# ATTACHMENT

**State of Alaska, Department of Environmental Conservation**
**Docket# EPA-HQ-OAR-2001-0017**

The Alaska Department of Environmental Conservation (ADEC) has serious concerns about the proposed 24-hour standard for coarse particulate matter. EPA concludes in its proposal that little health impact occurs from coarse particulate matter derived from crustal material. Based on what we believe to be a weak foundation, EPA proposes to apply the new coarse particulate standard only to areas dominated by resuspended dust from high-density traffic on paved roads or particulate matter originating from industrial and construction sources. EPA concludes that particulate matter generated by mining and agricultural sources is crustal and is exempt from the NAAQS. ADEC disagrees with EPA's approach to addressing the coarse particulate matter standard and does not believe it is protective of public health, particularly in rural areas and moderate sized communities.

ADEC provides the following information and comments related to EPA's coarse particulate matter standard proposal:

## PM Health Studies

EPA notes in the proposal that there are few studies to cite regarding the health impacts of coarse, crustal material in rural areas. ADEC agrees that evidence linking health effects to rural coarse particulate is lacking. Conducting research in rural areas that looks at small changes in small populations has many limitations under traditional epidemiological approaches. More monitoring and research is needed to clarify the impacts of coarse particles on rural populations. ADEC feels strongly that these data gaps need to be addressed through further study of rural particulate exposures and effects. The EPA proposal cites studies on Mt. St. Helens ash and wind storms in Spokane as evidence there are no impacts. However, EPA avoids citing foreign studies which provide some limited evidence for impacts and does not look at agriculture or mining impacts. The following are ADEC's comments on the available evidence of crustal coarse particulate health impacts, including additional studies that EPA could consider in its final decision on the standard.

### *Foreign Studies*

ADEC agrees with EPA that little health data exists on coarse particulate health impacts in rural areas. Part of the problem may be that EPA places emphasis on U.S. and Canadian studies in EPA's review of health literature. EPA stated "studies in other countries may well reflect different demographic and air pollution characteristics." Given the variety of people and geography within the U.S., perhaps insight from other countries is a good idea. A number of dust and ash studies from Europe and Asia indicate that coarse particulate may not be so harmless. The following are a sampling of these studies:

- A series of studies looked at hospital admissions in Taipei, Taiwan after Asian Dust Storm Events. (Yang et al. 2005; Chen and Yang, 2005; Chen et al. 2004; Chang et al. 2006). Non-

significant trends in Taipei were found between dust storm exposures and asthma, cardiovascular events, and allergic rhinitis.

- In the chapter "Natural Dust and Pneumoconiosis" in Geology and Health: Closing the Gap, Derbyshire describes the dusty conditions of north China. What little monitoring that has been done found TSP levels of 1000 $\mu g/m^3$ from dust originating in the deserts of high Asia. The review found evidence of higher than expected incidence of pneumoconiosis and silicosis.

- Baris et al. (1987) found epidemiological and environmental evidence of the health effects from exposure to erionite fibers in the Cappadocian region of Turkey. This study found ambient levels of naturally occurring erionite fibers (an asbestiform fiber) were associated with malignant mesotheliomas. Control villages, with no measurable erionite fibers suffered no malignancies.

- Norboo et al. (1991) found high levels of silicosis in a village with high dust levels compared to a village with lower dust levels. The percentage of quartz in the dust ranged from 16% to 21%. There are no industrial sources near the village and the source of particulate is 100% crustal.

These foreign studies do not definitively prove that a health impact occurs from any of the different forms of coarse particles. Yet, they do provide some evidence that a health impact may occur from coarse particle sources which would become unregulated if the proposed rule is adopted. Specifically, it is interesting that the U.S. Department of Health and Social Service's report on cancerous substances reports that erionite occurs naturally throughout the U.S. The conclusions of Baris et al. indicate that erionite should be of concern to EPA in judging health risks as part of this rule making decision. The Norboo work indicates that quartz based particulate should be of concern to EPA. Quartz is mined throughout the U.S. (USGS).

It is important to remember that the U.S. is impacted by dust from Africa and Asia, transported long distances across the oceans. Every year, dust from China is transported to the North American continent, including Alaska. This is of concern, as this dust adds to particulate background levels. Pollutants not normally emitted in Alaska can adsorb onto these particle surfaces, which are inhaled by our citizens. Alaska is currently monitoring long range transport of Asian dust in part due to comments and concerns by Alaskans.

***Mining***

ADEC is perplexed and concerned by EPA's proposal that "Agricultural and mining sources, and other similar sources of crustal material shall not be subject to control in meeting this standard."

Alaska has some of the nation's largest mineral mines. We pride ourselves in responsible environmental stewardship that fosters strong economic opportunities while preserving the cleanliness of our air, water and lands. Perhaps because we are so very familiar with the range of the mining industry from simple sand and gravel operations to various types of metal and coal mining that its seems odd and inappropriate to contemplate a broad sector exemption for mining. The environmental consequences from various types of mining range from harmless to very hazardous depending upon the methods of operations, the chemistry involved and the types of

physical or chemical pollution control measures. To contemplate a broad brush exemption for the entire industry is inappropriately simplistic and contrary to responsible management of the potential risk posed to the public and the ecology. Even a simple rock quarry which is normally relatively harmless from an air quality perspective can contain and possibly release naturally occurring asbestos fibers. Alaska, like California and others states has naturally occurring asbestos in some of the rock used for bulk fill material.

Alaska is home to some of the nation's largest mineral mines. We are proud to be able to produce minerals for the world. Mineral ore mining and processing is approached as a complex chemical operation. Mineral deposits often occur in a geological matrix that can pose serious threat to people's health and the well being of our waters, aquatic life, land animals and birds. Yet, in other geologic structures, the potentially harmful constituents are not mobile upon crushing and exposure to air or water and consequently have a minimal risk to the environment. It is not hard to find examples throughout the west, where early mining techniques and processes resulted in the detrimental environmental consequences – example consequences that serve at the heart of the purposes for the Clean Air Act and the Clean Water Act. Today, we have the knowledge, the technology and skills to avoids or mitigate the environmental risks posed by mining. But those risks can not continue to be well managed if EPA establishes a blanket exemption for mining under this rule making.

While there are many examples of fugitive dust emissions from mining causing serious consequences, one historical and very relevant example for this rule making exists in Skagway Alaska. For decades, Skagway was the port city for ship loading of a sulfide concentrate of lead and zinc ore from the Faro mine in the Yukon Territory. Rail cars and then trucks were the vehicles delivering ore to the Port of Skagway. During the early 1980's sampling of soils in Skagway yards and the interior of residential homes revealed dangerously high lead concentrations. A clean-up then commenced to remove the topsoil from scores of acres of contaminated surface soils embracing major portions of the residential and commercial properties in Skagway. The interior of many Skagway homes were thoroughly cleaned removing carpets, drapes and other materials. Contamination of the marine sediments at the ship loading site was also an issue. Fortunately for public health, the particular lead and zinc sulfide concentrate had a low affinity for biological uptake by the human body. Consequently, while soil and interior home contamination levels were alarming, health impacts were generally low due the chemistry involved. This less consequential outcome was not the experience in other historical mining districts where ore smelting was involved.

During the past two decades the Clean Air regulations obligated ADEC to require mine operators to take reasonable measures to control fugitive emissions during the mining operations. While this has not always been an easy undertaking, much progress has been achieved and the industry has taken major steps forward which prevent a Skagway type contamination. We believe this is simply part of 'Doing it Right' with respect to environmental stewardship in mining. Therefore, and not surprisingly, we believe EPA's broad brush approach for exempting coarse particle material from mining sources is certainly not 'Doing it Right'. We believe it directly undermines our ability to preserve clean air and clean water by jeopardizing the State's ability to require best practices procedures and technology to control fugitive emissions of crustal material when that crustal material contains harmful constituents.

If exemptions are valid from a scientific health basis we believe EPA has two primary duties to fulfill: 1) EPA should avoid the broad brushed exemption and identify specific types of operations or segments of the mining sector to be exempted (i.e. sand and gravel mining) along with the science to support that exemption and 2) set out the exemption in the implementation rules rather than the rules adopting the health standards. It is our conclusion that the implementation rules are the proper venue to accomplish the change. The structure of Section 109 of the Clean Air Act appears to specifically preclude costs considerations when adopting a health standard. It would appear to us that any exemption for mining, or aspects of mining would be a costs consideration.

***Volcanic Ash***

The EPA proposal reports there are animal and *in vitro* studies using Mt. St. Helens ash which found little toxicity. Yet, there are epidemiologic studies that contradict this conclusion. Studies on people who worked in the St. Helens forests after the eruption found respiratory problems associated with exposure to ash (Bernstein et al. 1986; Buist et al. 1986). Effects occurred to those with preexisting conditions like asthma. Silicosis was also implicated by long exposure to silicates released in the eruption. Short term symptoms faded as ash exposure ended. In the aftermath of volcanic eruptions in Alaska during the early 1990s, the Municipality of Anchorage performed microscopic analyses on high weight $PM_{10}$ filters to determine composition of particulate. The volcanic ash was easy to identify as it was angular. Air quality agencies received numerous reports of eye and lung irritation from exposure to ash.

A look for studies outside the United States finds more evidence of health impacts from exposure to volcanic ash. Horwell et al. (2003) looked at surface reactivity of ash erupted from Soufriere Hills volcano, Montserrat, West Indies. The material produces hydroxyl radicals, especially in the presence of iron. This is significant because it lends biological plausibility to another 2003 British study looking at respiratory problems resulting from eruptions in Montserrat (Forbes et al. 2003). This study found an increase in wheeze and exercise induced bronchoconstriction in children with high levels of ash exposure compared to children with lower levels of exposure. This is an example of where looking to foreign sources of data helps achieve a fuller picture of crustal coarse health impacts.

***Windstorms***

As part of the rationale to focus the coarse particulate standard on urban areas, EPA cites a study by Schwartz et al. (1999) showing no impact on mortality rates when large dust storms swept through Spokane, Washington. (Here, EPA uses a study from an urban area to draw conclusions about rural crustal dust. ADEC agrees EPA should use studies from cities where crustal dust dominates when health studies in rural areas do not exist.) EPA concluded from the Spokane study "mortality and possibly other health effects are not associated with thoracic coarse particles from dust storms or other such wind related events". We believe this conclusion is too sweeping and too definitive to rely on just one study.

There are other study results that do not agree with EPA's conclusions. The Spokane study looks at mortality. Mortality is not a good measure of impact from crustal material. Respiratory morbidity may be a better endpoint considering the studies used by EPA to justify a coarse standard. Morbidity endpoints were assessed in studies conducted in Anchorage, Alaska and a study in southeast Washington that pre-date and contradict the Spokane study.

- Gordian et al. (1996) and Choudhury et al. (1997) found associations between medical visits and $PM_{10}$ in Anchorage, Alaska. EPA recognizes that $PM_{10}$ in Anchorage is primarily crustal. However, EPA does not mention speciation studies from the middle 1980s that found Anchorage's dust to primarily be crustal in origin (MOA 1985; ADEC 1988).

  From time to time, Anchorage is subjected to volcanic ash fallout that introduces crustal particulate matter into the community which is then available for re-entrainment into the ambient air. In the middle 1990s, researchers examined ten $PM_{10}$ filters using computer-controlled scanning electron microscopy (MOA 1995). They provided estimates of the percentages of particle types by weight and number. Particle types were defined as Si-rich, Si/Al-rich, Fe-rich, C-rich, and miscellaneous. If you assume that the Si-rich, Si/Al-rich, and Fe-rich particles were from crustal sources, all ten $PM_{10}$ filters were greater than 90% by weight crustal sources. Other evidence from research in the mid-1990s supports the crustal origin of Anchorage dust (MOA 1994).

- There is an earlier Center for Disease Control and Prevention (CDC) study conducted in Southeast Washington during 1991 (Hefflin 1994). This study looked at hospitalizations for bronchitis and sinusitis during dust storms and did find a small increase in these impacts.

The Hefflin (1994) study contradicts the conclusions drawn from the Schwartz et al. (1999) study. We believe the Schwartz et al. (1999) conclusions may have been different if they used morbidity endpoints rather than mortality.

Also consider the Coachella Valley studies, cited by EPA. Ostro et al. (1999) found an association between mortality and coarse particulate in the Coachella Valley. A look at speciation studies conducted in Coachella Valley found crustal dust made up 50% to 90% of the dust (CAQMD).

The Spokane study looks at dust storm impacts. It is possible that avoidance behavior by people during bad air pollution days reduces hospital admissions. In summer of 2004, forest fires raged across interior Alaska. Fine particulate exceeded 800 $ug/m^3$ on a few days in Fairbanks. Even though fine particulates from combustion are considered more toxic than coarse particulate, there was no evidence for an increase in hospital admissions for mortality or morbidity (Alaska Building Science News, Fall 2004). The Alaska State Epidemiologist believes that avoidance practices as aided by medical advice were a primary factor accounting for the absence of hospitalization.

Also, the association between mortality and crustally derived coarse particulate found by Ostro et al. (1999) decreased during high wind events. These events suggest people protect themselves during episodes of extreme and obvious poor air quality. Thus, dust storms may not be the best pollution events to derive conclusions on crustal coarse particulate health impacts. A better indicator may be more moderately polluted days where people are not alarmed by pollution conditions and go about their activities.
On federal register page 2658 of the proposed rule, EPA states, "Coarse particles are generally not distributed over broad areas, but rather reflect contributions from more localized sources, thus it is more difficult than for fine particles to generalize the results of these studies to areas with other types of sources." EPA further asserts on page 2665, "$PM_{10-2.5}$ concentrations in such urban areas are not largely composed of particles blown in from more distant regions." The fact

that EPA has difficulty generalizing the results of coarse particulate studies does not mean there are no impacts from coarse particulate. Coarse particulate does not disperse as evenly as fine, but within the areas impacted by coarse particulate, the health effects may be significant. For Anchorage, significant quantities of coarse material are blown in from dried glacial stream beds many miles away. The discrepancy in health impacts between fine and coarse particulate may have less to do with a real difference in toxicity but be more a reflection of the lack of spatially monitored coarse particle concentration over a region of ambient air.

We assert part of the explanation for the discrepancy in health impacts between rural and urban areas lies in a lack of particulate monitoring in rural areas with concurrently measured health data. Gathering enough health impact data to achieve statistical robustness is also difficult. Health impacts from coarse material may occur in rural areas, but the monitoring and health assessment system may not be robust enough to detect them.

***Summary of Health Comments***

A lack of rural data is not an adequate basis to remove a health standard for those living in rural areas, especially when considering the high bar of an "adequate major of safety" called for in the Clean Air Act. On federal register page 2667 of the proposed rule, EPA states "this indicator would also be consistent with an appropriately cautious interpretation of the epidemiologic evidence that does not potentially over-generalize the results of the limited available studies." Studies suggesting health impact from crustal coarse particulate are not strong. Yet, these studies argue just as easily for health impacts by rural crustal particulate than argue against health impacts. These studies suggest changes in morbidity, even mortality, occurring from exposure to crustal coarse particulates. Further, there are studies indicating toxicity of naturally occurring dusts such as silicates and asbestiforms (Derbyshire 2003, Bares et al. 1987, Norboo et al. 1991, USGS, Gillette 1997). ADEC acknowledges that conducting research in rural areas, which looks at small changes in small populations, has many limitations under traditional epidemiological approaches. ADEC believes the studies discussed in these comments adds to anecdotal information from rural Alaska that strongly suggests health impacts by crustal coarse particulate. Removing this standard from rural areas does not strike ADEC as an "appropriately cautious interpretation of the epidemiologic evidence."

ADEC does not believe EPA has strong enough evidence to rescind air quality protections as compared to the evidence burden set out in the Act. Few studies have looked at the impacts of rural coarse particulate on health; yet EPA assumes the results (or lack of results) apply across the nation. ADEC believes studies in western urban areas demonstrate potential toxicity of crustally derived coarse particulate. Further, the difficulty of monitoring "generalized" coarse particulate levels leads to a focus on the more easily detected fine particulate. Perhaps we see health impacts in urban areas due to cities having enough people to allow statistical detection. Perhaps the toxicity of crustal dust is the same from urban to rural areas.

While the State of Alaska supports elimination of needless standards and regulation, ADEC does not believe that sufficient information exists to draw that conclusion for crustal coarse particulate and recommends EPA improve monitoring of coarse particulate and continue studying health impacts of dust in rural areas. More monitoring and research is needed to clarify the impacts of coarse particles on rural populations. EPA must identify, with much more certainty, whether or not there are health risks associated with crustal coarse particulate before removing a standard. If EPA can use Mt. St. Helens and Spokane studies to conclude rural dust is not a health problem,

EPA can use Anchorage, Coachella Valley, Reno, Montserrat, Taipei, Southeast Washington, and St. Helens epidemiology studies to prove rural dust is a health problem.

## PM Exposure and Health Effects in Rural Areas

### *Population Description*

The majority of available epidemiological studies supporting a coarse particulate standard have been performed in urban areas. It does not follow that the absence of data specifically implicating rural particulate in causing adverse health effects means crustal coarse particles have no adverse effects. There have been too few studies of crustal particles to make an informed judgment on their toxicity in relation to urban particles.

The combination of the proposed standard and the removal of monitoring for rural areas effectively eliminate any coarse particulate standard for rural areas. In Alaska, the population of our rural areas is dominated by Alaska Natives. Alaskan Natives make up around 7% of the population in Anchorage and Fairbanks and 11% of the population in Juneau, the state capitol. In smaller hub communities, like Bethel or Nome, Alaska Natives make up nearly 80% or more of the population. That percentage can climb to 90% in some small communities, like Noatak (population 428). The majority of our dust complaints originate from these hub communities and small villages. Monitoring in these communities consistently finds dust levels in the 300-600 $ug/m^3$ range. Failure to protect all Alaskans will most likely raise environmental justice concerns, especially if this is seen as a reduction in air quality protections by these potentially sensitive populations. Finalizing the coarse particulate standard as proposed will send the wrong message to the public as Anchorage is likely the only area in Alaska that will be protected by a coarse particulate standard.

The Native citizens who largely dominate the population of our rural communities suffer from a disproportionate rate of lung illness. Studies suggest either increasing or unusually high rates of asthma and respiratory disease in rural Alaska. In fact, asthma is one of the few medical conditions that is not improving for Alaska Natives. In addition to high dust exposures, 45% of Alaska Native adults smoke, which contributes to respiratory disease. A recent State of Alaska Section of Epidemiology study found two villages with approximately 11% of the population having a diagnosis of asthma or reactive airway disease (Serstad and Jenkerson 2003). According to the CDC (2002), asthma incidence for the U.S. population as a whole was between 7% and 8%. For Native Americans, the incidence rate was around 10%.

Although there is a general consensus that asthma rates are lower in rural areas than in urban areas, the actual rate is rarely published. One study from New Zealand states that the rate for farmers in rural areas of New Zealand is 6.8% (Firth et al, 2001) which is about a half of what the Section of Epidemiology found in these very rural Alaskan villages. A recent study by Lewis et al. (2004) looked at respiratory illness in the Yukon-Kuskokwim Delta area. Among the 377 Alaska Native children, 7.4% reported physician-diagnosed asthma, 11.4% reported asthma-like symptoms without an asthma diagnosis, and 21.5% reported chronic productive cough (CPC) without asthma. It would seem some evidence supports the idea that asthma rates are higher than normal in rural Alaska, and that is even with poor diagnosis rates due to a lack of medical professionals.

There are other problems as well. 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 Yukon-Kuskokwim Delta compared to the overall U.S. population (156 vs. 31/1000) (Lowther SA et al. 2000; Wright AL et al.1989; Shay DK 1999; Karron RA et al. 1999). During one recent RSV epidemic, one-fourth of all infants in this region were hospitalized with RSV infection, at an estimated cost of $1034 per Yukon-Kuskokwim Delta child (vs. $27/child in the rest of the United States) (Karron RA et al. 1999). Clinical characteristics of RSV in this population also differ from those observed elsewhere (Karron RA et al. 1999; Bulkow L et al. 2002), suggesting either different host factors or other risks that may be unique. Studies have shown that bronchiectasis, a condition that has nearly disappeared in the industrialized world, also remains relatively common among Alaska Natives in the Yukon-Kuskokwim Delta (Lewis T 2004; 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 in chronic respiratory symptoms. Are these problems, in part, related to dust exposure? Without a health standard and additional monitoring and studies, this question can not be addressed.

On federal register page 2665 of the proposed rule, EPA states "atmospheric science and monitoring information indicates that exposures to thoracic coarse particles tend to be higher in urban areas than in nearby rural locations." ADEC is not convinced this is a true statement for Alaska where $PM_{10}$ levels in Native villages in Alaska are high. Rural Alaska experiences extreme $PM_{10}$ concentrations that are far greater than those in Alaska's urban area, Anchorage, which would be covered by the proposed rule. Alaska's ambient air monitoring particulate data from rural villages has found $PM_{10}$ levels to be nearly three times the current 24 hour $PM_{10}$ standard. Given these high concentrations and EPA's lack of rural coarse particulate data and health impact research, the State of Alaska believes that EPA does not have sufficient data to eliminate a standard which may be protecting the health of these people.

The state and Native communities in northwest Alaska have been evaluating $PM_{10}$ levels for the past four years in response to concerns about increases in respiratory disease in the region. Kotzebue is the largest village in the Northwest Arctic Borough and is located 500 mile northwest of Anchorage. In 2004, Kotzebue experienced 24 hour particulate levels which were more than twice the existing $PM_{10}$ standard of 150 ug/$m^3$. At the same time, six smaller communities in the region monitored 24 hour $PM_{10}$ levels over 300 ug/$m^3$, with three of those villages exceeding 400 ug/$m^3$. These PM levels are five to seven times higher than the proposed urban coarse standard. We want to emphasize that these levels were not due to natural sources such as smoke from wildland fire or ash from volcanoes. These levels resulted from re-entrained road dust. Results from 2005 monitoring in Noatak, a small village 70 mile northeast of Kotzebue, found several $PM_{10}$ values above 600 ug/$m^3$. A specific six day average in Noatak found $PM_{10}$ levels at 224 ug/$m^3$. Add to these levels the inclusion of naturally occurring asbestos, which impacts Ambler and possibly other communities in the eastern portion of this borough, and you have a recipe for impaired lung function and increased cancer risk. The loss of a PM coarse standard for rural Alaska concerns us greatly. Without a PM coarse standard applicable to rural Alaska, the State will not be able to allocate funds to reduce the source of these impacts and thereby improve public health.

Our rural citizens deserve the same level of health protection as urban citizens. As noted above, sensitive populations live in rural areas as well as urban areas. High exposures to coarse particulate matter are certainly a cause for concern in Alaska's rural communities.

## Use of a Qualified $PM_{10-25}$ Indicator for the NAAQS

Alaska DEC believes that given the existing health data and uncertainties, it does not make sense to move from a particle sized indicator ($PM_{10}$) to a species specific qualified indicator (e.g. $PM_{10-2.5}$ for urban sources only, exempting mining/agriculture/crustal). In this proposed rule, the fine particle standard was left as a size-based standard due to lack of component specific information. EPA should not take the opposite approach with the coarse particle standard and move to components when it has very little data to identify and support a qualified indicator.

Instead, EPA should continue to use a particle sized indicator for the coarse standard with no exemptions or qualifications for specific sources; this standard could apply equally in both urban and rural areas and follows the same approach that was taken with $PM_{10}$ and $PM_{2.5}$, when insufficient information existed. This would provide a margin of safety to the NAAQS while additional studies are performed and data are collected.

Cities in western states, including Anchorage, have a high percentage of crustal material in their coarse particle pollution. By exempting mining and agricultural sources of particulate, the rule fails to recognize that crustal sources are a part of the urban coarse particle problem and may need to be controlled. Furthermore, the IMPROVE network speciation data (IMPROVE monitoring sites located in very rural areas of Alaska) contain significant evidence of constituents thought only to be prevalent in urban locales. DEC concludes that EPA's distinction between the component species and toxicity of urban and rural particulate matter appears critically flawed.

If EPA proceeds with its approach to exempt source categories from the standard (which ADEC disagrees with), a further concern is the lack of any specificity within the rule regarding the definition of mining or agricultural sources. ADEC is highly concerned that a broad interpretation of these source categories during implementation of the standards could severely limit the state's and EPA's ability to control significant source groups. EPA must specifically define these sources.

## Need for Additional Research on Coarse Particulate Exposures

The EPA proposal focuses the thoracic coarse particulate standard on the re-suspension of dust from high-density traffic on paved roads in urban areas. Road dust is the number one ambient air quality complaint we receive from rural Alaska. Rural Alaska road dust comes from both paved and unpaved roads. The dust contains the same bits of worn brake pads, tire particles, and fuel residue as urban road dust. Plus, unpaved roads provide even more particles for adsorption of mobile source toxics. The same reasoning EPA uses to justify an urban only coarse standard could be used to argue for a rural coarse standard in Alaska.

Rural areas of the country, like much of Alaska, do not experience a uniform type of coarse particulate. Alaska's largest industries, mines, fish processing plants, and oil extraction facilities are located in rural Alaska. Village sources of particulate are important to the type of particulate in the ambient air. Asbestos has been found in Alaskan quarries providing rock for village roads and construction pads for homes, schools, and businesses. It is possible that pathogens and toxic levels are more prevalent in our rural road dust than in our urban road dust. EPA acknowledges in the rule that rural particles can contain bacteria, fungal fragments, fertilizers residues, pesticides, and other toxins. We will not know for sure the constituents of rural dust without source attribution studies in rural Alaska and other rural areas of the country.

Before revoking the $PM_{10}$ standard and retreating on such an important environmental protection, it is imperative that the scientific basis for concluding that rural crustal material is benign is apparently evident and sufficiently strong to meet the test of adequate margin of safety for all segments of the American population as required by Section 109 of the Act. Alaska's ambient air monitoring for particulate matter in rural villages has found $PM_{10}$ levels many times the current 24 hour standard. However, there is a lack of health data related to rural coarse particulate exposure. The high concentrations of rural Alaska $PM_{10}$ levels cause concerns about health protection for rural Alaska residents. We have anecdotal evidence that the number of cars, trucks, and all terrain vehicles are on the rise, giving rise to increased dust problems. We have anecdotal information and some research suggesting a rise in reactionary airway disease in rural Alaska. At worse, the dust is responsible for an increase in lung illness in rural Alaska over the last decade. At best, rural Alaska dust is a nuisance that collects on food, homes, and electronics. These situations have not been considered by EPA staff or adequately addressed through the proposed rule.

## 2) $PM_{10}$ to $PM_{10-2.5}$ Equivalence

The EPA proposal requests comment (71 FR 2671) on alternative approaches to identifying a generally "equivalent" standard level. ADEC recognizes that it would be difficult to identify a single level of $PM_{10-2.5}$ that is "equivalent" to $PM_{10}$ across the nation. However, the proposed level of the standard appears to be much more stringent than the current $PM_{10}$ standard in Alaskan areas. In Alaska, the $PM_{2.5}$ portion of $PM_{10}$ appears to be fairly small. Yet, we have a paucity of ambient monitoring sites with paired $PM_{10}$ and $PM_{2.5}$ monitors. Simply put, our paired data set is too weak to suggest an alternative value for the 24 hour $PM_{10-2.5}$ standard. However we understand that the State of Arizona has an in-depth paired data set indicating the coarse fraction of $PM_{10}$ data is much higher than EPA assumed in the draft proposal. Alaska's limited paired data set is more aligned with Arizona's ratios than those used by EPA thus far.

## 3) Thoracic Coarse Particulate Matter Secondary Standard ($PM_{10-25}$)

The EPA proposal sets the secondary standard for coarse particulate matter at the same level and in the same form as the primary standard. Alaska supports establishing a secondary standard for PM. The EPA proposal has no rationale for not setting a nationwide secondary standard for thoracic coarse particles. These particles contribute to welfare effects based on their size, regardless of whether they are in urban or rural areas. ADEC believes that in order to protect against welfare effects, the Clean Air Act requires that EPA must set a nationwide secondary standard based on particle size. Relying solely on the regional haze rule for this welfare

protection too narrowly limits the scope for a nationally applied secondary standard. Regional haze is a pollution program for PSD Class I areas – a small subset of the land mass even when such a program requires inclusion of pollution reduction strategies from large geographic areas upwind of a Class I site.

**References:**
State of Alaska Section of Epidemiology

ADEC, "Source Apportionment by Chemical Mass Balance Technique of PM-10 Sources in Eagle River and Juneau, Alaska," Prepared for the Alaska Department of Environmental Conservation by NEA, May 23, 1988.

Alaska Building Science News, "Fire and Smoke: The Summer of 2004," Volume 10, issue 1, Fall 2004, 1-3.

Baris, L. Simanato, M. Artvinlu, et al., "Epidemiological and environmental evidence of the health effects of exposure to erionite fibers; a four year study in the Cappadocian region of Turkey" Int. J. Cancer 39, 10-17 (1987).

Baxter PJ, Ing R, Falk H, Plikaytis B. "Mount St. Helens eruptions: the acute respiratory effects of volcanic ash in a North American community." Arch Environ Health. 1983 May-Jun;38(3):138-43.

Bernstein RS, Baxter PJ, Falk H, Ing R, Foster L, Frost F. "Immediate public health concerns and actions in volcanic eruptions: lessons from the Mount St. Helens eruptions, May 18-October 18, 1980." Am J Public Health. 1986 Mar;76(3 Suppl):25-37.

Buist AS, Vollmer WM, Johnson LR, Bernstein RS, McCamant LE. "A four-year prospective study of the respiratory effects of volcanic ash from Mt. St. Helens." Am Rev Respir Dis. 1986 Apr;133(4):526-34.

Bulkow L., LR, Singleton, RJ, Karron, RA, Harrison, LH and the Alaska RSV Study Group., Risk Factors for severe Respiratory Syncytial Virus Infection Among Alaska Native Children. Pediatrics, 2002. 109(2): 210.

CDC, "Asthma Prevalence, Health Care Use and Mortality, 2002." http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm

Chang CC, Lee IM, Tsai SS, Yang CY. "Correlation of asian dust storm events with daily clinic visits for allergic rhinitis in Taipei, Taiwan." J Toxicol Environ Health A. 2006 Feb;69(3):229-35.

Chen YS, Sheen PC, Chen ER, Liu YK, Wu TN, Yang CY. "Effects of Asian dust storm events on daily mortality in Taipei, Taiwan." Environ Res. 2004 Jun; 95(2):151-5.

Chen YS, Yang CY. J "Effects of Asian dust storm events on daily hospital admissions for cardiovascular disease in Taipei, Taiwan." Toxicol Environ Health A. 2005 Sep;68(17-18):1457-64.

Choudhury AH, Gordian ME, Morris SS. "Associations between respiratory illness and PM10 air pollution." Arch Environ Health. 1997 Mar-Apr;52(2):113-7.

CAQMD - Coast Air Quality Management District -
http://www.aqmd.gov/news1/2001/Coachella_non_attain.htm
http://www.aqmd.gov/news1/2001/coachella_valley_plan.htm

Derbyshire, E. "Natural Dust and pneumoconiosis in High Asia, in Geology and Health: Closing the Gap." H.C.W. Skinner and A.R. Berger, eds., Oxford University Press, New York (2003)

Firth HH, Herbison P, McBride D, Feyer AM., "Health of farmers in southland: an overview." New Zealand Medical Journal. 2001 Sep 28;114(1140):426-8.

Fleshman J.K., J.F. Wilson, and J.J. Cohen, Bronchiectasis in Alaska Native children. Archives of Environmental Health, 1968. 17(4): 517-23.

Forrester T, Richardson S, Thomas G. "Public Health Assessment, Triumph Mine Tailings Piles, Hailey, Blaine County, Idaho" http://www.atsdr.cdc.gov/HAC/PHA/triumph/tri_p1.html. CDC

Gillette D, "Soil derived dust as a source of silica: aerosol properties, emissions, deposition, and transport." J. Expo. Anal. Environ. Epidemiol. 7(3), 303-311 (1997).

Gordian ME, Ozkaynak H, Xue J, Morris SS, Spengler JD. "Particulate air pollution and respiratory disease in Anchorage, Alaska." Environ Health Perspect. 1996 Mar; 104(3):290-7. Related Articles, Links

Horwell CJ, Fenoglio I, Vala Ragnarsdottir K, et al. "Surface reactivity of volcanic ash from the eruption of Soufriere Hills volcano, Montserrat, West Indies with implications for health hazards" Environ. Res. 93(2), 202-215 (2003).

Karron R.A., et al., Severe respiratory syncytial virus disease in Alaska Native children. RSV Alaska Study Group. Journal of Infectious Diseases, 1999. 180(1): 41-9.

Lewis TC, Stout JW, Martinez P, Morray B, White LC, Heckbert SR, Redding GJ., "Prevalence of asthma and chronic respiratory symptoms among Alaska Native children" CHEST 2004; 125:1665–1673

Lowther S.A., et al., Bronchiolitis-associated hospitalizations among American Indian and Alaska Native children. Pediatric Infectious Disease Journal, 2000. 19(1): 11-7.

Monn C, Becker S. "Cytotoxicity and induction of proinflammatory cytokines from human monocytes exposed to fine (PM2.5) and coarse particles (PM10-2.5) in outdoor and indoor air." Toxicol Appl Pharmacol. 1999 Mar 15;155(3):245-52.

MOA, "Aerosol Characterization Study of Anchorage, Alaska; Chemical Analysis and Source Apportionment", Prepared by NEA, Inc. for the Municipality of Anchorage, January 23, 1985

MOA, "Source of Particles on PM-10 Filters, Anchorage, Alaska," Laboratory Report from Microlab Northwest for the Municipality of Anchorage, Report No., 1062-94, October 17, 1994

MOA, "Computer Controlled Scanning Electron Microscopy of Ten Anchorage PM-10 Quartz Filters," Laboratory Report R.J. Lee Group, Prepared for the Municipality of Anchorage, March 21, 1995
Norboo T, Angchuk PT, Yahya M, et al., "Silicosis in a Himalayan village population: role of environmental dust." Thorax 46(5), 341-343 (1991).

Ostro, B.D., Hurley, S., Lipsett, M.J., 1999. Air pollution and daily mortality in the Coachella Valley, California: a study of PM10 dominated by coarse particles. Environmental Research 81, 231–238.

Ostro BD, Broadwin R, Lipsett MJ. "Coarse and fine particles and daily mortality in the Coachella Valley, California: a follow-up study." J Expo Anal Environ Epidemiol. 2000 Sep-Oct;10(5):412-9.

Schwartz J, Norris G, Larson T, Sheppard L, Claiborne C, Koenig J. "Episodes of high coarse particle concentrations are not associated with increased mortality." Environ Health Perspect. 1999 May;107(5):339-42.

Serstad JA, Jenkerson SA. "Investigation of Respiratory Illness in Nuiqsut: Interim Report". State of Alaska Department of Health and Social Services. November 4, 2003

Shay D.K., Bronchiolitis-associated hospitalizations among US children, 1980-1996. JAMA, 1999. 282(15): 1440-6.

Singleton R., et al., Bronchiectasis in Alaska Native children: causes and clinical courses. Pediatric Pulmonology, 2000. 29(3): 182-7.

Stout,J., White LC, Redding, GJ, Morray, BH, Martinez, PE and Gergen, PJ., Differences in asthma prevalence between samples of American Indian and Alaska Native children. Public Health Reports, 2001. 116: 51-57.

U.S. Department of Health and Human Services (USDHSS), Erionite Substance Profile, "11th Report on Carcinogens." Public Health Service, National Toxicology Program, http://ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s083erio.pdf

USGS. "Quartz" http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/sp14-95/quartz.html; from An Overview of Production of Specific U.S. Gemstones U.S. Bureau of Mines Special Publication 14-95 http://minerals.usgs.gov/minerals/pubs/commodity/gemstones/sp14-95/index.html. Donald W. Olson (dolson@usgs.gov)

Wei Sheng Yan Jiu. 2004 Mar;33(2):154-7. Impact of dust storm PM2.5 and PM10 on the phagocytic function of alveolar macrophages of rat] Huang X, Jin Y, Guo X, Wang Y.

Wright A.L., et al., The Tucson Children's Respiratory Study. II. Lower respiratory tract illness in the first year of life. American Journal of Epidemiology, 1989. 129(6): 1232-46.

Yang CY, Tsai SS, Chang CC, Ho SC. “Effects of asian dust storm events on daily admissions for asthma in Taipei, Taiwan.” Inhal Toxicol. 2005 Dec 15;17(14):817-21.