DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

16 Oct 08

MEMORANDUM FOR ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Air Quality
Attn: Alice Edwards, Acting Director
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FROM: 354 CES/CC
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SUBJECT: Comments for Consideration by the Alaska Department of Environmental Conservation (ADEC) in Support of ADEC Comments on Proposed Particulate Matter (PM) Less Than 2.5 Microns in Diameter (PM-2.5) Nonattainment Boundary for the Fairbanks North Star Borough (FNSB) AK

1. Eielson Air Force Base (AFB) is submitting comments and supporting information to ADEC for ADEC consideration and use in preparing ADEC comments on the proposed boundary for the PM-2.5 nonattainment area within the FNSB referenced in the Notice of Availability published in the Federal Register (FR) on 2 September 2008. Eielson AFB and certain portions of Alaska military training ranges are included within the proposed boundary.

2. Many of the comments and information that Eielson AFB is submitting to ADEC were also submitted to the Environmental Protection Agency (EPA) on October 2, 2008 in response to EPAs FR notice regarding the proposed boundary for the FNSB PM-2.5 nonattainment area. However, Eielson AFB is submitting additional information about measured concentrations of PM-2.5 at Eielson AFB, its demographics, and information about activities on ranges used by the base within the proposed nonattainment boundary.

3. Eielson AFB believes EPA's decision to propose inclusion of Eielson AFB and certain portions of Alaska military training ranges within the proposed PM-2.5 nonattainment area is unwarranted, not supported by available data. We are commenting using the nine factors utilized by EPA in designating nonattainment areas.

FACTOR 1, POLLUTANT EMISSIONS: Eielson AFB believes EPA has substantially overestimated the amount of PM-2.5 and sulfur dioxide (SO_2) emissions from stationary emission units at Eielson AFB.

a. We believe EPA used potential emissions estimates from 2002 to estimate PM-2.5 and SO_2 emissions from Eielson AFB. The EPA's 2002 emissions estimates for Eielson AFB are incorrect because it appears the emissions estimates use AP-42 emission factors to estimate PM-2.5 and SO_2 emissions from the Central Heat and Power Plant (CHPP) at Eielson AFB. This estimate does not account for the installation of full-stream bag houses on all six of the boilers at the CHPP in 2005.

b. Installation of the full-stream bag houses substantially reduced all PM emissions from Eielson AFB. Actual 2007 PM emissions (coarse PM, PM-10, and PM-2.5) from all stationary emission units at Eielson AFB were calculated at 7.5 tons. This is far less than EPA's 2002 estimate of PM-2.5 emissions from all stationary emission units at Eielson AFB of 414 tons. Similarly, Eielson AFB believes EPA's 2002 estimate of SO_2 emissions from stationary emission units at Eielson AFB of 855 tons is also incorrect. Eielson AFB calculated that 2007 actual emission of SO_2 from Eielson AFB were 284 tons. The 2007 assessable emissions from Eielson AFB are attached to this memorandum (Atch 1).

c. The primary source of space and hot water heating for all residences and buildings on Eielson AFB is steam from the Eielson AFB CHPP. However, a small number of diesel and propane-fired space and hot water heaters are utilized when steam heat does not adequately meet a given facilities heating requirements. Additionally, there are less than 10 wood stoves and fireplaces in housing units and commercial buildings which are only used for aesthetic purposes. Eielson AFB believes emissions from these sources are minor and have a small input into the PM-2.5 concentrations.

d. Eielson AFB does not believe activities on military training ranges within the FNSB have any effect on ambient concentrations of PM-2.5 in the city of Fairbanks and North Pole. With the exception of the Blair Lakes Range Facility (approximately 23 miles south of Fairbanks), there are no permanently staffed facilities on military training ranges within the FNSB. The estimated actual emissions from the Blair Lakes Range Facility for the period beginning on 1 June 2007 and ending on 31May 2008 are approximately 4.6 tons of PM-10 and 35 tons of SO_2. Given the relatively small magnitude of emissions from the Blair Lakes Range Facility, the distance from Fairbanks and the direction of prevailing winds (generally out of the north and the northeast), Eielson AFB does not believe emissions from Blair Lakes could be transported to Fairbanks.

e. All other permanent facilities on military training ranges within the FNSB either have no emission units associated with them or very small power and heat requirements (less than 25 kilowatts and 1 million British Thermal Units per hour). Eielson AFB is removing fossil fuel fired power and heat generation and replacing it with wind and solar power at many of these facilities. This is being done primarily to reduce the risk of fuel spills and also to reduce operational costs to the ranges.

f. Though some training does occur during the winter on the military training ranges within the FNSB, the vast majority of training activities occur during the spring, summer, and fall when attainment with the 24-hour PM-2.5 standard in Fairbanks does not appear to be an issue. Eielson AFB counted the number of training flights conducted on the Stuart Creek and Blair Lakes Ranges the period beginning 1 July 2007 and ending on 30 June 2008 in order to estimate the number of training flights where ordnance was expended on these ranges. For purposes of this memo, winter months are defined as December 2007 and January, February, and March of 2008.

g. For the Stuart Creek Range, approximately 91 ordnance expending training flights were flown in the spring, summer, and fall months and only 34 ordnance expending sorties were flown in the winter months. At the Blair Lakes Range, 66 ordnance expending training flights were flown in the summer months and approximately 39 sorties were flown in the winter months. For purposes of this memo spring, summer, and fall months are defined as July 2007, August 2007, September 2007, October 2007, November 2007, April 2008, May 2008, and June 2008.

h. Eielson AFB focused on sorties where ordnance was expended because these are usually training exercises for ground support missions. Ground support training exercises usually occur at low altitudes and might affect ambient concentrations of PM-2.5. Given that both the Stuart Creek and Blair Lakes Ranges are approximately 25 miles from Fairbanks and ordnance expending sorties in the winter months

are only flown at a rate of approximately one sortie per 4 days, Eielson AFB does not expect these types of exercises on the Stuart Creek or Blair Lakes Ranges could affect PM-2.5 nonattainment in Fairbanks.

i. All other Air Force aircraft operations are similar to those that occur at the Fairbanks International Airport (FIA). Eielson aircraft operations are similar to FIA but removed from the Fairbanks area by nearly 25 miles. Aircraft operation also decrease in the winter e.g., December 2007 through March 2008 by approximately 30% - 60% from October 2007 levels. Refer to Atch 2 for more information on monthly aircraft movement in the last quarter of 2007 and the first quarter of 2008.

FACTOR 2, AIR QUALITY DATA: Eielson AFB has reviewed the ambient PM-2.5 data that was collected in 2004/2005 (Atch 3) and compared it against the new 24-hour PM-2.5 standard of 35$\mu g/m^3$. Attachment 4 to this memo compares the ambient PM-2.5 data that was collected during this time period to the 24-hour PM-2.5 standard of 35$\mu g/m^3$. Attachment 4 shows that Eielson AFB is in compliance with the National Ambient Air Quality Standards for PM-2.5.

FACTOR 3, POPULATION DENSITY AND DEGREE OF URBANIZATION: Eielson AFB occupies approximately 63,195 acres approximately 23 miles southeast of Fairbanks. Approximately 3,400 military personnel and dependents live on Eielson AFB. The workforce on Eielson AFB consists of approximately 2,200 military personnel, 1,000 civilian employees and approximately 600 members of the National Guard. The population density of Eielson AFB is 73 people per square mile which is far less than the cities of Fairbanks and North Pole. Eielson AFB can be best described as a small town in a rural setting.

FACTOR 4, TRAFFIC AND COMMUTING PATTERNS: Approximately 60 percent of military personnel assigned to Eielson AFB live on the base. This means that approximately 850 military personnel and 1,100 civilians commute to Eielson AFB, predominately from the communities of Fairbanks and North Pole. Most commuters to Eielson drive vehicles powered with gasoline engines. Vehicles powered with gasoline engines emit less PM-2.5 and PM-2.5 precursors than diesel powered engines. Eielson AFB is also considering providing support to multi-person commuter transportation options such as buses and van pools.

FACTOR 5 GROWTH: In 2005, the Base Realignment and Closure (BRAC) action that removed two fighter squadrons from Eielson AFB, and reassigned them to other Air Force bases. This resulted in a reduction of approximately 30% to 40% of military personnel and dependents assigned to Eielson AFB. Though recent trends indicate that the population at Eielson AFB is declining, Eielson AFB is a key Department of Defense asset on the Pacific Rim and has the capacity to support new missions.

FACTORS 6 AND 7, METEOROLOGY, GEOGRAPHY. AND TOPOGRAPHY: We believe it is highly unlikely that Eielson AFB is contributing to any PM-2.5 exceedances in the city of Fairbanks.

a. Figure 8 from Attachment 1 to the EPA's letter to the Governor of Alaska (Atch 5) indicates that winds, on days where the PM-2.5 concentrations exceeded 35 $\mu g/m^3$, were either calm or predominantly out of the northeast, northwest, or southwest quadrants. Winds were rarely, if ever, coming from southeast of Fairbanks. Additionally, during calm conditions, PM-2.5 and PM-2.5 precursors would have to be transported approximately 25 miles to reach Fairbanks to contribute to exceedances of the 24-hour PM-2.5 standard. This circumstance seems unlikely.

b. Figures 9, 10, and 11 in the EPA's letter to the Governor of Alaska (Atch 5) indicate the predominant wind directions are out of the north and northeast during non-calm conditions. As Eielson AFB is located southeast of Fairbanks, it is highly unlikely PM-2.5 and PM-2.5 precursors could be

transported from Eielson AFB on non-calm days to Fairbanks and then become trapped in the Fairbanks airshed when calms and inversions occur.

c. Eielson AFB does acknowledge that data from the meteorological tower at Eielson AFB shows winds do, at times, blow from southeast of Eielson AFB towards the city of Fairbanks (Atch 6). This southeasterly flow does not appear to reach or affect Fairbanks and probably occurs when the Tanana Valley Jet (TVJ) wind phenomenon affects Eielson AFB. Reasons a southeasterly flow does not reach Fairbanks are not clear. One hypothesis is that the strong north and northeasterly flow observed at the meteorological tower at the Fairbanks International Airport changes the direction of a southeasterly flow so the vector of a southeasterly flow moves to the south of the Tanana River and Fairbanks. Page 18 of Atch 5 firmly states that while the TVJ may occasionally affect Eielson AFB and Nenana, it never impacts Fairbanks or North Pole.

d. The prevailing northeasterly flow during the winter months was also documented in a Master's Thesis completed by Pavan Kumar Reddy Kankanala in December 2007 (Atch 7). This study used a Sound Detection and Ranging (SODAR) instrument to measure wind direction and speeds and other meteorological parameters at the Fairbanks International Airport from December 2005 to April 2006. One of the primary observations from the SODAR study showed that the prevailing wind direction in the winter of 2005 and 2006 were from the north, northeast, or the east.

FACTOR 8 AND 9, JURISDICATION BOUNDARIES AND LEVEL OF CONTROL OF EMISSION SOURCES: Eielson AFB and the Blair Lakes and Stuart Creek Ranges are located within the FNSB. All stationary emission units at these locations are regulated by the ADEC. Because Eielson AFB and the ranges are military facilities, the base is able to exercise a high degree of control over these lands and facilities. This means Eielson AFB can more effectively implement measures to control emissions from non-point air emission units than other governmental entities. For example, to support the FNSB requirement that all vehicles have annual carbon monoxide (CO) emission checks as part of the CO attainment plan for the FNSB, Eielson AFB requires that in order for a vehicle to be permitted to drive on Eielson AFB, Eielson AFB requires that vehicles have a current CO inspection, even if the vehicle is registered in another state. Other commercial business, governmental entities, and land managers do not have the ability to impose these kinds of requirements.

4. Eielson AFB itself is clearly in attainment with the 24-hour PM-2.5 standard, and best metrological evidence available indicates direct PM-2.5 and PM-2.5 precursor emissions are not being transported into the city of Fairbanks nor are they contributing to nonattainment with the 24-hour PM-2.5 standard in the city of Fairbanks.

5. Because of the uncertainties about sources and causes of nonattainment with the 24-hour PM-2.5 standard in the city of Fairbanks, Eielson AFB believes EPA is being premature in setting a PM-2.5 boundary encompassing both Eielson AFB and large portions of the military training ranges. Furthermore, additional information/data will be available in 2009 from the FNSB, UAF, and Eielson AFB regarding the causes of PM-2.5 nonattainment in the FNSB. Due to these factors and the ones detailed above, Eielson AFB requests that ADEC propose to EPA that Eielson AFB and the Blair Lakes and Stuart Creek Ranges not be included in the PM-2.5 nonattainment area for the FNSB

6. Eielson AFB is fully committed to the goals of the Clean Air Act as evidenced by air quality monitoring and installation of new technologies on Eielson AFB's boilers already undertaken to drastically reduce emissions. One example of this commitment is Eielson's plan to install SO_2 and nitrogen oxide controls as Eielson AFB replaces existing coal-fired boilers with new coal-fired boilers. Additionally, Eielson AFB plans to work closely with the ADEC and the FNSB to better understand and characterize the sources and causes of PM-2.5 nonattainment in the FNSB. Eielson AFB strongly

maintains that the best available evidence, as described above, does not support the inclusion of Eielson AFB within the PM-2.5 nonattainment boundary for the FNSB. The inclusion of Eielson AFB in EPA;s proposed nonattainment area is simply not supported by the best science currently available and will likely have far-reaching negative effects on the ability of this base to carry out its existing and future mission.

7. If you have any questions regarding this matter, please contact Katherine Stringham, Air Program Manager, at (907) 377-3313.

DANIEL J. GERDES, Lt Col, USAF
Commander

Attachments:
1. Eielson AFB 2007 Assessable Emissions Estimate
2. Monthly Aircraft Movements
3. Eielson AFB Air Monitoring Program Annual Data Report
4. Analysis of PM-2.5 Air Monitoring Report
5. Letter to the Governor of Alaska, 18 August 2008
6. Eielson AFB and Fairbanks International Airport Wind Roses (2002-2006)
7. Master's Thesis, Pavan, et all

cc:
Alice Edwards, ADEC, Juneau
Elin Miller, Regional Administrator, EPA Region 10
Mayor Jim Whitaker, FNSB