



Ground Wash

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History of Ground Wash

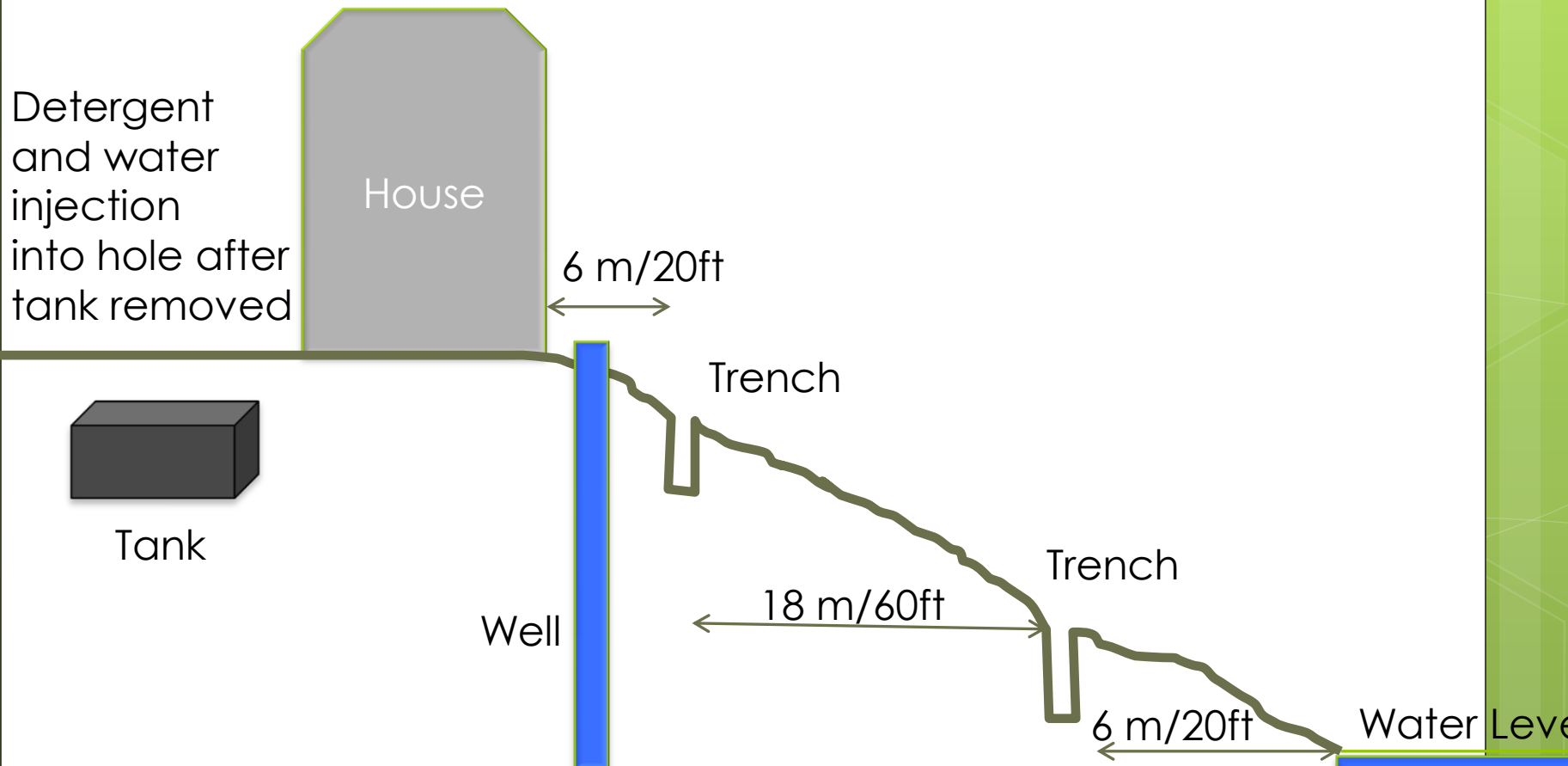
- Paul LeTendre (Quikpak Custom Packaging, PL Consulting) developed process to clean oil spills
 - Soil cleaned in place
- Blends of specialized industrial detergents used to flush out spilled oils.
- Dilute solution used to flush out oil for collection and safe disposal
- Unexpectedly low oil content in the effluent, but site was cleaned to negligible oil content

Case Study 1: Heating oil leakage on shore of Muskoka River

- 900 litres of heating oil entered soil from ruptured tank, drained downhill to river
- XSORB booms contained oil on water, in the well, two small streams and in trenches.
- Put bio-degradable detergent into former tank location – three separate days across three weeks
- Water injected between each detergent bolus
- Detergent in the well.

Cross section of site

Not to scale



The Outcome

- The levels of oil in the effluent in trenches and well reduced from being visibly present to 35-740ppm in 18 days
- Well was cleaned to be usable again to potable standards no detectable oil present
- Excavation of tank was only disturbance of site.
- Home owner did not lose her house

Cost Benefit Analysis

- Cost of cleanup operation was \$33,000
- Estimate for traditional soil excavation removal and disposal was \$400,000
- No liability for contamination of Muskoka River
- Home owner was out of her house for 9 days.
- No permanent environmental impact of spill and clean up operation.

Case Study 2: Former Auto Wrecking Yard, West Toronto

- Site contaminated from previous owner with hydraulic, engine, transmission, heating oils
- Drilled series of 3-4" diameter "test" wells into soil to depth of ~20 - 30ft
- Soil samples tested for levels of contamination
 - Very high in places, highly variable
 - Determined geographical and quantitative extent of contamination
 - Test well locations selected by hydro-geologist

Clean up procedure

- Drill pattern concentric circles radiating from centre of contamination
- Block end steel pipes driven into soil
 - Nozzle holes drilled into bottom 2ft of pipe
 - Depth of about 3ft, variable distance apart
 - Pumped detergent solution into pipes at steady rate for a day
 - Every 3rd day for 3 weeks
 - Weekly for further 2 months until test well samples consistently clean
 - Water pumped in daily between detergent injections continuously for 5 months overall
 - Effluent from test holes sampled and tested by independent lab

Outcome

- Levels of Oil contamination in samples from test wells fell progressively
- No oil recovered in samples after 3 months
- Site Record of Site Condition (RSC) certificate issued after 5 months: clean

Cost Benefit Analysis

- Initial estimate was several million dollars
 - Excavation down to 15 ft
 - Removal and safe disposal of contaminated soil
 - Replacement of soil to restore site
- Cost of ground wash decontamination over 5 months was about \$20,000
- Site has been returned to other uses and no further contamination has been discovered.

Where did all the oil go?

- Over next 15 sites cleaned, effluent collected from drain-off sumps
- Requested by Min of Environment for three clean up jobs
- Disposal cost based on effluent oil content – samples started coming back with no oil
- Oil analysis at Entech Labs using GC and IR found consistent, unexpected low oil levels
- Tests at York University lab confirmed that range of oils inoculated into the detergent progressively broke down to H_2 CO_2 and water.

Where is Ground Wash Today?

- Ground wash is not used or applied today
- The technology and Know-How has not been patented
- All knowledge remains with Paul Letendre
- There are some hypotheses on what happens to oil that cannot be recovered
 - Definitive research would still be needed to test hypotheses
- There are currently no operators interested in utilizing this knowledge