

FINAL DRAFT
Diesel Retrofit Technology and Program Experience National Park Service Biodiesel

Retrofit Project Summary

BACKGROUND INFORMATION

Date: February 9, 2005 **Location:** Denali National Park, AK

Report based on status of project as of January 24, 2005

Contact Organization: Alaska Department of Environmental Conservation (DEC)

PROJECT DESIGN

Project Description/Objectives/Project Evaluation – The project involves using fish oil derived biodiesel in stationary power generators outfitted with DOCs in Denali National Park. Alaska DEC is interested in developing and implementing strategies to reduce power generation and home heating emissions. DEC is supporting efforts to develop a local source of affordable ULSD.

Partners – The National Park Service (logistical and mechanical support), the Alaska Energy Authority (provide fuel through a contract), Alaska DEC (program support and allocates funding from EPA for fuel cost differential and retrofit hardware), and U.S. EPA (funding)

Status – Project is in the planning stage.

Funding – The U.S. EPA is providing funding for this project. The National Park Service is contributing in-kind services.

Major Program Elements – Major planning elements include: 1) identifying an affordable source of raw material (fish oil), 2) identifying the process by which the fish oil would be made into biodiesel, 3) identifying a way to test biodiesel in a controlled environment, 4) identifying a way to purchase biodiesel and 5) determining who would handle fuel transportation and who will install the retrofit technologies selected. The implementation elements of the program include: 1) establishing a way to transport the biodiesel into Denali National Park, 2) selecting a method for storing the biodiesel, and 3) insuring that gelling of the biodiesel does not occur.

Voluntary – The National Park Service has set a goal to be petroleum-free over the next ten years. This project is an attempt to help meet that goal. The incentives to initiate the project were the availability of funding and the desire to improve air quality, and avoid potential oil spill cleanup by switching from diesel fuel to 100% biodiesel. DPF technology was considered but because a continuous supply of biodiesel based ULSD could not be guaranteed, the decision was made to select DOC technology for this project.

Overall Comments on the Program – Project partners have determined that fish oil can produce a fully functional biodiesel fuel in current diesel engines. However, the fuel gels at just below 32F and this will prove problematic for winter use. DEC suggests that changes in fuel storage (i.e., heated and insulated) or blending would have to occur for this fuel to be practical in Alaska's most rural environment. The program is designed to determine the utility of the fuel in remote areas of the state and its potential for reducing diesel emissions.

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VEHICLE/EQUIPMENT FLEET APPLICATION

The two power generators are 2001 model year Onan 55 kW/DGCB equipped with Cummins 239.39, model 4BT3.9G4. The generators operate one at a time from May 1 through September 31, 24 hours a day, seven days a week. This is about 1,800 hours per generator per season. July temperatures range from 50 to 72F but can get below 50F in July at Toklat. Freezing is not uncommon. The generators operate at approximately 3,000 ft. above sea level. At the time of retrofit, the engines are expected to have no more than 5,000 hours of operation.

RETROFIT TECHNOLOGY CHARACTERISTICS & PERFORMANCE

Technology/System – The DOCs will likely be retrofitted in May/June 2005.

FUELS AND LUBRICANTS

Fuel Properties – The plan is to use 100% biodiesel.

Supply -- The biodiesel supplier will be a contractor to the Alaska Energy Authority.

Operation – There is concern about gelling problems with the biodiesel fuel at temperatures below 32F. For the majority of time during the operating season (May through September) temperatures are expected to be above freezing.