

Identification and bioavailability of toxic components in heavy oil

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Our objective is to identify the components of heavy oil (Fuel Oil No 6; i.e. Bunker C) that cause chronic toxicity to fish embryos. Following the 2005 spill of Bunker C into L. Wabamun, AB, it was evident that there are few data on aquatic toxicity to assess the unique ecological risks of oil that sinks and contaminates spawning shoals. Using different exposure scenarios, we will demonstrate bioavailability and toxicity of the components of Bunker C that persist after oil spills and that threaten fisheries recruitment. As well, tests of enhanced chemical metabolism in trout cells in culture, and of chronic toxicity to trout embryos will be combined with chemical analyses of oil fractions to identify those classes of compounds associated with toxicity. The products of this research will be: (1) a first-ever identification of the components of a heavy oil associated with chronic toxicity to fish; (2) perspective on how heavy oil compares to a medium and light oils in terms of toxicity, the nature of toxic effects, and the chemical structures associated with toxicity; (3) toxicity data for ecological risk assessments and site remediation; (4) an effects-driven fractionation strategy for future assessments of other heavy oils, and (5) specific methods for fractionation, toxicity testing, and chemical analysis. To meet a growing need for environmental scientists as large numbers of government and industry scientists retire over the next 10 years, this project will train two MSc and two PhD students, plus 3 undergraduates annually. Students will receive extensive training in toxicology at Queen's and Waterloo and in oil separation chemistry and analytical chemistry at Queen's and at the Oil Research Laboratory (ORL) of the Emergencies Science and Technology Division (ESTD) of Environment Canada, and at the Center for Offshore Oil and Gas Environmental Research, Bedford Institute of Oceanography, Fisheries and Oceans, Dartmouth NS .

The project page to link to is:

<http://biology.queensu.ca/~hodsonp/grants.htm>

For now, this contains just the abstract. This will change as the project develops. The project has not yet had it's kickoff meeting, but should within the month. Peter anticipates that this will be a 3-4 year project (I said two at the WG).

Kind Regards,

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