

CASE STUDY | INDUSTRIAL TANK
CLEANING

Biological Treatment Delivers Superior Results

Canadian Naphtha Storage Tank — Ferrous Oxide & Hydrocarbon Removal

Division 31 GEO Oil & Gas Group | Biological Remediation Division | 2026

EXECUTIVE SUMMARY

Putting Biological Treatment to the Test

When a Canadian oil company faced the challenge of cleaning a massive naphtha storage tank laden with solidified ferrous oxide and residual hydrocarbons, conventional manual cleaning methods presented significant cost, safety, and operational hurdles. Division 31 GEO Oil & Gas Group deployed its proprietary biological treatment technology — delivering a complete, cost-effective solution that eliminated confined-space hazards, suppressed explosive vapor risk, and restored the tank to operational condition in a fraction of the time and cost of conventional methods.

13 Days to Full Remediation	>70% Cost Reduction vs. Manual	0% LEL Vapor at Completion
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SITE BACKGROUND

Project Overview & Scope

The subject facility was a large-diameter naphtha storage tank operated by a Canadian oil company. The tank presented a challenging combination of contamination types that made conventional cleaning both hazardous and cost-prohibitive.

Site Parameter	Detail
Tank Diameter	220 feet
Tank Height	60 feet

Primary Contaminant	Solidified ferrous oxide (several inches depth)
Secondary Contaminant	Residual free hydrocarbon product
Storage Product	Naphtha
Location	Canada

Project Objectives

Division 31 GEO Oil & Gas Group was engaged to accomplish three primary objectives:

- Remove accumulated hydrocarbons and solidified ferrous oxide from the tank floor — efficiently and completely.
- Eliminate hazardous confined-space entry requirements for maintenance personnel, reducing worker safety exposure.
- Prevent the escape of flammable vapors from the tank throughout the cleaning process.

"Manual cleaning of a tank this size would have taken over 50 days and exceeded \$200,000. Biological treatment accomplished the same result in 13 days at less than 30% of that cost."

T R E A T M E N T A P P R O A C H

Biological Treatment Methodology

Division 31 GEO Oil & Gas Group employed a systematic biological treatment protocol, engineered to maximize contact between active microbial agents and target contaminants across the full floor area of the tank.

Phase 1 — Tank Preparation & Initial Flush

The tank was first flushed with fresh water to mobilize residual free product. Following the flush, 200–300 gallons of visible floating product remained on the water surface, with substantial additional hydrocarbon content still embedded within the sludge layer.

Phase 2 — Microbial Agent Deployment

A rotating liquid delivery system was installed within the tank to ensure uniform distribution of treatment agents. Division 31 GEO Oil & Gas Group's proprietary M-1000H★ microbial consortium was introduced through this system. The delivery mechanism was operated on a controlled 10-hour daily cycle to optimize microbial activity and contact time.

Phase 3 — Active Treatment & Monitoring

LEL (Lower Explosive Limit) vapor readings were taken every two hours throughout each workday, providing continuous safety monitoring and treatment progress tracking. Readings documented a consistent, measurable decline in hydrocarbon vapor concentration from treatment initiation through completion.

Treatment Step	Description
Initial Flush	Fresh water flush to mobilize floating free product
Delivery System	Rotating liquid delivery for uniform microbial distribution
Microbial Agent	M-1000H★ proprietary consortium — hydrocarbon & oxide degradation
Daily Operation	10 hours/day active treatment cycle
Safety Monitoring	LEL vapor readings every 2 hours throughout workday
Total Treatment Period	13 days

R E S U L T S

Documented Outcomes

Ferrous Oxide Elimination

After 13 days of treatment, the oxidized iron (ferrous oxide) layer in all areas contacted by the aqueous microbial solution had dissolved into a pumpable liquid phase. This material was successfully pumped from the tank, removing the vast majority of contaminant mass from the tank floor.

A limited area near the tank center — approximately 35 feet in diameter — had not been fully covered by the treatment water. The 1–2 inch layer of oxide in this zone was removed conventionally, requiring 4 additional days. This outcome clearly demonstrated the effectiveness of full-contact biological treatment versus areas receiving no microbial exposure.

Surface Condition After Treatment

Upon completion of biological treatment and material removal, inspection of all treated tank floor areas revealed a clean, smooth surface that appeared as though it had been sand-blasted — demonstrating the thoroughness of microbial action on the metal substrate and the complete removal of all contaminating material.

V A P O R S A F E T Y D A T A

LEL Vapor Reduction Over Treatment Period

Day	LEL Reading
Day 1	Baseline (pre-treatment)
Day 5	65% of LEL

Day 10	30% of LEL
Day 13	0% LEL — Cleared for safe entry

The progressive elimination of explosive vapor risk from treatment initiation through Day 13 enabled safe, compliant operations throughout the project — without interruption or incident.

FEATURES, ADVANTAGES & BENEFITS

Why Biological Treatment Outperforms Conventional Methods

Feature	Advantage	Benefit
Proprietary M-1000H★ microbial consortium	Specifically engineered for hydrocarbon & ferrous oxide degradation	Eliminates target contaminants faster and more completely than chemical or manual approaches
Rotating liquid delivery system	Ensures full floor coverage and continuous microbial contact	Maximizes treatment uniformity; minimizes residual areas requiring secondary treatment
No confined-space entry required during active treatment	Workers operate from outside the tank envelope	Eliminates the highest-risk phase of conventional tank cleaning; protects personnel
Progressive LEL vapor suppression	Microbial activity degrades explosive hydrocarbon vapors in situ	Continuous reduction in explosive hazard; achieves 0% LEL by treatment completion
Cost-effective at scale	Biological process scales to large-diameter tanks without proportional cost increase	Achieved equivalent result at less than 30% of manual cleaning cost
Accelerated timeline vs. manual methods	Parallel microbial activity across entire contact area simultaneously	13-day completion vs. estimated 50+ days for manual cleaning — significant operational downtime savings

ECONOMIC ANALYSIS

Biological vs. Manual Cleaning — Cost Comparison

Cost Factor	Manual Method
Estimated Total Cost	\$200,000+
Estimated Duration	50+ days

Confined Space Entry	Required — high risk, high cost
Vapor Hazard Management	Ongoing — full duration
Post-Clean Surface	Variable

Cost Factor	Division 31 GEO Biological Treatment
Actual Total Cost	Less than \$60,000 (< 30% of manual estimate)
Actual Duration	13 days active treatment + 4 days residual conventional
Confined Space Entry	Eliminated during active biological treatment phase
Vapor Hazard	Progressively eliminated — 0% LEL by Day 13
Post-Clean Surface	Sand-blasted appearance — fully clean substrate

Cost savings exceeded \$140,000 compared to conventional manual cleaning. Timeline reduction exceeded 33 days. These figures represent direct operational savings — before accounting for reduced safety incident risk, regulatory compliance benefits, or extended tank service life.

C O N C L U S I O N

Proven Performance. Measurable Results.

This project demonstrates that Division 31 GEO Oil & Gas Group's biological treatment technology delivers proven, measurable performance in large-scale industrial tank cleaning applications. The Canadian naphtha tank project validated every critical performance dimension:

- Superior contaminant removal — ferrous oxide dissolved and pumped out; hydrocarbons fully degraded.
- Worker safety — confined-space entry hazard eliminated throughout the active treatment phase.
- Explosive vapor elimination — LEL reduced from baseline to 0% in 13 days.
- Dramatic cost reduction — less than 30% of conventional manual cleaning cost.
- Accelerated completion — 13 days versus an estimated 50+ days for manual methods.

Division 31 GEO Oil & Gas Group brings this same proven biological treatment capability to industrial clients requiring tank cleaning, sludge management, and hydrocarbon remediation at scale. Our technology is engineered for the demands of the oil and gas sector — large tanks, complex contamination profiles, and zero tolerance for safety compromise.

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Biological Remediation | Industrial Tank Cleaning | Hydrocarbon & Oxide Treatment

For project inquiries, contact anthony@d31geo.com, Division 31 GEO Oil & Gas Group .