


*Terra-Tech Remediation Ltd.
&
Earth Brick International Inc.*




Removing hydrocarbons from soil more cost effectively than other conventional thermal technologies is now further enhanced when you can create viable recycling alternatives.

Executive Summary

- ▶ Remove the Hydro-Carbons
 - ▶ Look at recovering the gases VS burning them
 - ▶ Take soils that have metals and salts add the required additives to create benign bricks
 - ▶ The blending of these two technologies has the potential to address cost, speed and future liability
 - ▶ Regulatory frame work is questionable
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Background

- ▶ The most common methods of remediation have historically involved contaminant transfer (landfill, landfarm, injection)
 - ▶ Thermal Desorption is a long proven method of “insitu” remediation which is proven more expensive than the most conventional methods of contaminant transfer
 - ▶ Is industry motivated to pay a premium for a cleaner result
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The Project

- ▶ **Phase One**
- ▶ To remove and collect liquids from contaminated soil for recycling
- ▶ To collect operational data to provide real hard cost data
- ▶ To verify and refine process flow with different contaminated soil profiles
- ▶ To look closely at the viability of gas recovery

Alberta
Environment

Registration

PROVINCE OF ALBERTA
ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

REGISTRATION NO. 225205-00-00
001-225205

EFFECTIVE DATE December 5, 2005

REGISTRANT HOLDER 108329 ALBERTA LTD.

Registration is issued for the following activity:
The construction, operation or reclamation of a small incinerator (mobile thermal description unit).

Signature: [Handwritten Signature]
Date Issued: December 5/05

The Project

- ▶ **Phase Two**
- ▶ To determine cooling process, rehydration requirements and timeline required to create bricks
- ▶ To determine additives required for different soil profiles
- ▶ To test the structural integrity of the bricks (compression and shear)
- ▶ To emboss the bricks for tracking purposes



Operational Issues

- ▶ **Characteristics of the Target Soil**
 - *Coarse VS Fine Soils*
 - *Screening soils*
 - *Moisture Levels*
 - *Clay and wet soils work but slow the process*
 - *Distribution of Hydrocarbon Content*
 - *Spikes are not a concern due to the camber design*
 - *Co-contaminant Levels*
 - *Wash cycle and tank afford a second / third process stage for added treatment(s)*

Inventors & Partners

- ▶ Mr. Earl Gingras, Inventor/Operator,
- ▶ Mr. Jim Kuhnen, Steel Fabrication and Design,
- ▶ Dr. Norman Arrison, P.Eng., Ph.D., M.Sc., B.Sc.
our resident scientist.

Forecasting Outcomes

- ▶ Soils – Thermal processing can be simulated in a lab retort test
- ▶ Gases – Introducing additives during the water wash cycle may change the exhaust gas from the heat chamber
- ▶ Construction Bricks

Operating Costs

- ▶ **Soil Profile & Costs**
- ▶ **Variable Costs**
 - Fuel consumption for cogeneration of heat
 - Filter media (5 and 0.3 Micron)
 - Water required to rehydrate soil
- ▶ **Recovery / Offsetting of Costs**
 - Hydrocarbon liquids
 - Bricks

The Technologies

▶ KAG-1000 Performance

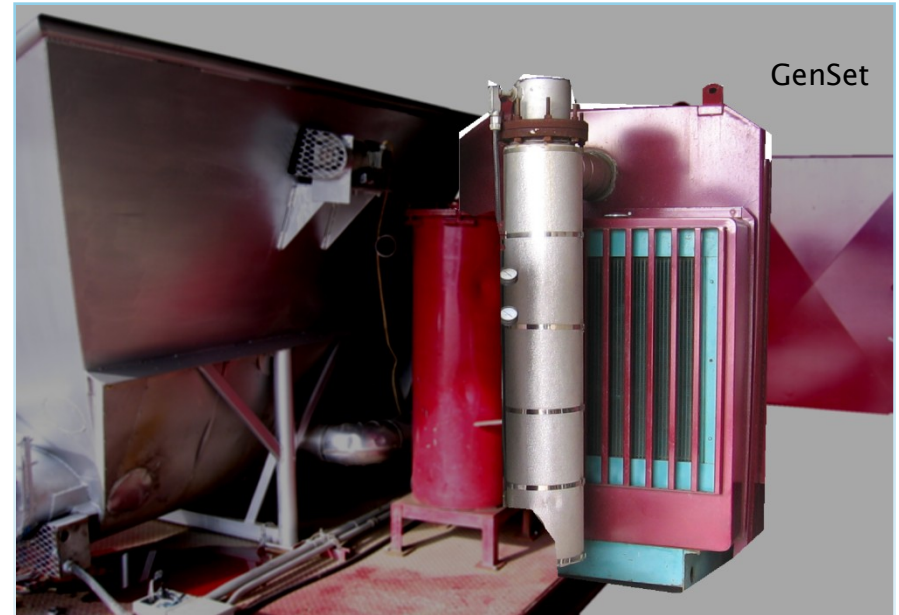
- Heat Generation
- Cooling & Condensing
- *Gases*
- Liquid & Soils
- Gas Collection
- Liquids Collection
- Air Emissions



The Technologies

▶ KAG-1000 Performance

- Heat Generation
- *Soil is sorted*
- *Cooling & Condensing*
- *Gases*
- *Liquid & Soils*
- *Gas Collection*
- *Liquids Collection*
- *Air Emissions*

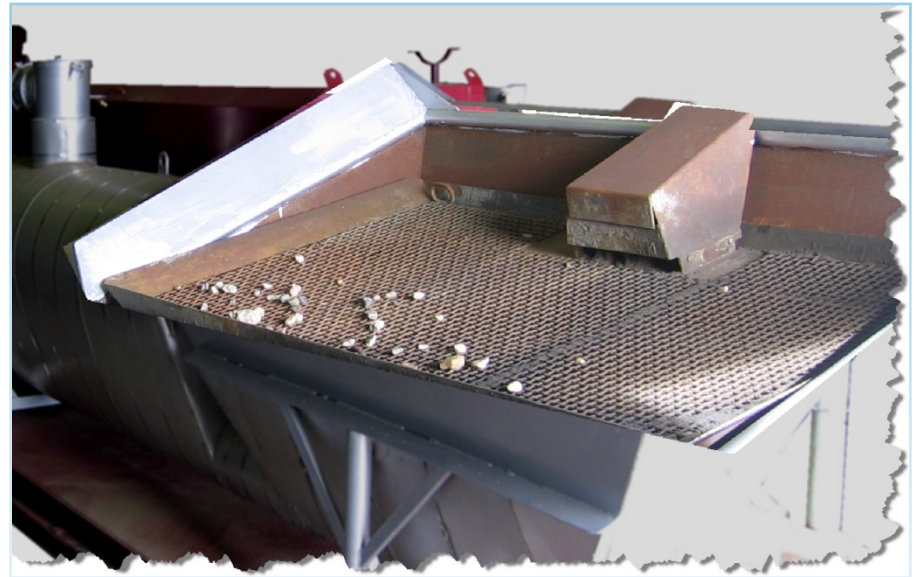


Independently controlled electric elements and hot exhaust gases from the self contained electric generation unit.

The Technologies

▶ KAG-1000 Performance

- *Heat Generation*
- **Soil is sorted**
- *Cooling & Condensing*
- *Gases*
- *Liquid & Soils*
- *Gas Collection*
- *Liquids Collection*
- *Air Emissions*

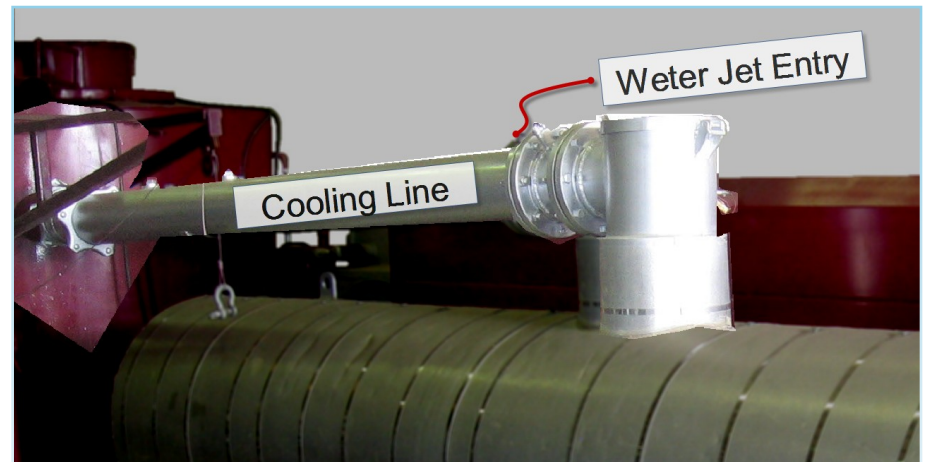


KAG sorts materials prior to moving soils into the heat chamber.

The Technologies

▶ KAG-1000 Performance

- *Heat Generation*
- *Soil is sorted*
- **Cooling & Condensing**
- *Gases*
- *Liquid & Soils*
- *Gas Collection*
- *Liquids Collection*
- *Air Emissions*



Adding water to the gases brings gases to near ambient at the tank.

The Technologies

▶ KAG-1000 Performance

- *Heat Generation*
- *Soil is sorted*
- *Cooling & Condensing Gas*
- **Liquid & Soils**
- **Gas Collection**
- **Liquids Collection**
- *Air Emissions*



The exhaust gas from the chamber is transferred to the tank to condensed into a recyclable liquid.

The Technologies

▶ KAG-1000 Performance

- *Heat Generation*
- *Soil is sorted*
- *Cooling & Condensing*
- *Gases*
- *Liquid & Soils*
- *Gas Collection*
- *Liquids Collection*
- **Air Emissions**

| Emissions | |
|-----------------------------|--------|
| VOC expressed by speciation | |
| Total VOC's | |
| mg/m ³ wet | 84.05 |
| grams/hr | 39.335 |

The Technologies

- ▶ **Earth Brick Performance**
 - Supply Auger
 - Screening Hopper
 - Additives Mixer
 - Chamber Auger
 - Ram

