DIVISION 31 GEO ENERGY GROUP

TANK CLEANING PRODUCTS
CASE STUDIES

Tiger Rentals, Trinidad

Oil & Gas Storage Tanks- Cleaning, Maintenance, Recovery

PROVEN. PROFITABLE. ZERO TANK ENTRY.

Field Performance: Case Studies

The following case studies document real-world results from Para-GeoBac™ and GEO-M-1000H™ deployments across North America and Europe. Each project demonstrates a consistent pattern: faster turnaround, lower cost, zero confined space entry, and—in nearly every instance—conversion of sludge waste into recoverable, salable product.

Case Study 1: Microbially Enhanced Oil Recovery — Two 95,000-Barrel Tanks

95,000	94,000	2×	21 days
Barrels of crude sludge (combined)	Barrels of high-quality oil recovered	Revenue vs. cleaning contract cost	Treatment duration

PROJECT	Late 1994–early 1995. Two external floating roof tanks for a major multinational oil company, together containing an estimated 95,000 barrels of paraffinic crude sludge.
METHOD	Two 8" diesel-driven pumps installed on each tank and connected to aluminum piping. Liquid crude used as carrier oil. Tanks inoculated with Para-GeoBac™ and circulated for three weeks, eight hours per day, five days per week.
RESULTS	After 21 days, liquefaction and BS&W goals were achieved. All recovered oil was pumped to secondary storage with no confined space entry required.
CONCLUSION	94,000 barrels of high-quality liquefied oil recovered. Revenue generated was nearly double the cost of the cleaning contract. The alternative—hydro-laser cutting of door sheets, off-site sludge storage, and tank repair—was eliminated entirely. Profits from this project funded additional maintenance work.

Case Study 2: Pour Point Reduction — 44,000-Barrel External Floating Roof Tank

44,000	160°F	<60°F	65 days
Barrels of paraffinic sludge	Pour point before treatment	Pour point after 19 days	Total cleaning time (vs. 7+ months conventional)

PROJECT	1994. An external floating roof tank for a major multinational oil company contained more than four feet of paraffinic bottom sludge (est. 44,000 barrels). Sludge covered the manways. Pour point: 160°F. Tank diameter: 250 feet; height: 56 feet.
METHOD	Two 8" diesel-driven pumps connected to existing plumbing. Liquid crude used as carrier oil. Tank inoculated with Para-GeoBac™ and circulated three weeks, eight hours/day, five days/week.
RESULTS	After 19 days, pour point of the liquefied sludge dropped to below 60°F. Oil was pumped from the tank to one to two inches residual with no confined space entry. Only 80 barrels of solids required disposal.

CONCLUSION	Nearly all 44,000 barrels recovered. Net revenue approached 200% of recovery cost. Cleaning timeline reduced from over seven months to 65 days. Sludge disposal liability eliminated.

Case Study 3: Oil Recovery — 22,000-Barrel Crude Storage Tanks

22,000 Barrels of sludge treated	**21 days** Liquefaction achieved	**0** Losses or penalties at refinery	**High Grade** Product classification by receiving refinery

PROJECT	1993. Recovery of paraffinic tank bottom sludges for a prominent multinational oil pipeline company. Two external floating roof tanks containing approximately 22,000 barrels of sludge.
METHOD	Two diesel-driven pumps (6-inch diameter) connected via aluminum piping. Crude oil used as circulating medium and carrier. Tanks inoculated with Para-Bac™. Circulated eight hours per day, seven days per week for three weeks.
RESULTS	After 21 days, sludge successfully liquefied, meeting BS&W requirements. Recovered oil transported directly to the refinery. Following pump-out, tanks were wiped down and squeegeed clean.
CONCLUSION	Oil delivered to the refinery exceeded BS&W standards and was classified as a very high-grade crude product. The refinery subsequently incorporated Para-GeoBac™ technology into its own tank cleaning program.

Case Study 4: Pesticide Biodegradation — 48,000-Barrel Ballast Storage Tank

>600 ppm Dicyclopentadiene at project start	**<1 ppb** Dicyclopentadiene after 17 days	**5,400** Barrels of crude oil recovered	**17 days** Time to achieve non-detect levels

PROJECT	An external floating roof tank holding over 27 feet of water (48,000 barrels) with approximately three feet of oil floating on the surface. Dicyclopentadiene (a pesticide) detected at concentrations exceeding 600 ppm. Health risk and community odor complaints prompted tank shutdown.
METHOD	A 3-inch air-actuated diaphragm pump connected to existing plumbing. Tank inoculated with GEO-M-1000H™ and nutrients. Two days of initial circulation for even microbe distribution. Monitoring continued through Day 17.
RESULTS	After 17 days, laboratory results confirmed that dicyclopentadiene had fallen below detection limits (< 1 ppb). Offensive odor reduced to a trace. Tank drained through charcoal filter to disposal trench.
CONCLUSION	Health hazard fully mitigated. All 5,400 barrels of floating crude oil successfully recovered. Project produced a net profit for the client.

Case Study 5: Oil/Water Emulsion Separation — European Petroleum Refinery Pilot

22,800	10,645	$0.68	$95,800
Barrels of emulsion treated	Barrels of water-free oil recovered	Treatment cost per barrel	Estimated value of net recovered oil

PROJECT	Pilot study at a European petroleum refinery. Approximately 22,800 barrels of oil/water emulsion (60% oil, 32% water, 8% solids) processed using Division 31 GEO Para-GeoBac™ and GEO-M-1000H™ bacteria, fresh water, and crude oil.
METHOD	Tanks circulated and settled over 24 days using a combination of Para-GeoBac™ and GEO-M-1000H™ products. Standard circulation and settling protocol applied.
RESULTS	10,645 barrels of water-free oil recovered—over 68% of the original emulsion—with less than 1% residual water content. Remaining water and solids fully removed.
CONCLUSION	Treatment cost of $0.68 per barrel yielded oil valued at approximately $9.00 per barrel. Total recovered value: approximately $95,800. The process proved highly cost-effective for emulsion tank remediation.

Case Study 6: Heavy Waxy Sludge Reduction — 10,000-Barrel Storage Tank

750	30	96%	3 weeks
Barrels of heavy sludge at start	Barrels of residual solids for disposal	Sludge volume reduction	Treatment period

PROJECT	A 10,000-barrel tank with 750 barrels of heavy waxy sludge. Time-critical: tank repairs and internal inspection required. Sludge moved to two 400-barrel tanks for treatment.
METHOD	3-inch connections used for suction. D31 GEO microbes and one barrel of fresh water added to each tank. Static contact for three days to distribute microbes through sludge, then circulation for eight hours every three days over three weeks. Tanks allowed one additional week of static rest for emulsion breakout.
RESULTS	Oil came to the surface and was blended with fresh oil to pipeline specifications. Sludge residual reduced from 750 barrels to just 30 barrels—a 96% volume reduction.
CONCLUSION	Dramatically reduced sludge volume minimized disposal cost and liability. Method proved cost-effective and time-efficient for the constrained repair schedule.

Case Study 7: Tank Cleaning Case Histories — Louisiana & Alberta

Louisiana — 350-Barrel Emulsified Crude (10 Gravity, 80% BS&W)

BEFORE	350 barrels of 10-gravity emulsified crude oil at 80% BS&W required clean-up and disposal.
AFTER	18-day treatment with Para-GeoBac™ (applied directly and circulated) raised gravity to 14, reduced BS&W to 10%. Client sold approximately 200 barrels of refined crude oil.

Alberta, Canada — 96,000-Barrel Condensate Storage Tank

BEFORE	A 96,000-barrel condensate storage tank had an estimated 12 feet of wax accumulation. Tank treated August 7,1990 with three separate injections of Para-GeoBac™, condensate, and produced water. Centrifugal pump used to agitate between injections.
AFTER	49 days post-treatment, average wax level reduced from 12 feet to 2 feet 6 inches. Recovered 19,000 barrels of pumpable wax bottoms, blended with salable crude and sold.

Case Study 8: Cost Comparison — Para-GeoBac™ vs. Conventional Tank Cleaning

The following comparison—drawn from a documented Louisiana field project—quantifies the economic advantage of Para-GeoBac™ treatment versus conventional sludge disposal. The results are striking:

Cost Category	Conventional Method	Para-GeoBac™ Method
Sludge Disposal	600 bbl @ $180/bbl = $108,000	200 bbl @ $180/bbl = $36,000
Estimated Labor	$15,000	$14,000
Microbes & Service	—	Included above
Total Expenses	$123,000	$50,000
Additional Revenue	—	400 bbl pentane @ $35/bbl = $14,000
Actual Expenditure	$123,000	$36,000 (after revenue offset)

The Para-GeoBac™ approach reduced total expenditure by over 70% compared to conventional disposal—and generated additional product revenue in the process. This is the economic model that distinguishes Division 31 GEO's approach: waste becomes asset.

Case Study 9: Explosive Atmosphere Reduction — Fixed Roof Storage Tank

600 BBL	<0.1%	1/3	$74,000
Gas-entrained sludge treated	Explosive mixture during sludge removal	Cost vs. conventional method	Savings vs. alternative approach

PROJECT	A 10,000-BBL fixed roof storage tank required sludge removal and internal cleaning to allow floor, wall, and roof inspection and coating. Primary objective: reduce explosive atmosphere hazard during sludge handling.
METHOD	Tank pumped out; both manways opened. Para-Bac™ injected. Added: 50 BBL basin hydrocarbon skimmings, 75 BBL lean oil, 175 BBL Pentane Plus. Overnight static contact, then daily circulation 4–6 hours for 18 days. Fluid pumped and water separated. Approximately 200 BBL water and 600 BBL condensate removed.
RESULTS	Sludge reduction most pronounced between the manways. Residual wall sludge became fluid overnight and was pumped off. Gas release during sludge agitation was within allowable limits (< 0.1% explosive mixture), enabling safe vacuum truck removal.
COST	Bacterial treatment cost was one-third of the conventional alternative—approximately $74,000 less expensive, not including labor savings from reduced sludge volume and degassed material.

Case Study 10: Ferrous Oxide & Hydrocarbon Removal — Canadian Naphtha Storage Tank

220 ft	13 days	0%	<30%
Tank diameter	Microbial treatment duration	LEL reading on Day 13	Cost vs. manual cleaning ($200k+ estimate)

PROJECT	A Canadian oil company's naphtha storage tank (220 ft diameter, 60 ft height) had several inches of solidified ferrous oxide and residual free product. Objectives: remove hydrocarbons and oxide, eliminate confined space entry, prevent vapor escape.
METHOD	Tank flushed with fresh water. Rotating liquid delivery system installed; GEO-M-1000H™ microbes introduced. Operated 10 hours per day.
RESULTS	After 13 days, corrosion previously covered by water had dissolved to a liquid and was pumped out. In water-covered areas, tank floor was visibly clean. LEL vapor readings dropped from initial levels to 0% by Day 13. Untreated center area (35-foot diameter) required 4 additional days of conventional cleaning—but would have required 50+ days by manual methods alone.
CONCLUSION	Estimated manual cost: $200,000+. GEO-M-1000H™ reduced this to less than 30% of that figure. The treated areas appeared as if sand-blasted, confirming thorough surface contact and cleaning.

Case Study 11: Northern Alberta Field—Tank Bottom Build-Up Removal

96%	80%	6 days	1989
Paraffinic bottom reduction (Tank #1)	Paraffinic bottom reduction (Tank #2)	Treatment duration (static after brief agitation)	Year demonstrated

PROJECT	Two 400-barrel tanks in Northern Alberta with approximately 26 cubic meters of paraffinic bottom material.
METHOD	Tank #1 treated with 20 liters of Para-Bac™ and agitated for four hours. Tank #2 treated with 30 liters and agitated for 1.5 hours. Both tanks then held in a static condition for six days.
RESULTS	After six days: Tank #1 reduced from 26 m^3 to 1 m^3 paraffinic bottom (96% reduction). Tank #2 reduced to 4.5 m^3 (80% reduction). Agitation confirmed as critical for even product distribution throughout the tank bottom.
CONCLUSION	Highly effective paraffin elimination with minimal intervention. Demonstrates that even brief agitation with proper microbial dosing yields dramatic results in paraffinic accumulations.

Case Study 12: Oil Recovery & Sludge Reduction — 220,000-Gallon Concrete Tank

PROJECT	1995. A 220,000-gallon concrete storage tank holding a mixture of crude oil, water, organic and inorganic solids from ocean-going tanker ballast water. The ballast water was treated to separate oils, remove solids, and allow safe discharge. (Information: Peak Oil Field Services, Anchorage, Alaska.)
METHOD	Tank bottom analysis performed. GEO-M-1000H™ and OSNF #9™ recommended. Due to cool ambient temperatures, a boiler was used to maintain tank liquid at 80°F. Large trash pump used for mixing and circulation: 10 hours/day for 21 consecutive days. Floating oil removed during treatment.
RESULTS	On Day 22, program complete. All oil and water removed. Remaining solids processed by centrifuge. Microbial treatment combined with centrifuging allowed significant oil recovery from sludge and reduced disposal volume and cost.
CONCLUSION	Owner approved the process for future programs. Demonstrated adaptability of D31 GEO technology to challenging multi-phase, low-temperature environments with inorganic-heavy feedstocks.

Ready to Recover What's Sitting at the Bottom of Your Tanks?

Division 31 GEO's Para-GeoBac™ technology has recovered hundreds of thousands of barrels of otherwise lost product—at a fraction of conventional cleaning costs and with zero confined space entry. The question is not whether microbial treatment works. The record proves it does. The question is how much longer your operation can afford to leave recoverable product in the tank.

CONTACT DIVISION 31 GEO TODAY

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Para-GeoBac™ | GEO-M-1000H™ | Corroso-GeoBac™ | OSNF #9™