Environmental Bioremediation Case Study

Why choose AEL?

- **ON-SITE TESTING**
  AEL leads the environmental consulting industry with innovative on-site testing approaches using XRF, UVF, and the Waterloo Profiler
- **RESPONSIVE SOLUTIONS**
  AEL's ESAs are custom designed for each unique site, offering the best value and most effective solutions
- **EXPERT TEAM**
  AEL's team of senior engineers, risk assessors, hydrogeologists, field scientists, geoscientists, GIS and data experts, and support personnel have expertise covering all facets of environmental engineering.

What AEL's clients say:

"AEL worked with us to assess, remediate, and file RSCs for a number of our sites. They used innovative technology in efficient ways, reducing the cost and working within our time frames. Their team is technically strong, and also able to communicate well."

Vince Polsoni, Manager of Station Sustainment, PowerStream Inc.

Project Location: Ontario, Canada

Former Trucking Distribution and Service Centre

AEL was retained to conduct a Phase I and Phase II ESA at a former transport truck repair and maintenance property ("the Site"), situated in a residential area.

Historically, the site had been used as a truck marshalling yard, for refuelling, and as a maintenance centre. Two former truck refuelling areas and a former waste oil tank were located on the property, which resulted in PHC impacts in and around these areas.

AEL began the project with a detailed sampling program. Prior to AEL involvement approximately 2500 tonnes of petroleum hydrocarbon (PHC) impacted soil had been estimated at the site. AEL undertook a Phase II ESA utilizing on-site testing for PHC in soil and groundwater by Ultra-Violet Fluorescence (UVF). The use of UVF enabled AEL to direct the investigation in real time over a 2 day period and delineated approximately 5000 tonnes of PHC impacted soils. UVF provided a greater understanding of impacts at the site, eliminated multiple site visits and waiting for traditional lab results and greatly reduced the time and cost of the assessment.

AEL developed a remedial plan to clean up these PHCs and bring the site below allowable standards set by the Ministry of the Environment (MOE) Table 3 criteria. The work was complicated by a limited time schedule, early winter working conditions and a sensitive site imposed by O. Reg. 153/04 due to surface bedrock. AEL was able to "segment" the site under by O. Reg. 153/04 and apply the sensitive criteria only to those portions of the property affected by shallow bedrock. This resulted in significant savings in assessment and remediation costs while at the same time being protective of the natural environment.

AEL's remedial plan consisted of the following:

- Purging and removing the existing tank on site, and demolition of any existing site buildings and flooring slabs.
- Segregation and stockpiling for

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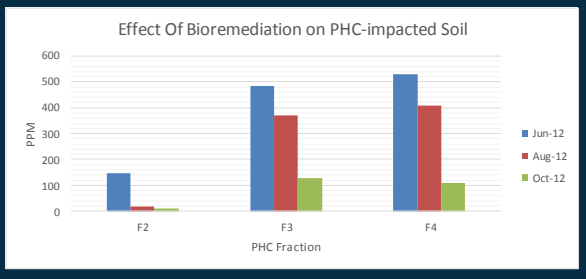
Isolating piles of impacted soil for treatment with biomix

Removing soil down to shallow bedrock



reuse of existing overburden that did not exceed the applicable site criteria in the vicinity of the former refuelling stations

- Excavation and construction of bioremediation cells on site for the treatment of soils impacted by PHCs
- Importing of soil fill that meets the site condition criteria to return excavated areas to existing grades

Bioremediation of soils impacted by PHCs to meet Table 3 residential criteria.

The total volume of soil excavated and placed into bio-piles was approximately 831 cubic meters of soil. Soil was excavated in those areas where field screenings indicated PHC levels were above acceptable limits in the soil. Excavations continued downward until floor samples were within acceptable MOE values, as determined through on site testing using SiteLab UVF analysis, and confirmed with laboratory testing.

Upon excavation, the soil was placed into one of three separate stockpiles. Samples of the stockpiles were taken prior to the commencement of treatment, in order to establish a baseline.

Soil was piled on a double layer of 6 mil polyethylene sheets and built to a height of about 0.6 m. Treatment consisted of the application of a liquid based microbial treatment (bioremediation) to the soil. A final 6 mil polyethylene sheet was placed on top of the pile as a protective cover and left for one month. The formula used was a proprietary formula which includes detergents and nutrients, all of which are non-toxic and bio-degradable.

After a period of one month, another round of sampling was performed, where samples were taken from the same area as previous samples, following the applicable stockpile sampling guidelines. Samples were tested with a photoionization detector (PID) and analyzed with the UVF.

The stockpiles were then turned over with an excavator and aerated, with an additional liquid microbial treatment applied to those areas that were still above acceptable limits. The piles were then left for an additional month. Additional confirmatory samples were then taken, with the soil determined to meet the MOE Table 3 site condition standard.

The bioremediation was successful, and the soil could be re-used at the site. By using bioremediation instead of off-site disposal, **AEL was able to reduce the cost of the remediation by more than 50%, saving the client close to $200,000. AEL's onsite laboratory also reduced the excavation and backfilling costs by adding confidence and precision to the soil removal work.**

Now, the site remediation has reached completion, closure samples show that the PHC impacts have been removed, and the site has been purchased by a local school board and will soon be the location of a new elementary school.

Land restoration benefits everyone—especially the site owner and the surrounding community. What once was a contaminated truck service facility is now a site where children can safely learn.

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