Lac Mégantic
Planning for the Worst Case Scenario

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Welcome
Presentation Material

1. Safety Moment
2. Introduction - MD-UN, GHD Limited
3. Planning for your Worst Case Scenario
4. Lac Magnetic Train Derailment
5. Driving Change – Crude by Rail
6. Emergency Management Learnings
7. Question and Answer
Introductions
MD-UN Emergency Management

- In operation 2002
- Base in ST-Jérôme Québec
- 10 Fulltime Staff
- CERCA member 2002
- CERCA Chair 2015 - Present
Canadian Emergency Response Contractors Alliance

www.cerca-aceiu.ca
CERCA - Association and Regulatory Members

- Canadian Association Chemical Distributers
- Chemistry Industry Association of Canada
- Canadian Fertilizer Institute
- Canadian Petroleum Producers Institute
- Canadian Trucking Alliance
- Railway Association of Canada
  - Canadian National Railway
  - Canadian Pacific Railway
- Transport Canada
- Environment Canada
CRA & GHD Merger

From Melbourne to Montreal, we’ve got you covered
Our Markets

Water  Energy & Resources  Environment  Property & Buildings  Transportation
Our Services

- Agriculture
- Air & Noise
- Asset & Facilities Management
- Aviation
- Bridges
- Building Sciences/Physics
- Climate Change
- Communication Systems
- Construction Contracting
- Contamination Assessment & Remediation
- Dams
- Data Management Services
- Design Documentation
- Electrical Engineering (Buildings)
- Electrical Engineering (Industrial)
- Emergency Response
- Engineering Procurement & Construction Management (EPCM)
- Fire & Life Safety
- Food Processing
- Forensic Engineering
- Forestry Management
- Geology
- Geotechnical
- Health Safety & Environmental (HSE) Systems & Industrial Hygiene
- HVAC
- Hydraulics (Buildings)
- Hydrocarbons Processing
- Hydrocarbons Transportation
- Hydrogeology
- Industrial Water & Waste Management
- Information Services
- Instrumentation & Control
- Integrated Water Management
- Intelligent Transport Systems
- Irrigation
- Land Development & Municipal Engineering
Worst Case Scenario

- Perception
- Reality
- Risk-based Approach
WHAT IS your worst case scenario incident?

- Flood
- Earthquake
- Fire
- Civil Unrest
- Acts of Mischief or Terrorism
- Environmental Spill
- Transportation Incident
- Power Outage
- And more….and more…. 
Railroad Safety

- Spending on rail infrastructure has increased over the last 30 years while incident rate has consistently fallen
- 99.997% of hazmat shipments arrive without incident
- Regulatory change
- Tank car engineering
- Railway Operating Standards
Lac Mégantic – Black Swan Event

Lac-Mégantic runaway train and derailment investigation summary

This summary of the Transportation Safety Board of Canada (TSB) Railway Investigation Report R12P00054 contains a description of the accident, along with an overview of the analysis and findings, the safety actions taken to date, key recommendations, and what more needs to be done to help ensure an accident like this does not happen again.

Montreal, Maine & Atlantic Railway

Contributing factors to the Lac-Mégantic accident

- Insufficient hand brakes
- Improper brake test
- Independent air brakes leaked off
- Excessive train speed for track
- Train security

Locomotive

- Mechanical problems not remedied
- Non-standard engine repair failure
- Locomotive engine fire
- Safety device not wired to initiate braking
- Breached tank cars and highly volatile crude oil
- Inadequate oversight of operational changes
- Limited follow-up on safety deficiencies
- Ineffective SMS audit program

Tank cars

Transport Canada

GHD

MD-UN
Lac Mégantic – Train Routing

The Beginning
Lac-Mégantic

July 2013
Lac Mégantic – Elevation

NANTES
513.58 mètres 1686 feet

LAC-MÉGANIC
1391 feet 414.83 mètres

DÉNIVELÉ
98.75 mètres 323.98 feet

DISTANCE ENTRE LES DEUX VILLES
13.1 km 8.14 miles

SOURCE: MAPBOX STREETS
ILLUSTRATION: LA PRESSE CANADIENNE, LA PRESSE
Lac Mégantic – Point of Derailment
Lac Mégantic – Event layout
Derailment Facts

- 73 tank cars involved
  - 9 removed intact
  - 65 directly impacted
  - 3 held containment
Derailment Facts

- A disaster without comparison
- Substantial loss of life
  - 47 people dead (8 Minutes)
  - 5 people never identified
- Firefighting, search and rescue and crime scene investigation ongoing
Emergency Service Assistance - Firefighting

- Asbestos
- Audet
- Austin
- Beauceville
- Blainville
- Brunsnsburg-Chatham
- Chandler
- Cowansville
- Dunham
- East-Angus-Cookshire
- East Broughton
- Farnham
- La Tuque
- La Pocatière
- Lac-Drolet
- La Guadeloupe
- Lambton
- Laprairie
- Lévis
- Longueuil
- Magog
- Mont-Laurier
- Montréal
- Morin-Heights
- MRC de Bellechasse
- MRC des Érables
- MRC de la Vallée-du-Richelieu
- Nantes
- Papineau
- Pont-Rouge
- Québec
- Salaberry de Valleyfield
- Sept-Îles
- Shawinigan
- Sherbrooke
- Stanstead
- St-Adalbert
- St-Antoine-sur-Richelieu
- St-Donat
- St-Georges
- St-Ludger
- St-Marc-sur-Richelieu
- St-Mathias
- St-Martin
- St-Philippe
- St-Romain
- St-Sébastien
- St-Simon
- St-Victor-de-Beauce
- Ste-Adèle
- Ste-Catherine-de-Hatley
- Ste-Julie
- Thetford-Mines
- Trois-Rivières
- Tring-Jonction
- Upton
- Waterloo
- Woburn
Active Fire Operations – 28 hours

• Evacuation of 2,000 people (total population 6,000)
• Defensive operations
  o Creating fire separation
  o Protecting exposure
• Offensive
  o Foam application when resources arrived (20+) hours
  ▪ Declared a crime scene by Sureté du Québec (SQ)
  ▪ Site securement and security (SQ)
Downtown Parking Lot

Photo: Pierre Lebeau – 6 Juillet 2013 vers 1h30
Downtown Core

Photo: Pierre Lebeau – Juillet 2013 vers 1h30
Downtown Parking lot

Photo: Pierre Lebeau  6 juillet 2013 vers 1h30
Downtown Parking Lot

Photo: Pierre Lebeau – 6 Juillet 2013 vers 1h30
Foam Application
Agencies involved in Command?

- Fire Department(s)
- Provincial Police - Sureté du Québec (SQ)
- Royal Canadian Mounted Police (RCMP)
- Sécurité Civile (SC)
- Environment Québec (MDDELCC)
- Environment Canada (EC)
- Transportation Safety Board (TSB)
- Transport Canada (TC)
Responsible Party – MMA

Responsible Party: Montreal, Maine and Atlantic Railway (MMA)

Response Resources:

- Lead Emergency Response Contractor (1)
  - Support Contractors (42)
  - Technical Specialists (3)
- Industry Resources
- Railway Association of Canada (RAC)
Mutual Aid Partners – Continued Response

- 2 Major cities
- Sherbrooke - Québec City
- 6 Municipal agencies (Chamber of Commerce)
- 23 Provincial Ministries or agencies
- 10 Federal Ministries or agencies
- 9 Other agencies (Red Cross, Salvation army etc.)
Life Safety Hazards

- Heat (fire)
- Inhalation Toxicity (BTEX)
- Flammability (LEL)
- Drinking Water Contamination
- Building Stability
- Slip, Trips, Falls
- Fatigue
Fire (HIT)
Inhalation Toxicity
Drinking Water Impacts
Building Stability
Slips, Trips, Falls
Environmental Hazards/ Exposures

Contaminated Soil
Contaminated Waterways
• Lac Mégantic
• River Chaudière
Contaminated Groundwater
Water

- 150 miles (240 km) of contaminated Shoreline
- Sediment contamination
- 12000 feet of boom installed
Soil
AIR

- TAGA fast mobilisation the Centre d'expertise en analyse environnementale du Québec
- CETH worker monitoring
Property and Infrastructure Exposures

- Linear infrastructure (Storm, Drinking, Sewage)
- Sewage treatment plant contamination
- Telephone substation
- Road closure
- Rail disruption
- Residential homes and personal possessions
Waster Treatment Facility

• We were given 3 weeks to clean up the Water Treatment Facility

• The procedure ended up taking 5 weeks…
Rebuild Infrastructure

• Surface water management
Logistical complexities

- No local infrastructure
  - Food
  - Lodging
  - Washrooms/ Showers
- Air operations
- Boat operations
- Large geographic reach
- Communications (independent systems)
- Logistics (independent systems)
Water Supply
Trailer City
An Angle Came

- Salvation Army canteen
- Anne-Marie Dagenais (Lieutenant)
- July 7 to August 10, 2013
- Fed more then 1000 firemen
  - Breakfast
  - Lunch
  - Diner
- Worked with food donation
Support Services

- 810 meals served every day under big top/cafeteria
- 65 trailers, fifth wheels as well as cottage rentals
- chemicals toilets and showers
- laundry service for all workers
General Logistics Support

- MSI Accounting company
- Dispatch
- Security
- Water treatment
- Fuel for equipment
- Truck repair and service
- Personal Protection Equipment
- Basic supplies (sleeping bags, pillows, towels, clothing, etc...)

GHD
MD-UN
### SUMMARY TABLE
Estimated Amounts of Crude Oil Involved in Lac-Megantic (October 7, 2013)

<table>
<thead>
<tr>
<th>Petroleum transported by rail</th>
<th>7,679,000 liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum contained in the 9 wagons left intact</td>
<td>961,000 liters</td>
</tr>
<tr>
<td>Petroleum contained in the crashed wagons, that could be recuperated and transported</td>
<td>740,000 liters</td>
</tr>
<tr>
<td>Petroleum burned or spilled in the environment</td>
<td>5,978,000 liters</td>
</tr>
<tr>
<td><strong>Estimated amount of petroleum that reached the Chaudière river</strong></td>
<td><strong>100,000 liters</strong></td>
</tr>
<tr>
<td>Contaminated water recuperated in the Chaudière river</td>
<td>52,000 liters</td>
</tr>
<tr>
<td>Contaminated water recuperated in Lac-Megantic’s (water system, lake and soil)</td>
<td>39,001,000 liters</td>
</tr>
</tbody>
</table>
Incident Innovation

Hydro-cutting

Water Management
Incident Innovation

BETX Level Control
Lessons Learned

Command and Control
- Unified command establishment issues
- Agency freelancing
- Occupational health and safety (OHS) inconsistency
- Crime scene vs life safety
Lessons Learned

Interoperability
- Language
- Hose fittings
- Radio frequency
- Foam compatibility
Lessons Learned

Need for Pre-Planning, Training and Exercises

- MMA contractor activation failure
- First responder training
- Bind Date Syndrome
Incidents Drive Change

- Protective Directions
- Emergency Response Taskforce
- Enhanced Tank car Standards
- Enhanced preparedness regulations
- Risk Focused tunnel vision
Emergency Management Relevance in Oregon

What can you apply from the learnings of this event?

- Risk based assessment
- Planning
- Exercise
- Believe that what can go wrong, will go wrong....
Questions?

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