Ontario Mine Rescue

BEV Emergency Response Incident Review and Best Practices

Agenda

- Mine Rescue Procedures and Operations
- BEV/Battery Incidents from across the province.
- Challenges and Best Practices

- Question Period

Mine Rescue Procedures and Operations

- Team Dynamics
- Briefing – Information Gathering
- Risk Assessment - Scene Assessment
- Agent Application

Team Dynamics

- 5-Person Team – Well-Balanced (trades/experience)
- 1st 5-Mine Rescue trained people is not always at Team #1
- Training/Experience/Background
- Familiarity with Mine Site and Location of Emergency
- Electricians and Mechanic MR trained personnel are an asset to EBV/Equipment
- 2nd Team as Backup and 3rd Team on Standby
- PPE- High Visibility Class 3, FR Rated Coveralls , Gloves, Safety Footwear

Briefing – Information Gathering

- Briefing Officer
- Formal Non-Routine Hazardous Task

Risk Assessment

- 20-Point Briefing

*Further questions if vehicle is involved

- Identifying Hazards - SDS/Vehicle Info
- Maps and Ventilation
- Equipment needed (TIC, Extinguishing

Agents, most suitable for situation, equipment available)

1. Information Available
2. Persons missing, location, and any trained persons
3. Action(s) taken so far
4. Whether the incident is a potential heat exposure incident
5. Intention
6. Fresh air base location and standby teams
7. Communications
8. Installation such as air, water, electricity
9. Location and status of refuge stations
10. Route of travel
11. Conditions on route of travel, including real or potential heat exposures
12. Potential rest or cooling area for relief from heat exposure
13. Ventilation
14. Visibility
15. Mine Rescue Equipment Available
16. Firefighting Equipment
17. First Aid Equipment and Stretcher
18. Tools and Supplies
19. Time Limit
20. Written Instructions

Information Available

- SDS

Access to key information

- Hazards – Chemicals, Metals
- Gas testing for specific gases

Ex. Hydrogen, Hydrogen Fluoride

- Firefighting

Extinguishing agents, special precautions,

points of access, battery location

Scene Assessment

- Mine Rescue teams are tasked with doing an Emergency Scene Risk Assessment throughout every emergency.
- Mine Rescue Principles:

1. Ensure safety of mine rescue teams
2. Rescue injured or missing workers
3. Respond to and resolve fire and non-fire emergencies
4. Restore mine to normal operations

- Assessment of Emergency (Hazard ID – Physical/Atmospheric)
- Planning - Action plan
- Execution - Re-assessment throughout emergency

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Agent Application

- Indirect Attack (Lower Risk)
- High Expansion Foam
- Alter Ventilation
- Allow fire to burn itself out

- Direct Attack (Higher Risk)
- Isolation where possible
- Water Application

2 Hose Application

- Low Expansion Foam

Compressed Air Foam System

AFFF

Ontario Mine Rescue EBV/Battery Incidents

- Incident #1 (Southern District)
- Incident #2 (Sudbury/Onaping District)
- Incident #3 (Red Lake District)

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Incident #1 (Southern District)

- Sept 19, 2019 at approximately 17:30 hrs
- An underground worker had noticed black smoke and an orange glow coming from a charging/parking station.
- The worker noted that at least one vehicle was on fire and then proceeded to seek refuge.
- At 17:32 hrs emergency procedures were implemented.
- Black smoke visible at mine shaft entrance
- Smoke exiting RAR forced evacuation of surrounding buildings

- 18:30hrs All underground employees were accounted for
- 19:40 hrs team #1 travels down portal ramp to approach fire scene from fresh air.
- 20:22 hrs team arrives at charging area, power is locked out, and team begins firefighting.
- Ground conditions have deteriorated from exposure to fire.
- 22:06 hrs Team #2 responds with water truck and extinguishes fire
- 22:46 hrs Team ensured that gasses in mine were clear, the area was barricaded, all clear was given by Control Group and the mine was evacuated.

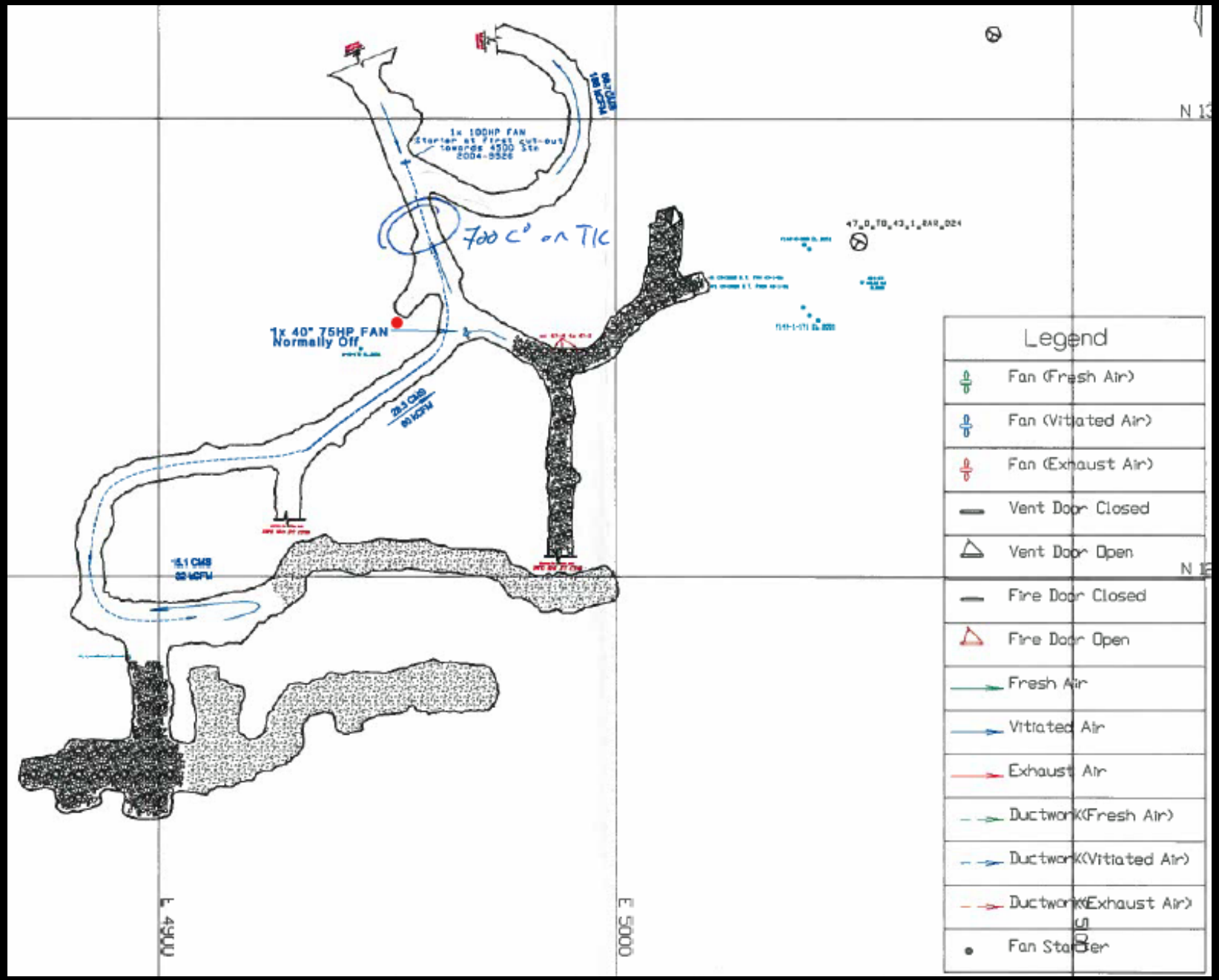
Root Cause:

- Faulty Charging cable/fixture back fed to first vehicle battery and propagated from there to two more vehicles with extreme heat. Total of 3 vehicles were consumed in the fire along with all lights and conductors in the charging area.

Incident #2 (Sudbury/Onaping District)

- July 6, 2020 @ approximately 10:50pm
- Initial Fire was reported by two contractors working on an electric boom truck.
- Information was received through brief contact with workers who reported that they had no compressed air and were trapped behind the vehicle on fire.
- Within minutes of initial contact, no further communication with the two contractors could be established.

- Emergency procedures were implemented soon after
- Team #1 went underground at around 0100 hrs and encountered the fire scene at 01:55 hrs.
- Dark black smoke and extreme heat were encountered at the area. (700F recorded with TIC)
- Communication was affected and could not be established at the work site.


1x 100HP FAN
Starter at first cut-out
towards 4500 Stn
2004-9526
700 c° on TIC
1x 40" 75HP FAN
Normally Off
Legend
Fan (Fresh Air)
Fan (Vitiated Air)
Fan (Exhaust Air)
Vent Door Closed
Vent Door Open
Fire Door Closed
Fire Door Open
Fresh Air
Vitiated Air
Exhaust Air
Ductwork (Fresh Air)
Ductwork (Vitiated Air)
Ductwork (Exhaust Air)
Fan Starter
N 13
N 12
E 4500
E 5000


Jul 7, 2020 8:00:57 AM
270
250
230
164°F

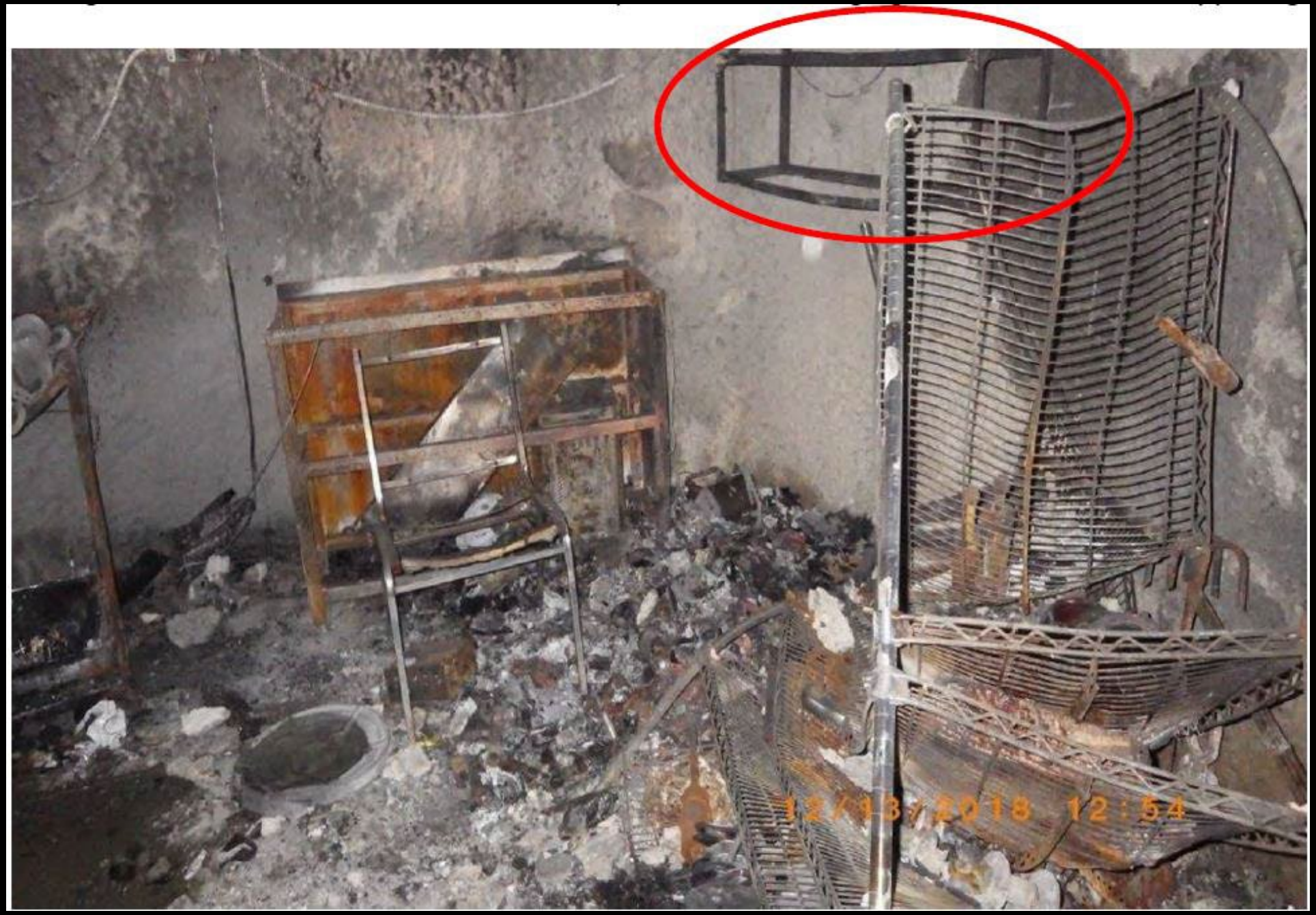
- Team #1 continued to advance on the fire scene and knock down flames, during this attack they had noticed cap lamps moving behind the engulfed vehicle.
- Due to poor communications Team #1 retreated to the last point of contact to update the Briefing Officer.
- While the team was communicating with surface, the two contractors fled the scene and travelled around the truck.
- Both contractors were protected with breathing apparatus, transported to surface and handed off to EMS.

- Team #2 was sent to the fire scene at 03:15 hrs to finish extinguishing the fire.
- The fire was declared out at 04:36 hrs, the team remained on fire watch cooling the unit until 06:30hrs.
- Team #3 was dispatched to ensure clear air throughout the mine an successfully completed that task at 09:09 hrs
- Control Group gave the all clear and workers were advised to exit the refuge stations and travel to surface.

Incident #3 (Red Lake District)

- June 12, 2018
- Incidents occurred between shifts, and was discovered by nightshift, in U/G shop, shelving unit containing batteries and charging unit.
- The fire started on the top shelf, which burned through the second shelf which also contained lithium ion batteries. The engulfed shelving and batteries fell to the ground and continued to burn.

- At 21:05 hrs Team #1 travelled U/G to investigate fire.
- Team arrived at the scene and encountered rechargeable batteries on fire.
- Fire extinguishers were used, and fire was reported out at 22:09 hrs.
- Team #1 remained on fire watch until 23:40 hrs.
- Team #2 travelled U/G and continued fire watch until 02:17 hrs.
- Investigation deemed that a battery charging station failed, and caught fire. (Approximately 30 18v batteries involved)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Challenges

- Information on vehicles
- Infrastructure for battery charging and storage areas
- Resources
- Location of incident
- Expansive mining operations leading to greater distance for team travel
- Unknown status of vehicle fire
- Limited access to cooling ports

Best Practices

- Communication with mine
- SDS Availability
- Well-versed Control Group
- Continued training of Mine Rescue to trades people
- Strong Emergency Response Plans
- Planned Infrastructure (Charging stations, Battery Storage)
- Resource Availability (Vent Plans/Water headers)
- Communication among Industry

Communication with Mines/ SDS Availability/ Control Groups

- Mutual understanding of:
- What EBV vehicles are on site
- U/G location of vehicles (Vehicle Tracking)
- Locations of EBV Charging Stations and Storage (with quantities)
- Rapid accessibility to SDS for Control Groups and Mine Rescue Teams
- Updated catalogue as EBV program develops

Mine Rescue Program/ Emergency Response Plan

- Training of OMR to electrical and mechanical trades people
- Continue research and development on best practices with EBV fires
- Updated and well-designed emergency response plan
- Trialed and reviewed on a regular basis
- Well-versed control group
- Ontario Mine Rescue Management Course
- Debrief Post-Emergency

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Mine Infrastructure / Resources

- Strategic placement of charging stations and storage during planning stage. (ex. Near Exhaust)
- Fire doors / Fire Suppression
- Equipment Parking
- Proper handling and removal of excess batteries
- Remote Gas Monitoring
- Advanced monitoring in charging stations. (Video/Thermal)
- Access to water (Drop headers / water pressure)
- Ventilation
- Access to suitable transportation for Mine Rescue teams

Question Period

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