Case Study:
Wildfire Risk Management for a Gold Mine in Saskatchewan

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Presentation Overview

• Framing the issue in North American Context.
• Case Study of Response to Gold Mine Incident in Sask.
• Incident Command Team Response
• Environmental Protection Assessment
• Outcomes
Idaho wildfire roars through former uranium mine site

(Reuters) - A wildfire in east-central Idaho has burned through three former mining sites containing traces of radioactive thorium and uranium and was advancing a fourth such site on Thursday, but state officials said they believed the risk to human health was low.

June 28, 2013

Cliffs Natural Resources Inc. Temporarily Idles its Wabush Scully Mine Due to Forest Fires in the Region

CLEVELAND, June 28, 2013 /PRNewswire/ -- Cliffs Natural Resources Inc. (NYSE: CLF) (Paris: CLF) announced today that it has evacuated employees from its Wabush Scully mine and temporarily idled the operation due to the forest fires in the region. The mine and processing plant are located in the town of Wabush in Labrador.
Situation Overview

- Partial evacuation in place – 4 fires threatening mine site
- Losing $149 K per day
  - Transportation
  - Food and lodging
  - Wages
  - Lost production
Team: Incident Management

• Assessment of situation
  ▪ Met with mine management
  ▪ Flew fires/values with them
  ▪ Listened to concerns
  ▪ Continued good communications

• Assigned On Site Expert Assistance
  ▪ Wildland Urban Interface Specialist
  ▪ Experienced Suppression Manager
Mine Assessment

- Mine & Fire Suppression Staff not prepared to deal with wildfire threat
  - Minimal on site fire fighting equipment
  - Pre-plan insufficient & not practiced
  - Mine staff untrained in wildfire
  - Forest Protection Staff poorly trained to work with hazardous materials on site
  - Hazardous material storage very poor
Team Response

• EP Officers called in to assist
• Mine Environmental Officer toured our group
## Chemical “Short List”

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>2.3 M liters</td>
</tr>
<tr>
<td>Gasoline</td>
<td>45 K liters</td>
</tr>
<tr>
<td>Hydrochloric Acid</td>
<td>30 K kg</td>
</tr>
<tr>
<td>Sodium Cyanide</td>
<td>300 K kg</td>
</tr>
<tr>
<td>Sodium Hydroxide</td>
<td>35 K kg</td>
</tr>
<tr>
<td>Propane</td>
<td>128 K lb</td>
</tr>
<tr>
<td>Hydrogen Peroxide</td>
<td>200 K kg (50%)</td>
</tr>
</tbody>
</table>
Sodium Cyanide Storage
One of the Diesel Farms
Sodium Cyanide Storage
Hydrochloric Acid Storage
Sodium Cyanide in Background
On Site Tour Observations

Potential to be a “World Class” Catastrophe

Potential Wildfire Impact
• Type of Chemicals Present
• Poor storage Practices
• Not a FireSmart Site
• Many infractions & hazards identified
Hazardous Goods Storage

VERY POOR

- Liquid chemicals uphill from solids
- Stored on unstable wooden pallets
- Standing diesel in containment facilities
Air Dispersal Model Developed

• Based on chemicals present
• Four models run
• Three threat zones
  ▪ Life threatening
  ▪ Severe health risks
  ▪ Mild discomfort
Air Dispersal Model

• 1.5, 5, 10 & 20 mile/hr wind projections
• Threat Zones of:
  ▪ Red: 150 ppm = ERPG-3 life threatening
  ▪ Orange: 20 ppm = ERPG-2 Severe Health Effects
  ▪ Yellow: 3 ppm = ERPG-1 mild discomfort
Model Conclusions

If The Site Burns Over

- 5 Km evacuation zone
- 10 Km exclusion zone
- All cellular life destroyed within “red Zone”

Years of clean up required
Some E. A. Concerns

• SCBA’s only good for 60 minutes
  ▪ No fly zone: 5 km radius, 3000’ above
  ▪ Have to walk into site to assess
  ▪ SCBA’s require 1/3 reservoir
  ▪ Logistically impossible to manage

• Evacuate underground (Emergency Plan)
  ▪ 3 days supplies
  ▪ Recommended a full week
In The Event of A Burnover

Do not add water – prior to or after it catches on fire

- Oxidizes – toxic fume
- Incomplete burn is worse
- Toxic sludge and runoff

- Let burn – hotter the better
- Evacuate
Incident Debrief

• Fire staff receive 1st Response Training
  ▪ 12 hour NFPA 471 & 472
• E P Officer Liaison position
• MOU’s be developed with private Hazmat companies (major cities)
• Hazardous Sites identified on our Values at Risk website
• Fire staff access to industry emergency & Pre-incident plans
End Results - Environment

Fires Never Did Reach Mine Site

- Awareness of potential danger
- Importance of visiting sites
- Wildfire Pre-Plans
- Training Required
  - Wildfire
  - First Response
End Results - Mine

- Mine received significant amount of “Free” consultation work
- Mine forced to bring in consultants at their expense
  - Chemical storage
  - Emergency and Incident Preplanning
- Interested in receiving some WUI training
Questions?