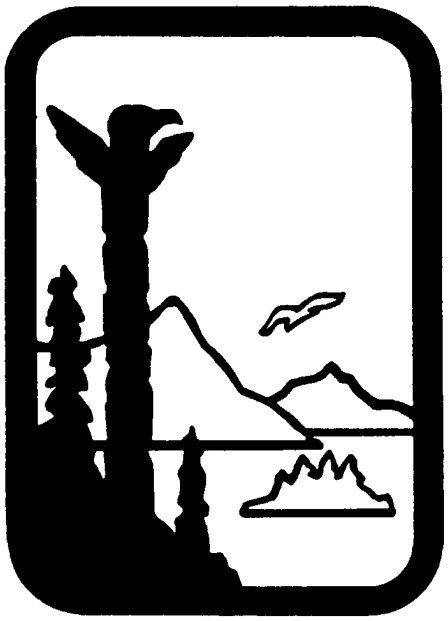
Alaska Department of Environmental Conservation



Amendments to:

State Air Quality Control Plan

Vol. III: Appendices (to Vol. II, Section III.D.3)

Public Review Draft
December 2008

Volume III, Appendices, of the State Air Quality Control Plan is amended to include additional documents based on amendments to Volume II, Section III.D.3 of that plan. In particular, Appendix III.D.3.5, III.D.3.8, and III.D.3.9 are proposed to be amended by adding the documents listed below (refer to Appendix III D.3.5 for complete ordinance language):

Appendix III.D.3.5

City & Borough of Juneau Ordinances:

- **#83-63** – "An Ordinance Regulating Open Burning and the Use of Wood-Fired Heating Devices in Smoke Hazard Areas"
- **#88-59** – "An Ordinance Amending the Woodsmoke Control Code to Implement a New Measurement System for Measuring Air Pollution, to Adopt Federal Standards for the Issuance of Class I Permits for NonCatalytic Solid Fuel-Fired Heating Devices, and to Delete References to Oregon State Woodstove Standards."
- **#91-52** – "An Ordinance Amending the Woodsmoke Control Code to Lower the Particulate Count Threshold for Declaring Air Alerts, to Authorize the Manager to Declare an Air Alert According to Certain Qualitative Criteria, to Provide for the Expiration of All Existing Class I Permits on July 1, 1997, to Terminate the Manager's Authority to Issue New Class I Permits, and to Prohibit the Burning in Woodstoves of Substances Other Than Paper, Cardboard, and Untreated Wood."
- **#91-53** – "An Ordinance Amending the Woodsmoke Control Fine Schedule to Increase the Fines for Violations of the Woodsmoke Control Code."
- **#93-01** – Ordinance on Local Improvement Districts
- **#93-06** – An Ordinance Creating Local Improvement District No. 76 of the City and Borough….
- **#2008-08-** "An Ordinance Amending the Woodsmoke Control Program Regarding Solid Fuel-Fired Burning Devices". This ordinance has been incorporated into City & Borough of Juneau Code at Title 36.40.040 "Air pollution alert and emergencies".

Fiscal Year 1994 CP-1s

City & Borough of Juneau Resolution #1612

Memorandum of Understanding between ADEC, ADOT/PF, and CBJ – 1992/1993

City & Borough of Juneau Resolution #2448- With this resolution, the City & Borough of Juneau approved the draft PM10 Limited Maintenance Plan, dated May 10, 2007. Resolution approved August 11, 2008.

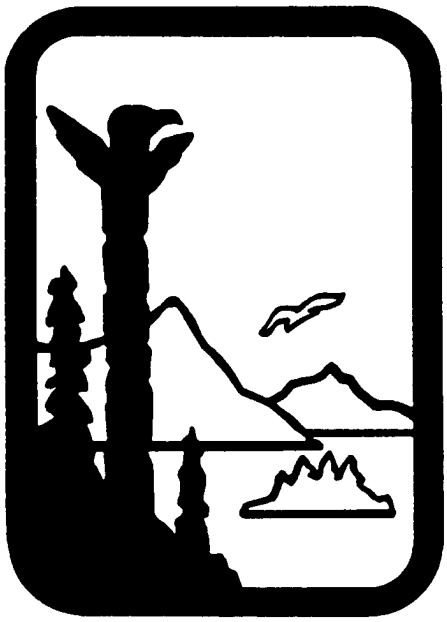
Appendix III.D.3.8

Mendenhall Valley PM_{10} Emission Inventory, January 2006

Appendix III.D.3.9

EPA Region 10 Analysis of PM_{10} Design Value

Alaska Department of Environmental Conservation



Amendments to:

State Air Quality Control Plan

Vol. III: Appendices

Appendix III.D.3.5

Public Review Draft
December 2008

OCT 19 1983

Presented by: Manager
Introduced: 9/15/83
Drafted by: G.L.S., J.R.C.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 83-63

AN ORDINANCE REGULATING OPEN BURNING AND THE USE OF WOOD-FIRED HEATING DEVICES IN SMOKE HAZARD AREAS

* Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the city and borough code.

* Section 2. Adoption of New Chapter. There is adopted as a part of the code of the City and Borough of Juneau a new chapter 36.40 reading:

CHAPTER

36.40 Wood Burning Devices

36.40.010 The Assembly of the City and Borough of Juneau finds that there has been a significant and unprecedented increase in the installation and use of wood-fired heating devices in the city and borough; that the increase in such installations and use in the Mendenhall Valley has been especially great; that such devices generally produce a high level of harmful airborne pollutants; and that the above conditions combined with atmospheric conditions in the Mendenhall Valley and other factors cause recurring smoke pollution conditions which are detrimental to the health of, and offensive to, persons living or working in the affected area. It is the purpose of this chapter to reduce the increase of airborne pollutants from open burning and from wood-fired heating devices at the times and in the areas of the city and borough that appear to be most adversely affected by such pollutants.

36.40.020 Smoke Hazard Area Map Adopted. There is adopted as the map identifying the smoke hazard area of the City and Borough of Juneau that map entitled Smoke Hazard Area Map, City and Borough of Juneau, Alaska, dated September 12, 1983.

36.40.030 Definitions. As used in this chapter the following words and phrases have the meaning indicated.

(a) "Wood-fired heating device" means a device designed for wood combustion so that usable heat is derived

for the interior of a building, and includes wood-fired stoves, fireplaces, wood-fired cooking stoves, and combination fuel furnaces or boilers which burn wood.

(b) "Open burning" means the burning of a material which results in the products of combustion being emitted directly into the ambient air without passing through a stack or flare.

(c) "Person" means an individual, partnership, corporation, company or other association.

36.40.040 Wood Smoke Emission Standards. (a) No person may operate a wood-fired heating device within a smoke hazard area in such a manner that visible emissions at the point of release to the atmosphere reduce visibility through the exhaust effluent by 50% or greater for more than fifteen minutes in any one hour as determined by a test conducted in substantial compliance with the regulations applicable to the visual determination of stationary source emission opacity promulgated at 40 CFR 60, Appendix A by the United States Environmental Protection Agency; provided, and notwithstanding any contrary provisions in said regulation, opacity observation shall be made at the point of greatest opacity in any portion of the emissions plume without regard to the presence or absence of condensed water vapor.

(b) No person may engage in the open burning of material in a smoke hazard area between November 1 and March 31.

36.40.050 Wood Burning Prohibition. (a) Upon notification by the manager that a smoke hazard condition exists within a smoke hazard area, no person may burn wood in any manner whether within or outside of any wood-fired heating device after the time stated in the notice as the time after which all wood burning must cease.

(b) Notice is adequate if published in a newspaper of general circulation within the city and borough or if given orally at least three times during a six hour period by at least two radio stations operating within the city and borough. The prohibition shall be effective from the later of the time stated in the notice, 6 p.m. of the day the notice is published in a newspaper or the time the last required announcement of the notice is given by radio.

(c) The manager or his designee shall give notice under this section upon a determination that weather conditions or smoke conditions within the smoke hazard area are such as to be, or are likely to become, any danger to the health of persons within the smoke hazard area or to become generally objectionable to such persons. Such determinations may be based upon reports or information from the United

States Weather Service or other weather reporting service or upon the report or recommendation of the Alaska Department of Environmental Conservation or the United States Environmental Protection Agency.

(d) Any person owning a building for which, on the effective date of this ordinance, a wood-fired heating device is the sole source of heat may apply to the manager for an exemption from the provisions of this section. Such exemption shall expire no later than January 1, 1986, and may not be renewed.

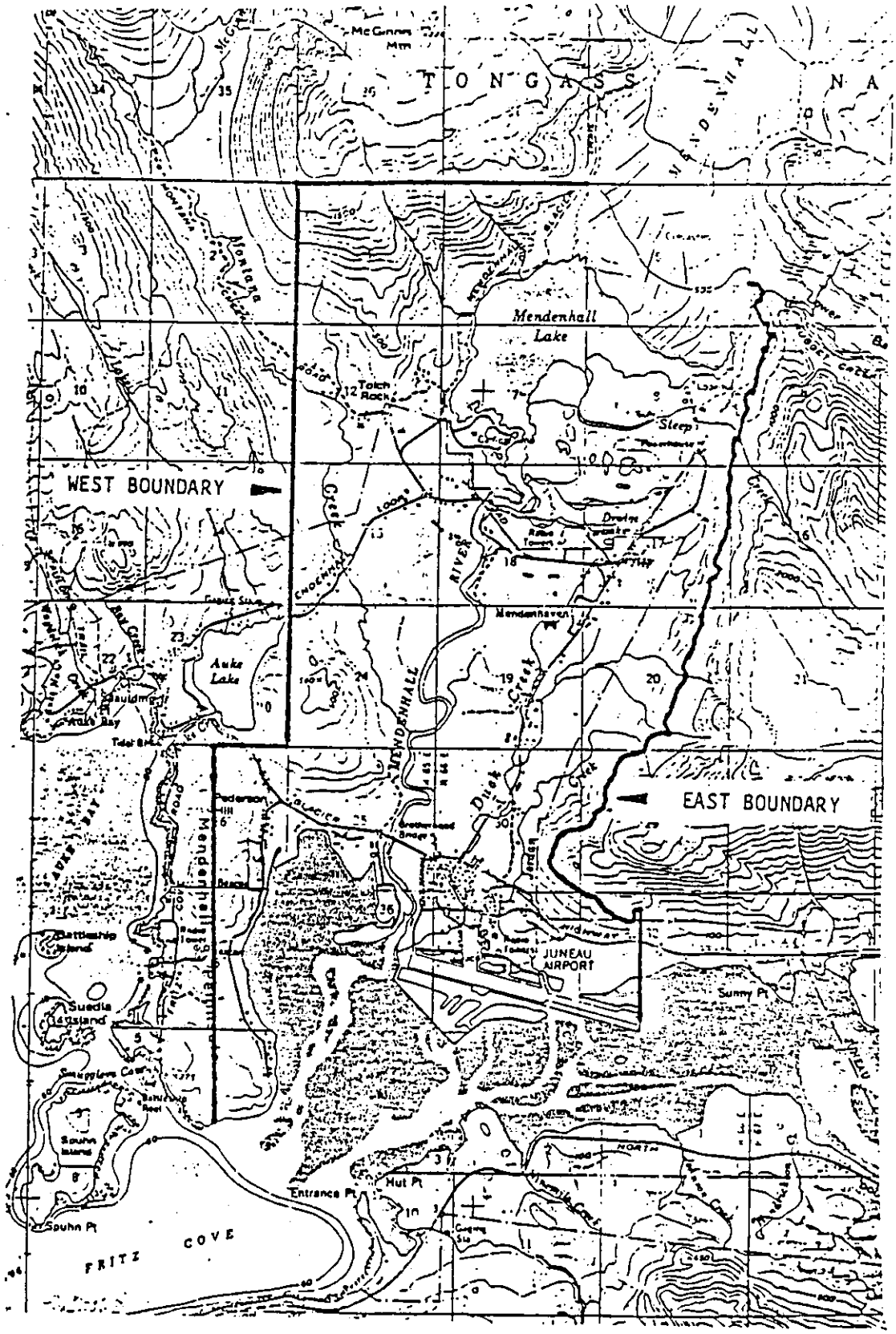
36.40.060 Penalties. For the first violation of any section of this chapter a fine of not more than $300 may be imposed. For any violation of this chapter followig conviction of a prior violation under this chapter a penalty not to exceed $500 or 30 days in jail or both may be imposed.

Adopted this 6th day of October, 1983.

Mayor

Attest:

Peggy Garrison
Clerk

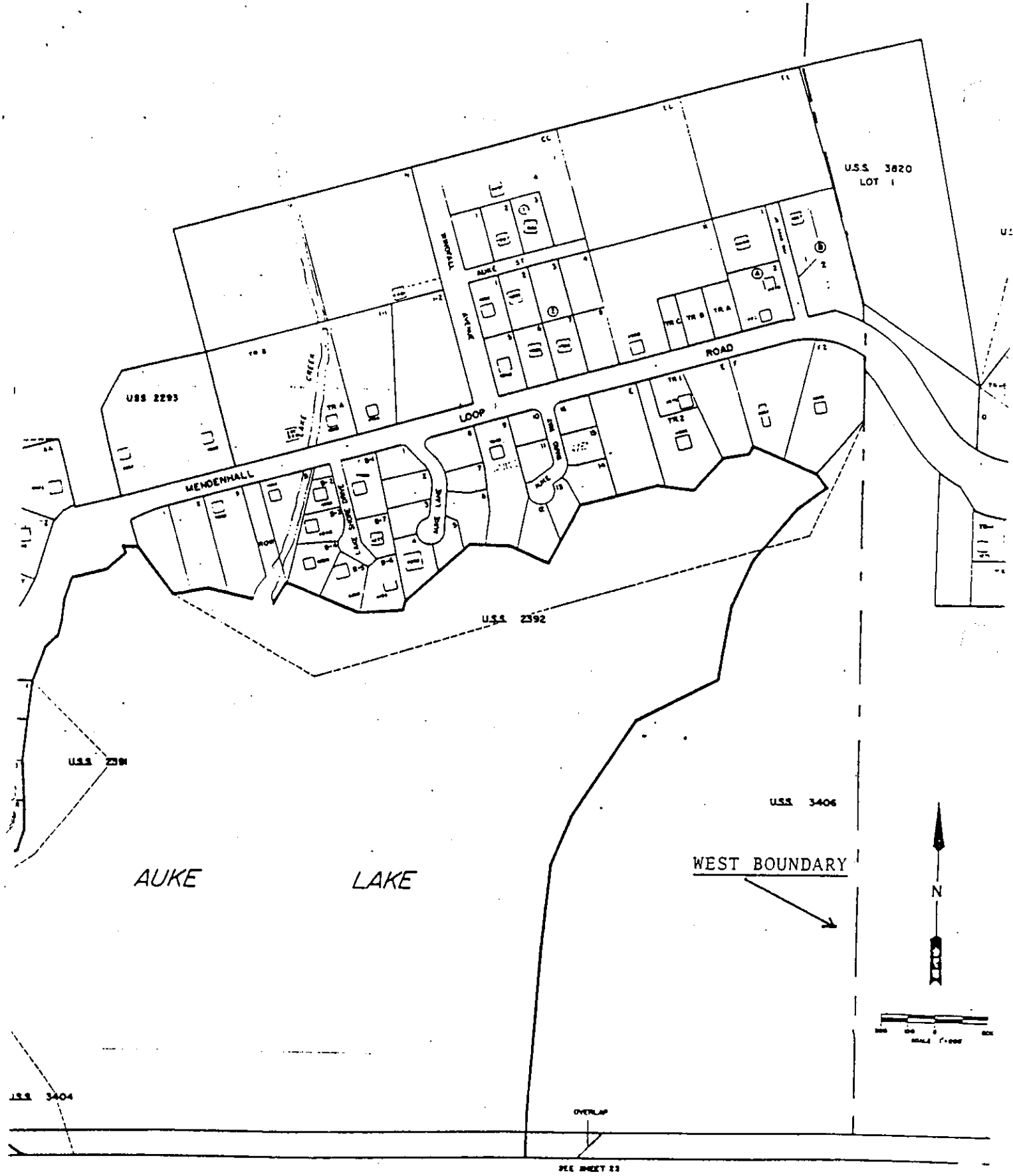


Smoke Hazard Area Map

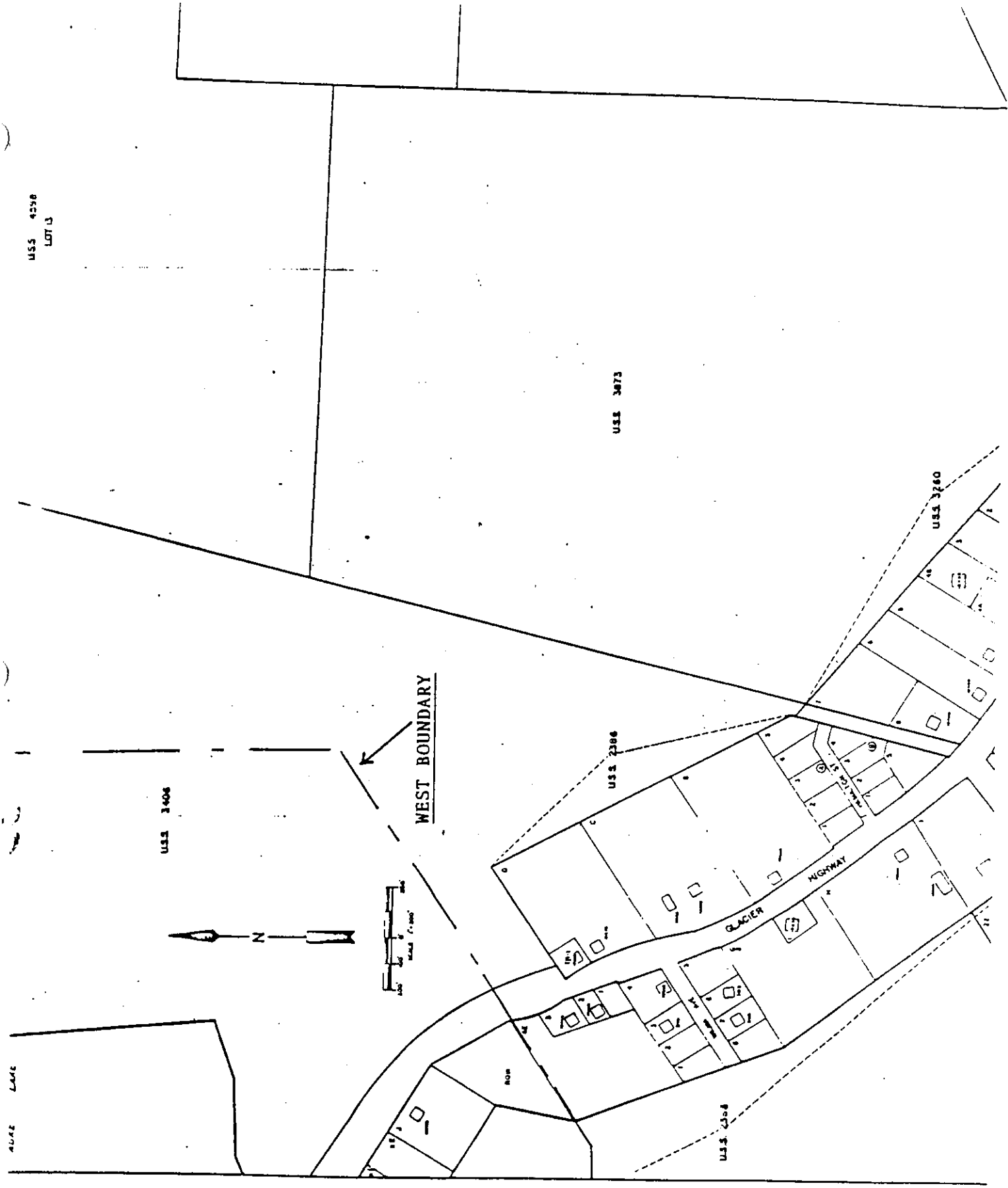
Sheet 1 9/12/83

Boundaries of Designated Wood Smoke Hazard Area

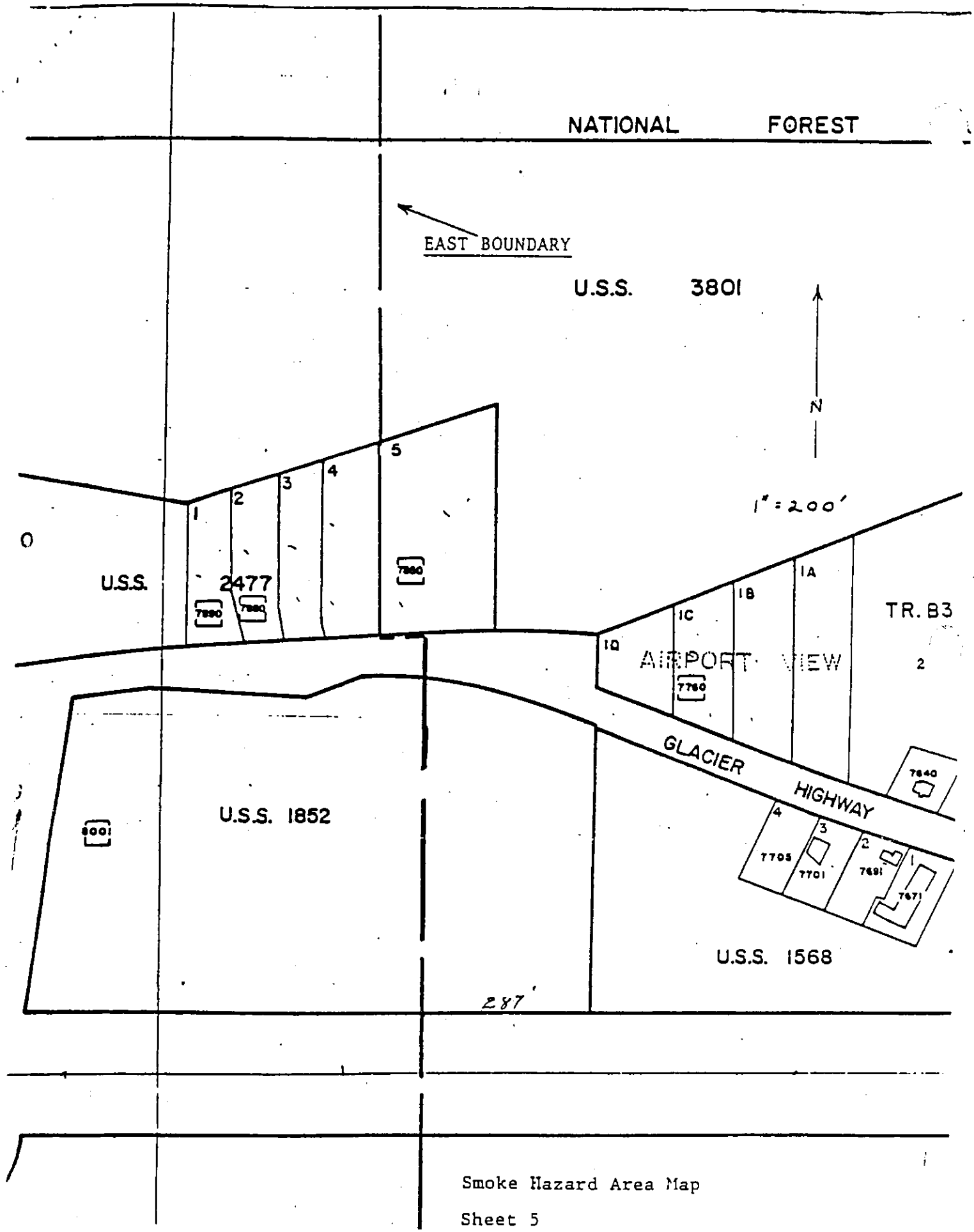
The designated Wood Smoke Hazard Area is the Mendenhall Valley of Juneau, which is described by the area located between the terminus of the Mendenhall Glacier and the tidewaters of Gastineau Channel and Fritz Cove. This area is bounded on the east by the 500-foot elevation contour of Heintzleman Ridge, (Thunder Mountain and contiguous foothills), extending south from the Mendenhall Glacier to a point directly north of the eastern terminus of the runway for the Juneau International Airport. The western border of the area is defined as the northern border of Section (S) 6, Township (T) 40S, Range (R) 66E of the Copper River Meridian (CRM) beginning at its northeast corner and heading westerly to the northwest corner of S1, T 40S, R65E, CRM (approximately beginning at the 500-foot level of the Mendenhall West Glacier Trail and heading 2 miles directly west) and thence southerly along the western borders of Sections 1, 12, 13, and 24, T40S, R65E, CRM to the southwest corner of Section 24, (a north-south line from the approximate southwest base of Mount McGinnis along the east side of Auke Lake to approximately 0.3 mile east southeast of the southern shore of Auke Lake). At this point, the boundary is described by a westerly heading along the northern border of S26, T40S, R65E, CRM to a location directly north of the knoll named Pederson Hill. A direct southerly heading from the described position through the top of Pederson Hill to the tidewaters of Fritz Cove serves as the final portion of the western boundary (boundary essentially divides the Mendenhall Peninsula along the north-south ridge line).



Smoke Hazard Area Map
Sheet 3

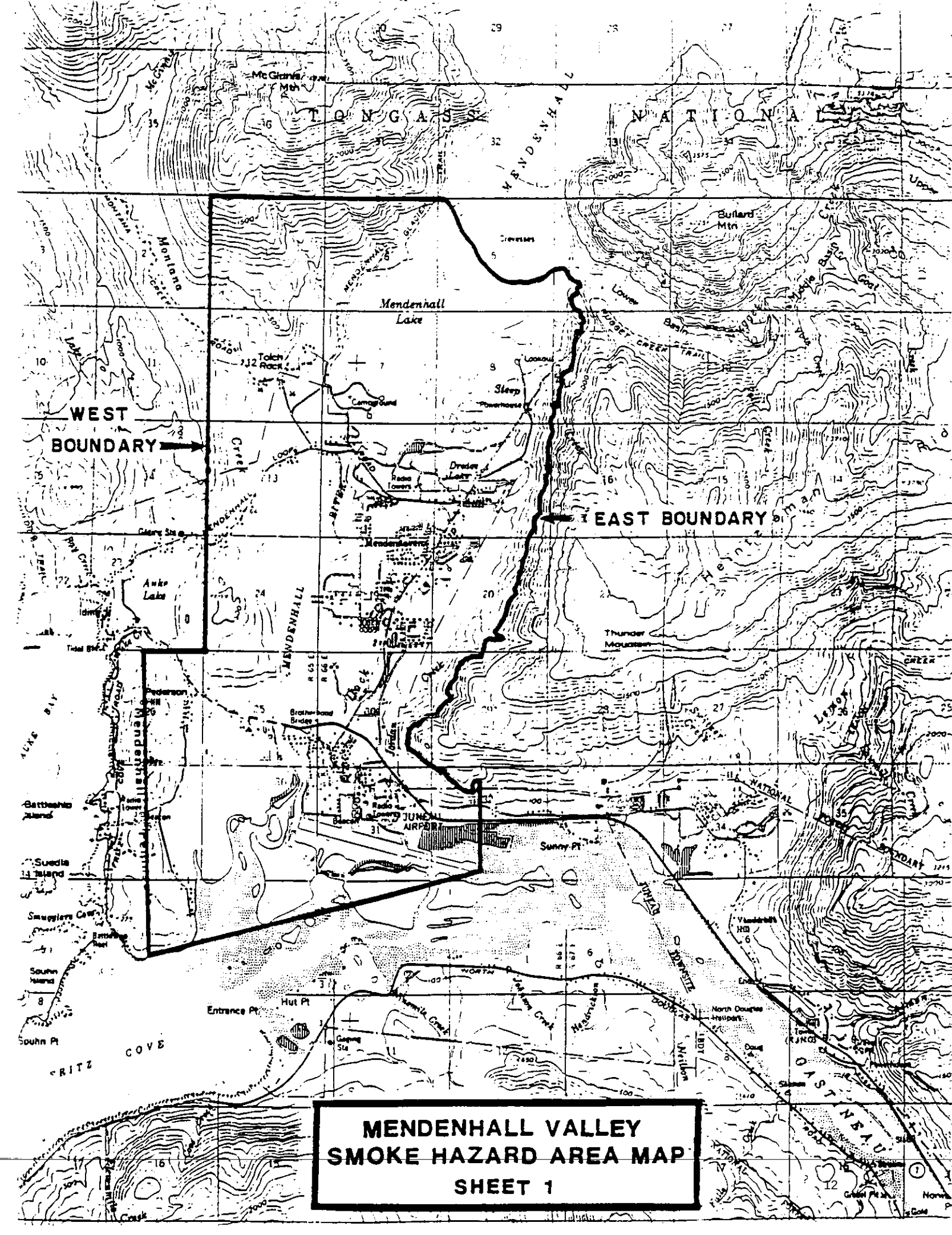


Smoke Hazard Area Map
Sheet 4



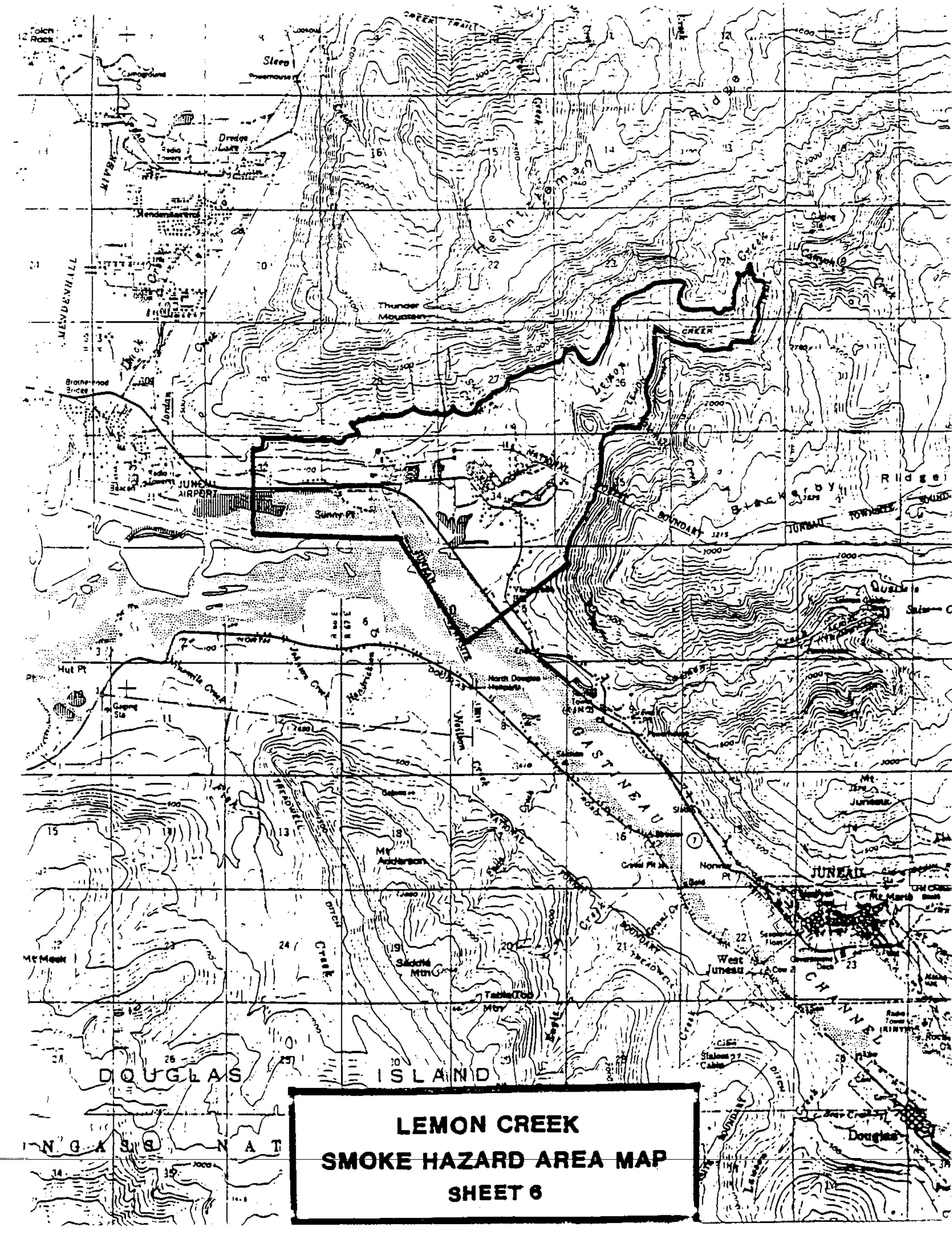
Smoke Hazard Area Map

Sheet 5



MENDENHALL VALLEY SMOKE HAZARD AREA MAP

SHEET 1



LEMON CREEK
SMOKE HAZARD AREA MAP
SHEET 6

Volume III, Section III.D.3, Item 2

Presented by: The Manager
Introduced: 12/05/88
Drafted by: S.B.G./J.R.C.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 88-59

AN ORDINANCE AMENDING THE WOODSMOKE CONTROL CODE TO IMPLEMENT A NEW MEASUREMENT SYSTEM FOR MEASURING AIR POLLUTION, TO ADOPT FEDERAL STANDARDS FOR SOLID FUEL-FIRED HEATING DEVICES, TO ADOPT STANDARDS FOR THE ISSUANCE OF CLASS I PERMITS FOR NONCATALYTIC SOLID FUEL-FIRED HEATING DEVICES, AND TO DELETE REFERENCES TO OREGON STATE WOODSTOVE STANDARDS.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

* Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the city and borough code.

Chapter 36.40

SOLID FUEL-FIRED BURNING DEVICES

36.40.010 FINDINGS. The Assembly of the City and Borough of Juneau finds that there has been a significant and unprecedented increase in the installation and use of solid fuel-fired burning devices in the city and borough; that the increase in such installations and use in the Mendenhall Valley has been especially great; that such devices generally produce a high level of harmful airborne pollutants; and that the above conditions combined with atmospheric conditions throughout the municipality and other factors causing recurring smoke pollution conditions are detrimental to the health of, and offensive to, the people of Juneau. It is the purpose of this chapter to reduce the increase of airborne pollutants from open burning and from solid fuel-fired heating devices at the times and in the areas of the city and borough that appear to be most adversely affected by such pollutants.

36.40.020 SMOKE HAZARD AREA MAP ADOPTED. There are adopted as the maps identifying the smoke hazard areas of the City and Borough of Juneau the maps entitled "Mendenhall Valley Smoke Hazard Area Map, City and Borough of Juneau, Alaska," dated September 30, 1985 and "Lemon Creek Smoke Hazard Area Map," dated December 10, 1985.

36.40.030 DEFINITIONS. As used in this chapter, the following words and phrases have the meanings indicated:

(a) "Solid fuel-fired heating device" or "device" means a device designed for solid fuel combustion so that usable heat is derived for the interior of a building, and includes solid fuel-fired stoves, fireplaces, solid fuel-fired cooking stoves, and combination fuel furnaces or boilers which burn solid fuel.

(b) "Open burning" means the burning of a material which results in the products of combustion being emitted directly into the ambient air without passing through a stack or flue, but not including the burning of campfires, barbecues, candles, or tobacco.

* Section 2. Amendment of Section. CBJ 36.40.040 is amended to read:

36.40.040 AIR POLLUTION ALERTS AND EMERGENCIES. (a) For the purposes of this section, the manager shall declare an air pollution alert to be in effect whenever the ambient concentration of particulate matter 10 micrometers and less in diameter (Pm-10) within the air pollution zone equals or exceeds 92 micrograms per cubic meter (ug/m^3) averaged over a twenty-four hour period and will remain at or above 92 ug/m^3 if an alert is not called. The manager may call an alert whenever available scientific and meteorological data indicate that the ambient concentration of Pm-10 within a smoke hazard area can reasonably be expected to equal or exceed 92 ug/m^3 averaged over a twenty-four hour period. When, in the opinion of the manager, meteorological and scientific data indicate that the type of particulate measured is not hazardous, the limit may be adjusted.

(b) Within a smoke hazard area, no person may operate a solid fuel fired heating device during an air pollution alert declared by the manager pursuant to Section 36.40.040(a) unless a Class I permit has been issued for such device pursuant to Section 36.40.050.

(c) Within a smoke hazard area, no person owning, operating, or in control of a solid fuel fired heating device for which a Class I permit has been issued shall cause, allow, or discharge for a period or periods in excess of twenty minutes in any four hour period, visible emissions which reduce visibility through the exhaust plume by 10 percent or greater from such device during an air pollution alert declared by the manager pursuant to Section 36.40.040(a).

(d) In the event that the manager declares an alert and the average Pm-10 concentrations nevertheless appear likely to continue to exceed 92 ug/m^3, the manager may declare an air emergency during which the use of all solid fuel fired heating devices is prohibited, including those for which a Class I permit has been issued.

(e) Notice of an air pollution alert or an air pollution emergency is adequate if published in a newspaper of general circulation within the city and borough, or if given orally at least three times during a six hour period by at least two radio stations operating within the city and borough, or if made available to the general public in the form of a recorded telephone message the telephone number for which is published in the telephone directory or newspaper of general circulation within the city and borough. The prohibition shall be effective from the earlier of the time stated in the notice, six p.m. of the day the notice is published in a newspaper, the time the last required announcement of the notice is given by radio, or two hours after the time the recorded message is first made available by telephone.

* Section 3. Amendment of Section. CBJ 36.40.050 is amended to read:

36.40.050 EMISSION STANDARDS AND CERTIFICATION FOR NEW WOODSTOVES. (a) The City and Borough of Juneau, Alaska, hereby adopts the United States Code 40 CFR, Part 60, Subpart AAA, Standards of Performance for New Residential Woodstoves as applicable for the purpose of establishing a uniform procedure to evaluate the emissions and efficiencies of solid fuel fired heating devices, including criteria for the acceptance of equivalent test methods.

(b) A Class I permit may be issued for a solid fuel fired heating device from which the emissions do not exceed 6 grams per hour weighted average particulate emission standard for catalytic devices and 8.5 grams per hour from noncatalytic devices when tested in conformance with the standards adopted in Section 36.40.050(a). Beginning July 1, 1990, the emission standards shall be 4.1 grams per hour for catalytic devices and 7.5 grams per hour for noncatalytic devices. All catalytically equipped devices must be equipped with a provision to accommodate a commercially available temperature sensor.

(c) Class I permits issued for new woodstoves to be operated during an air pollution alert shall be valid for a period of two years. They shall not be transferable from place to place without reapplication. When the permitted device is repermitted the manager may require information to determine if the relocated woodstove remains capable of meeting emission requirements. The manager may require evidence that any non-durable parts have been recently replaced. The holder of a Class I permit shall allow an inspection of the device before the device is repermitted. Class I permits are eligible for renewal as long as the woodstove continues to meet the emission standard in effect at the time the permit was originally issued.

(d) The manager shall issue a Class I permit when the applicant therefore has submitted information, on forms supplied by the department, which indicates compliance with Section 36.40.050(a).

(e) No new woodstove may be sold for use in the City and Borough of Juneau or installed within the City and Borough of Juneau after January 19, 1989, unless it is certified as meeting a 6 grams per hour weighted average particulate emissions standard for catalytic devices and 8.5 grams per hour for noncatalytic devices when tested in conformance with the standards adopted in Section 36.40.050(a).

(f) The manager shall issue a Class I permit when the applicant therefore has submitted information, on forms supplied by the department, which indicates compliance with Section 36.40.050(a).

(g) No new woodstove may be sold for use in the City and Borough of Juneau or installed within the City and Borough of Juneau after August 1, 1986 unless it is certified as meeting a 6 grams per hour weighted average particulate emissions standard when tested in conformance with the standards adopted in Section 36.40.050 (a).

36.40.060 OPEN BURNING. (a) Open burning within a designated smoke hazard area may be conducted only during the period of April 1 through October 31.

(b) No person may engage in the open burning of material without first obtaining a permit to be issued by

the manager or his designee upon a finding that weather conditions or smoke conditions are not such as to be, or likely to become, any danger to the public health or to become generally objectionable. Such determination maybe based upon reports or information from the United States Weather Service or other weather reporting service or upon the report or recommendation of the Alaska Department of Environmental Conservation or the United States Environmental Protection Agency.

36.40.070 PERMITS. (a) Upon a showing of justifiable need, the manager may issue a temporary permit authorizing operation of a solid fuel fired heating device in circumstances otherwise prohibited by this code. "Justifiable need" shall include occasions when a furnace or central heating system is inoperable other than through the owner's own actions or neglect.

(b) The manager may issue a temporary special burning permit to the municipal fire department for the purpose of training fire fighters, if the fire is restricted to a building or structure or a permanent training facility, and if the material to be burned is not allowed to smolder after the training session has terminated and no public nuisance is created. Special burning permits will not be issued during either an air alert or an air emergency.

36.40.080 SOLID FUEL SMOKE EMISSION STANDARDS. (a) No person may operate a solid fuel-fired heating device in such a manner that visible emissions reduce visibility through the exhaust effluent by fifty percent or greater for more than fifteen minutes in any one hour as determined by a test conducted in substantial compliance with the regulations applicable to the visual determination of stationary source emission opacity promulgated at 40 CFR 60, Appendix A, by the United States Environmental Protection Agency; provided, and notwithstanding any contrary provisions in the regulation, opacity observation shall be made at the point of greatest opacity in any portion of the emissions plume without regard to the presence or absence of condensed water vapor. The provisions of Section 36.40.040 shall apply to the operation of Class I devices during air pollution alerts.

36.40.090 PENALTIES. The first violation of any section of this chapter is an infraction. Each subsequent violation is a Class B misdemeanor.

* Section 4. Effective Date. This ordinance shall be effective thirty days after its adoption.

Adopted this 19th day of December, 1988.

Mayor

Attest:

Clerk

Ord. 88-59

Presented by: The Manager
Introduced: 12/16/91
Drafted by: J.R.C./S.B.G.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 91-52

AN ORDINANCE AMENDING THE WOODSMOKE CONTROL CODE TO LOWER THE PARTICULATE COUNT THRESHOLD FOR DECLARING AIR ALERTS, TO AUTHORIZE THE MANAGER TO DECLARE AN AIR ALERT ACCORDING TO CERTAIN QUALITATIVE CRITERIA, TO PROVIDE FOR THE EXPIRATION OF ALL EXISTING CLASS I PERMITS ON JULY 1, 1997, TO TERMINATE THE MANAGER'S AUTHORITY TO ISSUE NEW CLASS I PERMITS, AND TO PROHIBIT THE BURNING IN WOODSTOVES OF SUBSTANCES OTHER THAN PAPER, CARDBOARD AND UNTREATED WOOD.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

* Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the city and borough code.

* Section 2. Amendment of Section. CBJ 36.40.030(a) is amended to read:

(a) "Solid fuel-fired heating device" or "device" means a device designed for solid fuel combustion so that usable heat is derived for the interior of a building, and includes solid fuel-fired stoves, fireplaces, solid fuel-fired cooking stoves and combination fuel furnaces or boilers which burn solid fuel, but does not include stoves, fireplaces, furnaces, or boilers designed and used exclusively for the combustion of wood pellets having a maximum length of one inch in any dimension.

* Section 3. Amendment of Section. CBJ 36.40.040 is amended to read:

36.40.040 AIR POLLUTION ALERTS AND EMERGENCIES. (a) For the purposes of this section, the manager shall declare an air pollution alert to be in effect whenever the ambient concentration of particulate matter 10 micrometers and less in diameter (Pm-10) within the air pollution zone equals or exceeds 75 micrograms per cubic meter (ug/m3) averaged over a twenty-four hour period and will remain at or above 75 ug/m3 if an alert is not called. The manager may call an alert whenever available scientific and meteorological data indicate that the ambient concentration of Pm-10 within a smoke hazard

area can reasonably be expected to equal or exceed 75 ug/m3 averaged over a twenty-four hour period. When, in the opinion of the manager, meteorological and scientific data indicate that the type of particulate measured is not hazardous, the limit may be adjusted. The manager may call an alert upon a finding that smoke conditions are, or are likely to become, a danger to health or generally objectionable to persons in a smoke hazard area.

(b) Within a smoke hazard area, no person may operate a solid fuel fired heating device during an air pollution alert declared by the manager pursuant to Section 36.40.040(a) unless a Class I permit was issued for that device at that location pursuant to Section 36.40.050 on or before February 5, 1992.

(c) Within a smoke hazard area, no person owning, operating, or in control of a solid fuel fired heating device for which a Class I permit has been issued shall cause, allow, or discharge for a period or periods in excess of twenty minutes in any four hour period, visible emissions which reduce visibility through the exhaust plume by 10 percent or greater from such device during an air pollution alert declared by the manager pursuant to Section 36.40.040(a).

(d) In the event that the manager declares an alert and the average Pm-10 concentrations nevertheless appear likely to continue to exceed 75 ug/m3, the manager may declare an air emergency during which the use of all solid fuel fired heating devices is prohibited, including those for which a Class I permit has been issued.

(e) Notice of an air pollution alert or an air pollution emergency is adequate if published in a newspaper of general circulation within the city and borough, or if given orally at least three times during a six hour period by at least two radio stations operating within the city and borough, or if made available to the general public in the form of a recorded telephone message the telephone number for which is published in the telephone directory or newspaper of general circulation within the city and borough. The prohibition shall be effective from the earlier of the time stated in the notice, six p.m. of the day the notice is published in a newspaper, the time the last required announcement of the notice is given by radio, or two hours after the time the recorded message is first made available by telephone.

(f) Notwithstanding the provisions of subsections (b) and (d) of this section, solid fuel fired heating devices may be used at any location during a loss of electrical power service to that location. Use of the device may commence no sooner than two hours after the loss of electrical service and shall be terminated as soon as practicable after reestablishment of service.

* Section 4. Amendment of Section. CBJ 36.40.050 is amended to read:

36.40.050 EXPIRATION AND RELOCATION OF CLASS I PERMITS.

(a) No class I permit may be issued for a solid fuel fired heating device after February 5, 1992.

(b) Class I permits issued on or before February 5, 1992, shall expire no later than July 1, 1997. They shall not be transferable from place to place without reapplication. When the permitted device is repermitted the manager may require information to determine if the relocated woodstove remains capable of meeting emission requirements. The manager may require evidence that any non-durable parts have been recently replaced. The holder of a class I permit shall allow an inspection of the device before the device is repermitted. Class I permits are eligible for renewal as long as the woodstove continues to meet the emission standard in effect at the time the permit was originally issued, but no renewal shall be valid past July 1, 1997.

* Section 5. Amendment of Section. CBJ 36.40.080 is amended to read:

36.40.080 SOLID FUEL COMBUSTION AND SMOKE EMISSION STANDARDS. (a) No person shall use a solid fuel-fired heating device for the combustion of any material other than paper, cardboard, or untreated wood.

(b) No person may operate a solid fuel-fired heating device in such a manner that visible emissions reduce visibility through the exhaust effluent by fifty person or greater for more than fifteen minutes in any one hour as determined by a test conducted in substantial compliance with the regulations applicable to the visual determination of stationary source emission opacity promulgated at 40 CFR 60, Appendix A, by the United States Environmental Protection Agency; provided, and notwithstanding any contrary provisions in the regulation, opacity observation shall be made at the point of greatest opacity in any portion of the emissions

plume without regard to the presence or absence of condensed water vapor. The provisions of section 36.40.040 shall apply to the operation of class I devices during air pollution alerts.

* Section 6. Effective Date. This ordinance shall be effective thirty days after its adoption.

Adopted this 6th day of January, 1992.

Mayor

Attest:

Clerk

Presented by: The Manager
Introduced: 12/16/91
Drafted by: S.B.G.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 91-53

AN ORDINANCE AMENDING THE WOODSMOKE CONTROL FINE SCHEDULE TO INCREASE THE FINES FOR VIOLATIONS OF THE WOODSMOKE CONTROL CODE.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

* Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the city and borough code.

* Section 2. Amendment of Section. The woodsmoke control fine schedule set forth in CBJ 03.30.055 is amended to read as follows:

Woodsmoke Fine Schedule

CBJ	Offense	No. of Offenses	Fine
36.40.040(b)	Burning during smoke hazard condition	1st	$100.00
		2nd & Subseq.	MCA
36.40.040(c)	Excessive smoke density	1st	50.00
		2nd	75.00
		3rd & Subseq.	MCA

Woodsmoke Fine Schedule

CBJ	Offense	No. of Offenses	Fine
36.40.040(d)	Burning during an Air Emergency (all solid fuel stoves prohibited)	1st	100.00
		2nd & Subseq. Within 1 Year	MCA
36.40.060(a)-(e)	Open burning within smoke hazard area prohibited from November 1 to March 31; burning without a permit; in violation of a permit; which creates a danger or nuisance, etc.	1st	100.00
		2nd	300.00
		3rd & Subseq.	MCA

* Section 3. Effective Date. This ordinance shall be effective thirty days after its adoption.

Adopted this 6th day of January, 1992.

Mayor

Attest:

Clerk

Presented by: The Manager
Introduced: 01/04/93
Drafted by: J.R.C.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 93-01

[redacted] FINDING THAT SUCH LOCAL IMPROVEMENT DISTRICT IS IN THE PUBLIC INTEREST; SETTING THE BOUNDARIES OF SUCH LOCAL IMPROVEMENT DISTRICT; PROVIDING FOR THE IMPROVEMENTS TO BE ACQUIRED, CONSTRUCTED AND INSTALLED CONSISTING OF REGRADING AND SURFACING PORTIONS OF LONG RUN DRIVE, PORTAGE BOULEVARD, MCGINNIS DRIVE, TANIS DRIVE, TRIO STREET, DOGWOOD LANE, COLUMBIA BOULEVARD, SESAME STREET, ASPEN AVENUE, TONGASS BOULEVARD, AND DUDLEY STREET, AT AN ESTIMATED COST OF $752,198 OF WHICH COST AN ESTIMATED $316,099 IS TO BE BORNE BY THE PROPERTY SPECIALLY BENEFITTED AND AN ESTIMATED $436,099 BY THE CITY AND BOROUGH; DIRECTING THAT THE WORK BE DONE, THAT ANY LAND NECESSARY OR USEFUL BE ACQUIRED AND THAT EMINENT DOMAIN INCLUDING USE OF DECLARATION OF TAKING IS AUTHORIZED; CREATING SPECIAL ASSESSMENT FUND NO. 75; AND FINDING THAT SPECIAL BENEFIT TO THE PROPERTY WITHIN THE DESCRIBED DISTRICT EXISTS AND THAT EACH LOT OR TRACT WITHIN THE DISTRICT WILL BE SPECIALLY BENEFITTED IN PROPORTION TO THE AMOUNT ASSESSED.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

* Section 1. Classification. This ordinance is a noncode ordinance.

* Section 2. Finding that L.I.D. is in the Public Interest. The Assembly of the City and Borough of Juneau, having considered all material factors including the deterrence to property development, maintenance of property values, health, safety, and welfare of the businesses, employees, and property owners in the proposed local improvement district, finds that the formation of a local improvement district covering property described in Exhibit "A" attached to this ordinance, to be known as Local Improvement District No. 75 of the City and Borough of Juneau, Alaska, is in the public interest.

* Section 3. Creation and Boundaries. There is created Local Improvement District No. 75 (hereinafter "L.I.D. No. 75"). The boundaries of L.I.D. No. 75 are described in Exhibit "A" attached to this ordinance and made a part hereof.

* Section 4. . Improvements to be Constructed. The improvements to be constructed, consist of regrading and surfacing portions of Long Run Drive, Portage Boulevard, McGinnis Drive, Tanis Drive, Trio Street, Dogwood Lane, Columbia Boulevard, Sesame Street, Aspen Avenue, Tongass Boulevard, and Dudley Street.

* Section 5. Estimated Cost. The estimated cost of construction of the project is $752,198.

* Section 6. Source of Funds. The portion of the construction cost to be met with city and borough funds is estimated to be $436,099. The remainder of the construction cost, will be met from the assessments against the property specially benefitted, said amount estimated to be $316,099.

* Section 7. Direction that Work be Done. The city and borough administration is hereby ordered to do or cause to be done all things necessary or useful to plan, acquire, construct, and install the improvements described in Section 4.

* Section 8. Authorization to Acquire Land. The city and borough is hereby authorized to acquire any lands or rights in land necessary or useful for the project.

* Section 9. Authorization for Eminent Domain. The city and borough administration is hereby authorized to use such eminent domain proceedings, including use of declaration of taking, as may be necessary or useful to acquire property needed for the project. The costs of any property so acquired shall be added to the project cost.

* Section 10. Appropriation. There is hereby appropriated the sum of $752,198 for the cost of the project including the acquisition of property and construction of the improvements described in Section 4.

* Section 11. Special Assessment Fund. There is created within the central treasury a special fund of the city and borough known as Special Assessment Fund No. 75. Such fund shall be used for the purpose of paying the costs of the project. City and borough funds, assessments and all other receipts shall be paid into the fund.

* Section 12. Finding of Special Benefit. The Assembly of the City and Borough of Juneau hereby finds that the property within L.I.D. No. 75 described in Exhibit "A" will be specially benefitted by the improvement and each lot or tract within such district will be specially benefitted by the improvements and each lot or tract within such district will be specially benefitted in proportion to the amount separately assessed to each lot

or tract.

* Section 13. Method of Apportioning Costs. Costs to be borne by the property specially benefitted shall be apportioned at the rate of $1,500 per lot for the first 100 feet of front footage, plus $10 for each foot of front footage thereafter, plus $450 per lot for any lot abutting a street requiring application of aggregate for surface stabilization, plus $384 per lot for any lot abutting Tongass Boulevard or Dudley Street.

* Section 14. Prepayment-in-Full Discount. No prepayment-in-full discount is provided.

* Section 15. Effective Date. This ordinance shall be effective thirty days after its adoption.

Adopted this 8th day of February, 1993.

Mayor

Attest:

Clerk

EXHIBIT "A"

BOUNDARY DESCRIPTION

1993 MENDENHALL VALLEY STREET PAVING PROJECT

L.I.D. No. 75

Lot 21, Lots 58 through 63, inclusive, lots 84 through 88, inclusive, lots 106 through 109, inclusive and lots 112 through 115, inclusive of Mendenhaven Subdivision, U. S. Survey No.1799; Lots 1, 2, 3, and 4 of Birch Lane Subdivision, U.S. Survey No.1799;

Lots 34, 35, 36 and lots 43 through 47, inclusive of Sleepy Hollow Subdivision No. 2, U.S. Survey No.1799; Lots 1, 2, 3, and 4 of Aspen Subdivision, U.S.Survey No.1799;

Lots 1A, 1B, 1C, 2 and 3 of Block "A"; Lots 2 through 9, inclusive, of Block "B"; Lots 1, 2, 4, 6, 8 and 10 of Block "D"; Lots 1A, 1B and 2B of Block "E"; Lots 1 through 7, inclusive, of Block "G", Lots 1 through 8, inclusive, of Block "H", Lots 2, 4, 6, and 8 of Block "I" and Lot 4, Block "F" of Lu-Re-Co Homes Subdivision, Plat No. 366, U.S. Survey No.3144. Lot 1, Block "J" of Resubdivision of Lots 1 & 2, Block "J", Lu-Re-Co Homes Subdivision, U.S. Survey No.3144.

Lots 1 through 9, inclusive, of Block "A" and Lots 1 through 9, inclusive, of Block "B" of Mountain View Subdivision, Plat No. 691, U.S. Survey No.3144. Lots 1, 2, 3 and 7 of Duck Creek Subdivision, Plat No.400, U.S. Survey No. 3144. Lots 1, 2A, 2B and 4 of Duck Creek Manor Subdivision, U.S. Survey No. 3144.

Lot 12, Block "A" and Lot 1, Block "D" of Mountain View Subdivision No. 2, U.S. Survey No.3144. Lots 1A and 1B of Haffner Subdivision, U.S. Survey No.3144.

Lot 2, Block "D", Field Acres Subdivision, Plat No.238, U.S. Survey No. 2544. Lots A, B, C, D and E of Lot 1, Block "D"; and Lots A, B, C, D and E of Lot 4, Block "B" of a Resubdivision of Field Acres Subdivision, Plat No.61-2157, U.S. Survey No.2544. Lots A, B, C and D of Lot 1, Block "C", Field Acres Subdivision, U.S. Survey No.2544. Lots 1, 2, 3 and 4 of a Resubdivision of Block "C", Field Acres Subdivision, U.S. Survey No.2544.

East half and West half of Lot 1, Block "B", Field Acres Subdivision, Plat No.238, U.S. Survey No.2544. Lots 2B, 3A, 3B, 3C and 3D of De Long Lots Subdivision, Plat No.439, U.S. Survey No.2544. Lot 1 of Resubdivision of Lot 2C, De Long Lots Subdivision, U.S. Survey No.2544. Lots 14 and 15, Evergreen Park Subdivision, Plat No.299, U.S. Survey No.2100.

Lots 3A and 3G, Short Court Subdivision, Plat No.435, U.S. Survey No.2544. Lot 3, Block "A"; Lots 1 through 6, inclusive, Block "B"; Lots 1, 3, 4 and 9, Block "C" of Forest Grove

Subdivision, Plat No.685, U.S. Survey No.3751. Lot 100'X152.83' within the northwest corner of U.S. Survey No.3751, Labeled "Exception" of Forest Grove Subdivision. Lots 1A, 1B, 2A and 2B, of Forest Grove Subdivision Unit II, Plat No.83-5790, U.S. Survey No.3751.

Containing 156 parcels of land.

page 2, Attachment "A"

Presented by: The Manager
Introduced: 03/01/93
Drafted by: A.T.B./J.R.C.

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 93-06

AN ORDINANCE CREATING LOCAL IMPROVEMENT DISTRICT NO. 76 OF THE CITY AND BOROUGH; FINDING THAT SUCH LOCAL IMPROVEMENT DISTRICT IS IN THE PUBLIC INTEREST; SETTING THE BOUNDARIES OF SUCH LOCAL IMPROVEMENT DISTRICT; PROVIDING FOR THE IMPROVEMENTS TO BE ACQUIRED, CONSTRUCTED AND INSTALLED CONSISTING OF REGRADING, IMPROVING, AND PAVING PORTIONS OF WEST GLADSTONE, ROSEDALE, CLOVERDALE, PINEDALE, AND FIRNDALE STREETS AT AN ESTIMATED COST OF $227,050 OF WHICH COST AN ESTIMATED $95,802 IS TO BE BORNE BY THE PROPERTY SPECIALLY BENEFITTED AND AN ESTIMATED $131,248 BY THE CITY AND BOROUGH; DIRECTING THAT THE WORK BE DONE, THAT ANY LAND NECESSARY OR USEFUL BE ACQUIRED AND THAT EMINENT DOMAIN INCLUDING USE OF DECLARATION OF TAKING IS AUTHORIZED; CREATING SPECIAL ASSESSMENT FUND NO. 76; AND FINDING THAT SPECIAL BENEFIT TO THE PROPERTY WITHIN THE DESCRIBED DISTRICT EXISTS AND THAT EACH LOT OR TRACT WITHIN THE DISTRICT WILL BE SPECIALLY BENEFITTED IN PROPORTION TO THE AMOUNT ASSESSED.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

* Section 1. Classification. This ordinance is a noncode ordinance.

* Section 2. Finding that L.I.D. is in the Public Interest. The Assembly of the City and Borough of Juneau, having considered all material factors including the deterrence to property development, maintenance of property values, health, safety, and welfare of the businesses, employees, and property owners in the proposed local improvement district, finds that the formation of a local improvement district covering property described in Exhibit "A" attached to this ordinance, to be known as Local Improvement District No. 76 of the City and Borough of Juneau, Alaska, is in the public interest.

* Section 3. Creation and Boundaries. There is created Local Improvement District No. 76 (hereinafter "L.I.D. No. 76"). The boundaries of L.I.D. No. 76 are described in Exhibit "A" attached to this ordinance and made a part hereof.

* Section 4. Improvements to be Constructed. The improvements to be constructed, consist of base and drainage improvements, regrading, and paving on West Gladstone, Rosedale, Cloverdale, Pinedale and Firndale streets.

* Section 5. Estimated Cost. The estimated cost of construction of the project is $227,050.

* Section 6. Source of Funds. The portion of the construction cost to be met with city and borough funds is estimated to be $131,248. The remainder of the construction cost, will be met from the assessments against the property specially benefitted, said amount estimated to be $95,802.

* Section 7. Direction that Work be Done. The city and borough administration is hereby authorized to do or cause to be done all things necessary or useful to plan, acquire, construct, and install the improvements described in Section 4.

* Section 8. Authorization to Acquire Land. The city and borough is hereby authorized to acquire any lands or rights in land necessary or useful for the project.

* Section 9. Authorization for Eminent Domain. The city and borough administration is hereby authorized to use such eminent domain proceedings, including use of declaration of taking, as may be necessary or useful to acquire property needed for the project. The costs of any property so acquired shall be added to the project cost.

* Section 10. Appropriation. There is hereby appropriated the sum of $227,050 for the cost of the project including the acquisition of property and construction of the improvements described in Section 4.

* Section 11. Special Assessment Fund. There is created within the central treasury a special fund of the city and borough known as Special Assessment Fund No. 76. Such fund shall be used for the purpose of paying the costs of the project. City and borough funds, assessments and all other receipts shall be paid into the fund.

* Section 12. Finding of Special Benefit. The Assembly of the City and Borough of Juneau hereby finds that the property within L.I.D. No. 76 described in Exhibit "A" will be specially benefitted by the improvements and each lot or tract within such district will be specially benefitted in proportion to the amount separately assessed to each lot or tract.

* Section 13. Method of Apportioning Costs. Costs to be borne by the property specially benefitted shall be apportioned at the rate of $1,500 per lot for the first 100 feet of front footage, plus $10 for each foot of front footage thereafter, plus $395 per lot, such additional charge being for the application of aggregate for surface stabilization and minor drainage improvements.

* Section 14. Prepayment-in-Full Discount. No prepayment-in-full discount is provided.

* Section 15. Effective Date. This ordinance shall be effective thirty days after its adoption.

Adopted this 5th day of April, 1993.

Mayor

Attest:

Clerk

EXHIBIT "A"

BOUNDARY DESCRIPTION

1993 MENDENHALL VALLEY STREET PAVING PROJECT
WEST GLADSTONE, ROSEDALE, PINEDALE, CLOVERDALE AND FIRNDALE STREETS

L.I.D. No. 76

Lots 1 through 6, inclusive and lots 9 through 12, inclusive, of Glacier Park Subdivision, U.S. Survey No.1530, filed as plat No.237 in the Juneau Recording District, State of Alaska; Also, lot 8A of Plat No. 82-20W being a resubdivision of said Glacier Park Subdivision; Also, lots 8B1 and 8B2 of a resubdivision of said Plat No. 82-20W; Also, lots 13A and 13B of Plat No. 84-127 being a resubdivision of said Glacier Park Subdivision.

Lots 1 through 8, inclusive, of Block "B", Lots 1 and 2 of Block "C", Lots 1 through 6, inclusive, of Block "E", Lots 1 through 8, inclusive, and Lot 15 of Block "F"; of First Addition-Riverdale Heights Subdivision, U.S. Survey No. 2080, Juneau Recording District.

Lots 4, 5 and 6 of Block "D-1" and lots 1, 4, 7, 8, 9 and 10 of Block "D-2" of Plat No. 647, being a Resubdivision of Block D, Riverdale Heights Subdivision.

[lid76.atb]

Presented by: The Manager
Introduced: 08/25/2008
Drafted by: J.W. Hartle

ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 2008-28

An Ordinance Amending the Woodsmoke Control Program Regarding Solid Fuel-Fired Burning Devices.

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the City and Borough Code.

Section 2. Amendment of Chapter. CBJ 35.40 Solid Fuel-Fired Burning Devices is amended to read:

36.40.010 Findings.

The assembly of the City and Borough finds that there has been a significant and unprecedented increase in the installation and use of solid fuel-fired burning devices in the City and Borough; that the increase in such installations and use in the Mendenhall Valley has been especially great; that such devices generally produce a high level of harmful airborne pollutants; and that the above conditions combined with atmospheric conditions throughout the municipality and other factors causing recurring smoke pollution conditions are detrimental to the health of, and offensive to, the people of Juneau. It is the purpose of this chapter to reduce the increase of airborne pollutants from open burning and from solid fuel-fired heating devices at the times and in the areas of the City and Borough that appear to be most adversely affected by such pollutants.

36.40.020 Smoke hazard area map adopted.

There are adopted as the maps identifying the smoke hazard areas of the City and Borough the maps entitled "Mendenhall Valley Smoke Hazard Area Map, City and Borough of Juneau, Alaska," dated September 30, 1985, and "Lemon Creek Smoke Hazard Area Map," dated December 10, 1985.

36.40.030 Definitions.

The following words, terms and phrases when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Masonry heater means a heating appliance constructed of concrete or solid masonry which is designed to absorb and store heat from a solid fuel fire built in the firebox by routing the exhaust gases through internal heat exchange channels in which the flow path downstream of the firebox may include flow in a horizontal or downward direction before entering the chimney and which delivers heat by radiation from the masonry surface of the heater, or as otherwise defined in the current version of the International Building Code. Masonry heaters shall comply with one of the following:

1. Masonry heaters shall comply with the requirements of ASTM E 1602; or

2. Masonry heaters shall be listed and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's installation instructions.

Open burning means the burning of a material which results in the products of combustion being emitted directly into the ambient air without passing through a stack or flue, but not including the burning of campfires, barbecues, candles or tobacco.

Particulate matter means any combination of particles transported in the air that are either coarse (between 2.5 micrometers and 10 micrometers) or fine (2.5 micrometers or less). The two types of particulate matter have separate regulatory requirements. These particles can form from solids or liquids and can be a health hazard when inhaled.

Person means an individual, partnership corporation, company or other association.

Solid fuel-fired heating device and device mean a device designed for solid fuel combustion so that usable heat is derived for the interior of a building, and includes solid fuel-fired stoves, fireplaces, solid fuel-fired cooking stoves and combination fuel furnaces or boilers which burn solid fuel, but does not include stoves, fireplaces, furnaces, or boilers designed and used exclusively for the combustion of wood pellets having a maximum length of one inch in any dimension.

36.40.040 Air pollution alerts and emergencies.

(a) For the purposes of this section, the manager shall declare an air pollution emergency to be in effect whenever the ambient concentration of particulate matter within the air pollution zone equals or exceeds thirty micrograms per cubic meter (ug/m^3) averaged over a 24-hour period and will remain at or above 30 ug/m^3 if an emergency is not called. The manager may call an emergency whenever available scientific and meteorological data indicate that the ambient concentration of particulate matter within a smoke hazard area can reasonably be expected to equal or exceed 30 ug/m^3 averaged over a 24-hour period. When, in the opinion of the manager, meteorological and scientific data indicate that the type of particulate measured is not hazardous, the limit may be adjusted. The manager may call an emergency upon a finding that smoke conditions are, or are likely to become, a danger to health or generally objectionable to persons in a smoke hazard area.

(b) Within a smoke hazard area, no person may operate a solid fuel fired heating device, other than a masonry heater, during an air pollution emergency declared by the manager pursuant to subsection (a) of this section.

(c) *Reserved.*

(d) *Reserved.*

(e) Notice of an air pollution emergency is adequate if published in a newspaper of general circulation within the City and Borough, or if given orally at least three times during a six-hour period by at least two radio stations operating within the City and Borough, or if made available to the general public in the form of a recorded telephone message the telephone number for which is published in the telephone directory or newspaper of general circulation within the City and Borough, or if made available to the general public as a posting on the municipal webpage the address for which is published in the telephone directory or newspaper of general circulation within the City and Borough. The prohibition shall be effective from the earlier of the time stated in the notice, 6:00 p.m. of the day the notice is published in a newspaper, the time the last required announcement of the notice is given by radio, or two hours after the time the recorded message is first made available by telephone or webpage.

(f) Notwithstanding the provisions of subsection (b) of this section, solid fuel fired heating devices may be used at any location during a loss of electrical power service to that location. Use of the device may commence no sooner than two hours after the loss of electrical service and shall be terminated as soon as practicable after reestablishment of service.

36.40.050 *Reserved.*

36.40.060 Open burning.

(a) No person may engage in the open burning of any material except as authorized by a valid open burning permit. Open burning permits may be issued by the manager or the manager's designee upon application. No permit may be issued for open burning in the Mendenhall Valley or the Lemon Creek smoke hazard areas during the period of November 1 through March 31. Open burning by commercial businesses is not allowed.

(b) Open burning permits shall be valid only for the times and locations specified in the permit. Permits shall be issued only when weather conditions or smoke conditions are not such as to cause the burning to be, or be likely to become, a danger to the public health or generally objectionable. The manager or the manager's designee may base such determination upon direct observation or upon reports or forecasts from other agencies.

(c) A person may engage in open burning only if the fire is tended to at all times; the fire is not within 50 feet of any building; the prevailing wind direction is away from any structure or roadway; and the open burn is conducted during a period of adequate air movement.

(d) When burning land-clearing debris, slash piles must be loosely stacked to promote maximum combustion efficiency throughout the burn cycle. Noncombustible material must be minimized so as to not cause or create dense smoke. The manager or the manager's designee may, at their discretion, require the use of fans to promote enhanced combustion.

(e) No person may cause or allow open burning which creates a danger to public health or safety or a public or private nuisance. No person may cause or allow the open burning of asphalt, rubber, plastic, tar, wire insulation, petroleum products, automobile parts, petroleum-treated products, treated lumber, oily waste, contaminated oil cleanup materials, or other materials in a way that produces black smoke; or of putrescible garbage, animal carcasses, or petroleum-based materials.

(f) "Open burning" means the burning of a material that results in the products of combustion being emitted directly into the ambient air without passing through a contaminant outlet.

(g) This section 36.40.060 is applicable only to those portions of the City and Borough within the Roaded Service Area No. 9.

36.40.070 Permits.

(a) Upon a showing of justifiable need, the manager may issue a temporary permit authorizing operation of a solid fuel fired heating device in circumstances otherwise prohibited by this code. "Justifiable need" includes occasions when a furnace or central heating system is inoperable other than through the owner's own actions or neglect.

(b) The manager may issue a temporary special burning permit to the municipal fire department for the purpose of training fire fighters, if the fire is restricted to a building or structure or a permanent training facility, and if the material to be burned is not allowed to smolder after the training session has terminated and no public nuisance is created. Special burning permits will not be issued during either an air alert or an air emergency.

36.40.080 Solid fuel combustion and smoke emission standards.

(a) No person shall use a solid fuel-fired heating device for the combustion of any material other than paper, cardboard or untreated wood.

(b) No person may operate a solid fuel-fired heating device in such a manner that visible emissions reduce visibility through the exhaust effluent by 50 percent or greater for more than 15 minutes in any one hour as determined by a test conducted in substantial compliance with the regulations applicable to the visual determination of stationary source emission opacity promulgated at 40 CFR 60, Appendix A, by the United States Environmental Protection Agency; provided, and notwithstanding any contrary provisions in the regulation, opacity observation shall be made at the point of greatest opacity in any portion of the emissions plume without regard to the presence or absence of condensed water vapor.

36.40.090 Penalties.

The first violation of any section of this chapter is an infraction. Each subsequent violation is a Class B misdemeanor.

Section 3. Effective Date. This ordinance shall be effective 30 days after its adoption.

Adopted this 8th day of September, 2008.

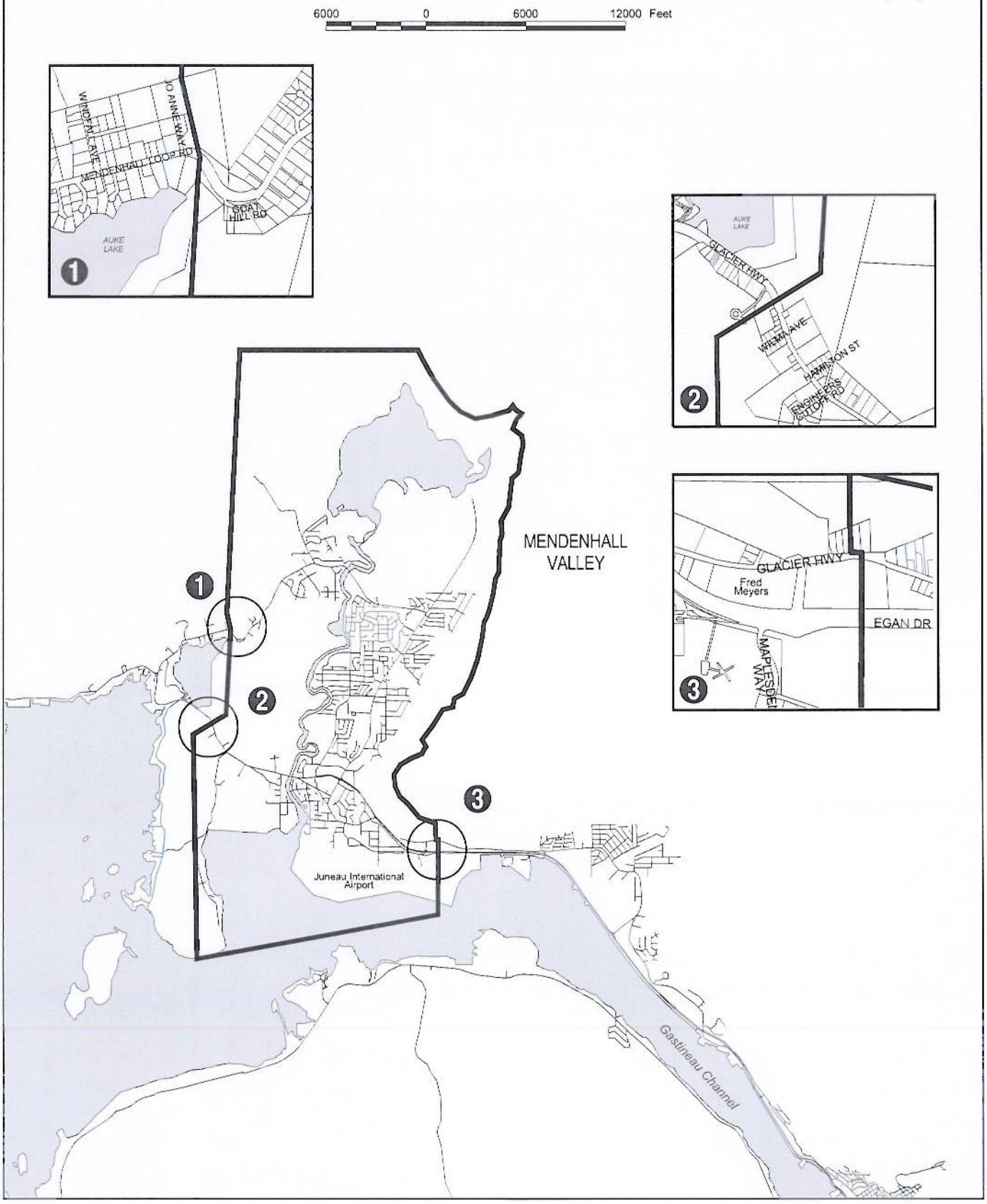
Bruce Botelho, Mayor

Attest:

Elizabeth J. McEwen, Deputy Clerk

MENDENHALL VALLEY SMOKE HAZARD AREA

City & Borough of Juneau, Alaska



Sept. 30, 1985

FISCAL YEAR 1994 CP-1s

PROJECT TITLE: JUNEAU-Air Quality/PM 10 Reductions in the Mendenhall Valley
LOCATION: JUNEAU REGION: SOUTHEAST COMPLETION DATE: 10/30/94 ED -4
APPROPRIATION TO: DOT&PF OMB PROGRAM: TRANSPORTATION
OMB WORK TYPE:

FUNDING:	CAPITAL REQUEST	OPERATING COSTS	NEW POSITIONS(PFT)
1002 FEDERAL RECEIPTS	2,000.0		
1003 GENERAL FUND MATCH			
1004 GENERAL FUND		0.0	0
1005 PROGRAM RECEIPTS			
1007 INTER-AGENCY RCPTS			
1026 HWCF			
1027 IARF			
1061 CIP RECEIPTS		YEAR ALTERNATE	FY
TOTAL	2,000.0	YEAR EXPECTED	FY '93

PROJECT DESCRIPTION: THIS REQUEST WILL PROVIDE FUNDING TO CORRECT EXISTING AIR QUALITY PROBLEMS IN JUNEAU'S MENDENHALL VALLEY ASSOCIATED WITH HIGH CONCENTRATIONS OF PARTICULATE MATTER GENERATED BY TRAFFIC ON LOCAL RESIDENTIAL STREETS.

PROJECT JUSTIFICATION: THE PROJECT IS NEEDED TO CORRECT THE ROAD RELATED AIR QUALITY PROBLEMS IN THE MENDENHALL VALLEY IN COMPLIANCE WITH THE INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991 AND THE CLEAN AIR ACT AMENDMENTS OF 1990. COMPLIANCE IS REQUIRED PRIOR TO DECEMBER 1994 IN ORDER TO AVOID THE POTENTIAL FOR ENVIRONMENTAL PROTECTION AGENCY SANCTIONS.

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

Presented by: The Manager
Introduced: 12/07/92
Drafted by: J.R.C.

RESOLUTION OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 1612

A RESOLUTION OF THE CITY AND BOROUGH OF JUNEAU ADOPTING A JOINT MEMORANDUM OF UNDERSTANDING WITH THE ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES TO RESOLVE THE MENDENHALL VALLEY PM-10 (PARTICULATE MATTER) NONATTAINMENT AREA.

WHEREAS, the City and Borough of Juneau, is committed to solve the PM-10 particulate matter nonattainment problem in the Mendenhall Valley, and

WHEREAS, particulate matter levels of more than six times the allowable levels have occurred in the Mendenhall Valley, and

WHEREAS, the main cause of these violations of state and federal air quality standards is unpaved roads, and

WHEREAS, the City and Borough should develop a plan to solve the nonattainment problem in the Mendenhall Valley, and

WHEREAS, the State Department of Transportation and Public Facilities and the State Department of Environmental Conservation have agreed to help solve the PM-10 nonattainment problem;

NOW, THEREFORE, BE IT RESOLVED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

1. That the City and Borough of Juneau enter into a Memorandum of Understanding with the State of Alaska to develop a plan that will bring the Mendenhall Valley into attainment with the health standard for PM-10 airborne particulate matter of 150 micro grams per cubic meter.

2. That the City and Borough of Juneau's Air Quality Control Plan detailing plans for bringing the Mendenhall Valley into attainment be submitted through the Alaska Department of Environmental Conservation to the Environmental Protection Agency.

3. Effective Date. This resolution shall be effective immediately upon adoption.

Adopted this 7th day of December, 1992.

Mayor

Attest:

Clerk

MEMORANDUM OF UNDERSTANDING
BETWEEN
ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
AND
CITY AND BOROUGH OF JUNEAU

The Alaska Department of Environmental Conservation (ADEC), Alaska Department of Transportation & Public Facilities (ADOT&PF) and the City and Borough of Juneau (CBJ) share responsibility and authority for resolving the Particulate Matter-less-than-ten-microns in-diameter (PM10) Nonattainment problems associated with road dust in the Mendenhall Valley. Recognizing that lines of responsibility need to be established for efficient use of available resources, these three parties hereby enter into this agreement.

Air Quality Attainment Strategy and Planning

The City and Borough of Juneau will continue its effort toward attainment of the State and National Ambient Air Quality Standard for PM10. This effort will include preparation of an Air Quality Attainment Plan for submittal to ADEC. The ADEC will provide technical and administrative assistance to CBJ and ADOT & PF as required to complete the plan and develop the strategy necessary to bring the Mendenhall Valley in compliance with the State and National Ambient Standard for PM10.

The City and Borough of Juneau will work with ADOT&PF to acquire the necessary funding for the engineering and contractual work needed to compete the road surfacing projects to bring the Mendenhall Valley into attainment. Schedule will be as expeditious as possible and will seek a completion date by September 30, 1994. Every effort will be made by ADOT & PF to secure the necessary Federal and Legislative approvals to obtain funding. ADEC will act as environmental and health impact spokesperson where necessary to achieve the common goals for this project. Specific responsibilities are outlined in Appendix A.

Telephone Contact Numbers

City and Borough of Juneau Public Works Department	780-6888
ADEC Central Office	465-5100
ADOT-PF Southeast Region Planning	789-6264
ADOT-PF Engineering & Operations Standards	465-2985

The signatories will review the tasks in this document quarterly to assure that the tasks in Appendices A & B are progressing as agreed. Amendments or additional appendices may need to be developed and implemented by mutual agreement at any time, without renegotiating the entire Memorandum of Understanding.

Mark Palesh, Manager
City and Borough of Juneau

12/15/92
Date

John Sandor, Commissioner
Department of Environmental Conservation

12/21/92
Date

for Frank G. Turpin, Commissioner
Dept. of Transportation &
Public Facilities

1/6/93
Date

ADEC will:

* prepare a list of Mendenhall Valley roads in order of Air Quality Priority;

* do the air quality modeling necessary for CBJ and DOT & PF to fulfill their respective engineering and federal approvals;

* assist CBJ and ADOT & PF in their dealings with EPA, particularly in the realm of Reasonable Further Progress and the development of strategies to reduce ambient levels of PM10 in the Mendenhall Valley;

CBJ Will:

* prepare an engineering plan and road maps outlining the road surfacing strategy that will bring the Mendenhall Valley into attainment;

* let the necessary contracts to assure timely completion of this strategy;

* resolve all the easement and right-of-way problems;

* prepare a resolution for the CBJ assembly that sanctions the agreement between the state and the city to bring Mendenhall Valley into compliance with state and national ambient standards;

* complete the necessary documents to establish agreements between CBJ and State DOT to allow ADOT & PF to make application to Federal Highways and/or the legislative budget and audit process;

* prepare and seek approval of Local Improvement Districts (LIDs), providing for at least $1,500 per assessed unit of local money for the project. Develop letters to the public and associated requests to meet the combined attainment goals for the Mendenhall Valley.

* conduct all aspects of the surfacing projects in accordance with federal and ADOT&PF guidelines applicable to the funding

ADOT & PF Will:

* agree to participate with up to $2 million of federal-aid funding for the PM10 Attainment Strategy, provided legislative appropriations are made;

* acquire the necessary state approvals in support of the attainment strategy;

* submit a letter through the Federal Highways to the EPA requesting that a waiver be granted for use of ISTEA or CMAQ funds for this PM10 project in lieu of Carbon Monoxide;

* request and support through the State budgeting process the necessary approvals to fund this attainment strategy.

Presented by: The Manager
Introduced: 08/11/2008
Drafted by: J.W. Hartle

RESOLUTION OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

Serial No. 2448

A Resolution Regarding the Alaska Department of Environmental Conservation's Mendenhall Valley Ambient Air Quality Standards.

WHEREAS, the Juneau Mendenhall Valley has not violated the 24-hour PM_{10} ambient air quality standard since 1994 and can now develop a Limited Maintenance Plan (LMP) which would be incorporated into Alaska's State Implementation Plan (SIP) according to the Alaska Department of Environmental Conservation (ADEC); and

WHEREAS, the ADEC has prepared the Mendenhall Valley PM_{10} Limited Maintenance Plan, and requests that the Assembly indicate concurrence with the air quality plan by resolution; and

WHEREAS, the resolution and the LMP will be submitted to the Environmental Protection Agency (EPA) with a request from ADEC to re-designate the Juneau Mendenhall Valley from nonattainment to attainment for the PM_{10} national ambient air quality standard; and

WHEREAS, the Alaska Department of Environmental Conservation, Division of Air Quality, has determined that the Juneau Mendenhall Valley has met the criteria to qualify for the Limited Maintenance Plan option; and

WHEREAS, the Lands Committee at its July 7, 2008 meeting, recommended this resolution be forwarded to the Assembly for approval.

NOW, THEREFORE, BE IT RESOLVED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

Section 1. That the Assembly approves Juneau's Mendenhall Valley Proposed PM_{10} Limited Maintenance Plan, drafted by the Alaska Department of Environmental Conservation, dated May 10, 2007.

Section 2. Effective Date. This resolution shall be effective immediately upon adoption.

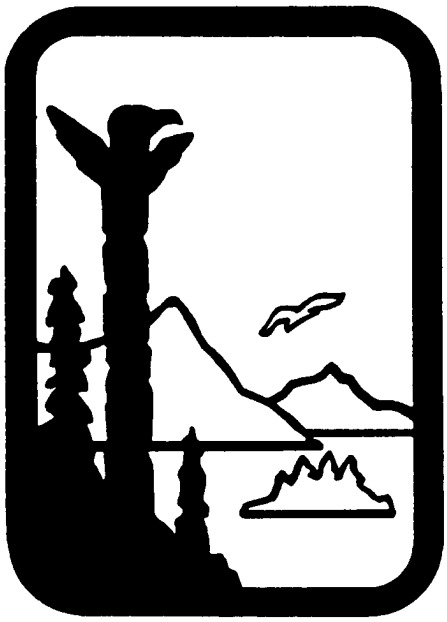
Adopted this 11th day of August, 2008.

Bruce Botelho, Mayor

Attest:

Laurie J. Sica, Clerk

Alaska Department of Environmental Conservation



Amendments to:

State Air Quality Control Plan

Vol. III: Appendices

Appendix III.D.3.8

Public Review Draft
December 2008

sierra research

DRAFT

Mendenhall Valley PM_{10} Emission Inventory

prepared for:

Alaska Department of Environmental Conservation

January 6, 2006

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95814
(916) 444-6666

DRAFT REPORT

MENDENHALL VALLEY PM_{10} EMISSION INVENTORY

prepared for:

Alaska Department of Environmental Conservation

January 6, 2006

Principal authors:

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MENDENHALL VALLEY PM_{10} EMISSION INVENTORY

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EXECUTIVE SUMMARY

The Mendenhall Valley (Valley) is currently classified as a moderate PM_{10} nonattainment area. Despite this classification, no exceedances of either the annual or the 24-hour standard have been recorded in more than a decade (based on a review of EPA monitoring data between 1994 and 2004).[1] This is the result of planning and implementation efforts by both the state Department of Environmental Conservation (DEC) and the City and Borough of Juneau (CBJ). Those efforts, documented in a 1993 State Implementation Plan (SIP) submission,[2] identified the following key emission sources:

- Smoke from residential wood combustion (home heating);
- Fugitive dust from travel on unpaved roads; and
- Fugitive dust from travel on paved roads.

To reduce emissions from these sources, the SIP implemented a wood smoke control program and a fugitive dust abatement program. Elements of the wood smoke control program included an aggressive public education program; implementation of a real-time monitoring system linked to episodic controls of wood burning; prohibition of open burning (during winter months); new stove certification requirements; and enforcement of the CBJ woodsmoke ordinance. The fugitive dust abatement program focused on paving unpaved roads in the Valley. No emission inventories have been developed to track the impact of these programs since the SIP was prepared in 1993.

To document the status of the control programs and to provide a basis for developing a Maintenance Plan and redesignation request, the Alaska Department of Environmental Conservation (ADEC) commissioned the development of a base and horizon year (2004 and 2018) PM_{10} emission inventory for the Valley. A summary of the updated inventory for these years is presented in Table ES-1. It shows that fugitive dust from traffic operating on paved roads is the dominant source of PM_{10} emissions as it is estimated to account for 83% of the inventory in 2004 and 84% of the inventory in 2018. This is a sharp contrast with the 46% share estimated in the last emission inventory prepared for calendar year 1988. The increase reflects the success of the locally implemented control programs and changes in emission factors available to quantify the emissions of different source categories. It does not reflect a huge increase in traffic, as the growth rate in Juneau is very modest at an annualized rate of less than 1% per year.

Table ES-1 Summary of Mendenhall Valley PM_{10} Emissions By Season and Source Category (tons/day)		
Source Category	Calendar Year 2004	Calendar Year 2018
Winter PM_{10} Emissions		
On-Road	0.022	0.011
Non-Road	0.027	0.012
Area		
Residential – Wood	*0.091*	*0.099*
Residential – Pellet	*0.006*	*0.007*
Residential – Oil	*0.002*	*0.002*
Residential Burn Barrels	*0.000*	*0.000*
Paved Road Fugitive Dust	*1.478*	*1.612*
Unpaved Road Fugitive Dust	*0.161*	*0.176*
Other Area Sources	*0.182*	*0.181*
Area Subtotal	1.920	2.077
Point	0.000	0.000
Total All Sources	1.969	2.100
Summer PM_{10} Emissions		
On-Road	0.021	0.011
Non-Road	0.049	0.021
Area		
Residential – Wood	*0.031*	*0.034*
Residential – Pellet	*0.002*	*0.002*
Residential – Oil	*0.001*	*0.001*
Residential Burn Barrels	*0.057*	*0.062*
Paved Road Fugitive Dust	*4.135*	*4.510*
Unpaved Road Fugitive Dust	*0.190*	*0.207*
Other Area Sources	*0.182*	*0.183*
Area Subtotal	4.598	4.999
Point	0.155	0.155
Total All Sources	4.823	5.186
Annual Average	3.400	3.647

In the 1988, fugitive dust from unpaved roads was estimated to account for 40% of the overall inventory. In 2004, that share declined to 5.2% and is projected to be 5.3% in 2018. The projected level of emissions from unpaved roads in 2018 is based on the conservative assumption that all unpaved roads in the Mendenhall Valley in 2004 would remain unpaved in 2018. Efforts by CBJ and the State to continue to pave sections of unpaved roads in the Valley would reduce the emission contributions of unpaved roads in the future.

PM_{10} emissions from wood burning (both fireplaces and stoves) were estimated to account for almost 9% of the annual inventory in 1988. In 2004, that share declined to less than 2% and is projected to remain at roughly that level in 2018. Based on the results of an extensive survey of homeowners conducted in 2004, it is estimated that the combination of new technology, related shifts in wood use, and implementation of control measures reduced wood burning by 85% from 1993 to 2004.

Other trends of note are that emissions from both the on-road and non-road source categories represent a trivial portion of the overall inventory and that they are projected to decline despite the increase in activity projected to occur between 2004 and 2018. This is the result of replacing older, higher-emitting vehicles/equipment populations with newer, lower-emitting populations and federal requirements for cleaner fuels (lower sulfur gasoline and Diesel fuel).

According to ADEC, there is only one permitted source located in the Valley and its operations are limited to 5 months per year.

Overall, the inventory is estimated to have declined by almost 30% between 1993 and 2004.

###

1. INTRODUCTION

1.1 Background

The Mendenhall Valley, located nine miles from downtown Juneau, is the largest residential area in the region. Bounded by sharply rising mountains on the east and west and the Mendenhall Glacier to the north, the valley is well sheltered from prevailing winds. This topography, combined with a low winter sun angle that limits solar heating, supports the development of relatively severe temperature inversions. These inversions trap emissions close to the valley floor and in the past led to severe concentrations of airborne particulate matter that exceeded state and federal ambient air quality standards for PM_{10}.

The Mendenhall Valley is currently classified as a moderate PM_{10} nonattainment area. Despite this classification, no exceedances of either the annual or the 24-hour standard have been recorded in more than a decade (based on a review of EPA monitoring data between 1994 and 2004).[1] This is the result of planning and implementation efforts by both DEC and the City and Borough of Juneau (CBJ). Those efforts, documented in a 1993 State Implementation Plan (SIP) submission,[3] identified the following key emission sources:

- Smoke from residential wood combustion (home heating);
- Fugitive dust from travel on unpaved roads; and
- Fugitive dust from travel on paved roads.

To reduce emissions from these sources, the SIP implemented a wood smoke control program and a fugitive dust abatement program. Elements of the wood smoke control program included an aggressive public education program; implementation of a real-time monitoring system linked to episodic controls of wood burning; prohibition of open burning (during winter months); new stove certification requirements; and enforcement of the CBJ woodsmoke ordinance. The fugitive dust abatement program focused on paving unpaved roads in the Valley. Both programs have been successful and led to significant reductions in key emission sources within the Valley. Recent work by Sierra,[4] under contract to ADEC, indicates the introduction of new technology has also had a significant impact on home heating emissions. We estimate that collectively the combination of new technology, related shifts in wood use, and implementation of control measures has reduced PM_{10} emissions by 85% from 1993 to 2004. Key contributors to these reductions include the following:

- Initiatives (e.g., burn bans, public education, new stove requirements, etc.) implemented under the Juneau wood smoke control program;

- A drop in wood use per household from 1.8 cords per heating season in 1993 to 1.1 cords in 2004;
- Widespread use of direct vent type fuel oil heaters; and
- Reductions in emission factors for both fuel oil and wood burning.

1.2 Approach

Sierra followed the source-specific data collection and modeling procedures detailed in the EPA emission inventory guidance document "PM-10 Emission Inventory Requirements," Final Report, September 1994. As noted above, key emission sources identified in the previous inventory were smoke from residential wood combustion and fugitive dust from both paved and unpaved roads. Given the significance of these sources and the efforts placed on controlling their emissions, effort was focused on collecting new data to characterize activity levels for each of these sources. The home heating survey conducted last year provides detailed insight into the impact of both technology changes and related activity levels on residential heating emissions. No similar survey has been conducted to support an update of fugitive dust from paved and unpaved roads.

In order to prepare an accurate update to these source categories, Sierra contacted state (Alaska Department of Transportation and Public Facilities, or ADOT&PF) and local CBJ agencies to obtain data on the mileage of paved/unpaved roads in the Valley and recent traffic counts and related speed estimates. Aside from these activity estimates, another key element of fugitive dust calculations is the silt content of the roads. A review of the last emission inventory prepared for the Valley[5] shows that silt loadings were collected locally to support the preparation of fugitive dust emissions for unpaved roads and that national average silt loadings were used to estimate on-road levels. Since no controls have been targeted at controlling silt loadings for unpaved roads, Sierra sees no need to update those estimates. However, controls have been targeted at reducing the mileage of unpaved roads and a corollary benefit of these controls should be a reduction of silt loadings (i.e., and fugitive dust) on paved roads. For this reason, we developed a protocol to collect silt loadings for a representative sample of paved roads (samples will be distributed across both road type and traffic volume) and use the results along with recent traffic counts to support an update of fugitive dust emitted from this source category. A description of the methodology to be used on collecting the silt samples is presented in Appendix A.

1.3 Organization

The remainder of this report is organized to document the activity data, emission factors and emission estimates for each of the primary source categories: on-road, nonroad, area and point sources. The appendices include a copy of the Inventory Preparation and Quality Assurance Plan, Demographic Forecasts, and documentation of the emission calculations for each of the source categories.

###

2. ON-ROAD SOURCES

The calendar year 2004 and 2018 PM_{10} on-road mobile source inventories were prepared for Mendenhall Valley using EPA's latest vehicle emission factor model, MOBILE6.[*] The model estimates the following PM_{10} pollutants from on-road motor vehicles:

- Sulfate (SO_4);
- Organic Carbon (OC) portion of Diesel exhaust particulate;
- Elemental Carbon (EC) portion of Diesel exhaust particulate;
- Total carbon (GASPM) portion of gasoline exhaust particulate;
- Lead (Pb) portion of exhaust particulate;[†]
- Brake-wear particulate emissions; and
- Tire-wear particulate emissions.

Separate inventories were prepared for winter (October to March) and summer (April to September) of each year, with corresponding modeling runs for each season. The MOBILE6 model inputs were customized to reflect the local traffic, fuel, and ambient characteristics as much as possible. The MOBILE6 model inputs and associated files are shown in Appendix A, and a discussion of the modeling procedures and results follows.

2.1 Modeling Parameters

The parameters needed for modeling on-road PM_{10} emissions from Mendenhall Valley using MOBILE6 were compiled by contacting local and state agencies and reviewing historical data on ambient conditions and local vehicle activity. There are a number of inputs that can be specified by the user to tailor a standard MOBILE6 run for a local area, and these are discussed below.

Temperature Data – Temperature data were compiled from www.weatherbase.com, which is a website that records historical climatological data for cities all over the world. The monthly average highs and lows for Juneau for the more than 40 years on record in the website database were obtained. The average highs and lows for summer (April to September) and winter (October to March) were estimated and are shown in Table 2-1.

[*] MOBILE6 version 6.2.03 dated September 24, 2003.
[†] Lead emissions are basically zero since Pb has been eliminated from gasoline fuels.

Table 2-1 Seasonal Ambient Temperature in Juneau(ºF)		
Season	Low	High
Summer	42.3	57.7
Winter	25.7	36.3

Registration Distribution – June 2000 Department of Motor Vehicle (DMV) registration data were used to estimate the vehicle age distribution for light-duty cars and trucks, which make up the majority of traffic in the Juneau area. However, the registration data were found to contain records for very old vehicles that are chronically unregistered (registration is not continuous over the last few years). These vehicles are not operated on a regular basis and tend to bias the registration fraction towards vehicles that are 25 years old and older—the oldest model year grouping in MOBILE6. Because of this, the light-duty vehicle registration fractions used for vehicles 25 years old and older were derived from the MOBILE6 default fractions instead of from the 2000 DMV registration data. The DMV registration fractions for the newer light-duty vehicles were renormalized in order to accommodate the default fractions in MOBILE6 for the oldest model year grouping. The MOBILE6 default registration fractions were used for the other vehicle classes in Juneau. Because no data are available to adjust the DMV registration data to reflect seasonal shifts in fleet mix, only one set of registration fractions was used for the Mendenhall Valley runs for the summer and winter seasons. In addition, it was assumed that the registration distribution used applies to the 2018 forecasted scenario as well. Appendix A shows the registration distribution used as model input in MOBILE6 for the model runs.

Mileage Accumulation Rates – Local data to estimate mileage accrual rates for Juneau were not available; therefore, the national average default rates in MOBILE6 were used for 2004 and 2018.

VMT by Vehicle Class – No local data were available to characterize the VMT by vehicle class; therefore the "default" MOBILE6 VMT fractions were used for modeling Mendenhall Valley. MOBILE6 calculates the "default" VMT distribution from national average and/or user-supplied local data for the registration distribution by age, registration distribution by vehicle class, mileage accrual rates, Diesel fractions, and the calendar year given in the model run. Therefore, for the model runs, the "default" VMT distribution is partly based on the local 2000 DMV registration data used in developing the registration distribution by age for the area. The resulting 2004 and 2018 VMT fractions used for the Mendenhall Valley are shown in Table 2-2. The fractions for the different vehicle classes sum to 1.000 for each season. Although the summer and winter model runs for the Valley used the same registration distribution by vehicle age, the resulting VMT fractions differ slightly within each calendar year because MOBILE6 ages the default fleet population by six months for the summer runs, which adjusts the model default annual mileage and average accumulation rates by vehicle age and affects the calculated "default" VMT fractions in the model.

Table 2-2 Seasonal VMT Distributions by Vehicle Class				
Vehicle Class	Calendar Year 2004		Calendar Year 2018	
	Winter	Summer	Winter	Summer
LDV	0.4463	0.4404	0.2986	0.2972
LDT1	0.0699	0.0705	0.0937	0.0936
LDT2	0.2321	0.2342	0.3121	0.3117
LDT3	0.0793	0.0801	0.1066	0.1066
LDT4	0.0369	0.0373	0.0496	0.0496
HDV2B	0.0417	0.0423	0.0429	0.0435
HDV3	0.0041	0.0041	0.0042	0.0043
HDV4	0.0033	0.0033	0.0035	0.0036
HDV5	0.0025	0.0025	0.0026	0.0027
HDV6	0.0093	0.0094	0.0097	0.0098
HDV7	0.0109	0.0111	0.0114	0.0115
HDV8A	0.0119	0.0121	0.0123	0.0125
HDV8B	0.0425	0.0431	0.0438	0.0444
HDBS	0.0017	0.0017	0.002	0.0021
HDBT	0.0014	0.0014	0.0011	0.0012
MC	0.0062	0.0063	0.0056	0.0057

Fuel Parameters – The fuel parameters that affect PM_{10} emissions, gasoline, and Diesel fuel sulfur content were customized to reflect the seasonal fuel properties in the Mendenhall Valley. The 2004 average fuel parameters were obtained from the 2004 Alliance of Automobile Manufacturers' (AAM) summer and winter fuel survey data. The Mendenhall fuel properties were based on fuel from Seattle, Washington, which is shipped into Juneau.

For 2018, gasoline fuel sulfur levels are assumed to fall within the requirements of the Tier 2 Gasoline Sulfur Rule, which in Alaska are currently required to be phased-in in 2007. The Diesel fuel sulfur in 2018 is assumed to follow the requirements of the EPA Low-Sulfur Diesel Rule, which takes effect in 2006. Although Alaska has been given the option by EPA to design an alternative low-sulfur transition plan to ease the hardships of converting both gasoline and Diesel to low sulfur within a relatively short time frame, it is assumed that the provisions of both the gasoline and Diesel low-sulfur rules are completely satisfied by 2018. Table 2-3 summarizes the characteristics of the fuel used for the Juneau area during the winter and summer of 2004 and 2018. The gasoline Reid vapor pressures (RVPs) used in the model runs are shown in Table 2-3 since it is a required input into MOBILE6; however, RVP does not affect PM_{10} levels from vehicles.

Table 2-3 Mendenhall Valley Gasoline and Diesel Fuel Characteristics				
Fuel Parameter	Calendar Year 2004		Calendar Year 2018	
	Winter	Summer	Winter	Summer
Gasoline RVP (psi)	13.6	7.8	13.6	7.8
Gasoline Avg Sulfur (ppm)	90	60	30	30
Gasoline Max Sulfur (ppm)	140	150	80	80
Diesel Avg Sulfur (ppm)	380	380	15	15

Other Modeling Considerations – For the MOBILE6 modeling of on-road vehicle emissions in Alaska, off-cycle effects or the Supplemental Federal Test Procedure (SFTP) Bag 4-equivalent were disabled during the winter runs. This was done because the aggressive driving represented by these effects is not observed with winter road conditions. In addition, the Valley was modeled as a low-altitude area.

Facility Types and Average Vehicle Speeds – The average daily VMT data for 2004 for the Mendenhall Valley were estimated as a function of average vehicle speeds, which were then used as inputs to the MOBILE6 model. In order to do this, the 2004 VMT and average speed estimates by facility were developed using local traffic data. Table 4 lists the VMT distribution and average speeds modeled by facility type for the Mendenhall Valley. No seasonal data were available to adjust any changes in VMT (i.e., possible VMT reduction in the winter), and the same average annual daily VMT by facility was used for both the summer and winter seasons as a conservative approach. MOBILE6 scenarios were created to result in PM_{10} emission factors for each combination of speed and facility type shown in Table 2-4 for the calendar years considered in the study (2004 and 2018). The detailed development of the facility VMT and speed data for the Mendenhall Valley is discussed in detail in the following section.

Table 2-4 VMT and Speeds by Facility Type for Mendenhall Valley			
Facility Type	Avg Speed (mph)	2004 VMT/day	% of Total VMT
Urban Collector	35.6	58,370	19%
Urban Minor Arterial	37.2	39,585	13%
Urban Principal Arterial	50.5	63,278	21%
Local Road	20.8	141,367	47%
ALL TOTAL		302,599	100%

2.2 Juneau Travel Activity

Once the input parameters were compiled and model runs were completed, the resulting PM_{10} emissions factors for each combination of facility type and average speed were combined with the local estimates of VMT in order to generate an emissions inventory. For the Mendenhall Valley, the 2004 VMT and average speed estimates by facility had to be developed by extrapolating average daily travel and speed data on Alaska Department of Transportation and Public Facilities (DOT&PF) monitored roadways to the rest of the roadways in the Valley. After this, the 2004 VMT estimates were forecasted to 2018 levels using yearly population data for the area. The data sources and analysis involved in this procedure are presented below.

Traffic Data Sources – The VMT and average speed by facility for the Mendenhall Valley were developed from traffic databases for monitored roadways and roadway mileage data obtained from DOT&PF and from the County and Borough of Juneau (CBJ).[6,7] The following four sources of roadway data were used in generating the most complete picture of on-road travel in the nonattainment area:

- The current DOT&PF routelist for Southeastern Alaska (2004 routelist), which includes Coordinated Data System (CDS) route numbers, route or roadway descriptions, mile points, functional class definitions or facility types, average daily traffic (ADT), length in miles, and the segment VMT for DOT&PF-managed roadway segments;
- A current DOT&PF record of routes with limited posted speed limit information for Southeastern Alaska (2004 speed list[*]) with CDS route number, mile points, roadway length in miles, and facility type;
- The current CBJ street inventory database, which lists the CBJ-managed streets, location within the borough, lengths, and surface description, but no traffic activity data; and
- The 1999 Juneau travel activity estimates developed by Sierra Research for the 1999 criteria pollutant inventory for Juneau (1999 routelist), which list CDS route numbers, mile points, lengths, facility types, and speeds for all routes on record for Juneau in 1999.[†]

Mendenhall Valley Roadway Inventory – In order to develop the average travel characteristics for the Valley, roadway segments located outside of the nonattainment area boundary were eliminated from the 2004 routelist and speed list. This was done based on the route descriptions, comparisons with area street maps, and the routes included in the 1999 routelist, which was already cleaned up during a previous analysis to include only roadways in the Borough of Juneau. This exercise showed that the 2004 routelist, 2004 speed list, and 1999 routelist do not map completely to each other

[*] Although this database is referred to as the "speed" list, only 66 of the 558 roadway segments in the complete database had speed limit data, and none of the segments with speed data are in the Mendenhall Valley nonattainment area.

[†] The 1999 Juneau travel activity estimates were developed following the same procedure outlined here using DOT&PF traffic data from 1999 for the roadways monitored at the time.

(beginning and ending mile points vary by roadway), and that various roadway segments were included in one source and not another. Therefore, a combined list of all roads in the Valley was created.

After eliminating the roadways outside the nonattainment area boundary in all the data sets, the 2004 routelist was used as the basis for creating the combined list of roadways for the Mendenhall Valley. First, the 2004 routelist was compared to the 2004 speed list, and segments missing from the former were added from the speed list in order to create a current list of roadways in the Valley—most with ADT data, and some with speed limit data. The resulting roadway listing was then compared to the 1999 routelist, and roadway segments found in the 1999 routelist that were not included in the 2004 lists of monitored routes within the nonattainment area were added to the combined list. Lastly, the CBJ-managed roadways located within the Valley were identified from the CBJ database and were added as local roads to the list. Table 2-5 summarizes the data included in the combined list of roadway segments by primary data source, and Table 2-6 summarizes the data in the combined list by facility type.* As shown in Table 2-6, the majority of roadway segments with missing speed and ADT data are local roads, most of which are CBJ-managed roads.

Table 2-5
Available Roadway Data for Mendenhall Valley by Source

Primary Data Source	No. of Segments	Length in Miles	Segments w/ Speed Data	Segments w/ ADT
2004 Routelist	70	30.5	36	70
2004 Speed List	198	35.3	0	0
1999 Routelist	15	12.7	13	15
CBJ database	272	55.0	0	0
ALL	555	133.4	49	85

Table 2-6
Available Roadway Data for Mendenhall Valley by Facility

Facility Type	No. of Segments	Length in Miles	Segments w/ Speed Data	Segments w/ ADT
Collector	48	19.9	23	44
Minor Arterial	10	3.2	10	10
Principal Arterial	6	3.5	6	6
Local	491	106.8	10	25
ALL	555	133.4	49	85

* Facility types included in the Juneau list of roadway segments include principal arterials, minor arterials, collectors, and locals.

ADT and Speed Estimates – After the combined list of roadway segments was developed, it was sorted by facility type, and a straight average of the known ADT levels was calculated for each facility type. In addition, VMT-based harmonic average speeds were developed for each facility type using the roadway segments with known speeds and VMT (VMT=ADT*length in miles). For the roadway segments that were derived from the 1999 routelist, the speed estimates were assumed to still apply, as no other source of traffic monitoring data for these segments were available. The average ADT and harmonic average speeds estimated was used to fill in the missing ADT and speed data for the roadway segments within each facility type. This resulted in a complete roadway segment data set—with ADT, length, VMT, and speed estimates.

Traffic Level Adjustment by Calendar Year – The ADT and VMT levels used from the 1999 routelist were adjusted to 2004 levels using yearly population estimates for the Mendenhall Valley. Details of deriving yearly population levels within the nonattainment area (1993, 2004, and 2018) are included in Appendix B. The 1999 population level was interpolated between the 2004 and 1993 levels. After complete VMT estimates by facility were developed for 2004, the VMT were then forecasted to 2018 using the population forecast. Table 2-7 shows the estimated borough population levels used in adjusting the estimated ADT and VMT in the roadways in the Mendenhall Valley.

Table 2-7
Mendenhall Valley Population Estimates

Calendar Year	Population
1999	12,724
2004	13,327
2018	14,535

Mendenhall Valley Nonattainment Area Travel Estimates – The estimated 2004 and 2018 average travel characteristics resulting from the combined Valley roadway segment data set are shown in Table 2-8 by facility type. As shown, the average ADT for local roads is higher than expected at 1,385 vehicles per day. This may stem from the small sample size of local roads with ADT data and from DOT&PF monitoring traffic counts on the larger, longer, and busier roadway segments, for which maintenance and improvements are more needed. No other data from local roadways were available to adjust this estimated average ADT, however, and the ADT for the local roads were kept as a conservative assumption.

The VMT-based harmonic average speeds shown in Table 2-8 were used in developing the MOBILE6 input files for the nonattainment area. The resulting PM_{10} emission factors from the model runs were then combined with the total daily VMT by calendar year and season to result in the average PM_{10} emissions for the area by facility type.

Table 2-8 Mendenhall Valley Average Travel Estimates				
Facility type	ADT	Harmonic Avg Speed (mph)	2004 Daily VMT	2018 Daily VMT
Collector	3,156	35.6	58,370	63,661
Minor Arterial	7,317	37.2	39,585	43,173
Principal Arterial	16,082	50.5	63,278	69,013
Local	995	20.8	141,367	154,180
ALL			302,599	330,028

2.3 PM_{10} Inventory Results

Tables 2-9 and 2-10 show the resulting 2004 and 2018 on-road mobile PM_{10} emission estimates for the Mendenhall Valley nonattainment area by pollutant, season, and facility type. The annual average emission inventories were estimated by weighting the summer and winter emission levels by the number of days in each season as defined by ADEC—183 for the summer and 182 for the winter. As shown in the tables, very little seasonal variation is seen in the PM_{10} emissions from on-road motor vehicles. All exhaust particulate emissions are reduced in 2018 as compared to the 2004 levels, even with increasing VMT, due to the more stringent standards on emissions for the later model year vehicles. Brake- and tire-wear emissions are based only on total miles driven; therefore, the increase in VMT for 2018 resulted in the increase in break- and tire-wear PM_{10} emissions.

Table 2-9 2004 Mendenhall Valley Seasonal On-Road PM_{10} Emissions in Tons/Day[a]							
Season	Facility	GASPM	EC	OC	SO4	Brake	Tire
Winter	Collector	3.1E-04	9.3E-04	4.7E-04	1.5E-04	5.5E-04	4.2E-04
	Minor Arterial	4.9E-04	1.5E-03	7.5E-04	2.4E-04	8.7E-04	6.7E-04
	Principal Arterial	1.1E-03	3.3E-03	1.7E-03	5.9E-04	1.9E-03	1.5E-03
	Local	4.5E-04	1.4E-03	6.9E-04	2.2E-04	8.0E-04	6.2E-04
	ALL TOTAL	0.0023	0.0071	0.0036	0.0012	0.0042	0.0032
Summer	Collector	3.1E-04	9.1E-04	4.6E-04	1.3E-04	5.5E-04	4.2E-04
	Minor Arterial	4.9E-04	1.5E-03	7.3E-04	2.1E-04	8.7E-04	6.8E-04
	Principal Arterial	1.1E-03	3.2E-03	1.6E-03	5.1E-04	1.9E-03	1.5E-03
	Local	4.5E-04	1.3E-03	6.8E-04	1.9E-04	8.0E-04	6.2E-04
	ALL TOTAL	0.0023	0.0069	0.0035	0.0010	0.0042	0.0032
Annual Average		0.0023	0.0070	0.0036	0.0011	0.0042	0.0032

[a] Lead emissions are zero for all scenarios.

Table 2-10 2018 Mendenhall Valley Seasonal On-Road PM_{10} Emissions in Tons/Day[a]							
Season	Facility	GASPM	EC	OC	SO4	Brake	Tire
Winter	Collector	2.9E-04	2.1E-04	1.1E-04	3.5E-05	8.8E-04	6.8E-04
	Minor Arterial	2.0E-04	1.4E-04	7.1E-05	2.4E-05	5.9E-04	4.6E-04
	Principal Arterial	3.1E-04	2.3E-04	1.1E-04	3.8E-05	9.5E-04	7.4E-04
	Local	6.6E-04	5.1E-04	2.5E-04	1.0E-04	2.1E-03	1.6E-03
	ALL TOTAL	0.0015	0.0011	0.0005	0.0002	0.0045	0.0035
Summer	Collector	2.8E-04	2.0E-04	1.1E-04	3.5E-05	8.8E-04	6.8E-04
	Minor Arterial	1.9E-04	1.4E-04	7.1E-05	2.4E-05	5.9E-04	4.6E-04
	Principal Arterial	3.0E-04	2.2E-04	1.1E-04	3.8E-05	9.5E-04	7.4E-04
	Local	6.6E-04	4.9E-04	2.5E-04	1.0E-04	2.1E-03	1.6E-03
	ALL TOTAL	0.0014	0.0011	0.0005	0.0002	0.0045	0.0035
Annual Average		0.0014	0.0011	0.0005	0.0002	0.0045	0.0035

[a] Lead emissions are zero for all scenarios.

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3. NONROAD SOURCES

The nonroad mobile source inventories presented in this report were developed using EPA's draft NONROAD model.* This model calculates emissions from approximately 80 different types of nonroad equipment, and categorizes them by technology type (i.e., gasoline, diesel, LPG, CNG, 2-stroke, and 4-stroke) and horsepower range. Note that default model input was replaced with Juneau-specific data whenever possible, as described in the methodology section below.

For purposes of this inventory, the Alaskan summer and winter are defined as April through September, and October through March, respectively. Sierra performed NONROAD modeling runs for calendar years 2004 and 2018 and determined emissions, in tons per day, for both a typical winter and a typical summer day for the Mendenhall Valley community. Unless otherwise specified, NONROAD default activity and population inputs were used in the modeling associated with these nonroad inventories.

3.1 Calculation Methodology

The NONROAD model calculates tons of emissions for a given geographical area using the following factors:

- equipment population;
- an equipment-specific emission factor (in grams per horsepower-hour);
- the average horsepower rating of the equipment;
- the estimated annual equipment activity (hours per year); and
- the average load factor for the given engine.

In addition, seasonal (month or season) and day of week (i.e., weekend vs. weekday) adjustments are applied depending on whether the end-user requests an inventory estimate expressed on an annual, seasonal, or daily basis. The equipment populations are based on national averages, and then scaled down to represent smaller geographic areas on the basis of human population and proximity to recreational, industrial, and commercial facilities. It should be noted that the model has undergone dramatic revisions and corrections with regard to estimates of equipment populations and activity rates, which has resulted in reduced emissions estimates from some equipment categories. For example, the emissions attributed to summertime marine equipment, which formerly constituted a large percentage of the total summer inventory, have been reduced primarily

* U.S. EPA NONROAD Model, draft version 2.3c, released April 2004.

as a result of EPA's revised population estimates for Alaska, which are generally two orders of magnitude lower than in the previous version of the model.

Scaling Methodology for Mendenhall Valley Results – Because the NONROAD model provides output on a county-wide, or borough-wide basis only, we performed the runs for the City and Borough of Juneau, then scaled the results by the ratio of the number of households in the Borough vs. nonattainment area, as shown in Table 3-1 below. Population information for the Borough was obtained from U.S. Census data,[*] and the nonattainment area population was determined according to the methodology presented in Appendix B.

Table 3-1
Fraction of Households in City and Borough of Juneau
vs. Mendenhall Valley Nonattainment Area

Calendar Year	# Mendenhall Valley Nonattainment Area Households	# City & Borough of Juneau Households	Nonattainment Area Housing Fraction
2002	4,608	12,422	0.37
2004	4,888	12,810	0.38
2018	5,331	14,491	0.37

3.2 Modifications to EPA's NONROAD Model Default Equipment Population and Activity Factors

Because EPA uses a top-down approach in developing populations and estimated annual activity factors for the equipment in the NONROAD model (i.e., distributed national equipment populations to individual states and counties based primarily on human population), it is recognized that locally generated data will improve the accuracy of the resulting NONROAD emissions estimates. As part of several studies completed for ADEC in the 2000 to 2002 calendar year timeframe,[†] it was possible to generate more accurate estimates for population and/or activity for a number of key summer and wintertime equipment categories (e.g., personal watercraft, lawn and garden equipment, snowmobiles) which operate in the Juneau area. ADEC staff and other local agencies provided key activity and population estimates that were used to adjust some of the more general NONROAD defaults. For example, there is little if any personal watercraft activity in the Juneau area during the summer months because of the cold water

[*] Juneau household population data for 1999 and 2002 was obtained from U.S. Census Data. 2004 and 2018 household population estimates were then calculated by increasing the 2002 population by the annual percent increase from 1999 to 2002 (i.e., 1.04 %).

[†] The "1995-2001 Fairbanks CO Inventory," the "1999 Air Toxics Emission Inventory," the "2000 Anchorage CO Inventory," and the "2002 Criteria Pollutant Emissions Inventory."

temperature of all surrounding bodies of water. With the exception of these modifications, described in greater detail below, the NONROAD model defaults were used for all modeling associated with the development of this Inventory.

Personal Watercraft (PWC)

Equipment Population – ADEC staff contacted the U.S. Coast Guard and obtained calendar year 2000 registration data for PWC in the Juneau area. According to ADEC, boating registration enforcement is fairly rigorous in Juneau, and although the geography is not a deterrent to PWC use in Juneau, seasonal constraints (in particular low water temperature and inclement weather) severely limit their use. Therefore, ADEC staff felt it was appropriate to assume that 50% of the PWC in Juneau are registered with the Coast Guard. Therefore, it was decided that registration data provided by the Coast Guard, with the 50% registration assumption discussed above, would provide a more accurate total. Note that the NONROAD estimate shown below was associated with the previous version of that model. However, because the current model defaults show PWC populations which appear to be unrealistically low (i.e., 26 units for Juneau), the populations shown below were used for this analysis, with minor adjustments to account for population increases between 2000 and 2018[*].

PWC Registered w/ Coast Guard	63
NONROAD PWC Estimate:	2,452
Modified PWC Population:	126

Note that the above population estimates refer to the Borough of Juneau; these totals were subsequently adjusted to represent the equipment population in the Mendenhall Valley nonattainment area, according to the methodology discussed previously.

Activity Estimates – Because there are no bodies of water within the boundaries of the Mendenhall Valley nonattainment area that would accommodate motorized watercraft, the activity for all pleasure craft (including PWCs) has been reduced to one hour per year for engine maintenance. The NONROAD default seasonal activity distribution[†] was also retained for all recreational marine categories.

Offroad Motorcycles and All Terrain Vehicles (ATVs)

Lacking more accurate data, we have retained the NONROAD assumptions for ATV activity and populations (with the requisite nonattainment area population adjustments), with the added assumption that all annual activity occurs during the summer months (i.e., April through September). ADEC staff believe the population numbers are too high, but

[*] According to U.S. Census data, the 2000 to 2002 population increase in Juneau was 0.18%.
[†] The default seasonal activity distribution for recreational marine equipment is 15% during the Spring and Fall, and 70% during the Winter (i.e., December through February).

have no local data to offer as a substitute. The 2004 and 2018 populations for offroad motorcycles and ATVs are shown below.

2004 ATV Population Estimate:	2,938
2004 Offroad Motorcycle Population Estimate:	756
2018 ATV Population Estimate:	5,261
2018 Offroad Motorcycle Population Estimate:	1,251

Snowmobiles

Equipment Population – ADEC staff obtained 1999 snowmobile registration from the Alaska DMV for use in developing the 2002 Criteria Pollutant Inventory. At that time, ADEC believed that assuming 50% of all operating snowmobiles are registered provided a more accurate population estimate than the defaults in the NONROAD model currently in use. Therefore, this logic was applied to the DMV registration totals. The revised population estimate is considered by ADEC staff to be more representative than either the current model defaults or those from the previous version of the NONROAD model – both of which appeared to be too high for Juneau. (According to ADEC staff, there are few areas to ride a snowmobile in Juneau due to the terrain and climate, and it is not possible to easily transport the equipment to neighboring areas outside the Borough as is routinely done in Anchorage and Fairbanks.) And, despite the fact that the current NONROAD population estimates do appear to be more reasonable than those in the preceding version of the model, we believe that the population estimates shown below remain the most accurate available, as they are based on actual Alaska DMV registration data. Accordingly, the population figures shown below were used for the current analysis, after adjustments for population increases between 1999 and 2002.

Old 1999 NONROAD Population Estimate:	368
Current 1999 NONROAD Population Estimate:	2,898
DMV Registration:	71
Modified Population	142

Note that, as discussed in earlier sections, the above population estimates refer to the Borough of Juneau; these population estimates were subsequently adjusted to represent the equipment population in the Mendenhall Valley nonattainment area, according to the methodology discussed previously.

Activity Estimates – According to ADEC staff, there are no areas within the confines of the nonattainment area that are suitable for snowmobile use. Therefore, we have assumed that the entire Juneau snowmobile population is used a total of 1.0 hours/year for maintenance purposes only, all of which occurs during the winter months.

Snowblowers

The default NONROAD assumptions regarding snowblower activity were retained, with the exception of seasonal distribution; for this analysis, it was assumed that all snowblower activity was evenly distributed throughout the winter season.

General Modifications – Lawn and Garden

Lacking more accurate data, the basic NONROAD assumptions for summertime lawn and garden activity and populations have been retained. ADEC staff believe the population numbers are too high, but have no local data to use as a replacement. However, some adjustments to these default inputs have been made, as described below.

Activity Estimates – Adjustments to the seasonal activity assumptions were made to reflect the fact that the weather patterns in Juneau effectively eliminate lawn and garden activity during a substantial portion of the year. Following the methodology used in previous inventory calculations, it was assumed that all lawn and garden activity takes place during the Alaska summer season, April through September. Using residential lawn mowers as an example, this gives the following estimated weekly activity factor:

58 hours/yr (NONROAD default for res. lawnmowers)	÷	26 weeks/yr	=	2.2 hours/week

Due to regional weather patterns, however, ADEC staff feel it is appropriate to limit the duration of lawn and garden activity to the 17.5 weeks from May 1 through August 31. This equates to approximately 17.5 weeks/yr of lawn and garden activity, rather than 26 weeks/yr. Distributing the 2.2 hours per week of residential lawnmower activity over this time period reduces the annual activity from 58 hours/week to 39 hours/week—a decrease of approximately 30%. This categorical decrease in the annual activity for all lawn and garden equipment seems appropriate, given that the NONROAD model default assumption is that 30% of all lawn and garden activity takes place during what we have defined as the Alaska winter. So, in essence, 30% of lawn and garden activity that the NONROAD model had assumed took place during the October through March time period was simply eliminated.

3.3 Emission Estimates

Table 3-2 below shows the summer and winter Nonroad inventory totals for Juneau for calendar years 2004 and 2018. These totals show a pattern of sustained, gradual decrease in PM_{10} emissions over time as older equipment is replaced with newer equipment.

Table 3-2
2004 and 2018 Nonroad PM_{10} Emissions

Calendar Year	Season	PM_{10} (tpd)
2004	Summer	0.05
	Winter	0.03
2018	Summer	0.02
	Winter	0.01

Tables 3-3 through 3-6 show a more detailed presentation of the calculated Nonroad emission totals. For each table, the equipment has been sorted in descending order of total PM_{10} emissions. The top 20 emission sources are listed individually, and the remaining sources are grouped together. These tables show that, generally, a handful of equipment types (e.g., snowmobiles and snowblowers in the winter, construction equipment in the summer) are responsible for the majority of the emissions for that season. However, it is important to note that the emissions from some of these key sources, particularly for the summer totals, are based on default equipment population and activity estimates in the current version of the NONROAD model, which may not be adequately representative of the Juneau equipment population and usage patterns, as discussed previously.

Table 3-3
2004 Mendenhall Valley Nonattainment Area Nonroad Emissions - Summer (tpd)

Equipment Description	Equipment Type	PM_{10}	Population (# units)	Activity (hrs/unit/month)
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	0.0090	65	104
Recreational Equipment	All Terrain Vehicles	0.0057	1,121	268
Logging Equipment	Chain Saws > 6 HP	0.0051	119	25
Recreational Equipment	Motorcycles: Off-road	0.0044	288	267
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.0038	37	125
Construction and Mining Equipment	Skid Steer Loaders	0.0035	58	89
Construction and Mining Equipment	Rubber Tire Loaders	0.0025	15	84
Construction and Mining Equipment	Crawler Tractor/Dozers	0.0020	10	104
Construction and Mining Equipment	Excavators	0.0019	14	121
Construction and Mining Equipment	Off-highway Trucks	0.0014	2	182
Construction and Mining Equipment	Rough Terrain Forklifts	0.0011	12	73
Construction and Mining Equipment	Rollers	0.0007	10	83
Construction and Mining Equipment	Concrete/Industrial Saws	0.0005	11	67
Construction and Mining Equipment	Scrapers	0.0005	2	101
Construction and Mining Equipment	Graders	0.0005	3	107
Industrial Equipment	AC\Refrigeration	0.0004	10	123
Construction and Mining Equipment	Trenchers	0.0004	9	59
Commercial Equipment	Generator Sets	0.0004	157	12
Construction and Mining Equipment	Cranes	0.0004	4	107
Construction and Mining Equipment	Bore/Drill Rigs	0.0004	15	24
	All Other Equipment	0.0039		
TOTAL		0.05		

Table 3-4
2004 Mendenhall Valley Nonattainment Area Nonroad Emissions - Winter (tpd)

Equipment Description	Equipment Type	PM_{10}	Population (# units)	Activity (hrs/unit/month)
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	0.0090	65	104
Logging Equipment	Chain Saws > 6 HP	0.0051	119	25
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.0019	37	63
Construction and Mining Equipment	Skid Steer Loaders	0.0017	58	45
Construction and Mining Equipment	Rubber Tire Loaders	0.0013	15	42
Construction and Mining Equipment	Crawler Tractor/Dozers	0.0010	10	52
Construction and Mining Equipment	Excavators	0.0009	14	61
Construction and Mining Equipment	Off-highway Trucks	0.0007	2	91
Construction and Mining Equipment	Rough Terrain Forklifts	0.0006	12	37
Commercial Equipment	Generator Sets	0.0004	157	12
Industrial Equipment	AC\Refrigeration	0.0004	10	100
Construction and Mining Equipment	Rollers	0.0004	10	42
Construction and Mining Equipment	Concrete/Industrial Saws	0.0003	11	34
Airport Ground Support Equipment	Airport Ground Support Equipment	0.0003	3	61
Construction and Mining Equipment	Scrapers	0.0003	2	51
Lawn and Garden Equipment	Snowblowers	0.0002	376	3
Construction and Mining Equipment	Graders	0.0002	3	54
Construction and Mining Equipment	Trenchers	0.0002	9	29
Commercial Equipment	Welders	0.0002	14	44
Construction and Mining Equipment	Cranes	0.0002	4	54
	All Other Equipment	0.0018		
TOTAL		0.03		

Table 3-5
2018 Mendenhall Valley Nonattainment Area Nonroad Emissions - Summer (tpd)

Equipment Description	Equipment Type	PM_{10}	Population (# units)	Activity (hrs/unit/month)
Logging Equipment	Chain Saws > 6 HP	0.0073	171	25
Recreational Equipment	Motorcycles: Off-road	0.0036	460	267
Construction and Mining Equipment	Skid Steer Loaders	0.0019	76	90
Recreational Equipment	All Terrain Vehicles	0.0019	1,935	268
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.0019	48	125
Construction and Mining Equipment	Concrete/Industrial Saws	0.0005	11	67
Construction and Mining Equipment	Rubber Tire Loaders	0.0004	20	84
Lawn and Garden Equipment	Chain Saws < 6 HP	0.0003	284	2
Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters	0.0003	760	1
Commercial Equipment	Generator Sets	0.0003	219	12
Lawn and Garden Equipment	Leafblowers/Vacuums	0.0003	400	2
Construction and Mining Equipment	Rough Terrain Forklifts	0.0003	16	73
Recreational Equipment	Specialty Vehicles/Carts	0.0002	114	11
Construction and Mining Equipment	Tampers/Rammers	0.0002	16	18
Commercial Equipment	Pumps	0.0002	56	20
Construction and Mining Equipment	Bore/Drill Rigs	0.0002	16	26
Commercial Equipment	Welders	0.0001	19	44
Construction and Mining Equipment	Crawler Tractor/Dozers	0.0001	14	104
Logging Equipment	Shredders > 6 HP	0.0001	1,056	4
Construction and Mining Equipment	Rollers	0.0001	12	83
	All Other Equipment	0.0010		
TOTAL		0.02		

Table 3-6
2018 Mendenhall Valley Nonattainment Area Nonroad Emissions – Winter (tpd)

Equipment Description	Equipment Type	PM_{10}	Population (# units)	Activity (hrs/unit/month)
Logging Equipment	Chain Saws > 6 HP	0.0073	171	25
Construction and Mining Equipment	Skid Steer Loaders	0.0010	76	45
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.0009	48	63
Lawn and Garden Equipment	Snowblowers	0.0003	467	3
Commercial Equipment	Generator Sets	0.0003	219	12
Construction and Mining Equipment	Concrete/Industrial Saws	0.0003	11	34
Construction and Mining Equipment	Rubber Tire Loaders	0.0002	20	42
Commercial Equipment	Pumps	0.0002	56	20
Commercial Equipment	Welders	0.0001	19	44
Construction and Mining Equipment	Rough Terrain Forklifts	0.0001	16	37
Logging Equipment	Shredders > 6 HP	0.0001	1,056	4
Recreational Equipment	Specialty Vehicles/Carts	0.0001	114	5
Construction and Mining Equipment	Tampers/Rammers	0.0001	16	9
Construction and Mining Equipment	Bore/Drill Rigs	0.0001	16	13
Construction and Mining Equipment	Crawler Tractor/Dozers	0.0001	14	52
Industrial Equipment	Forklifts	0.0001	11	134
Construction and Mining Equipment	Rollers	0.0001	12	42
Construction and Mining Equipment	Trenchers	0.0000	11	30
Commercial Equipment	Air Compressors	0.0000	12	51
Construction and Mining Equipment	Other Construction Equipment	0.0000	2	33
	All Other Equipment	0.0003		
TOTAL		0.01		

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4. AREA SOURCES

Area sources are small sources that individually emit a small quantity of emissions, but collectively can have a significant impact on regional air quality. The quantifiable area sources present in the Mendenhall Valley area that are integrated into this analysis include combustion sources generally used for heating and cooking, residential wood burning, fuel oil, propane, coal, and natural gas combustion, and structural fires.

Emissions from these sources are primarily based on activity estimates obtained from local agencies and/or fuel distributors. In cases where we were not able to procure current activity information for this analysis, it was necessary to extrapolate emission estimates from one community to another via human population, or to adjust past activity estimates from the four reports discussed in earlier sections[*] according to 2004 and 2018 population estimates.

The following is a description of the methodology used to calculate emissions from each area source.

4.1 Residential Fuel Use

Over the years, DEC has conducted several surveys of residential wood burning in the Mendenhall Valley. Past surveys, conducted in 1981, 1985, and 1993, however, did not address other sources of home heating. Recognizing that wood burning practices have shifted over the past decade, DEC commissioned a broader survey of home heating practices in the spring of 1994 to (a) update estimates of wood use, (b) document the influx of direct vent fuel oil stoves, and (c) quantify their combined impact on home heating emission estimates. A total of 435 homes participated in the survey, which represents almost 10% of the households located in the nonattainment area. Key findings from that effort[†] include the following:

- Initiatives (e.g., burn bans, public education, new stove certification requirements, etc.) implemented under the Juneau wood smoke control program were effectively implemented;

[*] The "1995-2001 Fairbanks CO Inventory," the "1999 Air Toxics Emission Inventory," the "2000 Anchorage CO Inventory," and the "2002 Criteria Pollutant Emissions Inventory."

[†] Memorandum to Alice Edwards, ADEC from Bob Dulla, Sierra Research, "Results of Juneau Home Heating Survey and Related PM_{10} Emission Estimates, July 19, 2004.

- Wood use per household dropped from 1.8 cords per heating season in 1993 to 1.1 cords in 2004;

- There is widespread use of direct vent-type fuel oil heaters, which were not addressed in previous surveys and had little market penetration in 1993; and

- Between 1993 and 2004, there were significant reductions in the AP-42 emission factors for both fuel oil and wood burning.

Collectively, these changes were estimated to reduce annual PM_{10} emissions from residential heating (for all fuels) by almost 85% from 152.0 tons/year in 1993 to 23.2 tons/year in 2004. The emission estimates produced in that effort, however, need to be revised to address the issues discussed below.

Differences in Seasonal Definitions – The survey collected data for the winter heating season, which was defined to last from October through May (a total of 243 days) and for the year. The seasonal definitions employed in this analysis are winter (October – March or 182 days) and summer (April – September or 183 days). The approach used to modify the survey data to match the seasonal definitions employed in this analysis was to proportion the 243-day winter survey data to the 182-day winter season on the basis of heating degree-days.[*] A summary of the degree-days and related proportions is presented in Table 4-1. It shows that on the basis of degree-days, the winter accounts for 71.8% of fuel use and the summer for 28.2%. It also shows that the October through March period accounts for 85% of the degree-days recorded during the October through May period addressed in the survey.

Table 4-1
Summary of Heating Degree Days for Juneau, Alaska
(April 2004 – March 2005)

Period	Degree Days	% of Year	% of Oct – May
April 2004 – Sept. 2004	2,229	28.2	-
Oct. 2004 – March 2005	5,680	71.8	85.0
April 2004 – March 2005	7,909	100.0	-
Oct. 2004 – May 2005	6,684	84.5	100.0

The survey collected data on the number of cords of wood, the number of 40-lb bags of wood pellets, and the gallons of distillate used in home heating for three different periods of time: winter, summer, and annual. Many respondents reported having multiple types of heaters. In some cases, it was easier for them to provide seasonal information and in others it was annual information. The challenge is correctly allocating the reported fuel use to the seasons being addressed in this analysis.

[*] Data on heating degree days for different periods of time are available at *http://www.wunderground.com/history/airport/PAJN/2004/10/1/CustomHistory.html*

Table 4-2 documents how the degree-day data were used to allocate the seasonal and annual fuel use data into two seasons:

- Winter – October – March, and
- Summer – April – September.

Table 4-2
Allocation of Survey Fuel Use to Summer & Winter Seasons
(fuel use by participating households)

Survey		Winter		Summer	
Season	Fuel Use	Adjustment	Fuel Used	Adjustment	Fuel Used
Wood (cords)					
Oct. – May	133	0.85	113.05	0.15	19.95
June – Sept.	19	-	-	1.00	19.00
Annual	1	0.72	0.72	0.28	0.28
Total	-	-	113.77	-	39.23
Fuel Use/Household		127 homes	0.90	127 homes	0.31
Pellets (40 lb bags)					
Oct. – May	1,291	0.85	1,097	0.15	194
June – Sept.	181	-	-	1.00	181
Annual	0	-	-	-	-
Total	-	-	1,097	-	375
Fuel Use/Household		22 homes	49.86	22 homes	17.05
Fuel Oil (gallons)					
Oct. – May	148,891	0.85	126,557	0.15	22,334
June – Sept.	51,944	-	-	1.00	51,944
Annual	35,403	0.72	25,420	0.28	9,984
Total	-	-	151,977	-	84,261
Fuel Use/Household		390 homes	389.68	390 homes	224.96

The winter survey data, which covers October – May, were adjusted by 85% to compute the amount of fuel used during the period of October – March. The remaining 15%, which covers April and May, was allocated to the summer season. Summer survey data, which covers the period of June – September, was fully allocated (100%) to the summer season. The annual survey data were allocated on the basis of winter (71.8%) and summer (28.2%) heating degree-day splits recorded over a 12-month period. The computed seasonal fuel-use values were then divided by the number of homes that reported wood, pellet, and fuel oil use in the survey to estimate fuel use per household.

A total of 435 homes participated in the overall survey. The proportion of homes reporting each fuel use was used to extrapolate the results of the survey to the overall population of homes in the Valley.

More Recent Demographic Data – At the time the survey was conducted, the most recent population estimates available for Juneau were for 2001, and a review of the growth rate suggested that there would be little growth between 2001 and 2004. Therefore, no adjustment was applied to account for the growth between 2001 and 2004. More recent demographic data have become available for Juneau and were used to prepare an updated estimate of the number of households in the nonattainment area in 2004 and a projection for 2018. A description of how those estimates were developed is presented in Appendix B. The 2001 estimate of households employed in the survey was 4,608. The number of households is projected to increase to 4,888 in 2003 and 5,331 in 2018.

Presented below is a brief summary of the approach used to compute home heating emissions using the fuel use and population data described above. A detailed listing of the calculations is presented in Appendix E.

Wood-Use Heating - The survey collected data on wood use by home and the types of wood burning devices in the home (e.g., pellet stoves, wood stoves, conventional fireplaces, modified fireplaces, etc.). Because wood use was reported on a per-household and not a per wood burning unit basis, and many households reported a mixture of wood burning devices, a method had to be developed to allocate wood use by type of wood burning device (i.e., those with different emission factors). This was accomplished by first determining the total number of wood heaters and then determining number of homes equipped with one or more non-pellet type wood heaters (i.e., getting rid of the overlap caused by homes having multiple heaters). The distribution of the total number of these heaters (which summed to 169) was normalized to the number of homes equipped with one or more heaters (which summed to 127), as shown in Tables 1 and 2 in Appendix E.[*] Total wood use was then distributed to the survey domain based on these percentages, and total emissions were calculated for the 435 households that participated in the survey using the appropriate AP-42 emission factors. The results were then extrapolated to represent emissions for the entire Valley. Because no detailed information regarding pellet stove technology was included in the survey, no similar distribution of pellet use by stove type was necessary.

The tables presented in Appendix E show the details of the calculations used to prepare wood burning emission estimates on both an annual and a winter seasonal basis. The general calculation method for residential wood combustion emissions has been used in a number of emissions inventories over the past few years, most recently for the 2003 Fairbanks Carbon Monoxide Maintenance Plan. The methodology is as follows:

(Cords of wood burned/day) x [EF (lbs CO/cord burned)] x (% homes w/ wood stoves)

[*] Of the 127 survey households, that reported the use of at least one type of wood stove or fireplace, 104 used only one unit and 23 used two units.

EPA's AP-42 contains emission factors for several specific types of wood-burning appliances. For example, AP-42[*] lists emission factors for conventional, noncatalytic, and catalytic type wood stoves. However, the 2004 survey includes information only for the more general "woodstove" category. In the absence of more detailed information regarding the mix of technology present in the Valley woodstoves, the general AP-42 woodstove emission factor (30.6 pounds/ton of wood burned) was used to calculate emissions for all Mendenhall Valley woodstoves, as shown in the tables in Appendix E.

Fireplaces are the other major source of PM_{10} emissions from wood combustion used in home heating. Although the 2004 survey contains information on both conventional and modified fireplaces, the most current available emission factor (23.6 pounds/ton of wood burned) is only for the more general "fireplace" category. This emission factor was included in a paper presented at EPA's 10th Annual Emissions Inventory Conference in May 2001.[†] The results documented in that paper show PM_{10} (and CO) emission factors for wood-burning fireplaces, which are significantly lower than those found in the most current AP-42 publication. (The study documented in this paper examined over a dozen more recent data sources for wood-burning fireplaces than contained in AP-42. PM_{10} emission factors were compiled from a database of 388 tests conducted on 112 fireplace models, which exceeds the number of tests and models on which the AP-42 factors are based.) In the absence of more detailed information, this fireplace emission factor was used to calculate emissions for all fireplace categories included in the 2004 survey, as well as those for the catch-all "any other wood device" survey category.

Both the woodstove and fireplace emission factors are given in units of pounds of PM_{10} produced per ton of wood burned. These were converted to units of pounds of PM_{10} per cord of wood burned by applying an assumed wood density of 30 pounds per cord, and a cord volume area of 80 cubic feet per cord. Both of these conversion factors were used in the 1988 PM_{10} Emission Inventory, and are the same as, or substantially similar to, conversion factors used in other recent ADEC reports. These converted emission factors were then applied to the total cords of wood used in the Valley, to give total PM_{10} emissions from wood burning sources. The actual conversions, and the overall emission calculations, are documented in Appendix E. A summary of the seasonal emissions in 2004 and 2018 is presented in Tables 4-3 and 4-4.

Emission factors for pellet stoves did not require any conversion, as total usage was given in pounds, which was then multiplied directly with AP-42 emission factors for pellet stoves, given in units of pounds of PM_{10} produced per ton of pellets burned. Specific seasonal and annual calculations are shown in Appendix E.

Fuel Oil Heating - In calculating emissions from Fuel Oil Combustion, AP-42 emission factors were again applied to seasonal and annual fuel-use totals collected in the recent survey. Because not all survey respondents provided fuel-use data, average fuel use by season was assumed to apply to the 390 fuel oil users recorded in the survey. These values were apportioned to Toyo/Monitor-type stoves and central oil furnaces according

[*] Compilation of Air Pollutant Emission Factors, Volume I, Fifth Edition, Chapter 1.09, October 1996.
[†] J. E. Houck, J. Crouch and R. H. Huntley, "Review of Wood Heater and Fireplace Emission Factors," proceedings from U.S. Environmental Protection Agency's 10th Annual Emissions Inventory Conference, May 2001.

Table 4-3 PM_{10} Emission Estimates for Residential Heating Mendenhall Valley in 2004					
Fuel Type	Homes Equipped	Cords per Household	40 # bags per Household	Gallons per Household	Emissions (tons)
Winter					
Wood	1,427	0.90	-	-	16.60
Pellet	247	-	49.86	-	1.09
Oil	4,382	-	-	389.68	0.34
				Total	18.02
Summer					
Wood	1,427	0.31	-	-	5.72
Pellet	247	-	17.05	-	0.37
Oil	4,328	-	-	224.96	0.19
				Total	6.28
				Annual	24.30

Table 4-4 PM_{10} Emission Estimates for Residential Heating Mendenhall Valley in 2018					
Fuel Type	Homes Equipped	Cords per Household	40 # bags per Household	Gallons per Household	Emissions (tons)
Winter					
Wood	1,556	0.90	-	-	18.11
Pellet	270	-	49.86	-	1.18
Oil	4,780	-	-	389.68	0.37
				Total	19.66
Summer					
Wood	1,556	0.31	-	-	6.24
Pellet	270	-	17.05	-	0.40
Oil	4,780	-	-	224.96	0.21
				Total	6.85
				Annual	26.51

to the percentage of households that reported the use of each, normalized to account for households that operate more than one unit (using the same method described for the cord wood heaters).[*] Total emissions for the survey domain were then calculated, and the result was then adjusted to represent the Mendenhall Valley using the ratio of surveyed households vs. Valley households.

[*] Of the 390 survey households (90%) that reported use of either a fuel oil or kerosene heating source, 55 said they use more than one type.

Contrary to emission factors for wood burning sources, individual emission factors for each type of fuel oil heater are not available. Therefore, a single emission factor, which was suitable for all residential fuel oil furnaces (from EPA's AP-42, 0.4 pounds of PM_{10} per 1000 gallons of fuel burned), was used in both calculations. The results are shown in Appendix E and displayed in Tables 4-3 and 4-4.

Used Oil Combustion – Although we do not believe there is a significant amount of used oil combustion in Juneau, and were not able to procure any used oil throughput totals, it is likely that it is used for heating in some automotive repair shops, and other similar facilities where it is easily accessible. Therefore, following the methodology used in the 1999 Criteria Pollutant Inventory and 1999 Air Toxics report, national used oil consumption (not to be confused with *waste* oil, which is officially designated as hazardous waste and whose combustion is illegal in the state of Alaska) was allocated to Juneau based on population data. The total U.S. consumption for 1983 (590,000,000 gallons) was prorated to 2004 and 2018 Juneau levels (78,222 and 85,312 gallons, respectively) based on U.S. Census population data, and our projected 2018 population estimate for the Mendenhall Valley. PM_{10} emissions were then calculated by applying AP-42 emission factors (Table 1.3-1) to these activity totals. All used oil combustion was assumed to occur during the winter months.

Propane – In calculating emissions from Propane Combustion, AP-42 emission factors were again applied to monthly fuel use totals provided by local Juneau fuel distributors. The Juneau totals were apportioned to the Mendenhall Valley via human population. The surprisingly constant annual usage totals for propane indicate that this fuel is used more for cooking and waterheaters than for home heating, a theory that the Mendenhall Valley Survey seems to support.

Natural Gas – Juneau does not use natural gas as a heating source because the landlocked geography makes its distribution impractical.

Coal –According to ADEC staff, coal is not used as a heating source in Juneau.

4.2 Other Area Sources

Asphalt Plants – The only asphalt plant in the Mendenhall Valley is the AEDCO Asphalt Plant, which is classified as a point source as discussed in Section 5 of this analysis.

Asphalt Paving – All particulate emissions from asphalt paving are in the form of condensable hydrocarbons (i.e., TOG or VOC emission factors), as shown in AP-42 section 4.5 for Asphalt Paving Operations. These emissions are included in VOC or TOG emission inventories, and should not be double-counted in particulate emission inventories. Therefore, there are no PM_{10} emissions associated with asphalt paving.

Wildfires – There were no wildfires in the Mendenhall Valley in either 2002—as confirmed by the Western Regional Air Partnership's (WRAP) recently completed 2002 air emission inventory for fire—or in 2004. Therefore, there are zero emissions from this

source in 2004. As wildfires are relatively rare in the Mendenhall Valley region, we are assuming that this will be the case as well in 2018.

Open Burning (Firefighter Training) – Local ADEC staff in Anchorage provided activity data for this emission source, which is assumed proportional to the activity in the Mendenhall Valley. In Anchorage, firefighter training was estimated to occur 28 times per year and to utilize 200 gallons of fuel per exercise, for a total of 5,600 total gallons burned during the summer months. This total was extrapolated to the Mendenhall Valley based on human population.

All fuel burned was assumed to be diesel. In the absence of any more accurate emission factors, the methodology used in the 1999 Air Toxics report was used to calculate emissions from this source; AP-42 emission factors for residential furnaces (Table 1.3-2) were applied to the activity data discussed above

Structural Fires – The total number of incidences for structural fires in 2004 was obtained from the Juneau Fire Marshal.[8] Only a borough-wide total of 27 structural fires in 2004 was available; however, the Fire Marshal estimated that 70% of these fires occurred in the Mendenhall Valley and that about 65% of the fires occurred in the wintertime and 35% occurred during the summer. Lacking projected estimates, the incidence level was assumed to be the same for calendar year 2018. Emission factors developed by the California Air Resources Board[*] (CARB) were applied to this activity estimate to generate the emission totals shown in Table 4-11.

Burn Barrels – Burn barrels are used in the Mendenhall Valley to supplement trash pick-up during the summer (use of burn barrels is prohibited during the winter). However, no data on the frequency and degree of use of burn barrels have been collected for the Juneau area. In order to estimate the potential emissions from these sources, a sensitivity analysis was performed. The analysis used an estimate of 2,137 lbs of refuse generated per household in a year, which was derived from estimates developed for California by CARB,[9] and assumed that 10% to 25% of the refuse is burned while the rest is picked up. The estimated PM_{10} emissions from burn barrels are shown in Table 4-5. As shown, burn barrels contribute 0.5% of the total PM_{10} area source emissions in the Valley at the 10% burning level estimate and about 1.2% of the total area source PM_{10} emissions at the 25% burning level estimate. Since the PM_{10} contribution from burn barrels becomes significant at the higher percentages of refuse burned, a survey effort should be undertaken to estimate the actual contribution from these sources in the Valley. As a conservative assumption, emissions from burning 25% of the total refuse generated were used in the area source emission summaries in Table 4-11 and in the Executive Summary.

Gasoline Distribution – This area source category is a source of VOC emissions only, and therefore is not included in this effort.

Surface Coatings – This area source category is a source of VOC emissions only, and therefore is not included in this effort.

[*] "Area Source Methodologies Manual," California Air Resources Board, March 1999.

Table 4-5 PM_{10} Emissions from Burn Barrels in the Mendenhall Valley (tons/day)				
Source	Summer 2004		Summer 2018	
	10% Burned	25% Burned	10% Burned	25% Burned
Burn Barrels	0.023	0.057	0.025	0.062
Total Area Sources	4.598	4.598	4.809	4.809
Burn Barrels as % of Total	0.5%	1.2%	0.5%	1.3%

4.3 Fugitive Dust

Paved and Unpaved Roads

Emissions of PM_{10} in the form of fugitive dust from paved and unpaved roads were developed for the Mendenhall Valley nonattainment area. The equations used for estimating both paved and unpaved road emissions on a per-VMT basis were derived from current procedures in the U.S. Environmental Protection Agency's (EPA's) AP-42 report.[10] Calendar year 2004 roadway miles of unpaved roads, along with the associated vehicle miles traveled (VMT), were estimated from local data and discussions with state and local agency staff. Paved roadway VMT was estimated by subtracting the unpaved road VMT from the total VMT for all roads. For calendar year 2018, VMT were estimated from the 2004 levels using projected population growth data for the Mendenhall Valley. It was conservatively assumed that the percentage of total VMT on unpaved roads (0.33%) remained the same in 2018 as in 2004. A discussion of the procedures, data sources, and inventory results follows.

Estimating Roadway Particulate Emissions - EPA's AP-42 is the agency's compilation of emission factors and procedures for estimating emissions from a variety of stationary sources. The methods described in the report for estimating fugitive dust emissions from unpaved and paved roads are summarized below.

Unpaved Roads – The equation in AP-42 for estimating particulate emissions from "dry" (no precipitation), unpaved publicly accessible roads dominated by light-duty vehicles is given as Equation 1 below:

Eqn. 1

$$E = \frac{k(s/12)(S/30)^{0.5}}{(M/0.5)^{0.2}} - C$$

where: E is the dry emission factor in lb/VMT;
k is a particle size empirical constant (1.8 for PM_{10}, 0.27 for $PM_{2.5}$);
s is the surface material % silt content;
M is the surface soil % moisture content;
S is the mean vehicle speed in miles per hour (mph); and

C is the 1980's motor vehicle particulate emission factor in lb/VMT (0.00047 for PM_{10}, 0.00036 for $PM_{2.5}$).*

Juneau- or Alaska-specific factors were used in Equation 1 as much as possible for estimating unpaved road emissions for the Mendenhall Valley. For the surface material silt content, 15% was used, which was the average from samples collected on unpaved streets in the Mendenhall Valley for a 1988 PM_{10} inventory prepared by Engineering Science for EPA.[5] The soil moisture content used in this analysis was 1.1%—the average found for measured unpaved roads in Region 10.[11] Based on discussions with the City and Borough of Juneau, the mean vehicle speed on unpaved roadways was estimated at 25 mph.

The fugitive dust emissions estimated using Equation 1 are during the average "dry" conditions of unpaved roads in a given area. That is, the natural mitigating effect of precipitation would need to be considered since any increase in moisture reduces the level of emissions from the roads. In order to account for the natural precipitation that control fugitive dust in the local areas, the dry emission factor E is adjusted using Equation 2 from AP-42

Eqn. 2 $$E_{unpaved} = E\left[(N - p)/N\right]$$

where: $E_{unpaved}$ is the final unpaved roads emission factor adjusted for natural mitigation in lb/VMT;
N is the total number of days in the study period (182 for summer and 183 for winter); and
p is the number of days in the study period with measurable amounts (at least 0.01 inch) of precipitation.

Locality-specific precipitation days for Juneau were derived from the monthly averages available from the Western Regional Climate Center (WRCC).[12] The WRCC keeps records for days per month with measurable precipitation (at least 0.01 inch) and has monthly averages over the last 50 years. The data for Juneau indicate that the area receives measurable precipitation for 117 days during the winter (October to March) and 106 days during the summer (April to September).

Paved Roads – Similar to unpaved roads, fugitive emissions from paved roads take into account road surface properties, traffic conditions and climate for natural mitigation. Equation 3 shows the equation from AP-42, which considers all these factors for estimating paved road emissions:

* The previous versions of the unpaved and paved road emission factor equations in AP-42 included exhaust, brake-wear, and tire-wear emissions from vehicles in the 1980 calendar year fleet. These emissions are now estimated as part of the on-road mobile emissions and have decreased since 1980 due to lower new vehicle emission standards and new fuel specifications. Therefore, this needs to be removed from the AP-42 paved and unpaved road emissions in order to prevent double-counting of emissions.

Eqn. 3

$$E_{paved} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C \right] \left[(4N - p)/4N\right]$$

where: E_{paved} is the final unpaved roads emission factor adjusted for natural mitigation in lb/VMT;
k is a particle size empirical constant (0.016 for PM_{10} and 0.004 for $PM_{2.5}$);
sL is the road surface silt loading in g/m^2;
W is the average weight of vehicle traveling the road in tons;
C is the 1980's motor vehicle particulate emission factor in lb/VMT (0.00047 for PM_{10}, 0.00036 for $PM_{2.5}$);
N is the total number of days in the study period (182 for summer and 183 for winter); and
p is the number of days in the study period with measurable (at least 0.01 inch) precipitation.

Equation 3 is analogous to the combination of Equations 1 and 2 for fugitive dust from unpaved roads. However, Equation 3 includes a factor of "4" in the natural precipitation mitigation effects because paved roads dry quicker than unpaved roads after precipitation events.

No paved road silt loading data are available from the Juneau area. Therefore, the road surface silt loading values for the paved roads in Mendenhall Valley were based on paved road samples collected from different roadway facility types in Anchorage in 1996.[13] The silt loading values used by season are shown in Table 4-6.[*] The average weight of the vehicle traveling on the roads was set to 2.0 tons, which was used for the Mendenhall Valley paved roads in the 1988 Engineering Science report for EPA.[5] The days per season with measurable precipitation were the same ones used for Equation 2.

Table 4-6
Seasonal Paved Roads Silt Loading (g/m^2) by Facility Type

Facility	Winter	Summer
Interstate/Major Arterial	2.6	20.4
Minor Arterial	1.1	6.7
Collector	2.9	9.4
Local Roads	4.7	18.4

[*] The paved road silt loadings used in this analysis are different from those used in a 1988 Engineering Science report prepared for the Mendenhall Valley, which applied national average default values in AP-42. Since the silt loading measurements taken in Anchorage represent at least state-specific measurements, these Anchorage silt loadings were deemed as better estimates for the paved road silt loading in the Mendenhall Valley than the national defaults.

Both the paved and unpaved road emission factors calculated using the AP-42 equations are expressed on a per VMT basis (lb/VMT). Therefore, the VMT for the paved and unpaved roadways in the nonattainment area need to be estimated. The following section describes the traffic data and sources used in estimating the VMT for the paved and unpaved roads in the Mendenhall Valley.

Roadway Activity Estimates and Data Sources - The total daily VMT for a road is calculated as the product of the annual average daily traffic (AADT) and the roadway length in miles (VMT = AADT × Road Length). First, the total daily VMT for all roads in the Valley were estimated. The VMT and associated emissions for the unpaved roads were then estimated using the unpaved road mileage and AADT. Lastly, the VMT for unpaved roads were subtracted from the Valley VMT, and the remaining VMT was used to estimate emissions from the paved roads.

Total Mendenhall Valley Nonattainment Area VMT – The total 2004 VMT estimates by facility were developed for the nonattainment area by extrapolating average daily travel on DOT&PF monitored roadways in the Mendenhall Valley to the rest of the network, and adjusting some 1999 VMT estimates to 2004 levels using yearly population data for the nonattainment area. After this, the 2004 VMT estimates were forecasted to 2018 levels using yearly population data for the area. This results in the 2004 and 2018 annual average total VMT shown in Table 4-7. The detailed development of the total Mendenhall Valley VMT levels is discussed as part of the *On-Road* section of this report. No seasonal data are available to reflect any seasonal variation in VMT; therefore, the average annual daily VMT was used for both the summer and winter seasons as a conservative approach.

Table 4-7
Mendenhall Valley Annual Average VMT/Day by Facility

Facility	2004 VMT	2018 VMT
Major/Principal Arterial	63,278	69,013
Minor Arterial	39,585	43,173
Collector/Intrazonal	58,370	63,661
Local	141,367	154,180
ALL TOTAL	302,599	330,028

Unpaved Roadway VMT – The 2004 pavement data from DOT&PF[14] were used to estimate the miles of unpaved roads in the Valley. In addition, DOT&PF provided data on unpaved roadways that were not included in the 2004 pavement data.[15] DOT&PF indicated that the pavement road data are up-to-date for the DOT&PF-maintained roadways, but that the information on roads maintained by other agencies may be outdated. Consequently, the CBJ was contacted for 2004 unpaved road data for roadways under their management,[7] and the CBJ data were compared with the DOT&PF data to eliminate duplicates and double counting. Because DOT&PF indicated that their

information on roads maintained by other agencies might be outdated, more confidence was given to the CBJ data when conflicting information existed on paving status for some roadways between the DOT&PF and CBJ data sets. From these, 2004 unpaved roadway miles and VMT were estimated.

For VMT and AADT, data within the Mendenhall Valley are limited. Consequently, the only unpaved local road AADT available for Juneau comes from the 1988 PM_{10} emissions inventory prepared for the Mendenhall Valley by Engineering Science.[5] In the report, an AADT of 171 was obtained from counts performed on 12 local streets. This estimate was adjusted to 2004 levels using the Borough population growth between 1988 and 2004. The 1988 population was estimated by Engineering Science in the PM_{10} inventory report, while the 2004 Borough population came from the Alaska Department of Labor and Workforce Development (DLWD).[*] The resulting adjusted AADT applied to all unpaved local roadways in Juneau is 177 vehicles per day. This, combined with the total miles of unpaved roads in the Valley, resulted in a total unpaved road daily VMT of 995 in the Mendenhall Valley nonattainment area. In 2018, the conservative assumptions were made that the same stretch of local unpaved roadways in 2004 remained unpaved and the percentage of total VMT (forecasted to 2018 using population forecasts) on unpaved roads remained the same. This resulted in a total unpaved road daily VMT of 1,085 in 2018 for the nonattainment area.

A summary of the data sources, unpaved roadway miles, and VMT estimated for Mendenhall Valley is shown in Table 4-8. As shown, a total of 5.62 miles of unpaved roadways—all local roads—were found for the Mendenhall Valley for 2004. Of this, about 5.21 miles are gravel or aggregate roads, 0.14 miles are undeveloped dirt roads, and 0.28 miles are overlaid with recycled asphalt pavement (RAP).[†] The same distribution of unpaved surface types was assumed for 2018.

Table 4-8
Mendenhall Valley Unpaved Road VMT and Data Sources

Data Source	Facility Type	2004 Unpaved Roads		2018 Unpaved Roads	
		Miles	VMT	Miles	VMT
DOT&PF	Local	1.15	203	1.15	222
CBJ	Local	4.47	791	4.47	863
ALL TOTAL		5.62	995	5.62	1,085

[*] The 1998 population for just the Mendenhall Valley was not available; therefore, borough-wide population growth was used. The 1988 total borough population was 29,946, and the 2004 population was 30,966.

[†] Recycled asphalt pavement (RAP) is reprocessed pavement materials containing asphalt and aggregates that, when processed properly, consist of high-quality, well-graded aggregates coated by asphalt cement. RAP provides some, but not complete, control on fugitive dust emissions from unpaved roads.

Paved Roadway VMT – The resulting paved roadway VMT for the Mendenhall Valley nonattainment area after the unpaved roadway VMT were subtracted from the total VMT are shown in Table 4-9 by facility.

Table 4-9
2004 and 2018 Mendenhall Valley Paved Road VMT by Facility

Facility	2004 VMT	2018 VMT
Major/Principal Arterial	63,278	69,013
Minor Arterial	39,585	43,173
Collector/Intrazonal	58,370	63,661
Local	140,372	153,096
ALL TOTAL	301,605	328,943

PM_{10} Fugitive Dust Emission Inventories - The emission factors for paved and unpaved roads found using Equations 1 through 3 from AP-42 were combined with the paved and unpaved road VMT estimates to result in the PM_{10} fugitive dust emissions for Mendenhall Valley. The 2004 and 2018 seasonal PM_{10} inventories are shown in Table 4-10. The annual average emission inventories were estimated by weighting the summer and winter emission levels by the number of days in each season as defined by ADEC—183 for the summer and 182 for the winter.

Table 4-10
Seasonal Road Fugitive Dust Emissions in Mendenhall Valley

Calendar Year	Source	PM_{10} (tons/day)		
		Winter	Summer	Annual Avg
2004	Paved Roads	1.48	4.14	2.81
	Unpaved Roads	0.16	0.19	0.18
	TOTAL	1.64	4.33	2.99
2018	Paved Roads	1.61	4.51	3.07
	Unpaved Roads	0.18	0.21	0.19
	TOTAL	1.79	4.72	3.26

Wind Blown Dust

There are two categories of windblown dust included in this inventory: glacial riverbeds and cleared areas, both of which are discussed in detail below.

Glacial River Beds – This category includes sand bars along glacial rivers, which are large enough to generate significant emissions during periods of high winds. In

developing the 1988 PM_{10} emissions inventory, Engineering Science examined aerial photographs of the Mendenhall Valley and concluded that only area where such emissions would occur is at the eastern shore of the Mendenhall Lake near the mouth of Nugget Creek. The sand bars located in that area were estimated to be 41 acres and produce 28.6 tons of PM_{10} per year. To be conservative, the acreage of sand bars was assumed to be unchanged. A review of AP-42 showed that the emission factor calculation methodology is unchanged; therefore, the previous estimates of emissions for this category are unchanged.

Cleared Areas – This category includes open areas where the vegetation has been destroyed and the surface material is susceptible to entrainment by wind. Engineering Science examined aerial photographs and determined that 154 acres of land were open and cleared for the 1988 PM_{10} emissions inventory. Using wind speed data collected from the Juneau Airport and silt loading values estimated from local bulk samples, they estimated this source category to produce a total of 4.4 tons of PM_{10} per year. Lacking any new data on the number of acres, the silt loadings or the wind speed, it has been conservatively assumed (since the amount of cleared land has dropped as development in the Valley has expanded) that the emissions for this source are unchanged.

4.4 PM_{10} Area Source Inventory

Table 4-11 shows the PM_{10} total area source emissions for the Mendenhall Valley Area, by source category, and illustrates the fact that fugitive and windblown dust comprises the majority (approximately 97%) of the average annual PM_{10} emissions in the Mendenhall Valley for both 2004 and 2018. Other source categories that show relatively high totals of PM_{10} emissions include woodstoves/fireplaces and burn barrels.

Table 4-11
2004 and 2018 PM_{10} Area Source Emissions for the Mendenhall Valley Nonattainment Area (tons/day)

	Calendar Year 2004			Calendar Year 2018		
Area Sources	Summer	Winter	Annual	Summer	Winter	Annual
Asphalt Production	N/A	N/A	0.0000	N/A	N/A	0.0000
Asphalt Paving	0.0000	N/A	0.0000	0.0000	N/A	0.0000
Gasoline Distribution	N/A	N/A	0.0000	N/A	N/A	0.0000
Used Oil Combustion	N/A	0.00004	0.00002	N/A	0.00004	0.00002
Fuel Oil Combustion	0.0010	0.0019	0.0014	0.0020	0.0011	0.0016
Surface Coatings	N/A	N/A	0.0000	N/A	N/A	0.0000
Wildfires	0.0000	N/A	0.0000	0.0000	N/A	0.0000
Open Burning (firefighter training)	0.0000003	N/A	0.0000002	0.0000003	N/A	0.0000002
Burn Barrels (refuse burning)	0.0571	0.0000	0.0286	0.0623	0.0000	0.0312
Woodstoves/Fireplaces	0.0333	0.0972	0.0652	0.0363	0.1060	0.0711
Propane Use	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Natural Gas Heating	N/A	N/A	0.0000	N/A	N/A	0.0000
Paved Road Fugitive Dust	4.1353	1.4785	2.8106	4.5102	1.6125	3.0653
Unpaved Road Fugitive Dust	0.1899	0.1612	0.1756	0.2071	0.1758	0.1915
Glacial/Cleared Areas Windblown Dust	0.1808	0.1808	0.1808	0.1808	0.1808	0.1808
Structural Fires	0.0002	0.0005	0.0004	0.0002	0.0005	0.0004
TOTAL	4.598	1.920	3.263	4.999	2.077	3.542

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5. POINT SOURCES

Discussions with ADEC staff confirmed that there is only one permitted source that is located in the Mendenhall Valley nonattainment area—an asphalt batch plant. The terms of the permit authorize the plant to operate continuously (24 hours per day) at a rate of 60 tons per hour for a 5-month period. There are two sources at the facility: a generator and a burner. The generator is rated at 400 hp/hr, and the burner has a maximum fuel rate of 180 gallons/hr. The activity rates, permitted limits, and daily emission rates are summarized in Table 5-1. It should be noted that the daily value is extremely conservative as it is based on the potential of the facility to emit.

Table 5-1
Mendenhall Valley Point Source Summary
Asphalt Batch Plant

Source	Activity Rate	5-Month PM_{10} Emission Limit (tons)	Daily Emissions PM_{10} (tons)
Generator	400 hp/hr	23.10	0.128
Burner	180 gallons/hr	4.86	0.027
Total		27.96	0.155

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Appendix A
Inventory Preparation and Quality Assurance Plan

Inventory Preparation and Quality Assurance Plan
for
Juneau – Mendenhall Valley PM_{10} Emission Inventory

Prepared for:

Alaska Department of Environmental Conservation

June 3, 2005

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INTRODUCTION

Background

The Mendenhall Valley, located nine miles from downtown Juneau, is the largest residential area in the region. Bounded by sharply rising mountains on the east and west and the Mendenhall Glacier to the north, the valley is well sheltered from prevailing winds. This topography, combined with a low winter sun angle that limits solar heating, supports the development of relatively severe temperature inversions. These inversions trap emissions close to the valley floor and in the past led to severe concentrations of airborne particulate matter that exceeded state and federal ambient air quality standards for PM_{10}.

The Mendenhall Valley is currently classified as a moderate PM_{10} nonattainment area. Despite this classification, no exceedances of either the annual or the 24-hour standard have been recorded in more than a decade (based on a review of EPA monitoring data between 1994 and 2004).[1] This is the result of planning and implementation efforts by both DEC and the City and Borough of Juneau (CBJ). Those efforts, documented in a 1993 State Implementation Plan (SIP) submission,[2] identified the following key emission sources:

- Smoke from residential wood combustion (home heating);
- Fugitive dust from travel on unpaved roads; and
- Fugitive dust from travel on paved roads.

To reduce emissions from these sources, the SIP implemented a wood smoke control program and a fugitive dust abatement program. Elements of the wood smoke control program included an aggressive public education program; implementation of a real-time monitoring system linked to episodic controls of wood burning; prohibition of open burning (during winter months); new stove certification requirements; and enforcement of the CBJ woodsmoke ordinance. The fugitive dust abatement program focused on paving unpaved roads in the Valley. Both programs have been successful and led to significant reductions in key emission sources within the Valley. Recent work by Sierra,[3] under contract to ADEC, indicates the introduction of new technology has also had a significant impact on home heating emissions. Collectively, we estimate that the combination of new technology, related shifts in wood use, and implementation of control measures, reduced PM_{10} emissions by 85% from 1993 to 2004. Key contributors to these reductions include the following:

- Initiatives (e.g., burn bans, public education, new stove requirements, etc.) implemented under the Juneau wood smoke control program;
- A drop in wood use per household from 1.8 cords per heating season in 1993 to 1.1 cords in 2004;
- Widespread use of direct vent-type fuel oil heaters; and
- Reductions in emission factors for both fuel oil and wood burning.

Approach

Sierra will follow the source-specific data collection and modeling procedures detailed in the EPA emission inventory guidance document: "PM-10 Emission Inventory Requirements," Final Report, September 1994. As noted above, key emission sources identified in the previous inventory were smoke from residential wood combustion and fugitive dust from both paved and unpaved roads. Given the significance of these sources and the efforts placed on controlling their emissions, it is imperative that new activity information be collected to characterize current emission levels from each of these sources. The home heating survey conducted last year provides detailed insight into the impact of both technology changes and related activity levels on residential heating emissions. No similar survey has been conducted to support an update of fugitive dust from paved and unpaved roads.

In order to prepare an accurate update to these source categories, Sierra intends to collect information on the mileage of paved/unpaved roads in the Valley, and obtain recent traffic counts and related speed estimates. A description of the methodology is presented in the next section. Aside from these activity estimates, another key element of fugitive dust calculations is the silt content of the roads. A review of the last emission inventory prepared for the Valley[4] shows that silt loadings were collected locally to support the preparation of fugitive dust emissions for unpaved roads, and that national average silt loadings were used to estimate on-road levels. Since no controls have been targeted at controlling silt loadings for unpaved roads, Sierra sees no need to update those estimates. However, controls have been targeted at reducing the mileage of unpaved roads and a corollary benefit of these controls should be a reduction of silt loadings (i.e., fugitive dust) on paved roads. For this reason, we intend to collect silt loadings for a representative sample of paved roads (samples will be distributed across both road type and traffic volume) and use the results along with recent traffic counts to support an update of fugitive dust emitted from this source category. A description of the methodology to be used for collecting the silt samples is presented in Appendix X.

Organization

The remainder of this report is organized to address the methods that will be used to compute emissions from the data obtained in the surveys and the quality assurance procedures that will be employed in the development of the emission inventory estimates.

###

EMISSIONS DATA AND METHOLOGY

The development of an emissions inventory can be divided into two primary steps: (1) identifying and collecting the activity data needed to characterize source-specific operations, and (2) selecting and using methodologies to translate the activity measurements into emissions. Presented below is a review of the activity data needed to characterize each of the source categories and the methods that will be used to compute emissions for each source category.

Collection of Activity Data

On-Road Mobile Sources – For on-road mobile sources, this effort will focus on collecting information on vehicle activity data and identifying the miles of roadway in the Valley that remain unpaved. Juneau is not large enough to qualify as a metropolitan planning organization (MPO) and related funds for the development of a travel demand model. As a result, the only option for estimating vehicle miles of travel (VMT) is to obtain local traffic counts and related speed measurements, and to develop a method for extrapolating that information to represent all of the roads in the Valley. In a previous study,[5] Sierra contacted both CBJ and the Alaska Department of Transportation and Public Facilities (ADOT&PF) and obtained counts for information on the Juneau VMT data. Sierra received three data files from ADOT&PF:

- JunroutebyFC.txt - contains the route description, route number, mile points, termination name (end of segment), and functional class (FC). The functional classes are identified as any of these four descriptions: Urban Minor Arterial, Urban Other Principal Arterial, Urban Collector, or Urban Local Road.

- Juneau_vmt99.txt - contains the route number, route name, mile point, feature (landmark), Average Daily Traffic (ADT), length (miles), and the resulting VMT.

- Juneauspeed.prn - contains the route number, route name, beginning mile point, end mile point, length, and posted speed limit. Out of 720 segments, 614 segments have no posted speed limit.

These three data sets were used to prepare estimates of the functional class, VMT, and average speed for each Juneau roadway segment. Sierra plans to contact ADOT&PF to

obtain updates to these files as part of a related NTP. Once that information is available, Sierra will then need to extract information for the roads located within the Valley. This will be accomplished by contacting CBJ and ADOT&PF staff for information on the miles of roadway that are unpaved within the Valley.

Non-Road Mobile Sources – For non-road mobile sources, Sierra has prepared estimates of activity and emissions for Juneau in the previously referenced study. Since little information is available to characterize local activity levels in Juneau, that effort focused on identifying those sources that actually exist and operate within the Valley. Examples of source categories that should be excluded are boats, locomotives, and aircraft.[*] Sierra plans to review each of the non-road source categories to determine if operation should be excluded on a seasonal basis and to determine if any local operating data are available to characterize activity levels.

Area Sources – For area sources, Sierra plans to use the activity and fuel use information collected in last year's home heating survey to quantify residential emissions. Data on the mixture of devices used to heat commercial businesses located within the Valley will be obtained through phone calls. To provide a conservative estimate of windblown dust emissions, the Engineering Science estimate of the acreage of cleared land located within the Valley in 1988 will be held constant.

Data collected from the Western Regional Climate Center (WRCC)[6] indicate that the Juneau area receives measurable precipitation for 117 days during the winter (October to March) and 106 days during the summer (April to September). In light of the extensive rainfall and lack of large scale agriculture within the nonattainment area, no emission estimates will be prepared for agricultural burning, prescribed burning, or wildfires.

Point Sources – Sierra will contact ADEC to obtain information on permits for point sources located within the Valley. Key variables to be obtained include the following:

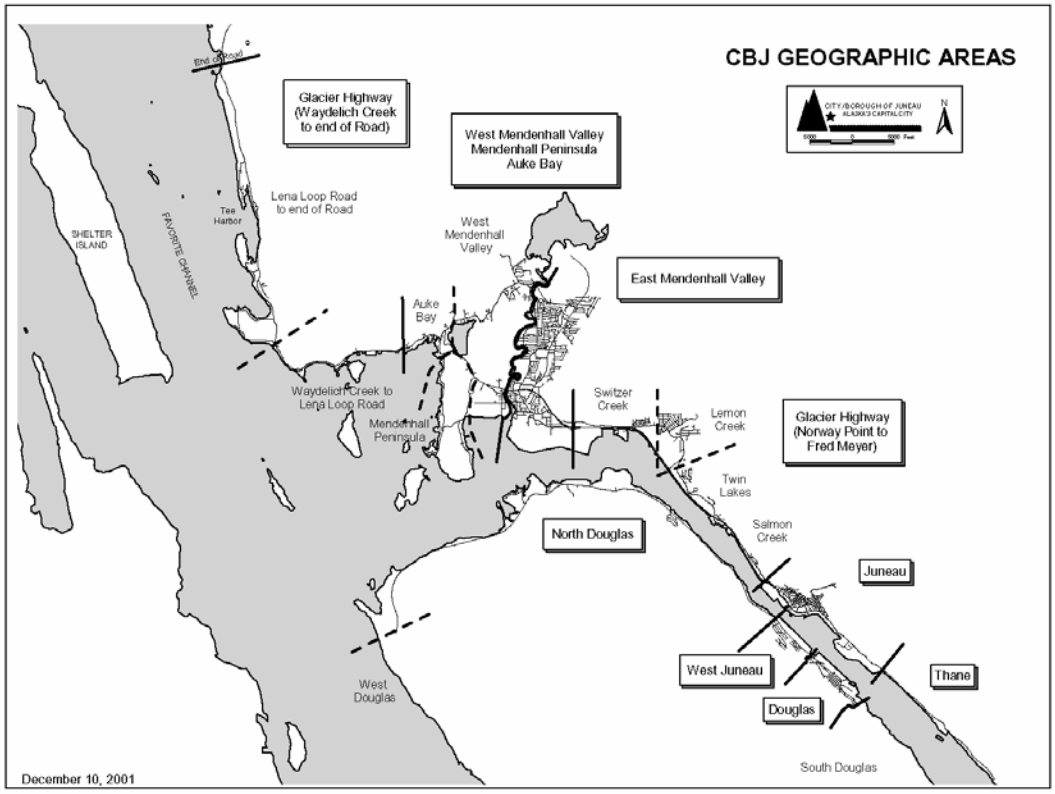
- Maximum allowable emission limit or federally enforceable permit limit;
- Actual or design capacity (whichever is greater) or federally enforceable permit limit; and
- Actual operating factor averaged over most recent two years.

Valley Demographics – In the course of preparing the estimate of Juneau home heating emissions, Sierra found that updating the population statistics to account for the growth that occurred since 1993 is not an easy task. This is because the boundaries of available demographic measurement systems (e.g., census tracts, etc.) do not match those of the Mendenhall Valley. We found that all available population metrics come from systems that bifurcate the Valley. Census Tract 2, for example, covers the eastern portion of the

[*]No water bodies, airports, or railroads are located within the boundaries of the nonattainment area. Therefore, boats and locomotives cannot contribute to the inventory. While an airport and heliport are adjacent to the southern boundary of the nonattainment area, aircraft and helicopter flights skirt the nonattainment area due to noise concerns and do not contribute to the inventory.

Valley. Census Tract 1, however, combines the western portion of the Valley with the Mendenhall Peninsula and Auke Bay. The western portion of the Mendenhall Peninsula and Auke Bay lie beyond the ridge that forms the western boundary of the Valley. No sources of population data could be identified for these areas (i.e., so that the population for the western portion of the Valley could be netted out of the available data). A further complicating factor is that portions of the south end of the Valley (i.e., the area surrounding the airport) were also excluded from the formal boundaries of the nonattainment area. No population data for this area could be identified either. A map of CBJ geographic areas presented in Figure 1 illustrates the problem.

Figure 1



In light of the inconsistency between Valley boundaries and demographic boundaries, we determined that the best method to update the population and dwelling estimates for the Valley was to assume that the growth experienced in the Valley was proportional to the growth experienced throughout the whole CBJ area. Borough-wide population statistics were obtained from the CBJ. Growth between 1988* and 2001 (the year most recently

* The emission inventory values reported in the 1993 SIP were the values produced in a 1988 report prepared by Engineering Science entitled "PM_{10} Emission Inventories for the Mendenhall Valley and Eagle River Areas." Emission calculations in that effort were based on 4,465 residential dwellings.

available) was determined to be 3.2%. This value was applied to the base estimates reported in the 1993 SIP. The resulting estimate of 4,608 dwellings was used to extrapolate the results of the survey to the rest of the Valley. Sierra plans to review the accuracy of these assumptions with CBJ staff to confirm their reasonableness for (a) estimating base year population levels in 2004 and (b) identifying appropriate growth indices for forecasting population levels in 2018.

Emission Calculation Methodologies

Annual and seasonal PM_{10} emissions will be computed on the basis of the activity data developed in Task 2 and emission factors derived from EPA's AP-42.[7] Emissions will be computed on an annual basis and on a 24-hour basis for average summer and winter days as requested in the RFP.

The method to be used to compute on-road emissions will distinguish between fugitive and vehicle exhaust, tire, and brake wear emissions. Since unpaved road characteristics have not changed since development of the 1993 PM_{10} attainment plan, the silt loadings published in the 1988 Engineering Science emission inventory and relied upon in the 1993 plan will be used to compute emissions for this source category. Estimates of the miles of unpaved roads and traffic levels will be updated with information obtained through contacts with relevant state and local agencies.

The fugitive dust source category in which substantial change has occurred, with respect to emission factor strength since 1993, is paved road travel. With the paving of a significant fraction of unpaved roads in the study region since 1993, the track-on of soil onto paved roads has declined substantially. Since the unpaved roads were the sources of much of the track-on material, the paving of these roads has resulted in the reduction of surface silt loadings during non-sanding periods to levels similar to those of average urban streets as reported in AP-42. Therefore, we will use average urban silt loadings in computing paved road emission factors for paved road travel, except during the road-sanding season. These values will be updated once the results of the silt survey become available.

Information on road sanding operations will be collected as a subtask under Task 2. Changes in abrasive composition, size distribution, and application rate will be identified through interviews of road maintenance agencies. Based on this information, adjustments to the silt loadings used in the 1993 emission inventory will be made and new emission factors for paved road travel during the road-sanding season will be developed.

Estimates of exhaust, tire, and brake wear emissions will be computed using MOBILE6.2. To develop these estimates, MOBILE6 will be configured to represent Juneau using average summer and winter temperature values, VMT by speed (using data collected in Task 2), Juneau-specific vehicle registration data, and VMT mix computed for Juneau. Available mileage accumulation rates (e.g., Anchorage, Fairbanks, national

default, etc.) will be reviewed to determine the data source that most appropriately represents Juneau since the local data needed to characterize this profile is not currently available. The development of the Juneau profile will be prepared under a related NTP.

Area Source Emissions – Area source emissions will be computed for residential and commercial facilities located within the Valley. Sierra plans to use the results of last year's home heating survey and related emission calculations to quantify residential heating emissions in 2004. That effort prepared separate emission estimates for wood-use and fuel-oil heating. If the demographic information obtained in Task 2 revises the number of homes located in the Valley in 2004, the previous estimates will be adjusted to account for those revisions. The emission factors employed in that residential analysis will be combined with the number of commercial facilities and related fuel-use estimates to estimate commercial heating emissions.

Windblown dust emissions will be calculated using the emission factor methodology used by Engineering Science in the 1988 emission inventory report. The emission factor methodology relies on the current emission model described in AP-42, which will be configured using the soil particle size distribution data published in the 1988 emission inventory report.

Non-Road Emissions – Non-road emissions will be computed using EPA's NONROAD model. It calculates tons of emissions for a geographical area using the following factors:

- Equipment population;
- An equipment-specific emission factor (in grams per horsepower-hour);
- The average horsepower rating of the equipment;
- The estimated annual equipment activity factor (hours per year); and
- The average load factor for the engine.

In addition, seasonal (month or season) and day or week (i.e., weekday versus weekend) adjustments are applied depending on the requirements of the analysis. The equipment populations are based on national averages, and then scaled down to represent smaller geographic areas on the basis of human population and proximity to recreational, industrial, and commercial facilities.

Sierra is well aware that many of the national average default values employed in the NONROAD model do not well represent activity levels in Juneau (or Alaska). However, the development of location-specific information can be expensive and non-road equipment represents a relatively small portion of the Juneau PM_{10} inventory. For this reason, Sierra plans to focus on model assumptions about the equipment categories that are operating in Juneau during the summer and the winter based on data collected in Task 2 and making adjustments to assumed activity levels based on available Alaska- or Juneau-specific data.

Point Source Emissions – Point source emissions will be derived from permits obtained from ADEC for any sources that are currently operating within the Valley. If any sources are operating in the Valley, one issue that will need to be addressed is whether rule effectiveness has been applied to the emission calculations.

Demographic forecasts obtained in Task 2 will be used to support the extrapolation of activity levels from 2004 to 2018. Emission factors used to project emissions in 2018 will be updated from 2004 where information on the benefits of new control measures is available (e.g., MOBILE6).

###

QUALITY ASSURANCE PLAN

This section presents a review of the QA procedures to be employed during the development of the Mendenhall Valley PM_{10} emission inventory. It includes all of the critical elements recommended in the U.S. EPA document *Guidance for the Preparation of Quality Assurance Plans for Ozone/Carbon Monoxide State Implementation Plan Emission Inventories*,[8] as well as guidance provided through the Emission Inventory Improvement Program (EIIP).[9] It also provides written instructions for the technical and quality aspects associated with development of the new emission inventories. It is designed so that QA/QC procedures are implemented throughout the entire inventory development process. This will ensure that the inventory is as complete, accurate, comparable, and representative as possible.

Inventory tasks and QC procedures will include data checking by the inventory development team (IDT) throughout the development of the inventory and final emission report. These procedures include, but are not limited to, the following:

- The development and implementation of written procedures for data collection, data assessment, data handling, calculation of emissions, and reporting;
- Adequate management and supervision of the work;
- Review of all calculations for technical soundness and accuracy, including verification that the appropriate emission factors were used and the impacts of controls were correctly addressed;
- Correct assignment of Source Category Codes;
- Assignment of DARS scores;
- Use of technically sound approaches when developing results based on engineering judgment;
- Documentation of the data in a manner that will allow reconstruction of all inventory development activities; and
- Maintenance of an orderly master file of all the data gathered and a copy-ready version of the final inventory submitted to the Project Manager.

The emission inventories developed in accordance with this plan are for SIP development and are considered Level II, based on guidance provided by the 1996 EIIP. The estimates contained in the inventories will be used to make decisions about the need for and types of control strategies required to ensure attainment with the ambient PM_{10} standards. As a result, they must satisfy applicable quality assurance (QA) requirements.

The first step in this process is establishing the data quality objectives (DQO) for the new inventories. Table 1 summarizes of the procedures to be employed in meeting the DQOs. It shows that considerable effort will be focused on meeting accuracy, completeness, representativeness, and comparability objectives. Table 2 shows the data quality indicators (DQIs) that will be used to measure progress towards the DQOs. The Data Attribute Rating System (DARS)[10] will be used to verify the desired inventory accuracy.

Table 1
Data Quality Objectives

DQO	Procedure for Achieving Objective
Accuracy	For point and onroad mobile sources, the data generator will check 100% of the calculations, and another equally qualified inventory development team member will check 20% of the calculations. For area and nonroad mobile sources, the data generator will check 100% of the calculations, and another equally qualified IDT member will check 10% of the calculations. In all cases, the data validator will develop a written summary of his or her activities, and will conduct follow-up activities to ensure that data are corrected as needed. If more than 5% of the calculations checked by the data validator need to be revised, then 100% of the calculations will be checked.
Completeness	Extensive planning will be conducted prior to data collection to identify all applicable emission sources. After identifying these sources, the goal will be to determine 100% of the emissions from the largest emitting sources from each source category and as many of the minor sources as possible within the time frame allotted for the work. Those sources identified but not included in the inventory will be identified in the data file and final report.
Representativeness	Technical personnel will review all of the primary source data AND compare them to previous emission results and similar results from comparable regions to determine the reasonableness of the emissions estimates and representativeness of the data.
Comparability	To ensure that the data are comparable, standard procedures will be followed and results will be presented in the same units that were used in previous criteria and toxic pollutant inventories.

Table 2 Data Quality Indicators	
DQO	**Inventory DQI Target Values**
Accuracy	Achieve DARS score >= 0.7 for all area sources contributing >10% of total emissions of CO Achieve DARS score >=0.8 for all point sources >=70 tons per year (TPY). Achieve DARS score >=0.7 for onroad mobile source inventory. Achieve DARS score <=0.5 for nonroad mobile source inventory.
Completeness	100% of all point sources >= 70 tpy. 90% of all other point sources
Comparability	Results to be compared to the previous Mendenhall Valley inventory.

Managerial Responsibilities

Sierra will lead the preparation of the community emission inventories. Key assignments shall include those outlined below.

Source Inventory Development Managers – The source inventory development managers are responsible for planning and leading source-specific inventory development activities.

QA/QC Coordinator – The QA/QC Coordinator is responsible for ensuring that adequate QA/QC procedures are incorporated into the inventory development process. The QA Coordinator's responsibilities and activities are as follows:

- Help develop the QAP;
- Provide QA training to inventory development and QA personnel;
- Attend inventory status meetings;
- Follow up on recommendation for corrective actions;
- Keep the Inventory Development Manager informed of actions;
- Work with the Project Manager to resolve any quality concerns that cannot be resolved at the inventory management level; and
- Maintain a file of findings and corresponding corrective actions.

The QA Coordinator reports directly to Sierra's Project Manager overseeing the development of the inventory. These reporting lines help provide an objective approach to the implementation of the QA program and reporting of quality issues.

Schedule

Data collection activities are to be completed by early June. Emission inventory estimates will be completed and documented by the end of June.

General QA/QC Procedures

QA/QC procedures described in this QAP were developed to help ensure data accuracy, completeness, representativeness, and comparability. These procedures have been incorporated in the technical procedures, where applicable, and will be implemented by the IDT throughout the planning, data collection, emission estimation, and reporting phases of the inventory development program.

QC procedures will be implemented by the IDT during inventory development to meet the technical objectives and DQOs. These activities will be conducted at the following steps in the inventory development process:

- Data collection;
- Data documentation;
- Calculation of emissions;
- Data checking and DARS scoring;
- Reporting; and
- Maintenance of the master file.

Data collection will be conducted according to U.S. EPA-approved procedures. The approach and supporting documents or references will be thoroughly documented and included in the emissions report.

All activities conducted by the IDT will be documented. The traditional approach is to use bound notebooks with indices to facilitate the retrieval of recorded information. An alternate approach is to record activities electronically and make this information available to team members located in different parts of the state. To enhance communication and productivity, team members will be allowed to employ either approach but will be encouraged to track information relative to the development of the inventory electronically. This daily log of activities will help another IDT member reproduce the emission results and allow an evaluation of data accuracy and completeness.

The following procedures are to be followed when documenting data in the notebooks:

- Data will be recorded legibly and in black ink;

- Entries will be corrected by drawing a single line through the data and writing the correct data above or below the correction (with initials, date, and explanation of corrections to allow reconstruction of the work);

- Complete descriptions of all data sources will be included (references to be included in final inventory report);

- Units of measurements will provided for emission sources that are omitted from the final inventory (justification required in report);

- The procedures used to calculate emissions will be described and example calculations will be provided;

- The approach used to determine completeness for each source type will be described;

- Documents from which emission factors are taken will be identified and referenced; and

- The source, agency, group, or company providing information by telephone will be identified (include telephone number and date information was provided).

Worksheets and contact reports may also be used to maintain records of data sources or calculations; however, the same guidelines must be followed when recording information on them. A file will be developed specifically for these forms to ensure that they are retained and are easily located when the data are needed to calculate emissions. A contact report should include the date of contact; originator name, title, organization, and address of person contacted; and a summary. All worksheets, electronic spreadsheets, and notebooks will be reviewed periodically by the inventory development task leaders to determine whether the procedures described above are being followed. This review should be evidenced by a dated signature on the notebook pages or worksheets reviewed (i.e., reviewed by _____ on _____).

Data used in calculation emissions should be checked for data accuracy, reasonableness, and completeness. The results from data checking will be documented to further qualify the emission estimates. In addition to the DARS scores assigned, the number of data points checked assists reviewers in evaluating the accuracy of the completed emissions report. Documentation of DARS scoring and data checking should include descriptions of the rationale for scoring, the data checked, and the dated signature of the reviewer.

Data Reporting

Reporting will be accomplished by submitting written documentation and emissions summaries to the Project Manager. All supporting documentation, project notebooks, data sheets, and calculations shall be submitted for review.

The report will include summary tables, raw listings of equipment, activity levels and emissions from individual sources, and a QA documentation section. A detailed inventory report allows comparison of baseline inventories between one area and another and the evaluation of the impact of control strategies, and also facilitates updates to the inventory and development of projection inventories.

In addition to EIIP guidance, the U.S. EPA report *PM-10 Emission Inventory Requirements* will be followed. These documents provide guidance for presenting and documenting SIP emissions inventories, and contain examples of how to present and verify inventory development efforts. The QA documentation section of the emissions inventory will provide enough detail so that the inventory development described in the report can be compared to the information provided in this QAP. Any discrepancies will be identified and explained.

At a minimum, documentation should describe in general terms how the inventory data were collected and where they came from. The report will include the components listed below.

- A description of the geographic area included in the inventory, including documentation for any adjustments made to the original designated area. Documentation shall reference all sources of current or projected data, and include maps of borough boundaries for excluded areas.

- The base year of the emissions inventory.

- The population of the area, and the source of the population data.

- Efforts taken as part of the QA program.

- Procedures used to temporally allocate each source category (e.g., selection of the months comprising the seasons, seasonal variations in activity levels at sources, daily variation in activity levels, etc.).

The QA documentation section of the inventory report will describe each deviation from approved procedures or findings that could compromise the successful outcome of the inventory. Documentation of each finding will include a description of the action or data reviewed that led to the quality concern, along with a recommendation for corrective action. The QA documentation section of the inventory report will then discuss how the recommended corrective actions were implemented.

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8. "Guidance for the Preparation of Quality Assurance Plans for O3/CO SIP Emission Inventories," EPA-450/4-88-023, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 1988.
9. "Emission Inventory Improvement Program," Volumes II-VI, prepared by State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), 1996.
10. Beck, L.L., R.L Peer, L.A. Bravo, and Y. Yan, "A Data Attribute Rating System," presented at the Air & Waste Management Association Specialty Conference on Emission Inventory Issues, Raleigh, North Carolina, November 1994.

###

Appendix B

Demographic Estimates for City and Borough of Juneau, Mendenhall Valley

Demographic Estimates for

City and Borough of Juneau and Mendenhall Valley

Three separate demographic data sources are available for Juneau:

- U.S. Census Bureau (Census Bureau)
- Alaska Department of Labor and Workforce Development (DLWD)
- City and Borough of Juneau (CBJ)

The Census Bureau conducts detailed demographic surveys once every decade. The most recent census reports available are for 1990 and 2000. Additional population estimates are also available for more recent years. The Research and Analysis Section of the DLWD develops population growth forecasts for the state and individual Boroughs. The most current is for the period of 1998 – 2018. DLWD also has population and household estimates for recent years. CBJ has population estimates for the entire Borough and its subregions (e.g., Douglas, Lemon Creek, etc.). CBJ is the only source of population and household data for the nonattainment area; that estimate was prepared in 1993 for the "wood smoke control area of the Mendenhall Valley." A review of the 1993 SIP for the Mendenhall Valley shows that the boundaries of the wood smoke control area are the same as the boundaries of the nonattainment area.

The problem with developing demographic estimates for the Mendenhall Valley nonattainment area is that its boundaries do not match the boundaries of the demographic measurement systems (e.g., census tracts, Juneau subregions, etc.). Figure 1 displays CBJ geographic areas. It shows that the Mendenhall Valley is divided into two areas: east and west. The West Mendenhall Valley includes data for both the peninsula and for Auke Bay. The western portion of the Mendenhall Peninsula and Auke Bay lie beyond the ridge that forms the western boundary of the nonattainment area. The southern portion of the East Mendenhall Valley (the airport and adjacent areas) is below the southern boundary of the nonattainment area. Because of these inconsistencies, it is not possible to map population estimates from the available surveys to the nonattainment area.

The only approach available to prepare demographic estimates for the nonattainment area is to start with the 1993 CBJ estimates and assume that growth is proportional to the growth seen for the entire Borough. Implementing this assumption, however, is not straightforward as the population estimates available from DLWD and the Census Bureau are not always consistent. A summary of the demographic information needed to make the projections is presented by source in Table 1. The discussion is organized by calendar year.

Figure 1

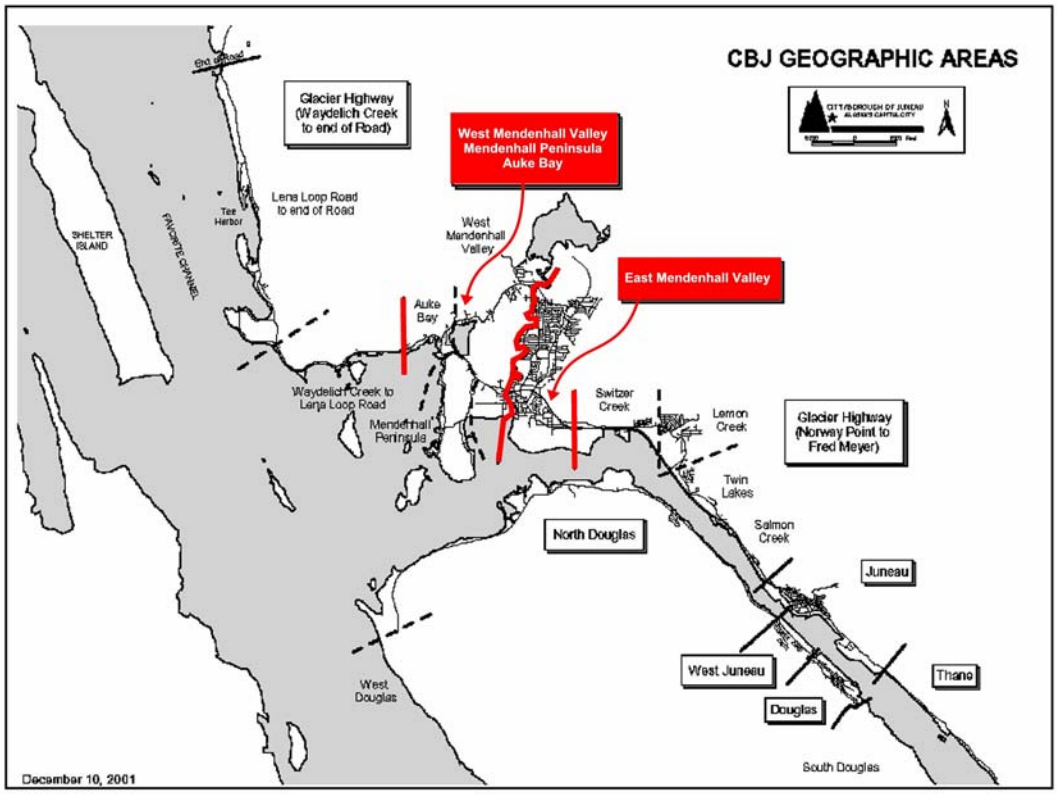


Table 1 Population and Housing Estimates for City and Borough of Juneau and Mendenhall Valley Nonattainment Area				
Year	City and Borough Juneau		Nonattainment Area	
	Population	Households	Population	Households
1988	29,946			**4,465**
1990	26,751	9,902		
1993	**27,882**		12,000	4,401
2000	30,711	11,543		
2002	**30,584**	**11,591**		
2004	30,966		**13,327**	**4,888**
2018	**33,774**		**14,535**	**5,331**

- 1988 – the year addressed in the Engineering Science PM_{10} emission inventory for the nonattainment area. Population estimates for the entire Borough are available from CBJ. The Engineering Science report did not present an estimate of either the number of households or the population of the nonattainment area. An estimate of the number of households, however, can be derived from fuel use information presented in the report.

- 1990 – year for which detailed census records are available.

- 1993 – year in which DEC conducted a wood smoke survey in the nonattainment area. Population and household estimates, prepared by CBJ for the nonattainment area (i.e., the wood smoke control area), were reported in the documentation* and used to support an evaluation of the survey coverage.

- 2000 – year for which detailed census records are available.

- 2002 – the year to be addressed in the criteria pollutant emission inventories for Anchorage, Fairbanks, and Juneau.

- 2004 – the base year of the PM_{10} emission inventory for the nonattainment area, also recent population estimates are available from DLWD and the Census Bureau.

- 2018 – the horizon year of the PM_{10} emission inventory for the nonattainment area.

All values obtained from the sources noted above are presented in a normal font. Derived values are presented in bold. Presented below is a description of the methodology used to prepare the derived values.

- The 1988 estimate of households was derived by dividing the total amount of fuel oil used for residential heating by the average amount of fuel use per home (2,179 x 10^3 gallons/800 gallons per home). The resulting estimate of 2,724 homes was increased to account for the fraction of homes that that did not use fuel oil (39%). The resulting estimate of 4,465 agrees very well with the CBJ value estimated for 1993. The difference between the estimates is 1% and the decline seen between 1988 and 1993 is consistent with the population decline reported over the same period.

- The 1993 City and Borough population estimate was derived by interpolating the annualized growth rate between the 1990 and 2000 Census values.

* 1993 Wood Heating Survey of Mendenhall Valley Residents, Alaska Department of Environmental Conservation, October 20, 1993

- The 2002 City and Borough population estimate was derived by selecting the mid-point between the 2000 Census value and the DLWD estimate for 2004. Surprisingly, the Census Bureau and DLWD offer different population estimates for 2004. (31,118 versus 30,966). The DLWD value was selected since that agency is focused exclusively on tracking Alaska demographic trends and is the sole source of growth projections for Juneau.

- The 2002 City and Borough household values were assumed to be proportional to the growth in population observed between 2000 and 2002. A review of the 1990 and 2000 Census values confirmed that housing growth tracks population growth very closely.

- The 2018 population projection for the City and Borough was derived from DLWD forecasts. Discussions with staff confirmed that the most current population forecast for Juneau was last prepared for the period 1998 – 2018.[*] A summary of the forecast is presented in Table 2. It shows that the growth rate for Juneau was projected to decline over the 20-year period addressed in the forecast. The annualized growth rate from 1998 – 2018 is 0.7% per year. Updates to this forecast are expected to be available later this year. As noted above, more current estimates of Juneau population levels are available (see the Department's website[†]). Those values, 30,966 for 2004 and 31,246 for 2003 show that population levels actually declined by 280 in 2004. Using the 2004 value as the baseline, options for projecting growth are to use (a) the Juneau-specific values employed in the somewhat dated 1998 – 2018 forecast or (b) the more current statewide forecast available at the above cited website. The current middle range forecast for the state is 1.0% per year for the period of 2004 – 2018. Since this value very closely matches the statewide forecast of 1.1% employed in the 1998 – 2018 forecast, the Juneau-specific forecast from 1998 – 2018 was used to project the 2004 base year population levels to 2018. The aggregate growth rate over this period is 9.0% (with an annualized rate of 0.62% per year) and the 2018 population level is forecasted to be 33,774.

Table 2
Mid-Range Population Forecasts for Juneau, Alaska

Year	Population	Growth Rate (%)
1998	30,236	-
2003	31,388	3.8
2008	32,413	3.3
2013	33,475	3.3
2018	34,447	2.9

[*] http://www.labor.state.ak.us/research/pop/pop-proj.pdf
[†] http://labor.state.ak.us/trends/feb05.pdf

- The 2018 population and household values for the nonattainment area were assumed to be proportional to the growth in Borough-wide population between 2004 and 2018.

###

Appendix C
On-Road Source Calculations

```
* CY2004 WINTER run for Mendenhall Valley Nonattainment Area
* PM10 Maintenance Plan

MOBILE6 INPUT FILE :
SPREADSHEET        :
PARTICULATES       :
RUN DATA           :

MIN/MAX TEMP       : 25.7 36.3
FUEL RVP           : 13.6
REG DIST           : jun_reg.prn

FUEL PROGRAM       : 4
338.0  338.0  338.0  160.0   90.0   90.0   60.0  60.0
 30.0   30.0   30.0   30.0   30.0   30.0   30.0  30.0
690.0  690.0  690.0  380.0  140.0  140.0  140.0  80.0
 80.0   80.0   80.0   80.0   80.0   80.0   80.0  80.0

SCENARIO RECORD    : Freeway - 50.5 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 1
AVERAGE SPEED      : 50.5 Freeway
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 37.2 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 1
AVERAGE SPEED      : 37.2 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 35.6 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 1
AVERAGE SPEED      : 35.6 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 20.8 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 1
AVERAGE SPEED      : 20.8 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

END OF RUN         :
```

```
* CY2004 SUMMER run for Mendenhall Valley Nonattainment Area
* PM10 Maintenance Plan

MOBILE6 INPUT FILE :
SPREADSHEET        :
PARTICULATES       :
RUN DATA           :

MIN/MAX TEMP       : 42.3 57.7
FUEL RVP           : 7.8
REG DIST           : jun_reg.prn

FUEL PROGRAM       : 4
338.0  338.0  338.0  160.0   60.0   60.0   60.0  60.0
 30.0   30.0   30.0   30.0   30.0   30.0   30.0  30.0
690.0  690.0  690.0  380.0  150.0  150.0  150.0  80.0
 80.0   80.0   80.0   80.0   80.0   80.0   80.0  80.0

SCENARIO RECORD    : Freeway - 50.5 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 7
AVERAGE SPEED      : 50.5 Freeway
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 37.2 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 7
AVERAGE SPEED      : 37.2 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 35.6 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 7
AVERAGE SPEED      : 35.6 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

SCENARIO RECORD    : Arterial - 20.8 mph
CALENDAR YEAR      : 2004
EVALUATION MONTH   : 7
AVERAGE SPEED      : 20.8 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 380

END OF RUN         :
```

```
* CY2018 WINTER run for Mendenhall Valley Nonattainment Area
* PM10 Maintenance Plan

MOBILE6 INPUT FILE :
SPREADSHEET        :
PARTICULATES       :
RUN DATA           :

MIN/MAX TEMP       : 25.7 36.3
FUEL RVP           : 13.6
REG DIST           : jun_reg.prn

FUEL PROGRAM       : 4
338.0  338.0  338.0  160.0   90.0   90.0   60.0  60.0
 30.0   30.0   30.0   30.0   30.0   30.0   30.0  30.0
690.0  690.0  690.0  380.0  140.0  140.0  140.0  80.0
 80.0   80.0   80.0   80.0   80.0   80.0   80.0  80.0

SCENARIO RECORD    : Freeway - 50.5 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 1
AVERAGE SPEED      : 50.5 Freeway
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 37.2 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 1
AVERAGE SPEED      : 37.2 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 35.6 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 1
AVERAGE SPEED      : 35.6 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 20.8 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 1
AVERAGE SPEED      : 20.8 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

END OF RUN         :
```

```
* CY2018 SUMMER run for Mendenhall Valley Nonattainment Area
* PM10 Maintenance Plan

MOBILE6 INPUT FILE :
SPREADSHEET        :
PARTICULATES       :
RUN DATA           :

MIN/MAX TEMP       : 42.3 57.7
FUEL RVP           : 7.8
REG DIST           : jun_reg.prn

FUEL PROGRAM       : 4
338.0  338.0  338.0  160.0   60.0   60.0   60.0  60.0
 30.0   30.0   30.0   30.0   30.0   30.0   30.0  30.0
690.0  690.0  690.0  380.0  150.0  150.0  150.0  80.0
 80.0   80.0   80.0   80.0   80.0   80.0   80.0  80.0

SCENARIO RECORD    : Freeway - 50.5 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 7
AVERAGE SPEED      : 50.5 Freeway
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 37.2 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 7
AVERAGE SPEED      : 37.2 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 35.6 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 7
AVERAGE SPEED      : 35.6 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

SCENARIO RECORD    : Arterial - 20.8 mph
CALENDAR YEAR      : 2018
EVALUATION MONTH   : 7
AVERAGE SPEED      : 20.8 Arterial
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 15

END OF RUN         :
```

```
REG DIST
*
* JUNEAU AREA REGISTRATION DISTRIBUTION BY VEHICLE AGE
* (DATA SOURCE INDICATED AFTER VEHICLE CLASS)
*
* LDV         2000 DMV data
1     0.0366  0.0593  0.0553  0.0524  0.0465  0.0630  0.0611  0.0605  0.0590  0.0690
      0.0693  0.0654  0.0537  0.0469  0.0437  0.0418  0.0364  0.0214  0.0142  0.0091
      0.0072  0.0077  0.0058  0.0046  0.0102
* LDT1        2000 DMV data
2     0.0263  0.0495  0.0456  0.0557  0.0490  0.0638  0.0634  0.0500  0.0478  0.0522
      0.0615  0.0562  0.0396  0.0326  0.0416  0.0456  0.0424  0.0336  0.0248  0.0225
      0.0155  0.0183  0.0149  0.0116  0.0359
* LDT2        2000 DMV data
3     0.0263  0.0495  0.0456  0.0557  0.0490  0.0638  0.0634  0.0500  0.0478  0.0522
      0.0615  0.0562  0.0396  0.0326  0.0416  0.0456  0.0424  0.0336  0.0248  0.0225
      0.0155  0.0183  0.0149  0.0116  0.0359
* LDT3        2000 DMV data
4     0.0263  0.0495  0.0456  0.0557  0.0490  0.0638  0.0634  0.0500  0.0478  0.0522
      0.0615  0.0562  0.0396  0.0326  0.0416  0.0456  0.0424  0.0336  0.0248  0.0225
      0.0155  0.0183  0.0149  0.0116  0.0359
* LDT4        2000 DMV data
5     0.0263  0.0495  0.0456  0.0557  0.0490  0.0638  0.0634  0.0500  0.0478  0.0522
      0.0615  0.0562  0.0396  0.0326  0.0416  0.0456  0.0424  0.0336  0.0248  0.0225
      0.0155  0.0183  0.0149  0.0116  0.0359
* HDV2B       MOBILE62 default
6     0.0503  0.0916  0.0833  0.0758  0.0690  0.0627  0.0571  0.0519  0.0472  0.0430
      0.0391  0.0356  0.0324  0.0294  0.0268  0.0244  0.0222  0.0202  0.0184  0.0167
      0.0152  0.0138  0.0126  0.0114  0.0499
* HDV3        MOBILE62 default
7     0.0503  0.0916  0.0833  0.0758  0.069   0.0627  0.0571  0.0519  0.0472  0.043
      0.0391  0.0356  0.0324  0.0294  0.0268  0.0244  0.0222  0.0202  0.0184  0.0167
      0.0152  0.0138  0.0126  0.0114  0.0499
* HDV4        MOBILE62 default
8     0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.052   0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDV5        MOBILE62 default
9     0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.052   0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDV6        MOBILE62 default
10    0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.052   0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDV7        MOBILE62 default
11    0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.0520  0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDV8a       MOBILE62 default
12    0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.0520  0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDV8b       MOBILE62 default
13    0.0388  0.0726  0.0679  0.0635  0.0594  0.0556  0.0520  0.0486  0.0455  0.0425
      0.0398  0.0372  0.0348  0.0326  0.0304  0.0285  0.0266  0.0249  0.0233  0.0218
      0.0204  0.0191  0.0178  0.0167  0.0797
* HDBS        MOBILE62 default
14    0.0393  0.0734  0.0686  0.0641  0.0599  0.0559  0.0522  0.0488  0.0456  0.0426
      0.0398  0.0372  0.0347  0.0324  0.0303  0.0283  0.0264  0.0247  0.0231  0.0216
      0.0201  0.0188  0.0176  0.0165  0.0781
* HDBT        MOBILE62 default
15    0.0307  0.0614  0.0614  0.0614  0.0614  0.0614  0.0614  0.0614  0.0614  0.0613
      0.0611  0.0607  0.0595  0.0568  0.0511  0.0406  0.0254  0.0121  0.0099  0.0081
      0.0066  0.0054  0.0044  0.0037  0.0114
* Motorcycles MOBILE62 default
16    0.1440  0.1680  0.1350  0.1090  0.0880  0.0700  0.0560  0.0450  0.0360  0.0290
      0.0230  0.0970  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
      0.0000  0.0000  0.0000  0.0000  0.0000
```

Appendix D
Nonroad Source Calculations

Summer 2004 Nonroad Model Output Details

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	1.6544	65	40,819
Recreational Equipment	All Terrain Vehicles	1.0435	1,121	1,802,858
Logging Equipment	Chain Saws > 6 HP	0.9268	119	18,092
Recreational Equipment	Motorcycles: Off-road	0.8007	288	461,470
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.6923	37	27,979
Construction and Mining Equipment	Skid Steer Loaders	0.6358	58	31,139
Construction and Mining Equipment	Rubber Tire Loaders	0.4662	15	7,762
Construction and Mining Equipment	Crawler Tractor/Dozers	0.3705	10	6,535
Construction and Mining Equipment	Excavators	0.3458	14	9,921
Construction and Mining Equipment	Off-highway Trucks	0.2573	2	1,873
Construction and Mining Equipment	Rough Terrain Forklifts	0.2026	12	5,400
Construction and Mining Equipment	Rollers	0.1276	10	4,834
Construction and Mining Equipment	Concrete/Industrial Saws	0.0988	11	4,537
Construction and Mining Equipment	Scrapers	0.0936	2	1,124
Construction and Mining Equipment	Graders	0.0826	3	2,086
Industrial Equipment	AC\Refrigeration	0.0819	10	7,686
Construction and Mining Equipment	Trenchers	0.0811	9	3,330
Commercial Equipment	Generator Sets	0.0766	157	11,331
Construction and Mining Equipment	Cranes	0.0765	4	2,385
Construction and Mining Equipment	Bore/Drill Rigs	0.0702	15	2,078
Lawn and Garden Equipment	Chain Saws < 6 HP	0.0561	162	4,490
Construction and Mining Equipment	Other Construction Equipment	0.0558	1	566
Recreational Equipment	Specialty Vehicles/Carts	0.0548	105	6,699
Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters	0.0545	434	7,248
Construction and Mining Equipment	Off-highway Tractors	0.0490	0	254
Construction and Mining Equipment	Pavers	0.0442	3	1,573
Lawn and Garden Equipment	Leafblowers/Vacuums	0.0427	228	5,282
Commercial Equipment	Welders	0.0402	14	3,613
Commercial Equipment	Pumps	0.0342	41	4,839
Construction and Mining Equipment	Tampers/Rammers	0.0341	16	1,731
Commercial Equipment	Air Compressors	0.0300	8	2,553
Industrial Equipment	Forklifts	0.0285	8	8,274
Construction and Mining Equipment	Signal Boards/Light Plants	0.0193	7	2,475
Logging Equipment	Shredders > 6 HP	0.0184	736	18,411
Construction and Mining Equipment	Crushing/Processing Equipment	0.0172	2	737
Lawn and Garden Equipment	Lawn and Garden Tractors	0.0165	367	25,303
Lawn and Garden Equipment	Lawn Mowers	0.0112	1,005	39,988
Construction and Mining Equipment	Paving Equipment	0.0111	13	1,746
Railroad Equipment	Railway Maintenance	0.0097	1	294
Industrial Equipment	Terminal Tractors	0.0086	0	273
Industrial Equipment	Other General Industrial Equipment	0.0080	2	721
Lawn and Garden Equipment	Chippers/Stump Grinders	0.0073	0	329
Construction and Mining Equipment	Surfacing Equipment	0.0070	2	772
Commercial Equipment	Pressure Washers	0.0066	63	3,642
Industrial Equipment	Sweepers/Scrubbers	0.0066	1	512
Pleasure Craft	Outboard	0.0052	75	63
Lawn and Garden Equipment	Front Mowers	0.0051	2	824
Lawn and Garden Equipment	Rotary Tillers < 6 HP	0.0051	105	4,341
Industrial Equipment	Aerial Lifts	0.0046	2	348
Construction and Mining Equipment	Cement and Mortar Mixers	0.0045	26	1,637
Construction and Mining Equipment	Plate Compactors	0.0044	14	2,023
Lawn and Garden Equipment	Turf Equipment	0.0038	5	4,548
Construction and Mining Equipment	Dumpers/Tenders	0.0023	3	402

Continued on following page

Summer 2004 Nonroad Model Output Details, Continued

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Construction and Mining Equipment	Dumpers/Tenders	0.0023	3	402
Agricultural Equipment	Agricultural Tractors	0.0020	0	34
Industrial Equipment	Other Material Handling Equipment	0.0012	0	30
Lawn and Garden Equipment	Rear Engine Riding Mowers	0.0011	54	2,935
Pleasure Craft	Personal Water Craft	0.0011	10	9
Lawn and Garden Equipment	Other Lawn and Garden Equipment	0.0009	21	1,870
Commercial Equipment	Gas Compressors	0.0005	0	82
Agricultural Equipment	Combines	0.0004	0	2
Lawn and Garden Equipment	Shredders < 6 HP	0.0001	1	103
Agricultural Equipment	Other Agricultural Equipment	0.0001	0	1
Pleasure Craft	Inboard/Sterndrive	0.0000	18	15
Agricultural Equipment	Sprayers	0.0000	0	1
Agricultural Equipment	Swathers	0.0000	0	0
Agricultural Equipment	Irrigation Sets	0.0000	0	1
Agricultural Equipment	Hydro-power Units	0.0000	0	1
Agricultural Equipment	Balers	0.0000	0	0
Agricultural Equipment	Tillers > 6 HP	0.0000	0	2
Agricultural Equipment	2-Wheel Tractors	0.0000	0	0
Agricultural Equipment	Agricultural Mowers	0.0000	0	0
Industrial Equipment	Other Oil Field Equipment	0.0000	-	-
Lawn and Garden Equipment	Snowblowers	0.0000	263	-
Recreational Equipment	Golf Carts	0.0000	-	-
Recreational Equipment	Snowmobiles	0.0000	1,347	-
	Total (tons/season)	8.90		
	Total (tons/day)	0.05		

Winter 2004 Nonroad Model Output Details

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	1.6544	65	40,819
Logging Equipment	Chain Saws > 6 HP	0.9268	119	18,092
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.3477	37	14,053
Construction and Mining Equipment	Skid Steer Loaders	0.3194	58	15,640
Construction and Mining Equipment	Rubber Tire Loaders	0.2341	15	3,898
Construction and Mining Equipment	Crawler Tractor/Dozers	0.1861	10	3,282
Construction and Mining Equipment	Excavators	0.1737	14	4,983
Construction and Mining Equipment	Off-highway Trucks	0.1292	2	941
Construction and Mining Equipment	Rough Terrain Forklifts	0.1018	12	2,712
Commercial Equipment	Generator Sets	0.0766	157	11,331
Industrial Equipment	AC\Refrigeration	0.0672	10	6,300
Construction and Mining Equipment	Rollers	0.0641	10	2,428
Construction and Mining Equipment	Concrete/Industrial Saws	0.0496	11	2,279
Construction and Mining Equipment	Scrapers	0.0470	2	564
Lawn and Garden Equipment	Snowblowers	0.0451	376	6,741
Construction and Mining Equipment	Graders	0.0415	3	1,048
Construction and Mining Equipment	Trenchers	0.0407	9	1,672
Commercial Equipment	Welders	0.0402	14	3,613
Construction and Mining Equipment	Cranes	0.0384	4	1,198
Construction and Mining Equipment	Bore/Drill Rigs	0.0353	15	1,044
Commercial Equipment	Pumps	0.0342	41	4,839
Commercial Equipment	Air Compressors	0.0300	8	2,553
Construction and Mining Equipment	Other Construction Equipment	0.0280	1	284
Recreational Equipment	Specialty Vehicles/Carts	0.0248	105	3,029
Construction and Mining Equipment	Off-highway Tractors	0.0246	0	127
Industrial Equipment	Forklifts	0.0234	8	6,782
Construction and Mining Equipment	Pavers	0.0222	3	790
Logging Equipment	Shredders > 6 HP	0.0184	736	18,411
Construction and Mining Equipment	Tampers/Rammers	0.0171	16	869
Railroad Equipment	Railway Maintenance	0.0097	1	294
Construction and Mining Equipment	Signal Boards/Light Plants	0.0097	7	1,243
Construction and Mining Equipment	Crushing/Processing Equipment	0.0086	2	370
Industrial Equipment	Terminal Tractors	0.0070	0	224
Commercial Equipment	Pressure Washers	0.0066	63	3,642
Industrial Equipment	Other General Industrial Equipment	0.0065	2	591
Construction and Mining Equipment	Paving Equipment	0.0056	13	877
Industrial Equipment	Sweepers/Scrubbers	0.0054	1	420
Industrial Equipment	Aerial Lifts	0.0038	2	285
Construction and Mining Equipment	Surfacing Equipment	0.0035	2	388
Recreational Equipment	Snowmobiles	0.0029	59	59
Construction and Mining Equipment	Cement and Mortar Mixers	0.0023	26	822
Construction and Mining Equipment	Plate Compactors	0.0022	14	1,016
Construction and Mining Equipment	Dumpers/Tenders	0.0011	3	202
Industrial Equipment	Other Material Handling Equipment	0.0010	0	24
Pleasure Craft	Outboard	0.0009	75	11
Agricultural Equipment	Agricultural Tractors	0.0008	0	13
Commercial Equipment	Gas Compressors	0.0005	0	82
Pleasure Craft	Personal Water Craft	0.0002	10	2
Agricultural Equipment	Combines	0.0002	0	1
Agricultural Equipment	Other Agricultural Equipment	0.0000	0	0
Agricultural Equipment	Sprayers	0.0000	0	0
Agricultural Equipment	Swathers	0.0000	0	0
Pleasure Craft	Inboard/Sterndrive	0.0000	18	3

Continued on following page

Winter 2004 Nonroad Model Output Details, Continued

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Agricultural Equipment	Irrigation Sets	0.0000	0	0
Agricultural Equipment	Hydro-power Units	0.0000	0	0
Agricultural Equipment	Balers	0.0000	0	0
Agricultural Equipment	Tillers > 6 HP	0.0000	0	1
Agricultural Equipment	2-Wheel Tractors	0.0000	0	0
Agricultural Equipment	Agricultural Mowers	0.0000	0	0
Recreational Equipment	All Terrain Vehicles	0.0000	1,121	-
Lawn and Garden Equipment	Chain Saws < 6 HP	0.0000	231	-
Lawn and Garden Equipment	Chippers/Stump Grinders	0.0000	1	-
Lawn and Garden Equipment	Front Mowers	0.0000	3	-
Recreational Equipment	Golf Carts	0.0000	-	-
Lawn and Garden Equipment	Lawn and Garden Tractors	0.0000	524	-
Lawn and Garden Equipment	Lawn Mowers	0.0000	1,436	-
Lawn and Garden Equipment	Leafblowers/Vacuums	0.0000	326	-
Recreational Equipment	Motorcycles: Off-road	0.0000	288	-
Lawn and Garden Equipment	Other Lawn and Garden Equipment	0.0000	31	-
Industrial Equipment	Other Oil Field Equipment	0.0000	-	-
Underground Mining Equipment	Other Underground Mining Equipment	0.0000	-	-
Lawn and Garden Equipment	Rear Engine Riding Mowers	0.0000	77	-
Lawn and Garden Equipment	Rotary Tillers < 6 HP	0.0000	150	-
Lawn and Garden Equipment	Shredders < 6 HP	0.0000	2	-
Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters	0.0000	620	-
Lawn and Garden Equipment	Turf Equipment	0.0000	7	-
	Total (tons/season)	4.92		
	Total (tons/day)	0.03		

Summer 2018 Nonroad Model Output Details

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Logging Equipment	Chain Saws > 6 HP	1.33	171	25,942
Recreational Equipment	Motorcycles: Off-road	0.66	460	736,252
Construction and Mining Equipment	Skid Steer Loaders	0.35	76	40,708
Recreational Equipment	All Terrain Vehicles	0.35	1,935	3,111,907
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.34	48	36,496
Construction and Mining Equipment	Concrete/Industrial Saws	0.09	11	4,639
Construction and Mining Equipment	Rubber Tire Loaders	0.07	20	10,143
Lawn and Garden Equipment	Chain Saws < 6 HP	0.06	284	3,854
Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters	0.06	760	6,223
Commercial Equipment	Generator Sets	0.05	219	15,844
Lawn and Garden Equipment	Leafblowers/Vacuums	0.05	400	4,540
Construction and Mining Equipment	Rough Terrain Forklifts	0.05	16	7,062
Recreational Equipment	Specialty Vehicles/Carts	0.04	114	7,759
Construction and Mining Equipment	Tampers/Rammers	0.03	16	1,759
Commercial Equipment	Pumps	0.03	56	6,729
Construction and Mining Equipment	Bore/Drill Rigs	0.03	16	2,497
Commercial Equipment	Welders	0.03	19	5,089
Construction and Mining Equipment	Crawler Tractor/Dozers	0.02	14	8,558
Logging Equipment	Shredders > 6 HP	0.02	1,056	26,399
Construction and Mining Equipment	Rollers	0.02	12	6,203
Lawn and Garden Equipment	Lawn and Garden Tractors	0.02	654	22,128
Construction and Mining Equipment	Trenchers	0.02	11	4,104
Construction and Mining Equipment	Other Construction Equipment	0.01	2	735
Industrial Equipment	Forklifts	0.01	11	10,662
Construction and Mining Equipment	Scrapers	0.01	2	1,472
Construction and Mining Equipment	Signal Boards/Light Plants	0.01	9	3,232
Commercial Equipment	Air Compressors	0.01	12	3,597
Construction and Mining Equipment	Off-highway Tractors	0.01	1	332
Lawn and Garden Equipment	Lawn Mowers	0.01	1,776	34,603
Commercial Equipment	Pressure Washers	0.01	87	5,030
Construction and Mining Equipment	Cranes	0.01	5	3,114
Pleasure Craft	Outboard	0.01	80	68
Railroad Equipment	Railway Maintenance	0.00	1	395
Lawn and Garden Equipment	Rotary Tillers < 6 HP	0.00	187	3,784
Construction and Mining Equipment	Paving Equipment	0.00	13	1,859
Lawn and Garden Equipment	Chippers/Stump Grinders	0.00	1	337
Industrial Equipment	Aerial Lifts	0.00	2	388
Industrial Equipment	AC\Refrigeration	0.00	14	10,404
Lawn and Garden Equipment	Turf Equipment	0.00	8	3,986
Construction and Mining Equipment	Pavers	0.00	4	1,989
Construction and Mining Equipment	Cement and Mortar Mixers	0.00	26	1,727
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	0.00	56	34,736
Construction and Mining Equipment	Plate Compactors	0.00	15	2,258
Construction and Mining Equipment	Crushing/Processing Equipment	0.00	2	926
Construction and Mining Equipment	Surfacing Equipment	0.00	2	817
Lawn and Garden Equipment	Front Mowers	0.00	4	887
Construction and Mining Equipment	Excavators	0.00	18	12,992
Construction and Mining Equipment	Dumpers/Tenders	0.00	3	452
Industrial Equipment	Other General Industrial Equipment	0.00	1	574
Lawn and Garden Equipment	Rear Engine Riding Mowers	0.00	96	2,561
Industrial Equipment	Other Material Handling Equipment	0.00	0	35
Construction and Mining Equipment	Graders	0.00	4	2,732
Pleasure Craft	Personal Water Craft	0.00	11	9

Continued on following page

Summer 2018 Nonroad Model Output Details, Continued

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Lawn and Garden Equipment	Other Lawn and Garden Equipment	0.00	38	1,632
Commercial Equipment	Gas Compressors	0.00	0	114
Agricultural Equipment	Agricultural Tractors	0.00	0	44
Agricultural Equipment	Combines	0.00	0	3
Industrial Equipment	Sweepers/Scrubbers	0.00	1	613
Industrial Equipment	Terminal Tractors	0.00	1	362
Pleasure Craft	Inboard/Sterndrive	0.00	20	17
Lawn and Garden Equipment	Shredders < 6 HP	0.00	3	90
Agricultural Equipment	Sprayers	0.00	0	1
Agricultural Equipment	Swathers	0.00	0	0
Agricultural Equipment	Other Agricultural Equipment	0.00	0	1
Agricultural Equipment	Irrigation Sets	0.00	0	1
Agricultural Equipment	Balers	0.00	0	0
Agricultural Equipment	Tillers > 6 HP	0.00	0	2
Agricultural Equipment	Hydro-power Units	0.00	0	1
Agricultural Equipment	2-Wheel Tractors	0.00	0	0
Agricultural Equipment	Agricultural Mowers	0.00	0	0
Construction and Mining Equipment	Off-highway Trucks	-	2	2,452
Industrial Equipment	Other Oil Field Equipment	-	-	-
Lawn and Garden Equipment	Snowblowers	-	467	-
Recreational Equipment	Golf Carts	-	-	-
Recreational Equipment	Snowmobiles	-	2,028	-
Underground Mining Equipment	Other Underground Mining Equipmer	-	-	-
	Total (tons/season)	3.87		
	Total (tons/day)	0.02		

Winter 2018 Nonroad Model Output Details

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Logging Equipment	Chain Saws > 6 HP	1.33	171	25,942
Construction and Mining Equipment	Skid Steer Loaders	0.18	76	20,446
Construction and Mining Equipment	Tractors/Loaders/Backhoes	0.17	48	18,330
Lawn and Garden Equipment	Snowblowers	0.06	467	8,372
Commercial Equipment	Generator Sets	0.05	219	15,844
Construction and Mining Equipment	Concrete/Industrial Saws	0.05	11	2,330
Construction and Mining Equipment	Rubber Tire Loaders	0.04	20	5,095
Commercial Equipment	Pumps	0.03	56	6,729
Commercial Equipment	Welders	0.03	19	5,089
Construction and Mining Equipment	Rough Terrain Forklifts	0.02	16	3,547
Logging Equipment	Shredders > 6 HP	0.02	1,056	26,399
Recreational Equipment	Specialty Vehicles/Carts	0.02	114	3,508
Construction and Mining Equipment	Tampers/Rammers	0.02	16	884
Construction and Mining Equipment	Bore/Drill Rigs	0.02	16	1,254
Construction and Mining Equipment	Crawler Tractor/Dozers	0.01	14	4,298
Industrial Equipment	Forklifts	0.01	11	8,739
Construction and Mining Equipment	Rollers	0.01	12	3,116
Construction and Mining Equipment	Trenchers	0.01	11	2,061
Commercial Equipment	Air Compressors	0.01	12	3,597
Construction and Mining Equipment	Other Construction Equipment	0.01	2	369
Commercial Equipment	Pressure Washers	0.01	87	5,030
Railroad Equipment	Railway Maintenance	0.00	1	395
Construction and Mining Equipment	Scrapers	0.00	2	739
Recreational Equipment	Snowmobiles	0.00	89	89
Construction and Mining Equipment	Signal Boards/Light Plants	0.00	9	1,623
Construction and Mining Equipment	Off-highway Tractors	0.00	1	167
Industrial Equipment	Aerial Lifts	0.00	2	318
Industrial Equipment	AC\Refrigeration	0.00	14	8,528
Construction and Mining Equipment	Cranes	0.00	5	1,564
Logging Equipment	Forest Eqp - Feller/Bunch/Skidder	0.00	56	34,736
Construction and Mining Equipment	Paving Equipment	0.00	13	934
Construction and Mining Equipment	Pavers	0.00	4	999
Construction and Mining Equipment	Cement and Mortar Mixers	0.00	26	867
Construction and Mining Equipment	Plate Compactors	0.00	15	1,134
Construction and Mining Equipment	Crushing/Processing Equipment	0.00	2	465
Construction and Mining Equipment	Surfacing Equipment	0.00	2	410
Construction and Mining Equipment	Excavators	0.00	18	6,526
Industrial Equipment	Other General Industrial Equipment	0.00	1	470
Pleasure Craft	Outboard	0.00	80	12
Industrial Equipment	Other Material Handling Equipment	0.00	0	29
Construction and Mining Equipment	Dumpers/Tenders	0.00	3	227
Commercial Equipment	Gas Compressors	0.00	0	114
Construction and Mining Equipment	Graders	0.00	4	1,372
Agricultural Equipment	Agricultural Tractors	0.00	0	17
Industrial Equipment	Sweepers/Scrubbers	0.00	1	503
Pleasure Craft	Personal Water Craft	0.00	11	2
Agricultural Equipment	Combines	0.00	0	1
Industrial Equipment	Terminal Tractors	0.00	1	297
Agricultural Equipment	Sprayers	0.00	0	0
Agricultural Equipment	Swathers	0.00	0	0
Pleasure Craft	Inboard/Sterndrive	0.00	20	3
Agricultural Equipment	Other Agricultural Equipment	0.00	0	0
Agricultural Equipment	Irrigation Sets	0.00	0	0

Continued on following page

Winter 2018 Nonroad Model Output Details, Continued

Equipment Description	Equipment Type	PM (tons/season)	Population (# units)	Activity (total hrs)
Agricultural Equipment	Balers	0.00	0	0
Agricultural Equipment	Tillers > 6 HP	0.00	0	1
Agricultural Equipment	Hydro-power Units	0.00	0	0
Agricultural Equipment	2-Wheel Tractors	0.00	0	0
Agricultural Equipment	Agricultural Mowers	0.00	0	0
Construction and Mining Equipment	Off-highway Trucks	-	2	1,232
Recreational Equipment	All Terrain Vehicles	-	1,935	-
Lawn and Garden Equipment	Chain Saws < 6 HP	-	284	-
Lawn and Garden Equipment	Chippers/Stump Grinders	-	1	-
Lawn and Garden Equipment	Front Mowers	-	4	-
Recreational Equipment	Golf Carts	-	-	-
Lawn and Garden Equipment	Lawn and Garden Tractors	-	654	-
Lawn and Garden Equipment	Lawn Mowers	-	1,776	-
Lawn and Garden Equipment	Leafblowers/Vacuums	-	400	-
Recreational Equipment	Motorcycles: Off-road	-	338	-
Lawn and Garden Equipment	Other Lawn and Garden Equipment	-	38	-
Industrial Equipment	Other Oil Field Equipment	-	-	-
Underground Mining Equipment	Other Underground Mining Equipment	-	-	-
Lawn and Garden Equipment	Rear Engine Riding Mowers	-	96	-
Lawn and Garden Equipment	Rotary Tillers < 6 HP	-	187	-
Lawn and Garden Equipment	Shredders < 6 HP	-	3	-
Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters	-	760	-
Lawn and Garden Equipment	Turf Equipment	-	8	-
	Total (tons/season)	2.13		
	Total (tons/day)	0.01		

Appendix E
Area Source Calculations

Used Oil Calculations:

1983 National burn rate (gallons/yr)	590,000,000
Prorated 2004 National burn rate (gallons/yr)	741,071,948
Prorated 2004 Mendenhall Consumption (gallons/yr)	33,632
Prorated 2018 Mendenhall Consumption (gallons/yr)	36,681

	2004	2018
AP-42 Table 1.3-1 EFs (lbs/1,000 gal)	0.4	0.4
Winter (lbs/season)	13	15
Winter (lbs/day)	0.07	0.08
Winter (tons/day)	0.000037	0.000040

Propane Calculations:

	Propane Throughput		
	2004 Juneau	2004 Mendenhall	2018 Mendenhall
gallons/year	711,392		
gallons/winter	366,321	157,503	171,779
gallons/summer	345,071	148,366	161,815

	PM10
PM10 EF (lbs/1000 gal)	0.4
2004 Winter (tpd)	0.00017
2004 Summer (tpd)	0.00016
2018 Winter (tpd)	0.00019
2018 Summer (tpd)	0.00018

Emission Factor: AP-42 Table 1.5-1, for Commercial Boilers

Open Burning (Firefighter Training) Calculations:

gallons burned/exercise:	200
Exercises/yr:	28
Total gallons burned/yr in MOA	5,600
Assumed gallons burned in 1999 in Mendenhall Valley:	273

	PM10
EFs (lbs/10^3 gal), AP-42 table 1.3-1	0.4
Summer tons	0.0001
Summer tpd	0.0000003

Structural Fires Calculations:

Data from Capital City Fire/Rescue Fire Marshal data on 2004 (Rich Etheridge, 907-586-0251, 8/18/05)

Incidences in 2004 (fires/year) =	27
% of fires in Valley =	70%
% of fires in Winter =	65%

	# fires/day
winter	0.0675
summer	0.0361

	PM10
EF (lbs/fire)	13.8
winter tpd	0.0005
summer tpd	0.0002

CARB's Index of Areawide Source Methodologies
Section 7.14: Structure and Automobile Fires (March 1999)

Fugitive Dust Calculations:

Windblown Dust (from 1988 PM10 Inventory)

glacial riverbeds	28.6	tons/yr
cleared areas	4.4	tons/yr
TOTAL Windblown Dust:	33.0	tons/yr

Calendar Year	Season	Paved Road PM10 (tpd)	Unpaved Road PM10 (tpd)	Windblown Dust (tpd)	TOTAL
2004	Winter	1.478	0.161	0.181	1.821
2004	Summer	4.135	0.190	0.181	4.506
2018	Winter	1.612	0.176	0.181	1.969
2018	Summer	4.510	0.207	0.181	4.898

Burn Barrels Calculations:

PM10 Emission Factor (lb/ton) =	16	EPA AP-42 Emissions from Municipal Refuse Burning, 10/92.	
Annual waste generation rate (lb/household) =	2137	CARB "ISOR Proposed ATCM to Reduce Emissions of TACs from Outdoor Residential Waste Burning," 1/4/02	
	CY2004	CY2018	
Total households in Valley =	4888	5331	
Other Assumptions:			
All burning in summer (prohibited in winter)			
Some percentage to trash pick up	90%	75%	
Sensitivity Analysis for range burned	10%	25%	
Summer PM10 Emissions (tpd) =	0.023	0.057	Summer 2004
Summer PM10 Emissions (tpd) =	0.025	0.062	Summer 2018

Winter 2004 Woodburning Emission Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Cords Burned by Survey Households (cords/season)	Cords Burned by Valley Households (tons/season)	Tons Burned by Valley Households (tons/season)	PM10 (#/ton of wood burned)	PM10 (tons/day)
Wood Stove	93	16.8%	819	65.3	575	690.40	30.6	0.058
Conventional Fireplace	53	9.6%	467	37.2	328	393.45	23.6	0.025
Modified Fireplace	12	2.2%	106	8.4	74	89.08	23.6	0.006
Other Non-Pellet woodburning device	4	0.7%	35	2.8	25	29.69	23.6	0.002
Total	162	29.2%	1,427	113.8	1,002	1202.6		
Total # Homes Equipped with One or More Non-Pellet Woodburning Unit	127	29.2%	1,427					0.091

				# 40 lb Stove Pellet bags	tons Pellets burned per season	Tons Burned by Valley Households	PM10 (#/ton of Pellets burned)	PM10 (tons/day)
Pellet Stove	22	5.1%	247	1,097	21.9	246.61	8.8	0.006
Total	435	34.3%	4,888					

TOTAL (tpd): 0.097

Summer 2004 Woodburning Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Cords Burned by Survey Households (cords/season)	Cords Burned by Valley Households (tons/season)	Tons Burned by Valley Households (tons/season)	PM10 (#/ton of wood burned)	PM10 (tons/day)
Wood Stove	93	16.8%	819	22.5	198	238.08	30.6	0.020
Conventional Fireplace	53	9.6%	467	12.8	113	135.68	23.6	0.009
Modified Fireplace	12	2.2%	106	2.9	26	30.72	23.6	0.002
Other Non-Pellet woodburning device	4	0.7%	35	1.0	9	10.24	23.6	0.001
Total	162	29.2%	1,427	39.2	346	414.7		
Total # Homes Equipped with One or More Non-Pellet Woodburning Unit	127	29.2%	1,427					0.031

				# 40 lb Stove Pellet bags	tons Pellets burned per season	Tons Burned by Valley Households	PM10 (#/ton of Pellets burned)	PM10 (tons/day)
Pellet Stove	22	5.1%	247	375	7.5	84.20	8.8	0.002
Total	435	34.3%	4,888					

TOTAL (tpd): 0.033

Winter 2018 Woodburning Emission Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Cords Burned by Survey Households (cords/season)	Cords Burned by Valley Households (tons/season)	Tons Burned by Valley Households (tons/season)	PM10 (#/ton of wood burned)	PM10 (tons/day)
Wood Stove	93	16.8%	893	65.3	627	752.97	30.6	0.063
Conventional Fireplace	53	9.6%	509	37.2	358	429.11	23.6	0.028
Modified Fireplace	12	2.2%	115	8.4	81	97.16	23.6	0.006
Other Non-Pellet woodburning device	4	0.7%	38	2.8	27	32.39	23.6	0.002
Total	162	29.2%	1,556	113.8	1,093	1311.6		
Total # Homes Equipped with One or More Non-Pellet Woodburning Unit	127	29.2%	1,556					0.099

				# 40 lb Stove Pellet bags	tons Pellets burned per season	Tons Burned by Valley Households	PM10 (#/ton of Pellets burned)	PM10 (tons/day)
Pellet Stove	22	5.1%	270	1,097	21.9	268.96	8.8	0.007
Total	435	34.3%	5,331					

TOTAL (tpd): 0.106

Summer 2018 Woodburning Emission Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Cords Burned by Survey Households (cords/season)	Cords Burned by Valley Households (tons/season)	Tons Burned by Valley Households (tons/season)	PM10 (#/ton of wood burned)	PM10 (tons/day)
Wood Stove	93	16.8%	893	22.5	216	259.66	30.6	0.022
Conventional Fireplace	53	9.6%	509	12.8	123	147.98	23.6	0.010
Modified Fireplace	12	2.2%	115	2.9	28	33.50	23.6	0.002
Other Non-Pellet woodburning device	4	0.7%	38	1.0	9	11.17	23.6	0.001
Total	162	29.2%	1,556	39.2	377	452.3		
Total # Homes Equipped with One or More Non-Pellet Woodburning Unit	127	29.2%	1,556					0.034

				# 40 lb Stove Pellet bags	tons Pellets burned per season	Tons Burned by Valley Households	PM10 (#/ton of Pellets burned)	PM10 (tons/day)
Pellet Stove	22	5.1%	270	375	7.5	91.83	8.8	0.002
Total	435	34.3%	5,331					

TOTAL (tpd): 0.036

2004 Fuel Oil Emission Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Average Winter Fuel Use for Survey Households (gal/hhold/season)	Average Summer Fuel Use for Survey Households (gal/hhold/year)	Total Winter Fuel Use for Valley Households (103 gallons/season)	Total Summer Fuel Use for Valley Households (103 gallons/year)	# PM_{10} per 10^3 gallons burned	Winter PM_{10} Emissions (tons/season)	Summer PM_{10} Emissions (tons/season)
Direct Vent Heater (i.e., Toyo, Monitor)	147	31.5%	1,537							
Central Oil Furnace	272	58.2%	2,845							
Total	419	89.7%	4,382	390	216	1,708	947	0.4	0.34	0.19
Total # Homes Equipped with One or More Oil Heating Units	390	89.7%	4,382							
Totals	435		4,888					tons/day:	0.002	0.001

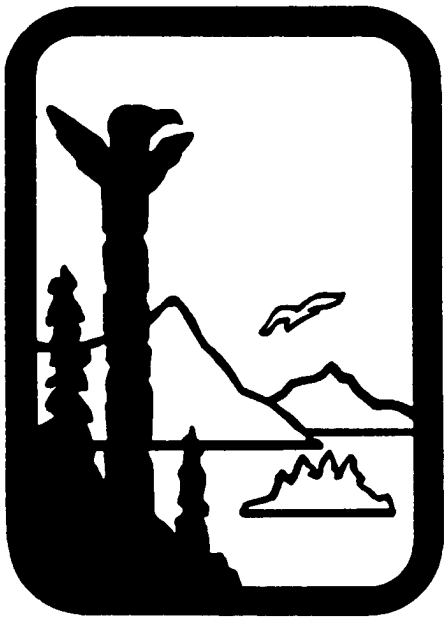
* Note that these percentages were normalized to 89.7% to account for homes with more than one type of unit.

2018 Fuel Oil Calculations:

Equipment Description	# Survey Households Equipped	% Survey Households Equipped*	Projected Valley Households Equipped	Average Winter Fuel Use for Survey Households (gal/hhold/season)	Average Summer Fuel Use for Survey Households (gal/hhold/year)	Total Winter Fuel Use for Valley Households (103 gallons/season)	Total Summer Fuel Use for Valley Households (103 gallons/year)	# PM_{10} per 10^3 gallons burned	Winter PM_{10} Emissions (tons/season)	Summer PM_{10} Emissions (tons/season)
Direct Vent Heater (i.e., Toyo, Mon	147	31.5%	1,677							
Central Oil Furnace	272	58.2%	3,103							
Total	419	89.7%	4,780	390	216	1,863	1,033	0.4	0.37	0.21
Total # Homes Equipped with One or More Oil Heating Units	390	89.7%	4,780							
Totals	435		5,331					tons/day:	0.002	0.001

* Note that these percentages were normalized to 89.7% to account for homes with more than one type of unit.

Alaska Department of Environmental Conservation



Amendments to:

State Air Quality Control Plan

Vol. III: Appendices

Appendix III.D.3.9

Public Review Draft
December 2008

24-Hr Design Value Determinations

Period	Design Value
1995-97	91.6
1996-98	88.1
1997-99	55.8
1998-00	44.2
1999-01	35.6
2000-02	36.9
2001-03	37.0
2002-04	41.2

Average Design Value 53.8

53.8 UG/M3 is much less than the 24-Hour Critical Design Value of 98 UG/M3 so the Area Qualifies for LMP

Annual Design Value Determinations

Year	Annual Mean	Period	Design Value
1995	15.6		
1996	15.3		
1997	10.7	1995-97	13.9
1998	10.6	1996-98	12.2
1999	6.6	1997-99	9.3
2000	7.5	1998-00	8.2
2001	6.8	1999-01	7.0
2002	7.8	2000-02	7.4
2003	9.6	2001-03	8.1
2004	9.2	2002-04	8.9

Average Design Value 9.4

9.4 UG/M3 is much less than Annual Critical Design Value of 40 UG/M3 so the Area Qualifies for LMP

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
19950317	1	743	1	0.002739726
19960209	1	742	0.998654105	0.002739726
19961203	1	741	0.99730821	0.002739726
19970222	1	740	0.995962315	0.002739726
19950803	2	739	0.99461642	0.002739726
19950910	2	738	0.993270525	0.002739726
19951008	2	737	0.99192463	0.002739726
19951019	2	736	0.990578735	0.002739726
19951226	2	735	0.98923284	0.002739726
19960109	2	734	0.987886945	0.002739726
19960207	2	733	0.98654105	0.002739726
19960210	2	732	0.985195155	0.002739726
19960310	2	731	0.98384926	0.002739726
19960628	2	730	0.982503365	0.002739726
19960922	2	729	0.98115747	0.002739726
19961026	2	728	0.979811575	0.002739726
19961204	2	727	0.97646568	0.002739726
19961205	2	726	0.977119785	0.002739726
19970206	2	725	0.97577389	0.002739726
19970221	2	724	0.974427995	0.002739726
19970223	2	723	0.9730821	0.002739726
19970416	2	722	0.971736205	0.002739726
19970907	2	721	0.97039031	0.002739726
19950206	3	720	0.969044415	0.002739726
19950813	3	719	0.96769852	0.002739726
19950831	3	718	0.966352624	0.002739726
19951001	3	717	0.965006729	0.002739726
19951007	3	716	0.963660834	0.002739726
19951011	3	715	0.962314939	0.002739726
19951116	3	714	0.960969044	0.002739726
19951225	3	713	0.959623149	0.002739726
19960206	3	712	0.958277254	0.002739726
19960211	3	711	0.956931359	0.002739726
19960311	3	710	0.955585464	0.002739726
19960427	3	709	0.954239569	0.002739726
19960612	3	708	0.952893674	0.002739726
19960630	3	707	0.951547779	0.002739726
19960821	3	706	0.950201884	0.002739726
19961105	3	705	0.948855989	0.002739726
19961128	3	704	0.947510094	0.002739726
19961129	3	703	0.946164199	0.002739726
19961217	3	702	0.944818304	0.002739726
19970112	3	701	0.943472409	0.002739726
19970118	3	700	0.942126514	0.002739726
19970320	3	699	0.940780619	0.002739726
19970324	3	698	0.939434724	0.002739726
19970329	3	697	0.938088829	0.002739726
19970822	3	696	0.936742934	0.002739726
19970923	3	695	0.935397039	0.002739726
19971016	3	694	0.934051144	0.002739726
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19950722	4	684	0.920592194	0.002739726
19950724	4	683	0.919246299	0.002739726
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19950730	4	681	0.916554509	0.002739726
19950908	4	680	0.915208614	0.002739726
19951004	4	679	0.913862719	0.002739726
19951009	4	678	0.912516824	0.002739726
19951012	4	677	0.911170929	0.002739726
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19951022	4	675	0.908479139	0.002739726
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19951219	4	672	0.904441454	0.002739726
19951222	4	671	0.903095559	0.002739726
19960107	4	670	0.901749664	0.002739726
19960108	4	669	0.900403769	0.002739726
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19960803	4	665	0.895020188	0.002739726
19960918	4	664	0.893674293	0.002739726
19961004	4	663	0.892328398	0.002739726
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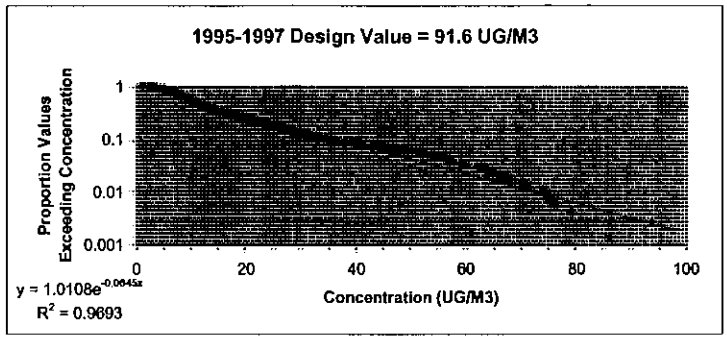
Design Value
91.6



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19970925	4	653	0.878869448	0.002739726
19950119	5	652	0.877523553	0.002739726
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19950720	8	506	0.68102288	0.002739726
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19951103	8	501	0.674293405	0.002739726
19951104	8	500	0.67294751	0.002739726
19960112	8	499	0.671601615	0.002739726
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19960223	8	497	0.668909825	0.002739726
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19960423	8	495	0.666218035	0.002739726
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19960926	8	484	0.65141319	0.002739726
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19970603	8	467	0.628532974	0.002739726
19970615	8	466	0.627187079	0.002739726
19970627	8	465	0.625841184	0.002739726
19970717	8	464	0.624495289	0.002739726
19970719	8	463	0.623149394	0.002739726
19970913	8	462	0.621803499	0.002739726
19970915	8	461	0.620457604	0.002739726
19950204	9	460	0.619111709	0.002739726
19950205	9	459	0.617765814	0.002739726
19950303	9	458	0.616419919	0.002739726
19950310	9	457	0.615074024	0.002739726
19950311	9	456	0.613728129	0.002739726
19950319	9	455	0.612382234	0.002739726
19950325	9	454	0.611036339	0.002739726
19950331	9	453	0.609690444	0.002739726
19950403	9	452	0.608344549	0.002739726
19950527	9	451	0.606998654	0.002739726
19950706	9	450	0.605652759	0.002739726
19950708	9	449	0.604306864	0.002739726
19950718	9	448	0.602960969	0.002739726
19950801	9	447	0.601615074	0.002739726
19950827	9	446	0.600269179	0.002739726
19951021	9	445	0.598923284	0.002739726
19960213	9	444	0.597577389	0.002739726
19960218	9	443	0.596231494	0.002739726
19960222	9	442	0.594885599	0.002739726
19960421	9	441	0.593539704	0.002739726
19960606	9	440	0.592193809	0.002739726
19960704	9	439	0.590847914	0.002739726
19960716	9	438	0.589502019	0.002739726
19960720	9	437	0.588156124	0.002739726
19960807	9	436	0.586810229	0.002739726
19960819	9	435	0.585464334	0.002739726
19960902	9	434	0.584118439	0.002739726
19961101	9	433	0.582772544	0.002739726
19970108	9	432	0.581426649	0.002739726
19970111	9	431	0.580060754	0.002739726
19970212	9	430	0.578734859	0.002739726
19970306	9	429	0.577388964	0.002739726
19970319	9	428	0.576043069	0.002739726
19970402	9	427	0.574697174	0.002739726
19970506	9	426	0.573351279	0.002739726
19970518	9	425	0.572005384	0.002739726
19970520	9	424	0.570659489	0.002739726
19970625	9	423	0.569313594	0.002739726
19970703	9	422	0.567967699	0.002739726
19970725	9	421	0.566621803	0.002739726
19970729	9	420	0.565275908	0.002739726
19970802	9	419	0.563930013	0.002739726
19970804	9	418	0.562584118	0.002739726
19970806	9	417	0.561238223	0.002739726
19970808	9	416	0.559892328	0.002739726
19970828	9	415	0.558546433	0.002739726
19970917	9	414	0.557200538	0.002739726
19971028	9	413	0.555854643	0.002739726
19971203	9	412	0.554508748	0.002739726
19950128	10	411	0.553162853	0.002739726
19950208	10	410	0.551816958	0.002739726
19950313	10	409	0.550471063	0.002739726

19950521	10	408	0.549125168	0.002739726
19950614	10	407	0.547779273	0.002739726
19950618	10	406	0.546433378	0.002739726
19950702	10	405	0.545087483	0.002739726
19950823	10	404	0.543741588	0.002739726
19950829	10	403	0.542395693	0.002739726
19951026	10	402	0.541049798	0.002739726
19951108	10	401	0.539703903	0.002739726
19951119	10	400	0.538358008	0.002739726
19951120	10	399	0.537012113	0.002739726
19951201	10	398	0.535666218	0.002739726
19960318	10	397	0.534320323	0.002739726
19960319	10	396	0.532974428	0.002739726
19960405	10	395	0.531628533	0.002739726
19960415	10	394	0.530282638	0.002739726
19960501	10	393	0.528936743	0.002739726
19960521	10	392	0.527590848	0.002739726
19960523	10	391	0.526244953	0.002739726
19960602	10	390	0.524899058	0.002739726
19960724	10	389	0.523553163	0.002739726
19960726	10	388	0.522207268	0.002739726
19960730	10	387	0.520861373	0.002739726
19960817	10	386	0.519515478	0.002739726
19960831	10	385	0.518169583	0.002739726
19960914	10	384	0.516823688	0.002739726
19961014	10	383	0.515477793	0.002739726
19961017	10	382	0.514131898	0.002739726
19961022	10	381	0.512786003	0.002739726
19961114	10	380	0.511440108	0.002739726
19961210	10	379	0.510094213	0.002739726
19961212	10	378	0.508748318	0.002739726
19970109	10	377	0.507402423	0.002739726
19970110	10	376	0.506056528	0.002739726
19970119	10	375	0.504710633	0.002739726
19970127	10	374	0.503364738	0.002739726
19970129	10	373	0.502018843	0.002739726
19970131	10	372	0.500672948	0.002739726
19970224	10	371	0.499327052	0.002739726
19970408	10	370	0.497961157	0.002739726
19970418	10	369	0.496635262	0.002739726
19970605	10	368	0.495289367	0.002739726
19970617	10	367	0.493943472	0.002739726
19970629	10	366	0.492597577	0.002739726
19970701	10	365	0.491251682	0.002739726
19970814	10	364	0.489905787	0.002739726
19970818	10	363	0.488559892	0.002739726
19970911	10	362	0.487213997	0.002739726
19971106	10	361	0.485868102	0.002739726
19950324	11	360	0.484522207	0.002739726
19950807	11	359	0.483176312	0.002739726
19950928	11	358	0.481830417	0.002739726
19951020	11	357	0.480484522	0.002739726
19951117	11	356	0.479138627	0.002739726
19951124	11	355	0.477792732	0.002739726
19960302	11	354	0.476446837	0.002739726
19960614	11	353	0.475100942	0.002739726
19960718	11	352	0.473755047	0.002739726
19960805	11	351	0.472409152	0.002739726
19961002	11	350	0.471063257	0.002739726
19961028	11	349	0.469717362	0.002739726
19961108	11	348	0.468371467	0.002739726
19961130	11	347	0.467025572	0.002739726
19961211	11	346	0.465679677	0.002739726
19970213	11	345	0.464333782	0.002739726
19970219	11	344	0.462987887	0.002739726
19970309	11	343	0.461641992	0.002739726
19970310	11	342	0.460296097	0.002739726
19970318	11	341	0.458950202	0.002739726
19970322	11	340	0.457604307	0.002739726
19970323	11	339	0.456258412	0.002739726
19970422	11	338	0.454912517	0.002739726
19970426	11	337	0.453566622	0.002739726
19970512	11	336	0.452220727	0.002739726
19970611	11	335	0.450874832	0.002739726
19970621	11	334	0.449528937	0.002739726
19970623	11	333	0.448183042	0.002739726
19970830	11	332	0.446837147	0.002739726
19971001	11	331	0.445491252	0.002739726
19971121	11	330	0.444145357	0.002739726
19971130	11	329	0.442799482	0.002739726
19950121	12	328	0.441453567	0.002739726
19950209	12	327	0.440107672	0.002739726
19950405	12	326	0.438761777	0.002739726
19950523	12	325	0.437415882	0.002739726

19950630	12	324	0.436069987	0.002739726
19950906	12	323	0.434724092	0.002739726
19951014	12	322	0.433378197	0.002739726
19951027	12	321	0.432032301	0.002739726
19951123	12	320	0.430686406	0.002739726
19951202	12	319	0.429340511	0.002739726
19960314	12	318	0.427994616	0.002739726
19960509	12	317	0.426648721	0.002739726
19960513	12	316	0.425302826	0.002739726
19960519	12	315	0.423956931	0.002739726
19960529	12	314	0.422611036	0.002739726
19960531	12	313	0.421265141	0.002739726
19960728	12	312	0.419919246	0.002739726
19960815	12	311	0.418573351	0.002739726
19960908	12	310	0.417227456	0.002739726
19960930	12	309	0.415881561	0.002739726
19961125	12	308	0.414535666	0.002739726
19961126	12	307	0.413189771	0.002739726
19961206	12	306	0.411843876	0.002739726
19961208	12	305	0.410497981	0.002739726
19961209	12	304	0.409152086	0.002739726
19961213	12	303	0.407806191	0.002739726
19970211	12	302	0.406460296	0.002739726
19970312	12	301	0.405114401	0.002739726
19970412	12	300	0.403768506	0.002739726
19970504	12	299	0.402422611	0.002739726
19970901	12	298	0.401076716	0.002739726
19970929	12	297	0.399730821	0.002739726
19950306	13	296	0.398384926	0.002739726
19950328	13	295	0.397039031	0.002739726
19950511	13	294	0.395693136	0.002739726
19950821	13	293	0.394347241	0.002739726
19951023	13	292	0.393001346	0.002739726
19951105	13	291	0.391655451	0.002739726
19951114	13	290	0.390309556	0.002739726
19951122	13	289	0.388963661	0.002739726
19951125	13	288	0.387617766	0.002739726
19951230	13	287	0.386271871	0.002739726
19960216	13	286	0.384925976	0.002739726
19960303	13	285	0.383580081	0.002739726
19960330	13	284	0.382234186	0.002739726
19960331	13	283	0.380888291	0.002739726
19960411	13	282	0.379542396	0.002739726
19960604	13	281	0.378196501	0.002739726
19960622	13	280	0.376850606	0.002739726
19960624	13	279	0.375504711	0.002739726
19960904	13	278	0.374158816	0.002739726
19961227	13	277	0.372812921	0.002739726
19970201	13	276	0.371467026	0.002739726
19970206	13	275	0.370121131	0.002739726
19970317	13	274	0.368775236	0.002739726
19970524	13	273	0.367429341	0.002739726
19970816	13	272	0.366083445	0.002739726
19950118	14	271	0.38473755	0.002739726
19950326	14	270	0.363391655	0.002739726
19950329	14	269	0.36204576	0.002739726
19950608	14	268	0.360699865	0.002739726
19950620	14	267	0.35935397	0.002739726
19950809	14	266	0.358008075	0.002739726
19951112	14	265	0.35666218	0.002739726
19951115	14	264	0.355316285	0.002739726
19951118	14	263	0.35397039	0.002739726
19951210	14	262	0.352624495	0.002739726
19951229	14	261	0.3512786	0.002739726
19960401	14	260	0.349932705	0.002739726
19961019	14	259	0.34858681	0.002739726
19961112	14	258	0.347240915	0.002739726
19961117	14	257	0.34589502	0.002739726
19961119	14	256	0.344549125	0.002739726
19961214	14	255	0.34320323	0.002739726
19970130	14	254	0.341857335	0.002739726
19970214	14	253	0.34051144	0.002739726
19970522	14	252	0.339165545	0.002739726
19971010	14	251	0.33781965	0.002739726
19950210	15	250	0.336473755	0.002739726
19950215	15	249	0.33512786	0.002739726
19950223	15	248	0.333781965	0.002739726
19950308	15	247	0.33243607	0.002739726
19950315	15	246	0.331090175	0.002739726
19950322	15	245	0.32974428	0.002739726
19950628	15	244	0.328398385	0.002739726
19950904	15	243	0.32705249	0.002739726
19950922	15	242	0.325706595	0.002739726
19960425	15	241	0.3243607	0.002739726

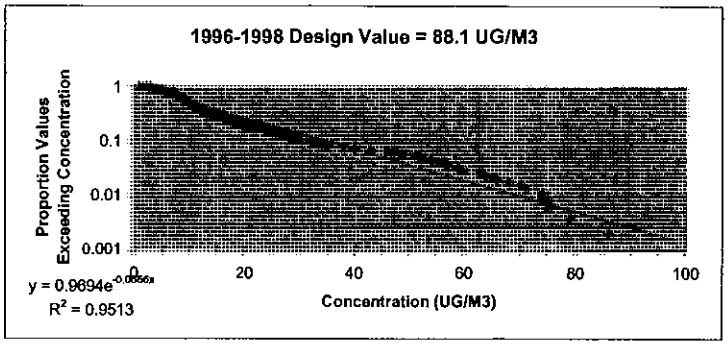
19960507	15	240	0.323014805	0.002739726
19960916	15	239	0.32166891	0.002739726
19970121	15	238	0.320323015	0.002739726
19970420	15	237	0.31897712	0.002739726
19971103	15	236	0.317631225	0.002739726
19950115	16	235	0.31628533	0.002739726
19950120	16	234	0.314939435	0.002739726
19950202	16	233	0.31359354	0.002739726
19950224	16	232	0.312247645	0.002739726
19950312	16	231	0.31090175	0.002739726
19950926	16	230	0.309555855	0.002739726
19951106	16	229	0.30820996	0.002739726
19960221	16	228	0.306864065	0.002739726
19960407	16	227	0.30551817	0.002739726
19961020	16	226	0.304172275	0.002739726
19961031	16	225	0.30282638	0.002739726
19961111	16	224	0.301480485	0.002739726
19970302	16	223	0.30013459	0.002739726
19970331	16	222	0.298788694	0.002739726
19970502	16	221	0.297442799	0.002739726
19950131	17	220	0.296096904	0.002739726
19950314	17	219	0.294751009	0.002739726
19950321	17	218	0.293405114	0.002739726
19950327	17	217	0.292059219	0.002739726
19950513	17	216	0.290713324	0.002739726
19950710	17	215	0.289367429	0.002739726
19951028	17	214	0.288021534	0.002739726
19951121	17	213	0.286675639	0.002739726
19951205	17	212	0.285329744	0.002739726
19960106	17	211	0.283983849	0.002739726
19960417	17	210	0.282637954	0.002739726
19960503	17	209	0.281292059	0.002739726
19961012	17	208	0.279946164	0.002739726
19961116	17	207	0.278600269	0.002739726
19961118	17	206	0.277254374	0.002739726
19961207	17	205	0.275908479	0.002739726
19970120	17	204	0.274562584	0.002739726
19970210	17	203	0.273216689	0.002739726
19970225	17	202	0.271870794	0.002739726
19970305	17	201	0.270524899	0.002739726
19950211	18	200	0.269179004	0.002739726
19950415	18	199	0.267833109	0.002739726
19950419	18	198	0.266487214	0.002739726
19950425	18	197	0.265141319	0.002739726
19950505	18	196	0.263795424	0.002739726
19950819	18	195	0.262449529	0.002739726
19951015	18	194	0.261103634	0.002739726
19951016	18	193	0.259757739	0.002739726
19951228	18	192	0.258411844	0.002739726
19951231	18	191	0.257065949	0.002739726
19960101	18	190	0.255720054	0.002739726
19960102	18	189	0.254374159	0.002739726
19960505	18	188	0.253028264	0.002739726
19960928	18	187	0.251682369	0.002739726
19961018	18	186	0.250336474	0.002739726
19961021	18	185	0.248990579	0.002739726
19970104	18	184	0.247644684	0.002739726
19970215	18	183	0.246296789	0.002739726
19970216	18	182	0.244952894	0.002739726
19970217	18	181	0.243606999	0.002739726
19970424	18	180	0.242261104	0.002739726
19971206	18	179	0.240915209	0.002739726
19950122	19	178	0.239569314	0.002739726
19950320	19	177	0.238223419	0.002739726
19950918	19	176	0.236877524	0.002739726
19951111	19	175	0.235531629	0.002739726
19951126	19	174	0.234185734	0.002739726
19951211	19	173	0.232839838	0.002739726
19960226	19	172	0.231493943	0.002739726
19960301	19	171	0.230148048	0.002739726
19960325	19	170	0.228802153	0.002739726
19961029	19	169	0.227456258	0.002739726
19961103	19	168	0.226110363	0.002739726
19961113	19	167	0.224764468	0.002739726
19971004	19	166	0.223418573	0.002739726
19950503	20	165	0.222072678	0.002739726
19950610	20	164	0.220726783	0.002739726
19960320	20	163	0.219380888	0.002739726
19960321	20	162	0.218034993	0.002739726
19960403	20	161	0.216689098	0.002739726
19960413	20	160	0.215343203	0.002739726
19961102	20	159	0.213997308	0.002739726
19961109	20	158	0.212651413	0.002739726
19970114	20	157	0.211305518	0.002739726

19970122	20	156	0.209959623	0.002739726
19950201	21	155	0.208613728	0.002739726
19950218	21	154	0.207267833	0.002739726
19950427	21	153	0.205921938	0.002739726
19960329	21	152	0.204576043	0.002739726
19961110	21	151	0.203230148	0.002739726
19970410	21	150	0.201884253	0.002739726
19950117	22	149	0.200538358	0.002739726
19950127	22	148	0.199192463	0.002739726
19950225	22	147	0.197846568	0.002739726
19950525	22	146	0.196500673	0.002739726
19960103	22	145	0.195154778	0.002739726
19970406	22	144	0.193808883	0.002739726
19950307	23	143	0.192462988	0.002739726
19950309	23	142	0.191117093	0.002739726
19950501	23	141	0.189771198	0.002739726
19950924	23	140	0.188425303	0.002739726
19951127	23	139	0.187079408	0.002739726
19951218	23	138	0.185733513	0.002739726
19960511	23	137	0.184387618	0.002739726
19961001	23	136	0.183041723	0.002739726
19970209	23	135	0.181695828	0.002739726
19950227	24	134	0.180349933	0.002739726
19950330	24	133	0.179004038	0.002739726
19950429	24	132	0.177658143	0.002739726
19950916	24	131	0.176312248	0.002739726
19951110	24	130	0.174966353	0.002739726
19961115	24	129	0.173620458	0.002739726
19970304	24	128	0.172274563	0.002739726
19970315	24	127	0.170928668	0.002739726
19971112	24	126	0.169582773	0.002739726
19950302	25	125	0.168236878	0.002739726
19950305	25	124	0.166890983	0.002739726
19950421	25	123	0.165545087	0.002739726
19960203	25	122	0.164199192	0.002739726
19961030	25	121	0.162853297	0.002739726
19961120	25	120	0.161507402	0.002739726
19961223	25	119	0.160161507	0.002739726
19970404	25	118	0.158815812	0.002739726
19950509	26	117	0.157469717	0.002739726
19951029	26	116	0.156123822	0.002739726
19960225	26	115	0.154777927	0.002739726
19971013	26	114	0.153432032	0.002739726
19950116	27	113	0.152086137	0.002739726
19950126	27	112	0.150740242	0.002739726
19950413	27	111	0.149394347	0.002739726
19960307	27	110	0.148048452	0.002739726
19961124	27	109	0.146702557	0.002739726
19970303	27	108	0.145356662	0.002739726
19970313	27	107	0.144010767	0.002739726
19971115	27	106	0.142664872	0.002739726
19950123	28	105	0.141318977	0.002739726
19950226	28	104	0.139973082	0.002739726
19950407	28	103	0.138627187	0.002739726
19951216	28	102	0.137281292	0.002739726
19960105	28	101	0.135935397	0.002739726
19960224	28	100	0.134589502	0.002739726
19960323	28	99	0.133243607	0.002739726
19970116	28	98	0.131897712	0.002739726
19970123	28	97	0.130551817	0.002739726
19950105	29	96	0.129205922	0.002739726
19951217	29	95	0.127660027	0.002739726
19960308	29	94	0.126514132	0.002739726
19960324	29	93	0.125168237	0.002739726
19960326	29	92	0.123822342	0.002739726
19960328	29	91	0.122476447	0.002739726
19950113	30	90	0.121130552	0.002739726
19950114	30	89	0.119784657	0.002739726
19950125	30	88	0.118438762	0.002739726
19950304	30	87	0.117092867	0.002739726
19950507	30	86	0.115746972	0.002739726
19951109	30	85	0.114401077	0.002739726
19970126	30	84	0.113055182	0.002739726
19970314	30	83	0.111709287	0.002739726
19950301	31	82	0.110363392	0.002739726
19951214	31	81	0.109017497	0.002739726
19960327	32	80	0.107671602	0.002739726
19950228	33	79	0.106325707	0.002739726
19960227	33	78	0.104979812	0.002739726
19960304	33	77	0.103633917	0.002739726
19960322	33	76	0.102288022	0.002739726
19961216	33	75	0.100942127	0.002739726
19961224	33	74	0.099596231	0.002739726
19951101	34	73	0.098250336	0.002739726

19970115	34	72	0.096904441	0.002739726
19971118	34	71	0.095558546	0.002739726
19950109	35	70	0.094212651	0.002739726
19951128	35	69	0.092866756	0.002739726
19960228	35	68	0.091520861	0.002739726
19960229	35	67	0.090174966	0.002739726
19951030	36	66	0.088829071	0.002739726
19951203	36	65	0.087483176	0.002739726
19951212	36	64	0.086137281	0.002739726
19950106	37	63	0.084791386	0.002739726
19970124	38	62	0.083445491	0.002739726
19950214	39	61	0.082099596	0.002739726
19950112	40	60	0.080753701	0.002739726
19960123	40	59	0.079407806	0.002739726
19960127	40	58	0.078061911	0.002739726
19950817	41	57	0.076716016	0.002739726
19950104	43	56	0.075370121	0.002739726
19961215	43	55	0.074024226	0.002739726
19950124	44	54	0.072678331	0.002739726
19951130	45	53	0.071332436	0.002739726
19951031	46	52	0.069986541	0.002739726
19951215	46	51	0.086640646	0.002739726
19961230	46	50	0.067294751	0.002739726
19960113	47	49	0.065948856	0.002739726
19960202	47	48	0.064602961	0.002739726
19951213	48	47	0.063257066	0.002739726
19961228	48	46	0.061911171	0.002739726
19961226	49	45	0.060565276	0.002739726
19951209	50	44	0.059219381	0.002739726
19960104	51	43	0.057873486	0.002739726
19951129	52	42	0.056527591	0.002739726
19960124	52	41	0.055181696	0.002739726
19961121	52	40	0.053835801	0.002739726
19961122	52	39	0.052489906	0.002739726
19970125	52	38	0.051144011	0.002739726
19960409	53	37	0.049798116	0.002739726
19950212	54	36	0.048452221	0.002739726
19961225	54	35	0.047106326	0.002739726
19951208	55	34	0.045760431	0.002739726
19960122	55	33	0.044414536	0.002739726
19960125	56	32	0.043068641	0.002739726
19950103	57	31	0.041722746	0.002739726
19950107	57	30	0.040376851	0.002739726
19961123	57	29	0.039030956	0.002739726
19961229	57	28	0.037685061	0.002739726
19961231	57	27	0.036339166	0.002739726
19950213	59	26	0.034993271	0.002739726
19960115	59	25	0.033647376	0.002739726
19960126	59	24	0.03230148	0.062739726
19970101	60	23	0.030955585	0.002739726
19950216	62	22	0.02960969	0.002739726
19960201	63	21	0.028263795	0.002739726
19970103	63	20	0.0269179	0.002739726
19950108	64	19	0.025572005	0.002739726
19950111	64	18	0.02422611	0.002739726
19960131	64	17	0.022880215	0.002739726
19960121	65	16	0.02153432	0.002739726
19960129	66	15	0.020188425	0.002739726
19950217	67	14	0.01884253	0.002739726
19950110	68	13	0.017496635	0.002739726
19960119	68	12	0.01615074	0.002739726
19970102	70	11	0.014804845	0.002739726
19950101	71	10	0.01345895	0.002739726
19960130	71	9	0.012113055	0.002739726
19960117	74	8	0.01076716	0.002739726
19960118	74	7	0.009421265	0.002739726
19960114	75	6	0.00807537	0.002739726
19960128	75	5	0.006729475	0.002739726
19950102	76	4	0.00538358	0.002739726
19960116	79	3	0.004037685	0.002739726
19951207	86	2	0.00269179	0.002739726
19960120	86	1	0.001345895	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
19960209	1	547	1	0.002739726
19961203	1	546	0.998171846	0.002739726
19970222	1	545	0.996343693	0.002739726
19960109	2	544	0.994515539	0.002739726
19960207	2	543	0.992687386	0.002739726
19960210	2	542	0.990859232	0.002739726
19960310	2	541	0.989031079	0.002739726
19960628	2	540	0.987202925	0.002739726
19960922	2	539	0.985374771	0.002739726
19961026	2	538	0.983546618	0.002739726
19961204	2	537	0.981718464	0.002739726
19961205	2	536	0.979890311	0.002739726
19970206	2	535	0.978062157	0.002739726
19970221	2	534	0.976234004	0.002739726
19970223	2	533	0.97440585	0.002739726
19970416	2	532	0.972577697	0.002739726
19970907	2	531	0.970749543	0.002739726
19980222	2	530	0.968921389	0.002739726
19981210	2	529	0.967093236	0.002739726
19960206	3	528	0.965265082	0.002739726
19960211	3	527	0.963436929	0.002739726
19960311	3	526	0.961608775	0.002739726
19960427	3	525	0.959780622	0.002739726
19960612	3	524	0.957952468	0.002739726
19960630	3	523	0.956124314	0.002739726
19960821	3	522	0.954296161	0.002739726
19961105	3	521	0.952468007	0.002739726
19961128	3	520	0.950639854	0.002739726
19961129	3	519	0.9488117	0.002739726
19961217	3	518	0.946983547	0.002739726
19970112	3	517	0.945155393	0.002739726
19970118	3	516	0.943327239	0.002739726
19970320	3	515	0.941499086	0.002739726
19970324	3	514	0.939670932	0.002739726
19970329	3	513	0.937842779	0.002739726
19970822	3	512	0.936014625	0.002739726
19970923	3	511	0.934186472	0.002739726
19971016	3	510	0.932358318	0.002739726
19971127	3	509	0.930530165	0.002739726
19971218	3	508	0.928702011	0.002739726
19971221	3	507	0.926873857	0.002739726
19980213	3	506	0.925045704	0.002739726
19981017	3	505	0.92321755	0.002739726
19981020	3	504	0.921389397	0.002739726
19960107	4	503	0.919561243	0.002739726
19960108	4	502	0.91773309	0.002739726
19960316	4	501	0.915904936	0.002739726
19960608	4	500	0.914076782	0.002739726
19960702	4	499	0.912248629	0.002739726
19960803	4	498	0.910420475	0.002739726
19960918	4	497	0.908592322	0.002739726
19961004	4	496	0.906764168	0.002739726
19961013	4	495	0.904936015	0.002739726
19961104	4	494	0.903107861	0.002739726
19961106	4	493	0.901279707	0.002739726
19961127	4	492	0.899451554	0.002739726
19970325	4	491	0.8976234	0.002739726
19970328	4	490	0.895795247	0.002739726
19970812	4	489	0.893967093	0.002739726
19970903	4	488	0.89213894	0.002739726
19970919	4	487	0.890310786	0.002739726
19970925	4	486	0.888482633	0.002739726
19980219	4	485	0.886654479	0.002739726
19980225	4	484	0.884826325	0.002739726
19980315	4	483	0.882998172	0.002739726
19980923	4	482	0.881170018	0.002739726
19960110	5	481	0.879341865	0.002739726
19960219	5	480	0.877513711	0.002739726
19960220	5	479	0.875685558	0.002739726
19960313	5	478	0.873857404	0.002739726
19960317	5	477	0.87202925	0.002739726
19960525	5	476	0.870201097	0.002739726
19960616	5	475	0.868372943	0.002739726
19960626	5	474	0.86654479	0.002739726
19960714	5	473	0.864716636	0.002739726
19960809	5	472	0.862888483	0.002739726
19960811	5	471	0.861060329	0.002739726
19960813	5	470	0.859232176	0.002739726
19960823	5	469	0.857404022	0.002739726
19960910	5	468	0.855575868	0.002739726
19960924	5	467	0.853747715	0.002739726
19961067	5	466	0.851919561	0.002739726
19961008	5	465	0.850091408	0.002739726
19961027	5	464	0.848263254	0.002739726
19961220	5	463	0.846435101	0.002739726
19970202	5	462	0.844606947	0.002739726
19970204	5	461	0.842778793	0.002739726

Design Value
88.1



19970205	5	460	0.84095064	0.002739726
19970327	5	459	0.839122486	0.002739726
19970414	5	458	0.837294333	0.002739726
19970601	5	457	0.835466179	0.002739726
19970613	5	456	0.833638026	0.002739726
19970713	5	455	0.831809872	0.002739726
19970715	5	454	0.829981718	0.002739726
19970731	5	453	0.828153565	0.002739726
19970927	5	452	0.826325411	0.002739726
19971007	5	451	0.824497258	0.002739726
19971025	5	450	0.822669104	0.002739726
19971031	5	449	0.820840951	0.002739726
19971124	5	448	0.819012797	0.002739726
19971212	5	447	0.817184644	0.002739726
19971227	5	446	0.81535649	0.002739726
19980330	5	445	0.813528336	0.002739726
19980417	5	444	0.811700183	0.002739726
19980426	5	443	0.809872029	0.002739726
19981005	5	442	0.808043876	0.002739726
19981008	5	441	0.806215722	0.002739726
19981204	5	440	0.804387569	0.002739726
19960111	6	439	0.802559415	0.002739726
19960208	6	438	0.800731261	0.002739726
19960215	6	437	0.798903108	0.002739726
19960312	6	436	0.797074954	0.002739726
19960429	6	435	0.795246801	0.002739726
19960710	6	434	0.793418047	0.002739726
19960722	6	433	0.791590494	0.002739726
19960920	6	432	0.78976234	0.002739726
19961003	6	431	0.787934186	0.002739726
19961009	6	430	0.786106033	0.002739726
19961015	6	429	0.784277879	0.002739726
19961016	6	428	0.782449726	0.002739726
19961025	6	427	0.780621572	0.002739726
19961107	6	426	0.778793419	0.002739726
19961201	6	425	0.776965265	0.002739726
19961202	6	424	0.775137112	0.002739726
19970107	6	423	0.773308958	0.002739726
19970203	6	422	0.771480804	0.002739726
19970301	6	421	0.769652651	0.002739726
19970330	6	420	0.767824497	0.002739726
19970428	6	419	0.765996344	0.002739726
19970508	6	418	0.76416819	0.002739726
19970607	6	417	0.762340037	0.002739726
19970609	6	416	0.760511883	0.002739726
19970619	6	415	0.758683729	0.002739726
19970709	6	414	0.756855576	0.002739726
19970711	6	413	0.755027422	0.002739726
19970722	6	412	0.753199269	0.002739726
19970909	6	411	0.751371115	0.002739726
19971022	6	410	0.749542962	0.002739726
19971224	6	409	0.747714808	0.002739726
19980318	6	408	0.745886654	0.002739726
19980511	6	407	0.744058501	0.002739726
19980520	6	406	0.742230347	0.002739726
19980920	6	405	0.740402194	0.002739726
19981119	6	404	0.73857404	0.002739726
19960205	7	403	0.736745887	0.002739726
19960214	7	402	0.734917733	0.002739726
19960217	7	401	0.73308958	0.002739726
19960305	7	400	0.731261426	0.002739726
19960306	7	399	0.729433272	0.002739726
19960309	7	398	0.727605119	0.002739726
19960419	7	397	0.725776965	0.002739726
19960527	7	396	0.723948812	0.002739726
19960610	7	395	0.722120658	0.002739726
19960706	7	394	0.720292505	0.002739726
19960712	7	393	0.718464351	0.002739726
19960912	7	392	0.716636197	0.002739726
19961005	7	391	0.714808044	0.002739726
19961010	7	390	0.71297989	0.002739726
19961011	7	389	0.711151737	0.002739726
19961024	7	388	0.709323583	0.002739726
19961219	7	387	0.70749543	0.002739726
19970113	7	386	0.705667276	0.002739726
19970207	7	385	0.703839122	0.002739726
19970220	7	384	0.702010969	0.002739726
19970308	7	383	0.700182815	0.002739726
19970311	7	382	0.698354662	0.002739726
19970430	7	381	0.696526508	0.002739726
19970510	7	380	0.694698355	0.002739726
19970516	7	379	0.692870201	0.002739726
19970526	7	378	0.691042048	0.002739726
19970530	7	377	0.689213894	0.002739726
19970820	7	376	0.68738574	0.002739726
19970824	7	375	0.685557587	0.002739726
19970826	7	374	0.683729433	0.002739726
19970921	7	373	0.68190128	0.002739726

19980105	7	372	0.680073126	0.002739726
19980926	7	371	0.678244973	0.002739726
19980929	7	370	0.676416819	0.002739726
19960112	8	369	0.674588665	0.002739726
19960212	8	368	0.672760512	0.002739726
19960223	8	367	0.670932358	0.002739726
19960315	8	366	0.669104205	0.002739726
19960423	8	365	0.667276051	0.002739726
19960515	8	364	0.665447898	0.002739726
19960517	8	363	0.663619744	0.002739726
19960618	8	362	0.66179159	0.002739726
19960620	8	361	0.659963437	0.002739726
19960708	8	360	0.658135283	0.002739726
19960801	8	359	0.65630713	0.002739726
19960825	8	358	0.654478976	0.002739726
19960827	8	357	0.652650823	0.002739726
19960829	8	356	0.650822669	0.002739726
19960906	8	355	0.648994516	0.002739726
19960926	8	354	0.647166362	0.002739726
19961006	8	353	0.645338208	0.002739726
19961023	8	352	0.643510055	0.002739726
19961218	8	351	0.641681901	0.002739726
19961222	8	350	0.639853748	0.002739726
19970117	8	349	0.638025594	0.002739726
19970128	8	348	0.636197441	0.002739726
19970218	8	347	0.634369287	0.002739726
19970226	8	346	0.632541133	0.002739726
19970227	8	345	0.63071298	0.002739726
19970228	8	344	0.628884826	0.002739726
19970307	8	343	0.627056673	0.002739726
19970316	8	342	0.625228519	0.002739726
19970321	8	341	0.623400366	0.002739726
19970326	8	340	0.621572212	0.002739726
19970514	8	339	0.619744059	0.002739726
19970528	8	338	0.617915905	0.002739726
19970603	8	337	0.616087751	0.002739726
19970615	8	336	0.614259598	0.002739726
19970627	8	335	0.612431444	0.002739726
19970717	8	334	0.610603291	0.002739726
19970719	8	333	0.608775137	0.002739726
19970913	8	332	0.606946984	0.002739726
19970915	8	331	0.60511883	0.002739726
19980210	8	330	0.603290676	0.002739726
19980216	8	329	0.601462523	0.002739726
19980408	8	328	0.599634369	0.002739726
19980502	8	327	0.597806216	0.002739726
19981014	8	326	0.595978062	0.002739726
19981207	8	325	0.594149909	0.002739726
19960213	9	324	0.592321755	0.002739726
19960218	9	323	0.590493601	0.002739726
19960222	9	322	0.588665448	0.002739726
19960421	9	321	0.586837294	0.002739726
19960606	9	320	0.585009141	0.002739726
19960704	9	319	0.583180987	0.002739726
19960716	9	318	0.581352834	0.002739726
19960720	9	317	0.57952468	0.002739726
19960807	9	316	0.577696527	0.002739726
19960819	9	315	0.575868373	0.002739726
19960902	9	314	0.574040219	0.002739726
19961101	9	313	0.572212066	0.002739726
19970108	9	312	0.570383912	0.002739726
19970111	9	311	0.568555759	0.002739726
19970212	9	310	0.566727605	0.002739726
19970306	9	309	0.564899452	0.002739726
19970319	9	308	0.563071298	0.002739726
19970402	9	307	0.561243144	0.002739726
19970506	9	306	0.559414991	0.002739726
19970518	9	305	0.557586837	0.002739726
19970520	9	304	0.555758684	0.002739726
19970625	9	303	0.55393053	0.002739726
19970703	9	302	0.552102377	0.002739726
19970725	9	301	0.550274223	0.002739726
19970729	9	300	0.548446069	0.002739726
19970802	9	299	0.546617916	0.002739726
19970804	9	298	0.544789762	0.002739726
19970806	9	297	0.542961609	0.002739726
19970808	9	296	0.541133455	0.002739726
19970828	9	295	0.539305302	0.002739726
19970917	9	294	0.537477148	0.002739726
19971028	9	293	0.535648995	0.002739726
19971203	9	292	0.533820841	0.002739726
19980402	9	291	0.531992687	0.002739726
19980411	9	290	0.530164534	0.002739726
19980423	9	289	0.52833638	0.002739726
19980508	9	288	0.526508227	0.002739726
19981026	9	287	0.524680073	0.002739726
19981122	9	286	0.52285192	0.002739726
19960318	10	285	0.521023766	0.002739726

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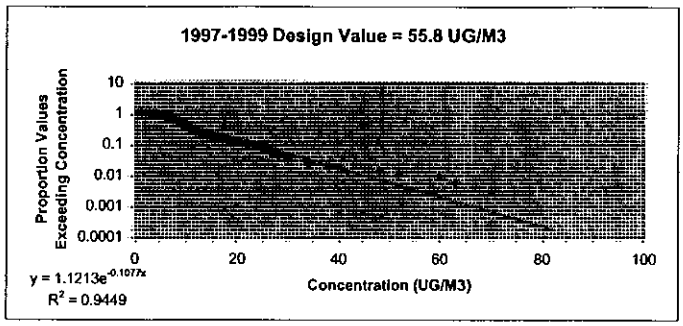
19960405	10	283	0.517367459	0.002739726
19960415	10	282	0.515539305	0.002739726
19960501	10	281	0.513711152	0.002739726
19960521	10	280	0.511882998	0.002739726
19960523	10	279	0.510054845	0.002739726
19960602	10	278	0.508226691	0.002739726
19960724	10	277	0.506398537	0.002739726
19960726	10	276	0.504570384	0.002739726
19960730	10	275	0.50274223	0.002739726
19960817	10	274	0.500914077	0.002739726
19960831	10	273	0.499085923	0.002739726
19960914	10	272	0.49725777	0.002739726
19961014	10	271	0.495429616	0.002739726
19961017	10	270	0.493601463	0.002739726
19961022	10	269	0.491773309	0.002739726
19961114	10	268	0.489945155	0.002739726
19961210	10	267	0.488117002	0.002739726
19961212	10	266	0.486288848	0.002739726
19970109	10	265	0.484460695	0.002739726
19970110	10	264	0.482632541	0.002739726
19970119	10	263	0.480804388	0.002739726
19970127	10	262	0.478976234	0.002739726
19970129	10	261	0.47714808	0.002739726
19970131	10	260	0.475319927	0.002739726
19970224	10	259	0.473491773	0.002739726
19970408	10	258	0.47166362	0.002739726
19970418	10	257	0.469835466	0.002739726
19970605	10	256	0.468007313	0.002739726
19970617	10	255	0.466179159	0.002739726
19970629	10	254	0.464351005	0.002739726
19970701	10	253	0.462522852	0.002739726
19970814	10	252	0.460694698	0.002739726
19970818	10	251	0.458866545	0.002739726
19970911	10	250	0.457038391	0.002739726
19971106	10	249	0.455210238	0.002739726
19980117	10	248	0.453382084	0.002739726
19980312	10	247	0.451553931	0.002739726
19980327	10	246	0.449725777	0.002739726
19980405	10	245	0.447897623	0.002739726
19980505	10	244	0.44606947	0.002739726
19981023	10	243	0.444241316	0.002739726
19981101	10	242	0.442413163	0.002739726
19981201	10	241	0.440585009	0.002739726
19960302	11	240	0.438756856	0.002739726
19960614	11	239	0.436928702	0.002739726
19960718	11	238	0.435100548	0.002739726
19960805	11	237	0.433272395	0.002739726
19961002	11	236	0.431444241	0.002739726
19961028	11	235	0.429616088	0.002739726
19961108	11	234	0.427787934	0.002739726
19961130	11	233	0.425959781	0.002739726
19961211	11	232	0.424131627	0.002739726
19970213	11	231	0.422303473	0.002739726
19970219	11	230	0.42047532	0.002739726
19970309	11	229	0.418647166	0.002739726
19970310	11	228	0.416819013	0.002739726
19970318	11	227	0.414990859	0.002739726
19970322	11	226	0.413162706	0.002739726
19970323	11	225	0.411334552	0.002739726
19970422	11	224	0.409506399	0.002739726
19970426	11	223	0.407678245	0.002739726
19970512	11	222	0.405850091	0.002739726
19970611	11	221	0.404021938	0.002739726
19970621	11	220	0.402193784	0.002739726
19970623	11	219	0.400365631	0.002739726
19970830	11	218	0.398537477	0.002739726
19971001	11	217	0.396709324	0.002739726
19971121	11	216	0.39488117	0.002739726
19971130	11	215	0.393053016	0.002739726
19981002	11	214	0.391224863	0.002739726
19981104	11	213	0.389396709	0.002739726
19981213	11	212	0.387568556	0.002739726
19960314	12	211	0.385740402	0.002739726
19960509	12	210	0.383912249	0.002739726
19960513	12	209	0.382084095	0.002739726
19960519	12	208	0.380255941	0.002739726
19960529	12	207	0.378427788	0.002739726
19960531	12	206	0.376599634	0.002739726
19960728	12	205	0.374771481	0.002739726
19960815	12	204	0.372943327	0.002739726
19960908	12	203	0.371115174	0.002739726
19960930	12	202	0.36928702	0.002739726
19961125	12	201	0.367458867	0.002739726
19961126	12	200	0.365630713	0.002739726
19961206	12	199	0.363802559	0.002739726
19961208	12	198	0.361974406	0.002739726
19961209	12	197	0.360146252	0.002739726

19961213	12	196	0.358318099	0.002739726
19970211	12	195	0.356489945	0.002739726
19970312	12	194	0.354661792	0.002739726
19970412	12	193	0.352833638	0.002739726
19970504	12	192	0.351005484	0.002739726
19970901	12	191	0.349177331	0.002739726
19970929	12	190	0.347349177	0.002739726
19980129	12	189	0.345521024	0.002739726
19980201	12	188	0.34369287	0.002739726
19980429	12	187	0.341864717	0.002739726
19980514	12	186	0.340036563	0.002739726
19980517	12	185	0.33820841	0.002739726
19960216	13	184	0.336380256	0.002739726
19960303	13	183	0.334552102	0.002739726
19960330	13	182	0.332723949	0.002739726
19960331	13	181	0.330895795	0.002739726
19960411	13	180	0.329067642	0.002739726
19960604	13	179	0.327239488	0.002739726
19960622	13	178	0.325411335	0.002739726
19960624	13	177	0.323583181	0.002739726
19960904	13	176	0.321755027	0.002739726
19961227	13	175	0.319926874	0.002739726
19970201	13	174	0.31809872	0.002739726
19970208	13	173	0.316270567	0.002739726
19970317	13	172	0.314442413	0.002739726
19970524	13	171	0.31261426	0.002739726
19970816	13	170	0.310786106	0.002739726
19980126	13	169	0.308957952	0.002739726
19981113	13	168	0.307129799	0.002739726
19981128	13	167	0.305301645	0.002739726
19960401	14	166	0.303473492	0.002739726
19961019	14	165	0.301645338	0.002739726
19961112	14	164	0.299817185	0.002739726
19961117	14	163	0.297989031	0.002739726
19961119	14	162	0.296160878	0.002739726
19961214	14	161	0.294332724	0.002739726
19970130	14	160	0.29250457	0.002739726
19970214	14	159	0.290676417	0.002739726
19970522	14	158	0.288848263	0.002739726
19971010	14	157	0.28702011	0.002739726
19980114	14	156	0.285191956	0.002739726
19980324	14	155	0.283363803	0.002739726
19980414	14	154	0.281535649	0.002739726
19981011	14	153	0.279707495	0.002739726
19960425	15	152	0.277879342	0.002739726
19960507	15	151	0.276051188	0.002739726
19960916	15	150	0.274223035	0.002739726
19970121	15	149	0.272394881	0.002739726
19970420	15	148	0.270566728	0.002739726
19971103	15	147	0.268738574	0.002739726
19981125	15	146	0.26691042	0.002739726
19960221	16	145	0.265082267	0.002739726
19960407	16	144	0.263254113	0.002739726
19961020	16	143	0.26142596	0.002739726
19961031	16	142	0.259597806	0.002739726
19961111	16	141	0.257769653	0.002739726
19970302	16	140	0.255941499	0.002739726
19970331	16	139	0.254113346	0.002739726
19970502	16	138	0.252285192	0.002739726
19980523	16	137	0.250457038	0.002739726
19960106	17	136	0.248628885	0.002739726
19960417	17	135	0.246800731	0.002739726
19960503	17	134	0.244972578	0.002739726
19961012	17	133	0.243144424	0.002739726
19961116	17	132	0.241316271	0.002739726
19961118	17	131	0.239488117	0.002739726
19961207	17	130	0.237659963	0.002739726
19970120	17	129	0.23583181	0.002739726
19970210	17	128	0.234003656	0.002739726
19970225	17	127	0.232175503	0.002739726
19970305	17	126	0.230347349	0.002739726
19981116	17	125	0.228519196	0.002739726
19981231	17	124	0.226691042	0.002739726
19960101	18	123	0.224862888	0.002739726
19960102	18	122	0.223034735	0.002739726
19960505	18	121	0.221206581	0.002739726
19960928	18	120	0.219378428	0.002739726
19961018	18	119	0.217550274	0.002739726
19961021	18	118	0.215722121	0.002739726
19970104	18	117	0.213893987	0.002739726
19970215	18	116	0.212065814	0.002739726
19970216	18	115	0.21023766	0.002739726
19970217	18	114	0.208409506	0.002739726
19970424	18	113	0.206581353	0.002739726
19971206	18	112	0.204753199	0.002739726
19960226	19	111	0.202925046	0.002739726
19960301	19	110	0.201096892	0.002739726
19960325	19	109	0.199268739	0.002739726

19961029	19	108	0.197440585	0.002739726
19961103	19	107	0.195612431	0.002739726
19961113	19	106	0.193784278	0.002739726
19971004	19	105	0.191956124	0.002739726
19960320	20	104	0.190127971	0.002739726
19960321	20	103	0.188299817	0.002739726
19960403	20	102	0.186471664	0.002739726
19960413	20	101	0.18464351	0.002739726
19961102	20	100	0.182815356	0.002739726
19961109	20	99	0.180987203	0.002739726
19970114	20	98	0.179159049	0.002739726
19970122	20	97	0.177330896	0.002739726
19960329	21	96	0.175502742	0.002739726
19961110	21	95	0.173674589	0.002739726
19970410	21	94	0.171846435	0.002739726
19980204	21	93	0.170018282	0.002739726
19980303	21	92	0.168190128	0.002739726
19960103	22	91	0.166361974	0.002739726
19970406	22	90	0.164533821	0.002739726
19980207	22	89	0.162705667	0.002739726
19960511	23	88	0.160877514	0.002739726
19961001	23	87	0.15904936	0.002739726
19970209	23	86	0.157221207	0.002739726
19961115	24	85	0.155393053	0.002739726
19970304	24	84	0.153564899	0.002739726
19970315	24	83	0.151736746	0.002739726
19971112	24	82	0.149908592	0.002739726
19980111	24	81	0.148080439	0.002739726
19960203	25	80	0.146252285	0.002739726
19961030	25	79	0.144424132	0.002739726
19961120	25	78	0.142595978	0.002739726
19961223	25	77	0.140767824	0.002739726
19970404	25	76	0.138939671	0.002739726
19980228	25	75	0.137111517	0.002739726
19960225	26	74	0.135283364	0.002739726
19971013	26	73	0.13345521	0.002739726
19980321	26	72	0.131627057	0.002739726
19981107	26	71	0.129798903	0.002739726
19960307	27	70	0.12797075	0.002739726
19961124	27	69	0.126142596	0.002739726
19970303	27	68	0.124314442	0.002739726
19970313	27	67	0.122486289	0.002739726
19971115	27	66	0.120658135	0.002739726
19980108	27	65	0.118829982	0.002739726
19960105	28	64	0.117001828	0.002739726
19960224	28	63	0.115173675	0.002739726
19960323	28	62	0.113345521	0.002739726
19970116	28	61	0.111517367	0.002739726
19970123	28	60	0.109689214	0.002739726
19981228	28	59	0.10786106	0.002739726
19960308	29	58	0.106032907	0.002739726
19960324	29	57	0.104204753	0.002739726
19960326	29	56	0.1023766	0.002739726
19960328	29	55	0.100548446	0.002739726
19970126	30	54	0.098720293	0.002739726
19970314	30	53	0.096892139	0.002739726
19981219	30	52	0.095063985	0.002739726
19960327	32	51	0.093235832	0.002739726
19960227	33	50	0.091407678	0.002739726
19960304	33	49	0.089579525	0.002739726
19960322	33	48	0.087751371	0.002739726
19961216	33	47	0.085923218	0.002739726
19961224	33	46	0.084095064	0.002739726
19970115	34	45	0.08226691	0.002739726
19971118	34	44	0.080438757	0.002739726
19981029	34	43	0.078610603	0.002739726
19960228	35	42	0.07678245	0.002739726
19960229	35	41	0.074954296	0.002739726
19970124	38	40	0.073126143	0.002739726
19960123	40	39	0.071297989	0.002739726
19960127	40	38	0.069469835	0.002739726
19980306	40	37	0.067641682	0.002739726
19961215	43	36	0.065813528	0.002739726
19961230	46	35	0.063985375	0.002739726
19960113	47	34	0.062157221	0.002739726
19960202	47	33	0.060329068	0.002739726
19961228	48	32	0.058500914	0.002739726
19981225	48	31	0.056672761	0.002739726
19961226	49	30	0.054844607	0.002739726
19960104	51	29	0.053016453	0.002739726
19960124	52	28	0.0511883	0.002739726
19961121	52	27	0.049360146	0.002739726
19961122	52	26	0.047531993	0.002739726
19970125	52	25	0.045703839	0.002739726
19960409	53	24	0.043875686	0.002739726
19961225	54	23	0.042047532	0.002739726
19960122	55	22	0.040219378	0.002739726
19960125	56	21	0.038391225	0.002739726

19961123	57	20	0.036563071	0.002739726
19961229	57	19	0.034734918	0.002739726
19961231	57	18	0.032906764	0.002739726
19960115	59	17	0.031078611	0.002739726
19960126	59	16	0.029250457	0.002739726
19970101	60	15	0.027422303	0.002739726
19960201	63	14	0.02559415	0.002739726
19970103	63	13	0.023765996	0.002739726
19960131	64	12	0.021937843	0.002739726
19960121	65	11	0.020109689	0.002739726
19960129	66	10	0.018281536	0.002739726
19960119	68	9	0.016453382	0.002739726
19970102	70	8	0.014625229	0.002739726
19960130	71	7	0.012797075	0.002739726
19960117	74	6	0.010968921	0.002739726
19960118	74	5	0.009140768	0.002739726
19960114	75	4	0.007312614	0.002739726
19960128	75	3	0.005484461	0.002739726
19960116	79	2	0.003656307	0.002739726
19960120	86	1	0.001828154	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365	Design Value
19970222	1	387	1	0.002739726	55.8
19990915	1	386	0.997416021	0.002739726	
19991018	1	385	0.994832041	0.002739726	
19991123	1	384	0.992248062	0.002739726	
19991228	1	383	0.989664083	0.002739726	
19970208	2	382	0.987080103	0.002739726	
19970221	2	381	0.984496124	0.002739726	
19970223	2	380	0.981912145	0.002739726	
19970416	2	379	0.979328165	0.002739726	
19970907	2	378	0.976744186	0.002739726	
19980222	2	377	0.974160207	0.002739726	
19981210	2	376	0.971576227	0.002739726	
19990127	2	375	0.968992248	0.002739726	
19990415	2	374	0.966408269	0.002739726	
19990521	2	373	0.963824289	0.002739726	
19990524	2	372	0.96124031	0.002739726	
19990530	2	371	0.958656331	0.002739726	
19990711	2	370	0.956072351	0.002739726	
19990813	2	369	0.953488372	0.002739726	
19991003	2	368	0.950904393	0.002739726	
19991006	2	367	0.948320413	0.002739726	
19991012	2	366	0.945736434	0.002739726	
19991024	2	365	0.943152455	0.002739726	
19991202	2	364	0.940568475	0.002739726	
19970112	3	363	0.937984496	0.002739726	
19970118	3	362	0.935400517	0.002739726	
19970320	3	361	0.932816537	0.002739726	
19970324	3	360	0.930232558	0.002739726	
19970329	3	359	0.927648579	0.002739726	
19970822	3	358	0.925064599	0.002739726	
19970923	3	357	0.92248062	0.002739726	
19971016	3	356	0.919896641	0.002739726	
19971127	3	355	0.917312661	0.002739726	
19971218	3	354	0.914728682	0.002739726	
19971221	3	353	0.912144703	0.002739726	
19980213	3	352	0.909560724	0.002739726	
19981017	3	351	0.906976744	0.002739726	
19981020	3	350	0.904392765	0.002739726	
19990205	3	349	0.901808786	0.002739726	
19990223	3	348	0.899224806	0.002739726	
19990310	3	347	0.896640827	0.002739726	
19990313	3	346	0.894056848	0.002739726	
19990424	3	345	0.891472868	0.002739726	
19990629	3	344	0.888888889	0.002739726	
19990726	3	343	0.88630491	0.002739726	
19990828	3	342	0.88372093	0.002739726	
19990903	3	341	0.881136951	0.002739726	
19990909	3	340	0.878552972	0.002739726	
19990924	3	339	0.875968992	0.002739726	
19990930	3	338	0.873385013	0.002739726	
19991009	3	337	0.870801034	0.002739726	
19991015	3	336	0.868217054	0.002739726	
19991021	3	335	0.865633075	0.002739726	
19991120	3	334	0.863049096	0.002739726	
19991211	3	333	0.860465116	0.002739726	
19970325	4	332	0.857881137	0.002739726	
19970328	4	331	0.855297158	0.002739726	
19970812	4	330	0.852713178	0.002739726	
19970903	4	329	0.850129199	0.002739726	
19970919	4	328	0.84754522	0.002739726	
19970925	4	327	0.84496124	0.002739726	
19980219	4	326	0.842377261	0.002739726	
19980225	4	325	0.839793282	0.002739726	
19980315	4	324	0.837209302	0.002739726	
19980923	4	323	0.834625323	0.002739726	
19990112	4	322	0.832041344	0.002739726	
19990518	4	321	0.829457364	0.002739726	
19990620	4	320	0.826873385	0.002739726	
19990810	4	319	0.824289406	0.002739726	
19990822	4	318	0.821705426	0.002739726	
19990927	4	317	0.819121447	0.002739726	
19991030	4	316	0.816537468	0.002739726	
19991220	4	315	0.813953488	0.002739726	
19970202	5	314	0.811369509	0.002739726	
19970204	5	313	0.80878553	0.002739726	
19970205	5	312	0.80620155	0.002739726	
19970327	5	311	0.803617571	0.002739726	
19970414	5	310	0.801033592	0.002739726	
19970601	5	309	0.798449612	0.002739726	
19970613	5	308	0.795865633	0.002739726	
19970713	5	307	0.793281654	0.002739726	
19970715	5	306	0.790697674	0.002739726	
19970731	5	305	0.788113695	0.002739726	
19970927	5	304	0.785529716	0.002739726	
19971007	5	303	0.782945736	0.002739726	
19971025	5	302	0.780361757	0.002739726	
19971031	5	301	0.777777778	0.002739726	
19971124	5	300	0.775193798	0.002739726	



19971212	5	299	0.772609819	0.002739726
19971227	5	298	0.77002584	0.002739726
19980330	5	297	0.76744186	0.002739726
19980417	5	296	0.764857881	0.002739726
19980426	5	295	0.762273902	0.002739726
19981005	5	294	0.759689922	0.002739726
19981008	5	293	0.757105943	0.002739726
19981204	5	292	0.754521964	0.002739726
19990307	5	291	0.751937984	0.002739726
19990319	5	290	0.749354005	0.002739726
19990503	5	289	0.746770026	0.002739726
19990617	5	288	0.744186047	0.002739726
19990720	5	287	0.741602067	0.002739726
19990729	5	286	0.739018088	0.002739726
19990921	5	285	0.736434109	0.002739726
19991027	5	284	0.733850129	0.002739726
19991111	5	283	0.73126615	0.002739726
19991229	5	282	0.728682171	0.002739726
19970107	6	281	0.726098191	0.002739726
19970203	6	280	0.723514212	0.002739726
19970301	6	279	0.720930233	0.002739726
19970330	6	278	0.718346253	0.002739726
19970428	6	277	0.715762274	0.002739726
19970508	6	276	0.713178295	0.002739726
19970607	6	275	0.710594315	0.002739726
19970609	6	274	0.708010336	0.002739726
19970619	6	273	0.705426357	0.002739726
19970709	6	272	0.702842377	0.002739726
19970711	6	271	0.700258398	0.002739726
19970722	6	270	0.697674419	0.002739726
19970909	6	269	0.695090439	0.002739726
19971022	6	268	0.69250646	0.002739726
19971224	6	267	0.689922481	0.002739726
19980318	6	266	0.687338501	0.002739726
19980511	6	265	0.684754522	0.002739726
19980520	6	264	0.682170543	0.002739726
19980920	6	263	0.679586563	0.002739726
19981119	6	262	0.677002584	0.002739726
19990211	6	261	0.674418605	0.002739726
19990214	6	260	0.671834625	0.002739726
19990316	6	259	0.669250646	0.002739726
19990322	6	258	0.666666667	0.002739726
19990406	6	257	0.664082687	0.002739726
19990412	6	256	0.661498708	0.002739726
19990506	6	255	0.658914729	0.002739726
19990512	6	254	0.656330749	0.002739726
19990626	6	253	0.65374677	0.002739726
19990831	6	252	0.651162791	0.002739726
19991105	6	251	0.648578811	0.002739726
19991108	6	250	0.645994832	0.002739726
19991114	6	249	0.643410853	0.002739726
19991205	6	248	0.640826873	0.002739726
19970113	7	247	0.638242894	0.002739726
19970207	7	246	0.635658915	0.002739726
19970220	7	245	0.633074935	0.002739726
19970308	7	244	0.630490956	0.002739726
19970311	7	243	0.627906977	0.002739726
19970430	7	242	0.625322997	0.002739726
19970510	7	241	0.622739018	0.002739726
19970516	7	240	0.620155039	0.002739726
19970526	7	239	0.617571059	0.002739726
19970530	7	238	0.61498708	0.002739726
19970820	7	237	0.612403101	0.002739726
19970824	7	236	0.609819121	0.002739726
19970828	7	235	0.607235142	0.002739726
19970921	7	234	0.604651163	0.002739726
19980105	7	233	0.602067183	0.002739726
19980926	7	232	0.599483204	0.002739726
19980929	7	231	0.596899225	0.002739726
19990202	7	230	0.594315245	0.002739726
19990208	7	229	0.591731266	0.002739726
19990217	7	228	0.589147287	0.002739726
19990509	7	227	0.586563307	0.002739726
19990823	7	226	0.583979326	0.002739726
19990717	7	225	0.581395349	0.002739726
19990819	7	224	0.57881137	0.002739726
19991117	7	223	0.57822739	0.002739726
19991223	7	222	0.573643411	0.002739726
19970117	8	221	0.571059432	0.002739726
19970128	8	220	0.568475452	0.002739726
19970218	8	219	0.565891473	0.002739726
19970226	8	218	0.563307494	0.002739726
19970227	8	217	0.560723514	0.002739726
19970228	8	216	0.558139535	0.002739726
19970307	8	215	0.555555556	0.002739726
19970316	8	214	0.552971576	0.002739726
19970321	8	213	0.550387597	0.002739726
19970326	8	212	0.547803618	0.002739726
19970514	8	211	0.545219638	0.002739726

19970528	8	210	0.542635659	0.002739726
19970603	8	209	0.54005168	0.002739726
19970815	8	208	0.5374677	0.002739726
19970827	8	207	0.534883721	0.002739726
19970717	8	206	0.532299742	0.002739726
19970719	8	205	0.529715762	0.002739726
19970913	8	204	0.527131783	0.002739726
19970915	8	203	0.524547804	0.002739726
19980210	8	202	0.521963824	0.002739726
19980216	8	201	0.519379845	0.002739726
19980408	8	200	0.516795866	0.002739726
19980502	8	199	0.514211886	0.002739726
19981014	8	198	0.511627907	0.002739726
19981207	8	197	0.509043928	0.002739726
19990301	8	196	0.506459948	0.002739726
19990403	8	195	0.503875969	0.002739726
19990421	8	194	0.50129199	0.002739726
19990611	8	193	0.49870801	0.002739726
19990723	8	192	0.496124031	0.002739726
19990906	8	191	0.493540052	0.002739726
19990918	8	190	0.490956072	0.002739726
19991102	8	189	0.488372093	0.002739726
19991208	8	188	0.485788114	0.002739726
19991214	8	187	0.483204134	0.002739726
19991217	8	186	0.480620155	0.002739726
19970108	9	185	0.478036176	0.002739726
19970111	9	184	0.475452196	0.002739726
19970212	9	183	0.472868217	0.002739726
19970306	9	182	0.470284238	0.002739726
19970319	9	181	0.467700258	0.002739726
19970402	9	180	0.465116279	0.002739726
19970506	9	179	0.4625323	0.002739726
19970518	9	178	0.45994832	0.002739726
19970520	9	177	0.457364341	0.002739726
19970625	9	176	0.454780362	0.002739726
19970703	9	175	0.452196382	0.002739726
19970725	9	174	0.449612403	0.002739726
19970729	9	173	0.447028424	0.002739726
19970802	9	172	0.444444444	0.002739726
19970804	9	171	0.441860465	0.002739726
19970808	9	170	0.439276486	0.002739726
19970808	9	169	0.436692506	0.002739726
19970828	9	168	0.434108527	0.002739726
19970917	9	167	0.431524548	0.002739726
19971028	9	166	0.428940568	0.002739726
19971203	9	165	0.426356589	0.002739726
19980402	9	164	0.42377261	0.002739726
19980411	9	163	0.42118863	0.002739726
19980423	9	162	0.418604651	0.002739726
19980508	9	161	0.416020672	0.002739726
19981026	9	160	0.413436693	0.002739726
19981122	9	159	0.410852713	0.002739726
19990124	9	158	0.408268734	0.002739726
19990220	9	157	0.405684755	0.002739726
19990226	9	156	0.403100775	0.002739726
19990418	9	155	0.400516796	0.002739726
19990430	9	154	0.397932817	0.002739726
19990708	9	153	0.395348837	0.002739726
19970109	10	152	0.392764858	0.002739726
19970110	10	151	0.390180879	0.002739726
19970119	10	150	0.387596899	0.002739726
19970127	10	149	0.38501292	0.002739726
19970129	10	148	0.382428941	0.002739726
19970131	10	147	0.379844961	0.002739726
19970224	10	146	0.377260982	0.002739726
19970408	10	145	0.374677003	0.002739726
19970418	10	144	0.372093023	0.002739726
19970605	10	143	0.369509044	0.002739726
19970617	10	142	0.366925065	0.002739726
19970629	10	141	0.364341085	0.002739726
19970701	10	140	0.361757106	0.002739726
19970814	10	139	0.359173127	0.002739726
19970818	10	138	0.356589147	0.002739726
19970911	10	137	0.354005168	0.002739726
19971106	10	136	0.351421189	0.002739726
19980117	10	135	0.348837209	0.002739726
19980312	10	134	0.34625323	0.002739726
19980327	10	133	0.343669251	0.002739726
19980405	10	132	0.341085271	0.002739726
19980505	10	131	0.338501292	0.002739726
19981023	10	130	0.335917313	0.002739726
19981101	10	129	0.333333333	0.002739726
19981201	10	128	0.330749354	0.002739726
19990304	10	127	0.328165375	0.002739726
19990427	10	126	0.325581395	0.002739726
19990605	10	125	0.322997416	0.002739726
19990614	10	124	0.320413437	0.002739726
19990714	10	123	0.317829457	0.002739726
19990816	10	122	0.315245478	0.002739726

19970213	11	121	0.312661499	0.002739726
19970219	11	120	0.310077519	0.002739726
19970309	11	119	0.30749354	0.002739726
19970310	11	118	0.304909561	0.002739726
19970318	11	117	0.302325581	0.002739726
19970322	11	116	0.299741602	0.002739726
19970323	11	115	0.297157623	0.002739726
19970422	11	114	0.294573643	0.002739726
19970426	11	113	0.291989664	0.002739726
19970512	11	112	0.289405685	0.002739726
19970611	11	111	0.286821705	0.002739726
19970621	11	110	0.284237726	0.002739726
19970623	11	109	0.281653747	0.002739726
19970830	11	108	0.279069767	0.002739726
19971001	11	107	0.276485788	0.002739726
19971121	11	106	0.273901809	0.002739726
19971130	11	105	0.271317829	0.002739726
19981002	11	104	0.26873385	0.002739726
19981104	11	103	0.266149871	0.002739726
19981213	11	102	0.263565891	0.002739726
19990325	11	101	0.260981912	0.002739726
19990705	11	100	0.258397933	0.002739726
19990801	11	99	0.255813953	0.002739726
19990807	11	98	0.253229974	0.002739726
19970211	12	97	0.250645995	0.002739726
19970312	12	96	0.248062016	0.002739726
19970412	12	95	0.245478036	0.002739726
19970504	12	94	0.242894057	0.002739726
19970901	12	93	0.240310078	0.002739726
19970929	12	92	0.237726098	0.002739726
19980129	12	91	0.235142119	0.002739726
19980201	12	90	0.23255814	0.002739726
19980429	12	89	0.22997416	0.002739726
19980514	12	88	0.227390181	0.002739726
19980517	12	87	0.224806202	0.002739726
19990109	12	86	0.222222222	0.002739726
19990409	12	85	0.219638243	0.002739726
19990515	12	84	0.217054264	0.002739726
19990609	12	83	0.214470284	0.002739726
19970201	13	82	0.211886305	0.002739726
19970208	13	81	0.209302326	0.002739726
19970317	13	80	0.206718348	0.002739726
19970524	13	79	0.204134367	0.002739726
19970816	13	78	0.201550388	0.002739726
19980126	13	77	0.198966408	0.002739726
19981113	13	76	0.196382429	0.002739726
19981126	13	75	0.19379845	0.002739726
19990328	13	74	0.19121447	0.002739726
19990331	13	73	0.188630491	0.002739726
19970130	14	72	0.186046512	0.002739726
19970214	14	71	0.183462532	0.002739726
19970522	14	70	0.180878553	0.002739726
19971010	14	69	0.178294574	0.002739726
19980114	14	68	0.175710594	0.002739726
19980324	14	67	0.173126615	0.002739726
19980414	14	66	0.170542636	0.002739726
19981011	14	65	0.167958656	0.002739726
19990804	14	64	0.165374677	0.002739726
19991126	14	63	0.162790698	0.002739726
19970121	15	62	0.160206718	0.002739726
19970420	15	61	0.157622739	0.002739726
19971103	15	60	0.15503876	0.002739726
19981125	15	59	0.15245478	0.002739726
19970302	16	58	0.149870801	0.002739726
19970331	16	57	0.147286822	0.002739726
19970502	16	56	0.144702842	0.002739726
19980523	16	55	0.142118863	0.002739726
19970120	17	54	0.139534884	0.002739726
19970210	17	53	0.136950904	0.002739726
19970225	17	52	0.134366925	0.002739726
19970305	17	51	0.131782946	0.002739726
19981116	17	50	0.129198966	0.002739726
19981231	17	49	0.126614987	0.002739726
19970104	18	48	0.124031008	0.002739726
19970215	18	47	0.121447028	0.002739726
19970216	18	46	0.118863049	0.002739726
19970217	18	45	0.11627907	0.002739726
19970424	18	44	0.11369509	0.002739726
19971206	18	43	0.111111111	0.002739726
19990106	18	42	0.108527132	0.002739726
19971004	19	41	0.105943152	0.002739726
19970114	20	40	0.103359173	0.002739726
19970122	20	39	0.100775194	0.002739726
19970410	21	38	0.098191214	0.002739726
19980204	21	37	0.095607235	0.002739726
19980303	21	36	0.093023256	0.002739726
19970406	22	35	0.090439276	0.002739726
19980207	22	34	0.087855297	0.002739726
19970209	23	33	0.085271318	0.002739726

19970304	24	32	0.082687339	0.002739726
19970315	24	31	0.080103359	0.002739726
19971112	24	30	0.07751938	0.002739726
19980111	24	29	0.074935401	0.002739726
19991129	24	28	0.072351421	0.002739726
19970404	25	27	0.069767442	0.002739726
19980228	25	26	0.067183463	0.002739726
19971013	26	25	0.064599483	0.002739726
19980321	26	24	0.062015504	0.002739726
19981107	26	23	0.059431525	0.002739726
19970303	27	22	0.056847545	0.002739726
19970313	27	21	0.054263566	0.002739726
19971115	27	20	0.051679587	0.002739726
19980108	27	19	0.049095607	0.002739726
19990118	27	18	0.046511628	0.002739726
19970116	28	17	0.043927649	0.002739726
19970123	28	16	0.041343669	0.002739726
19981228	28	15	0.03875969	0.002739726
19990121	28	14	0.036175711	0.002739726
19970126	30	13	0.033591731	0.002739726
19970314	30	12	0.031007752	0.002739726
19981219	30	11	0.028423773	0.002739726
19970115	34	10	0.025839793	0.002739726
19971118	34	9	0.023255814	0.002739726
19981029	34	8	0.020671835	0.002739726
19970124	38	7	0.018087855	0.002739726
19980306	40	6	0.015503876	0.002739726
19981225	48	5	0.012919897	0.002739726
19970125	52	4	0.010335917	0.002739726
19970101	60	3	0.007751938	0.002739726
19970103	63	2	0.005167959	0.002739726
19970102	70	1	0.002583979	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
20000218	0	284	1	0.002739726
20001009	0	283	0.996478873	0.002739726
19990915	1	282	0.992957746	0.002739726
19991018	1	281	0.98943662	0.002739726
19991123	1	280	0.985915493	0.002739726
19991226	1	279	0.982394366	0.002739726
20000329	1	278	0.978873239	0.002739726
20000418	1	277	0.975352113	0.002739726
20000430	1	276	0.971830986	0.002739726
20001006	1	275	0.968309859	0.002739726
20001126	1	274	0.964788732	0.002739726
19980222	2	273	0.961267606	0.002739726
19981210	2	272	0.957746479	0.002739726
19990127	2	271	0.954225352	0.002739726
19990415	2	270	0.950704225	0.002739726
19990521	2	269	0.947183099	0.002739726
19990524	2	268	0.943661972	0.002739726
19990530	2	267	0.940140845	0.002739726
19990711	2	266	0.936619718	0.002739726
19990813	2	265	0.933098592	0.002739726
19991003	2	264	0.929577465	0.002739726
19991006	2	263	0.926056338	0.002739726
19991012	2	262	0.922535211	0.002739726
19991024	2	261	0.919014085	0.002739726
19991202	2	260	0.915492958	0.002739726
20000325	2	259	0.911971831	0.002739726
20000406	2	258	0.908450704	0.002739726
20000723	2	257	0.904929577	0.002739726
20001012	2	256	0.901408451	0.002739726
20001015	2	255	0.897887324	0.002739726
20001021	2	254	0.894366197	0.002739726
20001111	2	253	0.89084507	0.002739726
20001114	2	252	0.887323944	0.002739726
20001205	2	251	0.883802817	0.002739726
19980213	3	250	0.88028169	0.002739726
19981017	3	249	0.876760563	0.002739726
19981020	3	248	0.873239437	0.002739726
19990205	3	247	0.86971831	0.002739726
19990223	3	246	0.866197183	0.002739726
19990310	3	245	0.862676056	0.002739726
19990313	3	244	0.85915493	0.002739726
19990424	3	243	0.855633803	0.002739726
19990629	3	242	0.852112676	0.002739726
19990726	3	241	0.848591549	0.002739726
19990828	3	240	0.845070423	0.002739726
19990903	3	239	0.841549296	0.002739726
19990909	3	238	0.838028169	0.002739726
19990924	3	237	0.834507042	0.002739726
19990930	3	236	0.830985915	0.002739726
19991009	3	235	0.827464789	0.002739726
19991015	3	234	0.823943662	0.002739726
19991021	3	233	0.820422535	0.002739726
19991120	3	232	0.816901408	0.002739726
19991211	3	231	0.813380282	0.002739726
20000131	3	230	0.809859155	0.002739726
20000224	3	229	0.806338028	0.002739726
20000322	3	228	0.802816901	0.002739726
20000424	3	227	0.799295775	0.002739726
20000518	3	226	0.795774648	0.002739726
20000614	3	225	0.792253521	0.002739726
20000711	3	224	0.788732394	0.002739726
20000717	3	223	0.785211268	0.002739726
20000729	3	222	0.781690141	0.002739726
19980219	4	221	0.778169014	0.002739726
19980225	4	220	0.774647887	0.002739726
19980315	4	219	0.771126761	0.002739726
19980923	4	218	0.767605634	0.002739726
19990112	4	217	0.764084507	0.002739726
19990518	4	216	0.76056338	0.002739726
19990620	4	215	0.757042254	0.002739726
19990810	4	214	0.753521127	0.002739726
19990822	4	213	0.75	0.002739726
19990927	4	212	0.746478873	0.002739726
19991030	4	211	0.742957746	0.002739726
19991220	4	210	0.73943662	0.002739726
20000304	4	209	0.735915493	0.002739726
20000403	4	208	0.732394366	0.002739726
20000524	4	207	0.728873239	0.002739726
20000617	4	206	0.725352113	0.002739726
20000620	4	205	0.721830986	0.002739726
20000629	4	204	0.718309859	0.002739726
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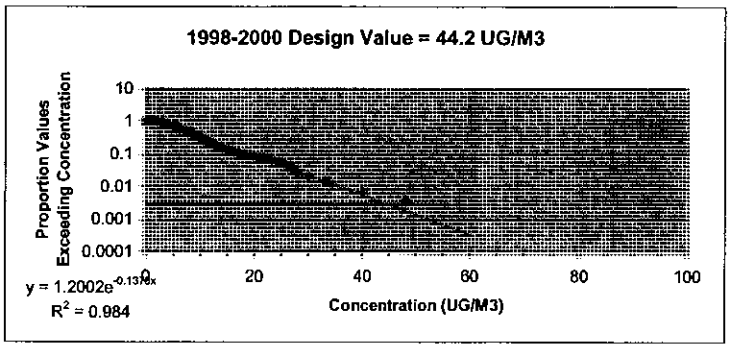
20000810	4	202	0.711267606	0.002739726

Design Value
44.2



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19980417	5	197	0.693661972	0.002739726
19980426	5	196	0.690140845	0.002739726
19981005	5	195	0.686619718	0.002739726
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19981204	5	193	0.679577465	0.002739726
19990307	5	192	0.676056338	0.002739726
19990319	5	191	0.672535211	0.002739726
19990503	5	190	0.669014085	0.002739726
19990617	5	189	0.665492958	0.002739726
19990720	5	188	0.661971831	0.002739726
19990729	5	187	0.658450704	0.002739726
19990921	5	186	0.654929577	0.002739726
19991027	5	185	0.651408451	0.002739726
19991111	5	184	0.647887324	0.002739726
19991229	5	183	0.644366197	0.002739726
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20000521	5	179	0.63028169	0.002739726
20000530	5	178	0.626760563	0.002739726
20000608	5	177	0.623239437	0.002739726
20000804	5	176	0.61971831	0.002739726
20000816	5	175	0.616197183	0.002739726
20000909	5	174	0.612676056	0.002739726
20000915	5	173	0.60915493	0.002739726
20001117	5	172	0.605633803	0.002739726
19980318	6	171	0.602112676	0.002739726
19980511	6	170	0.598591549	0.002739726
19980520	6	169	0.595070423	0.002739726
19980920	6	168	0.591549296	0.002739726
19981119	6	167	0.588028169	0.002739726
19990211	6	166	0.584507042	0.002739726
19990214	6	165	0.580985915	0.002739726
19990316	6	164	0.577464789	0.002739726
19990322	6	163	0.573943662	0.002739726
19990406	6	162	0.570422535	0.002739726
19990412	6	161	0.566901408	0.002739726
19990506	6	160	0.563380282	0.002739726
19990512	6	159	0.559859155	0.002739726
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19990831	6	157	0.552816901	0.002739726
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19991114	6	154	0.542253521	0.002739726
19991205	6	153	0.538732394	0.002739726
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20000331	6	151	0.531690141	0.002739726
20000903	6	150	0.528169014	0.002739726
20001024	6	149	0.524647887	0.002739726
20001102	6	148	0.521126761	0.002739726
20001217	6	147	0.517605634	0.002739726
19980105	7	146	0.514084507	0.002739726
19980926	7	145	0.51056338	0.002739726
19980929	7	144	0.507042254	0.002739726
19990202	7	143	0.503521127	0.002739726
19990208	7	142	0.5	0.002739726
19990217	7	141	0.496478873	0.002739726
19990509	7	140	0.492957746	0.002739726
19990023	7	139	0.48943662	0.002739726
19990717	7	138	0.485915493	0.002739726
19990819	7	137	0.482394366	0.002739726
19991117	7	136	0.478873239	0.002739726
19991223	7	135	0.475352113	0.002739726
20000107	7	134	0.471830986	0.002739726
20000506	7	133	0.468309859	0.002739726
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19980216	8	129	0.454225352	0.002739726
19980408	8	128	0.450704225	0.002739726
19980502	8	127	0.447183099	0.002739726
19981014	8	126	0.443661972	0.002739726
19981207	8	125	0.440140845	0.002739726
19990301	8	124	0.436619718	0.002739726
19990403	8	123	0.433098592	0.002739726
19990421	8	122	0.429577465	0.002739726
19990611	8	121	0.426056338	0.002739726
19990723	8	120	0.422535211	0.002739726
19990906	8	119	0.419014085	0.002739726
19990918	8	118	0.415492958	0.002739726

19991102	8	117	0.411971831	0.002739726
19991208	8	116	0.408450704	0.002739726
19991214	8	115	0.404929577	0.002739726
19991217	8	114	0.401408451	0.002739726
20000125	8	113	0.397887324	0.002739726
20000503	8	112	0.394366197	0.002739726
20001018	8	111	0.39084507	0.002739726
20001129	8	110	0.387323944	0.002739726
20001229	8	109	0.383802817	0.002739726
19980402	9	108	0.38028169	0.002739726
19980411	9	107	0.376760563	0.002739726
19980423	9	106	0.373239437	0.002739726
19980508	9	105	0.36971831	0.002739726
19981026	9	104	0.366197183	0.002739726
19981122	9	103	0.362676056	0.002739726
19990124	9	102	0.35915493	0.002739726
19990220	9	101	0.355633803	0.002739726
19990226	9	100	0.352112676	0.002739726
19990418	9	99	0.348591549	0.002739726
19990430	9	98	0.345070423	0.002739726
19990708	9	97	0.341549296	0.002739726
20000110	9	96	0.338028169	0.002739726
20000313	9	95	0.334507042	0.002739726
20000412	9	94	0.330985915	0.002739726
20000427	9	93	0.327464789	0.002739726
20000611	9	92	0.323943662	0.002739726
20000626	9	91	0.320422535	0.002739726
20000705	9	90	0.316901408	0.002739726
20001108	9	89	0.313380282	0.002739726
20001226	9	88	0.309859155	0.002739726
19980117	10	87	0.306338028	0.002739726
19980312	10	86	0.302816901	0.002739726
19980327	10	85	0.299295775	0.002739726
19980405	10	84	0.295774648	0.002739726
19980505	10	83	0.292253521	0.002739726
19981023	10	82	0.288732394	0.002739726
19981101	10	81	0.285211268	0.002739726
19981201	10	80	0.281690141	0.002739726
19990304	10	79	0.278169014	0.002739726
19990427	10	78	0.274647887	0.002739726
19990605	10	77	0.271126761	0.002739726
19990614	10	76	0.267605634	0.002739726
19990714	10	75	0.264084507	0.002739726
19990816	10	74	0.26056338	0.002739726
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19990325	11	69	0.242957746	0.002739726
19990705	11	68	0.23943662	0.002739726
19990801	11	67	0.235915493	0.002739726
19990807	11	66	0.232394366	0.002739726
20000119	11	65	0.228873239	0.002739726
20000512	11	64	0.225352113	0.002739726
20000527	11	63	0.221830986	0.002739726
20000602	11	62	0.218309859	0.002739726
20000921	11	61	0.214788732	0.002739726
20001208	11	60	0.211267606	0.002739726
19980129	12	59	0.207746479	0.002739726
19980201	12	58	0.204225352	0.002739726
19980429	12	57	0.200704225	0.002739726
19980514	12	56	0.197183099	0.002739726
19980517	12	55	0.193661972	0.002739726
19990109	12	54	0.190140845	0.002739726
19990409	12	53	0.186619718	0.002739726
19990515	12	52	0.183098592	0.002739726
19990609	12	51	0.179577465	0.002739726
20000409	12	50	0.176056338	0.002739726
20001105	12	49	0.172535211	0.002739726
19980126	13	48	0.169014085	0.002739726
19981113	13	47	0.165492958	0.002739726
19981128	13	46	0.161971831	0.002739726
19990328	13	45	0.158450704	0.002739726
19990331	13	44	0.154929577	0.002739726
20001202	13	43	0.151408451	0.002739726
19980114	14	42	0.147887324	0.002739726
19980324	14	41	0.144366197	0.002739726
19980414	14	40	0.14084507	0.002739726
19981011	14	39	0.137323944	0.002739726
19990804	14	38	0.133802817	0.002739726
19991126	14	37	0.13028169	0.002739726
20001028	14	36	0.126760563	0.002739726
19981125	15	35	0.123239437	0.002739726
20000215	15	34	0.11971831	0.002739726

20000605	15	33	0.116197183	0.002739726
19980523	16	32	0.112676056	0.002739726
20000203	16	31	0.10915493	0.002739726
19981116	17	30	0.105633803	0.002739726
19981231	17	29	0.102112676	0.002739726
20000209	17	28	0.098591549	0.002739726
20000415	17	27	0.095070423	0.002739726
20001214	17	26	0.091549296	0.002739726
19990106	18	25	0.088028169	0.002739726
20000101	18	24	0.084507042	0.002739726
20001027	19	23	0.080985915	0.002739726
20000113	20	22	0.077464789	0.002739726
19980204	21	21	0.073943662	0.002739726
19980303	21	20	0.070422535	0.002739726
20001223	21	19	0.066901408	0.002739726
19980207	22	18	0.063380282	0.002739726
20001220	23	17	0.059859155	0.002739726
19980111	24	16	0.056338028	0.002739726
19991129	24	15	0.052816901	0.002739726
19980228	25	14	0.049295775	0.002739726
19980321	26	13	0.045774648	0.002739726
19981107	26	12	0.042253521	0.002739726
20000307	26	11	0.038732394	0.002739726
19980108	27	10	0.035211268	0.002739726
19990118	27	9	0.031690141	0.002739726
20000212	27	8	0.028169014	0.002739726
19981228	28	7	0.024647887	0.002739726
19990121	28	6	0.021126761	0.002739726
19981219	30	5	0.017605634	0.002739726
20000116	33	4	0.014084507	0.002739726
19981029	34	3	0.01056338	0.002739726
19980306	40	2	0.007042254	0.002739726
19981225	48	1	0.003521127	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
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20001009	0	331	0.996987952	0.002739726
20010122	0	330	0.993975904	0.002739726
20010227	0	329	0.990963855	0.002739726
19990915	1	328	0.987951807	0.002739726
19991018	1	327	0.984939759	0.002739726
19991123	1	326	0.981927711	0.002739726
19991226	1	325	0.978915663	0.002739726
20000329	1	324	0.975903614	0.002739726
20000418	1	323	0.972891566	0.002739726
20000430	1	322	0.969879518	0.002739726
20001006	1	321	0.96686747	0.002739726
20001126	1	320	0.963855422	0.002739726
20010119	1	319	0.960843373	0.002739726
20010131	1	318	0.957831325	0.002739726
20010513	1	317	0.954819277	0.002739726
20010603	1	316	0.951807229	0.002739726
20010706	1	315	0.948795181	0.002739726
20011103	1	314	0.945783133	0.002739726
20011221	1	313	0.942771084	0.002739726
20011224	1	312	0.939759036	0.002739726
19990127	2	311	0.936746988	0.002739726
19990415	2	310	0.93373494	0.002739726
19990521	2	309	0.930722892	0.002739726
19990524	2	308	0.927710843	0.002739726
19990530	2	307	0.924698795	0.002739726
19990711	2	306	0.921686747	0.002739726
19990813	2	305	0.918674699	0.002739726
19991003	2	304	0.915662651	0.002739726
19991006	2	303	0.912650602	0.002739726
19991012	2	302	0.909638554	0.002739726
19991024	2	301	0.906626506	0.002739726
19991202	2	300	0.903614458	0.002739726
20000325	2	299	0.90060241	0.002739726
20000406	2	298	0.897590361	0.002739726
20000723	2	297	0.894578313	0.002739726
20001012	2	296	0.891566265	0.002739726
20001015	2	295	0.888554217	0.002739726
20001021	2	294	0.885542169	0.002739726
20001111	2	293	0.88253012	0.002739726
20001114	2	292	0.879518072	0.002739726
20001205	2	291	0.876506024	0.002739726
20010305	2	290	0.873493976	0.002739726
20010308	2	289	0.870481928	0.002739726
20010311	2	288	0.86746988	0.002739726
20010504	2	287	0.864457831	0.002739726
20010510	2	286	0.861445783	0.002739726
20010522	2	285	0.858433735	0.002739726
20010606	2	284	0.855421687	0.002739726
20010709	2	283	0.852409639	0.002739726
20010724	2	282	0.84939759	0.002739726
20010829	2	281	0.846385542	0.002739726
20010913	2	280	0.843373494	0.002739726
20011019	2	279	0.840361446	0.002739726
20011109	2	278	0.837349398	0.002739726
19990205	3	277	0.834337349	0.002739726
19990223	3	276	0.831325301	0.002739726
19990310	3	275	0.828313253	0.002739726
19990313	3	274	0.825301205	0.002739726
19990424	3	273	0.822289157	0.002739726
19990629	3	272	0.819277108	0.002739726
19990726	3	271	0.81626506	0.002739726
19990828	3	270	0.813253012	0.002739726
19990903	3	269	0.810240964	0.002739726
19990909	3	268	0.807228916	0.002739726
19990924	3	267	0.804216867	0.902739726
19990930	3	266	0.801204819	0.002739726
19991009	3	265	0.798192771	0.002739726
19991015	3	264	0.795180723	0.002739726
19991021	3	263	0.792168675	0.002739726
19991120	3	262	0.789156627	0.002739726
19991211	3	261	0.786144578	0.002739726
20000131	3	260	0.78313253	0.002739726
20000224	3	259	0.780120482	0.002739726
20000322	3	258	0.777108434	0.002739726
20000424	3	257	0.774096386	0.002739726
20000518	3	256	0.771084337	0.002739726
20000614	3	255	0.768072289	0.002739726
20000711	3	254	0.765060241	0.002739726
20000717	3	253	0.762048193	0.002739726
20000729	3	252	0.759036145	0.002739726
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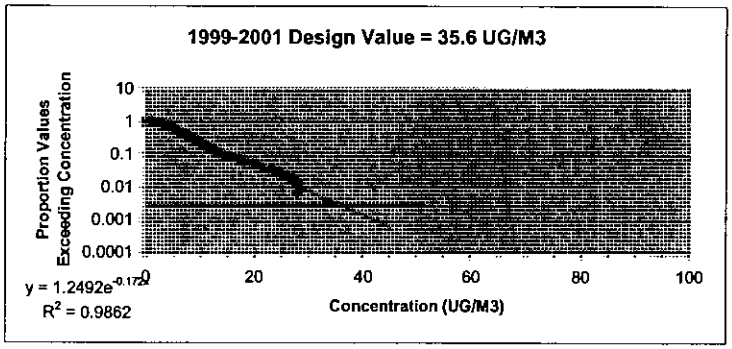
20010317	3	250	0.753012048	0.002739726

Design Value
35.6



20010404	3	249	0.75	0.002739726
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20010531	3	244	0.734939759	0.002739726
20010621	3	243	0.731927711	0.002739726
20010907	3	242	0.728915663	0.002739726
20010919	3	241	0.725903614	0.002739726
20011001	3	240	0.722891566	0.002739726
20011010	3	239	0.719879518	0.002739726
20011016	3	238	0.71688747	0.002739726
20011115	3	237	0.713855422	0.002739726
19990112	4	236	0.710843373	0.002739726
19990518	4	235	0.707831325	0.002739726
19990620	4	234	0.704819277	0.002739726
19990810	4	233	0.701807229	0.002739726
19990822	4	232	0.698795181	0.002739726
19990927	4	231	0.695783133	0.002739726
19991030	4	230	0.692771084	0.002739726
19991220	4	229	0.689750036	0.002739726
20000304	4	228	0.686746988	0.002739726
20000403	4	227	0.68373494	0.002739726
20000524	4	226	0.680722892	0.002739726
20000617	4	225	0.677710843	0.002739726
20000620	4	224	0.674698795	0.002739726
20000629	4	223	0.671686747	0.002739726
20000702	4	222	0.668674699	0.002739726
20000810	4	221	0.665662651	0.002739726
20000822	4	220	0.662650602	0.002739726
20001120	4	219	0.659638554	0.002739726
20001123	4	218	0.656626506	0.002739726
20010326	4	217	0.653614458	0.002739726
20010327	4	216	0.65060241	0.002739726
20010413	4	215	0.647590361	0.002739726
20010624	4	214	0.644578313	0.002739726
20010712	4	213	0.641566265	0.002739726
20010730	4	212	0.638554217	0.002739726
20010820	4	211	0.635542169	0.002739726
20010826	4	210	0.63253012	0.002739726
20010922	4	209	0.629518072	0.002739726
20010925	4	208	0.626506024	0.002739726
20011209	4	207	0.623493976	0.002739726
19990307	5	206	0.620481928	0.002739726
19990319	5	205	0.61746988	0.002739726
19990503	5	204	0.614457831	0.002739726
19990617	5	203	0.611445783	0.002739726
19990720	5	202	0.608433735	0.002739726
19990729	5	201	0.605421687	0.002739726
19990921	5	200	0.602409639	0.002739726
19991027	5	199	0.59939759	0.002739726
19991111	5	198	0.596385542	0.002739726
19991229	5	197	0.593373494	0.002739726
20000128	5	196	0.590361446	0.002739726
20000301	5	195	0.587349398	0.002739726
20000515	5	194	0.584337349	0.002739726
20000521	5	193	0.581325301	0.002739726
20000530	5	192	0.578313253	0.002739726
20000608	5	191	0.575301205	0.002739726
20000804	5	190	0.572289157	0.002739726
20000816	5	189	0.569277108	0.002739726
20000909	5	188	0.56626506	0.002739726
20000915	5	187	0.563253012	0.002739726
20001117	5	186	0.560240964	0.002739726
20010104	5	185	0.557228916	0.002739726
20010113	5	184	0.554216867	0.002739726
20010116	5	183	0.551204819	0.002739726
20010128	5	182	0.548192771	0.002739726
20010329	5	181	0.545180723	0.002739726
20010501	5	180	0.542168675	0.002739726
20010519	5	179	0.539156627	0.002739726
20010525	5	178	0.536144578	0.002739726
20010528	5	177	0.53313253	0.002739726
20010615	5	176	0.530120482	0.002739726
20010727	5	175	0.527108434	0.002739726
20010904	5	174	0.524096386	0.002739726
20010916	5	173	0.521084337	0.002739726
20011013	5	172	0.518072289	0.002739726
20011025	5	171	0.515060241	0.002739726
20011028	5	170	0.512048193	0.002739726
19990211	6	169	0.509036145	0.002739726
19990214	6	168	0.506024096	0.002739726
19990316	6	167	0.503012048	0.002739726
19990322	6	166	0.5	0.002739726

19990406	6	165	0.496987952	0.002739726
19990412	6	164	0.493975904	0.002739726
19990506	6	163	0.490963855	0.002739726
19990512	6	162	0.487951807	0.002739726
19990626	6	161	0.484939759	0.002739726
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19991105	6	159	0.478915663	0.002739726
19991108	6	158	0.475903614	0.002739726
19991114	6	157	0.472891566	0.002739726
19991205	6	156	0.469879518	0.002739726
20000319	6	155	0.46686747	0.002739726
20000331	6	154	0.463855422	0.002739726
20000903	6	153	0.460843373	0.002739726
20001024	6	152	0.457831325	0.002739726
20001102	6	151	0.454819277	0.002739726
20001217	6	150	0.451807229	0.002739726
20010203	6	149	0.448795181	0.002739726
20010314	6	148	0.445783133	0.002739726
20010609	6	147	0.442771084	0.002739726
20010612	6	146	0.439759036	0.002739726
20010629	6	145	0.436746988	0.002739726
20010715	6	144	0.43373494	0.002739726
20010802	6	143	0.430722892	0.002739726
20010805	6	142	0.427710843	0.002739726
20010910	6	141	0.424698795	0.002739726
20010928	6	140	0.421686747	0.002739726
20011007	6	139	0.418674699	0.002739726
19990202	7	138	0.415662651	0.002739726
19990208	7	137	0.412650602	0.002739726
19990217	7	136	0.409638554	0.002739726
19990509	7	135	0.406626506	0.002739726
19990623	7	134	0.403614458	0.002739726
19990717	7	133	0.40060241	0.002739726
19990819	7	132	0.397590361	0.002739726
19991117	7	131	0.394578313	0.002739726
19991223	7	130	0.391566265	0.002739726
20000107	7	129	0.388554217	0.002739726
20000506	7	128	0.385542169	0.002739726
20000623	7	127	0.38253012	0.002739726
20000828	7	126	0.379518072	0.002739726
20010101	7	125	0.376506024	0.002739726
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20010627	7	123	0.370481928	0.002739726
20010630	7	122	0.36746988	0.002739726
20010718	7	121	0.364457831	0.002739726
20010808	7	120	0.361445783	0.002739726
20010823	7	119	0.358433735	0.002739726
20010901	7	118	0.355421687	0.002739726
20011022	7	117	0.352409639	0.002739726
20011106	7	116	0.34939759	0.002739726
19990301	8	115	0.346385542	0.002739726
19990403	8	114	0.343373494	0.002739726
19990421	8	113	0.340361446	0.002739726
19990611	8	112	0.337349398	0.002739726
19990723	8	111	0.334337349	0.002739726
19990906	8	110	0.331325301	0.902739726
19990918	8	109	0.328313253	0.002739726
19991102	8	108	0.325301205	0.002739726
19991208	8	107	0.322289157	0.002739726
19991214	8	106	0.319277108	0.002739726
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20001229	8	100	0.301204819	0.002739726
20010302	8	99	0.298192771	0.002739726
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20010811	8	97	0.292168675	0.002739726
20011031	8	96	0.289156627	0.902739726
20011227	8	95	0.286144578	0.002739726
19990124	9	94	0.28313253	0.002739726
19990220	9	93	0.280120482	0.002739726
19990226	9	92	0.277108434	0.002739726
19990418	9	91	0.274096386	0.002739726
19990430	9	90	0.271084337	0.002739726
19990708	9	89	0.268072289	0.002739726
20000110	9	88	0.265060241	0.002739726
20000313	9	87	0.262048193	0.002739726
20000412	9	86	0.259036145	0.002739726
20000427	9	85	0.256024096	0.002739726
20000611	9	84	0.253012048	0.002739726
20000626	9	83	0.25	0.002739726
20000705	9	82	0.246987952	0.002739726

20001108	9	81	0.243975904	0.002739726
20001226	9	80	0.240963855	0.002739726
20010419	9	79	0.237951807	0.002739726
20010703	9	78	0.234939759	0.002739726
20010721	9	77	0.231927711	0.002739726
20011121	9	76	0.228915663	0.002739726
19990304	10	75	0.225903614	0.002739726
19990427	10	74	0.222891566	0.002739726
19990605	10	73	0.219879518	0.002739726
19990614	10	72	0.21686747	0.002739726
19990714	10	71	0.213855422	0.002739726
19990816	10	70	0.210843373	0.002739726
20000509	10	69	0.207831325	0.002739726
20010125	10	68	0.204819277	0.002739726
20010206	10	67	0.201807229	0.002739726
20010212	10	66	0.198795181	0.002739726
20010407	10	65	0.195783133	0.002739726
20010814	10	64	0.192771084	0.002739726
20011004	10	63	0.189759036	0.002739726
20011212	10	62	0.186746988	0.002739726
19990325	11	61	0.18373494	0.002739726
19990705	11	60	0.180722892	0.002739726
19990801	11	59	0.177710843	0.002739726
19990807	11	58	0.174698795	0.002739726
20000119	11	57	0.171686747	0.002739726
20000512	11	56	0.168674699	0.002739726
20000527	11	55	0.165662651	0.002739726
20000602	11	54	0.162650602	0.002739726
20000921	11	53	0.159638554	0.002739726
20001208	11	52	0.156626506	0.002739726
20010817	11	51	0.153614458	0.002739726
19990109	12	50	0.15060241	0.002739726
19900409	12	49	0.147590361	0.002739726
19990515	12	48	0.144576313	0.002739726
19990609	12	47	0.141566265	0.002739726
20000409	12	46	0.138554217	0.002739726
20001105	12	45	0.135542169	0.002739726
20010209	12	44	0.13253012	0.002739726
20010320	12	43	0.129518072	0.002739726
20011112	12	42	0.126506024	0.002739726
20011124	12	41	0.123493976	0.002739726
20011203	12	40	0.120481928	0.002739726
19990328	13	39	0.11746988	0.002739726
19990331	13	38	0.114457831	0.002739726
20001202	13	37	0.111445783	0.002739726
20010224	13	36	0.108433735	0.002739726
20010410	13	35	0.105421687	0.002739726
20011118	13	34	0.102409639	0.002739726
20011215	13	33	0.09939759	0.002739726
19990804	14	32	0.096385542	0.002739726
19991126	14	31	0.093373494	0.002739726
20001028	14	30	0.090361446	0.002739726
20010422	14	29	0.087349398	0.002739726
20011218	14	28	0.084337349	0.002739726
20000215	15	27	0.081325301	0.002739726
20000605	15	26	0.078313253	0.002739726
20000203	16	25	0.075301205	0.002739726
20000209	17	24	0.072289157	0.002739726
20000415	17	23	0.069277108	0.002739726
20001214	17	22	0.06626506	0.002739726
20010110	17	21	0.063253012	0.002739726
20010221	17	20	0.060240964	0.002739726
19990106	18	19	0.057228916	0.002739726
20000101	18	18	0.054216867	0.002739726
20001027	19	17	0.051204819	0.002739726
20000113	20	16	0.048192771	0.002739726
20010330	20	15	0.045180723	0.002739726
20001223	21	14	0.042168675	0.002739726
20010215	21	13	0.039156627	0.002739726
20001220	23	12	0.036144578	0.002739726
20011230	23	11	0.03313253	0.002739726
19991129	24	10	0.030120482	0.002739726
20010323	24	9	0.027108434	0.002739726
20011130	25	8	0.024096386	0.002739726
20000307	26	7	0.021084337	0.002739726
19990118	27	6	0.018072289	0.002739726
20000212	27	5	0.015060241	0.002739726
19990121	28	4	0.012048193	0.002739726
20010218	28	3	0.009036145	0.002739726
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20000116	33	1	0.003012048	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
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20010122	0	327	0.993920973	0.002739726
20010227	0	326	0.990881459	0.002739726
20000329	1	325	0.987841945	0.002739726
20000418	1	324	0.984802432	0.002739726
20000430	1	323	0.981762918	0.002739726
20001006	1	322	0.978723404	0.002739726
20001126	1	321	0.975683891	0.002739726
20010119	1	320	0.972644377	0.002739726
20010131	1	319	0.969604863	0.002739726
20010513	1	318	0.96656535	0.002739726
20010603	1	317	0.963525836	0.002739726
20010706	1	316	0.960486322	0.002739726
20011103	1	315	0.957446809	0.002739726
20011221	1	314	0.954407295	0.002739726
20011224	1	313	0.951367781	0.002739726
20021125	1	312	0.948328267	0.002739726
20000325	2	311	0.945288754	0.002739726
20000406	2	310	0.94224924	0.002739726
20000723	2	309	0.939209726	0.002739726
20001012	2	308	0.936170213	0.002739726
20001015	2	307	0.933130699	0.002739726
20001021	2	306	0.930091185	0.002739726
20001111	2	305	0.927051672	0.002739726
20001114	2	304	0.924012158	0.002739726
20001205	2	303	0.920972644	0.002739726
20010305	2	302	0.917933131	0.002739726
20010308	2	301	0.914893617	0.002739726
20010311	2	300	0.911854103	0.002739726
20010504	2	299	0.90881459	0.002739726
20010510	2	298	0.905775076	0.002739726
20010522	2	297	0.902735562	0.002739726
20010606	2	296	0.899696049	0.002739726
20010709	2	295	0.896656535	0.002739726
20010724	2	294	0.893617021	0.002739726
20010829	2	293	0.890577508	0.002739726
20010913	2	292	0.887537994	0.002739726
20011019	2	291	0.88449848	0.002739726
20011109	2	290	0.881458967	0.002739726
20020213	2	289	0.878419453	0.002739726
20020511	2	288	0.875379939	0.002739726
20020529	2	287	0.872340426	0.002739726
20020604	2	286	0.869300912	0.002739726
20020610	2	285	0.866261398	0.002739726
20020812	2	284	0.863221884	0.002739726
20020821	2	283	0.860182371	0.002739726
20021020	2	282	0.857142857	0.002739726
20021119	2	281	0.854103343	0.002739726
20000131	3	280	0.85106383	0.002739726
20000224	3	279	0.848024316	0.002739726
20000322	3	278	0.844984802	0.002739726
20000424	3	277	0.841945289	0.002739726
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20000614	3	275	0.835866261	0.002739726
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20000717	3	273	0.829787234	0.002739726
20000729	3	272	0.82674772	0.002739726
20010107	3	271	0.823708207	0.002739726
20010317	3	270	0.820668693	0.002739726
20010404	3	269	0.817629179	0.002739726
20010425	3	268	0.814589666	0.002739726
20010428	3	267	0.811550152	0.002739726
20010507	3	266	0.808510638	0.002739726
20010516	3	265	0.805471125	0.002739726
20010531	3	264	0.802431611	0.002739726
20010621	3	263	0.799392097	0.002739726
20010907	3	262	0.796352584	0.002739726
20010919	3	261	0.79331307	0.002739726
20011001	3	260	0.790273556	0.002739726
20011010	3	259	0.787234043	0.002739726
20011016	3	258	0.784194529	0.002739726
20011115	3	257	0.781155015	0.002739726
20020108	3	256	0.778115502	0.002739726
20020201	3	255	0.775075988	0.002739726
20020228	3	254	0.772036474	0.002739726
20020303	3	253	0.76899696	0.002739726
20020514	3	252	0.765957447	0.002739726
20020601	3	251	0.762917933	0.002739726
20020619	3	250	0.759878419	0.002739726
20020701	3	249	0.756838906	0.002739726
20020630	3	248	0.753799392	0.002739726
20020908	3	247	0.750759878	0.002739726
20020911	3	246	0.747720365	0.002739726
20021026	3	245	0.744680851	0.002739726
20021113	3	244	0.741641337	0.002739726
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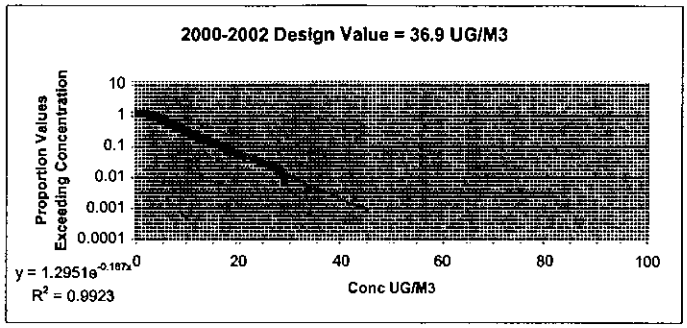
20000403	4	242	0.73556231	0.002739726

Design Value
36.9



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20000617	4	240	0.729483283	0.002739726
20000620	4	239	0.726443769	0.002739726
20000629	4	238	0.723404255	0.002739726
20000702	4	237	0.720364742	0.002739726
20000810	4	236	0.717325228	0.002739726
20000822	4	235	0.714285714	0.002739726
20001120	4	234	0.711246201	0.002739726
20001123	4	233	0.708206687	0.002739726
20010326	4	232	0.705167173	0.002739726
20010327	4	231	0.70212766	0.002739726
20010413	4	230	0.699088146	0.002739726
20010624	4	229	0.696048632	0.002739726
20010712	4	228	0.693009119	0.002739726
20010730	4	227	0.689969605	0.002739726
20010820	4	226	0.686930091	0.002739726
20010828	4	225	0.683890578	0.002739726
20010922	4	224	0.680851064	0.002739726
20010925	4	223	0.67781155	0.002739726
20011209	4	222	0.674772036	0.002739726
20020123	4	221	0.671732523	0.002739726
20020216	4	220	0.668693009	0.002739726
20020523	4	219	0.665653495	0.002739726
20020625	4	218	0.662613982	0.002739726
20020704	4	217	0.659574468	0.002739726
20020725	4	216	0.656534954	0.002739726
20020917	4	215	0.653495441	0.002739726
20020923	4	214	0.650455927	0.002739726
20021008	4	213	0.647416413	0.002739726
20021017	4	212	0.6443769	0.002739726
20021210	4	211	0.641337386	0.002739726
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20000515	5	208	0.632218845	0.002739726
20000521	5	207	0.629179331	0.002739726
20000530	5	206	0.626139818	0.002739726
20000608	5	205	0.623100304	0.002739726
20000804	5	204	0.62006079	0.002739726
20000816	5	203	0.617021277	0.002739726
20000909	5	202	0.613981763	0.002739726
20000915	5	201	0.610942249	0.002739726
20001117	5	200	0.607902736	0.002739726
20010104	5	199	0.604863222	0.002739726
20010113	5	198	0.601823708	0.002739726
20010116	5	197	0.598784195	0.002739726
20010128	5	196	0.595744681	0.002739726
20010329	5	195	0.592705167	0.002739726
20010501	5	194	0.589665653	0.002739726
20010519	5	193	0.58662614	0.002739726
20010525	5	192	0.583586626	0.002739726
20010528	5	191	0.580547112	0.002739726
20010615	5	190	0.577507599	0.002739726
20010727	5	189	0.574468085	0.002739726
20010904	5	188	0.571428571	0.002739726
20010916	5	187	0.568389058	0.002739726
20011013	5	186	0.565349544	0.002739726
20011025	5	185	0.56231003	0.002739726
20011028	5	184	0.559270517	0.002739726
20020204	5	183	0.556231003	0.002739726
20020219	5	182	0.553191489	0.002739726
20020710	5	181	0.550151976	0.002739726
20020713	5	180	0.547112462	0.002739726
20020728	5	179	0.544072948	0.002739726
20020809	5	178	0.541033435	0.002739726
20020920	5	177	0.537993921	0.002739726
20021014	5	176	0.534954407	0.002739726
20000319	6	175	0.531914894	0.002739726
20000331	6	174	0.52887538	0.002739726
20000903	6	173	0.525835866	0.002739726
20001024	6	172	0.522796353	0.002739726
20001102	6	171	0.519758839	0.002739726
20001217	6	170	0.516717325	0.002739726
20010203	6	169	0.513677812	0.002739726
20010314	6	168	0.510638298	0.002739726
20010609	6	167	0.507598784	0.002739726
20010612	6	166	0.504559271	0.002739726
20010629	6	165	0.501519757	0.002739726
20010715	6	164	0.498480243	0.002739726
20010802	6	163	0.495440729	0.002739726
20010805	6	162	0.492401216	0.002739726
20010910	6	161	0.489361702	0.002739726
20010928	6	160	0.486322188	0.002739726
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20020926	6	153	0.465045593	0.002739726

20021005	6	152	0.462006079	0.002739726
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20000623	7	146	0.443768997	0.002739726
20000828	7	145	0.440729483	0.002739726
20010101	7	144	0.43768997	0.002739726
20010401	7	143	0.434650456	0.002739726
20010627	7	142	0.431610942	0.002739726
20010630	7	141	0.428571429	0.002739726
20010718	7	140	0.425531915	0.002739726
20010808	7	139	0.422492401	0.002739726
20010823	7	138	0.419452888	0.002739726
20010901	7	137	0.416413374	0.002739726
20011022	7	136	0.41337386	0.002739726
20011106	7	135	0.410334347	0.002739726
20020105	7	134	0.407294833	0.002739726
20020120	7	133	0.404255319	0.002739726
20020225	7	132	0.401215805	0.002739726
20020505	7	131	0.398176292	0.002739726
20020526	7	130	0.395136778	0.002739726
20020607	7	129	0.392097264	0.002739726
20020719	7	128	0.389057751	0.002739726
20021002	7	127	0.386018237	0.002739726
20021107	7	126	0.382978723	0.002739726
20021222	7	125	0.37993921	0.002739726
20000125	8	124	0.376899696	0.002739726
20000503	8	123	0.373860182	0.002739726
20001018	8	122	0.370820669	0.002739726
20001129	8	121	0.367781155	0.002739726
20001229	8	120	0.364741641	0.002739726
20010302	8	119	0.361702128	0.002739726
20010618	8	118	0.358662614	0.002739726
20010811	8	117	0.3556231	0.002739726
20011031	8	116	0.352583587	0.002739726
20011227	8	115	0.349544073	0.002739726
20020129	8	114	0.346504559	0.002739726
20020316	8	113	0.343465046	0.002739726
20020613	8	112	0.349425532	0.002739726
20020628	8	111	0.337386018	0.002739726
20020716	8	110	0.334346505	0.002739726
20020914	8	109	0.331306991	0.002739726
20021122	8	108	0.328267477	0.002739726
20021213	8	107	0.325227964	0.002739726
20021228	8	106	0.32218845	0.002739726
20000110	9	105	0.319148936	0.002739726
20000313	9	104	0.316109422	0.002739726
20000412	9	103	0.313069909	0.002739726
20000427	9	102	0.310030395	0.002739726
20000611	9	101	0.306990881	0.002739726
20000626	9	100	0.303951368	0.002739726
20000705	9	99	0.300911854	0.002739726
20001108	9	98	0.29787234	0.002739726
20001226	9	97	0.294832827	0.002739726
20010419	9	96	0.291793313	0.002739726
20010703	9	95	0.288753799	0.002739726
20010721	9	94	0.285714286	0.002739726
20011121	9	93	0.282674772	0.002739726
20020117	9	92	0.279635258	0.002739726
20020411	9	91	0.276595745	0.002739726
20020707	9	90	0.273556231	0.002739726
20020929	9	89	0.270516717	0.002739726
20021201	9	88	0.267477204	0.002739726
20000509	10	87	0.26443769	0.002739726
20010125	10	86	0.261398176	0.002739726
20010206	10	85	0.258358663	0.002739726
20010212	10	84	0.255319149	0.002739726
20010407	10	83	0.252279635	0.002739726
20010814	10	82	0.249240122	0.002739726
20011004	10	81	0.246200608	0.002739726
20011212	10	80	0.243161094	0.002739726
20020312	10	79	0.240121581	0.002739726
20020321	10	78	0.237082067	0.002739726
20020324	10	77	0.234042553	0.002739726
20020408	10	76	0.23100304	0.002739726
20020622	10	75	0.227963526	0.002739726
20020818	10	74	0.224924012	0.002739726
20020824	10	73	0.221884498	0.002739726
20021104	10	72	0.218844985	0.002739726
20021110	10	71	0.215805471	0.002739726
20000119	11	70	0.212765957	0.002739726
20000512	11	69	0.209726444	0.002739726
20000527	11	68	0.20668693	0.002739726
20000602	11	67	0.203647416	0.002739726
20000921	11	66	0.200607903	0.002739726
20001208	11	65	0.197568389	0.002739726
20010817	11	64	0.194528875	0.002739726

20020414	11	63	0.191489362	0.002739726
20020616	11	62	0.188449848	0.002739726
20020731	11	61	0.185410334	0.002739726
20020803	11	60	0.182370821	0.002739726
20000409	12	59	0.179331307	0.002739726
20001105	12	58	0.176291793	0.002739726
20010209	12	57	0.17325228	0.002739726
20010320	12	56	0.170212766	0.002739726
20011112	12	55	0.167173252	0.002739726
20011124	12	54	0.164133739	0.002739726
20011203	12	53	0.161094225	0.002739726
20020315	12	52	0.158054711	0.002739726
20020405	12	51	0.155015198	0.002739726
20020815	12	50	0.151975684	0.002739726
20001202	13	49	0.14893617	0.002739726
20010224	13	48	0.145896657	0.002739726
20010410	13	47	0.142857143	0.002739726
20011118	13	46	0.139817629	0.002739726
20011215	13	45	0.136778116	0.002739726
20020520	13	44	0.133738602	0.002739726
20001028	14	43	0.130699088	0.002739726
20016422	14	42	0.127659574	0.002739726
20011218	14	41	0.124620061	0.002739726
20020102	14	40	0.121580547	0.002739726
20020306	14	39	0.118541033	0.002739726
20020309	14	38	0.11550152	0.002739726
20020426	14	37	0.112462006	0.002739726
20020905	14	36	0.109422492	0.002739726
20021116	14	35	0.106382979	0.002739726
20000215	15	34	0.103343465	0.002739726
20000605	15	33	0.100303951	0.002739726
20000203	16	32	0.097264438	0.002739726
20020402	16	31	0.094224924	0.002739726
20020429	16	30	0.09118541	0.002739726
20021101	16	29	0.088145897	0.002739726
20000209	17	28	0.085106383	0.002739726
20000415	17	27	0.082066869	0.002739726
20001214	17	26	0.079027356	0.002739726
20010110	17	25	0.075987842	0.002739726
20010221	17	24	0.072948328	0.002739726
20020207	17	23	0.069908815	0.002739726
20000101	18	22	0.066869301	0.002739726
20020417	18	21	0.063829787	0.002739726
20021204	18	20	0.060790274	0.002739726
20021219	18	19	0.05775076	0.002739726
20001027	19	18	0.054711246	0.002739726
20020508	19	17	0.051671733	0.002739726
20000113	20	16	0.048632219	0.002739726
20010330	20	15	0.045592705	0.002739726
20020222	20	14	0.042553191	0.002739726
20001223	21	13	0.039513678	0.002739726
20010215	21	12	0.036474164	0.002739726
20001220	23	11	0.03343465	0.002739726
20011230	23	10	0.030395137	0.002739726
20010323	24	9	0.027355623	0.002739726
20011130	25	8	0.024316109	0.002739726
20000307	26	7	0.021276596	0.002739726
20000212	27	6	0.018237082	0.002739726
20010218	28	5	0.015197568	0.002739726
20011127	28	4	0.012158055	0.002739726
20020126	29	3	0.009118541	0.002739726
20021029	29	2	0.006079027	0.002739726
20000116	33	1	0.003039514	0.002739726

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
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20010227	0	281	0.996453901	0.00273973
20010119	1	280	0.992907801	0.00273973
20010131	1	279	0.989361702	0.00273973
20010513	1	278	0.985815603	0.00273973
20010603	1	277	0.982269504	0.00273973
20010706	1	276	0.978723404	0.00273973
20011103	1	275	0.975177305	0.00273973
20011221	1	274	0.971631206	0.00273973
20011224	1	273	0.968085106	0.00273973
20021125	1	272	0.964539007	0.00273973
20010305	2	271	0.960992908	0.00273973
20010308	2	270	0.957446809	0.00273973
20010311	2	269	0.953900709	0.00273973
20010504	2	268	0.95035461	0.00273973
20010510	2	267	0.946808511	0.00273973
20010522	2	266	0.943262411	0.00273973
20010606	2	265	0.939716312	0.00273973
20010709	2	264	0.936170213	0.00273973
20010724	2	263	0.932624113	0.00273973
20010829	2	262	0.929078014	0.00273973
20010913	2	261	0.925531915	0.00273973
20011019	2	260	0.921985816	0.00273973
20011109	2	259	0.918439716	0.00273973
20020213	2	258	0.914893617	0.00273973
20020511	2	257	0.911347518	0.00273973
20020529	2	256	0.907801418	0.00273973
20020604	2	255	0.904255319	0.00273973
20020610	2	254	0.90070922	0.00273973
20020812	2	253	0.897163121	0.00273973
20020821	2	252	0.893617021	0.00273973
20021020	2	251	0.890070922	0.00273973
20021119	2	250	0.886524823	0.00273973
20030106	2	249	0.882978723	0.00273973
20031217	2	248	0.879432624	0.00273973
20010107	3	247	0.875886525	0.00273973
20010317	3	246	0.872340426	0.00273973
20010404	3	245	0.868794326	0.00273973
20010425	3	244	0.865248227	0.00273973
20010428	3	243	0.861702128	0.00273973
20010507	3	242	0.858156028	0.00273973
20010516	3	241	0.854609929	0.00273973
20010531	3	240	0.85106383	0.00273973
20010621	3	239	0.84751773	0.00273973
20010907	3	238	0.843971631	0.00273973
20010919	3	237	0.840425532	0.00273973
20011001	3	236	0.836870433	0.00273973
20011010	3	235	0.833333333	0.00273973
20011016	3	234	0.829787234	0.00273973
20011115	3	233	0.826241135	0.00273973
20020108	3	232	0.822695035	0.00273973
20020201	3	231	0.819148936	0.00273973
20020228	3	230	0.815602837	0.00273973
20020303	3	229	0.812056738	0.00273973
20020514	3	228	0.808510638	0.00273973
20020601	3	227	0.804964539	0.00273973
20020619	3	226	0.80141844	0.00273973
20020701	3	225	0.79787234	0.00273973
20020830	3	224	0.794326241	0.00273973
20020908	3	223	0.790780142	0.00273973
20020911	3	222	0.787234043	0.00273973
20021026	3	221	0.783687943	0.00273973
20021113	3	220	0.780141844	0.00273973
20030118	3	219	0.776595745	0.00273973
20010326	4	218	0.773049645	0.00273973
20010327	4	217	0.769503546	0.00273973
20010413	4	216	0.765957447	0.00273973
20010624	4	215	0.762411348	0.00273973
20010712	4	214	0.758865248	0.00273973
20010730	4	213	0.755319149	0.00273973
20010820	4	212	0.75177305	0.00273973
20010826	4	211	0.74822695	0.00273973
20010922	4	210	0.744680851	0.00273973
20010925	4	209	0.741134752	0.00273973
20011209	4	208	0.737588652	0.00273973
20020123	4	207	0.734042553	0.00273973
20020216	4	206	0.730496454	0.00273973
20020523	4	205	0.726950355	0.00273973
20020625	4	204	0.723404255	0.00273973
20020704	4	203	0.719858156	0.00273973
20020725	4	202	0.716312057	0.00273973
20020917	4	201	0.712765957	0.00273973
20020923	4	200	0.709219858	0.00273973
20021008	4	199	0.705673759	0.00273973
20021017	4	198	0.70212766	0.00273973
20021210	4	197	0.69858156	0.00273973
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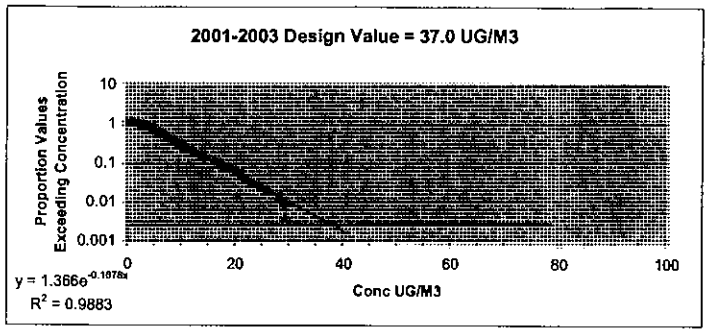
20031006	4	195	0.691489362	0.00273973

Design Value
37.0



20031018	4	194	0.687943262	0.00273973
20031024	4	193	0.684397163	0.00273973
20031111	4	192	0.680851064	0.00273973
20010104	5	191	0.677304965	0.00273973
20010113	5	190	0.673758865	0.00273973
20010116	5	189	0.670212766	0.00273973
20010128	5	188	0.666666667	0.00273973
20010329	5	187	0.663120567	0.00273973
20010501	5	186	0.659574468	0.00273973
20010519	5	185	0.656028369	0.00273973
20010525	5	184	0.65248227	0.00273973
20010528	5	183	0.64893617	0.00273973
20010815	5	182	0.645390071	0.00273973
20010727	5	181	0.641843972	0.00273973
20010904	5	180	0.638297872	0.00273973
20010916	5	179	0.634751773	0.00273973
20011013	5	178	0.631205674	0.00273973
20011025	5	177	0.627659574	0.00273973
20011028	5	176	0.624113475	0.00273973
20020204	5	175	0.620567376	0.00273973
20020219	5	174	0.617021277	0.00273973
20020710	5	173	0.613475177	0.00273973
20020713	5	172	0.609929078	0.00273973
20020728	5	171	0.606382979	0.00273973
20020809	5	170	0.602836879	0.00273973
20020920	5	169	0.59929078	0.00273973
20021014	5	168	0.595744681	0.00273973
20030202	5	167	0.592198582	0.00273973
20030206	5	166	0.588652482	0.00273973
20030301	5	165	0.585106383	0.00273973
20030316	5	164	0.581560284	0.00273973
20030319	5	163	0.578014184	0.00273973
20030322	5	162	0.574468085	0.00273973
20030331	5	161	0.570921986	0.00273973
20031117	5	160	0.567375887	0.00273973
20031223	5	159	0.563829787	0.00273973
20010203	6	158	0.560283688	0.00273973
20010314	6	157	0.556737589	0.00273973
20010609	6	156	0.553191489	0.00273973
20010612	6	155	0.54964539	0.00273973
20010629	6	154	0.546099291	0.00273973
20010715	6	153	0.542553191	0.00273973
20010802	6	152	0.539007092	0.00273973
20010805	6	151	0.535460993	0.00273973
20010910	6	150	0.531914894	0.00273973
20010928	6	149	0.528368794	0.00273973
20011007	6	148	0.524822695	0.00273973
20020111	6	147	0.521276596	0.00273973
20020114	6	146	0.517730496	0.00273973
20020502	6	145	0.514184397	0.00273973
20020722	6	144	0.510638298	0.00273973
20020806	6	143	0.507092109	0.00273973
20020928	6	142	0.503546099	0.00273973
20021005	6	141	0.5	0.00273973
20021011	6	140	0.496453901	0.00273973
20021023	6	139	0.492907801	0.00273973
20021207	6	138	0.489361702	0.00273973
20030217	6	137	0.485815603	0.00273973
20031127	6	136	0.482269504	0.00273973
20031229	6	135	0.478723404	0.00273973
20010101	7	134	0.475177305	0.00273973
20019401	7	133	0.471631206	0.00273973
20010627	7	132	0.468085106	0.00273973
20010630	7	131	0.464539007	0.00273973
20010718	7	130	0.460992908	0.00273973
20010808	7	129	0.457446809	0.00273973
20010823	7	128	0.453900709	0.00273973
20010901	7	127	0.45035461	0.00273973
20011022	7	126	0.446808511	0.00273973
20011106	7	125	0.443262411	0.00273973
20020105	7	124	0.439716312	0.00273973
20020120	7	123	0.436170213	0.00273973
20020225	7	122	0.432624113	0.00273973
20020505	7	121	0.429078014	0.00273973
20020526	7	120	0.425531915	0.00273973
20020607	7	119	0.421985816	0.00273973
20020719	7	118	0.418439718	0.00273973
20021002	7	117	0.414893617	0.00273973
20021107	7	116	0.411347518	0.00273973
20021222	7	115	0.407801418	0.00273973
20030124	7	114	0.404255319	0.00273973
20030130	7	113	0.40070922	0.00273973
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20010302	8	109	0.386524823	0.00273973
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20011227	8	105	0.372340426	0.00273973
20020129	8	104	0.368794326	0.00273973
20020318	8	103	0.365248227	0.00273973
20020613	8	102	0.361702128	0.00273973
20020628	8	101	0.358156028	0.00273973
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20020914	8	99	0.35106383	0.00273973
20021122	8	98	0.34751773	0.00273973
20021213	8	97	0.343971631	0.00273973
20021228	8	96	0.340425532	0.00273973
20030103	8	95	0.336879433	0.00273973
20030307	8	94	0.333333333	0.00273973
20030313	8	93	0.329787234	0.00273973
20010419	9	92	0.326241135	0.00273973
20010703	9	91	0.322695035	0.00273973
20010721	9	90	0.319148936	0.00273973
20011121	9	89	0.315602837	0.00273973
20020117	9	88	0.312056738	0.00273973
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20020707	9	86	0.304964539	0.00273973
20020929	9	85	0.30141844	0.00273973
20021201	9	84	0.29787234	0.00273973
20030115	9	83	0.294326241	0.00273973
20030127	9	82	0.290780142	0.00273973
20030205	9	81	0.287234043	0.00273973
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20010206	10	77	0.273049645	0.00273973
20010212	10	76	0.269503546	0.00273973
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20010814	10	74	0.262411348	0.00273973
20011004	10	73	0.258865248	0.00273973
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20020312	10	71	0.25177305	0.00273973
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20020324	10	69	0.244680851	0.00273973
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20020818	10	66	0.234042553	0.00273973
20020824	10	65	0.230496454	0.00273973
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20021110	10	63	0.223404255	0.00273973
20031123	10	62	0.219858156	0.00273973
20031205	10	61	0.216312057	0.00273973
20010817	11	60	0.212765957	0.00273973
20020414	11	59	0.209219858	0.00273973
20020616	11	58	0.205673759	0.00273973
20020731	11	57	0.20212766	0.00273973
20020803	11	56	0.19858156	0.00273973
20030214	11	55	0.195035461	0.00273973
20010209	12	54	0.191489362	0.00273973
20010320	12	53	0.187943262	0.00273973
20011112	12	52	0.184397163	0.00273973
20011124	12	51	0.180851064	0.00273973
20011203	12	50	0.177304965	0.00273973
20020315	12	49	0.173758865	0.00273973
20020405	12	48	0.170212766	0.00273973
20020815	12	47	0.166666667	0.00273973
20010224	13	46	0.163120567	0.00273973
20010410	13	45	0.159574468	0.00273973
20011118	13	44	0.156028369	0.00273973
20011215	13	43	0.15248227	0.00273973
20020520	13	42	0.14893617	0.00273973
20030220	13	41	0.145390071	0.00273973
20010422	14	40	0.141843972	0.00273973
20011218	14	39	0.138297872	0.00273973
20020102	14	38	0.134751773	0.00273973
20020306	14	37	0.131205674	0.00273973
20020309	14	36	0.127659574	0.00273973
20020426	14	35	0.124113475	0.00273973
20020905	14	34	0.120567376	0.00273973
20021116	14	33	0.117021277	0.00273973
20030325	14	32	0.113475177	0.00273973
20020402	16	31	0.109929078	0.00273973
20020429	16	30	0.106382979	0.00273973
20021101	16	29	0.102836879	0.00273973
20030310	16	28	0.09929078	0.00273973
20010110	17	27	0.095744681	0.00273973
20010221	17	26	0.092198582	0.00273973
20020207	17	25	0.088652482	0.00273973
20030122	17	24	0.085106383	0.00273973
20030223	17	23	0.081560284	0.00273973
20030308	17	22	0.078014184	0.00273973
20020417	18	21	0.074468085	0.00273973
20021204	18	20	0.070921986	0.00273973
20021219	18	19	0.067375887	0.00273973
20020508	19	18	0.063829787	0.00273973
20010330	20	17	0.060283688	0.00273973

20020222	20	16	0.056737569	0.00273973
20031012	20	15	0.053191489	0.00273973
20010215	21	14	0.04964539	0.00273973
20030109	21	13	0.046099291	0.00273973
20031105	21	12	0.042553191	0.00273973
20031119	21	11	0.039007092	0.00273973
20030112	22	10	0.035460993	0.00273973
20031030	22	9	0.031914894	0.00273973
20011230	23	8	0.028368794	0.00273973
20010323	24	7	0.024822695	0.00273973
20011130	25	6	0.021276596	0.00273973
20031102	26	5	0.017730496	0.00273973
20010218	28	4	0.014184397	0.00273973
20011127	28	3	0.010638298	0.00273973
20020126	29	2	0.007092199	0.00273973
20021029	29	1	0.003546099	0.00273973

Date	Sample Value	Rank	Proportion Values Exceeding Concentration	1/365
20021125	1	227	1	0.00273973
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20020213	2	225	0.991189427	0.00273973
20020511	2	224	0.986784141	0.00273973
20020529	2	223	0.982378855	0.00273973
20020604	2	222	0.977973568	0.00273973
20020610	2	221	0.973568282	0.00273973
20020612	2	220	0.969162996	0.00273973
20020821	2	219	0.964757709	0.00273973
20021020	2	218	0.960352423	0.00273973
20021119	2	217	0.955947137	0.00273973
20030106	2	216	0.95154185	0.00273973
20031217	2	215	0.947136564	0.00273973
20041117	2	214	0.942731278	0.00273973
20041223	2	213	0.938325991	0.00273973
20020108	3	212	0.933920705	0.00273973
20020201	3	211	0.929515419	0.00273973
20020228	3	210	0.925110132	0.00273973
20020303	3	209	0.920704846	0.00273973
20020514	3	208	0.916299559	0.00273973
20020601	3	207	0.911894273	0.00273973
20020619	3	206	0.907488987	0.00273973
20020701	3	205	0.9030837	0.00273973
20020830	3	204	0.898678414	0.00273973
20020908	3	203	0.894273128	0.00273973
20020911	3	202	0.889867841	0.00273973
20021026	3	201	0.885462555	0.00273973
20021113	3	200	0.881057269	0.00273973
20030118	3	199	0.876651982	0.00273973
20040331	3	198	0.872246696	0.00273973
20040403	3	197	0.86784141	0.00273973
20040509	3	196	0.863436123	0.00273973
20040602	3	195	0.859030837	0.00273973
20040608	3	194	0.854625551	0.00273973
20040614	3	193	0.850220264	0.00273973
20040912	3	192	0.845814978	0.00273973
20041217	3	191	0.841409692	0.00273973
20020123	4	190	0.837004405	0.00273973
20020216	4	189	0.832599119	0.00273973
20020523	4	188	0.828193833	0.00273973
20020625	4	187	0.823788546	0.00273973
20020704	4	186	0.81938326	0.00273973
20020725	4	185	0.814977974	0.00273973
20020917	4	184	0.810572687	0.00273973
20020923	4	183	0.806167401	0.00273973
20021008	4	182	0.801762115	0.00273973
20021017	4	181	0.797356828	0.00273973
20021210	4	180	0.792951542	0.00273973
20030304	4	179	0.788546256	0.00273973
20031008	4	178	0.784140969	0.00273973
20031018	4	177	0.779735683	0.00273973
20031024	4	176	0.775330396	0.00273973
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20040304	4	174	0.766519824	0.00273973
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20040924	4	172	0.757709251	0.00273973
20041030	4	171	0.753303965	0.00273973
20041105	4	170	0.748898678	0.00273973
20041123	4	169	0.744493392	0.00273973
20020204	5	168	0.740088106	0.00273973
20020219	5	167	0.735682819	0.00273973
20020710	5	166	0.731277533	0.00273973
20020713	5	165	0.726872247	0.00273973
20020728	5	164	0.72246698	0.00273973
20020809	5	163	0.718061674	0.00273973
20020920	5	162	0.713856388	0.00273973
20021014	5	161	0.709251101	0.00273973
20030202	5	160	0.704845815	0.00273973
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20030301	5	158	0.696035242	0.00273973
20030316	5	157	0.691629956	0.00273973
20030319	5	156	0.68722467	0.00273973
20030322	5	155	0.682819383	0.00273973
20030331	5	154	0.678414097	0.00273973
20031117	5	153	0.674008811	0.00273973
20031223	5	152	0.669603524	0.00273973
20040116	5	151	0.665198238	0.00273973
20040427	5	150	0.660792952	0.00273973
20040527	5	149	0.656387665	0.00273973
20040726	5	148	0.651982379	0.00273973
20040915	5	147	0.647577093	0.00273973
20040927	5	146	0.643171806	0.00273973
20041129	5	145	0.63876652	0.00273973
20041211	5	144	0.634361233	0.00273973
20041229	5	143	0.629955947	0.00273973
20020111	6	142	0.625550661	0.00273973
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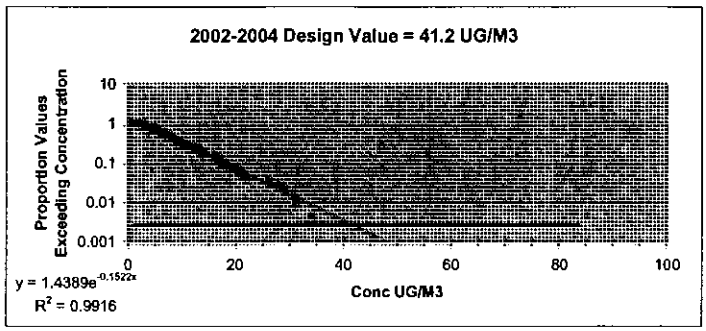
20020502	6	140	0.616740088	0.00273973

Design Value
41.2



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20020806	8	138	0.607929515	0.00273973
20020926	6	137	0.603524229	0.00273973
20021005	6	136	0.599118943	0.00273973
20021011	6	135	0.594713656	0.00273973
20021023	6	134	0.59030837	0.00273973
20021207	6	133	0.585903084	0.00273973
20030217	6	132	0.581497797	0.00273973
20031127	6	131	0.577092511	0.00273973
20031229	6	130	0.572687225	0.00273973
20040203	6	129	0.568281938	0.00273973
20040325	6	128	0.563876652	0.00273973
20040503	6	127	0.559471366	0.00273973
20020105	7	126	0.555066079	0.00273973
20020120	7	125	0.550660793	0.00273973
20020225	7	124	0.546255507	0.00273973
20020505	7	123	0.54185022	0.00273973
20020528	7	122	0.537444934	0.00273973
20020607	7	121	0.533039648	0.00273973
20020719	7	120	0.528634361	0.00273973
20021002	7	119	0.524229075	0.00273973
20021107	7	118	0.519823789	0.00273973
20021222	7	117	0.515418502	0.00273973
20030124	7	116	0.511013216	0.00273973
20030130	7	115	0.50660793	0.00273973
20030328	7	114	0.502202643	0.00273973
20031129	7	113	0.497797357	0.00273973
20031211	7	112	0.49339207	0.00273973
20040209	7	111	0.488986784	0.00273973
20040930	7	110	0.484581498	0.00273973
20041018	7	109	0.480176211	0.00273973
20041111	7	108	0.475770925	0.00273973
20020129	8	107	0.471365639	0.00273973
20020318	8	106	0.466960352	0.00273973
20020613	8	105	0.462555066	0.00273973
20020628	8	104	0.45814978	0.00273973
20020716	8	103	0.453744493	0.00273973
20020914	8	102	0.449339207	0.00273973
20021122	8	101	0.444933921	0.00273973
20021213	8	100	0.440528634	0.00273973
20021228	8	99	0.436123348	0.00273973
20030103	8	98	0.431718062	0.00273973
20030307	8	97	0.427312775	0.00273973
20030313	8	96	0.422907489	0.00273973
20040122	8	95	0.418502203	0.00273973
20040409	8	94	0.414096916	0.00273973
20040702	8	93	0.40969163	0.00273973
20040807	8	92	0.405286344	0.00273973
20041008	8	91	0.400881057	0.00273973
20020117	9	90	0.396475771	0.00273973
20020411	9	89	0.392070485	0.00273973
20020707	9	88	0.387665198	0.00273973
20020929	9	87	0.383259912	0.00273973
20021201	9	86	0.378854626	0.00273973
20030115	9	85	0.374449339	0.00273973
20030127	9	84	0.370044053	0.00273973
20030205	9	83	0.365638787	0.00273973
20030211	9	82	0.36123348	0.00273973
20030226	9	81	0.356828194	0.00273973
20040110	9	80	0.352422907	0.00273973
20040720	9	79	0.348017621	0.00273973
20040801	9	78	0.343612335	0.00273973
20040821	9	77	0.339207048	0.00273973
20041024	9	76	0.334801762	0.00273973
20020312	10	75	0.330396476	0.00273973
20020321	10	74	0.325991189	0.00273973
20020324	10	73	0.321585903	0.00273973
20020408	10	72	0.317180617	0.00273973
20029622	10	71	0.31277533	0.00273973
20020818	10	70	0.308370044	0.00273973
20020824	10	69	0.303964758	0.00273973
20021104	10	68	0.299559471	0.00273973
20021110	10	67	0.295154185	0.00273973
20031123	10	66	0.290748899	0.00273973
20031205	10	65	0.286343612	0.00273973
20040819	10	64	0.281938326	0.00273973
20020414	11	63	0.27753304	0.00273973
20020616	11	62	0.273127753	0.00273973
20020731	11	61	0.268722467	0.00273973
20020803	11	60	0.264317181	0.00273973
20030214	11	59	0.259911894	0.00273973
20040328	11	58	0.255506608	0.00273973
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20020315	12	56	0.246696035	0.00273973
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20040128	12	53	0.233480176	0.00273973
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20020520	13	51	0.224669604	0.00273973

20030220	13	50	0.220264317	0.00273973
20040322	13	49	0.215859031	0.00273973
20040415	13	48	0.211453744	0.00273973
20040813	13	47	0.207048458	0.00273973
20040910	13	46	0.202843172	0.00273973
20020102	14	45	0.198237885	0.00273973
20020306	14	44	0.193832599	0.00273973
20020309	14	43	0.189427313	0.00273973
20020426	14	42	0.185022026	0.00273973
20020905	14	41	0.18061674	0.00273973
20021116	14	40	0.176211454	0.00273973
20030325	14	39	0.171806167	0.00273973
20040215	14	38	0.167400881	0.00273973
20040620	14	37	0.162995595	0.00273973
20041012	14	36	0.158590308	0.00273973
20041205	14	35	0.154185022	0.00273973
20020402	16	34	0.149779736	0.00273973
20020429	16	33	0.145374449	0.00273973
20021101	16	32	0.140969163	0.00273973
20030310	16	31	0.136563877	0.00273973
20040918	16	30	0.13215859	0.00273973
20020207	17	29	0.127753304	0.00273973
20030122	17	28	0.123348018	0.00273973
20030223	17	27	0.118942731	0.00273973
20030308	17	26	0.114537445	0.00273973
20040319	17	25	0.110132159	0.00273973
20040421	17	24	0.105726872	0.00273973
20040515	17	23	0.101321586	0.00273973
20040626	17	22	0.0969163	0.00273973
20020417	18	21	0.092511013	0.00273973
20021204	18	20	0.088105727	0.00273973
20021219	18	19	0.083700441	0.00273973
20040227	18	18	0.079295154	0.00273973
20020508	19	17	0.074889868	0.00273973
20020222	20	16	0.070484581	0.00273973
20031012	20	15	0.066079295	0.00273973
20030109	21	14	0.061674009	0.00273973
20031105	21	13	0.057268722	0.00273973
20031119	21	12	0.052863436	0.00273973
20040825	21	11	0.04845815	0.00273973
20030112	22	10	0.044052863	0.00273973
20031030	22	9	0.039647577	0.00273973
20031102	26	8	0.035242291	0.00273973
20040709	26	7	0.030837004	0.00273973
20040104	28	6	0.026431718	0.00273973
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20021029	29	4	0.017621145	0.00273973
20040714	31	3	0.013215859	0.00273973
20040816	31	2	0.008810573	0.00273973
20040708	34	1	0.004405286	0.00273973