**In Pile Thermal Desorption (IPTD®) Heated-Box (HB)1100 Pilot Tests Treating VOC/SVOC Contaminated Soils**

**Fort Edward, NY**

**Results:**
- Composite soil sample results show treated soil is suitable for unrestricted use
- 28 to 32 day treatment durations
- 60 cubic yards (cy) or 90 tons of contaminated soils treated in pilot test (larger volumes planned for field-scale units)
- Up to 368°C average temperature achieved

**Approach:**
- COR-TEN steel box, insulated to minimize heat loss, and covered, such that any vapors generated are collected and treated in the off-gas treatment system.
- Heat from steel box transferred to contaminated soil via thermal conduction heating

**Background:** The IPTD® HB1100 is a cost-effective, indirect thermal desorption technology for on-site treatment of contaminated soils, sediments and debris.

Two pilot tests were designed and implemented, under the auspices and with the permission of NYSDEC, to demonstrate the applicability of this technology. Test One treated VOC- and light-end SVOC-contaminated soils, while Test Two treated heavy-end, SVOC (in this case MGP)-contaminated soil. Both pilot tests took place at the ESMI of NY, fixed thermal treatment facility, located in Fort Edward, New York.

**Objectives:**
- Demonstrate technology's ability to treat organic contaminants on-site for small/moderately sized projects (<10,000 cy), in a cost-effective way.
- Achieve soil cleanup levels meeting the 6 NYCRR Part 375-6.3 unrestricted use soil cleanup objectives.
- Verify model of predictions of in-box relationships between boiling points of contaminants, effects of vapor pressure, treatment duration and post treatment soil characteristics.
- Implement design enhancements for full-scale HB1100 deployment.

**Select Contaminants**

<table>
<thead>
<tr>
<th>Select Contaminants</th>
<th>Pre-Treatment Concentrations (PPM)</th>
<th>Unrestricted Land-Use Cleanup Goals* (PPM)</th>
<th>Met/Exceeded Cleanup Goals?</th>
</tr>
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<tbody>
<tr>
<td>Benzene</td>
<td>1.5</td>
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<td>Benz(a)anthracene</td>
<td>17</td>
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<td>Benzo(a)pyrene</td>
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<td>Chrysene</td>
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<td>Naphthalene</td>
<td>270</td>
<td>12</td>
<td>Yes</td>
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</table>

*From soil cleanup objective tables. Table 375-68(a): Unrestricted use Soil Cleanup Objectives
TerraTherm’s patented IPTD® Heated-Box (HB)1100 approach, is an ex-situ, on-site, batch-fed, indirect thermal desorption technology, for remediation of soils, sediments and construction debris.

**Treat Organic Contaminants including:**
- VOCs - including BTEX, CVOCs, and other volatile constituents
- SVOCs, PAHs, and MGP waste
- Pesticides, herbicides, dioxins, and PCBs

**HB1100 Approach**
- Soil capacity: 100 cubic yards per unit
- Scalable: Multiple units can be deployed for larger treatment volumes and expedited schedules
- Centralized treatment equipment: Provides efficient utilization of equipment and labor by treating batches in a sequential, staggered-operation fashion (U.S. Patent No. 6,881,009).
- Mobile/Modular: Plug & play equipment components
- Eliminates pre-treatment material handling and segregation processes
- Proven Results:
  - 16 years, 100% treatment success
  - 50 sites closed world-wide
  - Guaranteed ≥ 99.9% removal

Data results available on request

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**HB1100 Features:**
- Modularized Components

Heat Transfers via Thermal Conduction: Uniform Heating

**Typical Applications:**
- Land Disposal Restricted RCRA listed hazardous wastes:
  - Including hydrocarbon D, F & K listed wastes; Corrective Action Management Unit (CAMU).
- Ex-Situ Soil Remediation:
  - Any soil types including saturated and unsaturated sands and clays.
  - Any Total Petroleum Hydrocarbons (TPHs), chlorinated solvents, and semi-volatile organic compounds, including MGP coal tar or PCBs.
- Wastes associated with drill cuttings and manufacturing processes.
- Facility decontamination; concrete and non-combustible building materials.