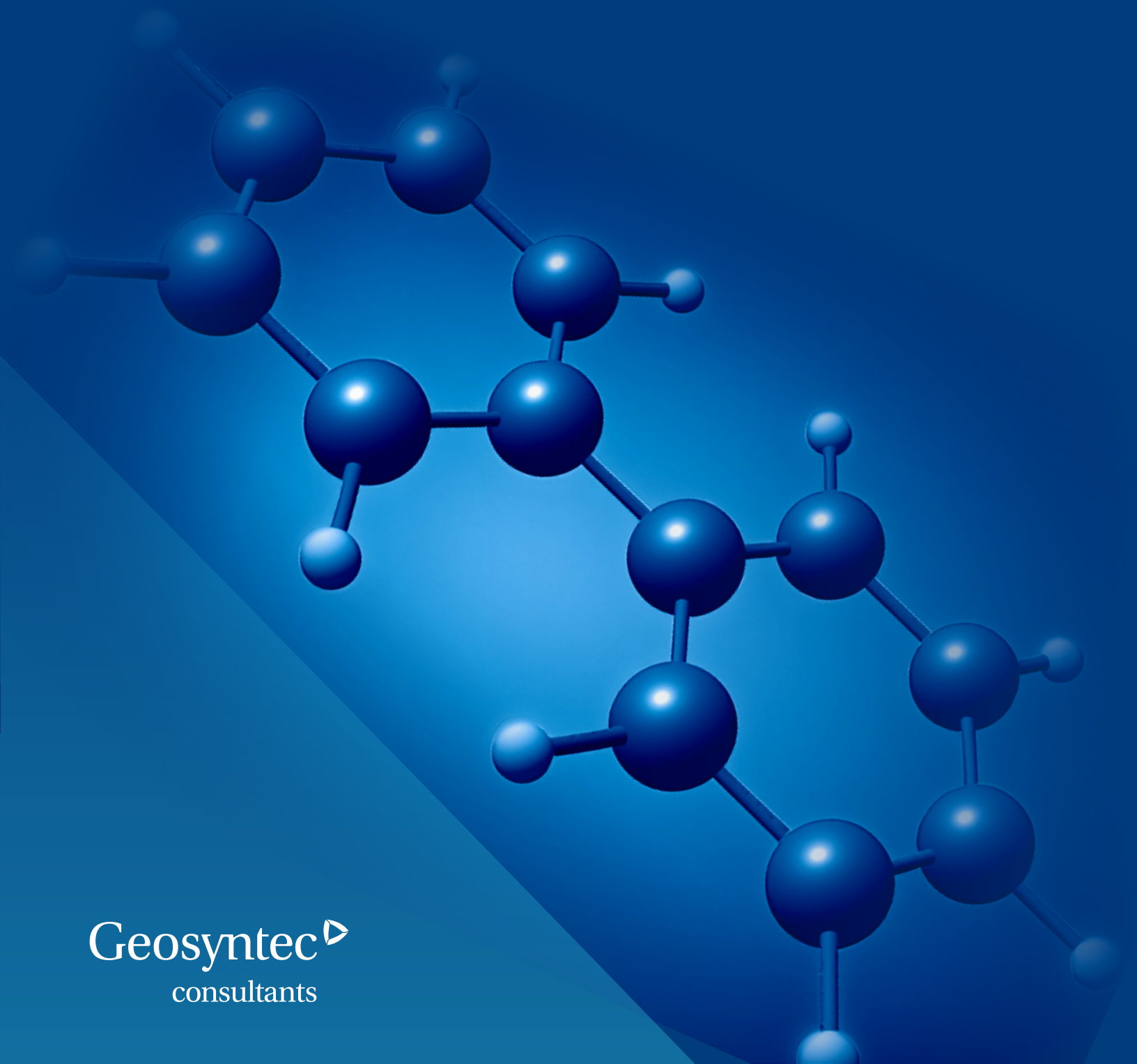
STATEMENT OF QUALIFICATIONS

POLYCHLORINATED BIPHENYLS (PCBS)



Geosyntec consultants



GEOSYNTEC OVERVIEW

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Geosyntec is a consulting and engineering firm that works with private- and public-sector clients to address new ventures and complex problems confronting our environment, natural resource, energy, and civil infrastructure. We serve clients from more than 130 offices in the United States, Canada, the United Kingdom, Ireland, Sweden, Spain, Finland, the United Arab Emirates, Saudi Arabia, and Australia. With more than 2,800 scientists, engineers, and other professionals from around the globe, we work each day to forge an inclusive and equitable environment for all our employees, clients, partners, and for the communities we serve.

GEOSYNTEC'S RISK ASSESSMENT AND TOXICOLOGY ACTION GROUP

Geosyntec's risk assessment and toxicology action group, with 200 practitioners, includes experts in the fields of toxicology, risk assessment, and public health. Our core focus in applied toxicology and ecotoxicology is supported by specialists in complementary fields such as statistics, air dispersion and deposition modeling, biotrophic feed web modeling, vapor intrusion, industrial health and safety, and consumer product stewardship. We deliver human health and ecological risk assessment services that identify best-value approaches to evaluate the implications for exposure and liability and remediate contaminated sites. Our risk assessment specialists work alongside our technology leaders, remediation practitioners, and internal and external counsels developing site-specific, pragmatic solutions. We characterize risk and tailor our approach to meet our client's goals for compliance, financial management, and environmental stewardship. We also provide expert consultation and testimony on environmental, worker, and consumer exposure issues for our legal clients. Our practitioners are experts in addressing allocation and complex issues associated with multiparty and high-profile sites and integrating remediation and redevelopment plans with sensitive land use designs, such as residential neighborhoods, schools, recreational facilities, or sensitive wildlife habitats.



PCBs are a continuing challenge in industrial products and equipment reclamation and disposal as systems are upgraded or replaced.

POLYCHLORINATED BIPHENYL (PCB) CHALLENGES

Polychlorinated biphenyls (PCBs) are a group of man-made chemicals that consist of a biphenyl molecule with anywhere from 1 to 10 chlorine atoms attached. The number of chlorine atoms and their locations in a PCB molecule determine many of its physical and chemical properties and toxicity.

Each PCB has a common structure of a biphenyl molecule where each possible variant is called a congener. Although there could be as many as 209 PCB congeners, not all congeners are found in manufactured PCB mixtures. Many individual congeners have compound-specific toxicity profiles and criteria for use in assessing human health exposures. PCBs were manufactured and sold under many names, and the most common (in the US) was the Aroclor series. Aroclors represent mixtures, often weathered in the environment. Aroclors are designated by the series (the first two digits) followed by the percentage of chlorine by mass in the mixture (the second two digits). Hence, Aroclor 1260 designates a 1200-series mixture, with 60% chlorine by mass.

PCBs were commercially produced in the United States from 1929 and were used primarily as insulating fluids in capacitors, transformers, and other electrical equipment until manufacturing was banned in the US under the Toxic Substances Control Act (TSCA) in 1976 and internationally in 2001. Although no longer commercially produced in the United States, PCBs can be present in products and materials produced before the 1976 PCB ban. PCBs are persistent in the environment, remaining in place for long periods of time in environmental media. PCBs can be transported long distances entrained in either air as dust or overland flow adhered to suspended particulates during precipitation events and surface water flow. In some instances, PCBs are volatile enough to compromise worker beathing zones. Additionally, PCBs are a continuing challenge in industrial products and equipment reclamation and disposal as systems are upgraded or replaced.

> PCB congeners are sometimes separated into two categories, dioxin-like and non-dioxin-like, that are defined by structural differences and the fact that they operate via different toxicological mechanisms. The dioxin-like PCBs are structurally and toxicologically related to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), which has been studied very extensively in toxicological and epidemiological research.

PCBs bioaccumulate and biomagnify in the food chain, which compounds issues for higher food chain receptors, including humans. Predominant general population exposures are chiefly related to consuming fish and shellfish. While we have surrogate-based toxicity criteria to assess human health implications for Aroclor data, congener-specific data are preferred when assessing human health exposures, allowing risk assessors to address dioxin-like effects of a small number of congeners. In contrast, most ecological testing has been conducted on Aroclors, so available ecotoxicity data reflect these mixtures. Where both human health and ecological concerns are evident at a site, both congener-specific and Aroclor-based data may be required to support informed risk management. Both PCB categories have been associated with adverse animal and human health outcomes, and there is significant uncertainty regarding congener-specific potencies, particularly for outcomes most relevant to children's health.

Due to how pervasively PCBs were used in industry, they remain widely distributed in the environment and are present at many Superfund sites. The persistent nature of PCBs and their distribution through the food chain has resulted in continuing human and ecological exposures. Additional challenges also lie in applied forensics—analyzing and identifying various sources based on varieties of PCB congeners or mixtures. Geosyntec has expert specialists that can help with the wide array of challenges that PCBs present.



PROJECT HIGHLIGHTS

Geosyntec continues to help clients address new and evolving concerns related to historical and legacy pollutants. Our risk assessment and toxicology professionals use tried-and-true methods or design innovative sampling and assessment programs to address complex problems.

COMPREHENSIVE REMEDIAL DESIGN OF THE GOWANUS CANAL SUPERFUND SITE | BROOKLYN, NEW YORK

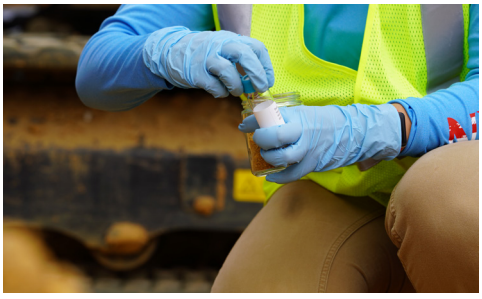
- Our technical experts critically reviewed the human health and ecological risk assessments underpinning the remedial investigation/feasibility study to inform remedial design and remedial action.
- We reassessed naturally occurring, nonanthropogenic and anthropogenic background conditions; refined the applied toxicology and health-based criteria, updated the assessment of sensitive subpopulation scenarios as receptors of concern, and conducted a systematic review of carcinogenic polycyclic aromatic hydrocarbons (PAHs), PCBs, heavy metals, and dioxin and furans in a cumulative assessment of site-related risk and hazards.
- Our staff assessed data gaps, conducted detailed data evaluations, and assessed statistics to redefine assignment of quantitative expressions of carcinogenic risk and noncarcinogenic hazard.
- Our experts developed a novel quantitative risk model to direct health-mediated allocation and assign remediation costs among all stakeholders, refining risk-driven decision criteria for PCBs and mapping preferred strategies.
- Our expert's work resulted in avoiding dredging of river and bay sediment, saving the client millions of dollars. In addition, our effective risk communication with local stakeholders dramatically relaxed community tension and relations.

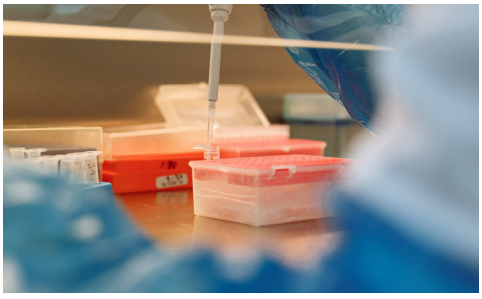
NOVEL ASSESSMENT OF NURSING INFANT EXPOSURES TO DIOXIN-LIKE PCBs | COLUMBIA RIVER, OREGON

- Geosyntec successfully assisted a client in overcoming a challenging impasse with the Oregon Department of Environmental Quality regarding PCB (and dioxin-like PCB) toxicity, degree of daily exposure, and extent of contamination along the Columbia River.
- We used novel applied toxicology and risk assessment techniques to refine the understanding of specific congener and dioxin-like congener impact to a Native American subsistence fishing population, where nursing infants of effected populations were considered the critical sensitive subpopulation receptors.

LAUREL HAWTHORN EMBAYMENT EAST SEDIMENT INVESTIGATION SAN DIEGO, CALIFORNIA

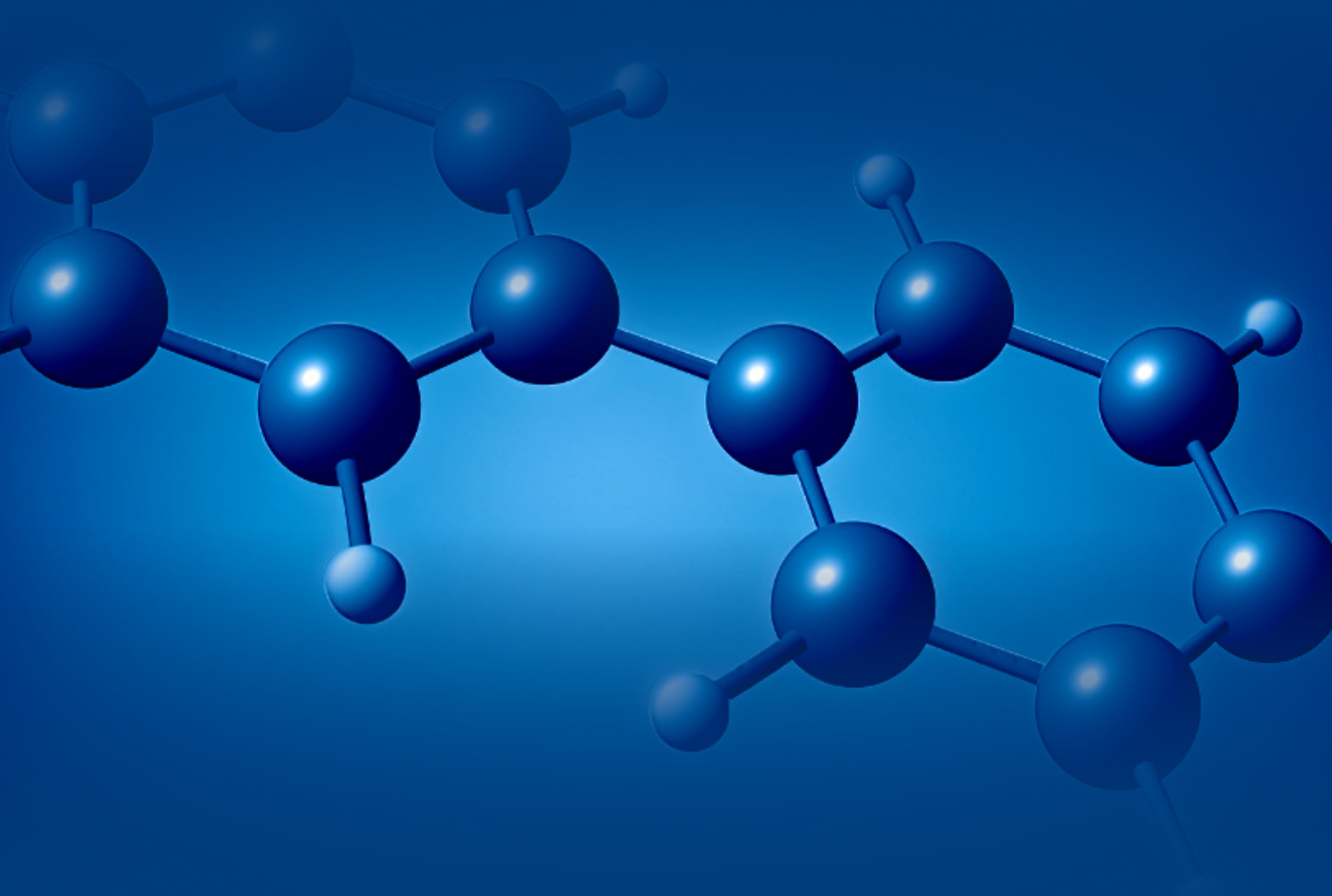
- Geosyntec conducted a sediment investigation and risk assessment in the Eastern Laurel Hawthorn Embayment of San Diego Bay under a Regional Water Quality Control Board Investigative Order. The study was designed to further characterize the sediment in this embayment, delineate contamination due to PCBs and other constituents of potential concern, and evaluate risks from PCBs and other constituents to human health, wildlife, and benthic macroinvertebrate to determine the need and extent for potential remedial actions.
- Geosyntec led the development of the work plan and implemented the study that included collecting and analyzing sediment, surface water, invertebrates, and fish for chemical analysis; conducting sediment toxicity testing; analyzing benthic community; and completing risk assessments for aquatic (benthic) life, wildlife, and adult and child recreational angler exposures related to concerns due to fish consumption and direct complete exposure pathways.
- For the wildlife risk assessment, we designed a food web model and determined parameters for three avian receptors potentially consuming fish and/or invertebrates. No-effect and low-effect tissue screening levels were back-calculated based on USEPA- and literature-derived toxicity reference values and a screening level ecological risk assessment was prepared.
- The human health risks associated with ingesting local fish with elevated PCBs were related to sediment PCB concentrations using a bioaccumulation model in accordance with the State of California's Sediment Quality Provisions. Results indicated that PCBs pose a potential risk to humans who consume fish and shellfish, which suggests the potential for sediment management to reduce risks.







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