

MICROCOSM EVALUATION OF Provect-CH₄™ FOR INHIBITION OF METHANE PRODUCTION

Objective. The objective of the laboratory study is to measure the reduction of methane at a remediation site that has used - or is evaluating the use of - a liquid or solid conventional (*i.e.*, non-antimethanogenic) remedial reagent such as carbon source, hydrogen release compound, (emulsified) oil/lecithin and/or sugar in an attempt to stimulate enhanced reductive dechlorination (ERD) or *In Situ* Chemical Reduction (ISCR) of site contaminants. The study will evaluate the reduction in the amount of methane produced that could potentially migrate from groundwater to shallow soils or structures and lead to explosions or fires. By minimizing methane production this will also render the remedial amendment more effective and cost efficient.

Sample Requirements. Site soil/sediment (3 kg), groundwater (4 liters), and a sample of the liquid or solid remedial reagent used, or intended for use, will be shipped at Client's expense to the ReResolution Partners laboratory at:

967 Jonathon Drive

Madison, WI 53713

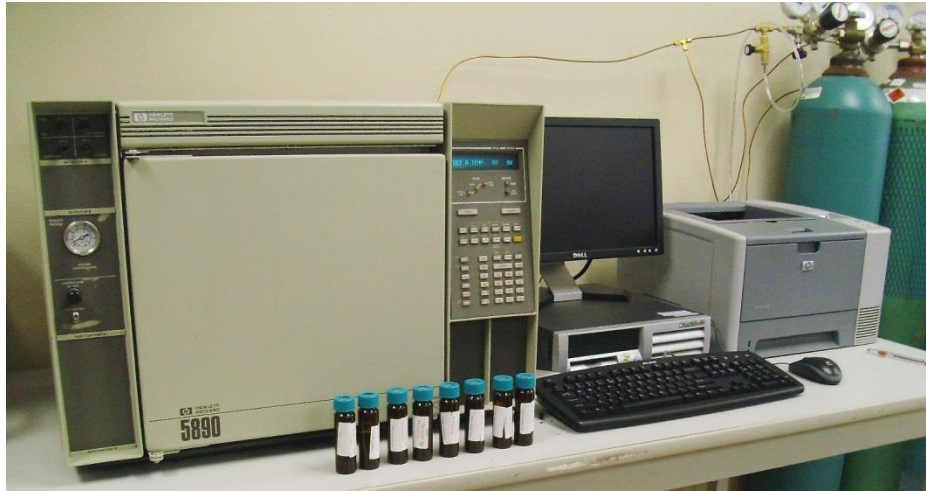
Attn: Kevin Baker, Laboratory Manager

Telephone: (608) 669-6949 / Email kbaker@resolutionpartnersllc.net

Please contact us for assistance with sample containers and shipping details.

Microcosm Set-Up. Testing will be conducted in 125 mL amber glass bottles equipped with PTFE-lined open septum caps (large VOA-type bottles/vials). Soil and groundwater from the site will be used to achieve a water:soil ratio of 1 part water to 1 part soil by weight (approximately 60 grams soil and 60 grams groundwater). One control (unamended) sample and two treatment samples (treated with remedial amendment at defined dosages) will be prepared in duplicate microcosms (both with and without Provect-CH₄) yielding a total of ten microcosms for each of 5 sampling events (Days 0, 2, 5, 10, and 15), for a total of 50 microcosm sample vials. A *Dehalococcoides* spp. (DHC) inoculum can be added upon request, targeting *ca.* 1x10⁶ DHC/L groundwater. Microcosms will be prepared under a nitrogen

atmosphere in an anaerobic glove box. Once the microcosms are sealed they will be removed from the glove box and incubated in the dark at room temperature. Vials will be inverted daily to provide gentle mixing.



Microcosm Sampling and Analysis. Periodic headspace samples will be drawn through septum seals for analysis of methane, ethane and ethene in the dissolved gas phase using a gas chromatograph (GC) with a flame ionization detector (FID). Henry's Law will be used to estimate the equivalent aqueous concentrations from the headspace analyses. Microcosm pH and ORP will be measured, as well after the gas samples have been analyzed. Samples will be collected at 5 time intervals: Day 0, 2, 5, 10, and 15. The duration of the later intervals may be revised with client consensus based on the results of the initial samples.

A summary letter report with results will be provided upon completion of the study (generally within 30 days following receipt of samples).

Optional Assays: Microbiological analyses via quantitative polymerase chain reaction (qPCR) DNA analyses can be conducted to enumerate *Dehalococcoides* (DHC) and methanogens (MGN) along with the number of microorganisms expressing the functional genes *bcvA* Vinyl Chloride Reductase (BAV1), *tceA* TCE Reductase, and *vcrA* Vinyl Chloride Reductase. Other gene probe assays can be conducted at an additional cost. Please inquire

Price. The testing described in this proposal will be performed for a price of \$8,900. DHC inoculation and testing are not included in the price, please inquire.

Notices and Disclaimers

Any estimated dosage or recommended application methods are based on the site information provided by others, and they are not meant to constitute a guarantee of field performance. We recommend that a comprehensive remedial design take the precise nature of the COI impact and actual site conditions into consideration.

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