

VACUUM DRIVEN IN-WELL STRIPPING AND RECIRCULATION, COMPARATIVE EVALUATION OF TWO PILOT STUDIES

ABSTRACT / SUMMARY

Background/Objectives. This paper presents a comparative evaluation of two pilot tests performed using an in-well stripping and recirculation method for treatment of petroleum hydrocarbon contaminated groundwater. The method of inwell stripping and recirculation removes or degrades in place volatile organic compounds (VOCs) from soil and groundwater. The process uses vacuum to air-lift the water in the well while stripping volatile organic compounds and increasing dissolved oxygen in the recirculated water. With this method, vapor is treated/destroyed using vapor treatment unit (thermal/catalytic oxidizer or granular activated carbon) and groundwater recirculated for additional stripping and biodegradation.

Approach/Activities. Two tests were performed using different setups at two different sites. The first test was performed in New York using two separate wells for recirculation (extraction and injection wells) and the second test was performed in California using a single well recirculation with two separate screen intervals (shallow and deep screen intervals). Pre-test and post-test groundwater samples were collected during each test. Additional groundwater samples were collected from extraction and injection portions of the recirculation cell to evaluate VOC reductions, dissolved oxygen increases and temperature chang-

Results/Lessons Learned. The results obtained during both tests indicated that there was a significant reduction in VOC concentrations and significant increases in dissolved oxygen concentrations during recirculation. A reduction in Fe2, BOD and COD was also observed during the second test. Scaling was observed during the second test in the extraction tube and would require a frequent maintenance or a scale control additive during long-term remediation projects.



Extraction Unit.

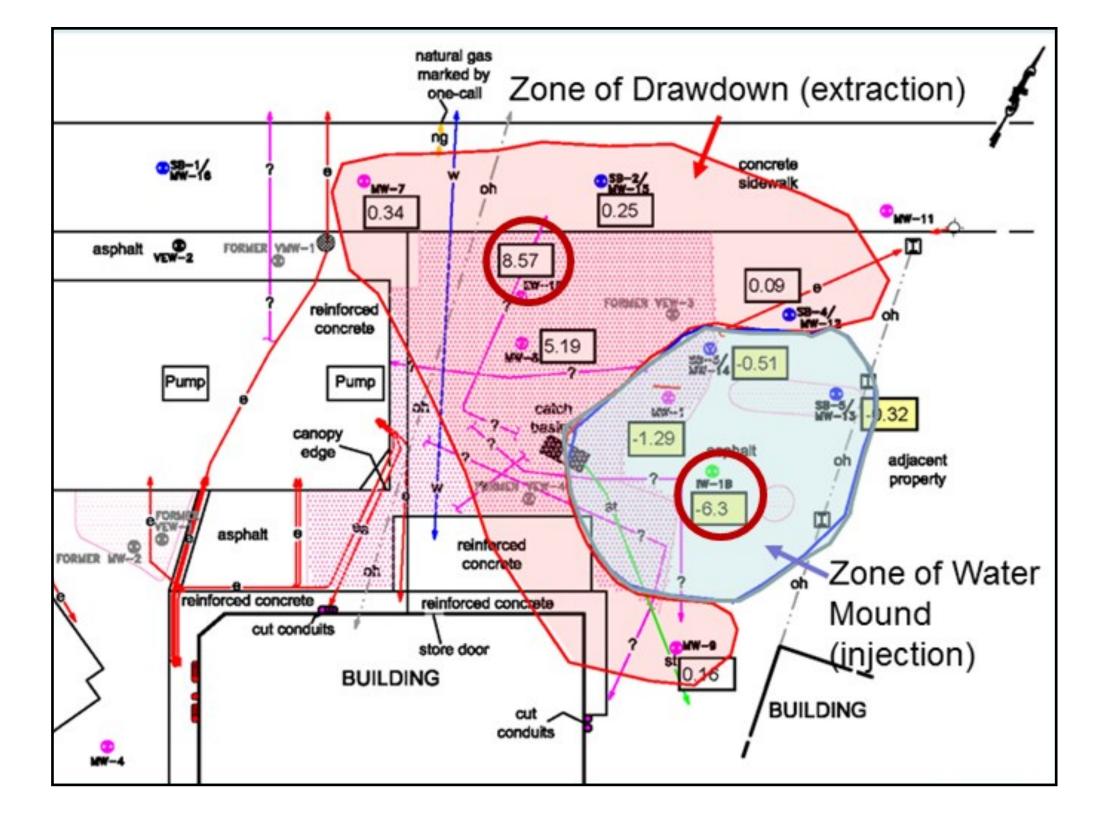


Figure 2 - Test I, Layout and Drawdown / Injection Mound Data

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TEST I - DUAL WELL RECIRCULATION CELL

Figure 1 - Test I Setup: Wellhead connections and Treatment /

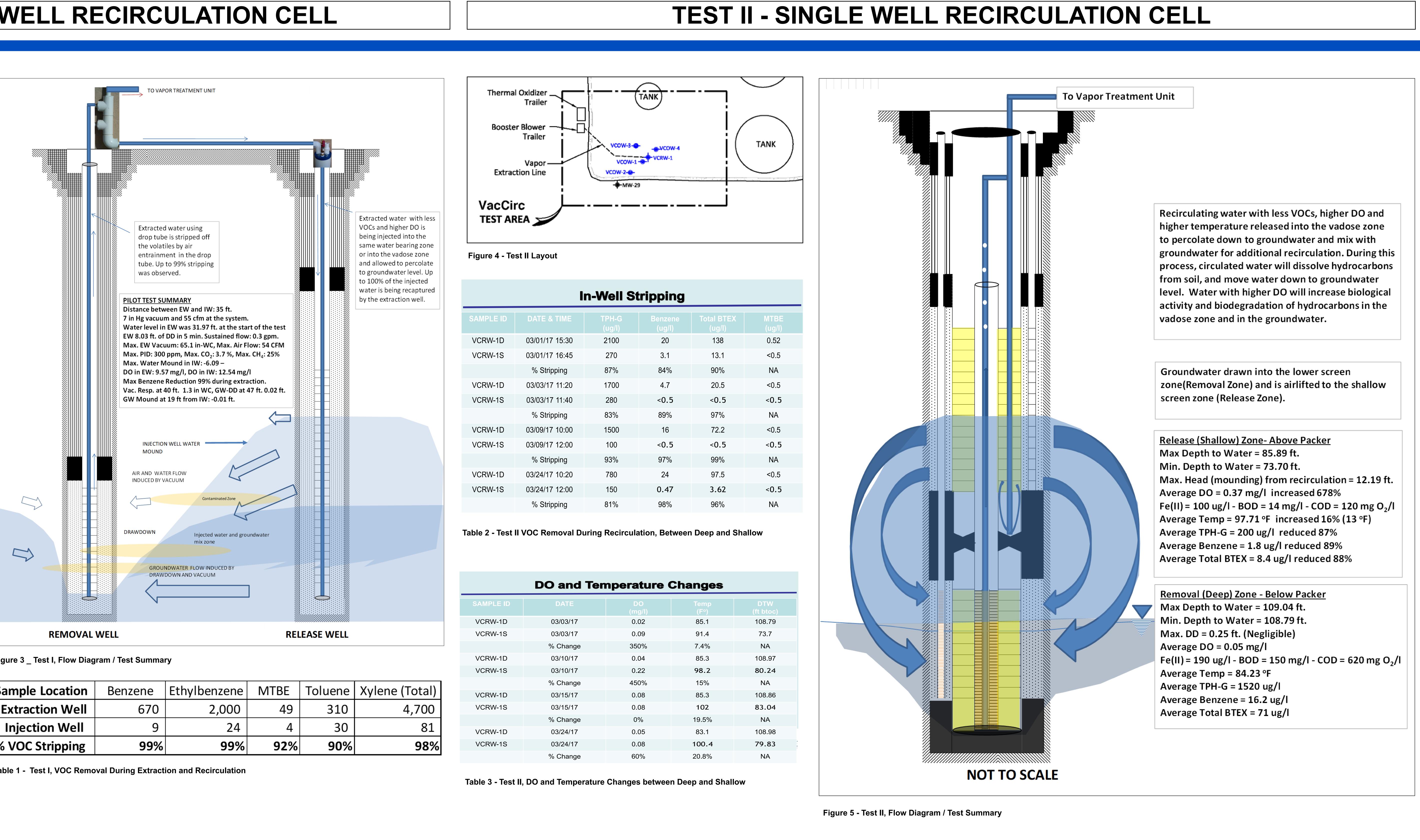


Figure 3 _ Test I, Flow Diagram / Test Summary

Sample Location	Benzene	Ethylbenzene	MTBE	Toluene	Xy
Extraction Well	670	2,000	49	310	
Injection Well	9	24	4	30	
% VOC Stripping	99%	99%	92%	90%	

Table 1 - Test I, VOC Removal During Extraction and Recirculation

