UTC Project Information	
Project Title	Assessment of Lube Oil Management and Self-Cleaning Oil Filter Feasibility in WSF Vessels Phases II and III: Part 1 Report
University	Washington State Univerisity
Principal Investigator	Quinn Langfitt and Liv Haselbach
PI Contact Information	E-mail: quinn.langfitt@email.wsu.edu; haselbach@wsu.edu; Phone: (509) 335-4874
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Brief Description of Research Project	Washington State Ferries (WSF) has proposed an alternative of the propulsion engine lubricating oil (lube oil) filtration systems on some vessels in their fleet. Currently, WSF uses disposable cartridge filters for oil filtration on most vessels. Self-cleaning oil filters could be installed which would eliminate the need for disposable filter cartridge changes and might raise the particle removal efficiency. WSF began with a pilot installation on one of two engines on the M/V Chetzemoka in early 2014 and is interested in utilizing a three pronged perspective in their decision making on whether to install more of these filters in their fleet, considering operational performance, cost savings, and potential environmental benefits. These three perspectives are the focus of this research endeavor, with operational performance considered through lube oil analysis of samples taken from the M/V Chetzemoka, potential cost savings through a life cycle cost analysis (LCCA), and potential environmental impacts through a life cycle assessment (LCA) methodology. This report covers the first stage of this research effort: a background on lube oil analysis, a rough order of magnitude life cycle cost analysis of lube oil and the filtration alternatives, and an overview of environmental impacts of lube oil and some disposal methods through life cycle assessment methodologies. The preliminary LCCA shows that for a retrofit vessel such as the M/V Chetzemoka, cost savings would likely be achieved by installation of a self-cleaning filtration system, considering a 50 year life cycle. These savings would be even greater for installation on a new vessel. The environmental impact data assembled and modeled herein gives

	WSF a simple tool for approximating environmental impacts from an LCA perspective separately for acquisition and disposal by distillation. It can be applied directly to the filter problem, or in other capacities when oil use and disposal volume changes are involved. For the acquisition of lube oil, the most significant impact category with respect to US daily normalization per capita is Human Health Non-Cancer. For disposal through distillation to other products, the benefits gained from offsetting these products are always higher than the impacts of the disposal process. Future work is ongoing to gather more information on the oil analyses with the self-cleaning oil filter over extended periods. With this additional information, the work herein will be updated. For the environmental analysis, future work might relate the gallon functional unit to different functional units relevant to WSF operations such as passenger/vehicle capacity, etc. Additional future research could be to expand the analyses to consider other vessels in the fleet.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • Reports • Project website	Assessment of Lube Oil Management and Self-Cleaning Oil Filter Feasibility in WSF Vessels Phases II and III: Part 1 Report http://depts.washington.edu/pactrans/wp-content/uploads/2013/11/PacTrans-44-739428-Haselbach-Liv-Small-Project.pdf