DEPARTMENT OF
ECOLOGY
State of Washington

Department of Ecology Progress Report to 2011 Legislature

Development of a Diesel Idle Reduction Program at the Port of Tacoma and Other Efforts to Reduce Diesel Particulate Matter in Tacoma

December 2010
Publication no. 10-02-035

Publication and Contact Information

This report is available on the Department of Ecology's website at
www.ecy.wa.gov/biblio/1002035.html

For more information contact:

Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

Phone: 360-407-6800

Washington State Department of Ecology - www.ecy.wa.gov

o Headquarters, Olympia	360-407-6000
o Northwest Regional Office, Bellevue	425-649-7000
o Southwest Regional Office, Olympia	360-407-6300
o Central Regional Office, Yakima	509-575-2490
o Eastern Regional Office, Spokane	509-329-3400

To ask about the availability of this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Department of Ecology Progress Report to 2011 Legislature

Development of a Diesel Idle Reduction Program at the Port of Tacoma and Other Efforts to Reduce Diesel Particulate Matter in Tacoma

by
Mike Boyer

Air Quality Program
Washington State Department of Ecology
Olympia, Washington

This page is purposely left blank

Acknowledgements

The author of this report would like to thank the following people for their contribution to this report:

- Ron Stuart, Environmental Project Manager – Air Quality, Port of Tacoma
- Puget Sound Clean Air Agency's Diesel Solutions staff – Beth Carper, Amy Fowler, Elizabeth Gilpin, and Leslie Stanton
- Frank Van Haren – Diesel Projects Manager for Washington Ports, Department of Ecology

Introduction

The 2010 State Legislature provided the Department of Ecology (Ecology) $1,000,000 to reduce diesel particulate matter in Tacoma. This funding is on the condition that Ecology will work with the Port of Tacoma (the Port) to establish a diesel idle reduction program at the Port. The 2010 Supplemental Capital Budget appropriation requires Ecology to provide a progress report to the 2011 Legislature. This report describes the collaborative effort between Ecology and the Port to develop an idle reduction plan and reduce emissions in Tacoma.

Development of Port of Tacoma Idle Reduction Program

In October 2010, the Port and Ecology signed an MOU to develop and implement an idle reduction program. The agencies will work together to reduce engine idle time for vehicles and equipment operating on port property. Through December 31, 2017, this MOU commits the Port and Ecology to:

- Develop an idle reduction work plan that includes goals, milestones, and annual progress reports.
- Seek federal, state, and local funding support to provide idle reduction technologies for publicly and privately owned diesel vehicles and equipment.
- Develop a diesel idle reduction education program for the Port's vehicle and equipment owners, operators, and technician/mechanics.

This program will provide both public health and financial benefits, including reduced toxic emissions and greenhouse gases, reduced diesel fuel consumption, and reduced engine wear and tear. Ecology and the Port will also explore opportunities for electrification projects. The Port will include a progress report on the idle reduction program as part of the Port's annual progress report for the Northwest Ports Clean Air Strategy.

The Port and Ecology will collaborate to determine the best ways to reduce diesel engine idle time at the Port. Ecology will use some of the appropriated state funds to install idle reduction technologies on locomotives, cargo handling equipment, trucks, and marine vessels.

- Locomotive/Rail
  - Install automatic engine stop/start systems on all switchyard locomotives.
  - Install wayside power units for commuter trains ("shore power" for locomotives).

- Cargo Handling Equipment
  - Identify appropriate idle reduction or electrification technology for each equipment type.
  - Implement education program for owner, operators, and technician/mechanics.
  - Develop strategy and set goals to install technologies.

- Heavy-duty Trucks
  - Identify appropriate idle reduction technology for vehicles.
  - Implement education program for owners/operators.
  - Promote hybridization and electrification of vehicles.
  - Develop strategy and set goals to install technologies.

- Marine Vessels
  - Ocean-going Ships: Idle reduction technologies for ocean going vessels tend to be very expensive, so Ecology and the Port will pursue federal funding for shore-power for ocean-going ships. Some future state, local, or private funds may be needed to help leverage federal funds.
  - Harbor Vessels (Tugs): Tugboat use at the Port of Tacoma is very minimal, so Ecology and the Port do not anticipate providing funds to install idle reduction technologies on tugs. However, Ecology and the Port will investigate to determine if installing idle reduction technologies on tugs is cost effective for tugs that operate in Tacoma waters at least part of the time.

Grant Management Program

Ecology will provide grants to install idle reduction technologies on both public and privately owned diesel vehicles and equipment. In addition to the state funding provided by the 2010 Supplemental budget, Ecology will seek federal funding to establish and support an on-going idle reduction program. The Port also will seek additional funds for replacing conventional diesel vehicles and equipment with pure electric or hybrid diesel/electric vehicles and equipment. Although pure electric and hybrid diesel/electric engines will significantly reduce diesel emissions, the difference in cost for purchasing these vehicles and equipment greatly exceeds the state funds available.

- Ecology will manage a grant program that provides:
  - up to 100% of funding for idle reduction technologies on publicly owned diesel vehicles and equipment, and;
  - up to 50% of funding for privately owned diesel vehicles and equipment.

- To help equipment owners identify the appropriate idle reduction technology for their operations, Ecology will provide up to 100% of funding for selected pilot projects on privately owned vehicles and equipment.

Education Programs

The Port and Ecology will develop and implement an idle reduction education program for equipment owners, operators, and technicians/mechanics. The education program will include:

- Site visits to port tenants to make presentations on the idle reduction program, idle reduction technologies, and opportunities to participate in pilot projects
- Require contractor training for operators and technicians/ mechanics on all purchased and installed idle reduction technology.

2013 Idle Reduction Program Goals

Ecology and the Port will work together to achieve the following program goals:

- Locomotive/Rail
  - Install automatic engine stop/start systems on all switchyard locomotives and install wayside power units for Sounder and Amtrak trains.
- Cargo Handling Equipment
  - Implement an idle reduction pilot project on about 30 pieces of equipment; three to five pieces of equipment for each equipment types; assume about six to seven equipment types.
  - Provide each port tenant an opportunity to participate in a fully funded (grant) idle reduction or electrification pilot project.
  - Develop and implement an idle reduction program for equipment owners, operators, and technicians/mechanics.
- Heavy-duty Trucks
  - Implement pilot project on three to five vehicles.
  - Implement idle reduction demonstration project on up to five vehicles.
  - Adopt a mandated anti-idle policy (manually shut down after two minutes of engine idling).

New Projects to Reduce Diesel Particulate Matter in the Tacoma Area

Ecology, the Puget Sound Clean Air Agency (PSCAA), and the Port are collaboratively selecting projects. Selection is based on overall health benefits, cost and cost effectiveness, ability to leverage additional federal funds, and the expected project schedule. The project applications received greatly exceed the amount of funding available.

Ecology has committed almost two-thirds of the $1 million in Tacoma diesel funds. An additional $2.5 million in federal funds and $35,000 in private funds are leveraged. PSCAA submitted a grant application to EPA proposing to leverage $920,000 in federal funds and $340,000 in private funds. The project partners are finalizing commitments for the remaining funds that potentially would leverage additional private funds.

Current project commitments:

- Ecology awarded $400,000 to the City of Tacoma as matching funds for a $2.5 million Federal Congestion Mitigation and Air Quality (CMAQ) grant to scrap and replace 200 pre-1994 heavy-duty diesel trucks. Most replacement trucks will also be retrofitted with exhaust controls to further reduce diesel emissions.
- Ecology will award $55,000 to $80,000 to install anti-idle technologies on four to six switchyard locomotives operating at the Port of Tacoma. (The exact number of locomotives has yet to be determined.) The locomotive owners will contribute another $35,000 to $58,000 to the project.
- Ecology will provide $50,000 to $75,000 to pilot the installation of idle reduction technologies on cargo handling equipment at the Port. Because this type of installation is a new venture, the specific cost per vehicle and the amount of equipment selected for installations has yet to be determined.
- PSCAA and Ecology are using $100,000 as a cost share to apply to EPA for $920,004 in federal Diesel Emission Reduction Act (DERA) grant funds. These funds would be used to repower diesel engines on the Harley Marine "Eagle" tugboat. The project would replace two main engines and two auxiliary engines with new, less polluting engines. Harley Marine will contribute $339,998 to the project. (PSCAA submitted the application in January 2011. EPA expects to announce awards in June 2011.)

Background: Diesel Exhaust in Washington State

Ecology has identified diesel exhaust as one of the air pollutants most harmful to public health in Washington. Seventy percent of the cancer risk from airborne pollutants is from fine particles in diesel exhaust. It makes healthy people more at risk for respiratory disease and worsens the symptoms of people with health problems such as asthma, heart disease, and lung disease. More than 4 million people in Washington live or work close to highways and other major roads where they are most likely to be exposed to diesel exhaust. Information about the health effects of diesel emissions is available online at www.ecy.wa.gov/pubs/0602018.pdf.

Ecology's Air Quality Program developed the Diesel Particulate Emission Reduction Strategy for Washington State to reduce diesel emissions. In developing this strategy, Ecology analyzed the many sources of diesel exhaust and identified the ones most likely to affect public health.

The goals of this strategy are to:

- decrease the amount of diesel pollution emitted into the air; and
- reduce the negative health effects of diesel pollution, especially for:
  - children, the elderly and people whose existing health problems put them at risk (sensitive populations);
  - economically disadvantaged communities (environmental justice communities) that are exposed to more pollution than other communities.

Ecology and PSCAA have developed the Washington State Clean Diesel Program and the Diesel Solutions Program. So far, these programs have installed 13,000 retrofit exhaust controls on 10,000 engines, as well as idle reduction technologies on 100 engines. Exhausts controls reduce varying amounts of diesel particulate emitted from the tailpipe and the engine crankcase. Idle reduction technologies reduce all tailpipe and engine crankcase pollutants and greenhouse gasses by turning off the engine. For operational and safety reasons, idle reduction technologies must be appropriately matched to the vehicle or equipment operations. Examples of idle reduction technologies include idle limiters, engine pre-heaters, heating/coolant fluid circulating pumps, and auxiliary power units. Information on idle reduction technologies is available online at http://www.epa.gov/otaq/smartway/transport/what-smartway/verified-technologies.htm#idle.

Information about the health effects of diesel emissions and the benefits of Ecology's Clean Diesel Program is available online at http://www.ecy.wa.gov/programs/air/cars/diesel_exhaust_information.htm.

Information about PSCAA's Diesel Solutions Program is available online at http://www.pscleanair.org/programs/dieselsolutions/default.aspx.

Background: Reducing Diesel Emissions in the Tacoma Area

Effective December 14, 2009, the U.S. Environmental Protection Agency (EPA) designated the Wapato Hills-Puyallup River Valley area of Pierce County as nonattainment for federal air quality standards for particulate matter less than 2.5 microns in size ($PM_{2.5}$). Ecology and PSCAA must use a public process to develop a State Implementation Plan showing how this area will meet and maintain the $PM_{2.5}$ standards. A map of the Wapato Hills-Puyallup River nonattainment area is available online at http://www.ecy.wa.gov/programs/air/Nonattainment/DetailedWHPRVnonattainmentmap.pdf.

Ecology conducted a study to determine the sources of fine particle pollution in the Wapato Hills-Puyallup River Valley area. The study found that wood smoke is the single most important source of $PM_{2.5}$ in the area. Wood smoke contributed more than half of the $PM_{2.5}$ on most winter days, as well as on days when $PM_{2.5}$ levels were the highest. Motor vehicles, including both gasoline and diesel vehicles and equipment, contributed an average 13% of the area's $PM_{2.5}$.

EPA considers a contribution of 10% or more from motor vehicles to be a significant contribution to an area's pollution problems.

This study is available online at http://www.ecy.wa.gov/pubs/1002009.pdf.

Ecology and PSCAA have already installed retrofit exhaust controls on most publicly owned diesel vehicles and equipment in Pierce County. The Port, port tenants, Ecology and PSCAA are also working together to install retrofit exhaust controls on most public and private owned cargo handling equipment at the port. Using about $2 million in state and federal funds, project partners have installed exhausts controls on almost 900 diesel engines. The California Air Resources Board has found that every dollar invested in reducing diesel emissions results in $3 to $8 in savings in improved health, avoided health problems, or lower operating and maintenance costs for diesel fleets. These project accomplishments include:

- 14 of the 15 school districts in Pierce County retrofitted 626 school buses
- 11 public fleets in Pierce County retrofitted 173 public works vehicles.
- The Port plus six port tenants retrofitted 83 pieces of cargo handling equipment and scheduled another 68 retrofits.

Ecology and PSCAA are also working with fleets to reduce engine idle time. Tacoma Rail has installed automatic engine start/stop systems on several locomotives and Sound Transit's Sounder Commuter Rail has installed shore power, electric plug-in stations for their locomotives. Totem Ocean Trailer Express (TOTE) has installed idle reduction technologies on 10 pieces of cargo handling equipment. TOTE has also installed shore power infrastructure for their ocean-going vessels to plug into while berthed at the Port.

Ecology and PSCAA have made good progress toward reducing diesel emissions from public fleets in the Tacoma area and cargo handling equipment at the Port. However, these fleets only represent about ten percent of the diesel vehicles and equipment that operate in and through the Tacoma area. This means much more work is required to reduce diesel emissions from port container trucks, locomotives, harbor craft, and ocean going marine vessels.

Northwest Ports Clean Air Strategy

The Northwest Ports Clean Air Strategy is a strategy to reduce maritime and port-related diesel emissions that affect air quality and climate change in the Pacific Northwest. British Columbia's Port Metro Vancouver and Washington's Port of Tacoma, Port of Seattle, Ecology, Environment Canada, USEPA, and local clean air agencies are working collaboratively to implement this strategy. The agencies hope to reduce diesel emissions and deposition into Puget Sound earlier than regulations require. Information on the Northwest Ports Clean Air Strategy is available online at http://www.portoftacoma.com/Page.aspx?nid=226.