

## Appendix B: Site Evaluations and Sample Photos



		City of Seattle	King County Ryerson	King Country Bellevue	City of Tacoma
<b>Program Description</b>					
Date started using biodiesel		May, 2002	10/26/2004	7/23/04	October 2001
Fleet Description		3200 total vehicles, several departments	Gilligs and New Flyers transit busses	King County Metro Transit busses	Solid Waste Trucks
Number of vehicles using biodiesel		150+	195 -235	144	About 100
Types of vehicles using biodiesel, including engine type if available.		Light, medium, and heavy duty trucks of all brands; mowers, backhoes, loaders, sweepers, tractors, etc. Engine OEMs include Ford, Chevrolet, Dodge, Cummins, Kubota, Yanmar, John Deere, Deutch. Types: 4, 6, and 8 cylinder turbocharged and normally aspirated diesel engines.	3600, NFLF – 40' Cummins, ISL- 280,- 280 HP, Yr. 2003  2300, NFHF – 60', Cummins M11-E, 330 HP Yr. 2000  3200 Gillig- 40', Cummins M-11 – 280-E, 280 HP Yr. 1997  2800 NFLF 60' CAT – C9 330 HP. Yr. 2004.	Transit Coaches (Gillig) 112-Cummins M-11 & 32-Cummins ISC	Collection Fleet over the road trucks w/ mostly Cat and a few Cummins engines.
Preparations implemented when switching to biodiesel?—Tank cleaning, other steps taken?		Stocked up on fuel filters, experienced many filter changes shortly after switch, but no equipment was cleaned or prepped prior to switch.	None	Underground storage tanks cleaned 6 months prior to start of biodiesel & 5 micron fuel filters installed at fuel dispenser nozzles.	None
<b>Fuel Information</b>					

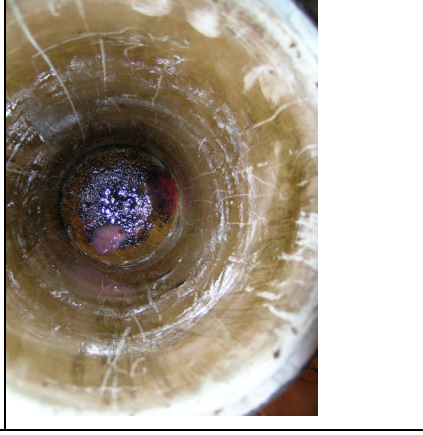
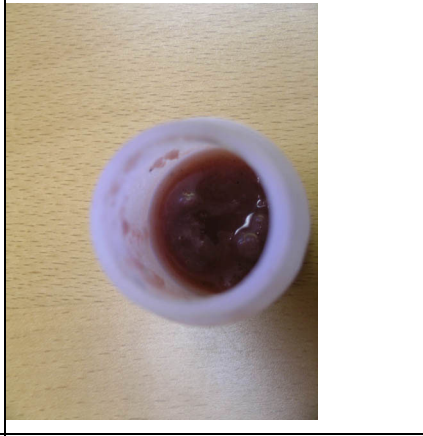
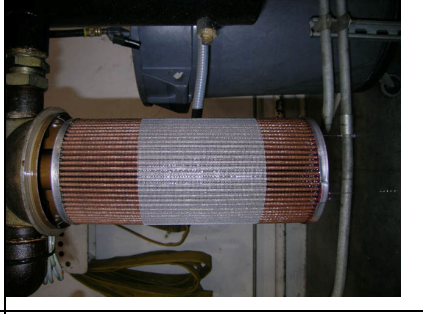
Blend percentage pre-blended or blended on site?	B20 pre-blended	B5 pre-blended	B5 pre-blended	B20 pre-blended
Source, specifications of petroleum diesel that is blended with the biodiesel. Mixed with ULSD?	ASTM Spec. ULSD	ASTM Spec. ULSD	ASTM Spec. ULSD	ASTM Spec. LSD
Biodiesel provider? Is this a BQ9000 producer?	APP - Some BQ9000	APP - Some BQ9000	APP - Some BQ9000	PNEC - BQ9000 from West Central Soy
Does the fleet purchase fuel to detailed specifications?	ASTM D-6751	ASTM D-6751	ASTM D-6751	ASTM D-6751
Does fleet obtain documentation showing the fuel meets ASTM standards?	No	No	No	No
<b>Distribution/Storage/Use Description</b>				
Provide step by step details of what happens to the fuel between the biodiesel producer and the end engine tank.	APP supplies B100 from manufactured by Seattle Biodiesel or World Energy, mixes ULSD with B100 to a B20 mix, and delivers it to our tanks in 8,000 gallon increments. Some equipment is refueled at dispensers and others deliver fuel to equipment on site every night. (Phone calls and email to fuel provider APP were not returned; info supplied by Scotty Conyne, Supervisor of Vehicle Maintenance)	960 gals of B-50 blended with 8,643 gals of ULSD at point of loading. Once the truck gets to Ryerson, fuel is offloaded into 3, 12,000 gal. underground tanks, from there fuel is pumped into Coaches through a 5 micron filter (Phone calls and email to fuel provider APP were not returned; info supplied by Scotty Conyne, Supervisor of Vehicle Maintenance)	960 gals of B-50 blended with 8,640 gals of ULSD at point of loading. All coach fuel tanks are filled nightly with onsite dispensers. (Phone calls to Frank Pupo Jr. at fuel provider APP were not returned, info supplied by Mark Quenzer, Vehicle Maintenance Supervisor)	Rail car to distributor, blender, tested and accepted, stored, and splash blended at the rack, delivered from distributor's truck directly into fleet vehicle fuel tanks (wet fill).
How is the fuel delivered to the site?	Tractor truck and trailer	Tractor truck and trailer	Tractor truck and trailer	Tractor truck

How is it stored? (Include tank type. Is tank filtration used? What is pore size / other key specifications of tank filter? Is biocide used? Any other maintenance, details to highlight?)	20,000 gallon underground tanks.	3 - 12,000 gallon XERXES double walled fiberglass underground tanks.	XERXES double walled fiberglass underground tanks. All tanks cleaned in 2004	Not stored/wet hosed/fleet fuel
How are vehicles fueled?	High volume dispenser	High volume dispenser	High volume dispenser	Fueled by the distributor's delivery truck
<b>Problem Description</b>				
When did the problems with biodiesel start?	Sept. 2005	Mar-05	N/A	January 2005
Where did the problems occur?	Mostly dispenser and coach filter clogging, with some injection pump replacements.	Dispenser and coach filter clogging	No significant problems to date. Initial filter clogging problems at beginning of program, glycerin was found in dispenser filters, and carbon found in coach filters – According to fuel tests conducted at time of problem.	Vehicle fuel filter clogging
Describe the problem.	Fuel filter clogging from Vaseline like substance	Dispenser filters clogged by an amber colored precipitate, and the coach filters were being clogged by a dark black precipitate.	Minimal clogged fuel filters, nothing out of the ordinary.	Clogged fuel filters with dark colored precipitate.
Do you have samples of the problem fuel and/or precipitate material?	Yes, both fuel and filters	Yes, fuel samples and filter samples from the dispenser and coaches.	N/A	Yes, both fuel and filters
<b>Site Evaluation</b>				
Date of site evaluation	1/12/06 & 2/9/06	1/19/2006	1/12/06	1/19/06

<p>Observations and evaluation related to problems reported (above).</p>	<p>City of Seattle is the only fleet to retain contaminated fuel and filter samples from their problems dating in September. At the time of our study, they were not reporting any significant problems, thus we only collected the samples from Sept.</p>	<p>Evaluated fuel filter system, dispensing system and storage tanks. Found black and amber colored precipitate materials in the filtration system.</p>	<p>Evaluated fuel filter system, dispensing system and storage tanks. Looked for material build up within the filtration system, and dispensing system.</p>	<p>No fuel dispensing system to evaluate.</p>
<p><b>Sampling</b></p>				
<p>Index of samples</p>	<p>Total of ten samples; two filters and eight fuel samples from various vehicles were provided by SEC.</p>	<p>Samples from each stage in the dispensing system; centrifuge, filter, and dispenser. Evaluated apparatus examining for material. A mixture of black and amber colored vaseline like precipitate at the bottom of the filter canister was observed. Sample scraped and placed it into a sample jar. Examined two vehicles and removed filter from each. Both were driven roughly 6,000 miles.</p>	<p>Two fuel samples, one from each dispenser on each island.</p>	<p>Received clogged filter and fuel sample from Jon Edick, Sr. Vehicle &amp; Equipment Shop Supervisor. Fuel sample had dark layer residing on the bottom.</p>

**Fuel Sample Photos**

<p>City of Seattle B20 Fuel from vehicle tank FS-5</p>	
<p>Vaseline like Substance FS-7</p>	

<p>King County, Ryerson Base Dispenser Filter Casing FS-13</p>	
<p>Scrapings from filter FS-13</p>	
<p>Filter FS-15</p>	

King County, Bellevue	City of Tacoma
Dispenser Filter	Fuel from delivery truck FS-20
Clean filter (not sampled)	Fuel from vehicle tank FS-19
