

One Site, Seven Remedial Solutions: A Combined Approach to Increase Remediation Effectiveness

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Background/Objectives. This chemical facility is located at the banks of the Guanabara Bay, in Rio de Janeiro, at an environmentally protected area. The existing benzene contamination impacts an area of approximately 120,000 sq. meters, in concentrations of up to 1,200 mg/L. Due to the distinct characteristics of different areas of the site, a total of seven remedial technologies are being used to remediate the plume. This combined approach allowed us to greatly reduce the expected time to remediate the entire plume, with clear direct consequences on sustainability and overall budget to finalize the project.

Approach/Activities. Given that benzene is a fairly common contaminant, the first approach to the plume was the usual technology for this type of plume, a combination of soil vapor extraction and air sparging. It was clear from the start that this technology would not be able to be applied at the entire plume area due to site constraints such as densely constructed areas and underground pipelines. After a feasibility study and several bench tests and pilot tests, other technologies were deemed suitable for different areas. These technologies include bioremediation, in situ thermal desorption, rhizoremediation, ART wells and enhanced biodegradation.

Results/Lessons Learned. Even a common contaminant such as benzene can greatly benefit from the combination of several technologies. This paper will present the pathway behind the choice of each technology, including bench and pilot tests, and the result we got from a very large initial plume. It will also show how this combination has allowed for a significant reduction in costs and schedule to remediate the entire site. Finally, the interaction with the environmental agency in Brazil, which was not familiar with some of these technologies, will also be analyzed.