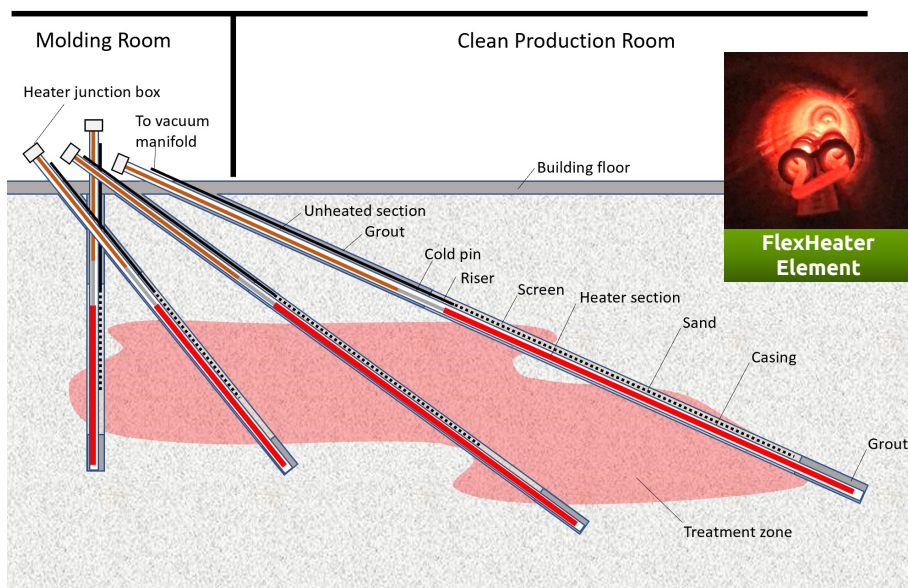


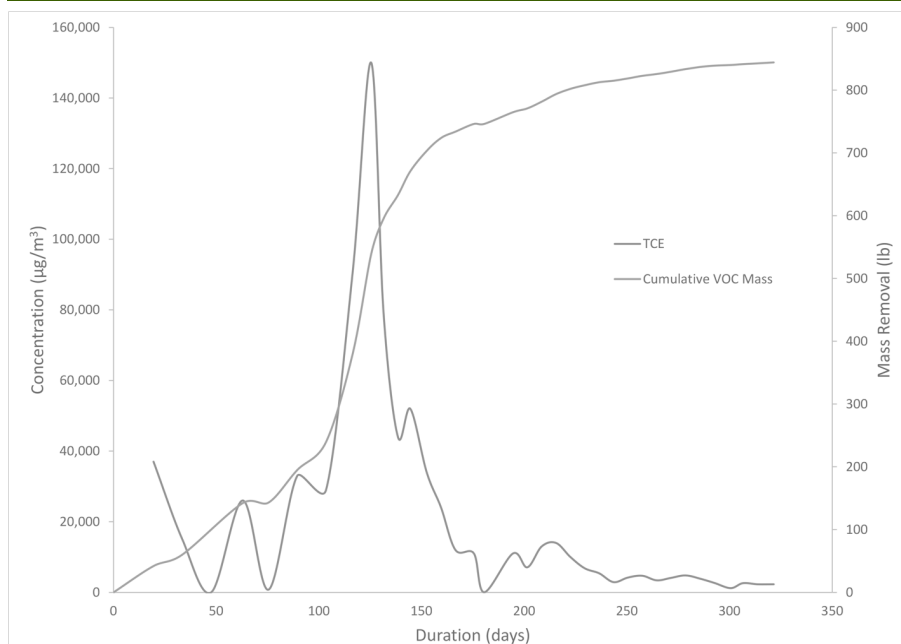


TRS Group, Inc.
Accelerating Value

Complex Guaranteed ISTR Remediation Confidential Superfund, NJ



In Situ Thermal Remediation with Highly Angled Heater Design



Operations Summary with Vapor Concentrations & Cumulative Mass

Guaranteed Remediation

- ISTR technology: thermal conduction heating
- Active building & significant constraints
- Goals: 90°C and 1 mg/kg TCE

Site Characteristics

- Treatment volume: 28,000 yd³
- Glacial till with cobbles
- Estimated mass: 274 lbs

Operations

- Accelerated schedule
- Five miles of heating infrastructure
- 179 heaters with co-located vapor recovery

Results

- Max soil concentration: 0.081 mg/kg
- 853 lbs of TCE removed

**Safe. Fast. Certain.
Guaranteed.**
An Employee Owned Company

Contact TRS Group:
Mark Kluger
VP Sales & Marketing
302-655-6651

For more information
and other project examples,
please visit:
www.thermalrs.com



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TRS treated a TCE source zone at depths of 50-125 feet below an active manufacturing facility using thermal conduction heating (TCH). More than half of the treatment area was located below active portions of the facility where access was limited. TRS designed and applied innovative drilling methods to install 135 steel

casings under these portions of the building from an adjacent room. Four compact drill rigs operated simultaneously to meet the aggressive project schedule. Heater boring lengths ranged from 87 to 196 feet at angles up to 60 degrees from vertical. After installing each casing, TRS determined the exact trajectory and position of the casing using the Devi-Flex tool. Where the drill stem deviated from its designed target due to boulders or other subsurface variables, TRS adjusted surrounding

Contract Type: Guaranteed remediation

Contract Value: \$23 million

Project Years: 2019 to 2022

"TRS came on to our project at a critical time and was able to take on contractual performance risks that were requirements of the project. Further, TRS held the patents for the thermal conductive heating technology that ensured our ability to fully execute the project. They provided and met an aggressive schedule that was required by the client all while working through COVID with multiple out-of-state drilling subcontractors. Performance of the thermal conduction heating system exceeded expectations. As challenges presented themselves, TRS took a collaborative approach with Ramboll and my client to ensure the project moved forward in a mutually beneficial way."

Bruce Kennington, Principal, Ramboll

borings to compensate. TRS custom built the FlexHeaters to minimize heat output in the upper interval, preventing heating of the building during operations. TRS routed cables through the ceiling onto the roof of the building to minimize disturbance of the manufacturing operations. To expedite the schedule, TRS operated three groups of heaters and vapor recovery wells in overlapping periods. TRS remediated the TCE source zone without interruptions to the facility's operations. After a thorough shakedown period, operations began in July 2021. Each of the three groups had a specific energy target based on their respective modeled mass and heat loss. Group C concluded operations in May 2022; Group A in June 2022; and Group B in July 2022. Soil sampling results indicated no TCE concentrations above 0.57 µg/kg in Group C with most results below the detection limit of 0.26 µg/kg; no TCE concentrations above 74 µg/kg in Group A; and no TCE concentrations above 81 µg/kg in Group B.

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