TESC 496

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Toxicity in Pulp Mill Effluent

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Industrial plants, such as pulp mills, regulate the quality of wastewater they produce, as per federal and state regulations. A local pulp mill near Aberdeen, Washington, constantly ran testing on their effluent (wastewater), to make the necessary adjustments in their treatment procedure. This mill has been plagued with failed Chronic Toxicity Tests for the last four decades. Results from these tests with greatest toxic response of marine bivalves was to the High Molecular Mass (HMM) components. Filtering water to bring the >10,000 molecular weight fraction (Daltons) down greatly reduced the toxic response of the bivalves, though HMMs are hard to remove through secondary treatment. To find a cause for the HMM spikes, data was gathered from sensors across the mill to potentially locate notable abnormalities. Results showed several data points coincided with failed effluent tests, such as the high biological oxygen demand (BOD) count in the effluent. No definitive culprit could be identified as the cause for the HMMs. However, the natural plant life decaying along the waste stream may have been the reason for high tannins and therefore, HMMs and high BOD. Notwithstanding, the HMM spikes did not correlate with seasonal patterns expected with plant decay. A source of tannins could be in red liquor, a syrup-like byproduct of the “pulp cooking” process. To conclude, future research is needed to determine the exact source and identity of the culprit toxin.