IN-SITU THERMAL DESORPTION OF HYDROCARBON-IMPACTED SOIL

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BACKGROUND

RUDERSDAL KOMMUNE
Client

COWI
Consultant

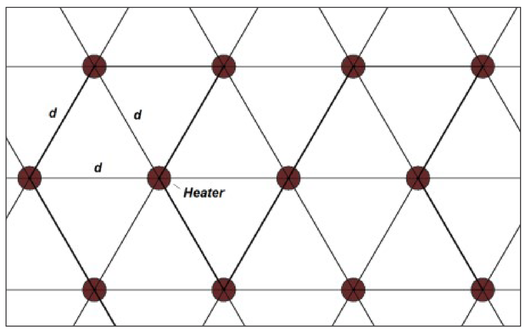
ARKIL
Main Contractor

- A leak of domestic fuel oil from an underground tank led to the pollution of hydrocarbons in a residential area in the north of Copenhagen.
- Unacceptable concentrations of hydrocarbons detected under a private house's terrace (mainly in the garden)
- To avoid exceeding the drinking water standards in Ground Water and to prevent pollutant's propagation, In-Situ Thermal Desorption (ISTD) was applied.

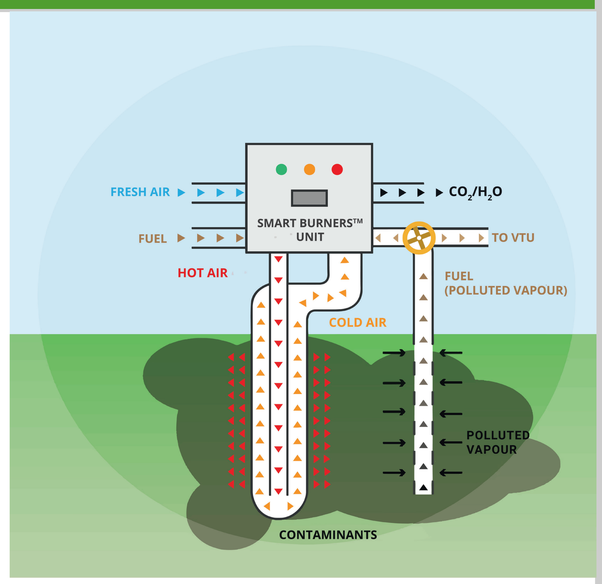
AIM

The ISTD Principle

1 Heating the soil in a specific pattern to vaporize contaminants



Typical Heating Pattern



2 Recover Contaminants

As the soil is maintained under negative pressure, contaminants are vaporized and extracted, then recycled as fuel for the burners (reburn) or as liquid product after condensation.

The main expected mechanism of the treatment after recovering is a complete oxidative reaction. The combustion products are then sent toward the chimney, with Continuous Emissions Monitoring.

SITE DESCRIPTION & ISTD TREATMENT (1)

Contaminated soil (target zone)	**5700 m³**
Lower treatment depth	**18 m below ground level (bgl), with a total surface close to ca. 400 m².**

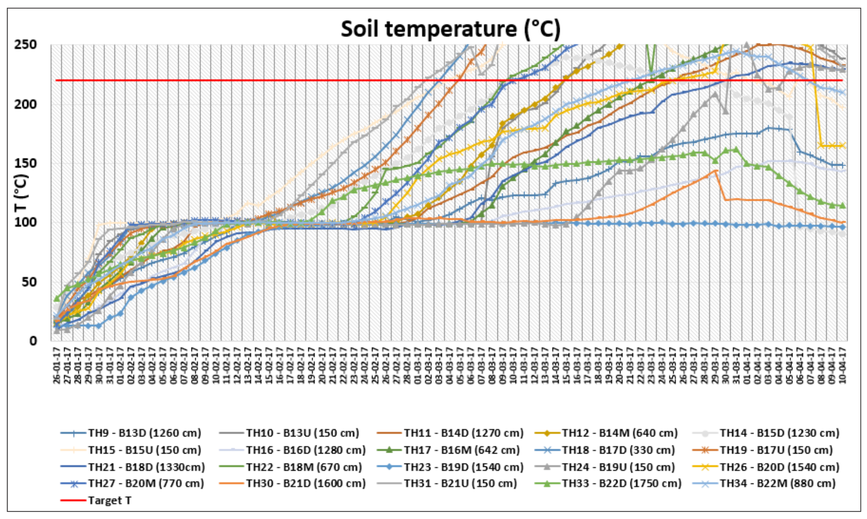
As groundwater level is lower than the contaminated zone, it has not been lowered.

TPH Average concentration	**± 1000 mg/kg (DM)**
Max concentration	**22.000 mg/kg (DM)**
Total mass of pollutant into soil	**12.000 kg**

The contaminated zone was treated in two batches

	BATCH 1	BATCH 2
Number of Burners	57	69
Treatment surface (m²)	ca. 200	ca. 200
Contaminated depth (m)	12-18	12
Volume of batch (m³)	ca. 3000	ca. 2700
Treatment duration (days)	65	69
Average soil temperature at the end (°C)	242	302

SITE DESCRIPTION & ISTD TREATMENT (2)



Temperature progression for Batch 1

A process-related report was made available to all stake-holders on a daily basis to track changes in thermal desorption.

RESULTS

8 control drills with different locations covering the two batches are summarized on the table below.

Drill	KB1	KB2	KB3	KB4	KB5	KB10	KB11	KB12
Sampling upper depth (m)	1	1	9	3	1	3	2	1
Sampling lower depth (m)	12.3	14	16	15.5	15.5	14.5	12.5	12.5
BTEX sum (mg/kg DM)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Average C6H6-C35 (mg/kg DM)	<20	<20	<20	364	<20	<20	40	150
Max C6H6-C35 (mg/kg DM)	<20	<20	<20	1300	<20	<20	160	750
Min C6H6-C35 (mg/kg DM)	<20	<20	<20	<20	<20	<20	<20	<20

IN-SITU THERMAL DESORPTION OF HYDROCARBON-IMPACTED SOIL IN RESIDENTIAL AREA

Avec le soutien de la Wallonie

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