



# TECHNICAL AND ORGANIZATIONAL INNOVATION

Diligent and efficient environmental assessment of a Portfolio

**INTERSOL - LILLE – MARCH 28<sup>TH</sup> 2019**

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## HSE MOMENT

### GOOD HOUSE KEEPING PREVENTS ACCIDENTS

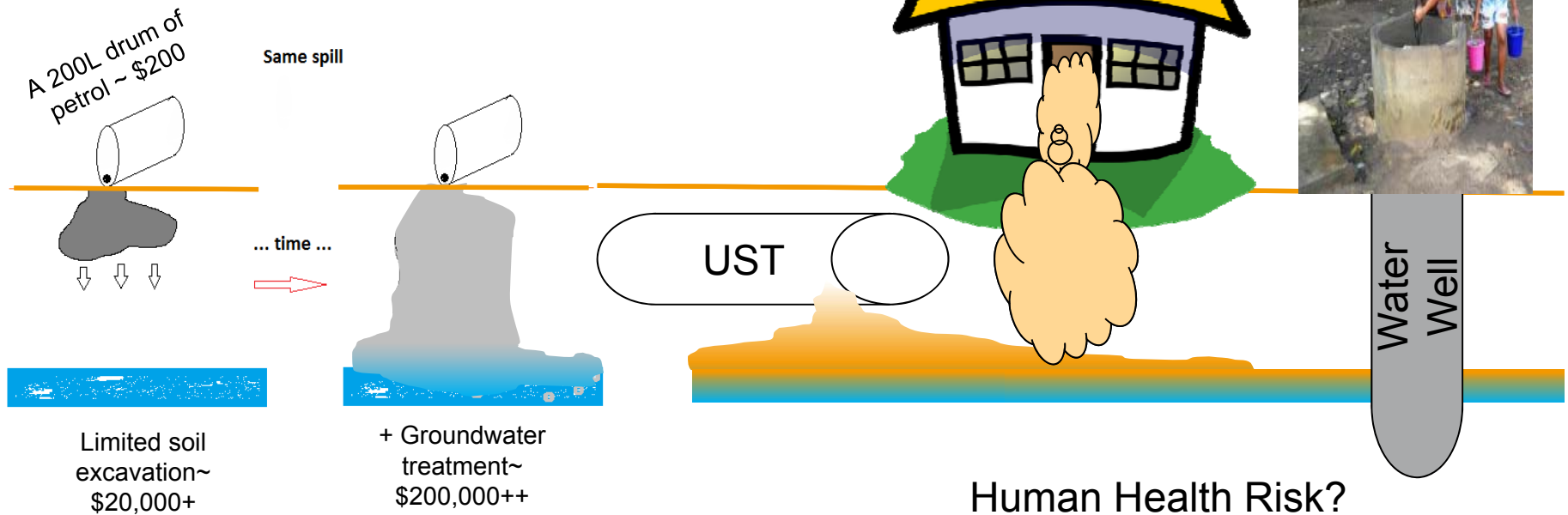


## SUMMARY

- What is the objective?
- Tool box description and deployment in the field
- Innovative, robust and efficient field methodology
- Portfolio screening
- Cost saving
- Take-away

# WHAT IS THE OBJECTIVE?

The objective is to perform a screening of the portfolio and detect the most impacted sites ...



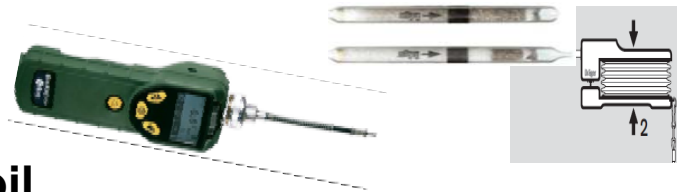
... to further decide which of them will require remedial action, if any.



# TOOL-BOX DESCRIPTION AND MEDIA EVALUATION

## ● Soil vapors

- Portable perforator to reach the soil beneath the pavement;
- Photoionization detector to estimate volatile fractions concentrations;
- Charcoal tube to detect presence of Benzene;



## ● Soil

- Hand auger to evaluate type of soil;
- Photoionization detector to estimate volatile fractions concentrations;
- Cooking pan to check the presence of free phase product;



Hand Auger

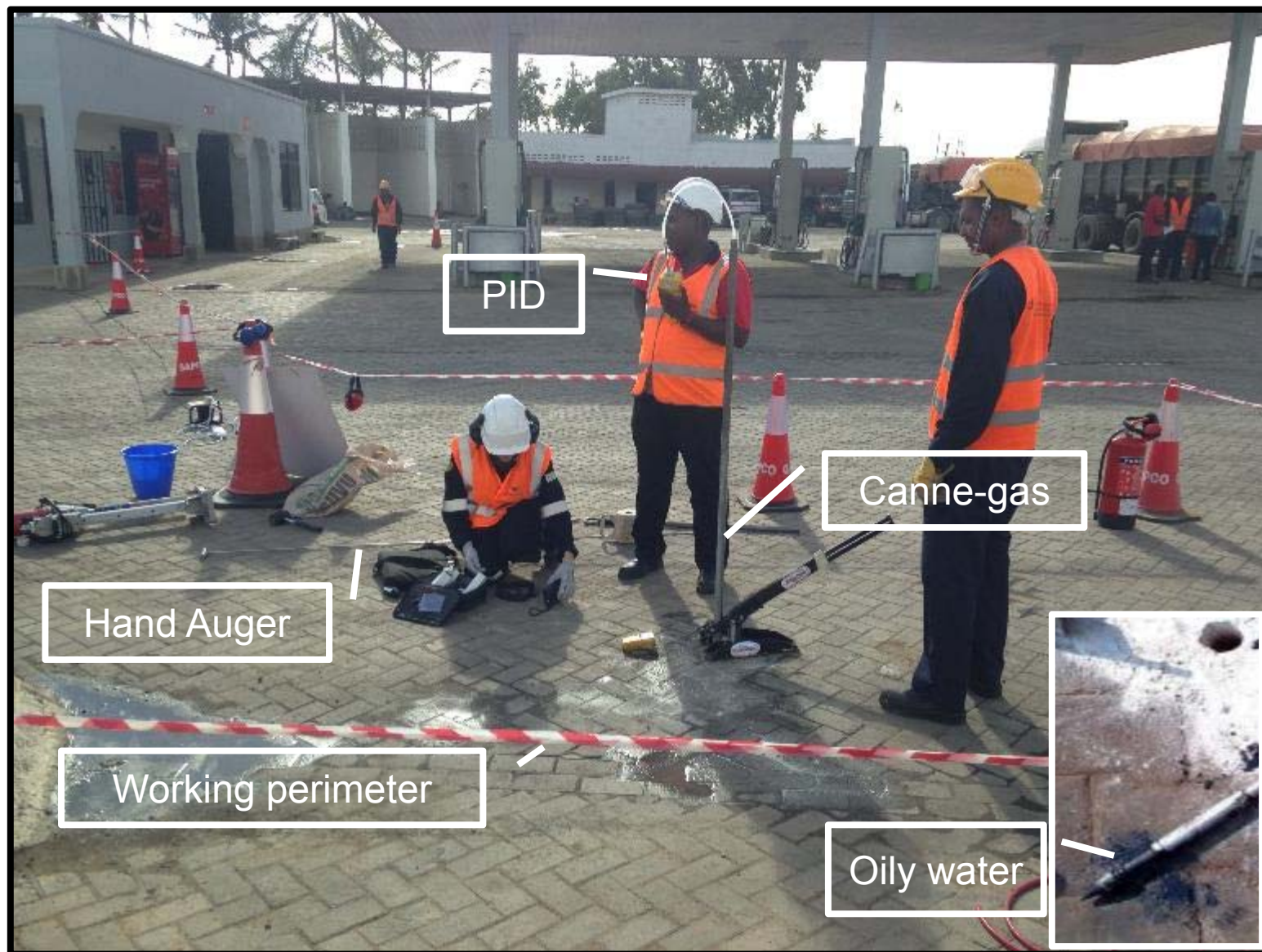
PID

## ● Shallow groundwater

- Portable perforator to reach the GW beneath the pavement;
- Interface probe to measure LNAPL if any;
- Manual peristaltic pump to grab a water sample and test it ;
- Field test kit (like pH paper);



## TOOL-BOX – DEPLOYMENT IN THE FIELD





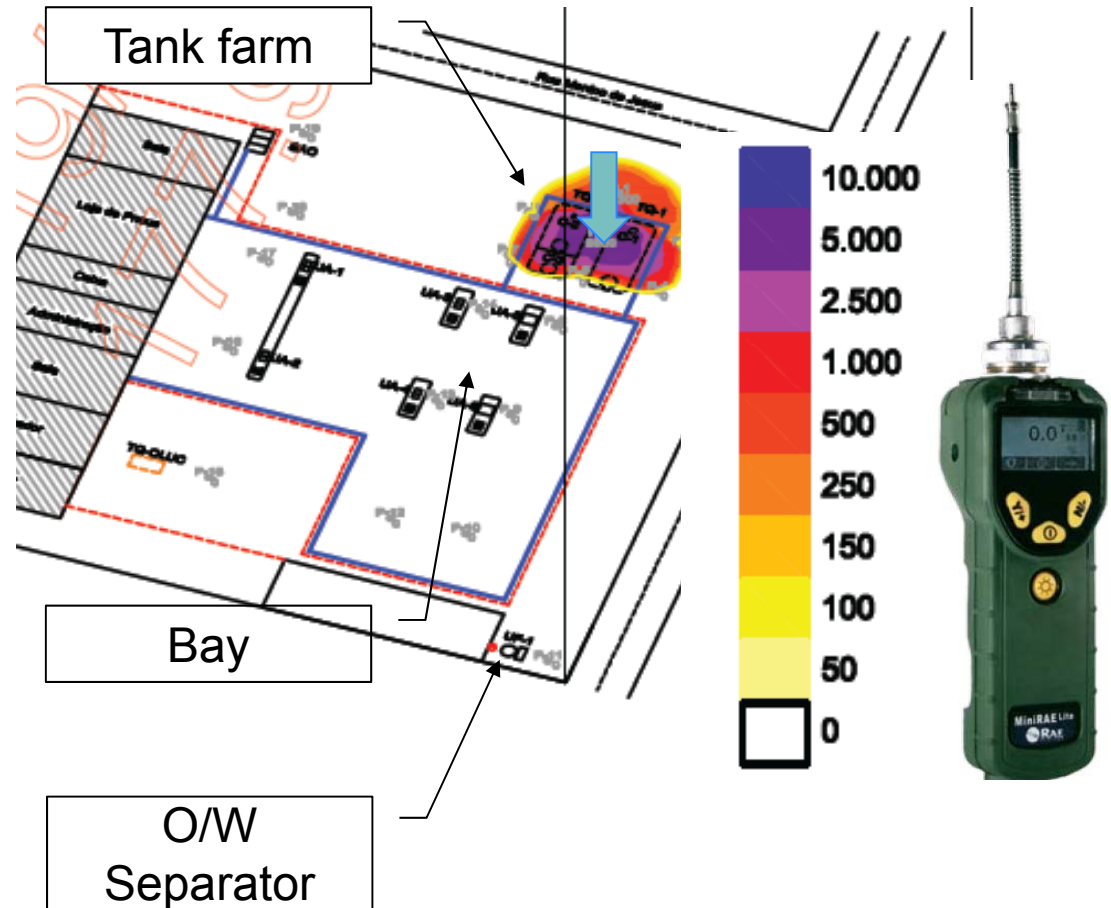
# INNOVATIVE, ROBUST AND EFFICIENT FIELD METHODOLOGY

## ● 1<sup>st</sup> Soil vapors

- Focus on areas of potential concern;
- PID readings to detect most impacted area;
- Evaluate the presence of Benzene (potential site user exposure to vapors);

## ● 2<sup>nd</sup> Shallow groundwater

- Select the well location based on the PID reading contours;
- Check potential presence of LNAPL, iridescences, if any;
- Take a grab sample at the highest PID reading location;



# PORTFOLIO SCREENING

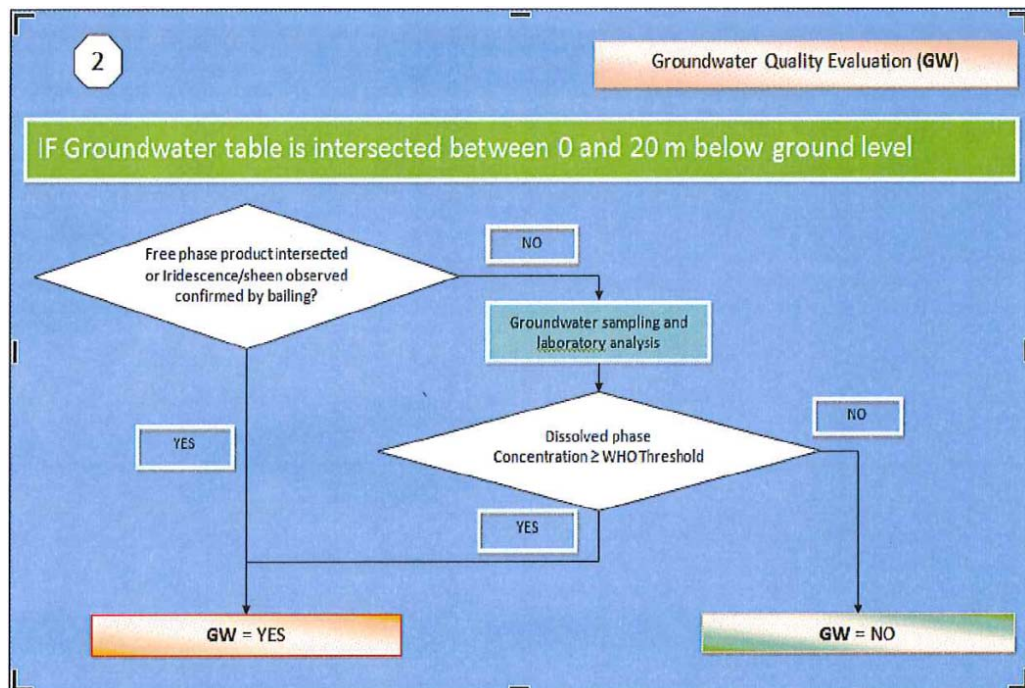
## ● Soil vapor flowchart

- Set a reference value depending on the type of hydrocarbons;
- Confirm that the site should be tagged where the presence of Benzene is measured;
- **Tag the site to further perform complementary investigation, where necessary;**



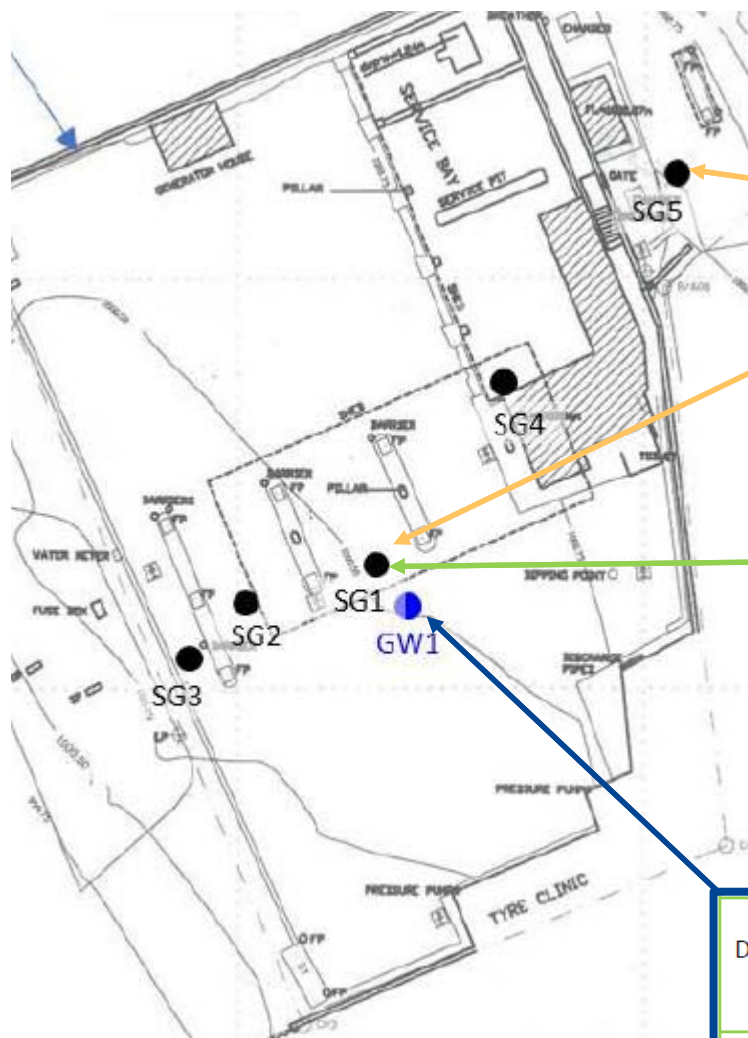
## ● Soil and Groundwater flowcharts

- Criteria No1: presence of free phase product;
- If none, send a groundwater grab sample to the lab;
- For soil, take a PID reading;
- **Tag the site to further perform complementary investigation, where necessary;**





# PORTFOLIO SCREENING



## Colorimetric tube testing

SG ID	Benzene conc. (ppm)
SG1	50
SG5	50

SG ID	PID stabilised (ppm)
SG1	2 440
SG2	91
SG3	59.8
SG5	161.4



Dissolved Phase	Free Phase / iridescence confirmed by bailing	TPH	Benzene	Toluene	Ethyl-benzene	Xylenes	B(a)P
WHO Guideline (µg/L)			10	700	300	500	0.7
GW1	No	96 180	121	17,3	482	353,3	3,41

## COST SAVINGS (1/2)

- **Scope of Work:** Environmental Investigation of a Portfolio of service stations;

### **PREFERRED:**

- A. 1st: Preliminary Investigation** (~12 kUSD ) incl. 7 Soil vapors measurement + 1 GW sampling and lab analysis;
- B. Where necessary: Complementary Investigation** (~50 kUSD) incl. 3MW + 5 soil borings + 5 Soil vapors + PID reading, associated Soil & GW sampling + lab analysis;

### **Alternative:**

- C. Typical Phase II investigation** - depth of 10m (~75 kUSD) incl. 3 Groundwater Monitoring Wells (flow direction), 15 Soil borings + PID reading, associated Soil & GW sampling + lab analysis;

*(Cost evaluations are order of magnitude and will vary upon countries labor rate, equipment availability)*

## COST SAVINGS (2/2)

- Statistic approach: representative number of ~30 sites;
- 100% of the 30 sites is investigated (A & C);
- ONLY a portion of the 30 sites (B) is investigated - 2 scenarios: 25% or 75% is impacted;

Type of Investigation program	Portfolio of <u>30 sites</u>	Portfolio of <u>30 sites</u> - 25% of impacted sites	Portfolio of <u>30 sites</u> - 75% of impacted sites
<b>A - Preliminary (30 sites)</b>	No	~ 360 kUSD	~ 360 kUSD
<b>B – Complementary ONLY TAGGED SITES (25 or 75%)</b>	No	~ 400 kUSD	~ 1,150 kUSD
<b>Sum</b>	-	<b>~ 760 kUSD</b>	<b>~ 1,510 kUSD</b>
<b>C - Typical Phase II (30 sites)</b>	~ 2,250 kUSD	No	No
<b>*Evaluation of Cost Savings C - (A+B)</b>	-	<b>~ 1,490 kUSD</b>	<b>~ 740 kUSD</b>

*\*Cost evaluations = orders of magnitude which will vary upon countries labor rate, equipment availability*



## TAKE-AWAY

- The **environmental screening** objective is fulfilled, understanding that the limited preliminary investigation program may not capture every single impacted site;
- The **Tool Box** is light weight, **user friendly** and robust. The PID is still the most fragile tool. A drilling rig not being available everywhere for various reasons (no provider, size, difficult road access), you can work easily at almost every site, with minimum disturbance of the operations (sales);
- The Tool Box allows the **characterization of 3 media** (soil vapors, soil and groundwater / surface water);
- The methodology is innovative as it brings **agility** and it is **efficient** when supported by adequate screening values;
- Flowchart is user friendly and **ease the decision process** (site tagged or not) and **shorten the « Go » decision** process to further implement complementary investigation. You perform a quick evaluation of the field results right after mapping the data. **No expert staff needed in the field**;
- Cost saving: **less time at site**, no need for heavy equipment (**minimum disturbance** of the operations (sales), limited footprint), expedite decision process helping determine if further investigation/delineation is required, **only address sites of concern**.



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