

## A.1 Technology Name

Bio-Trap® Sampler

### A.1.1 Source

A-Zone Environmental, LLC and Hana Engineers and Consultants, LLC. *Final Feasibility Study, Manassas Air Force Communication Facility, Independent Hill, Virginia. August 2019.* Prepared for United States Army Corps of Engineers, Baltimore District and Norfolk District.

### A.1.2 Summary

<b>Media:</b>	Groundwater
<b>Study Type:</b>	NA
<b>Technology:</b>	Accumulation
<b>Peer Reviewed:</b>	Yes
<b>Publication Date:</b>	August 2019

### A.1.3 Site Description

- Formerly Used Defense Site (FUDS) in Independence Hill, Virginia with chlorinated solvents plume in groundwater within saprolite, weathered and competent bedrock zones. Greater than 10,000 µg/L of Trichloroethene (TCE) in weathered zone near source area.
- Feasibility Study (FS) included two rounds of biological testing to determine if in-situ enhanced bioremediation (ISEB) was a viable remedial alternative. First round included standard Bio-Trap® samplers installed in 14 monitoring wells. Second round included a control (Monitored Natural Attenuation – MNA) unit, and baited Bio-Trap® samplers with a biostimulation unit (sodium lactate electron donor) and a bioaugmentation unit (live microorganisms with sodium lactate electron donor), with a pH buffer added as well.

### A.1.4 Remedial Phase

Remedial phase FS treatability study to determine viability of ISEB remedial alternative.

### A.1.5 Outcome

Standard Bio-Trap® samplers did not measure detectable levels of *Dehalococcoides* spp. (DHC) or DHC functional genes (*tceA*, *bvcA*, or *vcrA*), potentially due to low pH (3-5) during sampling event. Baited Bio-Trap® samplers detected high levels of DHC in all three units, attributable to addition of pH buffer, electron donor and/or cultured microorganisms. DHC levels in baited samplers above recommended effective rate of reductive dechlorination of 10<sup>4</sup> cells/bead of DHC (Lu et al. 2006). Detectable levels of *tceA* gene and *vcrA* genes, indicating the presence of the enzyme responsible for reductive dichlorination of TCE to cis-DCE and from cis-DCE and VC to ethene. Results support ISEB remedial alternative.

### A.1.6 References

32 A-Zone Environmental, LLC and Hana Engineers and Consultants, LLC. *Final Feasibility Study,*  
33 *Manassas Air Force Communication Facility, Independent Hill, Virginia. August 2019.* Prepared  
34 for United States Army Corps of Engineers, Baltimore District and Norfolk District.

35 A-Zone Environmental Services, LLC. *Final Supplemental Site Characterization Report, Former*  
36 *Manassas Air Force Communication Facility, Independent Hill, Virginia.* April 2018. Prepared  
37 for United States Army Corps of Engineers, Baltimore District and Norfolk District.  
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39 Lu, X., J.T. Wilson, and D.H. Kampbell. 2006. *Relationship between Dehalococcoides*  
40 *DNA in groundwater and rates of reductive dechlorination at field scale.* Water  
41 Research 40 no. 16: 3131--3140.  
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