Serious Injury and Fatality Prevention

Larry Simmons, Senior Director, Serious Injury & Fatality Prevention
PotashCorp
Who Is PotashCorp?

- A Global Company

PotashCorp is the world’s largest fertilizer company by capacity, producing the three primary crop nutrients: potash (K), nitrogen (N) and phosphate (P).

We are the world's largest potash producer by capacity, with five low-cost mines in Saskatchewan and one in New Brunswick. To enhance our global footprint, we also have investments in other key potash-related businesses in Chile, Israel, Jordan and China.

As the world’s leading potash producer, we are responsible for about 20 percent of global capacity.
Three nitrogen production facilities in the US that produce a range of products for industrial and agriculture users. Our large-scale nitrogen complex in Trinidad consists of four ammonia plants and one urea plant.

We operate two phosphate mines in the US and manufacture phosphoric acid at three plants and are one of the world’s largest producers of feed and industrial phosphate products.

With operations and business interests in seven countries, PotashCorp is an international enterprise and a key player in meeting the growing challenge of feeding the world.
World's Ten Largest Fertilizer Companies
Our Locations
A New Paradigm

- The causes and correlates of SIFs are different from Non-SIFs
- You will not impact the top of the triangle by just working on the bottom of the triangle
- The SIF blind spot is significant
- Our accident investigation processes are not getting the job done

High-risk situations in which management controls are either absent, ineffective, or not complied with, and which will result in a serious or fatal injury if allowed to continue.
Are these Predictive?

- TRIF?
- Hours since last LTIs?
- Total LTIs?
- Leading Indicators?
- SIF Rate?
Familiar Trend

PotashCorp Fatalities by year

Total Recordable Injury Frequency
4-Month Rolling Average

2012 TRIF
2013 TRIF 1.06
2014 TRIF 1.01
Past 6 Mo. TRIF 0.73


Jan-12 Mar-12 May-12 Jul-12 Sep-12 Nov-12 Jan-13 Mar-13 May-13 Jul-13 Sep-13 Nov-13 Jan-14 Mar-14 May-14 Jul-14 Sep-14 Nov-14 Jan-15
2014 SIF Incident Classifications

- Cranes & Hoist/Rigging
- Temperature Extremes:
- Unplanned Fall of Ground
- Dropped or Falling Objects
- Contact with Energized
- Mine Hoists or Shafts
- Manlift/Personnel Lifts
- Deviation from Procedures
- Scaffold/Isolate/Stored:
- Key Procedure Failures
- Arc Flash
- Chemical Exposure
- Falls from Heights
- Vehicle Incidents (Passenger:
- Rail Yard Incident
- Other
- Fire/Explosion
- Piping or Equipment:

Count
The Top Three

- **Nitrogen**
  - Contact with chemicals
  - Dropped or falling objects
  - Falls from heights

- **Phosphate**
  - Contact with energized electrical conducts
  - Dropped or falling objects
  - Falls from heights

- **Potash**
  - Dropped or falling objects
  - Falls from heights
  - Piping or equipment failure/mechanical integrity
Exposure Elimination

- Established a technology team with focus on top three hierarchy of controls
  - Led by Sr. VP of Technology
  - Provided staffing to achieve objective
  - Researched and test drove new products and technologies
  - Engaged site personnel including operators, mechanics and contractors
  - Established standards for UTVs, tools (zip cutters), etc.
- Hierarchy of Controls at 3 or higher became a leading indicator
  - Tracked weekly in enterprise database
  - Dropped or falling objects
  - Falls from heights
- Potash
  - Dropped or falling objects
  - Falls from heights
  - Piping or equipment failure/mechanical integrity
Dropped or Falling Objects

• Dropped Object Prevention Initiative began in November 2013

• Identified the “Buckets” of incident types by analyzing Enterprise database.

• Committee was formed in November 2013 to create a prevention strategy focused on:
  ➢ Education of all employees and service providers
  ➢ Securing potential dropped objects
  ➢ Barricading below elevated work areas
  ➢ Ongoing planned maintenance and inspection campaigns

• Provided update on initiative at our Spring Safety Summit

• 62 Incidents 2013, 30 incidents 2014
Mobile Equipment / Vehicle Incidents

• Developed a PotashCorp Tier 1 Standard “Interaction with Mobile Equipment” - February 2014

• Developed Potash Tier 2 Standards “Light Utility Vehicles, Mobile Equipment/Vehicle, Towing/Hauling” - August 2013

• Nitrogen/Phosphate Tier 2 Standard “Light Utility Vehicles” - February 2014

• Proximity detection systems explored and piloted at Rocanville

• Launched “Behind the Borer Safety Initiative”

○ 25 Incidents 2013, 25 incidents 2014
Contact with Energized Electrical / Arc Flash

- Energy Isolation (Try/Lock/Try) Key Safety Procedure, Audited frequently by all levels
- All sites formally audited every year
- Developed PotashCorp Tier 1 Standard “Control of Hazardous Energy” - February 2014
- Developed PotashCorp Tier 1 Standards “Electrical Safety Arc Flash and Electrical Safety Power Cable Management”
- Potash Tier 2 Standard “Ground Fault Circuit Interrupters” - August 2013
Contact with Energized Electrical / Arc Flash (cont.)

  - Electrical Safety Audits performed annually

- Electrical Safety Implementation Team was formed in August 2014 to create a prevention strategy focused on:
  - Education of all employees and service providers
  - Implement Workplace Electrical Safety Guidance Document throughout PotashCorp
  - Implement Risk Based Electrical Maintenance

- Update on these initiatives at this Fall Safety Summit
- 30 Incidents 2013, 18 incidents 2014
Falls from Height

- Fall Protection Guidance Document developed in 2009
- Identified as a Key Safety Procedure, Audited by all levels
- All sites formally audited Annually
- 20 Incidents 2013, 5 incidents 2014
Unplanned Fall of Ground

• Committee was formed to create a prevention strategy with significant recent efforts focused on:

  ➢ Higher standards incorporated into Formal, Consistent, Documented Cutting Procedures

  ➢ Training and education of all employees and service providers

  ➢ Advanced the “Borer Mounted Ground Penetrating Radar” systems – successful prototype being installed

  ➢ Currently developing new automated “Brattice Deployment System”

• 3 Incidents 2013, 7 incidents 2014
Hydroblasting

- Developed a complete list of all jobs and tasks that required hydroblasting

- Evaluated engineered solutions or process changes that could reduce the need or frequency to hydroblast

- Performed a detailed evaluation of the latest technology available

- Partnered with providers that can implement robotic solutions where the need to hydroblast remains
Quick Successes

- Identified SIF Potential by site in order for each site to develop its own intervention strategies that would improve existing management or safety systems
- Standardized Categories and Precursors
- Developed enterprise reports and charts to capture data
- Educated and engaged Senior Leadership to help drive the initiative
- Developed Implementation Plan with training to all employees and contractors
- Developed a binary decision matrix to determine SIF potential
Challenges

- Limited resources to investigate SIF potential incidents due to the existing requirements for investigating all recordable incidents regardless of their SIF potential
- Consistently determining SIF potential across sites
- Drift from the centerline of the process
- Loss of Institutional Knowledge
- Implementing level 3 or higher corrective actions
- Very little knowledge of human factors
Enhanced Incident Investigation

- Transformational Incident Investigation Process
  - Immediate Concern – Care & concern for the injured or those involved
  - Contributing factors
  - Root causes
  - Identify Precursors
  - Management Control Deficiencies
  - Fatigue Factors
  - Validating effectiveness of corrective and preventive actions
  - Tracking of recommendations
  - Effective communications of lessons learned
  - Third Party Involvement – Internal & External
  - Changed Incident Investigation Requirements
SIF Prevention Think Tank Team

- **Leveraging the JHA/FLRA Process** - Continued focus on improvement and engagement in the JHA/FLRA process

- **Serious Injury & Fatality Exposure Identification and Capability Building** - Development of a White Paper outlining our holistic approach, development of training resources to increase our capability of all employees and contractors

- **Data Analysis, Investigations and Technology** – Continued work of our SIF Prevention teams, data analysis to ensure we are focused in the right areas and we are leveraging all technology and inherently safer design

- **Shift Start Line-Out/Toolbox Meeting** – Ensuring we have a consistent approach to how we communicate to all employees and contractors before we start work
Focus on the Culture

- **Leadership**
  - GM and direct reports time present in field
  - Front line leader JHA interaction
  - Established Safety Leadership Coaches
  - Crew feedback surveys and leader development plans
  - Development of comprehensive action plan for engagement survey results

- **Front Line workers**
  - Enhancement of our Exposure Based Safety Process
  - Hourly worker engagement training

- **Process**
  - Investigation improvements
Focus on the Systems

- Rigorous Data Analysis & Trending by Trained Personnel – multiple data streams
- Third Party and Internal Audits
- Training and Workshops on Human Factors
- Semi-Annual Safety, Health & Environmental Summits with Senior Leadership in Attendance including Board Members.
- Supervisor Span of Control Evaluation
- Development of a “Preventing Serious Injuries and Fatalities Field Guide”
- Risk Assessment Workshops to Develop Comprehensive Site Risk Register
What Leaders Are Doing

- Less about TRIR/LTIR, more about what happened, personal impacts, feelings
- Keep case management rigor behind closed doors
- Climate supports and encourages near-miss reports
- Gather more info with live conversations, site visits
- Understanding any deviation from centerline
- Question critical exposures and controls
- Greater focus on understanding Human Factors
- Partnering with other companies – Goldcorp, Mosaic, Chevron on best practices and lessons learned
Top Ten Lessons

- Have a plan. Know your risk profile - provides focus and direction to the plan
- Manage the exposures (predictive) not outcomes
- Senior Leadership sets the tone
- We cannot prevent fatalities without engaging those who perform the work
- Developing workers’ hazard recognition and risk assessment skills is essential
- Fatalities occur at the task level and are influenced by multiple causal factors
- Relying on a single LOP for high-risk tasks makes us vulnerable
- Individual perception of risk is often biased and limited by personal experience
- Change management matters at all levels of the organization
- Capture institutional knowledge about hazards and risk to advance the next generation’s chance for success
Conclusion

When and where can I apply these learnings?

- Reviewing results of accident and near-miss investigations
- Reviewing leading indicators such as JSA Quality, JSA Rates, etc..
- Reviewing safety audit results for leadership & culture implications
- At regular corporate staff meetings
- Ensure Exposure Based Safety efforts have a sampling strategy for critical SIF behaviors
- When you hear reports of near-misses with SIF potential… “We dodged a bullet”

SIF Exposure Recognition and Mitigation

A Core Operational Responsibility
Questions?

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