



# **VIDO-InterVac – Case study of epoxy coating remediation within a working CL3-Ag facility**

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# **VIDO-InterVac – Case study of epoxy coating remediation within a working CL3-Ag facility**

- introduction to VIDO-InterVac
- explanation/origin of the problem
- challenges posed by the project
- processes and outcomes of the project
- Interesting discoveries made along the way
- questions



# The Vaccine and Infectious Disease Organization – International Vaccine Centre





# Vaccine Infectious Disease Organization (VIDO)



- Research institute at the U of S formed in 1975
- Multidiscipline approach with 75+ PhD level scientists, veterinarians and technicians
  - 175 staff in total
- 10 vaccines commercialized
  - protected by >85 US patents
- 6 recognized as world firsts
  - 1<sup>st</sup> recombinant vaccine for animals and *E. coli* 0157



# Vaccine Infectious Disease Organization (VIDO)



- Significant CL-2 and CL-3 multi-species animal facilities; special emphasis on large animals
- Awarded NIH Prime Contracts (IDIQ) for large animal models
- 1<sup>st</sup> non-government lab permitted to work with ASF
- 160 acre research farm
- 4 privatized companies
- ISO 9001:2015 certified
- Single organization known as VIDO-InterVac



# International Vaccine Centre (InterVac)





# International Vaccine Centre (InterVac)



- CL-3 and CL-3Ag facility opened in 2013
- 180,000 sq. ft.
- Cost of \$145M
- Unique in terms of large animal holding capacity
- “Bed and breakfast” for researchers from other institutions



Floor plans removed for security purposes



Basement





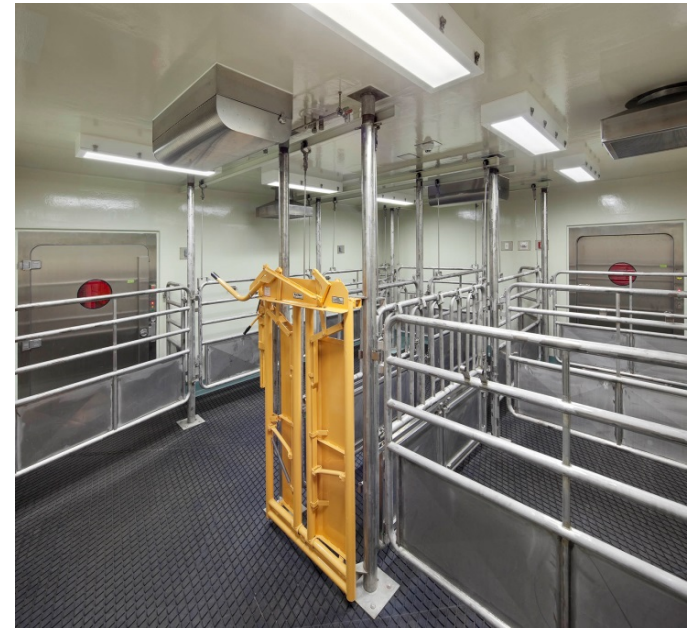
Floor plans removed for security purposes



Ground floor



Floor plans removed for security purposes



Ground floor



Floor plans removed for security purposes



1st floor



Floor plans removed for security purposes



2<sup>nd</sup> floor



## Novel disease models

- Bovine TB bison model
- MERS bat model





# Epoxy coating replacement - history

- Conducted regular reviews of the barrier coatings every 6 months since building turnover using the same individual that was involved in original project
- First discovered very fine cracks in the Necropsy room and rippling of the coating in the adjacent laboratory in October of 2017
- Advanced the timing of the next review to Feb, 2018
- Cracking had multiplied 10 fold in Necropsy
- Rippling in adjacent lab had begun to develop into spider cracking that broke through finish
- Ceiling of Standing Surgery lab turned a deep yellow and became chalky



# Epoxy coating replacement – affected areas

Floor plans removed for  
security purposes

Ground floor



# Epoxy coating replacement – affected areas







# Epoxy coating replacement – affected areas



Tissue Processing and Histology labs



Standing Surgery lab



# Epoxy coating replacement – Oct 2017





# Epoxy coating replacement – Oct 2017





# Epoxy coating replacement – Feb 2018





# Epoxy coating replacement – Feb 2018





# Epoxy coating replacement – Feb 2018





# Epoxy coating replacement – analysis



- Core samples taken from areas of epoxy failure
- 10 samples taken from differing types of appearance
- Sent to suppliers US lab for structural & chemical analysis.....



## Epoxy coating replacement - planning

- Decision was made to perform remediation with a comparable product supplied by Dudick
- Co-ordinated a site visit with supplier and Kelson & Kelson, contractor that performed the original installation
- Determined that the entire original installation had to be removed down to bare concrete due to the potential for product incompatibility and warranty
- Received project proposal from contractor in November
- Intent was to mobilize equipment and supplies in December to have crews start the first week in January
- All planned animal experiments slated for first part of 2019 cancelled or postponed
- Last animals cleared out Dec 16. 2018
- **But....**





# Epoxy coating replacement - planning

- U of S Purchasing would not accept the Sole Source Justification for the original project contractor and requested publicly-offered Request For Proposal (RFP) process for value and transparency
- Contractor site tours could not be conducted due to the contamination of the space
- Floor plans could not be circulated due to issues of security
- Communication with potential proponents could not occur while RFP was active.
- RFP process lasted 4 weeks
- Contract award to Kelson & Kelson on Dec. 20, 2018
- University closed from Dec. 21 – Jan 02
- Merry Christmas?!?



# Epoxy coating replacement – facility preparation

- Full VHP decontamination of all spaces
- Removal of all installed elements
  - equipment cabinets & counters
  - sinks and associated plumbing
  - electrical outlets and lighting
  - removal of floor level exhaust ductwork
  - removal of tissue digester lids
- Provision of 600v power for contractor equipment
- Laying of full floor protection in all application areas and support pathways to removal equipment



# Epoxy coating replacement – facility preparation





# Epoxy coating replacement – epoxy removal



- Waterjetting removal of epoxy
- water shoots out of underside of application head at 40, 000 PSI
- pulverized epoxy slurry vacuumed up by head
- supply of water and collection of slurry controlled by equipment housed in seacans placed at the west loading dock



# Epoxy coating replacement – epoxy removal

Floor plans removed for security purposes

- 200 feet of hose needed to gain access to rooms



# Epoxy coating replacement - execution



- Seacans about 20 feet from west loading door
- heated hording to keep lines from freezing



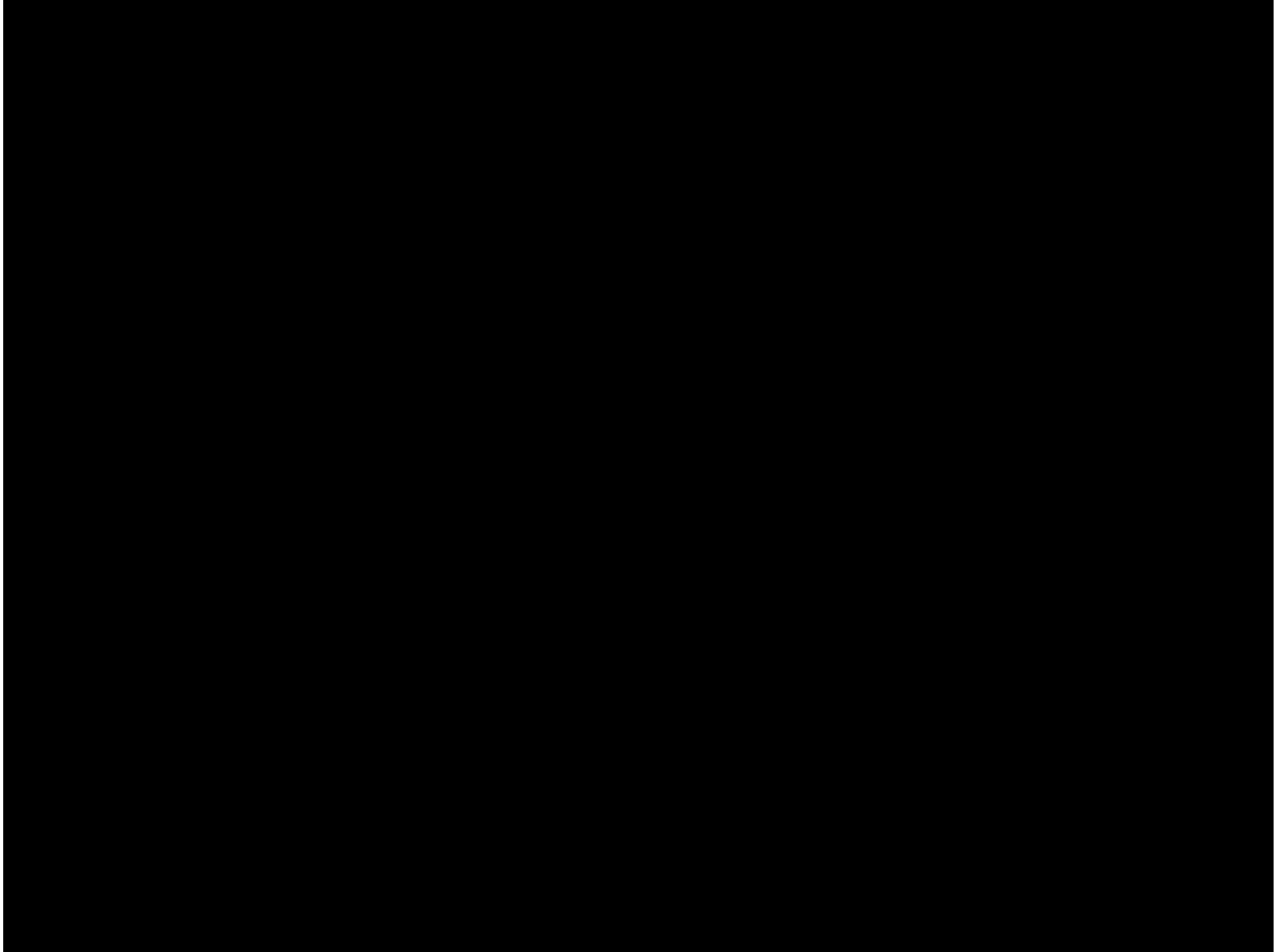
# Epoxy coating replacement – epoxy removal



View from ceiling CCTV camera in Necropsy – first section of epoxy removal  
Going well - this shouldn't be that difficult.....



# Epoxy coating replacement – epoxy removal







# Epoxy coating replacement – epoxy removal





# Epoxy coating replacement – epoxy removal





# Epoxy coating replacement – epoxy removal



Progress by end of January....but remember the protective hoarding outside?



# Epoxy coating replacement – epoxy removal



- Polar vortex began in late January
- Daily highs were 10-15 degrees below average  
nightly lows
- record low temperatures for weeks
- February was the cold month in history



# Epoxy coating replacement – epoxy removal



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- Daily highs were 10-15 degrees below average nightly lows
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- February was the cold month in history
- February 08....-43 at 9:00 am; -54 with wind chill



# Epoxy coating replacement – epoxy removal



- Polar vortex began in January
- Daily highs were 10 degrees below average nightly lows
- record low temperatures for weeks
- February was the cold month in history
- February 08....-43 at 9:00 am; -54 with wind chill
- Residual water leaking from seacans and flooding neighboring facility access road



# Epoxy coating replacement - application

Replacement epoxy system supplied by Dudick

- Steri-Seal HB built-up barrier coating
  - concrete sealer
  - Primer 67
  - 2 layers of Scratch-coat
  - 2 layers of two part epoxy finish
  - 1 layer of UV topcoat 30
- Supplier had to provide 3<sup>rd</sup> party testing and validation for product resistance to commonly used decontamination products (VHP, Formaldehyde, Cavacide, Virkon, Microchem, etc)
- Direct application oversight by Dudick site representative
- Site reviews by Architecture 49 (original site rep)



# Epoxy coating replacement - application



Sealant and 1<sup>st</sup> layer of filler



2<sup>nd</sup> later of filler (grind between each layer with grinders)





# Epoxy coating replacement - application



1<sup>st</sup> layer of 2 part epoxy



2<sup>nd</sup> layer of 2 part epoxy (sand and fully clean between applications)



# Epoxy coating replacement - application



UV resistant clear topcoat



Reinstallation of covered baseboard assembly



# Epoxy coating replacement - completion



Necropsy laboratory complete – April 26, 2019



# Epoxy coating replacement - summary

- Epoxy remediation was completed between January and April
- Entailed full removal of failed coating, surface preparation, and application of new system
- Required full shutdown of Animal containment wing (no access to Necropsy suite) All planned animal experimentation was suspended from Dec, 2018 to May 2019
- Total costs in excess of \$800,000 (external)
- Currently in discussions with U of S legal to determine the viability of suing the supplier of the original epoxy coating



# Epoxy coating replacement – “fun” facts

- Kelson & Kelson was a sub-contractor who worked for the supplier of original epoxy coating
- They reported the anomalies of the product the supplier at the time of original installation
- That information never made its way from the supplier to the General Contractor (PCL)
- Kelson & Kelson kept an actual liquid sample of that batch of epoxy until the summer of 2018.



# Epoxy coating replacement – “fun” facts





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# QUESTIONS?







Thank You!

