



Alaskan

# Diesel Retrofit Projects

Alaska Department of Environmental Conservation

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(Delivered by Wayne Elson)

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# Alaska Diesel Retrofit Projects

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## 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

Number	BUS MAKE	YEAR
20	IC CORP	2003
15	AM TRAN	1999
9	GENESIS	1993
10	AM TRAN	2001
3	THOMAS	2001
12	THOMAS	1999
3	THOMAS	1998
2	THOMAS	1997
<b>74</b>	<b>TOTAL</b>	

# Alaska Diesel Retrofit Projects

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## 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

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## 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:

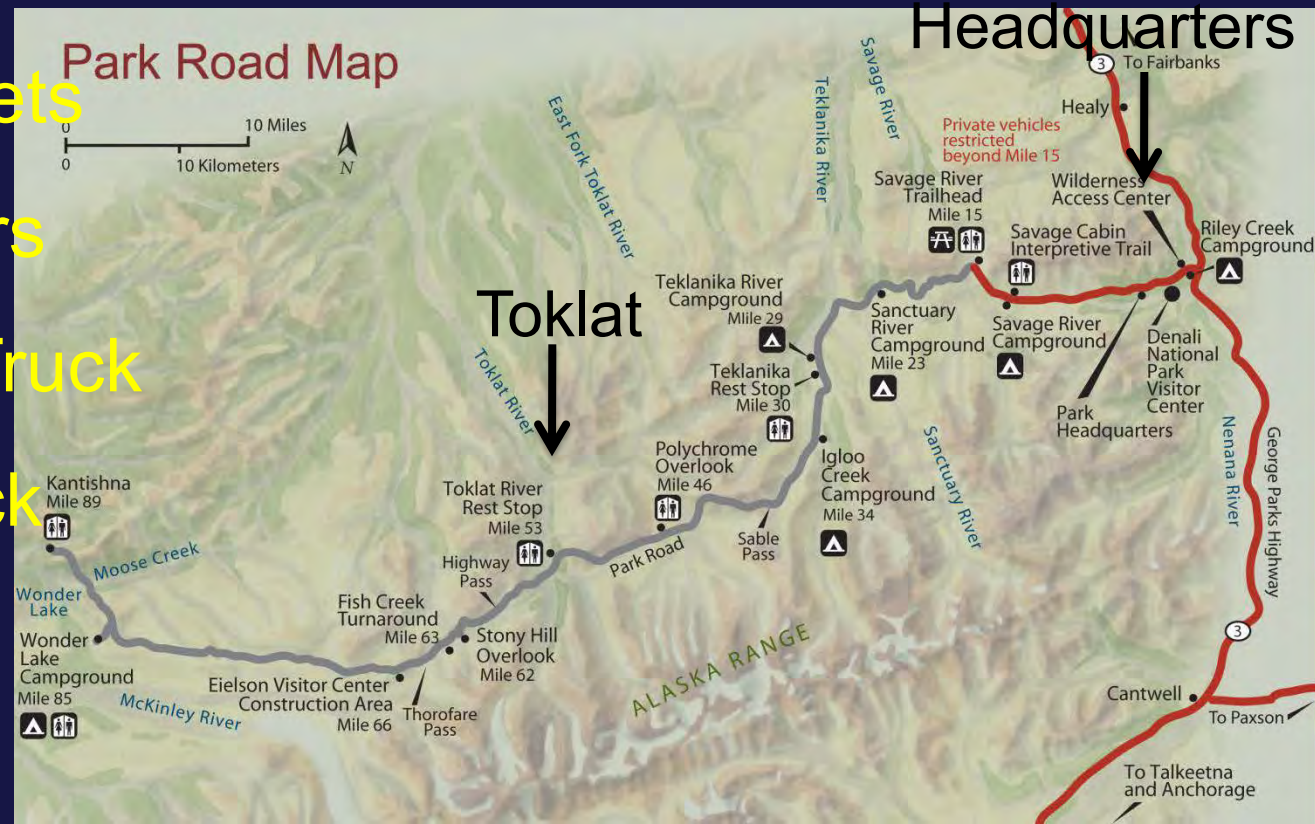
Toklat camp

- Two Onan Gensets

Park Headquarters

- Sterling Dump Truck

- Ford Dump Truck



# Sterling Dump Truck





# American Lung Fairbanks Retrofit



# Alaska Diesel Retrofit Projects

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## 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

# Alaska Diesel Retrofit Projects

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## 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

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## 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.



# Alaska's Diesel Strategy

## History of North Slope Retrofit Alaska Rule Flexibility

Covered fuel	Before 2006	2006	2007-2009	2010-2011	2012
<b>National</b>					
Highway	500 ppm	15 ppm	15 ppm	15 ppm	15 ppm
Non-Road	HS	HS	500 ppm	15 ppm	15 ppm
Locomotive/Marine	HS	HS	500 ppm	500 ppm	15 ppm
<b>Urban Alaska</b>					
Highway	HS	15 ppm	15 ppm	15 ppm	15 ppm
Non-Road	HS	HS	500 ppm	15 ppm	15 ppm
Locomotive/Marine	HS	HS	500 ppm	500 ppm	15 ppm
<b>Rural Alaska - One step transition in 2010</b>					
Highway	HS	HS	HS	15 ppm	15 ppm
Non-Road	HS	HS	HS	15 ppm	15 ppm
Locomotive/Marine	HS	HS	HS	15 ppm	15 ppm

# Alaska Diesel Retrofit Projects

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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



# The North Slope Oil and Gas Industry Diesel Retrofit Project

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## 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
- Retrofits prioritized by cost of implementation and volume of emissions reduced
- 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

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## 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



# Alaska Diesel Retrofit Projects

## North Slope Retrofit - By the numbers

Project	No. pieces of equipment	fuel savings (gal/year)
Temp-a-start/Webasto heater	250 (95 completed)	1,300,000 17%
Bull rails	218 (Completed)	1,400,000 18%
Warm storage	41	150,000 1%
Guard shack electrification	1	19000 3%
Diesel OxCats	100 (nonroad)	0
Total		2,869,000

# Alaska Diesel Retrofit Projects

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## North Slope Retrofit - By the numbers

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 CO<sub>2</sub>

# Alaska Diesel Retrofit Projects

## DERA

### Oh DERA, oh DERA



# Alaska Diesel Retrofit Projects

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## 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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