Heath – *Ventura*

Litigation Support · Expert Witness Testimony · Environmental Forensics

About

Heath Ventura provides litigation support, environmental forensics, and expert witness testimony for the legal community in the area of environmental litigation. Mr. Gregory Smith, President has been involved early in the interpretation of stable isotope analysis data beginning in the late 1990s. At that time, the analytical techniques determined bulk isotope ratios that were applied at sites involving groundwater investigations and remediation using a variety of techniques including steam injection, electrical resistance heating, groundwater pump and treat, and in situ chemical oxidation. He also worked with researchers at Argonne National Laboratory developing the interpretative techniques for bulk isotope analysis.

- As methodologies and analytical techniques and equipment improved bulk isotope analysis developed to compound specific isotope analysis (CSIA). Mr. Smith continued to expand the use of CSIA and he has used this analytical technique at various locations around the world as summarized below: England: differentiated 3 groundwater plumes by comparing fractionation patterns where previously one plume was believed to be present.
- Japan: At an active automotive parts manufacturer, prior to the use of CSIA, it was believed that the released trichloroethene was stable and not undergoing natural degradation. As a result, the groundwater treatment remedy called for both source treatment and hydraulic capture and treatment at the fenceline. Using CSIA, Mr. Smith demonstrated that natural biodegradation was occurring and resulted in concentration reductions in groundwater. As a result the fenceline hydraulic containment and capture component of the remediation could be eliminated, saving significant treatment costs.
- Australia: A former automotive parts manufacturer had experienced releases of trichloroethene to groundwater at two locations on its property that were interpreted to have impacted offsite groundwater. The client's impacted groundwater was undergoing in situ chemical oxidation, involving multiple treatments. CSIA demonstrated that the oxidation was having limited effect, natural degradation was controlling offsite migration and other releases of chlorinated solvents to groundwater had occurred that were previously undetected. This allowed for using a risk-based closure of remediation operations.
- Spain: An active manufacturing facility had experienced releases of trichloroethene at two locations at the plant site. The two locations were inaccessible due to active production that could not be shut down. Enhanced biodegradation was employed to address the sources, but the monitoring program was having difficulty determining effectiveness. CSIA was used to evaluate the biodegradation treatment that showed that degradation was occurring, but was limited by geochemical conditions in groundwater. Three additional sources of groundwater pollution were discovered as part of the study.
- Brazil: An active manufacturer in the process of shutting down operations needed to understand the effectiveness of a permanganate groundwater treatment. The oxidation treatment was combined with natural degradation. CSIA was used to determine degradation

mechanisms, which determined where the treatment was effective and where it was not. Two areas on site where identified to expand the permanganate treatment.

- Indiana: Groundwater at a former manufacturing plant was undergoing in situ thermal using the electro thermal – dynamic stripping process. CSIA was used as part of an overall study to determine the changes in groundwater chemistry during in situ heating and whether this effected the concentration reduction mechanisms.
- Illinois: At a former electronics manufacturer, testing of the use of bulk isotopes to evaluate the effects of in situ thermal treatment. The testing was successful in differentiating evaporation and biodegradation of trichloroethene. This information allowed for the phased shutdown of treatment.
- Illinois: A former manufacturing plant was being re-purposed. As part of the process, groundwater contamination from the use of 1,1,1-trichloroethane was discovered, with the extent determined. The remedial solution that was applied was electrical resistance heating. Remediation progress was tracked using CSIA to determine at what point degradation processes were more effective than vaporization. When this occurred, active heating could be discontinued and natural degradation could continue as the remediation process.
- Pennsylvania: At a Superfund site consisting of an industrial park with multiple releases of various chlorinated solvents the client was interested in determining whether the sources could be differentiated. Unfortunately, the previous consultant sampled the monitoring wells for ^{13}C, only. Full characterization required ^{37}Cl and ^{2}H which the client was unwilling to pay. A qualified interpretation was performed, but the various sources could not be completely differentiated using ^{13}C alone.
- Missouri: An electronics manufacturer, located in an area of light industry and residences had experienced releases of trichloroethene to groundwater in fractured bedrock. The wells were sampled for ^{13}C, ^{37}Cl, and $^{87}Sr/^{86}Sr$. The ^{13}C and ^{37}Cl data was used to locate wells for the treatment system. The strontium isotope data was less helpful as a result of the preponderance of strontium in the carbonate bedrock.
- South Carolina: Two manufacturing plants located across the street from one another had experienced releases of trichloroethene to groundwater in a fractured bedrock. The isotope data was used to evaluate mixing from the two sources to define the extent of migration and hence responsibility for clean-up.