Hazards & Energy Isolation**
- Explosion in the Camp
- Explosion in the Mill and Mill Terrace
- Exposure to Anhydrous Ammonia
- **Exposure to Sulphuric Acid**
- Exposure to Sulphur Dioxide
- **Falling Objects**
- Fire in the Mill and Mill Terrace
- **Vehicle & Pedestrian Interaction**



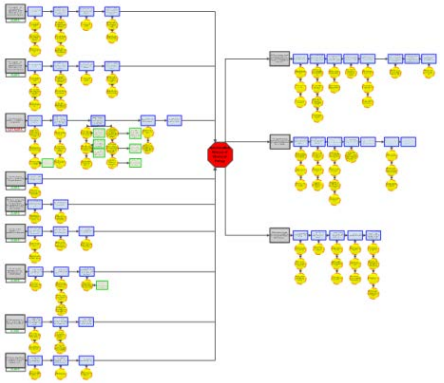
- Electricity
- Vehicle Interaction
- Ground or Slope Failure
- Explosions
- Fall of Ground
- Loss of Containments
- Tailings Storage/Dam/ Structural Failure
- Falling from Height
- Lifitng/Cranes
- Falling Objects
- Fire
- Aviation
- Confined Space
- Uncontolled realase of energy



*Democratic Republic of the Congo

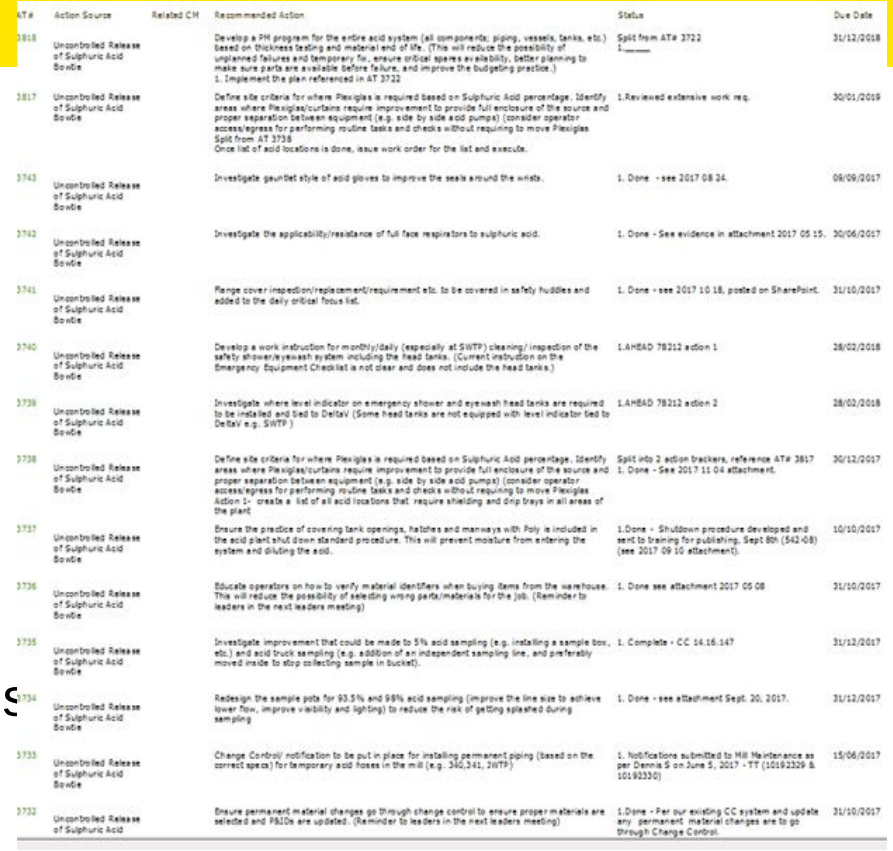
Learnings

- Time to understand
- Involving the right people; value in discussion.
- Using conflict to your advantage
- Not about the bowtie; communication & awareness
- Not necessarily about problem solving



Challenges

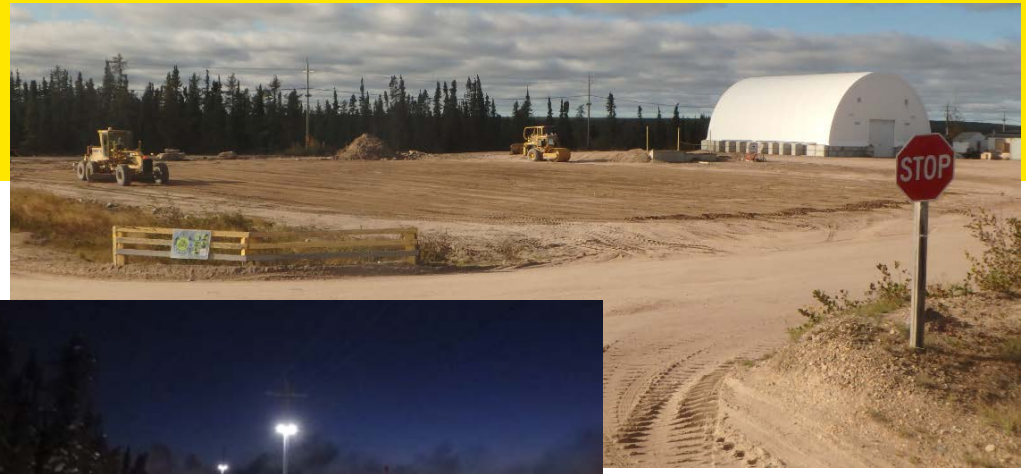
- yet another concept?!
- Keeping the momentum
- Keeping it manageable
- Bowtie - Staying on track; the scope
- Bowtie –threats and controls vs. response (right side)

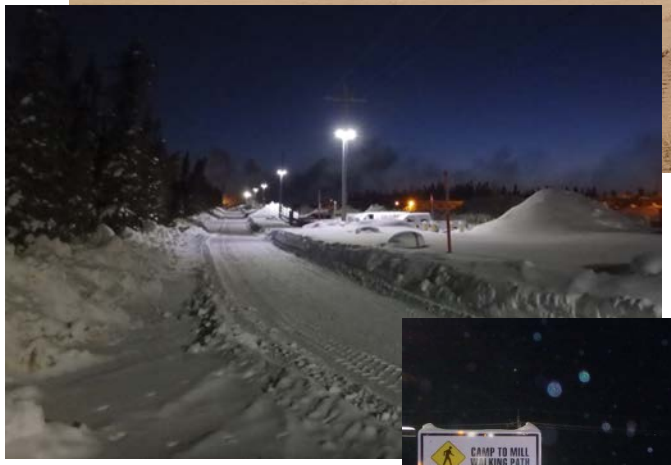


AT#	Action Source	Related CM	Recommended Action	Status	Due Date
3818	Uncontrolled Release of Sulphuric Acid Bowtie		Develop a PM program for the entire acid system (all components: piping, vessels, tanks, etc.) based on thickness testing and material end of life. (This will reduce the possibility of unplanned failures and temporary fix, ensure critical spares availability, better planning to make sure parts are available before failure, and improve the budgeting practice.) 1. Implement the plan referenced in AT 3722	Split from AT# 3722 1.____	31/12/2018
3817	Uncontrolled Release of Sulphuric Acid Bowtie		Define site criteria for where Plexiglas is required based on Sulphuric Acid percentage. Identify areas where Plexiglas/curtains require improvement to provide full enclosure of the source and proper separation between equipment (e.g. side by side acid pumps) (consider operator access/egress for performing routine tasks and checks without requiring to move Plexiglas Split from AT 3738 Once list of acid locations is done, issue work order for the list and execute.	1.Reviewed extensive work req.	30/01/2019
3743	Uncontrolled Release of Sulphuric Acid Bowtie		Investigate gauntlet style of acid gloves to improve the seals around the wrists.	1. Done - see 2017 08 24.	09/09/2017
3742	Uncontrolled Release of Sulphuric Acid Bowtie		Investigate the applicability/resistance of full face respirators to sulphuric acid.	1. Done - See evidence in attachment 2017 05 15.	30/06/2017
3741	Uncontrolled Release of Sulphuric Acid Bowtie		Flange cover inspection/replacement/requirement etc. to be covered in safety huddles and added to the daily critical focus list.	1. Done - see 2017 10 18, posted on SharePoint.	31/10/2017
3740	Uncontrolled Release of Sulphuric Acid Bowtie		Develop a work instruction for monthly/daily (especially at SWTP) cleaning/inspection of the safety shower/eyewash system including the head tanks. (Current instruction on the Emergency Equipment Checklist is not clear and does not include the head tanks.)	1.AHEAD 78212 action 1	28/02/2018
3739	Uncontrolled Release of Sulphuric Acid Bowtie		Investigate where level indicator on emergency shower and eyewash head tanks are required to be installed and tied to DeltaV (Some head tanks are not equipped with level indicator tied to DeltaV e.g. SWTP)	1.AHEAD 78212 action 2	28/02/2018
3738	Uncontrolled Release of Sulphuric Acid Bowtie		Define site criteria for where Plexiglas is required based on Sulphuric Acid percentage. Identify areas where Plexiglas/curtains require improvement to provide full enclosure of the source and proper separation between equipment (e.g. side by side acid pumps) (consider operator access/egress for performing routine tasks and checks without requiring to move Plexiglas Action 1- create a list of all acid locations that require shielding and drip trays in all areas of the plant	Split into 2 action trackers, reference AT# 3817 1. Done - See 2017 11 04 attachment.	30/12/2017
3737	Uncontrolled Release of Sulphuric Acid Bowtie		Ensure the practice of covering tank openings, hatches and manways with Poly is included in the acid plant shut down standard procedure. This will prevent moisture from entering the system and diluting the acid.	1.Done - Shutdown procedure developed and sent to training for publishing. Sept 8th (542-08) (see 2017 09 10 attachment).	10/10/2017
3736	Uncontrolled Release of Sulphuric Acid Bowtie		Educate operators on how to verify material identifiers when buying items from the warehouse. This will reduce the possibility of selecting wrong parts/materials for the job. (Reminder to leaders in the next leaders meeting)	1. Done see attachment 2017 05 08	31/10/2017
3735	Uncontrolled Release of Sulphuric Acid Bowtie		Investigate improvement that could be made to 5% acid sampling (e.g. installing a sample box, etc.) and acid truck sampling (e.g. addition of an independent sampling line, and preferably moved inside to stop collecting sample in bucket).	1. Complete - CC 14.16.147	31/12/2017
3734	Uncontrolled Release of Sulphuric Acid Bowtie		Redesign the sample pots for 93.5% and 98% acid sampling (improve the line size to achieve lower flow, improve visibility and lighting) to reduce the risk of getting splashed during sampling	1. Done - see attachment Sept. 20, 2017.	31/12/2017
3733	Uncontrolled Release of Sulphuric Acid Bowtie		Change Control/ notification to be put in place for installing permanent piping (based on the correct specs) for temporary acid hoses in the mill (e.g. 340,341, SWTP)	1. Notifications submitted to Mill Maintenance as per Dennis S on June 5, 2017 - TT (10192329 & 10192330)	15/06/2017
3732	Uncontrolled Release of Sulphuric Acid		Ensure permanent material changes go through change control to ensure proper materials are selected and P&IDs are updated. (Reminder to leaders in the next leaders meeting)	1.Done - Per our existing CC system and update any permanent material changes are to go through Change Control.	31/10/2017

Successes

- Gains…
  - Engagement and discussion
  - Prioritizing
  - Commitment
  - Improvements





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Successes – Electrical Isolation

- Electrical Isolation
  - Simplifying the lock out procedure

AREVA

LOCK TAG
McClean Lake Operation

Lock # _____
Equipment # _____
Description _____

Pump ☐ Valve Open ☐ Closed ☐
Blind ☐ Other _____

_____
_____

Lockout by (please print)
_____
Date _____
Reason (check one)
Maintenance ☐
Out of Service ☐

IT IS AN OFFENCE TO REMOVE THIS TAG & LOCK WITHOUT PERMISSION

DO NOT OPERATE

AREVA

KEY TAG
McClean Lake Operation

Lock # _____
Equipment # _____
Description _____

Pump ☐ Valve Open ☐ Closed ☐
Blind ☐ Other _____

_____
_____

Lockout by (please print)
_____
Date _____
Reason (check one)
Maintenance ☐
Out of Service ☐

IT IS AN OFFENCE TO REMOVE THIS TAG & LOCK WITHOUT PERMISSION

DO NOT OPERATE

783-00-01 Version 3 December 15, 2017

Work in Progress

- Exposure to Sulphuric Acid
  - Over 20 recommendations; examples
    - developing a PM program for the entire acid system
    - developing a QA/QC program to verify specs and ensure quality of the materials are accurate.
    - Redesign some sampling equipment and areas to improve visibility, lighting and reduce flow to reduce the risk.

93% Acid Storage Tanks

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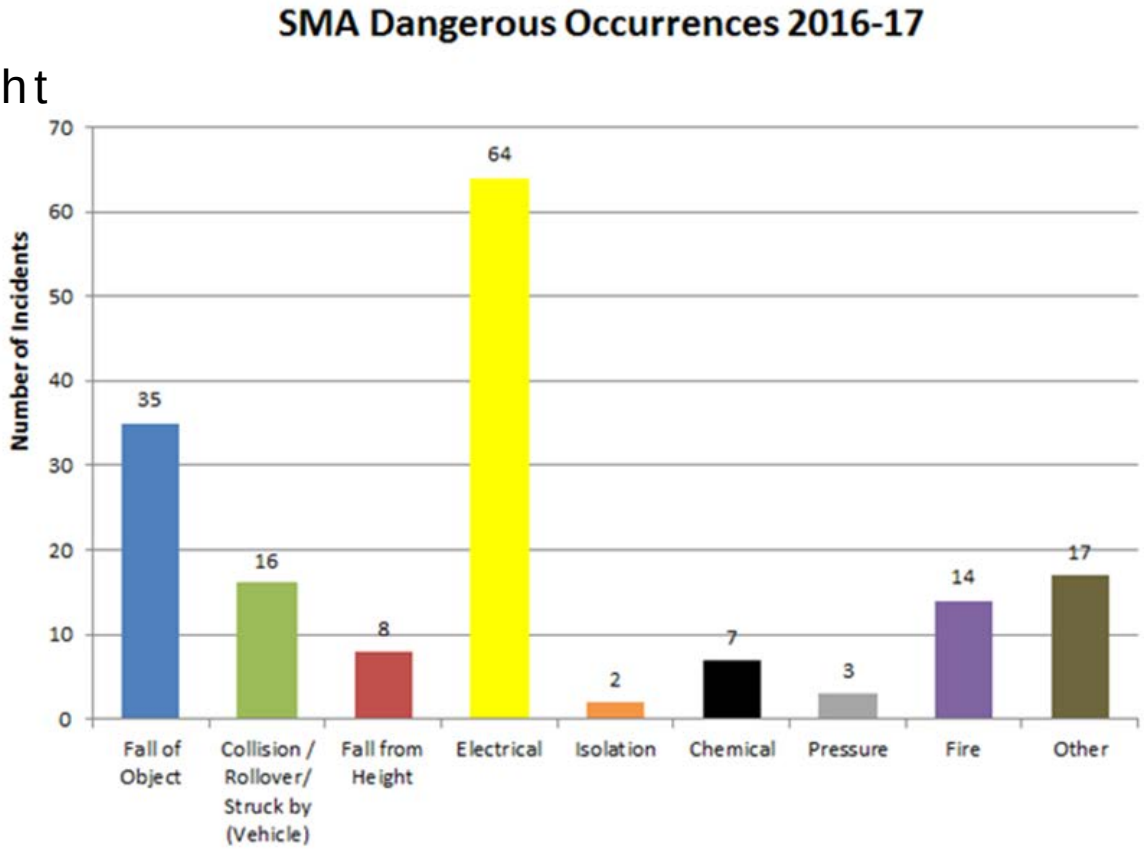
Next Steps

- Discussion on using the right tool
- Identifying and managing critical controls

- Ammonia Exposure
- Explosion

Take Home Message

- Focusing on the right issues.
- Keeping it live
- Alignment across all levels and industry



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Questions?

- Thank You!
  - Check us out on social media

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Giving nuclear energy its full value