



THE CHALLENGE

Low-to-mid temperature subsurface heating (35–75°C) activates a powerful spectrum of removal mechanisms: heat-enhanced bioremediation, accelerated hydrolysis, NAPL mobilization, as well as numerous other thermally enhanced processes.

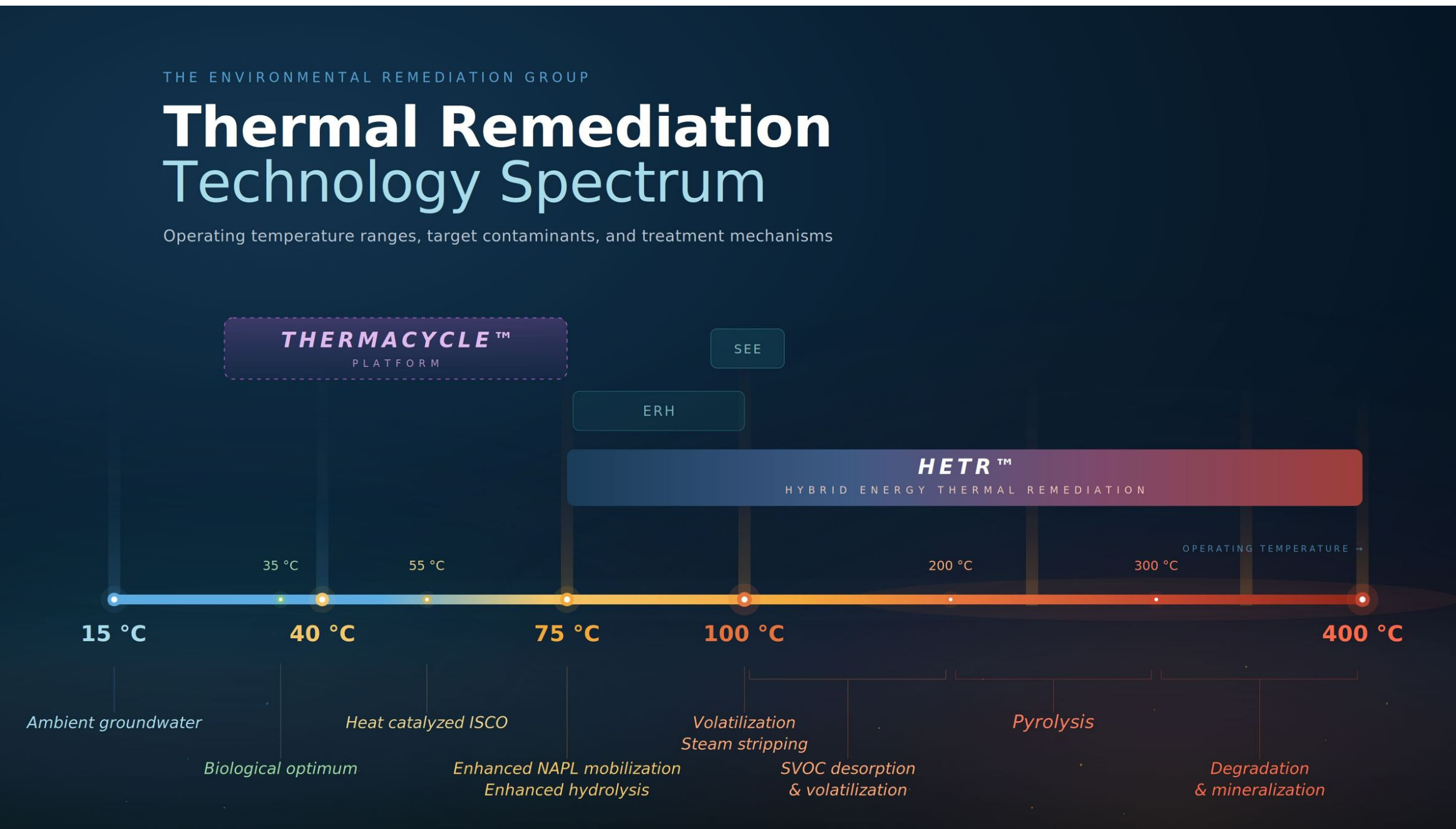
Conventional ISTR systems such as TCH and ERH are optimized for high-temperature volatilization and are often technically or economically impractical at lower temperature targets. Lower-cost alternatives — P&T, PRBs, and MNA — avoid that problem but trade it for prolonged timelines and uncertain closure.

ThermaCycle® fills that gap. ERG's proprietary closed-loop recirculating platform delivers heat, hydraulic control, and amendment chemistry through a single integrated infrastructure across the full remedial trajectory — scaling from stuck-ISR acceleration to complex multi-phase DNAPL-to-plume-closure programs, without remobilization or redesign. For the thousands of sites conventional ISTR can't justify and passive or less aggressive remediation can't close, ThermaCycle® is the missing platform.

ERG SOLUTION

ThermaCycle® was engineered to own the 35–75°C window — the most mechanistically rich and historically underleveraged zone in the thermal spectrum, where heat simultaneously drives biology, abiotic chemistry, and physical NAPL recovery.

ThermaCycle®



PARTNERS & COLLABORATORS:

THE PLATFORM

≤75°C

Adaptive Thermal Platform

- Recirculating groundwater heating
- 90–150 °F subsurface
- 100–180 °F injection

Closed-Loop Architecture

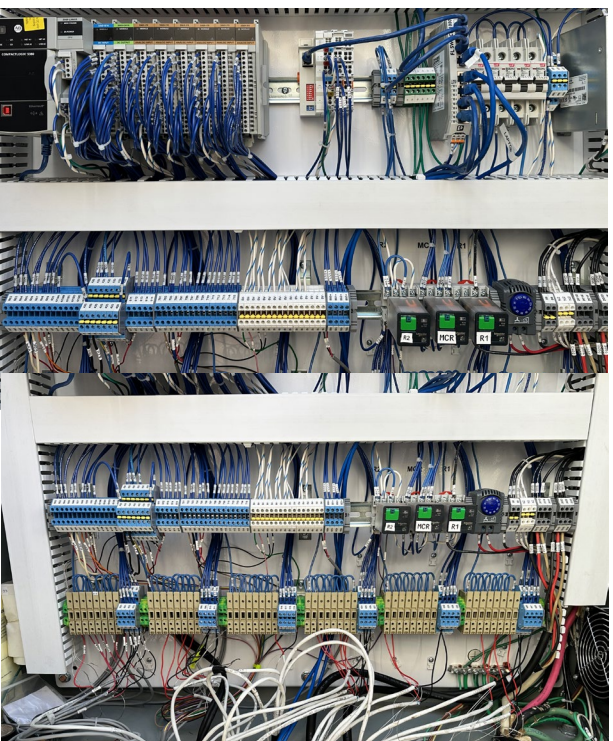
- Recirculating groundwater 5-50gpm
- Heat + amendments in a single loop
- Built in doing tanks/pumps, inline ports, and static mixer

Built to Evolve

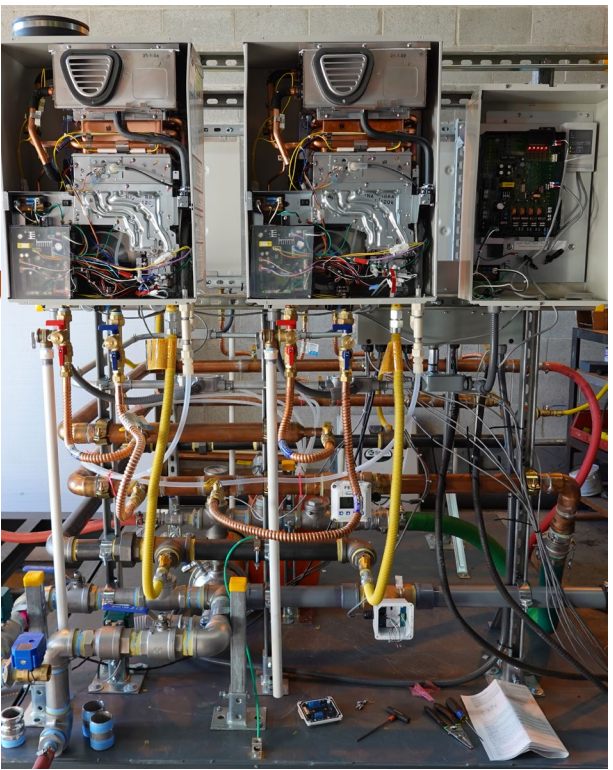
- Removal mechanisms that evolve alongside remedial trajectory
- Flow, heat, and amendments/dosing adapt over time with PLC control



8.5 × 12 ft all-metal process enclosure, fully piped, wired, and factory-tested



Programmable Logic Controller—real-time telemetry, remote HMI, automated alarms, continuous data logging, and SCADA Backbone



Heating units provide cheap reliable heating system with redundancy and optimization controls



Internal Amendment Dosing Tank with mixer for soluble amendment injectate solutions (ie. water soluble nutrient amended carbohydrate blend).



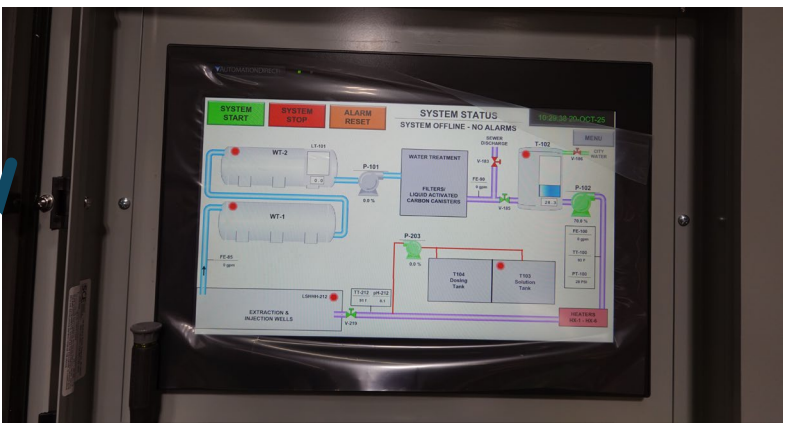
Manifolding
Pre-plumbed “plug and play” injection and extraction manifolding with flow meters, inline sensors (Ph, temp, pressure, etc.)



Integrated Dosing
Static mixer — integrates multi-chemical dosing in-line with heated water pre-reinjection



Electric or Air Actuated Pumping Options
Down well pump engine (optional for high-temp approaches/Sites, >120°F)



Real-time Remote Control
SCADA and HMI system with flow metering, temperature telemetry, and dosing pump control

CASE STUDY - JOIN US

Hear Brett Bowyer present this case study live.

THU, JUN 4 · 1:00 – 1:25 PM · Track H, Room 204

Bowyer Environmental Consulting (BEC) lead, ERG (co-author)

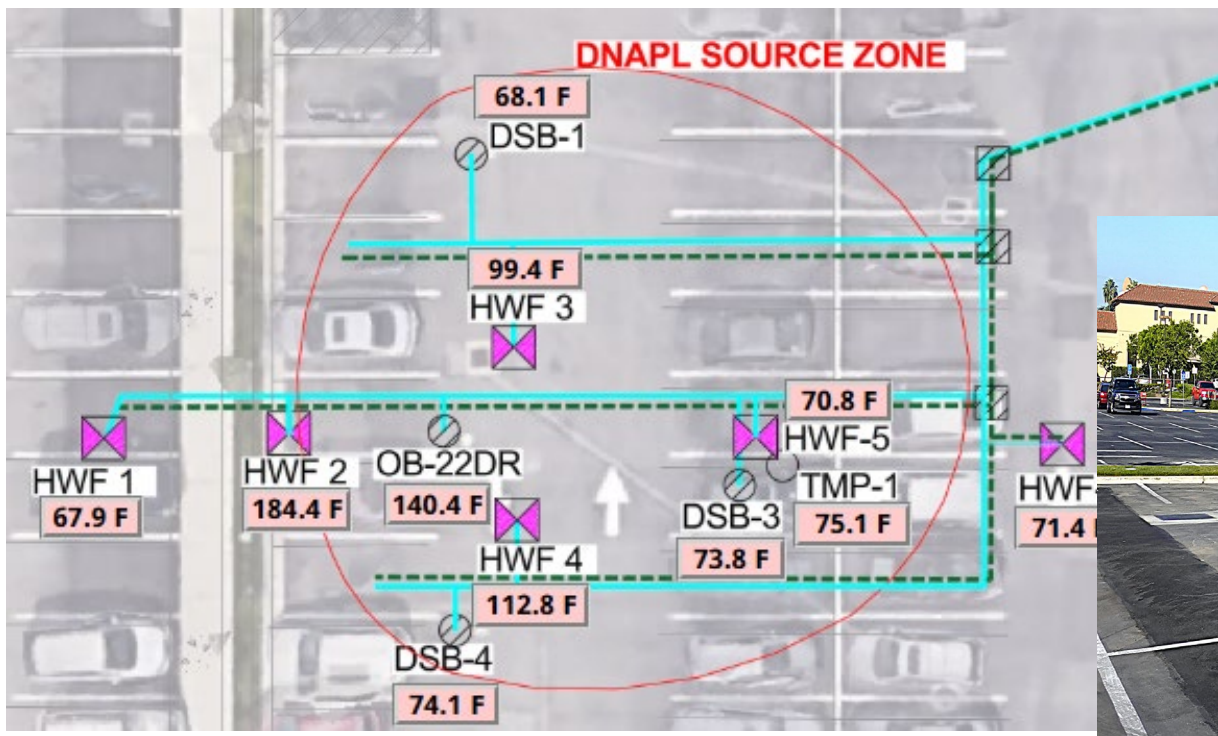


Figure 1(left): SCADA Real-Time Temperature Monitoring Interface



Figure 2(top): Parking Lot After Subsurface Wellfield Installation



Figure 3(left): Equipment Compound and ThermaCycle® Platform

The results from system startup began in early 2026 and some valuable insights into the effective application of ThermaCycle® in deep hydraulically sensitive environments.

TAKEAWAYS

- The 35–75°C thermal window simultaneously activates heat-enhanced biodegradation, hydrolysis, dehydrohalogenation, and thermally enhanced ISCO — mechanisms high-temperature ISTR bypasses entirely — while enhancing dissolution and NAPL mobilization at a fraction of conventional ISTR cost.
- One closed-loop platform delivers heat, hydraulic control, and amendment chemistry through the same infrastructure — with programmable flow, temperature, and inline dosing adapting the remedial strategy in real time as subsurface conditions evolve — transitioning from NAPL source zone treatment to dissolved plume bioremediation without remobilization, redesign, or additional capital.
- For stuck ISR sites, stalled P&T systems, and large legacy plume programs, ThermaCycle® integrates directly into existing infrastructure — compressing remedial timelines without replacing the existing remedy.