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**Memo to:** Honorable Luke Hopkins, Mayor  
Fairbanks North Star Borough

**From:** Bob Dulla and Frank Di Genova

**Subject:** Emission Reduction Benefits of Natural Gas Displacing Conventional Heating Fuels in Fairbanks

For a variety of reasons, including poor dispersion, low temperatures, and limited fuel mix, Fairbanks has poor wintertime air quality and frequently exceeds the National Ambient Air Quality Standard for PM<sub>2.5</sub>. A recent inventory of emissions shows that space heating, and particularly heating with wood, is responsible for the vast majority (74%) of the direct wintertime PM<sub>2.5</sub> emissions (and an even higher percentage of nuisance smoke complaints). By contrast, oil burning provides roughly the same amount of heating as wood (BTU basis) but contributes only about 1% of direct PM<sub>2.5</sub> emissions. However, distillate oil burning for space heating contributes about 42% of (gaseous) sulfur dioxide emissions, and these and other gaseous emissions can convert in the atmosphere to secondary PM<sub>2.5</sub>, adding significantly to the total PM<sub>2.5</sub> burden. Displacement of wood burning and, to a lesser extent, displacing of oil burning, with much cleaner natural gas can significantly reduce these direct and indirect PM<sub>2.5</sub> emissions.

Based on EPA emission factor data, switching from a conventional wood stove to natural gas reduces direct PM emissions by 99.7%, and switching from residential distillate oil burning to natural gas reduces direct PM by 38.6%. In addition, the fuel oil to gas switch reduces emissions of (gaseous) sulfur dioxide by 99.7%.

According to the 2000 Census, there are 25,583 households in the Fairbanks PM<sub>2.5</sub> nonattainment area. Shifting 12,000 homes to natural gas would largely eliminate directly emitted PM from almost 50% of the homes in the nonattainment area and substantially reduce the secondary PM burden as well. No other option has been identified to date that can produce reductions of this magnitude and significantly move the Borough towards attainment in a cost effective manner.

cc. Glenn Miller  
Jim Conner