

In Situ Remediation of Former Industrial Area (Redeveloped to New Housing Buildings) with Innovative Enhanced Reductive Dechlorination Technology

Gabriele Giorgio Ceriani (ggc@ejlskov.com) (Ejlskov A/S, Jens Olsens Vej 3, Århus, Denmark)

Background/Objectives. A former industrial dry-cleaning facility in the southern neighborhood of Stockholm (Sweden), called Huddinge, was planned for redevelopment into a new residential building complex. To proceed with the construction of the concrete foundations of the building and underground garage, the property developer needed an authority approval which could only be granted by showing that residual contamination present from 3 meters below ground level (m bgl) to bedrock (located from 6 to 11 m bgl) had been efficiently treated with a solution allowing for long term treatment both as a source and barrier treatment. The clean-up goals set were to show an order of magnitude reduction in groundwater concentrations within 3 to 5 months post remediation works. Excavation of the top 3 meters of overburden was carried out in conjunction with the construction works as part of the execution and preparation for the construction of underground parking lots.

Contamination was mainly constituted by tetrachloroethylene (PCE) and partly from trichlorethylene (TCE).

Approach/Activities. The consultant in charge of the project selected the Trap & Treat® approach for the site, as in 2011 a nearby construction site was treated using the same technology. After reviewing the site characterization data, a remediation plan was prepared for the client. The work plan had to envisage the conduction of remediation works without causing any interference to the other contractors. Implementation of an innovative enhanced reductive dechlorination in situ technology (CAT100™) was approved and planned to be installed across the delineated source area of contamination (approximately 400 m²).

A barrier zone of 70-80 m in length encompassing the southwestern and southern portion of the property was also included as part of the same remediation plan. Installation activities had to be complete within eight weeks to meet the construction works schedule. Injection work was performed while several other contractors were simultaneously on site. This mandated moving operations in accordance with the general site plan. Daily meetings with site staff allowed for a smooth process without any issues or impact to the project schedule.

Results/Lessons Learned. Implementation of injection works was performed according to plan, meeting the client expectations and without causing delay to any of the contractors on site. Most importantly the client received approval from the local environmental authorities to proceed with the construction works (layout of concrete foundations), allowing the property developer to maintain the construction project on time.

A total of approximately 9,050 kg of CAT100™ were injected across 182 points in the source zone. Across the 69 injection points comprising the barrier, a total of approximately 5,900 kg of CAT100™ were installed. Groundwater monitoring data eight months post injection works show PCE concentrations in both source and barrier zone reduced from levels of ten-thousands of µg/l to non-detect levels. Monitoring data from specific dissolved gases demonstrate that biological activity is occurring as part of the enhanced reductive dechlorination process.