

# Li-Ion Battery Fire Report

Report of Lithium Ion Battery, South Africa



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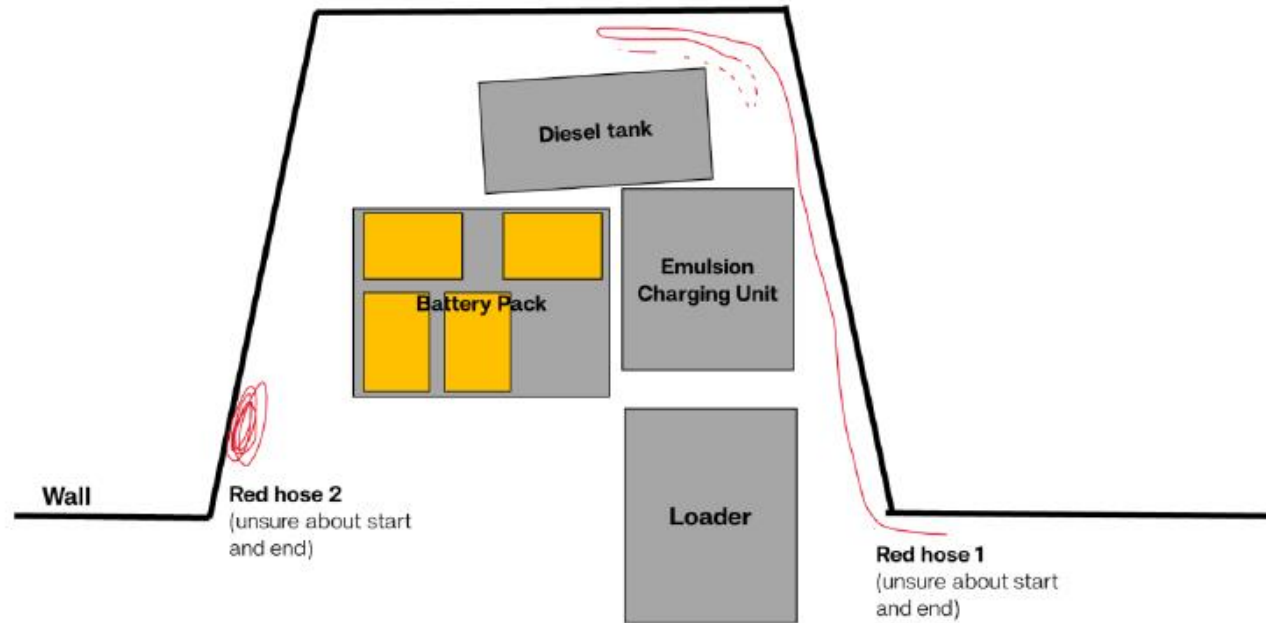
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# Acronyms and Abbreviations

Acronym	Description
TMS	Thermal Management System
IP Rating	Ingress Protection Rating
VPC	Volt Pack Core
SP	Sub-Pack (Same as Volt Pack Core)
OEM	Original Equipment Manufacturer
MSD	Main Service Disconnect
MRS	Mine Rescue Services

# Summary of Incident



- On the morning of the 31 January 2025, a battery fire was reported to Epiroc having occurred in a underground mining operation
- The battery, at the time of fire, was not in use, either charging or discharging and was booked down for repairs during this period
- The fire was reported at approximately 00:12, where a mine evacuation was initiated. The battery was doused with service water whilst burning, for approximately 25 minutes, after which it was reported that battery flames had completely subsided.
- No injuries or gas inhalation was reported as a result of the battery fire.
- Mining operations resumed during the night shift of the 31 January 2025, after the battery and area had been declared safe.

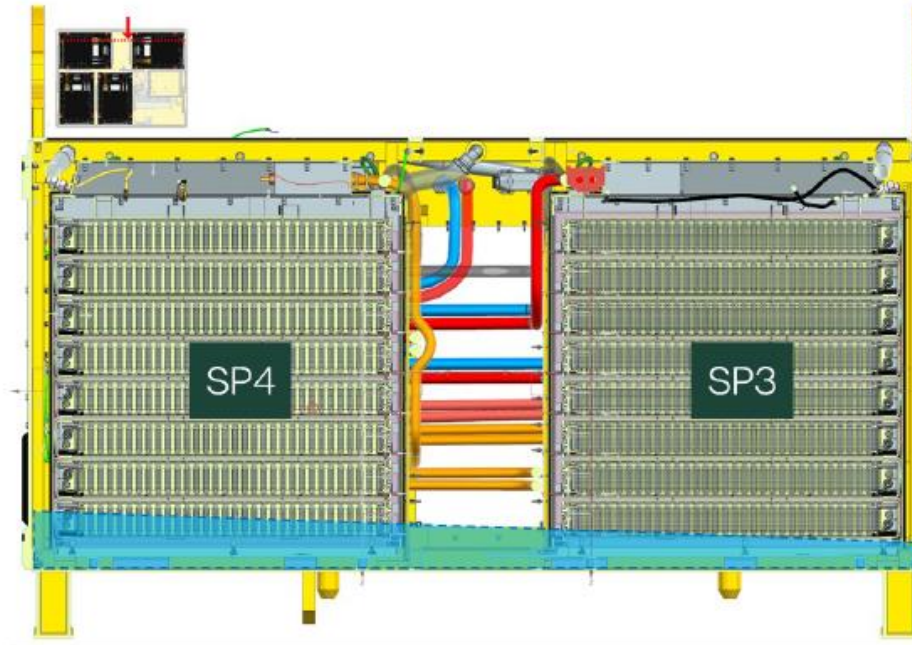
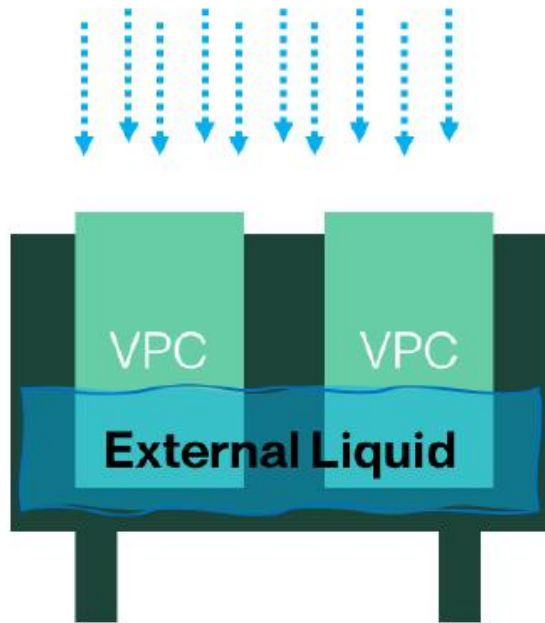


# Findings

- During the investigation, the battery was found to be located in a state with the battery cover and Thermal Management System (TMS), removed from the battery
- The battery was found stored in an area, close to other equipment
- All subpacks had shown signs of thermal runaway, indicating all cells had been burnt within the battery
- Foreign objects found within the battery casing



# Findings



- Further investigation, noted burn patterns of the battery, coinciding with water ingress into the battery cavity, where no fire damage was incurred at a level lower than the water level believed to be within the pack during the thermal runaway
- With the Battery Lid and TMS removed, the IP rating of the battery pack was compromised, and battery subpacks exposed to conditions, not in accordance with storage and handling conditions of subpacks
- Drainage valves on the battery pack were also not opened, preventing water ingress from building in the battery pack

# Findings

## Summary of Findings

- Storage & Handling
  - Battery pack storage and handling was not in accordance with OEM Recommendations
  - Battery was left in a compromised state during breakdown, with the battery lid/TMS not on the battery pack
  - Foreign objects such as blasting caps, aluminium cans, masks and gloves were found within the battery pack
- Safe Operating Procedure
  - Battery pack was found with Main Service Disconnect (MSD) in ON Position and locked out, despite being on breakdown
  - Storage Area around the exposed battery was not sectioned off
- Li-Ion Battery Knowledge
  - Training and recommendations received from OEM not cascaded sufficiently within the organization and not handed over to all people in contact with batteries



# Recommendations

- Storage & Handling
  - Ensure all storage & handling conditions are incorporated into Mine Operational Risk Assessment & Procedures
  - Ensure personnel involved with Battery pack operations are aware of storage and handling conditions
  - Mine to ensure areas allocated for battery storage are conducive to OEM Storage/Handling Recommendations
  - Correct Tools to be utilized for lifting and moving of battery packs
- Safe Operating Procedures
  - Any battery pack on breakdown, to be locked out to prevent accidental use of the battery pack
  - Battery packs to not be left open within an underground environment
  - All Plug Covers to be in place when battery pack is stand alone
- Li-Ion Battery Knowledge
  - Educate organisation around the risk related with Li-Ion Batteries and Dangerous goods
  - Collaboration with Mine Rescue Services (MRS) on addressing and dealing with Li-Ion Battery Fires
  - Establish escalation procedure for notification of dangerous situations

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