1135-VN-2095 **Curtis Taylor Peterson*** (curtistaylorpeterson@gmail.com), AZ , and **Wenbo Tang**. *On the Nature of Advection-Diffusion-Reaction Systems Exhibiting Long-Term Limit Cycles or Stable Asymptotic States at a Bifurcation Point.*

The nutrient-phytoplankton-zooplankton (NPZ) equations describe the time evolution of uniform concentration fields of plankton subject to various degrees of predation and availability of nutrients in the biogeochemical system. This set of equations may exhibit a transition in its long-term behavior at a bifurcation point, such that the system can either be driven to a stable asymptotic state or a limit cycle. We extend upon the NPZ system by first studying the behavior of interacting chemical species with stable limit cycle behavior subject to a non-uniform background flow field by studying a system of coupled advection-diffusion-reaction (ADR) equations with periodic reaction terms. We show, given some impurity confined in different flow patterns, that our system's long term behavior can reach either a stable asymptotic state or a limit cycle at a bifurcation point. We then investigate our system's behavior in both cases. (Received September 25, 2017)