

The Official Publication of the Passenger Vessel Association • December 2008

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Vessel Review

Washington State Ferries Tests Bio-fuels in a Large-Scale Project

By Shawn Devine, Washington State Department of Transportation Ferries Division

As the largest ferry system in the nation, Washington State Department of Transportation (WSDOT) Ferries Division/Washington State Ferries (WSF) is committed to providing safe and reliable marine transportation to its 24-million annual passengers. The ferry system uses approximately 17 million gallons of diesel fuel annually on its 22 operating vessels, making it a significant diesel fuel user in the Puget Sound area.

Through innovative environmental programs and partnerships with maritime stakeholders WSF is working to conserve fuel, reduce pollution and save taxpayers' dollars.

One such program is the Biodiesel Research and Demonstration Project – a three-phased pilot test of biodiesel fuel use in the marine environment. Biodiesel is made from animal fats, cooking greases and vegetable oils such as soybeans. It contains almost no sulfur and reduces toxic pollutants and could potentially reduce greenhouse gas emissions into the atmosphere from our fleet. The ferry system is partnering with the Puget Sound Clean Air Agency (PSCAA) and other regional stakeholders to administer this project. This controlled scientific study's three phases encompass research, lab experimentation, and a fuel demonstration on three 87-car vessels: *Issaquah*, *Tillikum*, and *Klahowya*.

"We're committed to responsible stewardship of Puget Sound," said David Moseley, Ferries Division Assistant Secretary. "This pilot project is an exciting chance to see

how we can make changes to one part of the ferry system and contribute to preserving the environment for the citizens of Washington."

In March, the demonstration phase of the project began with biodiesel testing aboard the *Issaquah* and *Tillikum*. These vessels typically serve picturesque Vashon Island located in central Puget Sound between Seattle and Tacoma.

Project goals include identifying



problems which caused WSF to discontinue previous biodiesel testing in 2004 and 2005, and development of a fuel quality-assurance testing system and guidance document to ensure that biodiesel quality remains high from the point of production to actual operations in WSF vessels.

"We are taking a scientific approach to this demonstration. We have worked closely with our project partners to develop testing procedures and protocols for this phase of the project," says project manager

Paul Brodeur, Ferries Division Director of Vessel Maintenance, Preservation and Engineering.

Initially the boats were fueled with a five percent blend (B5) of biodiesel and ultra-low sulfur



diesel. As the demonstration progresses, biodiesel blends are increased to a 10 percent (B10), followed by a 20 percent blend (B20). In addition to testing different percentages of biodiesel, the ferry system is also testing three different types of biodiesel feedstocks: soy, canola, and tallow (high-cloud point).

The *Issaquah* is currently running on a B20 blend of soy-based biodiesel. There have been no problems in the vessel's operational performance running on biodiesel so far.

"The *Issaquah*'s performance has been remarkable thus far. There have been no problems with filter clogging which was experienced in WSF's previous biodiesel pilot project in 2004," Brodeur said. "There is no no-

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ticeable difference in this fuel type as compared to burning ultra-low sulfur petroleum diesel.”

In April, the *Tillikum* began running on a B5 blend of canola-based biodiesel. The vessel’s increase to a ten-percent biodiesel blend was delayed due to sludge accumulation in the vessel’s fuel purifier. Laboratory studies conducted by the University of Idaho indicated that this was likely due to microbial growth in the fuel stored in the vessels tanks. This issue has been resolved through the application of a fuel biocide. The vessel has now increased to a B20 blend.

Previous biodiesel testing by WSF in 2004 was suspended after reports of clogging in the fuel filters and oil purifiers. Using lessons learned from those tests, WSF began working with

its project partners to develop the current research and demonstration project.

In July, WSF began operating its third vessel – *Klahowya* – with a B5 blend of tallow-based biodiesel. The vessel is now operating on an B20 blend and has experienced no operational difficulties to date.

Biodiesel testing is expected to continue through February 2009. Testing results will be used to create a published document guiding the marine industry in the use of biodiesel.

In addition PSCAA, project partners include Seattle City Light, the U.S. Department of Energy, Washington State University, Imperium Renewables, University of Idaho, Rainier Petroleum, Sound Refining, the Glostén Associates, and

Gen-X Energy Group.

More information about the Biodiesel Research and Demonstration Project is available on the WSDOT Washington State Ferries Web site at: www.wsdot.wa.gov/Ferries/Environment/biodiesel. ■

About the Author

Shawn Devine is a communications consultant at Washington State Department of Transportation Ferries



Division. He can be reached at 206-515-3771 or DevineS@wsdot.wa.gov.