

CASE STUDIES: EMERGENCY PREPAREDNESS

September 26, 2019

Presenter:

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Requirements for Emergency Preparedness

Canadian Environmental Protection Act

- Environmental Emergency Regulation
 - Based on product and quantities

Fisheries Act

Transportation of Dangerous Goods Act

Requirements for Emergency Preparedness

Ontario Environmental Protection Act (s.6, 14)

- O. Reg. 224/07 Spill prevention and contingency plans
- O. Reg. 675/98 Classification and exemption of spills

Ontario Clean Water Act (re: risk management plans)

Ontario Water Resources Act (no discharge to surface)

Municipal By-laws re: sewer use, water supply

ISO 14001:2015 Environmental Management Systems

- s.8.2 Emergency Preparedness and Response

Emergency Definition

Emergency Management Ontario (EMO)

A situation or an impending situation that:

- constitutes a danger of major proportions that could result in:
 - serious harm to persons or
 - substantial damage to property

Emergency Definition

Emergency Management Ontario (EMO)

- That is caused by
 - the forces of **nature**
 - a disease or other **health** risk
 - an **accident** or
 - an **act** whether intentional or otherwise

EMO: Five Pillars of Emergency Management

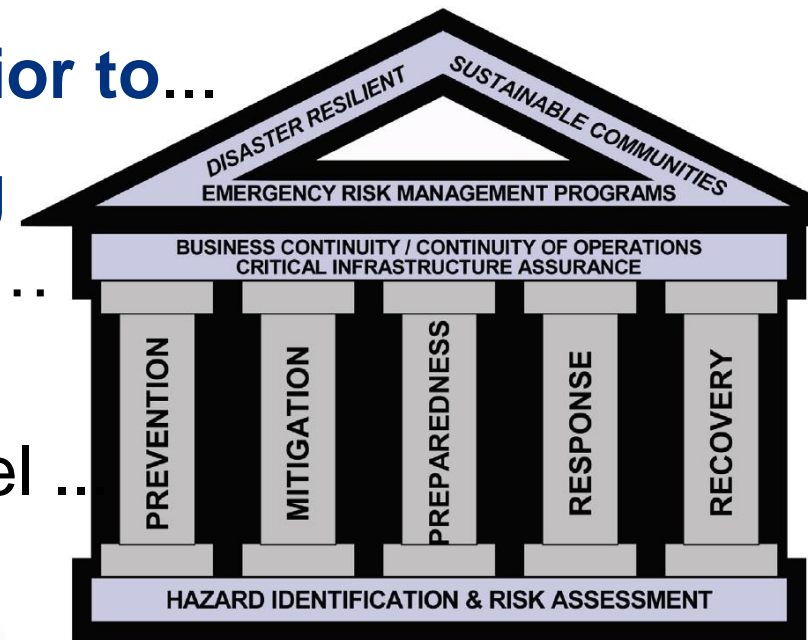
Prevention – Actions taken to **avoid** an emergency

Mitigation – Actions taken to **reduce** the **adverse impacts**...

Preparedness – Actions taken **prior to**...

Response – Actions taken **during**
or immediately after an incident ...

Recovery – The process of
restoring ...to a **pre-disaster** level ..



EMO: 9 Subsections of Hazards

A. Agricultural & Food Emergency

- Farm Animal Disease
- Food Contamination
- Plant Disease or Infestation

B. Environmental

- Avalanche
- Drought or Low Water
- Earthquake
- Erosion
- Extreme Cold
- Extreme Heat
- Flood
- Fog

- High Wind
- Hurricane
- Land Subsidence
- Landslide
- Lightning
- Thunderstorm
- Storm Surge
- Tornado
- Wildland Fire
- Winter Weather

C. Extraterrestrial

- Space Object Crash (Any)
- Space Weather

EMO: 9 Subsections of Hazards

D. Hazardous Materials

- Fixed Site or in Transport
- Chemical Release
- Nuclear (Facility)
- Oil or Natural Gas Release
- Radiological Emergency

E. Health

- Water Quality
- Infectious Disease
- Substance Use & Overdose

F. Public Safety

- Active Threat
- Civil Disorder
- Crowd Disaster
- Geopolitical Pressures
- Sabotage
- CBRNE
- Cyber Attack
- Electromagnetic Pulse (EMP)

EMO: 9 Subsections of Hazards

G. Structural

- Dam Failure
- Fire/Explosion
- Mine Emergency
- Structure Failure

H. Supply & Distribution

- Communications Failure
- Electrical Energy Failure
- Food Shortage
- Medical Drug, Blood Product or Supplies Shortage

- Petroleum Product Shortage
- Water or Wastewater Disruption

I. Transportation

- Aviation
- Marine
- Public Transit Systems
- Rail, Light Rail, Subway
- Road and Highway

Emergency Case Studies

The next set of slides summarize key points of highest impacting **environmental hazards / hazardous events** to potentially affect industry in Ontario.

The three pillars of emergency management are:

- Prevention
- Mitigation
- Preparedness

Flooding



- **Leading cause** of public emergency in Ontario
- Most costly natural disaster in the country (\$400M/yr 1983-2008 to \$1B/yr 2009 +)
- More frequent and extreme precipitation events; or flooding from ice break-ups
- Floods can contaminate water sources, wash away infrastructure including intake, distribution system (w/ sinkholes), roads, power, communication towers, cause sewer back-ups, combined sewer overflows, large scale debris management

Flooding

PREVENTION

- Refer to Conservation Authorities' floodplain mapping, watershed and land use regulations
- Invest in natural infrastructure: ponds, wetlands, vegetated areas
- Invest in grey infrastructure: dams, dikes, channels, plant upgrades
- Monitor Ontario flood forecasting and warnings

MITIGATION

- Proper operation of dams, dikes, channels, erosion control structures

PREPAREDNESS

- Maintain state of emergency preparedness.
- Identify critical infrastructure and processes in advance
- Identify viable flood mitigation measures

Extreme Heat



- Increasing demand on utilities
- Deteriorating water quality
- Power disruptions due to high energy demand
- Higher risk of flash flooding (dry ground not able to effectively absorb rainwater)
- Staff exertion and heat stress issues

Extreme Heat

PREVENTION

- Monitor conditions (e.g. drought or emergency contributing to low water)
- Participate in Ontario's Low Water Response Program (three levels)

MITIGATION

- Tiered water use restrictions w/ public utilities
- Consider time-shifting for high water and energy users

- Back-up generators (fuel available)

PREPAREDNESS

- Identify critical infrastructure and processes in advance
- Create response procedure for reducing demand
- Standard messages prepared
- Work with utilities re: plan for low water, lower energy conditions

Extreme Cold / Winter Weather



Snowstorm 2010

- 200 tractor trailers; 124 cars trapped on Hwy 402 near Sarnia
- OPP, Canadian Forces, military helicopters called in to rescue
- Some left the area on foot
- Others, who had sufficient emergency supplies, chose to wait in their vehicles
- Several shelters and warming centers were set up
- Individual community members helped by allowing those stranded to stay with them

Extreme Cold / Winter Weather

PREVENTION

- Monitor weather conditions
- Upgrade infrastructure to address vulnerability to freezing
- Be 72-hour prepared and take actions to prevent freezing pipes / infrastructure

MITIGATION

- Identify extreme cold threshold to address various issues (e.g. freezing pipes)

PREPAREDNESS

- Maintain state of emergency preparedness
- Identify critical infrastructure and processes in advance
- Identify customer call tracking method and response
- Prepare resources for temporary water service line installations, thawing and alternate water supplies

Freezing Rain



Ice Storm 1998

- 50-100 mm of freezing rain from January 6 to 10th, 1998 from Kingston to eastern Canada (Montreal to New Brunswick)
 - 57 Ontario communities declared emergencies with 1.5M people w/out electricity (~ half for more than 3 weeks)
 - 28 fatalities and 945 injuries
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- Most fatalities and injuries are due to secondary hazards, such as transportation accidents caused by the poor driving conditions

Freezing Rain

PREVENTION

- Monitor weather conditions

MITIGATION

- Back-up generators (fuel available)
- Be 72-hour prepared and take actions to mitigate issues

PREPAREDNESS

- Maintain state of emergency preparedness
- Departmental preparations (e.g. road safety prep, increase in on-call staffing, clear roadways of fallen branches, etc.)
- Plan alternate transportation routes for staff, essential supplies and products
- Have alternate communication equipment (e.g. radios) available

Tornado

Tornado Outbreak – August 20, 2009



- Est. 10 million people in Ontario were in areas placed under tornado watch / warning
- 19 tornadoes (5 x F0's; 10 x F1's; 4 x F2's)
- 600+ homes damaged, 38 torn down
- 69,000 people without power in peak
- Major flooding reported along lakeshores
- Damage to DWS infrastructure resulting in loss of service and reduced pressures
- Restricted access (debris / transportation)
- Loss of power / communication
- Possible contamination

Tornado

PREVENTION

- Monitor weather conditions and take immediate actions

MITIGATION

- Back-up generators (fuel available)

PREPAREDNESS

- Maintain state of emergency preparedness
- Identify critical infrastructure and processes in advance

- Have alternate communication equipment (e.g. radios) available
- Standard messages prepared
- Identify viable alternate water and energy supply

Risk Assessment & Risk Analysis

- In **risk assessment**, the level of risk for each hazard is examined. May involve the examination of:
 - Past occurrences
 - Possible scenarios
 - Existing control measures (capability to prevent or respond)
 - An examination of the current vulnerability, and
 - Area of the hazard
- **Risk analysis** helps to identify which hazards should be considered a **priority** for emergency management programs based on their **frequency** and potential **consequences**.

Risk Management

Strategies in risk management:

- Acceptance
- Avoidance
- Reduction
- Containment
- Transfer

Incident Management System (IMS) for Improved Response & Recovery

The IMS is a **standardized approach** to emergency management encompassing:

- Personnel
- Facilities
- Equipment
- Procedures (describing processes for unified plan)
- Communications (with standardized terminology)

Operating within a **common organizational structure**

Need for One Common IMS – Lessons Learned from Past Incidents

Improved **management** is required, with:

- Integrated, timely **communications**
- Management of **information** for **internal** and **external** audiences
- “**Span of control**” (during emergency...optimally 1 supervisor to 5 subordinates ratio for efficiency, health & safety)

Improved coordination among **responding organizations**, with:

- **Unity of command** and
- “**Management by objectives**”

Need for One Common IMS – Lessons Learned from Past Incidents

An effective **planning** process is required:

- With one **incident action plan** per operational period and records management

An improved **logistics** system is needed:

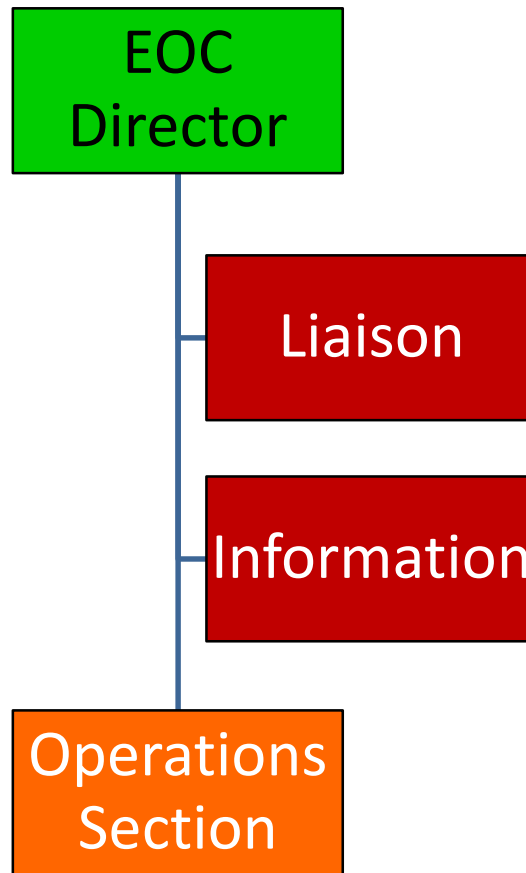
- For sustainability; for categorizing, ordering, accessing, dispatching, tracking, recovering and returning resources

Improved **finance & administration** controls are required.

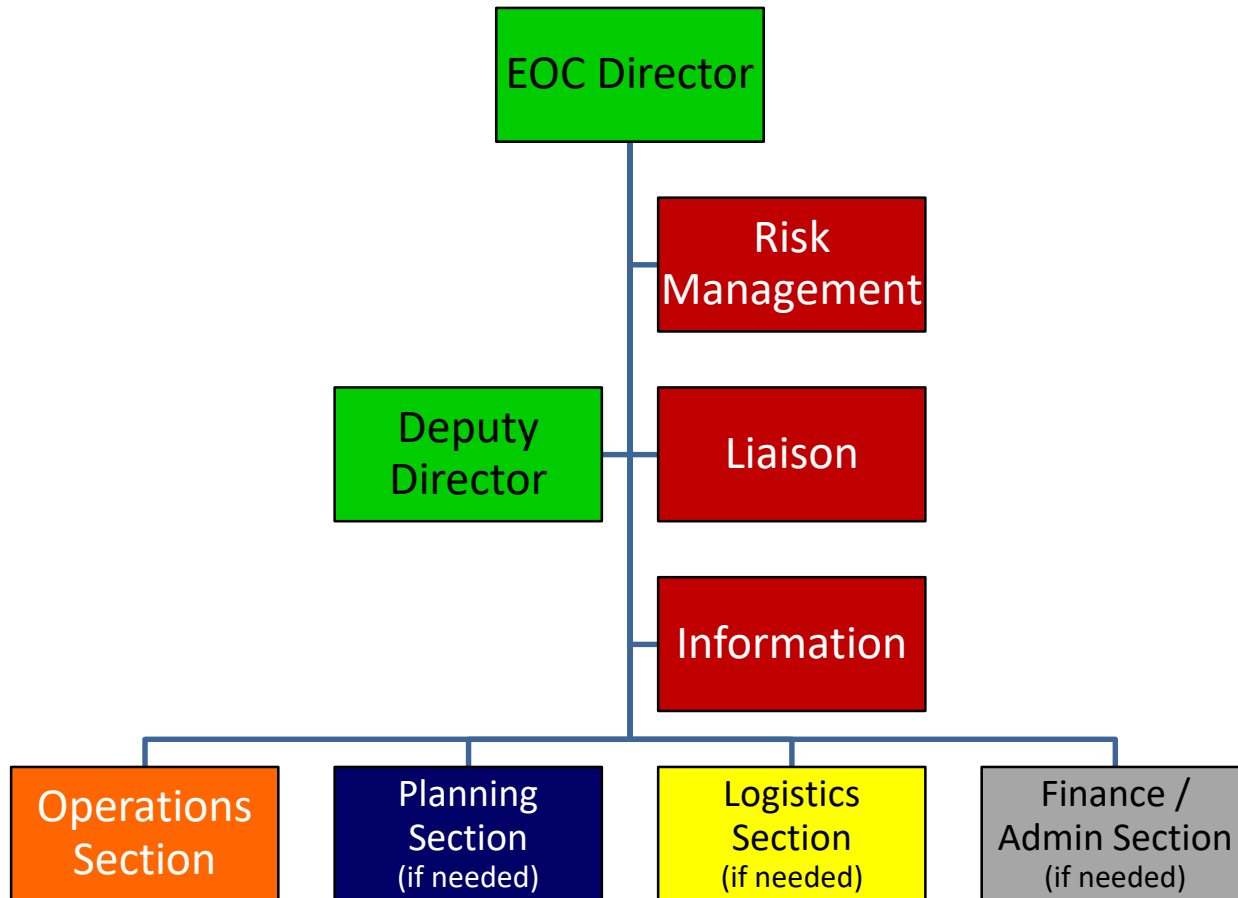
Emergency Operations Centre (EOC) Roles and Responsibilities

MANAGEMENT STAFF				
<p style="text-align: center;">DIRECTOR</p> <ul style="list-style-type: none"> • Overall authority/ responsibility for EOC • Provides leadership to Mgmt Team • Ensures/approves EOC objectives • Communicates with Policy Group • Initiates Mgmt Team Briefings 	<p style="text-align: center;">DEPUTY</p> <ul style="list-style-type: none"> • Assumes duties of EOC Director in their absence • Ensures efficient internal information/ communication processes • Facilitates resolution of internal staffing/ personnel challenges 	<p style="text-align: center;">RISK MGMT</p> <ul style="list-style-type: none"> • Monitors EOC safety • Maintains link with Safety Officers as applicable • Identifies/analyses liability/loss exposures • Assesses unsafe situations & halts operations if necessary • Recommends safety modifications to ops 	<p style="text-align: center;">LIAISON</p> <ul style="list-style-type: none"> • Ensures required agencies are in EOC • Primary contact with external agencies, other EOCs • Assists EOC Director with activities (e.g. briefings, meetings) • Maintains regular contact with cooperating agencies 	<p style="text-align: center;">INFORMATION</p> <ul style="list-style-type: none"> • Establishes/maintains media contacts • Coordinates info for release • Coordinates media interviews • Liaises with other IOs • Prepares public info materials • Prepares EOC messaging sheets
GENERAL STAFF				
<p style="text-align: center;">POLICY GROUP</p> <ul style="list-style-type: none"> • Provides overall policy direction • Authorizes "declaration"/policy directives • Provides direction on public information activities • May act as official spokesperson 	<p style="text-align: center;">OPERATIONS</p> <ul style="list-style-type: none"> • Communicates with site(s), field personnel & DOCs • Supports site ops • Implements plans/ strategies • Deploys/tracks EOC-issued site resources • Coordination of multi-agency/department responses 	<p style="text-align: center;">PLANNING</p> <ul style="list-style-type: none"> • Collects, evaluates, displays info • Develops Action Plans & SitReps • Conducts long-term/ advanced planning • Recommends alternative actions • Maintains overall resource and event status 	<p style="text-align: center;">LOGISTICS</p> <ul style="list-style-type: none"> • Provides technology/ comms support • Arranges/manages facilities • Establishes transport resources • Arranges responder/ personnel support • Orders/supplies requested resources 	<p style="text-align: center;">FINANCE</p> <ul style="list-style-type: none"> • Monitors response and recovery costs • Monitors expenditure process • Coordinates compensation & claims • Supports contracts & procurement • Tracks personnel time • Analyzes & estimates overall costs

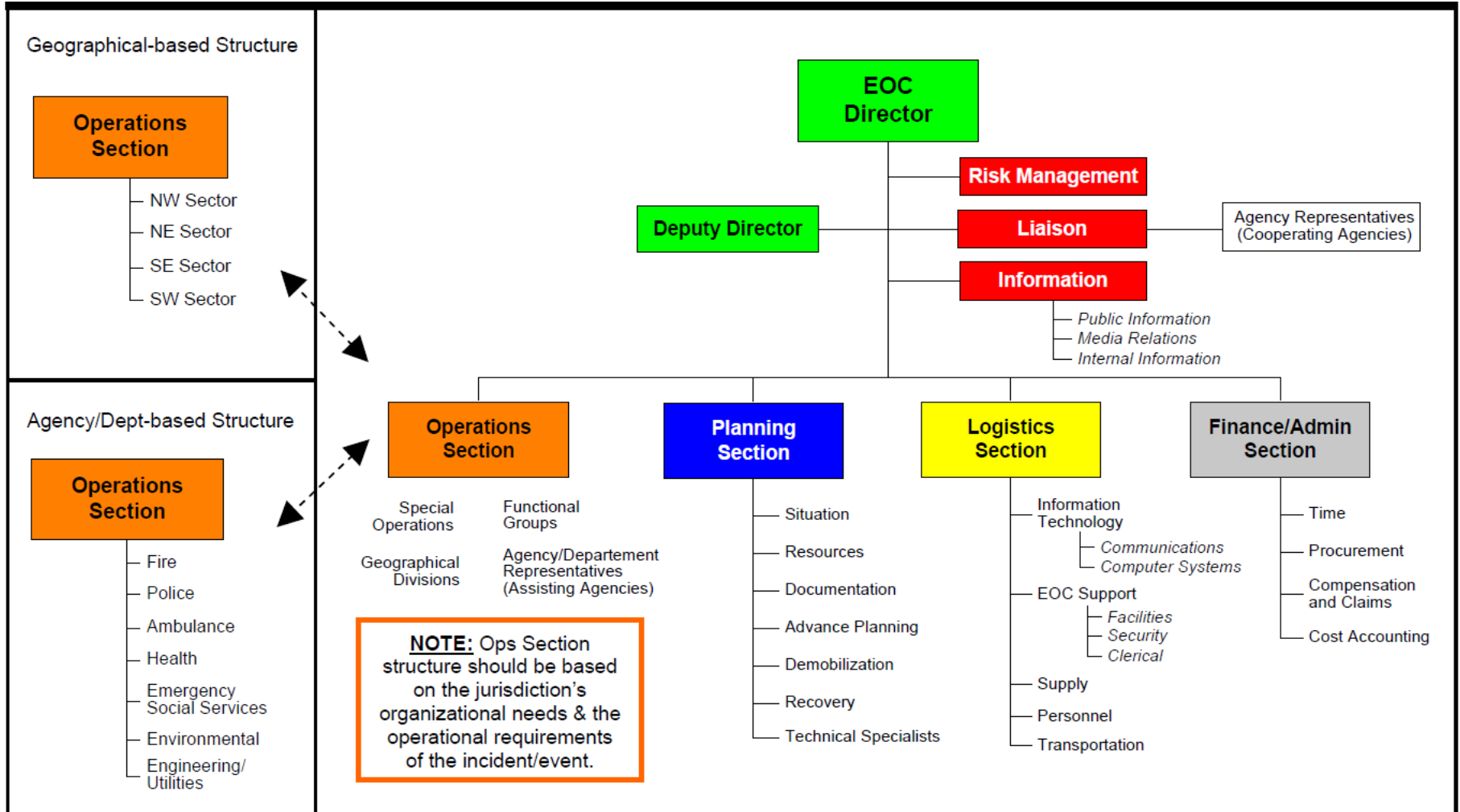
Level 1 Activation



Level 2 Activation



Level 3 Activation



Standard Response Goals

1. Safety & health of responders
2. Save lives
3. Reduce suffering
4. Protect public health
5. Protect critical infrastructure
6. Protect property
7. Protect the environment
8. Reduce economic & social losses

Continual Improvement Following Incidents...

DEBRIEF (ensure all perspectives are considered)

1. **WHY** did this happen?
2. What **WENT WELL**?
3. What **DIDN'T GO WELL**?
4. **ACTIONS** we should take to **PREVENT** the hazardous event from recurring (if possible) and be **BETTER PREPARED** next time?

Link this summary to your process for **tracking & measuring continual improvement.**

“Try to turn every disaster into an opportunity.”

John D. Rockefeller

Thank You

For more information or any questions, please contact:

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“The only thing tougher than planning for emergencies and disasters is explaining why you didn’t.” *Unknown*

“It is not only what we do, but also what we do not do, for which we are accountable.” *Molière*