



Commissioning of a Mobile CL3 Laboratory: Lessons Learned



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Mobile Truck Laboratory

- bioterrorism response
- Operated by MERT (NML's Microbiological Emergency Response Team)
- Deployed to G8/G20 summit, 2010 Winter Olympics, various international exercises.
- CRTI funding (chemical, biological, radiological-nuclear and explosives research and technology initiative)



Mobile Truck Laboratory

- extract RNA/DNA of unknown origin
- May be RG2, 3, or 4
- RG3 & 4 packaged and securely transported to NML for further confirmation.

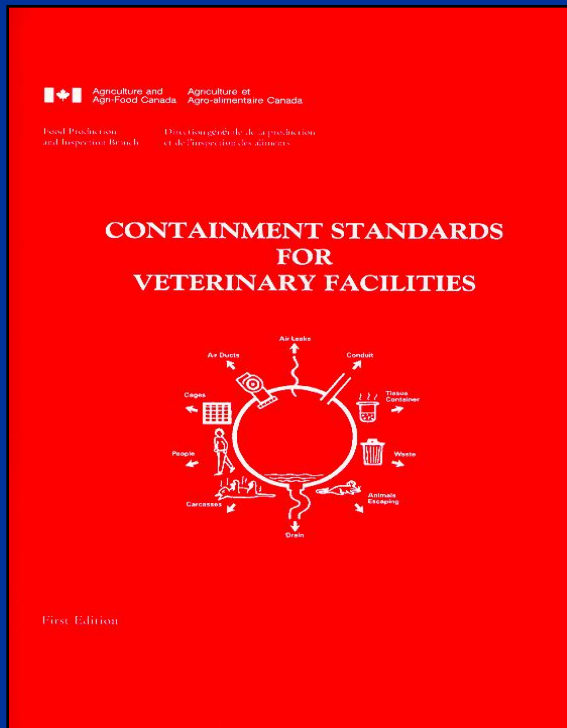
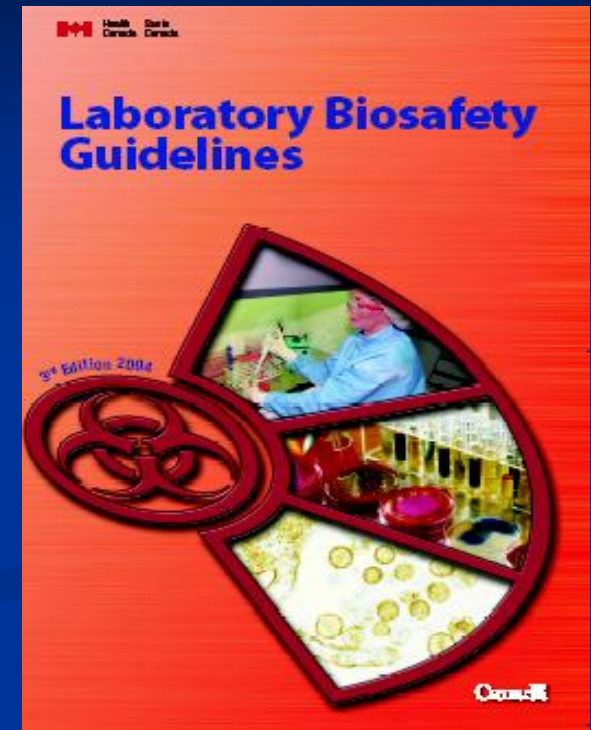
- First of its kind!





Design Features

The Public Health Agency of
Canada (PHAC)
*Laboratory Biosafety
Guidelines, 3rd ed., 2004*



The Canadian Food Inspection
Agency (CFIA)
*Containment Standards for
Veterinary Facilities*

Canada 



CL3

CL2

entrance/
office

Tent and sample receiving



Initial Design Features - General



**Tent allows for:
staging,
sample receiving,
storage,
office extension,
and a
dry entrance!!**

**Sample
receiving
and
ladder to
assist**



Initial Design Features – General

- Communications system
 - Linked to ops centre
 - Sample receiving (chain of custody)
- Security system
 - Restricted access
 - Cameras
 - Alarms



NML Ops Centre



Initial Design features – utilities

- Electrical connections for shore power
- 2 x 40kV Emergency Generators for general power
- Dedicated UPS backup power to class III cabinets, freezers and control system
- connections for fresh water tank fill





Initial Design Features - General

■ Stainless Steel & Arcoplast

= easy to clean 😊

= heavy! 😞



Walls
Surfaces
Housings
Storage
Doors
Shower
Changeroom



Initial Design Features - General

- Fresh water tank
 - Eyewash stations
 - Hands-free sinks
 - shower
- 450L (120 gal) polypropylene waste water tank

Shower eyewash



Lab eyewash



Emergency shower



Standalone autoclave



Initial Design features CL2 laboratory

- Bank of real time pcr machines
 - Air ride counter



- Fridges, freezers, autoclave, storage
- Vented pass-through to CL3
- Computer stations



Initial Design features CL2 laboratory

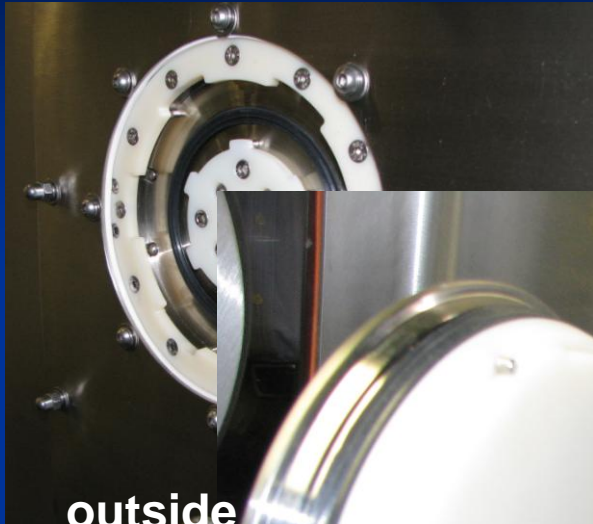




Initial Design Features CL3 laboratory

- Specimen receiving ports
- Pass-through autoclave from large class III cabinet
- Decon ports for space decontamination



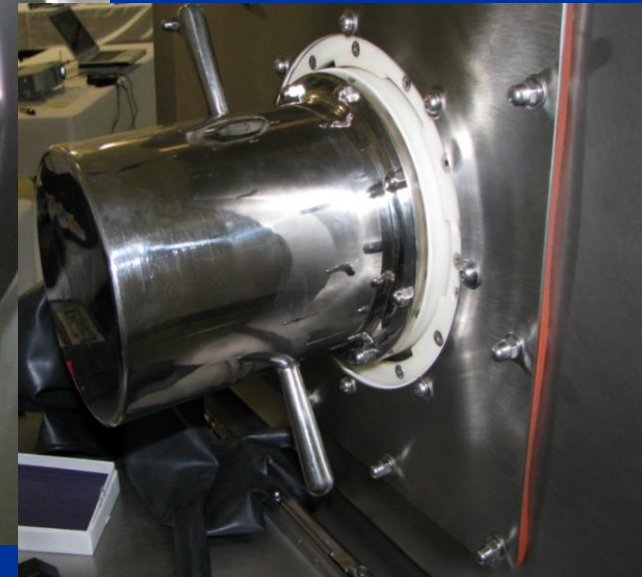


outside



Inside

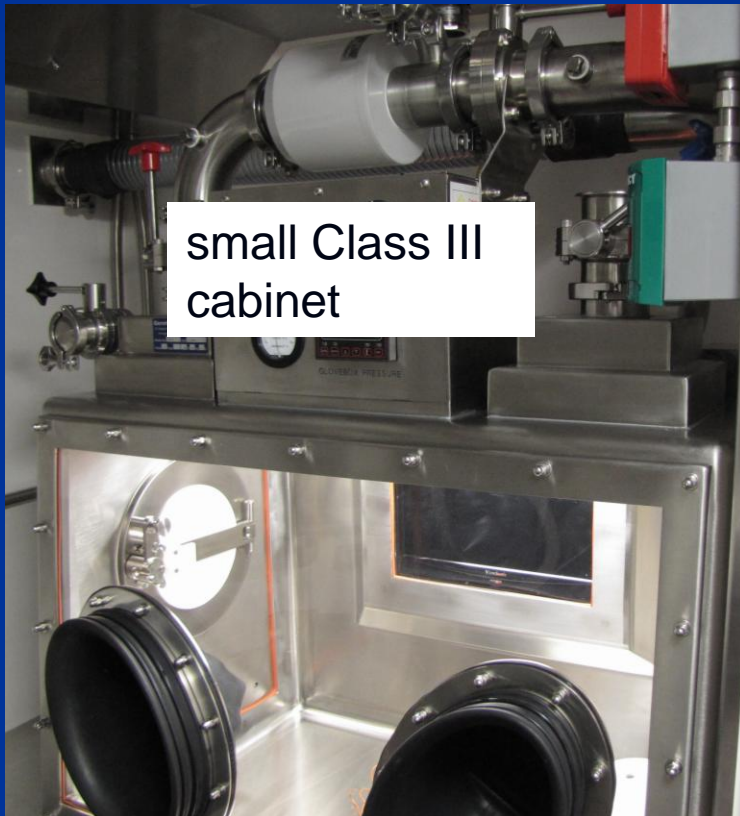
Specimen Receiving Port





Initial Design Features

CL3 laboratory



Touch screens & cameras



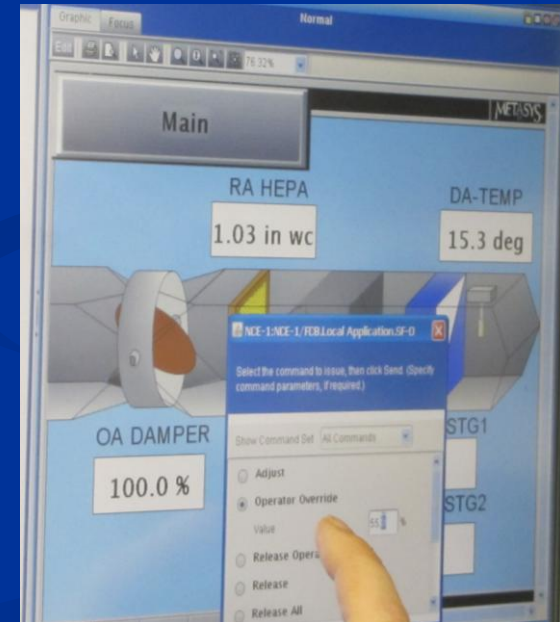
Initial Design Features - HVAC



- Pressure alarms, mag gauges

Dedicated supply air serving office, CL2 and CL3 labs

Dedicated Exhaust serving CL2 and CL3 labs.





Challenges - Limited space !





Challenges

- Very short time frames to deployment
- (Canadian) roads!
- How much effect does driving have on hepa filters ??
 - on BSC settings ??
 - On sensitive equipment like rt pcr machines ??



Challenges

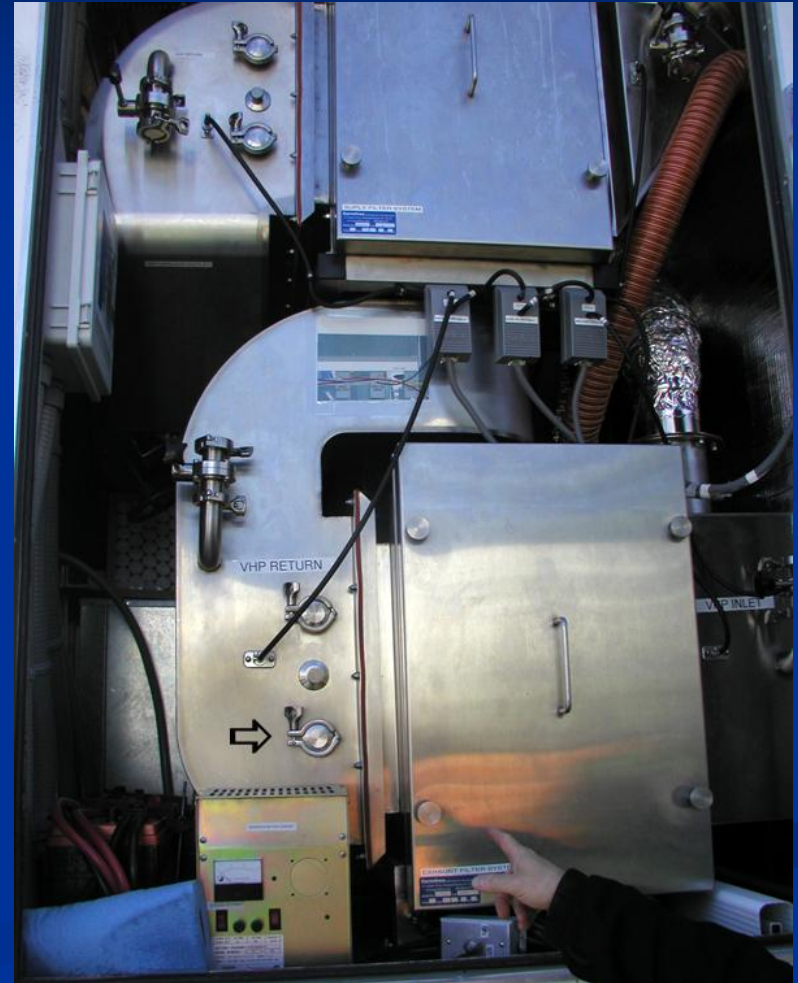
- Use of flexible ducts makes recertification difficult



- Less problem with vibration and breakage though



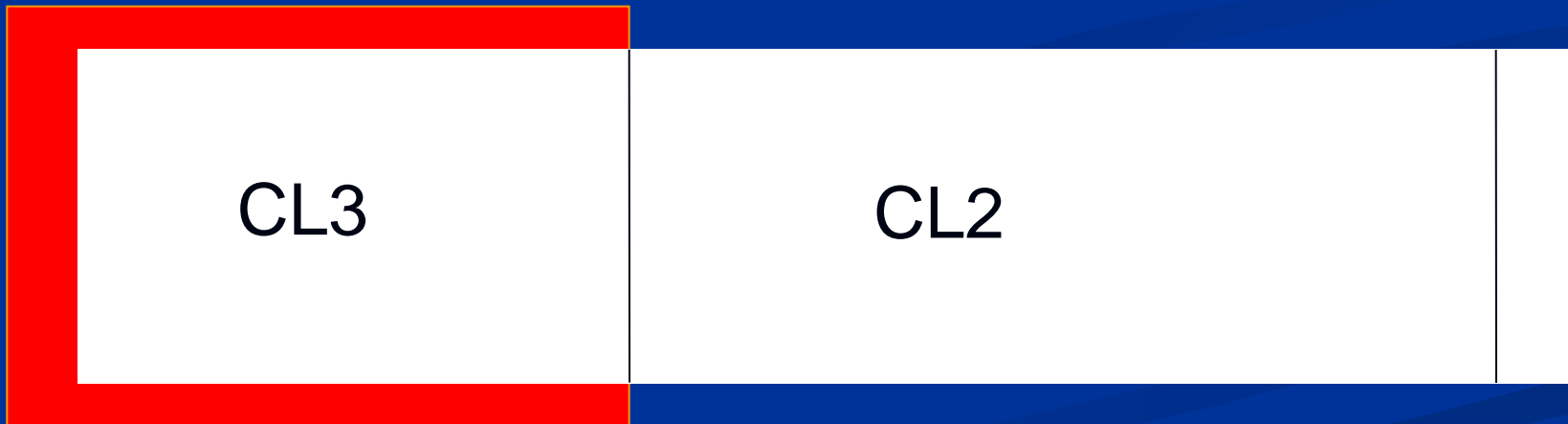
Challenges-limited access to filters, mechanical spaces





Challenges

- Dirty ductwork through mechanical space with initial design meant need to decon, 3 pressure decay tests





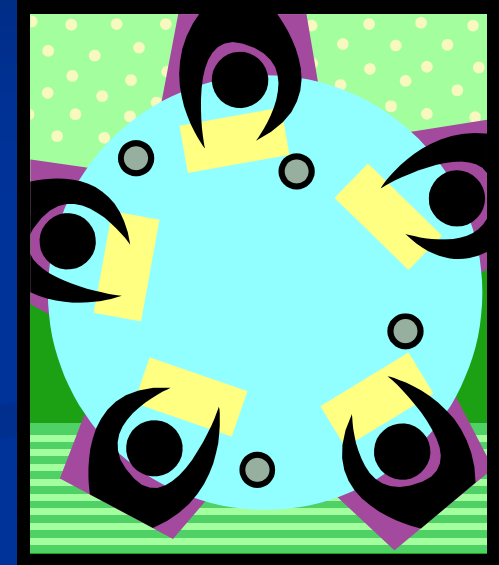
Re-design





Lessons Learned

- Hold REGULAR meetings with experienced personnel – starting with concept stage
- Have a point person responsible for list of tasks
- Look beyond the Guidelines
 - Traffic Act
 - TDG





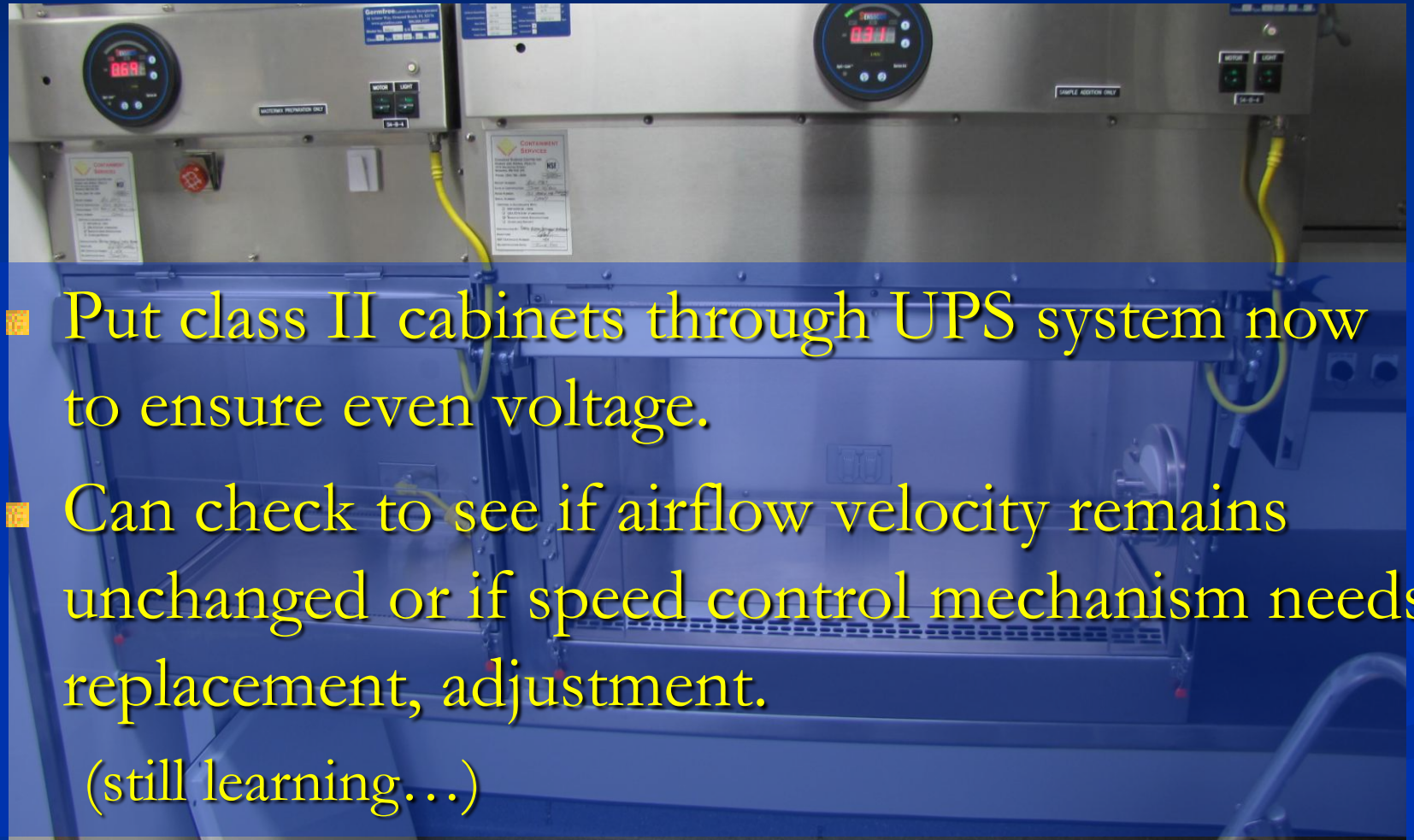
Lessons Learned

- Many vertical surfaces changed to powder coated aluminum
 - Much lighter, same easy cleaning attributes





Lessons Learned



- Put class II cabinets through UPS system now to ensure even voltage.
- Can check to see if airflow velocity remains unchanged or if speed control mechanism needs replacement, adjustment.
(still learning...)

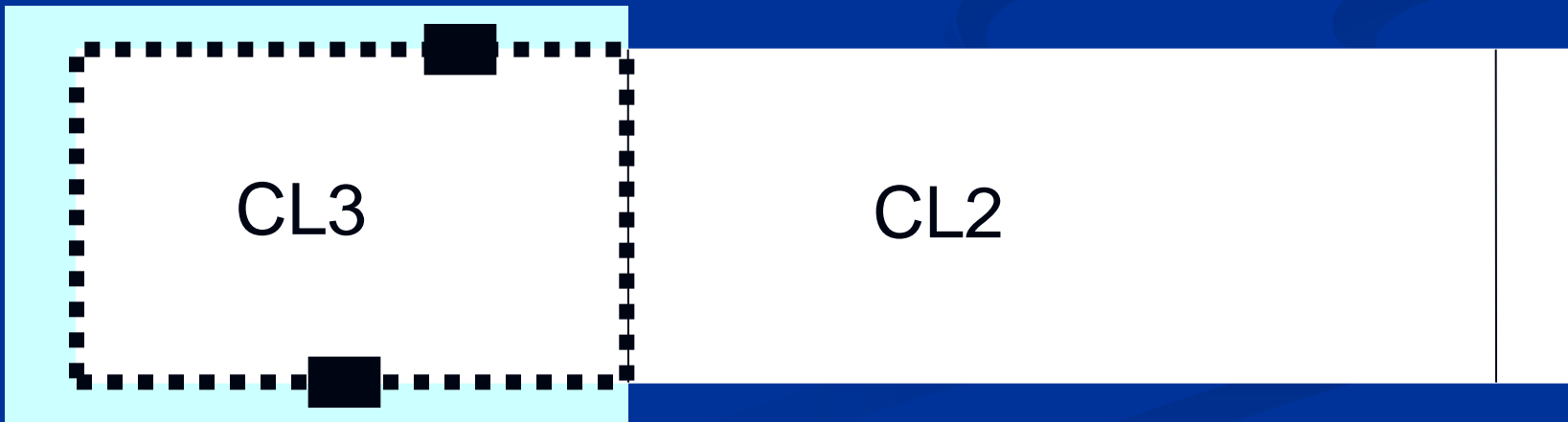


Lessons Learned

- Removed HEPA housing in exhaust duct (mechanical space)
- Remove HEPA housing in Main supply/Main return HVAC loop (mechanical space)
 - Reduces weight of truck
 - Reduce congestion in mechanical space



- Added ceiling and wall mounted HEPA filters at supply and return diffusers inside CL3.
- Added a conventional HVAC filter and housing instead of heavy stainless housing and HEPA filter.
 - Eliminate contaminated ductwork





Lessons Learned

- CL3 space ends with lab perimeter.
- Stream line the recertification process for deployment
- No pressure decay tests needed



Lessons Learned

- **Class III cabinet HEPA filter and carbon filters were moved to separate housings to facilitate decon.**





Lessons Learned

- HEPA filter and housing challenge ports
- Clean ducts outside of lab



- Ease of HEPA certification
 - No weather factor



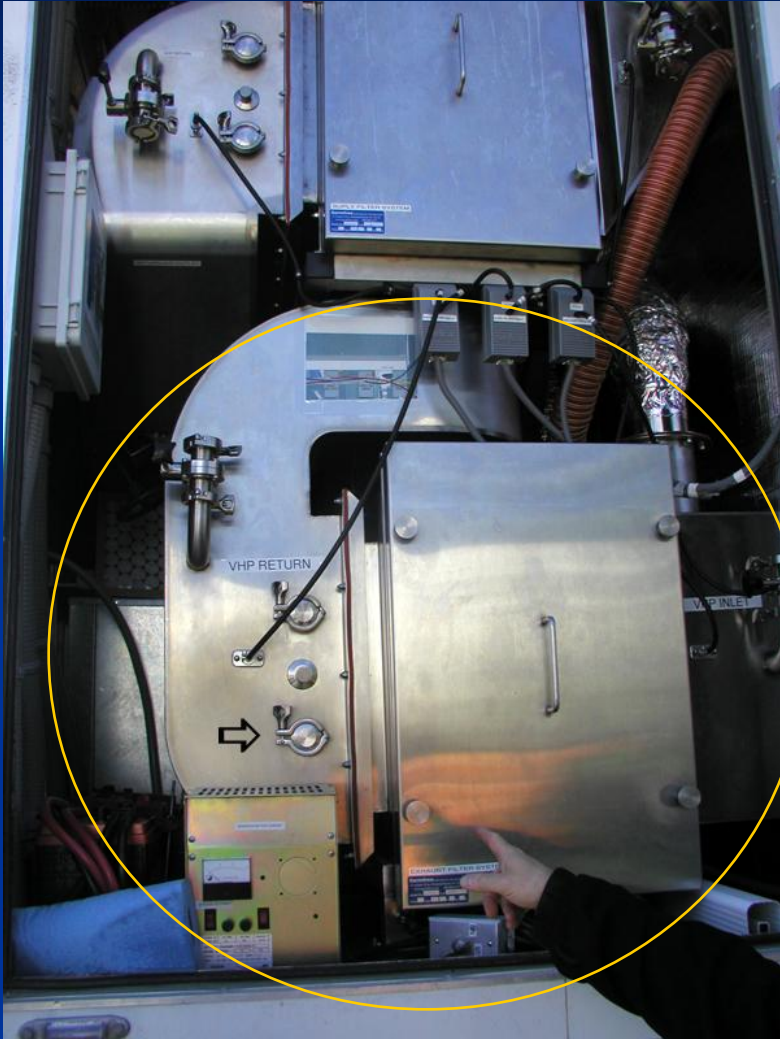
Lessons Learned Canadian climate

- Antifreeze addition point
- Heating/Air conditioning





before



after





- AND... Lightened weight of truck by more than 907 kg (2,000 lbs) !!





Still more to learn to Learn...

- Dry Fog decontamination vs VHP
 - Of space
 - Of cabinets
- Chlorine Dioxide validation of waste water tank



Acknowledgements

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