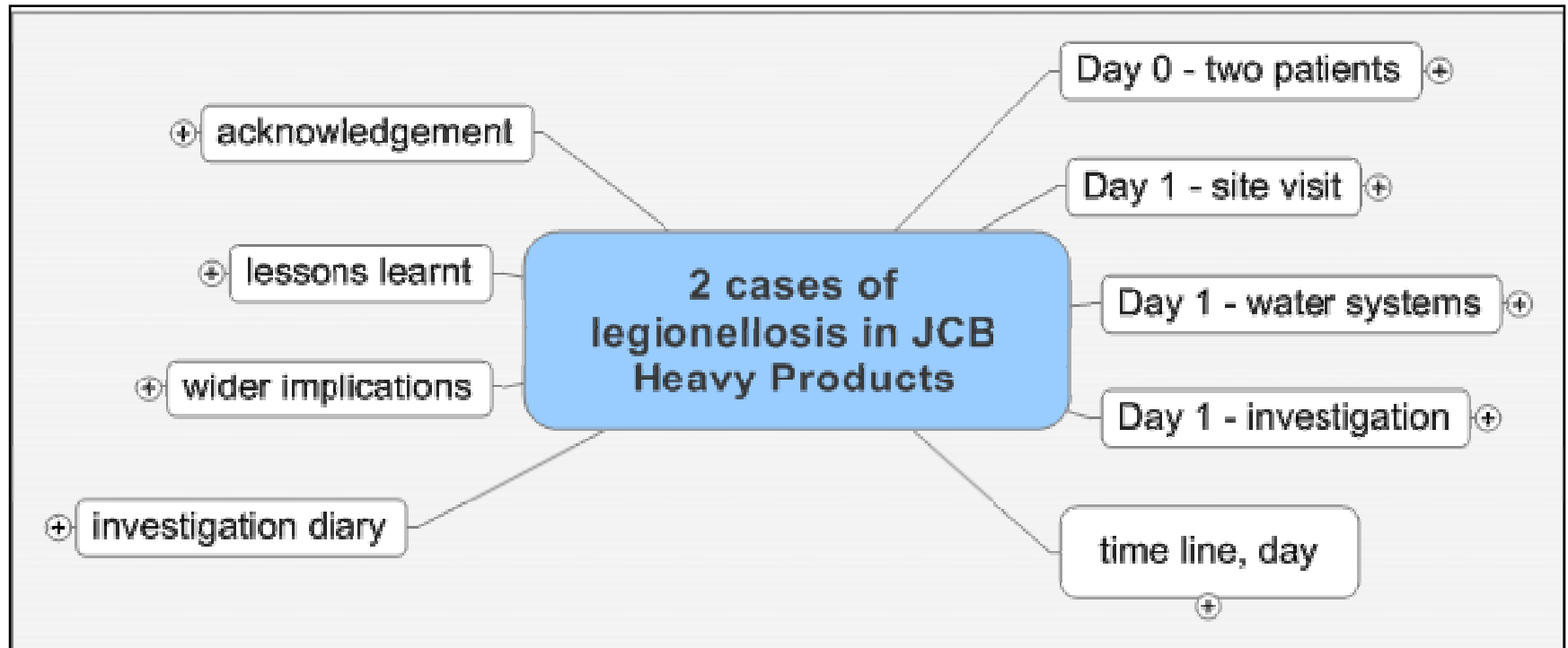


2 cases of legionellosis in JCB Heavy Products



Legionella cases

- worker 1
 - assembly work in the middle of the factory
- worker 2
 - paint sprayer @ small parts paint shop
- investigation by HPA showed:
 - no common link of the two cases apart from workplace

Water systems

- **NO cooling towers**

1. Domestic hot & cold water
2. Wet paint mist water trap system
3. Aqueous metal pre-treatment system
4. Water jet vehicle cleaner

Vehicle wash jets - UNLIKELY

- mains feed into single machines
- no storage tank
- external

Wet spray booth - LESS LIKELY source

- water underground
- re circulated water aerosol goes out to the top of the chimney
- Water temperature <15 °C

H&CW domestic systems – known POSSIBLE source

- 30-40 years old system
- no schematic of pipe work
- last cleaned in Jan & Apr 08 included shower heads as per L8

pre-treatment tunnel

an unknown but **LIKELY** source

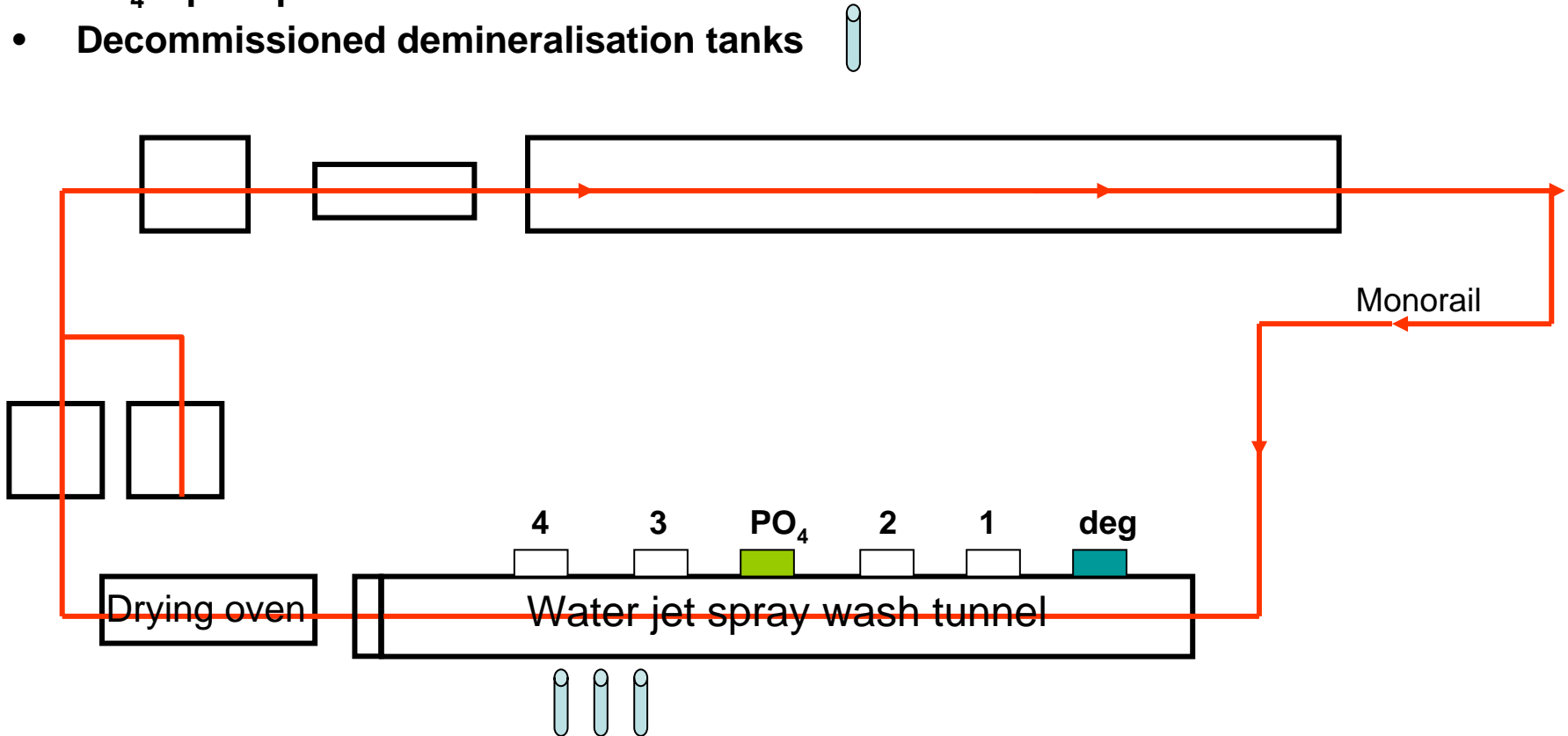
- degreaser is alkaline
- phosphate wash is acid
- water rinses temperature was 25 - 38 °C
- by the time of inspection – the system was shutting down
 - did not see aerosols coming out from the top
- chemistry of the degreaser & phosphate wash NOT known
- told the system was an enclosed system with air curtains on both ends
- jets of water spray into the tunnel
- some open trenches
- not listed as a risk system in L8, though temperature was optimal for legionella

Pre-treatment tunnel

- Aqueous degreasing & conditioning of small metal parts before paint spraying or powder coating
- Water rinses in between degreasing and conditioning stage

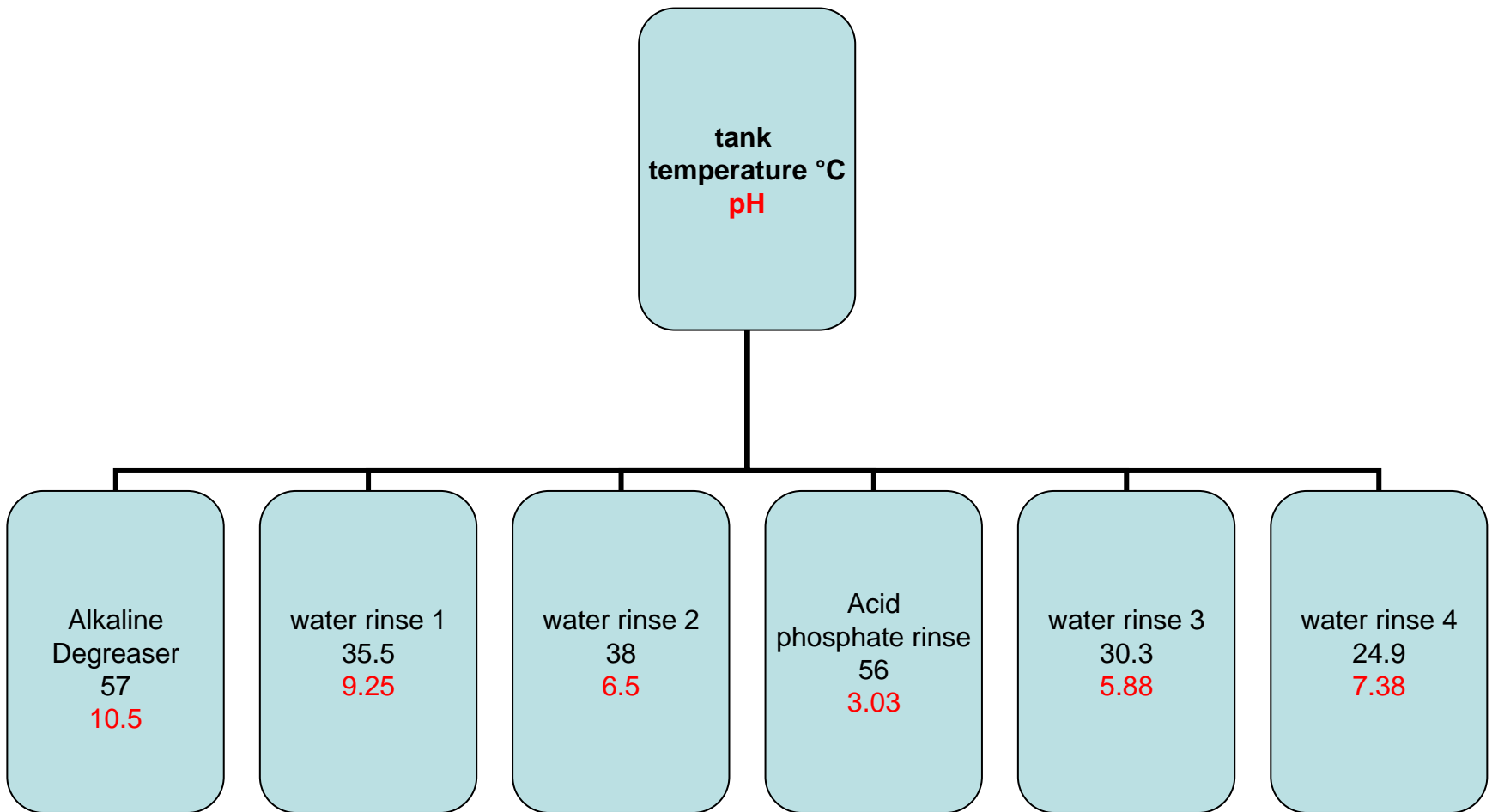
Small parts paint shop

- Water rinse tanks 1-4; cold water feed from mains
- deg – degreaser
- PO₄ – phosphate wash
- Decommissioned demineralisation tanks



inspection

- treatment tunnel
 - measured temperature of the four water rinse tanks because the water was mixed in the tunnel
- both domestic toilet - shower blocks
- wet paint spray booth
- Total viable count (TVC) and legionella culture BEFORE any cleaning or disinfection



Agreed actions

- clean & disinfect the domestic systems
- no actions on the spray booth water trap & the treatment tunnel water rinses

Time line

- Day 0 - two cases reported
- Day 1
 - Inspection; TVC & legionella culture
 - system shutdown at the weekend
- Day 4
 - no new cases

Time line

- Day 6
 - Cleaning, disinfection, sampling
- Day 7 – 11
 - Whitsun shut down
- Day 12 – legionella culture results of samples taken from Day 1
 - Water tanks 3 & 4 grew legionella
 - interim control regime

Time line

- Day 19 – no new cases
- Day 21 - legionella isolated in water rinse tanks 3 & 4
- Day 25 – diminished number of Legionella isolated in water rinse tanks 1 & 3
- no legionella isolated from Day 28 onwards

Factors to consider in control

- chlorine based biocide was considered inappropriate in the circumstances as
 - the plant is within the factory; exposure to chlorine
 - Product quality
 - corrosion
- additional biocide in alternating regime
- heating the water rinse tanks to 60 °C, 50 °C is lowest allowable
- Chlorine dioxide to remove biofilm

lessons learnt

- key concept - Para 19 (d) of L8
- factors to consider bringing a system under control
- Limitation of bacteriological culture as monitor

key concept - Para 19 (d) of L8

- Para 19: *A reasonably foreseeable risks of exposure to legionella bacteria exists in (d) other plants and systems containing **water** which is **likely to exceed 20 °C** and which **may release a spray or aerosol** during operation or when being maintained*

putting the concept into practice

- assess the risks

- Growth
 - Water temperature
 - Reservoir: recirculation/recycling
 - Other factors: nutrients, surface for biofilm
- Transmission
 - aerosol generation
 - location

water temperature, °C

- CHECK the water temperature at different locations in the system
- Watch out for heat transfer
 - mixing hot and cold water
 - hot and cold pipe work side by side
 - ambient water in a hot environment
 - direct transfer

factors encouraging bacterial growth

- presence of sludge, scale, rust, organic matter, algae
- stagnation
 - storage tank
 - reservoir
 - dead legs
- demineralisation plant
- components provide nutrients

Is the water

- recycled?
- re-circulated?

transmission

- aerosol generation
 - jet spray
 - extraction of aerosols and mists to outside
 - splashes, dripping
- structure and layout
 - gaps to allow escape of aerosols
 - brushes to seal the gaps
 - enclosed some of the time but not long enough for clearance
 - fully enclosed at all time
- location of plant