

**AN EVENT-BY-EVENT PROBABILISTIC METHODOLOGY
FOR ASSESSING THE HEALTH RISKS
OF PERSISTENT CHEMICALS IN FISH:
A CASE STUDY AT THE PALOS VERDES SHELF**

Natalie D. Wilson

N. D. Wilson & Associates, LLC, Huntington Woods, Michigan, USA

Paul S. Price

AMEC Earth and Environmental, Portland, Maine, USA

Dennis J. Paustenbach

ChemRisk, Woodside, California, USA

A human health risk assessment of recreational anglers who consume fish from the Palos Verdes Shelf was conducted. The uptake of DDT, DDE, and DDD (collectively total DDT or tDDT) and polychlorinated biphenyls (PCBs) due to fish ingestion was characterized using Monte Carlo techniques. This analysis relied upon 176 probability density functions developed from over 300,000 individual pieces of information to represent 17 different exposure factors that influence the human uptake of persistent organic chemicals in fish. The carcinogenic and noncarcinogenic risks were estimated using a microexposure event modeling approach that estimates exposure on an event-by-event basis. This evaluation relied upon several large studies that provided site-specific data on angler behavior and concentrations of chemicals in 13 fish species. Our results indicate that the median theoretical increased lifetime cancer risk associated with estimated exposure to tDDT and PCBs was 5×10^{-9} for anglers who fish on commercial passenger fishing vessels (CPFVs) and who catch and eat fish from the Palos Verdes Shelf. The mean risk for these anglers was 2×10^{-7} , and the 95th percentile risk was 8×10^{-7} . At the 95th percentile, the hazard quotients for anglers were less than 1, indicating that noncancer effects are unlikely. These results are in contrast with prior risk assessments of this site that suggested that consumption of white croaker alone posed a cancer risk of 2×10^{-1} and a hazard quotient of 32. Our results were validated by their agreement with several independent local studies regarding fishing and consumption practices. This assessment indicates that the levels of tDDT and PCB in fish at the Palos Verdes Shelf do not pose a significant risk to human health among recreational anglers. Based on the size of the local angler population, no cases of cancer would be expected to result from eating Palos Verdes Shelf fish. The methodology used here should be applicable to characterizing the risks to those who ingest fish from the waterways of most industrialized nations.