Fatality Prevention Program
Development and Implementation

Presented by:
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Director - Health, Safety and Environment
J.S. Redpath Limited

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Superintendent - Health and Safety
J.S. Redpath Limited
• Mining Contractors and Engineers
• Started in 1962
• 4500 employees
• 44 Clients
• 13 Countries, 6 Continents
1. Sumitomo, Pogo - Alaska
2. Barnard, Blue Lake - Alaska
3. PCS, Scissors Creek (AMC) - Saskatchewan
   PCS, Corey (AMC) - Saskatchewan
   Mosaic, Esthervazy (AMC) - Saskatchewan
   Agrium, Vanscoy (AMC) - Saskatchewan
4. HudBay, Lalor - Manitoba
   HudBay, 777 - Manitoba
5. Goldcorp, Red Lake - Ontario
   Goldcorp, Campbell - Ontario
   Goldcorp, Cochenour – Ontario
   Goldcorp, Musselwhite - Ontario
   NAP, Lac des Iles - Ontario
6. Barrick, Williams - Ontario
   Lake Shore Gold, Timmins West - Ontario
7. Vale, Totten - Ontario
   FNI, Lockerby - Ontario
   Vale, North Mine - Ontario
8. Goldcorp, Eleonore – Quebec
9. Barrick, Meikle/Rodeo - Nevada
   Barrick, Bazza - Nevada
   Newmont, Leeville - Nevada
   Newmont, Midas - Nevada
10. Kennecott, Eagle – Michigan
11. Codelco, El Teniente - Chile
    Las Cenizas - Chile
12. Troy, Casposo - Argentina
    Yamana, Gualcamayo - Argentina
13. Goldcorp, Cerro Negro - Argentina
Outline

Why do we need another program?
Background/Development
FPP Components
Implementation Challenges/Solutions
Planning for Sustainability
Why Do We Need a Fatality Prevention Program?

Overall trend suggests that occupational fatality rates have plateaued.

We have experienced fatalities.

Falling injury rates can be deceiving.

A low or decreasing injury rate does not guarantee that fatal risks are being adequately managed.
USA Metal/Non-metal Mining

Lost-Time Injury* Frequencies

*NFDL Incidence rate - Metal, Non-metal and stone, UG and Surface Mines
USA Metal/Non-metal Mining

**Fatal** Injuries

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<th>Year</th>
<th>Fatalities</th>
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<tr>
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<td>26</td>
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<td>2008</td>
<td>23</td>
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<td>16</td>
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<td>2012</td>
<td>16</td>
</tr>
<tr>
<td>2013</td>
<td>22</td>
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</tbody>
</table>

No. of Fatalities

- **Number of Fatalities**
Australian Mining Sector

Lost Time Injury Frequencies

Number of lost-time injuries per 1 million hours worked
Ontario Mining Contractors

Lost-Time Injury Frequencies

Source: MASHA/WSN Mining Sector Injury Statistics, 1999-2013
Ontario Mining Sector Fatal Injuries

Number of Fatalities

Source: MASHA/WSN Mining Sector Injury Statistics, 1999-2013
Quebec Mining Sector

Lost Time Injury Frequencies

LTI Frequency

2002  3.6
2003  3.0
2004  3.5
2005  2.5
2006  2.0
2007  1.5
2008  1.2
2009  1.1
2010  1.5
2011  1.2
2012  1.1

13
Quebec Mining Sector

Fatal Injuries

<table>
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<tr>
<th>Year</th>
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<tbody>
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<tr>
<td>2011</td>
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</tr>
<tr>
<td>2012</td>
<td>2</td>
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</table>

Number of Fatalities

14
Peer Inspiration and Industry Best Practices

- Australian
  - Charter
  - Rules
- Other projects
- South African Industrial Theater
Peer Inspiration and Industry Best Practices
Peer Inspiration and Industry Best Practices

Leadership Matters
The elimination of fatalities

ICMM
International Council on Mining & Metals

Rio Tinto

Barrick

AngloGold Ashanti

GOLDCORP

Vale

Glencore

Xstrata

Codelco
Orgullo de Todos

Anglo American

Freeport-McMoRan Copper & Gold Inc.

Sumitomo Metal Mining Co., Ltd.
Fatality Prevention Program

Independently, sites began to incorporate new fatality prevention efforts into safety systems

Global Safety Group and Executives agree on requirement for formal program

Planned Marketing strategy

Monthly Safety Theme Focus

Implementation in 1st quarter of 2013

2009
Sr. Executives Fatality Prevention discussions initiated

2010

2011
Development of program content with operations and safety personnel

2012
Sr. Executives involvement and approval

2013

2014
Annual Refresher
Fatality Prevention Program

Program Goal:
To eliminate fatal risks and fatalities in the workplace.
Program Objectives

1. Develop and maintain a commitment from all leaders to implement fatality prevention program.

2. Engage all employees in the process of fatality prevention.

CONTENTS:

• Training Presentation
• New Personal Safety Plan Template
• Cardinal Rules
• Fatal Risk Elimination Protocols
• Employee Pamphlet
• Fatality Prevention Charters

• Serious Incidents Register and Review Procedure
• Cardinal Rules added to 5 Point Safety Card
• Promotional Material (stickers/posters, etc.)
• Fatality Prevention Program Manual
• Ongoing initiatives
# 5 Point Safety System

<table>
<thead>
<tr>
<th>Workplace Location</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>✓ = YES  X = NO</td>
<td>W</td>
<td>S</td>
</tr>
<tr>
<td>1. Are the entrances and travelways to your workplace in good order? If not -- stop and correct!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Are your workplace and equipment in good condition? If not -- stop and correct!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Are you and your co-workers working safely? (Proper tools, standards, procedures, etc.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## CARDINAL RULES:

Which lifesaving Cardinal Rule(s) apply to the work I am doing today?

---

IF NO IS ANSWERED TO ANY OF THE ABOVE POINTS, EXPLAIN AND OUTLINE THE STOP & CORRECT ACTION TAKEN BELOW:

---

<table>
<thead>
<tr>
<th>CARDINAL RULES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which lifesaving Cardinal Rule(s) apply to the work I am doing today?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st LINE SUPERVISOR:</th>
<th>2nd LINE SUPERVISOR:</th>
<th>OTHER: (Management, Safety, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME:</td>
<td>TIME:</td>
<td>TIME:</td>
</tr>
</tbody>
</table>

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Fatality Prevention Program

CARDINAL RULES

1. NEVER move or operate machinery or equipment without the appropriate training and authorization.

2. NEVER tamper with or make a safety device inoperable.

3. ALWAYS correctly isolate equipment from all energy sources before working on it.

4. NEVER remove another person’s personal underground access tag or personal lock.

5. NEVER enter an area that has access prohibiting barricades or signs without authorization.

6. NEVER work or travel under unsupported ground or suspended loads (excluding shaft operations; refer to Fatal Risk Elimination Protocols for Underground Ground Control and Shaft Work).

7. NEVER work at height above the site’s prescribed distance or within the site’s prescribed distance from open holes without suitable fall protection.

8. ALWAYS comply with explosives, blasting and re-entry procedures.

9. NEVER operate heavy equipment within 10 metres of any pedestrian without first establishing and then maintaining positive contact.

10. ALWAYS park equipment securely so that it cannot move in an uncontrolled way.

SAFETY – FIRST, LAST, AND ALWAYS
Incident

Initial Investigation

Suspected breach of Cardinal Rule

No Fatality

Investigation Team Formed

Suspension of Employment

Investigation

Intended Action

Violation

OUTCOME

Serious Misconduct

Dismissal

Unintended Action

Slip / Lapse / Mistake

OUTCOME

Misconduct

Written Warning to Dismissal

No Breach

OUTCOME

No Misconduct

Return to Normal Duties

Fatality

Investigation Team Formed (External)

• Investigation
• Departmental Investigation
• Coronial Inquiry

Outcome

Serious Misconduct

Dismissal
Employee Booklets

Fatal Risk Elimination Protocols

Workplace Posters
Fatal Risk Elimination Protocols

1. Underground Mobile Equipment
2. Underground Ground Control
3. Machinery, Equipment and Hand Tools
4. Equipment Safeguarding
5. Isolation
6. Working at Heights
7. Lifting, Towing and Rigging
8. Explosives and Blasting Practices
9. Shaft Work
10. Mechanized Raise Work
11. Raisebore Work
PERSONAL SAFETY PLAN (PSP) - YEAR

I commit to doing the following to improve Redpath's safety performance this year:

________________________________________________________________________________________

Specifically, to prevent workplace fatalities, I am committed to do the following:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

PSP prepared by:

Name: ___________________________
Signature: _______________________
Date: ___________________________

*See attached for examples
Everyone in the workplace must know and abide by the Redpath Cardinal Rules
Annual Refresher Training
Training Penyegaran Tahunan

Fatality Prevention Program
Program Pencegahan Kejadian Fatal

Fatality Prevention Program
Training 2014
Implementation Challenges

- Languages
- Cultures
- Various Clients
- Document Control
- Roll-Out/Training
Planning for Sustainability

Safety Strategic Planning
Perception Survey
Protocols Booklets

Hire package
Safety Program
– documentation
– activities
Fatality Prevention Program

Sign Off Sheet

I confirm that the training presentation on the Fatality Prevention Program has been presented to me along with the employee pamphlet, Cardinal Rules and Fatal Risk Elimination Protocols.

I understand them, and commit to abide by the Cardinal Rules, Fatal Risk Elimination Protocols and best practices as described in the presentation.

I promise to be vigilant in identifying potentially fatal risks, bring fatal risks to the attention of others and to participate in fatality prevention efforts.

I understand the possible fatal implications of failing to abide by the Cardinal Rules and Fatal Risk Elimination Protocols in addition to the potential for immediate termination of employment.

In the event that I am at any time unsure about the application of a particular Rule or Protocol I commit to STOPPING the job and asking for assistance.

Please print name clearly:

<table>
<thead>
<tr>
<th>Employee Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Redpath Supervisors Name</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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HAZARD ALERT

CUTTING DETONATING CORD

NATURE OF THE HAZARD
Detonating cord should be handled with the same care and respect as other explosive materials. Proper tools are required to cut detonating cord. Use of tools which could cause sparking, friction or cutting devices which have a shearing action (i.e., scissors or cutting shears) must not be used to cut detonating cord as it can cause accidental detonation.

CAUSAL FACTORS
• Using the wrong tool for the job
• Inadequate tools

PREVENTION AND PRECAUTIONS
• Always cut detonating cord with the specialized tool specifically designed and approved for cutting detonating cord.
• Specialized tools for cutting detonating cord include:
  - Anvil-type cutters (single bladed cutter that uses guillotine action against non-sparking surface; one side is plastic).
  - Sharp single hooked blade cutting tool.
• Never cut detonating cord with devices that produce metal-to-metal contact, such as scissors, wire cutters, crimper or similar instruments.
• Never attempt to cut detonating cord by abrasion or with a blow from a sharp or blunt dull object.
• Never use a hack saw that may result in abrasive friction from the sawing action.
• Never apply excessive force, intense impact, friction or heat that could cause initiation.
• Read the product’s technical data sheet for other safety precautions before use.

5 POINT SAFETY SYSTEM
#3 Are you and your co-workers working safely? (Proper tools, standards, procedures etc.)
#5 Can you and your co-workers continue to work safely? Do they have the equipment, motivation and desire to work safely? If not, then you must stop work and correct.

CARDINAL RULE #8: ALWAYS comply with explosives, blasting and re-entry procedures. FATAL RISK ELIMINATION PROTOCOL #8: Explosives and Blasting Practices

Applicable Cardinal Rules and Protocols
Potential Fatal Event
3. Were all the applicable procedures, standards and Cardinal Rules followed during the observation? □ Yes □ No
   If no, please explain:

   3. Were all the applicable procedures, standards and Cardinal Rules followed during the observation? □ Yes □ No
      If no, please explain:

4. Was any positive recognition given to the worker(s) following the observation? □ Yes □ No
   If yes, what was said?

5. Was any corrective information and instruction given to the worker(s) during the observation? □ Yes □ No
   If yes, what was it?

6. Were the methods and practices observed the most efficient and productive? □ Yes □ No
   Please explain:
INVESTIGATION REPORT

Type of Mishap: (multiple selections possible)

<table>
<thead>
<tr>
<th>Injurious</th>
<th>Property Damage</th>
<th>Incidental (Potential Loss)</th>
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</thead>
</table>

INCIDENT (Potential Loss)

Injury
Equipment/property damage
Loss to process
Environment
Potentially Fatal Event (PFE)

Describe Potential Loss:

Basic/underlying causes of mishaps are the result of lack of control.

Lack of control in this mishap was the result of: (multiple selections possible; provide details:

- Inadequate program
- Inadequate work standards or procedure
- Inadequate compliance to standards or procedure
- Inadequate compliance to Cardinal Rule(s)
- Inadequate compliance to Fatal Risk Elimination Protocols

Yes □ No □ Yes □ No □ Yes □ No □ Yes □ No □ Yes □ No □

Supervisor: ____________________  Investigator: _____________  Date: _______________
Fatality Prevention Program

The primary goal of the Redpath Fatality Prevention Program is to eliminate fatal risks and fatalities in the workplace. The program includes:

• Cardinal Rules
• Fatal Risk Elimination Protocols
• Fatality Prevention Information and Training

SAFETY - FIRST, LAST, AND ALWAYS
Planning for Sustainability

• Monthly Themes
  – Cardinal Rules 2013
  – Fatal Risk Elimination Protocols 2014

• Posters/Promotional Items

• Focus on Leading Indicators
Summary

Industry wide injury trends show a need to do more for fatality prevention

We believe there is more benefit than just preventing fatalities

– Employee engagement
– Senior management buy in
– Enhanced safety culture
<table>
<thead>
<tr>
<th>Period</th>
<th>Hours Worked</th>
<th>LTI Frequency</th>
<th>MA Frequency</th>
<th>TMI Frequency</th>
<th>TMI % Improvement</th>
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* Includes Sub Contractors
TMI Frequencies 2006 – 2014 (1st Q)
The Redpath Group

- Total Medical Injury Frequency
- Down by 40%
- Down by 29%

(TMI Frequencies 2006 – 2014 (1st Q))
The Redpath Group

(Mar)
LTI Frequencies 2006 – 2014 (1st Q)
The Redpath Group

Lost Time Injury Frequency

- Down by 33%
- Down by 50%

0.9
0.6
0.4
0.2
0.0

Conclusion

We may never know how many fatalities we prevent.
Thank you.
Bibliography


LONMIN Platinum. Limpopo Safety Breakthrough: The Road the Zero Injuries (PowerPoint Presentation).


Mine Safety and Heath Administration (MSHA) - Mining Fatality Statistics for 1900 through 2009 – Metal/Nonmetal Mining.
Bibliography


Redpath Group Statistics (March, 2014).
Bibliography
