

# First Native Alaskan Baseline Emissions Inventory: The 125-year-old Native Village of Noatak, AK

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## **ABSTRACT**

The Native Village of Noatak (Nautaaq), Alaska, is approximately 75 miles north of the Arctic Circle and it has been continuously occupied for more than 125 years by the Inupiaq Eskimo people. In August, 2002, the authors visited the Village and data was gathered for the emissions inventory (EI). Data compilation and assimilation has continued sporadically to the present and tentative results are used in this paper.

Only the major air pollution sources are being considered in this initial EI for the Village. They include: wood-burning stoves; diesel-powered generators; fuel-oil furnaces; gasoline-powered ATVs and snowmobiles (off-road); gasoline- and diesel-powered motor vehicles; and gasoline- and diesel-powered motorboats.

It is our understanding that this is the first EI for any Alaskan Native village or tribe. This inventory also probably portrays typical emission sources for most of the Native Alaskan villages, settlements, and towns.

## **INTRODUCTION**

The Native Village of Noatak (Nautaaq), AK was established in the 1800's by the Inupiaq Eskimo people. It is the only settlement on the banks of the Noatak River, approximately 75 miles north of the Arctic Circle, and it has been continuously occupied for more than 125 years. This isolated, remote village is situated on public land, governed solely by the Tribal Council, practices subsistence living, and has a population of 428 people occupying 90 private residences. After 125 years, there has been very little impact on the surrounding Arctic landscape.

In the summer of 2002, the Noatak Environmental Director expressed interest in having a baseline emissions inventory (EI) for the Village. Funding for this project was supplied by the Maniilaq Association, a consortium of Native Alaskan tribes with headquarters in Kotzebue, AK. During August 2002, the authors visited the Village and initiated the baseline survey and data gathering.

The final EI is nearing completion and preliminary results will be presented in this paper. This inventory includes the Village's major emission sources. These sources are: wood-burning stoves; diesel-powered generators; fuel-oil furnaces; gasoline-powered ATVs and snowmobiles (off-road); gasoline- and diesel-powered motor vehicles; and gasoline- and diesel-powered motorboats. It is also

our understanding that this is the first EI for any Alaskan Native village or tribe. This inventory also probably portrays typical emission sources for most of the Native Alaskan villages, settlements, and towns.

## **NOATAK'S EMISSIONS INVENTORY**

This is the first EI for the Native Village of Noatak and, consequently, it is the baseline EI. The inventory data is being compiled and assimilated and although nearly complete, the data used herein is still preliminary. Demands upon the authors' time has extended the expected completion date as has the lack of supporting data. For example, there is no meteorological data or station in Noatak. Likewise, monitoring of incoming fuel supplies is nonexistent for the whole village.

Initially, the authors and the Noatak Environmental Director created a residential survey questionnaire. This questionnaire was then taken by students of the high school senior class door-to-door to the residents. The residents answered the questions and the students returned the completed questionnaires for compilation. Next, the authors and the Environmental Director toured and surveyed the other facilities (power plant, Post Office, etc.) of the Village. This completed the initial data gathering activities.

Compilation of the survey questionnaire results occupied some time. This was because vehicle (car, truck, ATV, snowmobile, etc.) use was usually given as gallons per month, year, or season and heating fuel use was likewise given as per month, year, or season. Also, some residents didn't know how much fuel or wood they used. Average use had to be calculated and added for those residents who didn't know how much they used. Several problems like this had to be resolved before the initial data compilation was considered complete.

While the data compilation was being completed, background information was gathered. This was another problem since there wasn't very much information available. The Village didn't have a written history (town history) and the authors and the Environmental Director had to generate a village history for the purposes of this EI. Likewise, they had to search diligently to obtain any data specific to the climate, topography, geography, etc. of the Village and its surrounding area. Where pertinent information was unavailable, they researched and generated an appropriate description. Background information of this nature is helpful for the reader of the EI. Understanding the location, weather, geography, etc. details aids in understanding the data presented.

In developing the Village of Noatak EI, five major source categories were considered. These included point, area, on-road mobile, off-road mobile and biogenic sources. From these, only the three major contributing categories were quantified. Within these categories, individual emission source components were considered and emissions from point sources (power generators), area sources (wood-burning stoves and fuel oil stoves) and off-road mobile sources (ATVs, snowmobiles, and motorboats) were quantified using data and estimates, where data was unavailable. Table 1 shows the results of the survey and the estimated annual fuel consumption. Table 2 gives the preliminary aggregate yearly PM (particulate matter), VOC (volatile organic carbon), and HAP (hazardous air pollutant) emissions for the Village. The finished EI quantifies emissions for 55 criteria and HAP pollutants.

**Table 1.** Surveyed Emission Sources and Estimated 2002 Fuel Consumption

<b>Sources</b>	<b>Estimated Annual Fuel Consumption</b>	<b>Number Surveyed</b>
Woodstoves	106 cords - wood	34
Home Heaters	49,101 gal. - diesel	66
ATVs	17,220 gal. – gasoline	68
Snowmobiles	19,021 gal. – gasoline	102
Cars/Trucks	780 gal. – gasoline 260 gal. - diesel	7
Motorboats	20,156 gal. – gasoline	41
Power Generators	26,280 gal. - diesel	2

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**Table 2.** Estimated 2002 Village of Noatak Emissions (PM, VOC, & HAP pollutants only)

<b>Pollutant</b>	<b>Winter Emissions</b>	<b>Summer Emissions</b>	<b>Pollutant Totals (t/yr)</b>
PM	0.62	0.65	1.27
VOC	14.52	15.55	30.07
Misc. HAPs	3.56	2.31	5.87

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## **CONCLUSIONS**

This baseline EI is being developed as an initial starting point for understanding the air quality of the Native Village of Noatak and its surrounding environment. All categories of emissions were investigated and evaluated, but only the three major emission sources were quantified. Preliminary data indicates that VOCs are the primary pollutants generated by the Village from the combustion of diesel and gasoline fuels. The final EI will list the 55 pollutants (criteria and HAP) individually and their respective estimated amounts. Observations by the authors of the surrounding landscape showed little or no impact of these emissions.

## **KEY WORDS**

Native Village of Noatak  
Air Quality  
Emissions Inventory  
Tribe

Native Alaskan  
Alaska  
Arctic Circle  
Point Source  
Off-Road Mobile Source  
Area Source  
Wood-burning Stove  
Criteria Pollutant