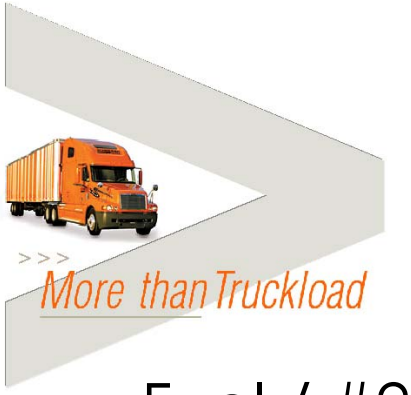

2007 Engine/OBD Maintenance/Operations

Fuel / #2 Diesel, Urea

- Availability:
  - Overall supply.
  - Supply of ULSD.
- Impact on winter blends.
- Additional cost due to actual production costs and market disruption.
- Urea availability and costs.
- Freeze protection of SCR.
- Urea distribution at company owned facilities.
- Consequence of fueling error (low sulfur in engine which requires ULSD) – need physical deterrent to prevent errors.

2007 Engine/OBD Maintenance/Operations

Adequate Field Evaluation Time

Purpose:

Reliability	(24-48 mos.)
Driving Performance	(12 mos [4 season])
Service Intervals	(12 –24 mos.)
Durability	(24 – 48 mos.)
MPG	(6 –12 mos.)

2007 Engine/OBD Maintenance/Operations

Shop Tools/Record keeping:

- Will existing tools accommodate new technology with reasonable upgrades.
- J1939 for OBD?
- Any new records required?

2007 Engine/OBD Maintenance/Operations

After treatment cleaning / service:

- Service interval.
- Service method – i.e. local shop cleaning, component exchange.
- Reliable method to determine when service is required, advanced notice.
- Replacement cost of aftertreatment components vs. commodity muffler.
- Fuel consumption / safety / maintenance requirements of active, on board regeneration systems.

2007 Engine/OBD Maintenance/Operations

Engine Oil / Coolants

- Oil drain interval/sump size.
- Common oil for all new technologies.
- Backward compatible.
- Oil specification for 2007, 2010.
- Continued use of on board automatic oil consumption (i.e. Sentinel like).

2007 Engine/OBD Maintenance/Operations

Potential Engine Oil Impacts:

- Requirement to stock and manage multiple specs of oil.
  - Infrastructure costs to store and distribute.
  - Risk of errors – wrong oil in wrong truck.
  - Higher cost due to smaller volume purchase.
  - Higher disposal costs.

2007 Engine/OBD Maintenance/Operations

Cost Performance

- Purchase price.
- Warranty.
- MPG.
- Residual value.
- Maintenance
  - Service.
  - Repairs.
- Downtime.
- Inventory / infrastructure.
- Trade Cycle
  - Cost benefit new vs. used.
- Competitive impact:
  - Timing due to trade cycle.
  - Market vs. cost based pricing.
  - Proactive cost awareness among small operations.

Fleet Cost Estimate

October '02 Engine Cost Impacts/Tractor

	Cost Area	Additional Cost Range/Tractor Minimum	Maximum	Actual
1.	Purchase Price Combined OEM and engine manufacturer	$4,000	$5,000	$4,500 - $5,500
2.	Residual value reduction @ 4-6 years of age.	$3,000	$5,000	TBD *
3.	MPG loss @ 3% - 5%.	$720 / yr. $4,320 / 6 yr. life	$1,200 / yr. $7,200 / 6 yr. life	EGR -5% +
4.	Operating Costs - Service&Repairs	$3,500	$8,260 / 6 yr. life	TBD
5.	Total Incremental Costs	$14,820	$25,460	
6.	Net Present Value Costs for 6 years @ 8% Discount Rate	$11,688	$19,607	
7.	Additional Present Value Costs per Year from the Purchase of 2000 Tractors per Year	$23,376,000	$39,214,000	TBD - to be determined

Total Cost of '02 and '07 Engines

	2002	2007	Combined 2002/2007
Purchase price	$4,500	$16,000	$20,500
Fuel MPG	$5,500	$7,200	$12,700
Maintenance	$6,000	$9,000	$15,000
Other (Fuel CPG)		$5,100	$5,100
Total Operating	$11,500	$21,300	$32,800
Residual value reduction	$4,000	$5,000	$9,000
Total Cost	$20,000	$42,300	$62,300
NPV (6 years @ 8%)	$15,000	$35,000	$50,000