



Sustainable Remediation – More Ways Than One

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Outline

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Poll the Audience

Sustainable Remediation – More Ways Than One
RemTech | Mentimeter

Take the Quiz!



Corporate Bulk Plant



Historical Infrastructure

- Former bulk plant - sixteen 90,000-L above-ground storage tanks (ASTs)
- Concrete secondary containment berm
- Cardlock facility, loading rack
- Two pump dispensers, product lines

Current Infrastructure

- Twenty-five 147,700-L ASTs
- Concrete secondary containment berm
- Loading rack



Treatment Train

- Excavation/ALLU (2019)
- Approximately 2,000 m³ treated on site
- Oxygen Release Compound (ORC) amendment added to backfill material



Treatment Train

- Dual-phase extraction (2022)
- Operated for 20 days
- Recovered 1,500 L of hydrocarbons, 108,500 L of groundwater



DPVE Pilot Study LNAPL Recovery

- Dual-phase vacuum extraction (DPVE) system operation
- Bioslurping mode
- DPVE connected to three wells containing light non-aqueous phase liquid (LNAPL)
- Vacuum applied to 1-inch diameter drop tube lowered to the depth of the oil water interface



Treatment Train



- Sustainable in-situ / ex-situ remediation (2024 – ongoing)
- Installation of interceptor trench
- Windmill – aeration of soil/groundwater
- Spill Buster – LNAPL skimmer
- Activated carbon filtration for irrigated groundwater
- Biopiles – alfalfa and mycelium



Interceptor Trench Installation

- Excavate interceptor trench
- Install 30-inch diameter fibreglass sump
- Install 2-inch polyvinyl chloride (PVC) monitoring wells



Construction of Biopiles

- Installed 6-m, 10-slot, schedule 40 PVC aeration pipe in West Biopile
- Spread 90 kg ORC within East Biopile



Installation of Double Diaphragm Windmill Aeration

- Transfers up to 50,000 cubic feet of air per month
- Increases oxygen available for chemical oxidation and increases the primary electron acceptor available for aerobic biodegradation
- Accelerates degradation of benzene and other petroleum hydrocarbons



Solar-powered LNAPL Skimmer

- FCL's Spill Buster solar-powered skimmer was installed to skim LNAPL present in the groundwater
- Approximately 200 L of LNAPL was recovered in the first month of operation



Water Recovery, Treatment, and Irrigation

- A solar direct submersible pump was installed to recover groundwater from the sump
- Water was pumped through a sediment filter and drum of granular activated carbon mixed with organoclay to treat the recovered groundwater



Mycoremediation and Phytoremediation

- Mycelium and oyster mushrooms were spread across the surface of the West Biopile
- Super Hay (65% alfalfa, 25% fleet meadow brome grass, 10% Promesse timothy grass) was planted on the surface of the East Biopile

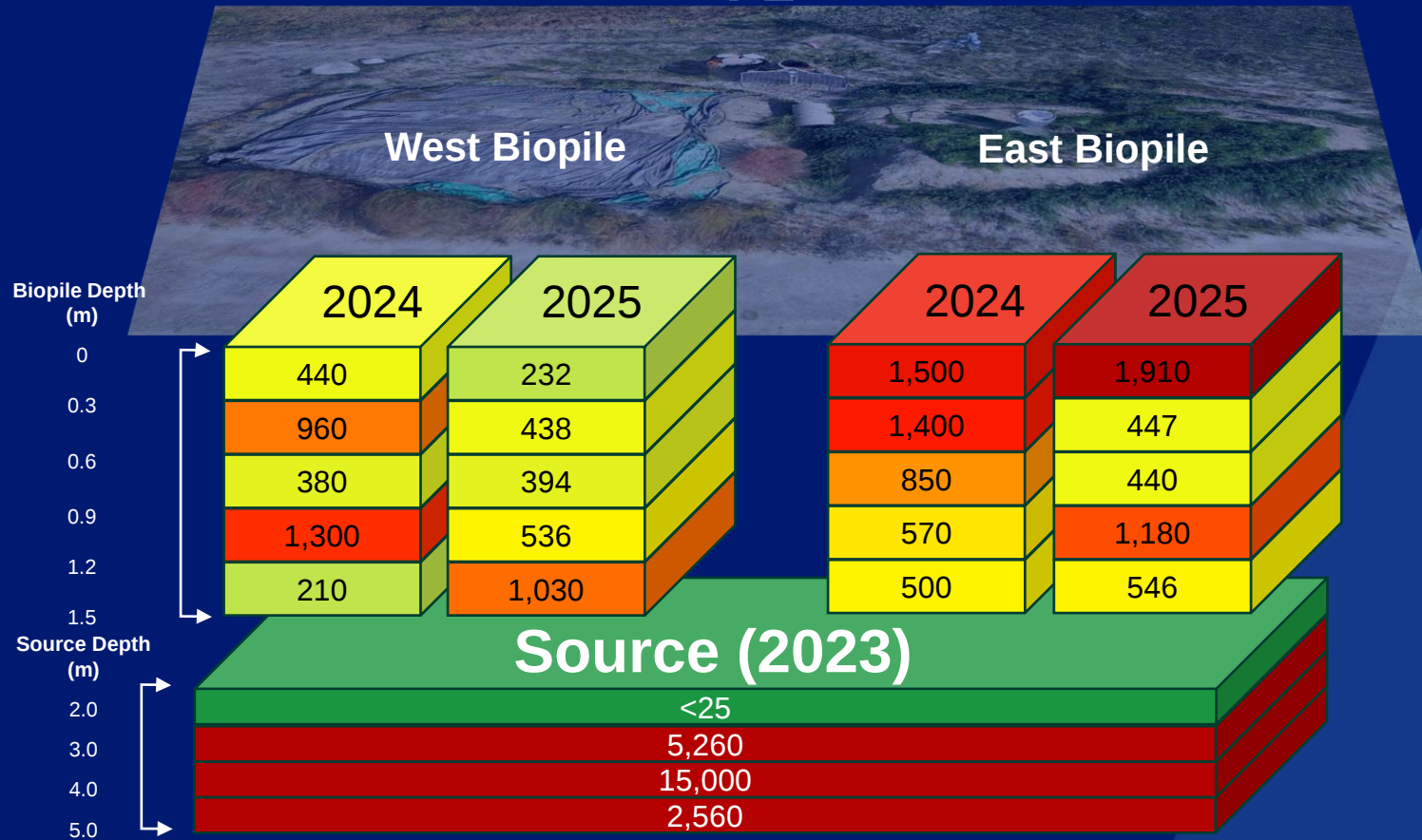


Ongoing Sustainable Site Remediation



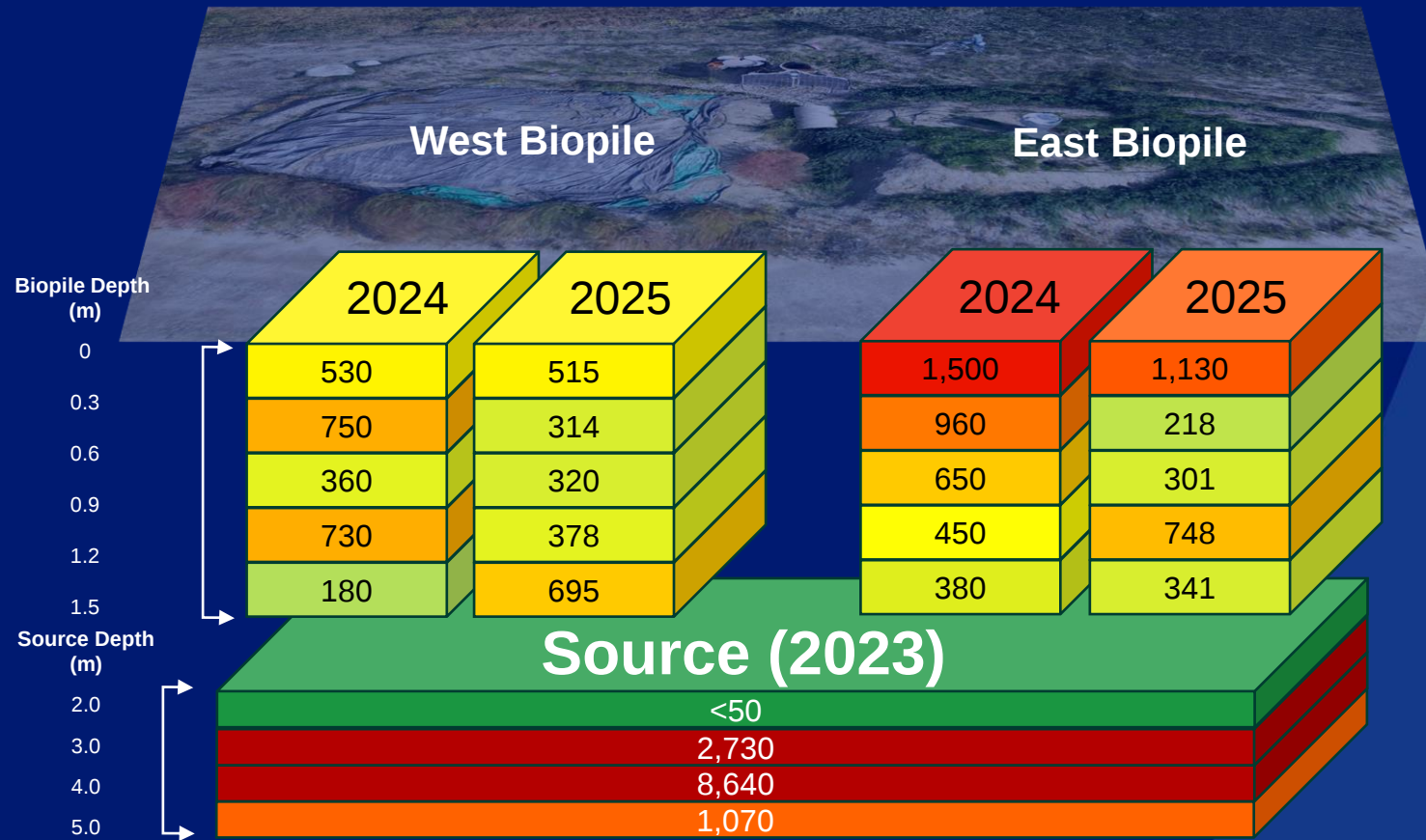
2023 to 2025 Biopile Soil Results (mg/kg)

F2



2023 to 2025 Biopile Soil Results (mg/kg)

F3



Sustainable Aeration Equipment

- Windmills
- Airstones
- Venturi tubes
- Inline mixers





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QUESTIONS? We're Here to Help.



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