

## Development of Robotic & Remote Systems for Difficult to Access Environments

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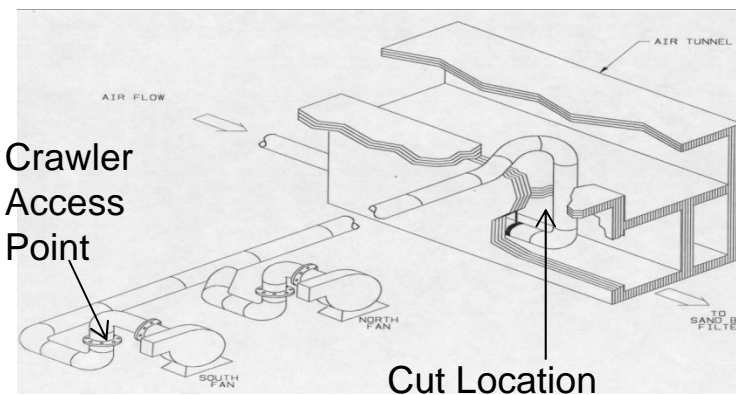
*March 7, 2017*



# Large Diameter Pipe Crawler



- Redirect F-Canyon air flow
- 36" diameter pipe
- Over 300 ft travel to cut area
- Route included a "Y" and gooseneck
- Plasma arc cutter and cameras on board crawler
- Successfully removed pipe section



## Application Examples – DWPF Melt Cell Cleanup

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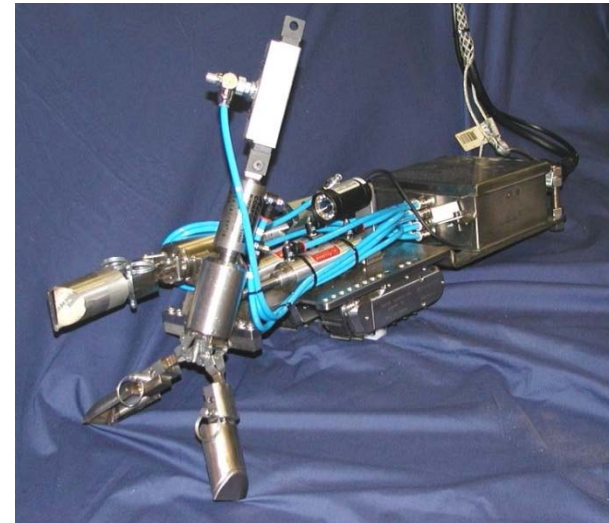
- Clean Melt cell floor during melter outage
- 19 days to design, test, deploy, clean floor, and remove system
- Used available commercial parts and some custom designed parts
- Tethered system, operator in the loop
- Facility crane flew vehicle in and removed



# Remote Sampling of High Level Waste Tank 18F

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- Samples required from waste mound inside of High Level Waste tank
- 23" diameter riser to deploy system
- Traveled 40' out from under access riser
- Combination of commercial and custom designed parts
- Tethered system, operator in the loop



# WIPP Camera

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## Dome Camera

- 1080p HD-SDI video
- 18x Optical Zoom
- Pan/ Tilt/ Zoom
- Teradek wireless video transmitters
- Moxa wireless control transmitters
- 225 ft transmission range
- Long lasting lithium ion battery pack.



## Drop down camera

- Inuktun SP-45 PTZ Camera
- 15 feet deployable cable reel
- Teradek wireless video transmitters
- Moxa wireless control transmitters
- 225 ft transmission range
- Laser locator to pinpoint drop-down location.
- Long lasting lithium ion battery pack



## Results

- Captured video to support characterization of event scene
- Allowed Accident Investigation Board to reach final conclusions



# H-Canyon Air Tunnel Inspections Background



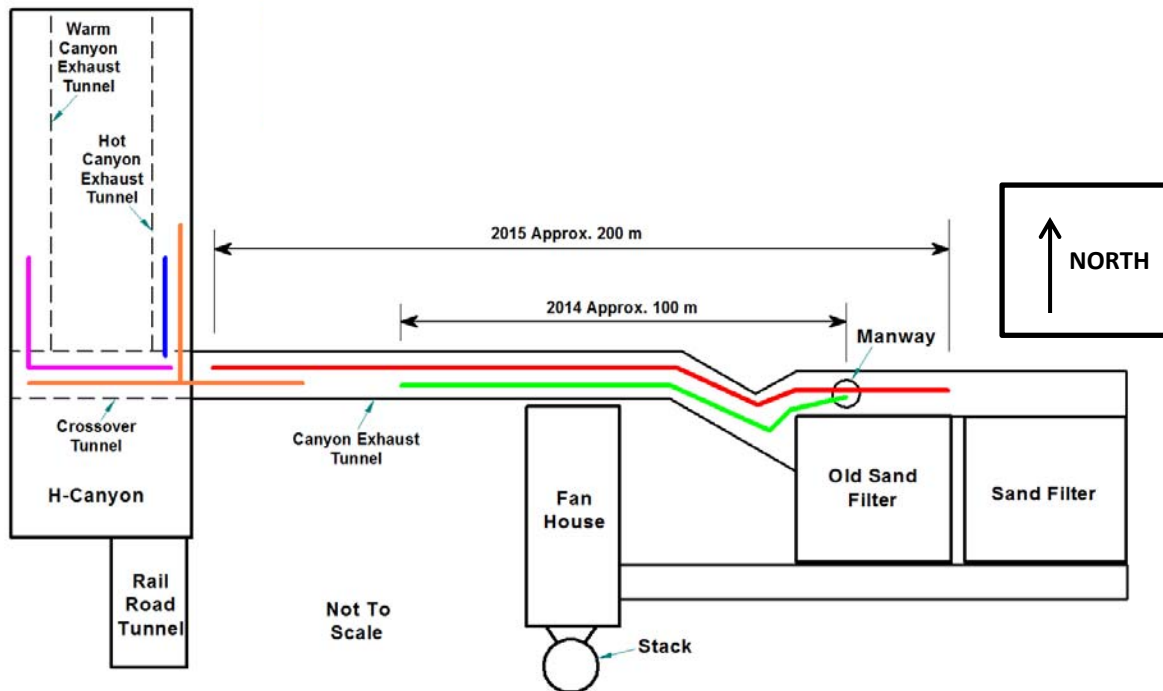
H-Canyon Air Tunnel



Degrading Tunnel Wall



# H-Canyon Inspection Vehicle Routes



# Video of 2015 Inspections

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