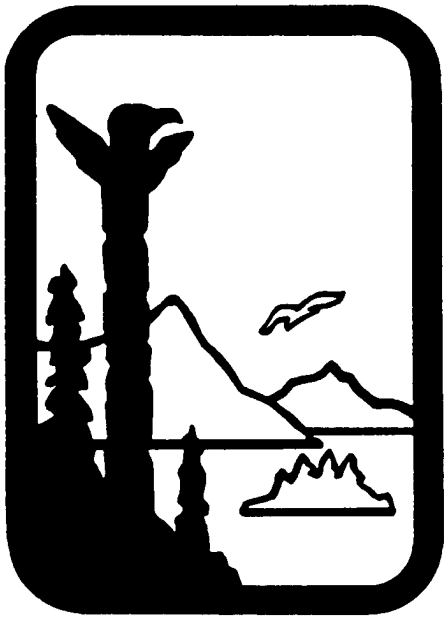
Alaska Department of Environmental Conservation



Amendments to:

State Air Quality Control Plan

Vol. II: Analysis of Problems, Control Actions
Section III.C: Fairbanks Transportation Control Program

Public Review Draft

January 11, 2013

Sean Parnell, Governor

Larry Hartig, Commissioner

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Fairbanks Limited
CO Maintenance Plan

A plan addressing the second 10 years of the 2004 -2024 CO maintenance planning period

Vol. II: Analysis of Problems, Control Actions
Section III.C: Fairbanks Transportation Control Program

Prepared by the
Fairbanks North Star Borough

for submission to the
Alaska Department of Environmental Conservation
for inclusion in the
State Implementation Plan for Air Quality

Draft

December 2012

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A note on the format and organization of this document.

This document is organized and formatted to be consistent with the State of Alaska Air Quality Control Plan or SIP. The previously adopted Fairbanks CO Maintenance Plan encompassed Sections III.C.1 – C.11 of the SIP. A new Section III.C.12, entitled *Limited Maintenance Plan for 2014-2024,* has been added to the original document and Section III.C.10, which addresses air quality conformity procedures for CO, has been revised. Other sections of the document (III.C.1 – III.C.9 and III.C.11) have been changed as needed to provide consistency with the information presented. Revisions to those sections are included in this document.

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Introductory Note: In this document each reference to "CAAA" means the Clean Air Act Amendments of 1990, P.L. 101-549.

SECTION III.B FAIRBANKS CARBON MONOXIDE CONTROL PROGRAM

III.C.12. Limited Maintenance Plan for 2014-2024

Note: This is a new section added to the CO Maintenance Plan. It was submitted to EPA on _____. Section III.C.3, which addresses the emissions inventory, was modified to reflect the calculation of MOVES based on-road vehicle emissions. Section III.C.10, which addresses CO conformity, was revised and submitted at the same time as Section III.C.12 to reflect the simplified conformity process required for limited maintenance areas.

Background

When the EPA first approved the Fairbanks CO Maintenance Plan, effective September 27, 2004, it initiated a 20-year maintenance planning period as defined in the CAA. The CAA requires the submission of a second maintenance plan eight years after the redesignation that covers the second ten years of the maintenance planning period. Thus, an updated "second 10-year maintenance plan" for Fairbanks is required for the period September 27, 2014, through September 27, 2024.

The EPA provides areas with design values less than 7.65 ppm the option of preparing their second 10-year maintenance plan using the limited maintenance plan (LMP) procedure. The basic elements of the LMP procedure for CO are described in a guidance memorandum, referred to as the Paisie memo.* Fairbanks has decided to use the LMP option for this second 10-year maintenance plan update.

The Paisie memo identifies five core provisions that should be included in the LMP: (1) an attainment inventory; (2) a maintenance demonstration, (3) monitoring to verify continued attainment of the CO NAAQS; (4) a contingency plan; and (5) conformity determination requirements under an LMP. These are discussed in more detail below.

Discussion of Core LMP Provisions

1. Attainment Inventory

The Paisie memo states that "the State should develop an attainment emissions inventory to identify the level of emission in the area which is sufficient to attain the NAAQS." A comprehensive inventory was prepared for base year 2005 that showed that motor vehicle emissions were responsible for approximately 87% of all CO emissions in the Fairbanks nonattainment area. The emission inventory was prepared for a "CO design day" when CO concentrations are the highest. In Fairbanks, the highest CO concentrations tend to occur on mid-winter weekdays when temperatures are well below zero. The assumptions and computations involved in producing this inventory are described in detail in Section III.C.3 and its appendix.

Results of 2005 emission inventory are re-summarized in Table III.C.12-1.

* Memorandum "Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas," Joseph W. Paisie, EPA, Oct 6, 1995

Table III.C.12-1 Sources of Fairbanks CO Emissions in 2005 Base Year (tons/day)		
Source Category	**CO Emitted**	**% of Total**
Motor Vehicle – starting	12.46	15.0
Motor Vehicle – running	33.00	39.7
Motor Vehicle – extended idle by combination trucks	0.02	0.0
Motor Vehicle -Total	45.48	54.8
Point	3.08	3.7
Area	19.70	23.7
Non-road	14.80	17.8
Subtotal – Other Sources	37.58	45.2
Total	83.06	100.0

2. Maintenance Demonstration

According to the Paisie memo, the maintenance demonstration requirement is considered to be satisfied "if the monitoring data show that the area is meeting the air quality criteria for limited maintenance areas." Areas with design values of 7.65 ppm (85% of the CO NAAQS) or less qualify for the LMP option.†

Unlike previous CO attainment and maintenance plans prepared for Fairbanks, when an LMP is prepared there is no requirement to forecast CO emissions or concentrations to demonstrate compliance with the NAAQS. When EPA approves an LMP, it concludes that it is unreasonable to expect that emission growth during the maintenance period would result in a violation of the NAAQS.

Table III.C.12.2 shows that design value as defined in the Paisie memo (DV_{Paisie}) has consistently met the 7.65 ppm criteria since 2006. The DV_{Paisie} in base year 2010 was 4.9 ppm. In 2011, the value was 4.0 ppm. The Post Office monitor has consistently measured the highest CO concentrations in the network and thus has been the controlling site in the determination of the design value.

† It should be noted that the Paisie memo definition of design value is different than the design value defined earlier in Section III.C.6. In Section III.C.6, the design value is the upper-bound 90th percentile prediction interval value for the winter 2005/2006 computed from second 8-hour maximum values measured at the Post Office between 1990 and 2006. The design value as defined in the Paisie memo is determined by examining the second maximum 8-hour concentration recorded each year at each monitoring site in the area over a two-year period. For each site, the higher of the two values is the design value for that site for that two-year period. To determine the design value for an area for that two-year period, all monitors in the area are reviewed and the highest design value among the individual sites is the design value for the area as a whole. Because the Paisie definition of the design value is different than the design value referred to in Section III.C.6, it is referred to as DV_{Paisie} in this section.

III.C.12.2 Fairbanks CO Design Value Highest 2nd Max 8-hr Concentration 2002 – 2011 (ppm)					
Year	**State Office Building**	**High School**	**Post Office**	**Armory**	**Design Value**
2002	4.6	5.7	5.6	2.8	5.7
2003	-	5.2	5.2	3.5	5.2
2004	-	4.8	5.4	2.7	5.4
2005	-	4.3	4.5	2.4	4.5
2006	-	3.5	3.7	2.6	3.7
2007	-	3.1	3.2	2.1	3.2
2008	-	3.3	3.6	-	3.6
2009	-	2.8	2.9	-	2.9
2010	-	-	4.9	-	4.9
2011	-	-	4.0	-	4.0

The Paisie memo also notes that, as part of the maintenance demonstration, any control measures in the SIP must be continued. Current CO control measures for Fairbanks are described in Section III.C.5. These primary control measures include (1) expanded availability of plug-ins to promote use of engine block heaters to reduce CO cold start emissions; (2) a consumer-based oxygen sensor replacement program; (3) an episodic woodstove burn ban; and (4) voluntary programs that promote public awareness on actions to reduce CO, and transit system improvements.

3. Monitoring Network/Verification of Continued Attainment

The Paisie memo states that the LMP should provide for continued operation of a CO monitoring network consistent with requirements outlined in 40 CFR 58. Fairbanks is committed to maintaining a CO monitoring network to verify continued attainment of the NAAQS. The specifics of this monitoring network are discussed in Section III.C.4. Commitments to continue monitoring as described in that section remain in force with this LMP.

4. Contingency Plan

The Paisie memo notes that Section 175A of the CAA requires that a maintenance plan include contingency provisions. Section III.C.7 of this Plan provides a menu of six possible contingency measures that could be implemented if Fairbanks failed to attain the CO NAAQS:

- Increased public awareness;
- Enhanced public transit;
- Expansion of the supply of plug-ins;
- Altered signal timing;
- Roadway improvements; and
- Reintroduction of the I/M Program.

In the event monitoring data indicate that a violation of the ambient CO standard has occurred, the Borough would examine the data to assess the spatial extent (i.e., hot spot versus region) and severity of the episode as well as trends over time. Based on this information, Borough staff in consultation with ADEC would determine which of the above measures to implement.

The contingency provisions discussed in Section III.C.7 remain unchanged. This LMP does not alter the commitments or the timelines for implementing contingency measures described in that section.

5. Conformity Determinations under LMPs

When the LMP is approved or found adequate by the EPA, a regional emissions analysis will no longer be required as part of the regional transportation conformity determination process that must accompany the adoption of all metropolitan transportation plans and improvement programs adopted by FMATS. The conformity requirements and procedures that will be employed by FMATS after this LMP has been approved or found adequate by the EPA are discussed in Section III.C.10. This section was revised as part of the preparation of the LMP. Prior to revision, this section set forth a CO emission budget for use in the conformity determination process. As noted earlier, a regional emissions analysis is not required in limited maintenance areas, so a CO emissions budget is no longer needed. Section III.C.10, as revised, describes the simplified conformity process that will be utilized when this LMP is approved or found adequate for conformity purposes by the EPA.

Planning Process Used to Develop the Fairbanks CO LMP‡

The local planning process used to develop air quality plans in Fairbanks is described in detail in Section III.C.1. This same process was used to develop this LMP. The first draft of this LMP was prepared in October 2012 with input from the Interagency Consultation held on October 29, 2012. A public review draft was released for 30-day public review by the FMATS Policy Committee on November 21, 2012. After consideration of comments from the public, on December 19, 2012, the FMATS Policy Committee recommended that the Fairbanks North Star Borough Assembly adopt the LMP if no significant comments

‡ This section will be completed when the public review and approval process is completed. The narrative in this paragraph will likely be revised.

were received by the December 21, 2012 deadline. None were received. The Assembly adopted the LMP and associated amendments to Section III.C.10 on _____.

ADEC held a public hearing on the LMP on February 12, 2013. After review and consideration of the comments received, the LMP was forwarded to the EPA by the Lieutenant Governor on _____.

As part of this LMP, the emission inventory portions of Section III.C.3 have been revised to replace the previously adopted introductory section and subsections entitled "2005 Base Year Inventory," "Base 2006-2015 Modeling Inventories," "Additional 2005 – 2016 Reductions," and "Carbon Monoxide Trends."

III.C.3 Air Quality Emissions Data

Section 187 of the CAA requires three types of emission inventories for all moderate CO nonattainment areas. The three types of inventories are base year inventories, periodic inventories, and modeling inventories. In accordance with these requirements, previous plans included a series of nonattainment inventories for Fairbanks (1) 1990 base year inventory, (2) 1993 periodic inventory, (3) 1995 and 2000 projected year inventories, (4) 1996 periodic inventory, (5) 1995-2001 base year inventory and projections, and (6) 2002-2015 base year inventory and projections.[§]

Section 175A of the CAA defines the general required framework of a maintenance plan. Specifically, it requires that the plan provide for maintenance of the relevant NAAQS for at least 10 years after redesignation. These provisions have been further clarified through the release of subsequent EPA guidance.[3] This guidance includes a requirement that an attainment emissions inventory be included in the maintenance plan to identify the level of emissions in the area which is sufficient to attain the NAAQS. According to the guidance:

> *This inventory should be consistent with EPA's most recent guidance on emission inventories for nonattainment areas available at the time and include the emissions during the time period associated with the monitoring data showing attainment.*

The guidance goes on to indicate that for carbon monoxide (CO) nonattainment areas, the inventory should be based on actual "typical CO season day" emissions for the attainment year. Based on extensive consultation among the Borough, ADEC and EPA Region 10 staff, calendar year 2005 was selected as the most appropriate base year for the attainment inventory.[**] An emissions inventory was subsequently developed for this year and is included in Appendix III.C.3. Additional yearly modeling inventories up through 2015 were also developed to demonstrate continued maintenance of the NAAQS through the required 10-year timeframe after redesignation.

As discussed in Section III.C.2, the Fairbanks CO nonattainment area consists of the urban portion of the FNSB. Accordingly, the attainment and modeling inventories are all focused on this specific area. Unlike earlier Fairbanks CO nonattainment inventories, emissions originating in the remainder of FNSB are not included in the attainment or modeling inventories. The inventories were prepared based on EPA guidance. Detailed estimates of emissions were prepared for on-road mobile sources, non-road mobile sources, area sources, and point sources. The on-road mobile source portion of each inventory was prepared using EPA's mobile source emission model, MOVES2010b (dated June 2012), which includes revisions to reflect the CO benefits of emission control technologies introduced to meet Tier II emission standards. MOVES2010b input parameters also reflect the design elements of

§ A Sierra Research memorandum dated November 20, 2012 comparing the current 2005-2015 base year emission inventory to the 2002-2015 base year inventory is included in Appendix III.C.3

** The term "attainment inventory" is used to be consistent with that contained in the referenced EPA guidance memorandum. It refers to the emissions inventory that is to be included in the maintenance plan identifying the level of emissions in Fairbanks sufficient to attain the CO NAAQS.

the Fairbanks I/M program prior to its termination effective January 1, 2010. The MOVES2010b-based vehicle emissions do not include any adjustments to reflect the benefits of engine block heater plug-in use.††

2005 Base Year Inventory

The 2005 inventory prepared for the Fairbanks nonattainment area provides estimates of daily emissions calculated for a typical winter weekday during calendar year 2005. Total CO emissions are estimated to be 85.68 tons per day (tpd) prior to the implementation of additional local control measures, which are addressed separately below. Roadway emissions produce the bulk (45.79 tpd or 53%) of the total CO emitted per day in the nonattainment area, based on a travel estimate of 917,608 vehicle miles traveled (VMT) per winter weekday provided by the ADOT&PF.[16] In addition, point sources (primarily power plants) account for about 4%, area sources (including residential wood combustion) for about 26%, and nonroad sources for about 17% of total daily CO emissions.

Base 2006-2015 Modeling Inventories

The base 2006-2015 modeling inventories account for the elimination of the inspection and maintenance (I/M) program after 2009. This results in a slight increase in on-road mobile emissions as the analysis assumes no residual benefits remain after the program is ended.

The base modeling inventories exhibit a net decline between 2005 and 2009, increase in 2010 due to the loss of the emission benefits from the I/M program, and increase slowly by about 1% per year through 2015.

Overall, base emissions (i.e., those that do not account for the implementation of additional local control measures) are projected to increase by 4.80 tpd (6%) between the 2005 attainment year and the 2015 horizon planning year. This is because motor vehicle emissions are forecast to marginally decrease by only 1.2% and do not offset the growth in emissions from other sources estimated for the same period. Traditionally, motor vehicle CO rates have been forecast to decline substantially over time and those reductions have offset growth in other source categories. The current version of MOVES, however, projects starting CO emission rates to increase through 2015. Reductions in projecting running emissions are insufficient to offset the growth in running emissions, which leads to a small growth in overall motor vehicle CO emissions.

Table III.C.3-1 summarizes both the 2005 attainment inventory and the base 2006-2015 modeling inventories for the Fairbanks nonattainment area.

†† Earlier versions of the CO Maintenance Plan inventories included emission benefits for wintertime plug-in use based on cold-temperature emission measurements conducted in Fairbanks with and without plug-in use. The benefits from these testing data were applied within an Alaska-specific version of the MOVES predecessor, AKMOBILE6 had been formally reviewed and approved for use in Alaska by EPA. For this MOVES-based LMP inventory, no plug-in benefits were assumed because no EPA-approved Alaska version of MOVES yet exists.

Table III.C.3-1
Base Fairbanks CO Emissions Inventory: Nonattainment Area Totals by Year

	CO (tpd)					
Nonroad Sources	2005	2006	2007	2008	2009	2010
Agricultural Equipment	-	-	-	-	-	-
Aircraft & Airport GSE Total	3.70	3.72	3.91	3.95	3.96	4.00
Commercial Equipment Total	0.14	0.14	0.15	0.15	0.15	0.15
Construction and Mining Equipment Total	-	-	-	-	-	-
Industrial Equipment Total	0.09	0.09	0.09	0.09	0.09	0.09
Lawn and Garden Equipment Total	0.02	0.02	0.02	0.02	0.02	0.02
Logging Equipment Total	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft Total	-	-	-	-	-	-
Railroad Operations (Locomotives)	0.18	0.18	0.19	0.20	0.20	0.20
Railroad Equipment Total*	0.01	0.01	0.01	0.01	0.01	0.01
Recreational Equipment Total	10.66	10.72	11.24	11.37	11.39	11.50
Underground Mining Equipment Total	-	-	-	-	-	-
TOTAL Nonroad Sources	**14.80**	**14.89**	**15.61**	**15.78**	**15.82**	**15.97**
Area Sources						
Residential Wood Burning	21.23	21.37	22.40	22.65	22.70	22.93
Fuel Oil	0.05	0.05	0.05	0.05	0.05	0.05
Propane	0.00	0.00	0.00	0.00	0.00	0.00
Coal	0.57	0.58	0.60	0.61	0.61	0.62
Natural Gas	0.02	0.02	0.02	0.02	0.02	0.02
Industrial Processes – Commercial Cooking	0.02	0.02	0.03	0.03	0.03	0.03
Structural Fires	0.10	0.10	0.11	0.11	0.11	0.11
TOTAL Area Sources	**22.00**	**22.14**	**23.21**	**23.47**	**23.52**	**23.75**
Point Sources						
MAPCO (Williams/Flint Hills)	0.08	0.08	0.08	0.09	0.09	0.09
Eielson	0.00	0.00	0.00	0.00	0.00	0.00
Fort Wainwright	1.45	1.46	1.53	1.55	1.55	1.57
GVEA/North Pole	0.03	0.03	0.03	0.03	0.03	0.03
Alaska RR Heating Plant	0.01	0.01	0.00	0.00	0.00	0.00
University of Alaska-Fairbanks	0.50	0.50	0.53	0.53	0.53	0.54
Petro – Star	0.00	0.00	0.00	0.00	0.00	0.00
Fairbanks MUS (Aurora)	1.02	1.03	1.08	1.09	1.09	1.10
Alyeska Pump Station #8	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Point Sources	**3.09**	**3.11**	**3.26**	**3.30**	**3.31**	**3.34**
On-Road Mobile Sources						
Running Emissions	12.56	11.68	10.87	9.85	8.13	8.47
Starting Emissions	33.22	35.00	36.11	36.02	33.60	35.05
Extended Idle Combination Truck Emissions	0.02	0.02	0.02	0.02	0.02	0.02
Total On-Road Mobile Sources	**45.79**	**46.70**	**47.00**	**45.88**	**41.75**	**43.54**
GRAND TOTAL	**85.68**	**86.84**	**89.08**	**88.44**	**84.40**	**86.61**

* Does not include emissions from locomotive engines.

Table III.C.3-1 (cont.)
Base Fairbanks CO Emissions Inventory: Nonattainment Area Totals by Year

	CO (tpd)				
Nonroad Sources	2011	2012	2013	2014	2015
Agricultural Equipment	-	-	-	-	-
Aircraft & Airport GSE Total	4.04	4.08	4.12	4.16	4.20
Commercial Equipment Total	0.15	0.16	0.16	0.16	0.16
Construction and Mining Equipment Total	-	-	-	-	-
Industrial Equipment Total	0.09	0.10	0.10	0.10	0.10
Lawn and Garden Equipment Total	0.02	0.02	0.02	0.02	0.02
Logging Equipment Total	0.00	0.00	0.00	0.00	0.00
Pleasure Craft Total	-	-	-	-	-
Railroad Operations (Locomotives)	0.20	0.20	0.20	0.21	0.21
Railroad Equipment Total*	0.00	0.00	0.00	0.00	0.00
Recreational Equipment Total	11.62	11.74	11.85	11.97	12.09
Underground Mining Equipment Total	-	-	-	-	-
TOTAL Nonroad Sources	**16.13**	**16.29**	**16.46**	**16.62**	**16.79**
Area Sources					
Residential Wood Burning	23.16	23.39	23.62	23.86	24.10
Fuel Oil	0.05	0.05	0.05	0.05	0.05
Propane	0.00	0.00	0.00	0.00	0.00
Coal	0.62	0.63	0.64	0.64	0.65
Natural Gas	0.02	0.02	0.02	0.02	0.02
Industrial Processes – Commercial Cooking	0.03	0.03	0.03	0.03	0.03
Structural Fires	0.11	0.11	0.12	0.12	0.12
TOTAL Area Sources	**23.99**	**24.23**	**24.47**	**24.72**	**24.96**
Point Sources					
MAPCO (Williams/Flint Hills)	0.09	0.09	0.09	0.09	0.09
Eielson	0.00	0.00	0.00	0.00	0.00
Fort Wainwright	1.58	1.60	1.61	1.63	1.65
GVEA/North Pole	0.03	0.03	0.03	0.03	0.03
Alaska RR Heating Plant	0.01	0.01	0.01	0.01	0.01
University of Alaska-Fairbanks	0.55	0.55	0.56	0.56	0.57
Petro – Star	0.00	0.00	0.00	0.00	0.00
Fairbanks MUS (Aurora)	1.11	1.12	1.13	1.15	1.16
Alyeska Pump Station #8	0.00	0.00	0.00	0.00	0.00
TOTAL Point Sources	**3.37**	**3.41**	**3.44**	**3.47**	**3.51**
On-Road Mobile Sources					
Running Emissions	8.15	7.66	7.37	7.13	6.93
Starting Emissions	35.67	36.27	37.03	37.60	38.27
Extended Idle Combination Truck Emissions	0.02	0.02	0.02	0.02	0.02
Total On-Road Mobile Sources	**43.83**	**43.95**	**44.42**	**44.75**	**45.22**
GRAND TOTAL	**87.33**	**87.88**	**88.79**	**89.56**	**90.48**
* Does not include emissions from locomotive engines.					

Additional 2005-2015 Reductions

Additional CO emissions reductions beyond those incorporated into the base 2005-2015 modeling inventories shown in Table III.C.3-1 are also projected to occur due to the implementation of additional local control measures. These measures, which are described in detail in Section III.C.5, include the following:

- Episodic woodstove burning ban ‡‡;
- Oxygen sensor replacement program;
- OBD-I/M inspections of heavy-duty gas vehicles (HDGVs) until 2009; and
- Other measures (e.g., transit).

Table III.C.3-2 shows the additional emissions reductions projected for these measures, as well as the adjusted CO emissions totals estimated for each of the inventory years.

Table III.C.3-2
Adjusted Fairbanks CO Emissions Inventory:
Nonattainment Area Totals*

	CO (tpd)					
	2005	2006	2007	2008	2009	2010
Baseline Inventory	**85.68**	**86.84**	**89.08**	**88.44**	**84.40**	**86.61**
Wood Burning Ban	2.31	2.38	2.40	2.42	2.44	2.47
Oxygen Sensor Replacement	0.28	0.50	0.46	0.29	0.13	0.03
HDGV OBD-I/M	0.00	0.01	0.01	0.01	0.01	0.00
Other	0.03	0.03	0.03	0.03	0.03	0.03
Total Reduction	2.62	2.92	2.90	2.75	2.61	2.53
Adjusted Inventory	**83.06**	**83.92**	**86.18**	**85.69**	**81.79**	**84.08**

	CO (tpd)				
	2011	2012	2013	2014	2015
Baseline Inventory	**87.33**	**87.88**	**88.79**	**89.56**	**90.48**
Wood Burning Ban	2.49	2.51	2.53	2.55	2.58
Oxygen Sensor Replacement	0.00	0.00	0.00	0.00	0.00
HDGV OBD-I/M	0.00	0.00	0.00	0.00	0.00
Other	0.03	0.03	0.03	0.03	0.03
Total Reduction	2.52	2.54	2.56	2.58	2.61
Adjusted Inventory	**84.81**	**85.34**	**86.23**	**86.98**	**87.87**

*See the Sierra Research memorandum, "Fairbanks Carbon Monoxide Maintenance Plan Emission Inventory Control Measure Adjustments," dated October 25, 2007, in Appendix III.C.3-2 for emission calculations of control strategy benefits.

‡‡ In October 2012, a citizen's initiative passed removing the Borough's ability to place restrictions on fuel heating devices, thus eliminating ordinance 2003-71's ability to institute this control measure. Therefore, under 18AAC 50.075, the department will ensure the implementation of this measure should it be needed.

The impact of these reductions on the continued probability of attainment in Fairbanks is discussed in Section III.C.8.

Carbon Monoxide Trends

Because vehicle travel is such a large source of CO emissions in the Fairbanks area, it is instructive to review past trends in both population and travel, as well as ambient CO concentrations. A review of historical population and traffic data is presented below.

Population Growth

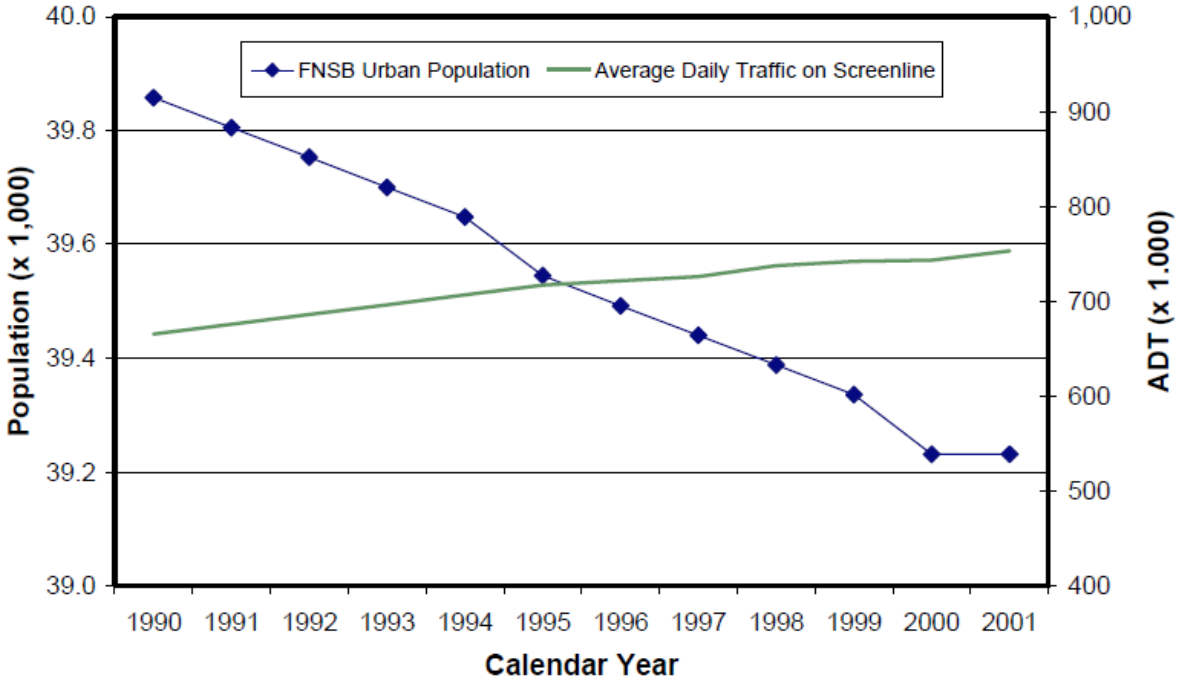
Fairbanks was established in the early 1900s as a trading post serving gold prospectors in the area. During the first part of the century, the population peaked and waned according to the price and availability of gold. Completion of the Alaska Highway in the 1940s, plus increased military activity in the area due to World War II, combined to cause considerable growth. By 1950, the population of the Fairbanks Census District (an area somewhat larger than the current boundaries of the Fairbanks North Star Borough) had grown to 19,409.

Continued military spending and increased governmental growth resulted in renewed economic activity and growth in population during the 1950s. By 1960, the population of the Fairbanks Census District had risen to 43,412. In the 1960s, military influence in the area leveled off, while increased oil exploration on the North Slope accounted for a 15% increase in population during the decade. The Fairbanks North Star Borough was formed in the mid-1960s. The 1970 Census District population of 50,043 can be compared to a Borough population for the same year of 45,864.

Construction of the Trans-Alaska Oil Pipeline during the 1970s resulted in a large population influx into the area. FNSB population peaked at 72,037 in 1976. With completion of the pipeline, the population fell dramatically to 51,659 in 1981. However, increased state and local governmental spending due to state oil revenues led to a resurgence in local economic activity and another growth spurt in population, resulting in a 1985 FNSB population of 75,079.

Since 1985, population levels in the Fairbanks area have remained relatively unchanged. Increase in military activity due to the addition of a light infantry division to Fort Wainwright acted to offset a reduction in state and local governmental spending due to declining oil revenues. These factors resulted in a 1990 FNSB population of 77,720. According to the Census,[5] the Borough population experienced little change between 1990 and 2000, with an overall growth rate of 0.6% per year. During that same time period, the Census data indicate that the population in the nonattainment area actually declined from 39,858 to 39,231, a reduction of 0.16% per year. The decline in nonattainment area population during the 1990s is displayed in Figure III.C.3-2. It shows that while there was a net reduction in population, the year-to-year change was very modest.

Figure III.C.3-2
Trends in Population and Average Daily Traffic for Fairbanks, Alaska (1990-2001)



Population forecasts for the 2005-2015 maintenance planning period show an increase of about 3% between 2005 and 2006 then a steady increase of about 1% each year to 2015. The nonattainment area population estimated from historical data and projected forecasts from the 2035 Metropolitan Transportation Plan (MTP) coupled with block-level population data from the 2010 U.S. Census is shown in Table III.C.3-3. The vehicle travel-specific forecasts for the period are described in more detail below.

Growth in Vehicle Travel

Despite the reduction in population recorded between 1990 and 2000, the nonattainment area still experienced a modest increase in travel during this decade. The increase is based on traffic counts recorded at Highway Performance Monitoring System (HPMS) and other sites located throughout the Borough.[7] Figure III.C.3-2 shows that travel activity, measured by average daily traffic counts, increased from 665,398 miles per day in 1990 to 752,992 miles per day in 2001, a growth rate of 1.1% per year.

Table III.C.3-3
Projected Fairbanks Nonattainment Area Population

Calendar Year	LRTP Population Forecast
2005	35,628
2006	36,720
2007	37,035
2008	37,354
2009	37,678
2010	38,007
2011	38,387
2012	38,771
2013	39,159
2014	39,550
2015	39,946

From 2002 through 2004, ADOT&PF reported an annual nonattainment area VMT growth rate of 1.2%. Starting in 2005, the projected growth in vehicle travel reported in the previous Maintenance Plan was updated using the VMT projections reported in the FMATS 2035 MTP. The resulting annual VMT projections for the area during the 2005-2015 maintenance planning period are shown in Table III.C.3-4.

Table III.C.3-4
Projected Vehicle Travel in the Fairbanks CO Nonattainment Area (2005-2015)

Year	Vehicle Miles Traveled (per winter day)
2005	917,608
2006	905,801
2007	918,857
2008	932,102
2009	900,675
2010	869,249
2011	878,409
2012	887,570
2013	896,730
2014	905,890
2015	915,050

As part of this LMP, Section III.C.4 below has been revised and will replace the previously adopted section entitled "Carbon Monoxide Network Monitoring Program."

III.C.4. Carbon Monoxide Network Monitoring Program

Although emission projections are used to track Reasonable Further Progress (RFP), it is actual ambient air quality monitoring data that determine whether an area attains the NAAQS by the required attainment date. The difficulty with using ambient monitoring data to assess progress toward attainment is the fluctuation in pollution concentrations caused by daily, weekly, and yearly variations in meteorological conditions, traffic levels, and other factors. However, it is important to monitor and compare ambient air quality concentrations to modeled emission projections to determine if the projections provide a reasonable surrogate for tracking progress toward attainment. Section 110(a)(2)(B) of the CAA requires that each implementation plan submitted to EPA provide for the establishment and operation of "appropriate devices, methods, systems, and procedures to monitor, compile, and analyze data on ambient air quality."

The Arctic Health Research Center began ambient air quality sampling in Fairbanks in 1969. The results of the preliminary monitoring program indicated that high CO levels were occurring during the winter months. The Fairbanks area experiences severe wintertime temperature inversions, resulting in the trapping of pollutants near ground level, with little vertical dispersion. Low winds and the presence of hills around most of the urban area combine to limit horizontal dispersion as well.

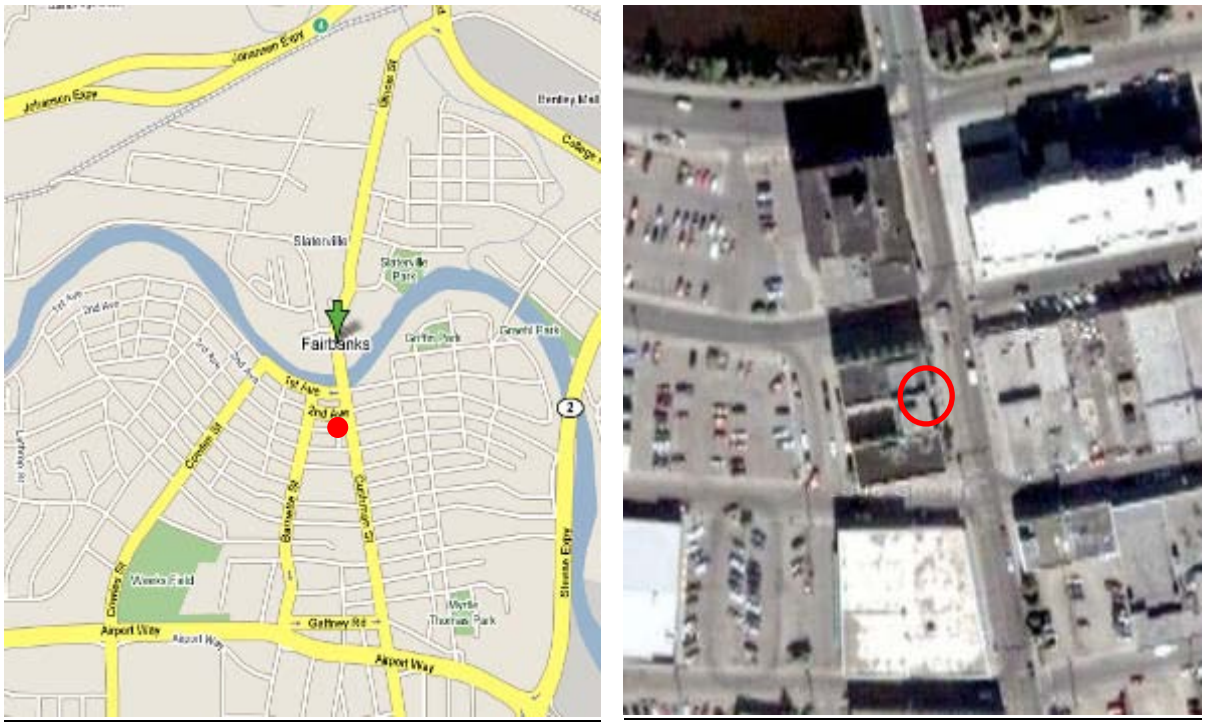
In fulfillment of the ambient monitoring requirement, and to better understand Fairbanks' air quality problems, the FNSB has operated a CO sampling network since the early 1970s. In 1972, the FNSB began continuous ambient CO monitoring in the downtown area. In addition, a grab sampling program to determine CO levels outside the downtown core area was conducted during the period 1976-1977, followed by mobile laboratory sampling during the winters of 1982-1985.

The monitoring network consisted of three sites (including one microscale, one middle-scale, and one neighborhood monitoring site) operated October 1 through March 31 each year, with up to 30 days of additional operation at the beginning and end of the season for quality assurance calibration and audits. The microscale and neighborhood sites have been operated in their present configuration since 1985. In April 2002, the middle-scale monitoring site was moved from the State Office Building (where it had been since 1985) to the National Guard Armory, at the corner of Wien Street and 2nd Avenue (approximately 2.5km to the west and 0.5km north of the old site) in order to provide an "off-axis" site relative to the other two monitoring sites.

Recognition of declining CO concentrations led to the decommissioning of the CO monitors located at Hunter School and the National Guard Armory in recent years. The decision to retire these sites was made in coordination with EPA 10 Region staff. As part of that effort, DEC decided to locate the new NCORE multi-pollutant monitoring site in Fairbanks because, despite the progress in reducing CO concentrations, it has the most significant air quality impacts in the state. Presented below is a summary of the two CO monitoring sites that are currently operating in Fairbanks

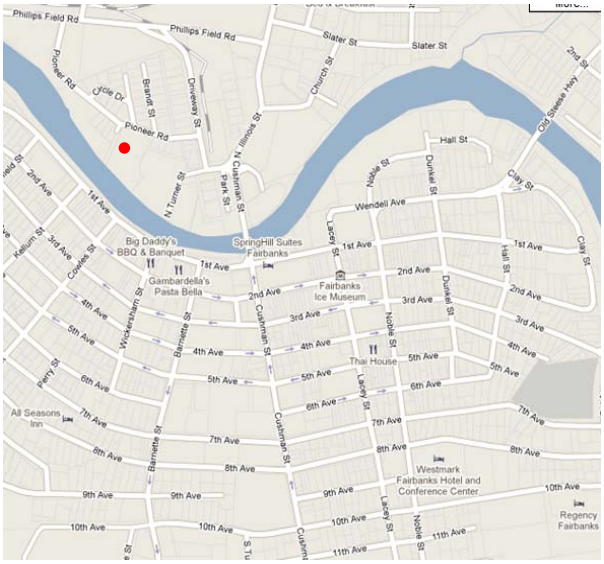
Old Post Office - The site is located in the Old Post Office building at 250 Cushman Street at latitude 64° 50' 43" north (64.845278), longitude 147° 43' 16" west (-147.721111), and elevation of 140 meters (460 feet) above sea level. Figure III.C.4-1 shows a street map of downtown Fairbanks and satellite image of the area. The site is located in the middle of the central business district. This was the first monitoring site in Fairbanks, operated from 1972 through 1978, and then re-established in January 1985. Due to its long operating history, it provides the best picture of long-term trends in Fairbanks' CO levels. It recorded the highest concentrations of any monitor in the original three-site network. The Old Post Office is a micro-scale, population-oriented site and it is equipped with a Thermo Electron 48C CO monitor.

Figure III.C.4-1
Map and Satellite Image of the Old Post Office Monitoring Site
(the red dot indicates the site location)



NCore - The site is located approximately 32 meters north of the Chena River near the Fairbanks North Star Borough building on Pioneer Road at latitude of 64° 50′ 44.6″ north (64.845690), longitude of 147° 43′ 38.2″ west (-147.727413), and elevation of 472 feet (144 meters) above sea level. There is a small patch of birch trees 6 to10 meter tall that sit approximately 32 meters to the east of the site. The heights of the trees exceed the height of the monitor inlets. There is a 12 meter tall building approximately 75 meters to the southeast of the site and a 7 meter tall building approximately 50 meters to the west. Figure III.C.4-2 shows a street map and the satellite image of the local area. This is a neighborhood-scale, population-oriented site and it is equipped with a Thermo Scientific Model 48i-TLE continuous CO monitor.

Figure III.C.4-2
Map and New Shelter of the NCore Monitoring Site
(the red dot indicates the site location)



Given the close proximity of the two remaining monitors, DEC is considering dropping the Old Post Office site. A decision, however, will not be made until sufficient data is assembled for a correlation analysis that confirms the representativeness of concentrations recorded at the NCore site.

As part of this LMP, Section III.C.6 below has been revised and will replace the previously adopted section entitled "Modeling and Projections."

III.C.6 Modeling and Projections

In previous air quality plans, Fairbanks acknowledged the limitations of using rollback modeling to determine the emission reductions needed to demonstrate attainment of the ambient CO standard. The rollback modeling approach conflicted with EPA guidance that requires the use of dispersion modeling to demonstrate attainment of the NAAQS. However, concerns about Fairbanks' ability to supply the data needed to accurately characterize emissions and meteorology within the modeling domain and the ability of dispersion models to adequately characterize low-level arctic inversions led EPA to accept the use of rollback modeling. Nevertheless, concerns about the limitations of rollback persisted and the history of attainment demonstrations that underestimated the emission reductions needed to ensure long-term attainment of the CO standard caused the Borough to agree to work with both EPA and a National Research Council (NRC) committee investigating CO to assess the feasibility of using dispersion models to accurately represent conditions leading to CO violations in Fairbanks. The Borough followed through on both of these commitments. This resulted in the development of a probabilistic rollback methodology that was used to demonstrate long-term attainment in the previous maintenance plan without the I/M Program.

While this methodology was used to prepare an updated demonstration of attainment using MOVES based CO emission factors, the decision to pursue a LMP option eliminated the requirement to prepare the maintenance demonstration. EPA LMP guidance§§ states:

> *The maintenance demonstration requirement is considered to be satisfied for nonclassifiable areas if the monitoring data show that the area is meeting the air quality criteria for maintenance areas (7.65 ppm or 85% of the CO NAAQS). There is no requirement to project emissions over the maintenance period. The EPA believes if the area begins the maintenance period at or below 85 percent of the exceedance levels, the air quality along with the continued applicability of PSD requirements, any control measures already in the SIP and Federal measures, should provide adequate assurance of maintenance over the initial 10-year maintenance plan.*

To provide assurance that emissions growth does not threaten long-term maintenance a forecast of source specific emissions is presented from the base year through 2015 in Section III.C.3 Air Quality Emissions Data. Those forecasts show that CO emissions are only projected to increase by roughly 6% from 2005-2015. This modest increase is largely the result of an upward trend in CO starting emissions at low temperatures reflected in EPA's latest MOVES2010b vehicle emission factor model.

§§ Memorandum "Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas," Joseph W. Paisie, EPA, October 6, 1995

As part of this LMP, Section III.C.10 below is re-titled and will replace the previously adopted section entitled "Motor Vehicle Emissions Budget."

III.C.10 Air Quality Conformity Procedures

Note: This section of the maintenance plan was revised in October 2012 as part of the preparation of a limited maintenance plan for CO. At the same time Section III.C.10 was revised, a new section (Section III.C.12) was added. Together Section III.C.10 and Section III.C.12 constitute the Fairbanks CO Limited Maintenance Plan.

Regional Conformity Determination Methodology

Before any regional transportation plan can be adopted or amended, the metropolitan planning organization is required to make an affirmative determination that it meets conformity requirements outlined in 40 CFR 93. Although EPA policy does not exempt CO LMP areas from the need to demonstrate conformity, it allows the area to do so without completing a regional emissions analysis. EPA guidance states that "emissions budgets in limited maintenance plan areas may be treated as essentially not constraining."*** The EPA has concluded that for transportation purposes, the emissions in a qualifying LMP area need not be capped for the maintenance period and thus no emissions budget is required in the maintenance plan. A regional emissions analysis and associated regional conformity requirements (40 CFR 93.118 and 93.119) are no longer applicable. Similarly, federal actions subject to the general conformity rule would automatically satisfy the "budget test" specified in Section 93.158(a)(5)(i)(A) for the same reasons.

When a regional conformity determination is made for a transportation plan or improvement program, it should state that a regional emission analysis is not required because the area has an approved LMP for CO. The Plan and the TIP must still be made available for public review. The interagency consultation requirements specified in 40 CFR 93.112 and under state regulation 18 AAC 50 .715 and 50.720 still apply. To meet requirements outlined in 40 CFR 93.113, the conformity determination must also address whether the transportation control measures in the SIP are being implemented in a timely manner.

Project-Level Conformity Methodology

CO LMP areas are not exempt from project-level or "hot spot" analysis requirements outlined in 40 CFR93.116 & 123. A project-level hot-spot analysis consists of performing dispersion modeling to determine whether a project will cause or contribute to any new violations of ambient standards or increase the frequency or severity of existing violations. This hot-spot modeling requirement applies to certain types of projects in all nonattainment and maintenance areas. Thus, in Fairbanks, hot-spot CO modeling must be performed in project-level conformity determinations for these types of projects (spelled out in 40 CFR 93.123(a)).

The EPA has released guidance on how the MOVES model should be used to prepare project level conformity analyses.††† Inputs to the hot-spot modeling include link-specific vehicle emission factors for roadway segments in the project vicinity. For project-level

*** Memorandum "Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas," Joseph W. Paisie, EPA, Oct 6, 1995

††† "Using MOVES in Project Level Carbon Monoxide Analyses," EPA-420-B-10-041, December 2010

analyses, these emission factors will be developed in one of two ways, depending on the type of project. Through the interagency consultation process, a project will be put into one of two tracks, as described below.

1. Projects that do not significantly impact off-network emissions (e.g., projects that are not likely to affect the amount of initial idling and/or engine block heater use in the project area) will follow a more routine approach to computing emission impacts using MOVES. Off-network emissions will not be directly modeled in the analyses of these projects, as they do not change as a result of the project. For these types of projects, off-network emissions are accounted for in the background concentration input in CAL3QHC. The interagency consultation team should determine the appropriate CO background concentration used to model the project.‡‡‡

2. Those projects that do significantly impact off-network emissions (e.g., construction of facilities like parking lots that add substantially to start emissions in the project area, or projects that are likely to affect the amount of initial idling and/or engine block heater use in the area) will follow a process that incorporates off-network emissions, roadway link emissions, and background concentration. The EPA MOVES guidance for project-level analyses describes how off-network emissions should be modeled. The interagency consultation team should review and approve the assumptions that are used in this modeling. The consultation team should also evaluate and determine the appropriate dispersion model used to model the ambient CO impacts expected from these off-network emissions.

The interagency consultation process will be the key means of ensuring that projects are placed in the correct track for calculation of emission impacts. The interagency consultation process will also be important in ensuring that appropriate analyses of project emission impacts are conducted under the two scenarios listed above. Moreover, it is important that the interagency process be used to develop guidance so that consistent methodologies are utilized in project-level analyses. Hot spot modeling is often required in project-level conformity determinations. When possible, the interagency consultation process should be used to develop written guidance regarding modeling inputs and assumptions, and these assumptions should be consistent with those employed in the maintenance demonstration in this Plan. As always, conformity determinations will be subject to the applicable public review requirements. This provides the public an opportunity to comment on the approach that is taken for the conformity determination for each plan, program, and project.

General Conformity

For projects requiring general conformity determinations, it is also important to consider the impacts of off-network motor vehicle emissions (e.g., idle emissions). Interagency consultation shall be used to determine whether off-network mobile source emissions are significant and what analysis of these emissions is appropriate for determining general conformity. An example of a project of this type is an airport expansion.

‡‡‡ Typically, background CO is estimated from background or neighborhood-scale monitors in the vicinity.

[16]. Vehicle miles traveled data supplied by Paul Pruzak, Alaska Department of Transportation and Public Facilities, Northern Regional Office, November 2003.