Alaskan Diesel Retrofit Projects
Alaska Department of Environmental Conservation

Clint Farr
(Delivered by Wayne Elson)

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Alaska Diesel Retrofit Projects

Retrofit History

• Anchorage School District Bus project - 2004
• National Park Service biodiesel and retrofit - 2006
• ADEC brokered SEP funding for American Lung Association of Alaska project - 2007
• North Slope Oil Producers project – 2008 and ongoing
• DERA
Anchorage School District Retrofit

Old Mufflers
Alaska Diesel Retrofit Projects

Anchorage School District Retrofit

- Learned the importance of a project “champion”
- Funded with EPA school bus and State SEP funds
- Mistake by contractor allowed negotiation of 10 more retrofits over number paid for

<table>
<thead>
<tr>
<th>Number</th>
<th>BUS MAKE</th>
<th>YEAR</th>
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<tbody>
<tr>
<td>20</td>
<td>IC CORP</td>
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</tr>
<tr>
<td>15</td>
<td>AM TRAN</td>
<td>1999</td>
</tr>
<tr>
<td>9</td>
<td>GENESIS</td>
<td>1993</td>
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<td>AM TRAN</td>
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<tr>
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<td>THOMAS</td>
<td>1999</td>
</tr>
<tr>
<td>3</td>
<td>THOMAS</td>
<td>1998</td>
</tr>
<tr>
<td>2</td>
<td>THOMAS</td>
<td>1997</td>
</tr>
<tr>
<td>74</td>
<td>TOTAL</td>
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</table>
Denali National Park Retrofit

- Summer of 2006, DEC contractor retrofitted diesel sources at park
- First Alaska retrofit of stationary diesel source
- Part of overall effort to introduce field use of fish oil biodiesel
Alaska Diesel Retrofit Projects

Denali National Park Retrofit

“One generator torn apart due to injector pump replacement” – Contractor report

Fish oil (B100) basically destroyed generator fuel pumps – not recommended

Fish oil blend (<B20) worked in gen-sets and mobile sources
Alaska Diesel Retrofit Projects

Denali National Park Retrofit

Diesel oxidatives catalysts placed on:

Toklat camp

• Two Onan Gensets

Park Headquarters

• Sterling Dump Truck

• Ford Dump Truck
Sterling Dump Truck
American Lung
Fairbanks Retrofit

AMERICAN LUNG ASSOCIATION®
of Alaska
American Lung Association of Alaska (ALAA) Fairbanks Retrofit

Through a State Supplemental Environmental Project funds brokered by DEC, ALA received $75,000 to manage retrofit projects in Fairbanks

• Plan A – retrofit school buses
  • ALAA found school bus contractor bought all new school buses, with DOCs

• Plan B – retrofit transit buses
  • ALAA found Fairbanks municipal buses replaced in December 2006 and were equipped with particulate traps
American Lung Association of Alaska (ALAA) Fairbanks Retrofit

Plan C – retrofit anybody

- ALAA made numerous inquiries throughout federal, state, and municipal departments to ID fleets for retrofits
- ALAA contracted with Cummins Northwest to retrofit six Department of Transportation snow plows - completed in March 2007

Plan D – purchase of clean vehicles

- Two community organizations received hybrid vehicles
North Slope Retrofit
Alaska Diesel Retrofit Projects

North Slope Retrofit Background

• Moving specialty fuels to remote areas of Alaska is expensive

• Fuel costs in rural Alaska are already some of the highest in the nation

• Alaska asked for and received flexibility in implementing the ULSD rules in these areas.
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History of North Slope Retrofit

• An initial delay changed the implementation date for ULSD production from January 2008 to January 2009.
• To capture some emission reductions lost to the delay the producers agreed to a diesel retrofit project.
• 2 million dollars would be spent by each entity on retrofits.
• Retrofits prioritized by cost of implementation and volume of emissions reduced.
• And the winner is …
## Alaska’s Diesel Strategy

### History of North Slope Retrofit

#### Alaska Rule Flexibility

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<td>15 ppm</td>
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<td>HS</td>
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<td>15 ppm</td>
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<td>500 ppm</td>
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<tr>
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<td>HS</td>
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<td>500 ppm</td>
<td>15 ppm</td>
</tr>
<tr>
<td><strong>Rural Alaska</strong> - One step transition in 2010</td>
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</tr>
<tr>
<td>Highway</td>
<td>HS</td>
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<td>15 ppm</td>
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<td>HS</td>
<td>15 ppm</td>
<td>15 ppm</td>
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North Slope Retrofit Background

• Initially, because of the Dalton Highway, the north slope was deemed “urban”

• In 2005, North Slope producers BP-Alaska and ConocoPhillips approached ADEC with an offer
  • Designate the North Slope “rural”
  • ConocoPhillips will produce ULSD in one of their two topping plants by January 2008
  • BP and ConocoPhillips would use nothing but ULSD in their diesel burning sources (including sources not regulated such as space heating and stationary engines) facility wide starting Summer 2008
North Slope Retrofit Background

• An initial delay changed the implementation date for ULSD production from January 2008 to January 2009.

• To capture some emission reductions lost to the delay the producers agreed to a diesel retrofit project

• **2 million dollars** would be spent by each entity on retrofits

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• And the winner is …
Alaska Diesel Retrofit Projects

North Slope Retrofit

Anti-idling measures— allow trucks to be turned off without much compromise in cab comfort or worry about re-starting the engine after a soak at ambient temperatures

• temp-a-starts
• webasto heaters
• bull rails
• warm storage

By far the most cost effective means of reducing emissions
Alaska Diesel Retrofit Projects

North Slope Retrofit

Anti-idling measures

Bull Rail

Webasto Panel

Warming Shelter
Alaska Diesel Retrofit Projects

North Slope Retrofit - Other activities

Diesel oxidative catalysts

• Will provide field use experience to help determine utility for other arctic retrofits
  • Funding just approved for the DOC's – 50 per producer
• Electrification of guard shack (shutting down a diesel power generator)
  • Encountering difficulties due to regulations on power providers and users
### North Slope Retrofit - By the numbers

<table>
<thead>
<tr>
<th>Project</th>
<th>No. pieces of equipment</th>
<th>fuel savings (gal/year)</th>
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</thead>
<tbody>
<tr>
<td>Temp-a-start/Webasto heater</td>
<td>250 (95 completed)</td>
<td>1,300,000</td>
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<tr>
<td></td>
<td></td>
<td>17%</td>
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<tr>
<td>Bull rails</td>
<td>218 (Completed)</td>
<td>1,400,000</td>
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<tr>
<td></td>
<td></td>
<td>18%</td>
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<tr>
<td>Warm storage</td>
<td>41</td>
<td>150,000</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Guard shack electrification</td>
<td>1</td>
<td>19000</td>
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<tr>
<td></td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Diesel OxCats</td>
<td>100 (nonroad)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2,869,000</strong></td>
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</table>
Fuel savings equates to the following annual reduction of emissions:

- PM10: 5.5 tons
- CO: TBD
- SOx: 27 tons (at 1000ppm); about half at 500 ppm
- GHG: 40,400 tons CO2
Alaska Diesel Retrofit Projects

DERA

Oh DERA, oh DERA

© Gary Lackie
Alaska Diesel Retrofit Projects

DERA

What does the future hold?

• Matching funds to Alaska Energy Authority for diesel engine efficiency project implementation

• Base funds to ADEC for direct management of retrofit projects

• Projects in negotiation include –
  • Biodiesel
  • Power plant retrofits
  • Port of Anchorage retrofits
  • Marine repower
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