

Re-Evaluation of F2 and F3 Petroleum Hydrocarbon Management Limits

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Alberta Tier 1 PHC Management Limits

PHC Fraction	Fine Soil (mg/kg)	Coarse Soil (mg/kg)
F1	800	700
F2	1,000	1,000
F3	3,500	2,500
F4	10,000	10,000

Basis for Management Limits (Existing)

Consideration	Current Alberta Tier 1	Green Zone Subsoil Guidelines
Mobile Free Phase	✓	✓
Workers in Trenches – Vapour Exposure	✓	
Buried Infrastructure	✓	
Aesthetics	✓	
“Technological Factors”	✓	
Fire and Explosion	✓	✓
Hydrophobicity		✓
Upwards Migration from Subsoil		✓

Basis for Management Limits (Proposed)

Consideration	Proposed	Green Zone Subsoil Guidelines
Mobile Free Phase	Updated	✓
Workers in Trenches – Vapour Exposure	Phase 3	
Buried Infrastructure	Updated	
Aesthetics	✓	
“Technological Factors”	(Discontinue)	
Fire and Explosion	Updated	✓
Hydrophobicity	Add	✓
Upwards Migration from Subsoil	Add	✓

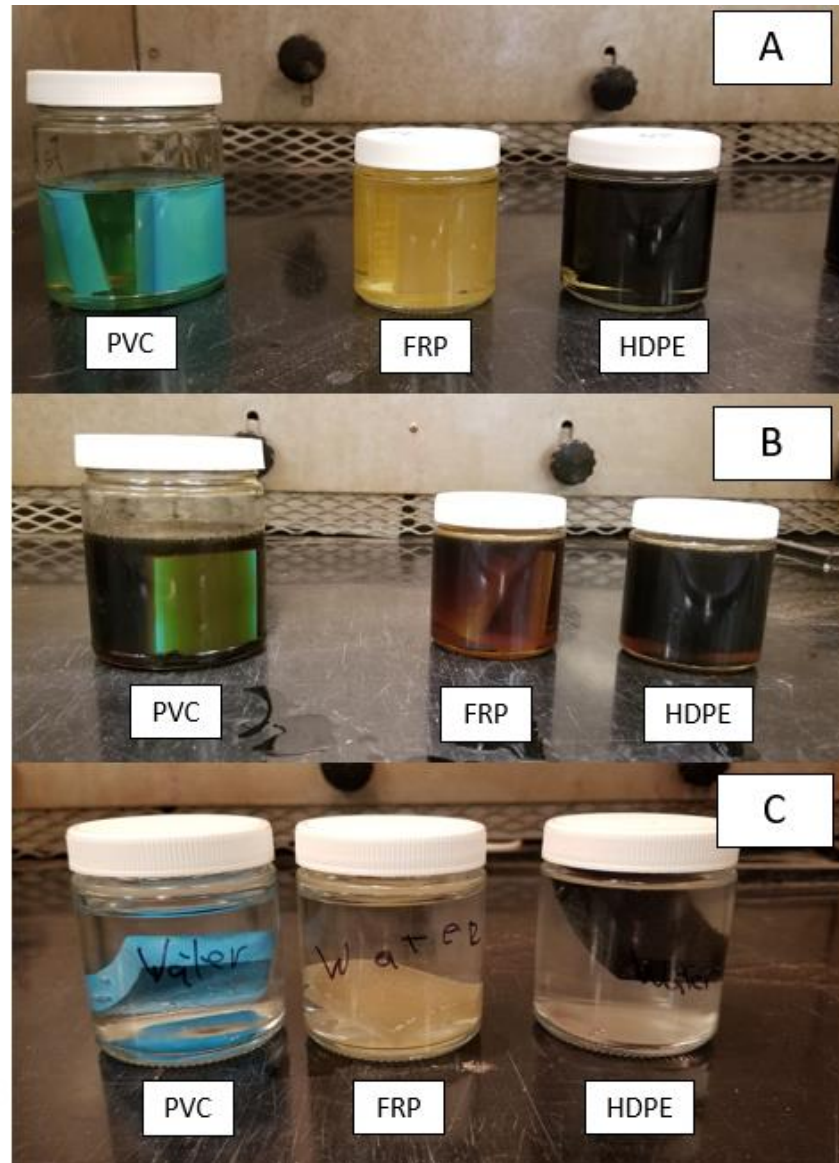
Mobile Free Phase Limits



Flammability



Buried Infrastructure - Effects on Water Piping

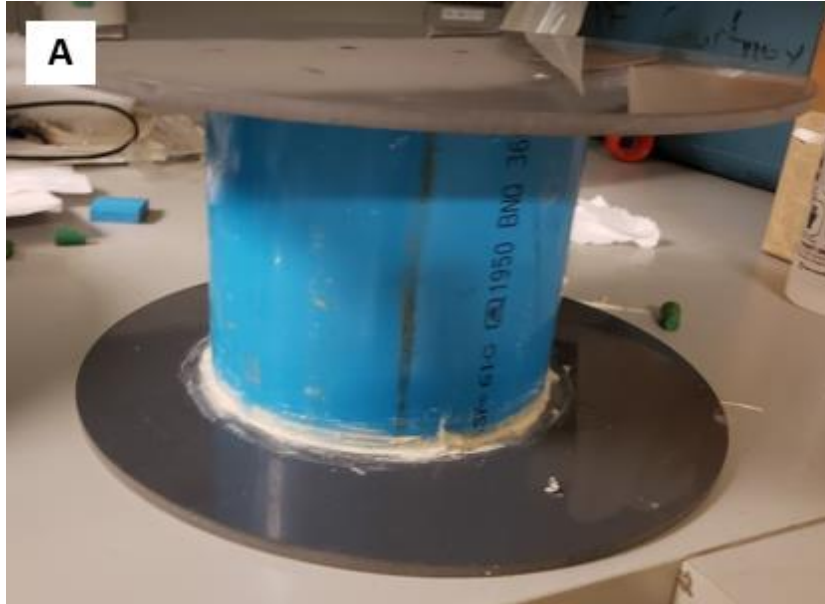


- Polyvinyl chloride (PVC)
- Fibre-reinforced plastic (FRP)
- High-density polyethylene (HDPE) coupons (5 x 5 cm) incubated in
(A) PHC F2 distillate
(B) PHC F3 distillate
(C) water

Result:

- No significant impact to materials

Buried Infrastructure – Infiltration into Water Pipe



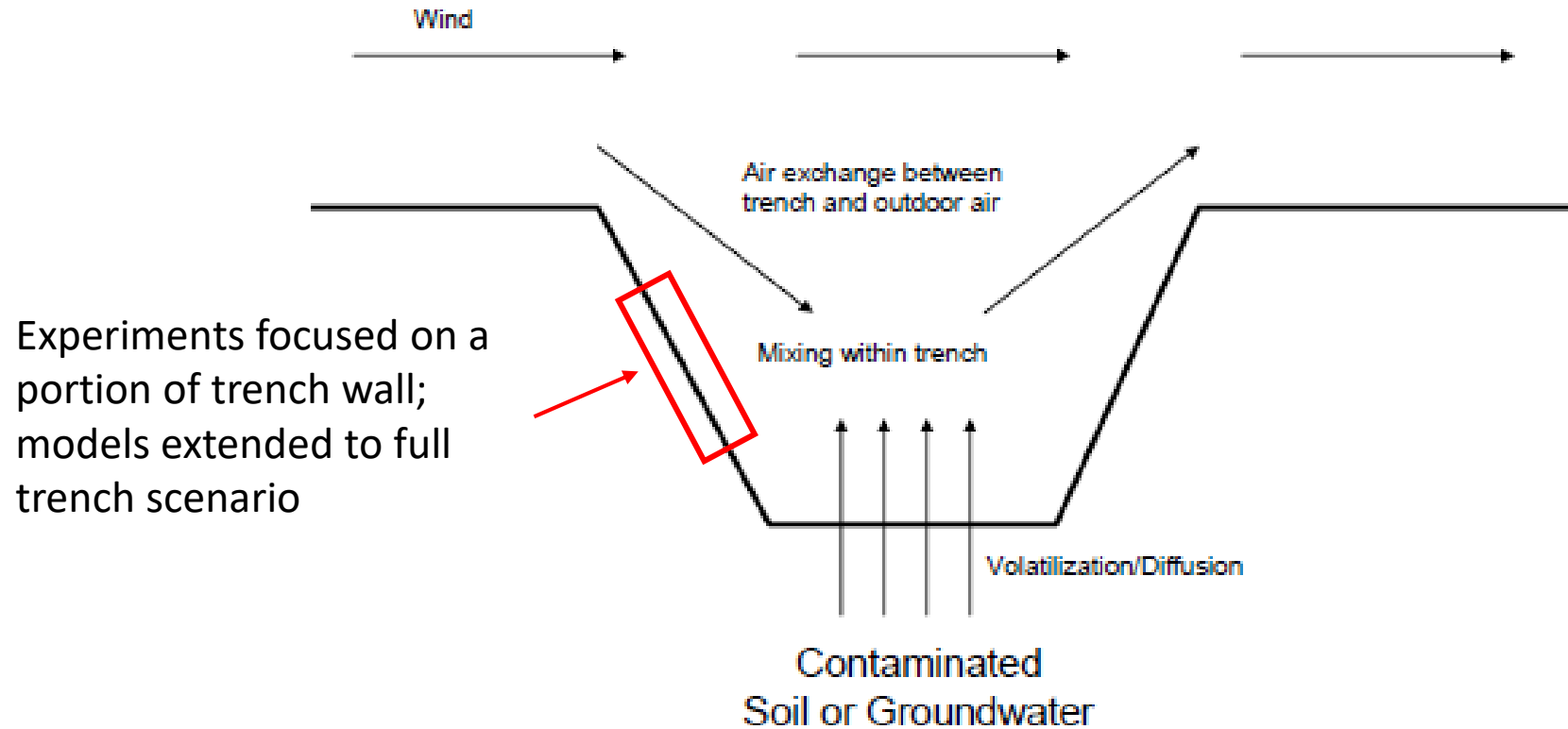
Result:
Water from within the pipe did not contain PHC F2 attributable to distillate

Water-filled PVC incubation with PHC F2 distillate (80-day incubation)

- (A) Assembled piping incubation setup prior to installation of PHC F2 distillate-soaked batting and enclosure
- (B) Final setup including batting and closure

Trench Model – Vapour Exposure

Challenge: Assess potential release and accumulation of vapours in trench

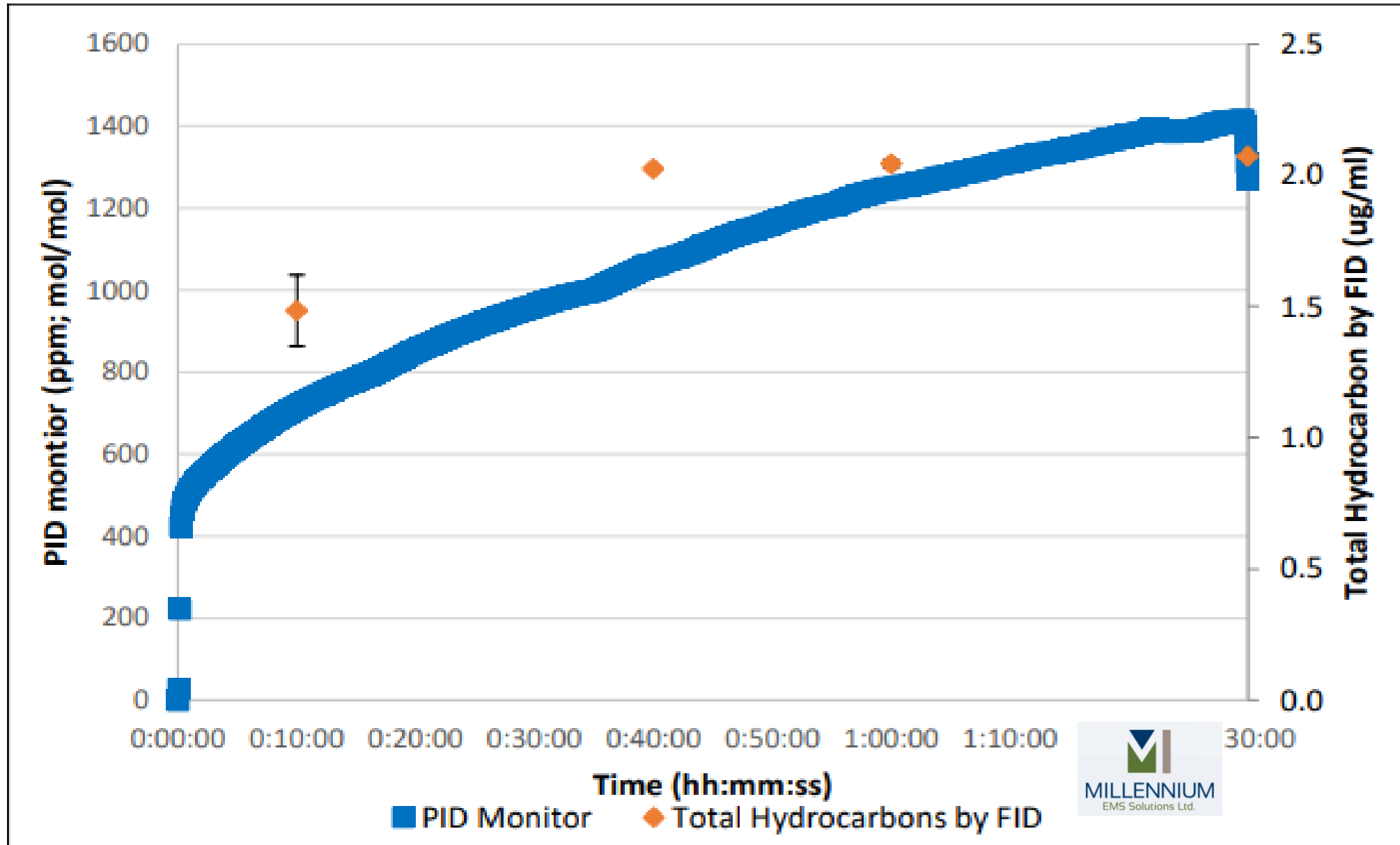


Experiments focused on a portion of trench wall; models extended to full trench scenario

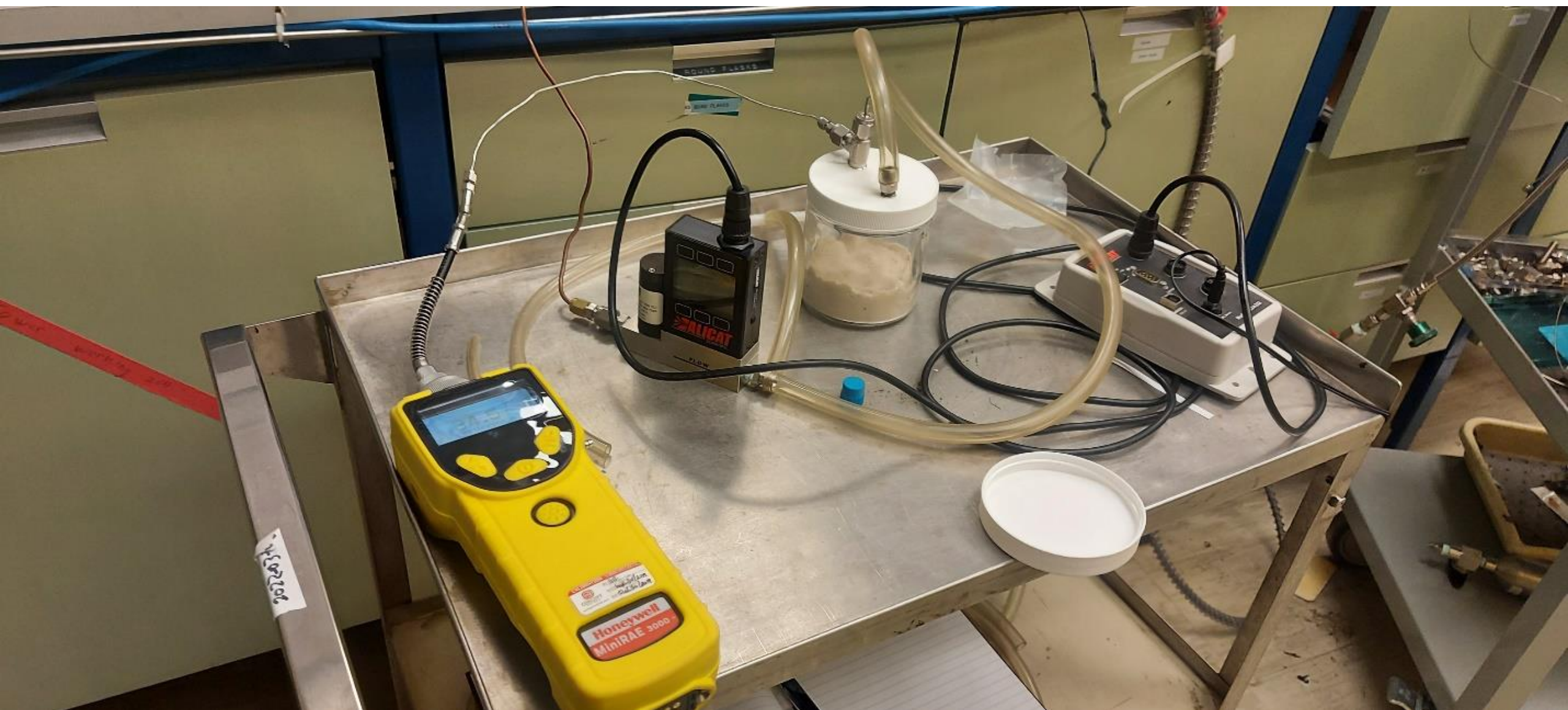
F2 Volatilization Rate – Static Headspace



Headspace Concentrations vs Time



F2 Volatilization Rate – Flow-Through Cell



Proposed Alberta Tier 1 PHC Management Limits

Consideration	F2 (mg/kg)		F3 (mg/kg)	
	Fine Soil	Coarse Soil	Fine Soil	Coarse Soil
All Land Uses				
Mobile Free Phase	10,000	9,000	14,000	34,000
Fire and Explosion	-	-	-	-
Hydrophobicity	>64,000	>64,000	40,000	4,000
Upwards Migration from Subsoil	-	-	-	-
All Land Uses Except Green Zone				
Workers in Trenches – Vapour Exposure	TBD	TBD	-	-
Buried Infrastructure	-	-	-	-
Aesthetics	-	-	-	-