Enclosure

Background

In July 2005, the EPA issued its proposed New Source Performance Standard (NSPS) rules for stationary compression ignition internal combustion engines. The proposed rule regulates NOx, PM, CO, and NMHC in applicable engines. The rule requires engines to meet the emission standards, in part, through use of low and ultra low sulfur diesel fuel. During the comment period, the Alaska Department of Environmental Conservation developed recommendations to align the NSPS transition to ultra low sulfur diesel in rural Alaska with the timeline developed for rural Alaska mobile diesel sources.

EPA's proposed NSPS rule followed the same fuel sulfur transition timeline as promulgated in the EPA's diesel nonroad rule. Essentially, EPA required fuel destined for nonroad use to less than 500 ppm (low) sulfur in summer of 2007. In summer of 2010, EPA lowered the fuel sulfur requirement to less than 15 ppm (ultra low) sulfur. After 2010, there are downstream requirements for retailers and end-users to ensure proper fueling of 2011 and later model year equipment with ultra low sulfur diesel. The NSPS rule required low sulfur diesel after 2007 and ultra low sulfur diesel after 2010 for new, reconstructed, or modified engines.

To align the NSPS rule with the fuel sulfur timeline already final and in place for Alaska's mobile sources, ADEC recommended EPA keep the fuel transition timeline for urban Alaska. ADEC then recommended EPA allow rural Alaska to skip the 2007 low sulfur diesel step and instead allow a one step transition from uncontrolled to ultra low sulfur diesel in 2010. On-highway and nonroad mobile diesel sources transition to ultra low sulfur diesel in Fall of 2010. Aligning the NSPS requirements with this timeline simplifies the distribution of ultra low sulfur diesel to rural Alaska making compliance easier and ensuring a supply of ULSD for sources needing the fuel. Phasing fuel in different stages would create an unnecessary logistical and financial hardship for rural Alaska communities for a relatively small environmental gain. A one step transition to ultra low sulfur diesel helps eliminates costs and fuel distribution problems associated with a premature switch in infrastructure from a single diesel fuel distribution network, to a multi-fuel system. A one-step transition allows time for cost differentials between ultra low and higher sulfur diesels to resolve.

ADEC also asked for time to develop a cost analysis and health assessment before moving forward with final rules affecting stationary diesel fired sources. ADEC asked EPA for assistance in developing a health study and cost assessment. ADEC requested EPA research health impacts from diesel exposure in rural areas. ADEC also requested EPA perform a cost benefit analysis considering rural Alaska's unique market demand and Alaska's refinery capacity to produce arctic grade ultra low sulfur diesel fuel. In June of 2006, we requested EPA add language to the final rule specifying that modifications to the NSPS timeline, justified by these studies, would only impact rural Alaska power utilities.

In July of 2006, the United States Environmental Protection Agency, issued its final New Source Performance Standard rules for stationary compression ignition internal combustion engines. The final rule implemented the recommended timeline of a 2010 transition to ULSD in rural Alaska for new, modified or reconstructed engines. To address concerns specific to the power utilities, EPA stated:

> "In addition, the final regulations include language that allows Alaska to submit for EPA approval through rulemaking process, by no later than January 11, 2008, an alternative plan for implementing the requirements of this regulation for public-sector electrical utilities located in rural areas of Alaska not accessible by the Federal Aid Highway System."

ADEC proceeded to complete a pilot health assessment study already underway at the time. Further, ADEC proceeded to identify funding and formed a work group to look at the cost impacts of rural Alaska's transition to ULSD. The economic study and pilot health assessment have been completed.

Rural Alaska Power Utilities (SIC 49-11)

Over 180 communities in rural Alaska depend on diesel fuel for electricity. They are scattered over an area twice the size of Texas, and are located in remote areas of the state without road access. More than 93% of these communities have a population less than 1000, with an average population of only 310 residents. Each community has a school, post office, health clinic, airport, and community building, and a few have public water and sewer. These communities are located in the most severe arctic environments in the United States and rely entirely on locally diesel-generated electricity to maintain critical public infrastructure. Unlike the Continental U.S., they are not linked by electrical interties, but rely on a local, self sufficient, diesel power plant. This system of power generation is unique in the United States.

Rural Alaska power generation is primarily fueled by diesel. While costs vary by region across the state, rural Alaska communities typically pay some of the highest fuel costs in the United States. This translates into high power costs. A gallon of diesel costs over five dollars in some areas. In many communities, the cost per kilowatt-hour of power is over fifty cents before a Power Cost Equalization (PCE) subsidy is provided.

These power systems in rural Alaska are often operated as non-profits by city governments or regional cooperatives. Operations are tightly controlled for costs. There is little revenue cushion to shield customers from increased operating costs including those from rising wholesale fuel prices. The transition to ultra low sulfur diesel presents a financial and logistical challenge to rural electric generators and has the potential to seriously increase the cost of power. Cost increases will occur through increases in the cost of fuel, and fuel distribution storage modifications.

Cost Implications

The cost of implementing federal fuel rules on stationary engines in rural Alaska is uncertain. There is consensus that costs will go up, but the extent of the increase is uncertain. Further complicating the picture are global factors raising the price of fuel to unforeseen levels. The daily wellbeing of rural Alaska residents and communities depends on the ability to generate electricity and heat from hundreds of continuously operating diesel engines and burners. The uncertainty in fuels costs and potential cost increases makes it hard for individuals, local and regional organizations to plan budgets for fuel, heat, and power costs. A cost analysis for Alaska is consistent with Section 111(a) of the Clean Air Act whereby the Administrator is obligated to determine the best demonstrated technology "taking into account the cost of achieving such [emission] reduction and any non-air quality health and environmental impact and energy requirements."

Through 2007, ADEC, with assistance, was able to formulate a scope of work, find funding, and hire a contractor to perform a cost assessment. The contractor, Northern Economics Inc., was selected in June 2007. Northern Economics researched and drafted deliverables through the Fall of 2007, presenting a completed study to ADEC in January 2008. The assessment looked at how impacts to household costs associated with delivering ULSD to rural communities would vary depending on how the transition occurred and in what part of rural Alaska the transition occurred. Researchers took into account community size, infrastructure considerations, fuel distribution methods, available fuel types, refinery costs, regulatory requirements, and demand.

The cost study outlines a number of scenarios that may occur in the transition of rural Alaska to ULSD. Each scenario has a set of challenges and cost implications for different end user groups. With any scenario, the annual fuel costs to rural Alaska households will rise. The following describes the salient findings of the report.

- The project area consists of northern and western Alaska not connected to the road or ferry system. The area has 151 communities categorized as hubs, subregional hubs, towns, and villages.

- Typical fuels consumed in the project area are Jet A for heating fuel and certain aircraft, diesel No. 1 and No. 2 (sometime with additives for the Arctic), aviation gasoline, and unleaded gasoline. Jet A is the main fuel consumed.
- The cost differences between ULSD and Jet A are estimated at
  - 1.32 percent in Anchorage
  - 3.3 percent in Fairbanks
  - 1.4 percent at Anacortes, Washington which is representative of the refineries located in northern Puget Sound that supply fuel to Alaska
- Cost differences between these fuels are getting smaller as ULSD volumes increase.
- Anchorage cost differences per gallon averaged 9.1 cents from mid-2006 to the end of 2007. (These costs are for the fuel only and do not reflect additives for pour point adjustment or lubricity).
- Three scenarios were used to analyze two main cost centers (storage and distribution, and heat and electrical power).
  - Scenario 1 - the Warranty scenario reflected just enough shipment of ULSD to meet 2007 and newer engine requirements.
  - Scenario 2 - the Compliance scenario reflected more consumption of ULSD to meet EPA-mandated timelines.
  - Scenario 3 - the Full Conversion scenario, with ULSD shipped for all purposes (heating, engines, and power plants) except aircraft Jet A needs.
- Scenario 3 had the lowest modeled costs to rural households at $189 per household per year in costs resulting from the transition to ULSD. Scenario 2 was $278 per household per year, and scenario 1 was $300 per household per year.
- The analysis suggests the household costs of transitioning to ULSD fuel are highest for the regions of the state with the lowest income populations. This disproportionate impact is due to the greater reliance of project area communities on diesel for heating and power generation in comparison to the rest of Alaska.

- By starting to burn ULSD in 2008 as outlined in scenario 3, villages benefit from a "blend-down" of diesel, where average sulfur concentrations decline, over three years, to less than the 15 ppm upper limit on sulfur.
- A "blend down" of diesel allows communities to avoid purchasing new tanks, cleaning existing tanks, disposing of cleaning wastes, and temporary drum use.

The contractor concluded a blend down of fuels to comply with the existing 2010 deadline recommendation will be less of a cost impact than delaying the transition to some later date. This conclusion supports our initial recommendation to keep the transition to ULSD within the same timeframe as the mobile source rules.

ADEC does note that keeping cost impacts of the ULSD transition to a minimum is important for air quality. An increase in cost of diesel means people may shift to other sources of heat and power. In the absence of a viable and clean alternative energy, the primary fuel options available to Alaskans are wood burning for heat, and possibly coal burning for heat and power. Wood and coal emit far more pollution per unit of energy than diesel.

Health Implications

Pilot Study

Over three months in the winter and early spring of 2006, ADEC and University of Alaska researchers conducted a pilot study in a small Alaskan village to determine if health effects from diesel power generation could be detected. Monitoring found fine particulate levels within applicable federal standards over the three months of monitoring. ADEC instruments likely detected the exhaust plume from the power generator.

Due to difficulties in getting an adequate number of study participants, and adequate participation from those who were assessed, no conclusions were drawn concerning diesel power exhaust and possible health impacts. National studies are clear that diesel exhaust impacts health. It is also clear that rural Alaskans suffer disproportionately from poor lung health. We cannot exclude a contribution of diesel exhaust to these health impacts. Further, mere compliance with federal air quality standards does not justify removal of a location from compliance with NSPS rules. Though other considerations like cost and logistics are considered, the lack of a concrete conclusion from the pilot health study effort does not justify removal of ADEC's original recommendation of keeping the 2010 timeline for transition to ULSD in rural Alaska. Discussion of the studies showing the health impacts of diesel exhaust and Alaska's disproportionate rate of lung ailments follow.

Evidence of Health Effects from Diesel Exhaust

Diesel exhaust (DE) is composed of vapors, gases, and fine particulate. Diesel combustion also produces polycyclic aromatic hydrocarbons (Strickland, P and Kang, D, 1999). The health impacts of fine particulate are well documented. The impacts of diesel exhaust on immunological response are discussed below.

DE can act as a nonspecific airway irritant at relatively high levels. At lower levels, DE promotes release of specific proteins in the upper and lower airway involved in immune response to allergens, bacteria, and other foreign material. Low levels of DE also release oxidants in the lower airway. Release of these proteins associated with allergic and inflammatory response can culminate in airway inflammation, mucus, and an asthmatic contraction of the bronchial muscles (Pandya, RJ et al., 2002). DE increases inflammatory response to allergens, (Diaz-Sanchez, D et al., 1994) and allergic reactions to new antigens (Diaz-Sanchez, D et al., 1999). Exposure of healthy human volunteers to low dose of diesel exhaust showed increase in antibodies found in nasal lavage, and a rise in antibody secreting cells (Diaz-Sanchez, D et al., 1994). These studies imply exposure to diesel exhaust results in increased respiratory inflammation. Further studies have found that diesel exhaust can worsen existing allergic response, an effect detectable at concentrations comparable to exposures along a busy urban street (Diaz-Sanchez, D et al., 1997; Fujieda, S et al., 1998; Diaz-Sanchez, D et al., 1999).

Evidence for Possible Health Effects in Alaska

In Anchorage, children who live close to high traffic areas were found to have a higher rate of doctor-diagnosed asthma as compared to children living in low traffic areas (Gordian, Wakefield et al in preparation). Anchorage is an attainment area for PM2.5. The study demonstrates that nonattainment status alone does not equate to a lack of health impacts associated with air pollution. Proximity to pollution sources can impact health in areas where overall air quality may be good.

Chronic respiratory disease is the most common complaint in Alaska Native children. The prevalence of asthma has been increasing in Alaska Natives. The State of Alaska, Section of Epidemiology, studied respiratory illness in Nuiqsut and a control village in rural Alaska. Both villages had populations of about 400. Forty-seven people in each village (11% of population in Nuiqsut, 12% in control village) had a diagnosis of asthma or reactive airway disease. In both villages the most common respiratory diagnosis was asthma and the vast majority of the medical visits for respiratory disease were among those diagnosed with asthma. A 1997 survey of 465 Alaska Native children in grades 6-9 in the Yukon Kuskokwim Delta (YK) found 24% had asthma or asthma-like symptoms, 37% were sputum producers, and only 39% had no respiratory symptoms (Hennessy T et al 1999). Nationwide, asthma rates are lower in rural areas than in urban areas. With nearly 8% of the US population having asthma, the asthma rates in Nuiqsut are higher than the general population. Further, there are indications that asthma in American Indian and Alaska Native children is often undiagnosed and inadequately treated (Hisnanick, et al 1994; Liu, et al, 2000) which may mean the reported numbers are underestimated.

Asthma is not the only respiratory ailment of concern. The Yup'ik Eskimo have some of the highest rates of respiratory morbidity documented for any Native population. For example, hospitalization for respiratory syncytial virus (RSV) is five times higher for Native children in the YK Delta compared to the overall US population (156 vs. 31/1000) (Lowther, S.A., et al., 2000; Wright, A.L., et al.1989; Shay, D.K 1999;

Karron, R.A., et al., 1999). During one RSV epidemic, one-fourth of all infants in this region were hospitalized with the infection, at an estimated cost of $1034 per YK Delta child (compared to $27 per child in the rest of the United States) (Karron, R.A., et al., 1999).

Another common lung condition is called bronchiectasis. Bronchiectasis has nearly disappeared in the industrialized world, but remains relatively common among Alaska Natives in the YK Delta (Lewis, T. 1999; Stout, J et al 2001; Fleshman, et al 1968; Singleton, R., et al., 2000). The most common predisposing factor for bronchiectasis is having early and recurrent pneumonia, implicating increased susceptibility to respiratory infections and chronic respiratory symptoms.

Final Recommendations

In November 2007, the Alaska Energy Authority approached ADEC with concerns regarding the NSPS rule. The Alaska Energy Authority (AEA) is a corporation of the State of Alaska. Their mission is to reduce the cost of energy in Alaska, in part, by assisting in the development of safe, reliable, and efficient energy systems. With rural Alaska suffering from some of the highest fuel costs in the country, AEA and rural power utilities undertake a number of strategies to keep power and fuel costs to a minimum for village residents. Implementing NSPS ULSD and emission requirements clearly and negatively impact these strategies. The strategies include importing a single grade of diesel fuel to simplify storage and use; capturing waste heat off the generators and heating nearby building, displacing fuel oil emissions and cost; and burning waste lubricating oil to capture the heat energy and ameliorate soil and water contamination concerns. Addressing these concerns in turn with ADEC's desire to maintain and improve air quality, the following recommendations were developed for EPA to consider in the NSPS for stationary diesel internal combustion engines..

Allow NSPS owner-operator requirements to apply only to model year 2011 and later engines.

By changing the application date for NSPS requirements from model year 2007 engines on October 1, 2007 to model year 2011 engines on December 31, 2010, EPA will greatly simplify the NSPS requirements and thus greatly enhance compliance success with the NSPS rules.

Alaska village power plants are typically operated by a single part time operator with an alternate. Although a plant operator may be one of the few jobs in a rural community, there is a high rate of turnover among plant operators. This frequently leads to inexperienced operators responsible for the power plant. In addition, there is an inordinate amount of paperwork and training involved for an operator to properly run a village power plant. Though good mechanics, in many cases, village power plant operators generally do not have the training, expertise or resources to adequately track safety and environmental paperwork requirements, and at the same time keep the engines and fuel tanks in good operating order. AEA and ADEC believe simplifying operations and keeping village requirements straightforward is the best path toward compliance with the NSPS.

There are many power plants in rural Alaska where both pre-model year 2007 and model year 2007 and later engines are installed. These power plants receive a single grade of diesel fuel from a bulk fuel storage facility that stores a year's supply of fuel. The NSPS require all model year 2007 and later engines, as well as pre-model year 2007 engines that have been modified or reconstructed, to use ULSD fuel starting no later than December 1, 2010. Coordinating the 2010 ULSD requirement with 2011 model year engines, rather than retroactively applying to 2007-2010 model year engines, greatly simplifies the NSPS compliance requirements. Otherwise, operators across Alaska must identify 2007 and later year engines, ensure ULSD orders are made by Spring 2010, and ensure proper storage is available for the transition of these engines to ULSD in Fall/Winter 2010. This forces the purchase, transport, and storage of a large volume of ULSD at once rather than a smoother transition of a little toward a lot. Consider that exhaust after-treatments required to meet the low Tier 4 NOx and PM emissions standards will not be required until model year 2011 engines.

There is no technological requirement pre-model year 2011 diesel engines to operate on ULSD. A 2010 fuel requirement for 2011 model year engines provides a clear demarcation between regulated and unregulated engines, it agrees with mobile fuel sulfur requirements, and ensures better compliance and an easier (thus more assured) transition to ULSD.

Planning, construction and operation of a rural Alaska power plant is complex. The Alaska Energy Authority, in partnership with the federal Denali Commission, develops new power plant projects throughout rural Alaska. The timeframe from project identification, concept design, final design, environmental permitting, construction funding, and procurement typically exceeds three years. There are several projects that have been designed and funded based on pre-2007 model year engines. Other projects have already procured pre-2007 model year diesel generators, but will not be installed prior to the December 31, 2008 deadline. A 2010 transition to the NSPS requirements will allow these pre-2007 engines, procured before the NSPS rule was proposed, to be installed without penalty to AEA from the stockpiling prohibitions in the NSPS.

Maintain a December 1 2010 deadline for transition of regulated engines to ULSD.

As outlined in the cost assessment, fuel costs in rural Alaska are some of the highest in the nation – and are hitting communities which already have poor economies. Diesel costs in rural Alaska are dependent on rack prices and the arduous process of delivering fuel to these remote communities. Importing ultra low sulfur diesel will raise diesel prices by some amount. However, that amount is a small percentage relative to the increase in fuel costs due to Outside market influences. Allowing an exemption to burn higher sulfur diesel in 2011 and later engines in no way guarantees lower fuel costs, it only assures higher levels of particulate matter and SOx emissions for rural Alaskans. Given the poor inhalation health existing in rural Alaska in general, we cannot walk away from this opportunity to improve air quality.

However, ensuring a transition to this fuel requires keeping the NSPS requirements as straightforward and simple as possible.

Authorize continued use of single circuit jacketwater marine diesel engines for prime power applications.

Due to the high cost of fuel in rural Alaska, the use of combined heat and power (CHP) diesel electric cogeneration plants is vital to the economy of rural villages. Numerous diesel power plant heat recovery systems throughout the state provide essential heat to community facilities and schools. Wherever possible, fuel efficient marine-jacketed diesel engines are used in prime power applications to provide increased recovered jacketwater heat and improve overall thermal efficiency. In fact, the thermal efficiency of a marine jacketed CHP plant is as high as 65%, compared to only 35% for a power plant without heat recovery. The heat rejected from a marine-jacketed diesel is about double that of a Tier 3 separately cooled aftercooler (SCAC) diesel engine. To replace an existing jacketwater cooled engine with a SCAC diesel engine effectively eliminates any recoverable heat for delivery. Recently, where SCAC engines have been installed in small rural communities, there has been a total loss of available space heat for community buildings, as well as insufficient heat to heat the power plant. If this situation were to repeat across Alaska there will be an increase in resources spent by schools and community facilities in heating oil, and increased emissions from burning the extra heating oil.

AEA conducted a study in 2005 to assess the number and condition of heat recovery system throughout rural Alaska. Of 174 responding utilities, 107 had functioning heat recovery systems that were providing beneficial recovered heat to community facilities. Although the study did not evaluate the quantity of fuel savings realized by these CHP facilities, it is conservatively estimated that over 1-million gallons of heating fuel is offset each year by heat recovery from diesel generators. Conservatively then, this prevents over a ton of particulate matter and 10 tons of NOx from entering the atmosphere, using EPA’s AP-42 emission factors.

Marine engines will have to meet Tier III standards some five years later than stationary source engines, and marine engines less than 800 HP (560 kWe) will not be required to meet Tier IV standards. For example, in 2013, the PM standard for stationary engines greater than 175 hp and below 750 hp is 0.02 grams per kilowatt-hour. For marine engines, the 2012 standard will be 0.12 to 0.24 grams per kilowatt-hour. See Tables 1 and 2. The difference in NOx is 0.40 to up to 11.0 between stationary and marine engines. In rural Alaska, the pollutant of primary concern is fine particulate matter because of health concerns and a collection of other local fine particulate sources such as woodstoves and open burning of refuse. Other parts of Alaska are approaching or exceeding the fine particulate standard. NOx on the other hand, is not considered a health concern; neither as a precursor to ozone or PM2.5, nor as a criteria pollutant.

ADEC recommends EPA allow the use of single circuit jacketwater marine diesel engines for prime power applications. Allowing use of marine engines in land based applications means operating engines that emit more NOx and PM than land based stationary source engines. Recognizing the importance of air quality protection, ADEC will seek opportunities to retrofit emissions controls, either an oxidative catalyst, a particulate trap, or both, onto a 2011 or later model year marine diesel engines to take advantage of the 2010 transition to ULSD.

Table 1: Emission Standards Summary: G/KW-hr (G/HP-hr) for Engine Size 75≤HP<175

Date	Pollutant	Stationary	Marine (L/cylinder)*+				
			<0.9	0.9-<1.2	1.2 <2.5	2.5-<3.5	3.5-<7.5
2007	PM	0.30 (0.22)					
	NOx	4.0 (3.0)					
2008-2011	PM	0.30 (0.22)					
	NOx	4.0 (3.0)					
2012	PM	0.02 (0.01)	0.15 (0.11) *[0.14 (0.10)]*				
	NOx	0.40 (0.30)	*[5.4 (4.0)]*				
2013	PM	0.02 (0.01)		0.14 (0.10) *[0.12 (0.09)]*		0.12 (0.09) *[0.11 (0.08)]*	
	NOx	0.40 (0.30)		7.0 (5.2) *[5.4 (4.0)]*		5.8 (4.3) *[5.6 (4.2)]*	
2014 +	PM	0.02 (0.01)			0.12 (0.09) *[0.11 (0.08)]*		0.11 (0.8) *[0.11 (0.08)]*
	NOx	0.40 (0.30)			5.8 (4.3) *[5.6 (4.2)]*		5.8 (4.3) *[5.8 (4.3)]*

**Italicized marine numbers are Tier 3 Standards for Marine Diesel C1 Commercial Standard Power Density*

+Standard font marine numbers are Tier 3 Standards for Marine Diesel C1 Recreational and Commercial High Power Density

Table 2: Emission Standards Summary: G/KW-hr (G/HP-hr) for Engine Size 175≤HP<750

Date	Pollutant	Stationary	C1 Marine (L/cylinder) *+				
			<0.9	0.9-<1.2	1.2-<2.5	2.5-<3.5	3.5-<7.5
2007	PM	0.20 (0.15)					
	NOx	4.0 (3.0)					
2008-2010	PM	0.20 (0.15)					
	NOx	4.0 (3.0)					
2011	PM	0.02 (0.01)					
	NOx	0.40 (0.30)					
2012	PM	0.02 (0.01)	0.15 (0.11) *[0.14 (0.10)]*				
	NOx	0.40 (0.30)	*[5.4 (4.0)]*				
2013	PM	0.02 (0.01)		0.14 (0.10) *[0.12 (0.09)]*		0.12 (0.09) *[0.11 (0.08)]*	
	NOx	0.40 (0.30)		7.0 (5.2) *[5.4 (4.0)]*		5.8 (4.3) *[5.6 (4.2)]*	
2014 +	PM	0.02 (0.01)			0.12 (0.09) *[0.11 (0.08)]*		0.11 (0.8) *[0.11 (0.08)]*
	NOx	0.40 (0.30)			5.8 (4.3) *[5.6 (4.2)]*		5.8 (4.3) *[5.8 (4.3)]*

**Italicized marine numbers are Tier 3 Standards for Marine Diesel C1 Commercial Standard Power Density*

+Standard font marine numbers are Tier 3 Standards for Marine Diesel C1 Recreational and Commercial High Power Density

There is an environmental benefit to leaving the marine NOx standard in place for engines operated in rural Alaska. Engine manufacturers have indicated they intend to use selective catalytic reduction as the means to meet Tier IV NOx standards. For stationary engines, SCR technology means the use of liquid ammonia which is vaporized in the exhaust gas stream to remove NOx. The two primary concerns with ammonia are related to the remoteness of the power plants and the lack of training of their operators. Shipping tanks of liquid ammonia to rural Alaska is a spill hazard. Adding one more dangerous product to the list of environmental worries remote villages must deal with is not prudent. Already it is expensive and logistically difficult to backhaul empty barrels of lubricating oil, solvents, batteries and other hazardous wastes out of a village. The lack of roads and rail means these materials must be flown or barged out at immense costs. The result often is these materials do not make it out of a village, contaminating local soil and water for years. The second concern is worker safety. It is already difficult to get remote workers trained in enclosed space and fuel tank safety. Handling and recovering a caustic substance like ammonia will put worker's health at more risk than is already experienced. We feel these two drawbacks of SCR are more of a health concern than reduction of NOx.

Remove limitations on using fuels mixed with used waste oil that do not meet the fuel requirements of Subpart III.

Improper disposal of used oil is a significant environmental threat to rural Alaska communities. There are no permitted used oil disposal facilities in rural communities, and the freight cost of exporting used oil can be as much or more than the purchase price of new oil. The Alaska Energy Authority developed a cost effective and reliable used-oil blending system that is part of many rural Alaska power plants funded by the Denali Commission. The used-oil blending system utilizes the oil in an environmentally approved manner and captures the energy content of the lubricating oil. Eliminating used-oil blending increases the risk of improper disposal and spills, and forces a community to pay for shipping used oil out and fuel oil in to make up for the loss of heat energy.

Calculations by ADEC permit engineers find that blending waste fuel through a system (equivalent to the WOTEC brand) at 1.75% or less will keep fuel within ASTM specifications. The exact percentage under this maximum level that keeps final fuel stream sulfur levels within limits tolerated by new engines depends on the sulfur levels in delivered fuel and in the waste oil. Initial calculations find that fuel delivered at 10 ppm sulfur can tolerate a 1.75% blend of waste oil if the waste oil sulfur level is below 200 ppm. This is equivalent to 1750 gallons of waste oil burned for every 100,000 gallons of diesel delivered. As the sulfur level of the waste oil increases, the percent of the blend necessarily must go down. At 2000 ppm sulfur in the waste oil, the maximum blend will be 0.23%. This is equivalent to 230 gallons of waste oil burned for every 100,000 gallons of diesel delivered. ADEC recommends a maximum blend of 1.75% with the exact percent of the blend dependent on the estimated sulfur level of delivered fuel and blended waste oil. ADEC and AEA acknowledge that engines equipped with aftertreatment devices must burn fuel meeting sulfur requirements.

Review emission control design requirements needed to meet new NSPS emission standards, including the possibility of removing or delaying emissions standards requiring advanced exhaust gas emissions aftertreatment technologies until the technology is proven for remote applications.

Most rural Alaska power plants are unmanned or are run by part-time staff. Diesel engine use throughout Alaska is a manifestation of the economy and reliability of heavy-duty diesel engines. Selective catalytic reaction (SCR) systems are used in large-scale electric utilities in Alaska. However the aftertreatment technologies presently available for small-scale heavy-duty diesel engines are not sufficiently robust and reliable for use in unmanned rural power plants. These technologies are mostly untested in arctic climates.

In addition to the increased risk to reliable electric power, substantial capital and operating costs will be incurred. Due to the need to store fuel supplies for an entire winter, typically a minimum of 9-months supply, each utility will be required to invest substantially in new infrastructure to support the use of urea for SCR. General estimates of urea use range from 3.5% to 6.5% of annual diesel fuel consumption. A small rural utility using 100,000-gallons of diesel fuel to serve a community with a population of 350 will require a minimum urea storage capacity of 6500 gallons. Due to the aggressive nature of urea, the storage and handling facilities will need to constructed of stainless steel and insulated and heated to prevent freezing during winter. Cost of installation will vary widely depending on the remoteness of a community and the soil type. The estimated cost for a 6500 gallon urea storage and handling facility in an accessible area with good soils is in excess of $200,000. In a more remote area with marginal permafrost soil conditions the cost could exceed well over $300,000.

In combination with the extreme logistical issues and costs associated with transporting, storing and utilizing urea in small rural villages, SCR does not warrant the risk associated with its implementation in small and remote stationary diesel engines. The lack of available recovered heat from small SCAC engines further exacerbates the risk of using SCR systems in unmanned power plants as there will be a lack of available heat to keep the urea from freezing in winter.

ADEC suggests EPA list likely technologies necessary to meet proposed emission standards. EPA should determine whether these technologies are feasible in rural Alaska and the arctic in general. If the likely technologies prove unfeasible for use in rural Alaska, EPA should consider an engine standard that reflects technologies robust enough to function in the arctic.

Ultimately, the goal of emission reductions in rural Alaska may best be achieved through a technology based provision rather than specific gram per hour reduction requirements. AEA concerns with use of selective catalytic reduction technology convince ADEC that rural Alaskans need the flexibility to explore use of control devices that are feasible for the rural Alaskan environment. Initially, the coupling of ULSD with either oxidative catalysts or particulate traps could be considered a better bet to reduce diesel exhaust concentrations without introducing the severe health, environmental, and logistical concerns associated with SCR.

The loss of heat recovery will lead to increased fuel oil use. As air quality professionals, this increase use of fuel oil is a concern as there are emissions associated with burning fuel oil in a boiler. Perhaps even worse, the increasing cost of fuel in rural Alaska is forcing many to wood. Wood is one of the few alternative fuels to oil available and wood burns many hundreds of times dirtier than fuel oil. We need to ensure the well meaning requirements to improve stationary diesel engine emissions do not lead to unintended consequences such as an inability to afford heat and power, a reduction in air quality due to a switch from diesel to wood or coal, or an accident with the storage and transport of urea in these remote areas.

Summary of ADEC Recommendations

- Allow NSPS owner-operator requirements to apply only to model year 2011 and later engines.
- Maintain a December 01 2010 deadline for transition regulated engines to ULSD.
- Authorizing continued use of single circuit jacketwater marine diesel engines for prime power applications.
- Remove limitations on using fuels mixed with used lubricating oil that do not meet the fuel requirements of Subpart III of the rule.
- Review emission control design requirements needed to meet new NSPS emission standards, including the possibility of removing or delaying emissions standards

requiring advanced exhaust gas emissions aftertreatment technologies until the technology is proven for remote and arctic applications.

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