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FINAL

NUIQSUT AMBIENT AIR QUALITY MONITORING PROGRAM
6TH MONITORING YEAR DATA SUMMARY
APRIL 1, 2004 THROUGH MARCH 31, 2005

FOR

CONOCOPHILLIPS ALASKA, INC.

Alpine Central Processing Facility

October 2006
12CP.11481.04.0045

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

EXECUTIVE SUMMARY

This report summarizes data collected at the Nuiqsut Ambient Air Quality Monitoring Station (Nuiqsut Station) during the 6th monitoring year (April 2004 through March 2005). The Nuiqsut Station was established in April 1999 to address air quality concerns raised by citizens of Nuiqsut and the North Slope Borough and has fulfilled the Alaska Department of Environmental Conservation (ADEC) one-year monitoring requirement in the ConocoPhillips Alaska, Inc. Alpine construction permit. Currently, the monitoring at the Nuiqsut Station is being conducted on a voluntary basis to document that Nuiqsut air quality is not being compromised by continued Alaskan North Slope oil and gas development and to support potential regional air quality permitting activities.

The Nuiqsut Station is equipped to continuously measure ambient air quality (NO_x, SO_2, PM_{10}, and O_3) and dispersion meteorology parameters. Ozone was added to the Nuiqsut Station during this monitoring year. Official ozone data collection began on November 19, 2004. Air quality data collected at the Nuiqsut Station meet strict quality assurance and data recovery requirements of the United States Environmental Protection Agency (USEPA) Prevention of Significant Deterioration program as administered by ADEC and other specific ADEC ambient monitoring quality assurance requirements. Protocols used to collect data at the Nuiqsut Station are fully described in the project Monitoring and Quality Assurance Project Plan (QAPP). There were no procedures used during the monitoring year that differed from those specified in the QAPP.

As shown in Table 1, air quality and meteorological data recovery this quarter exceeded project goals for all parameters except vertical wind speed and vertical wind speed standard deviation. The vertical wind parameters are considered optional parameters by the models these data are being collected to drive; therefore, it is not critical these parameters meet the 90% per calendar quarter data recovery goal.

Tables 2 through 5 summarize average NO_2, SO_2, PM_{10}, and O_3 concentrations measured during the monitoring year. Measured concentrations of NO_2, SO_2, PM_{10}, and O_3 were well below Alaska Ambient Air Quality Standards (AAAQS), which are equivalent to the National Ambient Air Quality Standards (NAAQS).

The annual average of hourly NO_2 concentrations was just above instrument detection, and well below applicable AAAQS. Concentrations measured this monitoring year were generally lower than historical measurements. Contrary to historical trends (i.e., measured NO_2 concentrations higher in summer and lower in winter) NO_2 measurements this year showed little seasonal variation.

Measured SO_2 concentrations were at or below instrument detection the entire year. The low concentrations measured are consistent with an airshed containing relatively few and widely dispersed SO_2 sources. This trend has been typical of SO_2 measurements since monitoring began.

The annual average of hourly PM_{10} concentrations was slightly higher compared to previous years but well below the AAAQS. Consistent with historical measurements, elevated particulate

concentrations measured were a result of naturally occurring wind blown fugitive dust from exposed areas local to the Nuiqsut Station. When fugitive dust from exposed areas is not present (i.e., during winter), hourly concentrations are at or below the instrument detection limit and reflective of global background levels. High PM_{10} concentrations were observed throughout the summer of 2004 due to a very active wildfire season in the interior of Alaska. Smoke transport across the state could be clearly seen in satellite imagery throughout July and August.

Ozone concentrations measured during this monitoring year were typical of seasonal averages measured on the Alaskan North Slope (Prudhoe Bay, Kuparuk River Unit and Barrow). In the absence of large combustion sources, frontal boundaries and high incoming solar radiation, ambient ozone levels will be spatially homogenous and representative of a regional background.

TABLE 1

6TH MONITORING YEAR DATA RECOVERY STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	2nd Quarter 2004 (%)	3rd Quarter 2004 (%)	4th Quarter 2004 (%)	1st Quarter 2005 (%)	Required Capture Rates (%)
Meteorological					
10-m Horizontal Wind Speed	99.4	98.6	96.4	94.7	90
10-m Horizontal Wind Direction	99.4	98.6	96.4	94.7	
10-m Sigma-Theta (σ_θ)	99.4	98.6	96.4	94.7	
10-m Vertical Wind Speed	**46.6**	97.7	**81.7**	91.8	
10-m Vertical Sigma-w (σ_w)	**46.6**	97.7	**81.7**	91.8	
10-m Temperature	99.7	98.6	98.6	98.8	
2-m Temperature	99.7	98.6	98.6	98.8	
10-2m Temperature Difference	99.7	98.6	98.6	98.8	
Total Solar Radiation	99.7	98.6	99.0	98.8	
Air Quality					
Nitrogen Dioxide (NO_2)	98.9	97.8	96.6	96.1	80
Sulfur Dioxide (SO_2)	98.9	97.8	96.6	81.3	
Ozone (O_3)	-	-	98.7[1]	88.4	
Particulate (PM_{10}) (TEOM)	99.4	99.0	97.7	89.1	

[1] Official ozone data collection began on November 19, 2004. Recovery statistics based on this start date.

TABLE 2

MEASURED NITROGEN DIOXIDE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	Period Mean (ppm)	Number of Exceedances
2nd Qtr.	2004	0.002	None
3rd Qtr.	2004	0.001	None
4th Qtr.	2004	0.002	None
1st Qtr.	2005	0.002	None
Annual	2004	0.002	None

NAAQS/AAAQS:

- Annual - 0.053 ppm (100 µg/m^3) – Compared to the annual arithmetic mean.

TABLE 3

MEASURED SULFUR DIOXIDE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	3-hour (ppm)		24-hour (ppm)		Period Mean (ppm)	Number of Exceedances
		1st high	2nd high	1st high	2nd high		
2nd Qtr.	2004	0.002	0.002	0.000	0.000	0.000	None
3rd Qtr.	2004	0.005	0.004	0.002	0.001	0.000	None
4th Qtr.	2004	0.004	0.003	0.001	0.001	0.000	None
1st Qtr.	2005	0.007	0.007	0.003	0.003	0.000	None
Annual	2004	0.007	0.007	0.003	0.003	0.000	None

NAAQS/AAAQS:

- 3-hour - 0.5 ppm (1,300 $\mu g/m^3$) – Rolling average not to be exceeded more than once per year.
- 24-hour - 0.14 ppm – Midnight to midnight average not to be exceeded more than once per year.
- Annual - 0.03 ppm – Compared to the annual arithmetic mean.

TABLE 4

MEASURED PM_{10} DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	24-hour ($\mu g/m^3$)		Period Mean ($\mu g/m^3$)	Number of Exceedances
		1st high	2nd high		
2nd Qtr.	2004	54.0	34.3	8.3	None
3rd Qtr.	2004	119.4	88.9	11.2	None
		33.9[1]	22.5[1]	7.8[1]	None
4th Qtr.	2004	19.1	18.7	6.2	None
1st Qtr.	2005	13.6	10.3	4.9	None
Annual	2004	119.4	88.9	7.7	None
		54.0[1]	34.3[1]	6.9[1]	None

NAAQS/AAAQS:

- 24-hour – 150 $\mu g/m^3$ - Not to be exceeded more than once per year measured from midnight to midnight at USEPA Standard Conditions.
- Annual – 50 $\mu g/m^3$ – Compared to the 3-year average of the weighted annual arithmetic mean concentration measured at USEPA Standard Conditions.

[1] Averages do not include hours obviously influenced by naturally occurring forest fires.

TABLE 5

MEASURED OZONE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	8-hour (ppm)			Period Mean (ppm)	Number of Exceedances
		1st high	2nd high	4th high		
2nd Qtr.	2004	N.A.	N.A.	N.A.	N.A.	None
3rd Qtr.	2004	N.A.	N.A.	N.A.	N.A.	None
4th Qtr.[1]	2004	0.0381	0.0379	0.0376	0.0294	None
1st Qtr.	2005	0.0411	0.0411	0.0410	0.0250	None
Annual	2004	0.0411	0.0411	0.0410	0.0265	None

NAAQS/AAAQS:

- 8-hour - 0.08 ppm – Compared to the 3-year average of the fourth-highest daily maximum rolling 8-hour average concentration.

[1] Based on a partial quarter of sampling. Ozone data collection officially began on November 19, 2004.

1.0 INTRODUCTION

1.1 Project Summary

Since April 9, 1999 (prior to the startup of the Alpine Central Processing Facility) ConocoPhillips Alaska, Inc. (CPAI) has operated an air quality and dispersion meteorology monitoring station in Nuiqsut, Alaska (Nuiqsut Station) which is located on the Alaskan North Slope. This station is part of the Nuiqsut Ambient Air Quality and Meteorological Monitoring Program (Monitoring Program) which is primarily designed to characterize ambient air in Nuiqsut as regional oilfield development continues. This Monitoring Program has been administered according to USEPA Prevention of Significant Deterioration (PSD) protocols; therefore, data collected is considered PSD quality.

Currently, the Monitoring Program is being conducted on a voluntary basis to document air quality in Nuiqsut. Monitoring Program data is also used to support various ambient air quality impact analysis conducted for oil field development in the Colville Delta region.

Since the beginning, the Monitoring Program has been modified to enhance quality assurance and quality control and increase program utility through the addition of monitored parameters. Major Monitoring Program modifications include:

- Collocated Federal Reference Method (FRM) PM_{10} sampling initiated to evaluate the Monitoring Program Federal Equivalent Method sampling methodology (July 14, 2000). Collocated FRM PM_{10} sampling was discontinued in the Fall 2002.
- Enhanced dispersion meteorology characterization through the addition of 10 meter temperature, vertical wind speed and solar radiation monitoring (July 24, 2001).
- Expanded background air quality evaluation through the addition of ozone monitoring (November 19, 2004).

Since inception, the specific technical objectives of the program are to:

- collect data meeting quality assurance and data recovery requirements of the USEPA PSD Program and other specific ADEC ambient monitoring quality assurance requirements (ADEC 1996),
- document preconstruction air quality impacts at Nuiqsut prior to operation of Alpine (fulfilled),
- document air quality conditions after Alpine is operational,
- meet air quality and meteorological monitoring requirements listed in Alpine Permit No. 0073-AC060 (fulfilled), and
- document dispersion meteorology conditions in Nuiqsut to support refined modeling of potential impacts in the region.

1.2 Measurement Methods

To meet project technical objectives the Nuiqsut Station is instrumented and equipped to continuously measure the parameters listed in Table 1-1. Table 1-1 also details the methods and instruments used for measurement. A complete description of the Monitoring Program, including the quality assurance plan, is contained in the ADEC approved Monitoring and Quality Assurance Project Plan (QAPP) which consists of:

- the original project monitoring plan (SECOR 2000), approved by ADEC in April 2000;
- the Partisol Addendum to the original monitoring plan (SECOR 2001), final ADEC approval pending;
- the draft Expanded Meteorology Addendum to the original monitoring plan (SECOR 2002), final ADEC approval pending; and
- the draft Ozone Monitoring Addendum to the original monitoring plan (SECOR 2004), final ADEC approval pending.

1.3 Variations from Quality Assurance Project Plan

There were no procedures used during the monitoring year that differed from those specified in the QAPP.

TABLE 1-1

MEASUREMENT METHODS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	Suggested Manufacturer/Model	Sample Frequency	Averaging Period	Measurement Range	Lower Detection Limit	Method
Nitrogen Oxides (NO_x, NO_2, NO)	Thermo Environmental Instruments (TECO) Model 42C	Continuous	1-hour	1-500 ppb	0.5 ppb	Chemiluminescence (EPA reference method RFNA-1289-074)
Sulfur Dioxide (SO_2)	Thermo Environmental Instruments (TECO) Model 43C	Continuous	1-hour	2–500 ppb	2 ppb	Pulsed Fluorescence (EPA equivalent method EQSA-0486-060)
Particulate Matter (PM_{10})	Rupprecht & Patashnick (R&P) Model 1400b TEOM PM_{10}	Continuous	1-hour	<5 µg/m^3 to several g/m^3	<5 µg/m^3	Tapered Element Oscillating Microbalance (EPA equivalent method EQPM-1090-079)
Ozone (O_3)	Thermo Environmental Model 49	Continuous	1-hour	0-1,000 ppb	2 ppb	Pulsed UV Photometric (EPA equivalent method EQOA-0880-047)
Horizontal Wind Speed (10 m)	R.M. Young Wind Monitor AQ – 05305	Continuous	1-hour	0 to 50 m/s	0.4 m/s	Propeller/Magnetically Induced AC
Horizontal Wind Direction (10 m)	R.M. Young Wind Monitor AQ – 05305	Continuous	1-hour	0 to 360°	N.A.	Vane/Potentiometer
Sigma-Theta (σ_θ) (10 m)	Campbell Scientific Model 23X	Continuous	1-hour	0 to 103.9°	N.A.	Single Pass Estimator of Wind Direction Standard Deviation (Yamartino 1984)

TABLE 1-1 (CONTINUED)

MEASUREMENT METHODS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	Manufacturer/Model	Sample Frequency	Averaging Period	Measurement Range	Lower Detection Limit	Method
Temperature (2 m)	YSI 44020	Continuous	1-hour	-50°C to 50°C	N.A.	Motor aspirated/shielded thermistor (triple-element)
Temperature (10 m)	YSI 44020	Continuous	1-hour	-50°C to 50°C	N.A.	Motor aspirated/shielded thermistor (triple-element)
10 m – 2 m Temperature Difference (ΔT)	Campbell Scientific Model 23X	Continuous	1-hour	-100°C to 100°C	N.A.	Numerical Subtraction
Vertical Wind Speed (10 m)	RM Young Propeller Anemometer Model 27106T	Continuous	1-hour	-35 m/s to 35 m/s	±0.25 m/s	Four blade helicoid propeller/AC
Sigma-w (σ_w) (10 m)	Campbell Scientific Model 23X	Continuous	1-hour	0 to 35 m/s	N.A.	Standard Deviation
Total Solar Radiation (2 m)	Eppley 8-48	Continuous	1-hour	0 to 1,400 W/m^2	<1 W/m^2	Differential Thermopile

2.0 STATION PERFORMANCE SUMMARY

2.1 Significant Project Events

Table 2-1 summarizes significant project events occurring during the monitoring year. Detailed discussions of project events affecting data recovery are presented in Section 2.2.

2.2 Missing Invalid and Adjusted Data

All hourly NO_x, SO_2 and O_3 data is routinely adjusted for instrument drift according to the procedure outlined in the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volume II: Part 1 (USEPA 1998), as presented in Appendix A, Section A.3. After instrument drift corrections are applied, all hourly NO_x, SO_2 and O_3 data less than 0.000 ppm have been investigated and then set to 0.000 ppm to conservatively remove any remaining negative bias from the data set.

The following sub-sections provide details pertaining to non-routine data losses for each specific portion of the monitoring network. Additional data losses for the period include those due to routine network operation and maintenance, audits, and precision checks.

2.2.1 NO_x, SO_2 and O_3 Data

Second Quarter 2004
NO_x and SO_2 data losses this quarter were limited to routine onsite maintenance, calibration, and auditing activities. Throughout the quarter, the NO_x analyzer measurement error steadily increased, biasing measurements low. Corrective action could not be taken because the program did not have an onsite technician. At the time of the May 18-19 independent quality assurance audit, the error was unacceptable and the NO_x analyzer failed the audit. By June 12, an onsite technician had been hired, the analyzer was adjusted and was operating within acceptable limits. Nightly level I calibration check data were used to correct NO_x data for the analyzer measurement error drift according to the procedure outlined in Appendix A, Section A.3; therefore, no data was invalidated.

Third Quarter 2004
NO_x and SO_2 data losses this quarter were limited to routine onsite maintenance, calibration, and auditing activities.

Fourth Quarter 2004
NO_x, SO_2, and O_3 data losses this quarter were limited to power failures and routine onsite maintenance, calibration, and auditing activities. During the quarter the ozone monitoring system was brought online and official data collection began on November 19, 2004.

First Quarter 2005
Upon arrival for the first quarter 2005 audit (March 15 and 16, 2005), the auditor found the NO_x, SO_2 and O_3 instrument common exhaust was partially plugged with snow which resulted in back

TABLE 2-1

SIGNIFICANT PROJECT EVENTS
CONOCOPHILLIPS ALASKA, INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Date	Event/Comment
May 18 through 19, 2004	Second quarter 2004 independent quality assurance audit of the meteorological and air quality monitoring systems. The audit confirmed all instrumentation was operating within acceptable limits except for the NO_x analyzer. The NO_x analyzer had drifted outside acceptable limits in the absence of a trained onsite technician. During the audit, the auditor discovered the vertical wind speed sensor had a broken propeller which he repaired. All vertical wind speed data was invalidated from the last date the sensor was known to be undamaged (March 30, 2004 calibration) through May 18, when the sensor was repaired.
June 12, 2004	The newly hired onsite technician adjusted the NO_x analyzer and post-adjustment calibration confirmed the analyzer was operating within acceptable limits.
July 13 and July 15, 2004	Second quarter 2004 routine calibration of the air quality monitoring systems. The calibrations and routine quarterly site service and maintenance visit confirmed all instrumentation and systems were operating within acceptable limits.
September 8 through 9, 2004	Third quarter 2004 independent quality assurance audit of the air quality monitoring systems. The audit confirmed all instrumentation was operating within acceptable limits.
October 3 through 5, 2004	Third quarter 2004 routine calibration of the air quality monitoring systems. The calibrations and routine quarterly site service and maintenance visit confirmed all instrumentation and systems were operating within acceptable limits.
November 16 through 18, 2004	Fourth quarter 2004 independent quality assurance audit of the air quality monitoring systems. The audit confirmed all instrumentation was operating within acceptable limits. Fourth quarter 2004 routine calibration of the air quality monitoring systems. The calibrations and routine quarterly site service and maintenance visit confirmed all instrumentation and systems were operating within acceptable limits. Ozone monitoring system brought online and official data collection began on November 19, 2004.
March 2 through 15, 2004	SO_2 data was lost due to a restricted exhaust line and instrument sample pump failure. The sample pump was replaced during the first quarter performance audit.

Continued on the next page…

TABLE 2-1 (CONTINUED)

SIGNIFICANT PROJECT EVENTS
CONOCOPHILLIPS ALASKA, INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Date	Event/Comment
March 9 through 16, 2004	O_3 data lost due to a restricted exhaust line and instrument sample pump failure. The pump was repaired during the first quarter performance audit.
March 11 through 15, 2005	PM_{10} data invalid due to a low total flow rate. The problem was corrected by replacing the instrument mass flow controller inlet filter.
March 15 through 16, 2005	First quarter independent performance audit of the air quality monitoring systems. Only the PM_{10} analyzer was found operating within acceptable limits.
March 22 through 23, 2005	First quarter calibration of the air quality monitoring systems. The calibration and routine site maintenance visit confirmed all air quality monitoring systems were operating within acceptable limits following instrument maintenance and adjustments.

pressure on all air quality instrumentation except the PM_{10} analyzer. This situation had been occurring for at least two weeks prior to the audit, and resulted in damaged SO_2 and O_3 analyzer sample pumps and higher than normal NO_X analyzer electronics drift. The SO_2 analyzer was repaired, audited and found operating just outside acceptable limits. The O_3 analyzer was repaired, but not audited due to time constraints. In the absence of audit results, an examination of nightly Level I calibration checks and the as found quarterly calibration showed the O_3 analyzer was likely operating just outside acceptable limits when the auditor left the site. The NO_x analyzer needed no repairs but failed the audit due to the electronic drift that had occurred. No post-audit instrument adjustments were made due to time constraints and the fact that the quarterly calibration was scheduled within a week of the audit. During the quarterly calibration, all instrumentation was thoroughly inspected, calibrated and left operating well within acceptable limits.

An examination of hourly data and nightly Level I calibration check data made it possible to identify when the partially plugged exhaust line began to influence data. In the case of the SO_2 and O_3 analyzers, the affect on the data was extreme and all affected data was invalidated. In the case of the NO_x analyzer, the affect was small enough that hourly data could be corrected and validated according to the procedure outlined in Appendix A, Section A.3.

Though the NO_x, SO_2, and O_3 analyzers all failed the audit, following repairs this instrumentation was operating close enough to acceptable limits to justify correcting the data for the instrument measurement error the week between the audit and the calibration. Therefore, all NO_x, SO_2, and O_3 data collected between the audit and the subsequent quarterly calibration was corrected and validated.

2.2.2 PM_{10} Data

During the monitoring year, losses of PM_{10} data were generally limited to power failures, routine onsite maintenance, calibration, and auditing activities. Several hours of negative concentrations below acceptable limits[1] were also invalidated. The exception to this was a brief period from March 11 through March 15, 2005 when PM_{10} data was invalid due to a low total flow rate. This problem was corrected by replacing the instrument mass flow controller inlet filter.

2.2.3 Meteorological Data

During the monitoring year, losses of meteorological data were generally limited to routine onsite maintenance, calibration, and auditing activities. Additional losses of horizontal wind speed/direction and vertical wind speed data occurred throughout the year due to frozen sensors.

A significant loss of vertical wind speed data resulted from a broken propeller discovered and repaired during the May 18, 2004 independent quality assurance audit. The broken propeller caused the loss of data from March 30, 2004 through May 18, 2004.

[1] For a discussion of the range of acceptable measured PM_{10} concentrations refer to Appendix A, Section A.1

2.3 Network Data Completeness

Table 2-2 provides a summary of quarterly data recovery for each parameter during the monitoring year. Data capture rates for each continuous air quality and meteorological parameter have been calculated according to the procedure discussed in Appendix A, Section A.1. Network data capture rates for the monitoring year achieved project goals for all parameters except vertical wind speed and vertical wind speed standard deviation. The vertical wind parameters are considered optional parameters by the models these data are being collected to drive; therefore, it is not critical these parameters meet the 90% per calendar quarter data recovery goal.

2.4 Precision Statistics

2.4.1 Monitoring Network Precision Statistics

Quarterly NO_2, NO, SO_2 and O_3 precision check statistics shown in Tables 2-3a through 2-3d indicate all air quality analyzers generally operated within tolerances established in the QAPP. All excedances of applicable precision criteria are discussed as part of the quarterly precision summary tables. Precision statistics have been calculated for NO_2, NO, SO_2 and O_3 analyzers based on USEPA methods which are summarized in Appendix A, Section A.2 of this report. Individual results from each precision check conducted are listed in Appendix B, Tables B-1 through B-4.

2.5 Accuracy Statistics

Meteorological and ambient air quality monitoring systems are subjected to periodic calibrations/Quality Control (QC) checks and independent quality assurance performance audits to document accuracy of instrumentation measurements. All calibration/QC check and audit equipment is traceable to authoritative standards. The purpose of calibration/QC and audit checks is to challenge monitoring systems with known inputs, verifying that each instrument response is accurate to within USEPA established tolerances listed in the QAPP. A complete copy of all calibration/QC check data, independent quality assurance performance audits and technical systems audits is included in Appendix C sections C.1, C.2, and C.3, respectively.

2.5.1 Instrument Calibration Statistics

A description of quarterly calibration/QC checks is presented below by quarter. These quarterly calibration/QC check descriptions are summarized in Tables 2-4a through Table 2-4d for each measurement parameter during the monitoring year. Summarized results characterize an as-left instrument state. If as-found results were significantly different, they are discussed as part of the summary table and detailed below by quarter.

Second Quarter 2004

A QC check was conducted by the onsite technician on June 12, 2004. During the QC check, the NO_x analyzer was adjusted to correct for normal accuracy drift due to instrument electronics.

TABLE 2-2

6TH MONITORING YEAR DATA RECOVERY STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	2nd Quarter 2004 (%)	3rd Quarter 2004 (%)	4th Quarter 2004 (%)	1st Quarter 2005 (%)	Required Capture Rates (%)
Meteorological					
10-m Horizontal Wind Speed	99.4	98.6	96.4	94.7	90
10-m Horizontal Wind Direction	99.4	98.6	96.4	94.7	
10-m Sigma-Theta (σ_θ)	99.4	98.6	96.4	94.7	
10-m Vertical Wind Speed	**46.6**	97.7	**81.7**	91.8	
10-m Vertical Sigma-w (σ_w)	**46.6**	97.7	**81.7**	91.8	
10-m Temperature	99.7	98.6	98.6	98.8	
2-m Temperature	99.7	98.6	98.6	98.8	
10-2m Temperature Difference	99.7	98.6	98.6	98.8	
Total Solar Radiation	99.7	98.6	99.0	98.8	
Air Quality					
Nitrogen Dioxide (NO_2)	98.9	97.8	96.6	96.1	80
Sulfur Dioxide (SO_2)	98.9	97.8	96.6	81.3	
Ozone (O_3)	-	-	98.7[1]	88.4	
Particulate (PM_{10}) (TEOM)	99.4	99.0	97.7	89.1	

[1] Official ozone data collection began on November 19, 2004. Recovery statistics based on this start date.

TABLE 2-3A

SECOND QUARTER 2004 PRECISION STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Analyzer	Number of Precision Checks (N)	Average Percent Difference $(\bar{d}j)$	Standard Deviation (S_j)	Upper 95% Probability Limit (U_{95})	Lower 95% Probability Limit (L_{95})
NO	15	**-15.5**	14.1	12.2	**-43.2**
NO_2	13	-3.9	11.5	**18.6**	**-26.4**
SO_2	13	-10.7	1.7	-7.3	-14.1
Precision Goal	N.A.	±15	N.A.	15	-15

Remarks:

A close examination of individual precision results indicate that due to normal electronics drift the NO_x analyzer operated just outside acceptable limits prior to analyzer adjustment. Analyzer drift and adjustment lead to high standard deviations and probability limits.

Nightly level one calibration data were used to identify and correct NO_x data collected when the analyzer measurement error drift was unacceptable; therefore, no data was invalidated.

Note: This table summarizes data presented in Appendix B, Table B-1.

TABLE 2-3B

THIRD QUARTER 2004 PRECISION STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Analyzer	Number of Precision Checks (N)	Average Percent Difference $(\bar{d}j)$	Standard Deviation (S_j)	Upper 95% Probability Limit (U_{95})	Lower 95% Probability Limit (L_{95})
NO	13	11.2	7.5	**25.8**	-3.4
NO_2	11	11.7	5.6	**22.7**	0.80
SO_2	12	-3.1	2.5	1.8	-7.9
Precision Goal	N.A.	±15	N.A.	15	-15

Remarks:

The NO_x (NO_2 and NO) analyzer generally met precision goals for the quarter; however, a high bias in measurements combined with an elevated standard deviation caused by a poorly functioning automatic calibration system lead to high upper 95% probability limit. Since individual precision results were within precision criteria, no NO_x data were invalidated.

Note: This table summarizes data presented in Appendix B, Table B-2.

TABLE 2-3C

FOURTH QUARTER 2004 PRECISION STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Analyzer	Number of Precision Checks (N)	Average Percent Difference $(\bar{d}j)$	Standard Deviation (S_j)	Upper 95% Probability Limit (U_{95})	Lower 95% Probability Limit (L_{95})
NO	17	2.7	3.9	10.3	-4.9
NO_2	17	-1.6	13.3	**24.4**	**-27.6**
SO_2	17	-2.0	4.2	6.2	-10.1
O_3	5	-1.0	4.1	7.0	-8.9
Precision Goal	N.A.	±15	N.A.	15	-15

Remarks:

NO_2 analyzer drift and adjustments lead to a high standard deviation and probability limits. Since individual precision results were within precision criteria, no NO_2 data were invalidated

Note: This table summarizes data presented in Appendix B, Table B-3.

TABLE 2-3D

FIRST QUARTER 2005 PRECISION STATISTICS SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Analyzer	Number of Precision Checks (N)	Average Percent Difference $(\bar{d}j)$	Standard Deviation (S_j)	Upper 95% Probability Limit (U_{95})	Lower 95% Probability Limit (L_{95})
NO	19	-8.6	12.6	**16.1**	**-33.4**
NO_2	15	5.3	14.7	**34.0**	**-23.5**
SO_2	19	-4.0	19.2	**33.5**	**-41.6**
O_3	19	-5.2	17.9	**29.9**	**-40.3**
Precision Goal	N.A.	±15	N.A.	15	-15

Remarks:

According to the average percent difference, all analyzers met precision goals for the quarter. However, the plugged station exhaust line and subsequent repair of station instrumentation lead to high standard deviations and probability limits.

Note: This table summarizes data presented in Appendix B, Table B-4.

TABLE 2-4A

SECOND QUARTER 2004 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Calibration July 13-14, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	1.0	Pass	
	Intercept	≤ ±3% full scale	0.31%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	1.0	Pass	The calibration confirmed that following adjustment of the NO_x analyzer all air quality monitoring systems were operating within acceptable limits. The pre-adjustment NO_x analyzer calibration showed measurements were biased approximately 21% high.
	Intercept	≤ ±3% full scale	0.26%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	1.0	Pass	
	Intercept	≤ ±3% full scale	0.18%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	100%	Pass	
PM_{10}	Sample Flow	≤ ±10%	0.7%	Pass	
	Total Flow	≤ ±10%	-4.6%	Pass	
	Mass Determination	≤ ±2.5%	1.66%	Pass	

TABLE 2-4A (CONTINUED)

SECOND QUARTER 2004 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Meteorological Calibration July 14, 2004					
10-m Horizontal Wind Speed	Accuracy	≤ ±5%	-1.3%	Pass	The calibration confirmed all meteorological monitoring systems were operating within acceptable limits.
	Starting Torque	≤ 1 g-cm	0.3 g-cm	Pass	
10-m Horizontal Wind Direction	Accuracy	≤ ±5 deg.	-1.9 deg.	Pass	
	Linearity	≤ ±3 deg.	-2.3 deg.	Pass	
	Starting Torque	≤ 11.0 g-cm	6.0 g-cm	Pass	
10-m Vertical Wind Speed	Accuracy	≤ ±2.5 m/s	-0.06 m/s	Pass	
	Starting Torque	≤ 1 g-cm	0.4 g-cm	Pass	
10-m Temperature	Accuracy	≤ ±0.5 °C	-0.20°C	Pass	
2-m Temperature	Accuracy	≤ ±0.5 °C	-0.20°C	Pass	
10-2m Temperature Difference	Accuracy	≤ ±0.1 °C	0.04°C	Pass	
Total Solar Radiation	Accuracy	≤ ±25 W/m^2	-0.3 W/m^2	Pass	

TABLE 2-4B

THIRD QUARTER 2004 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Calibration October 3-5, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	0.98	Pass	The calibration confirmed all air quality monitoring systems were operating within acceptable limits.
	Intercept	≤ ±3% full scale	0.37%	Pass	
	Correlation Coef.	≥ 0.9950	1.0%	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	0.99	Pass	
	Intercept	≤ ±3% full scale	0.70	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	0.99%	Pass	
	Intercept	≤ ±3% full scale	0.72%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	102%	Pass	
PM_{10}	Sample Flow	≤ ±10%	0.1%	Pass	
	Total Flow	≤ ±10%	1.3%	Pass	
	Mass Determination	≤ ±2.5%	1.7%	Pass	
Meteorological Calibration					
Conducting a calibration of meteorological monitoring instrumentation is only required semi-annually and was conducted during the second and fourth calendar quarters of 2004.					

TABLE 2-4C

FOURTH QUARTER 2004 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Calibration November 16-18, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	0.99	Pass	The calibration confirmed all air quality monitoring systems were operating within acceptable limits following a slight adjustment of the NO_x analyzer. The pre-adjustment NO_x analyzer calibration showed the instrument zero intercept was biased high. The ozone instrument became operational during the fourth quarter.
	Intercept	≤ ±3% full scale	0.67%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	0.99	Pass	
	Intercept	≤ ±3% full scale	1.00%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	0.99	Pass	
	Intercept	≤ ±3% full scale	0.72%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO_2	Converter Eff.	≥ 96%	98%	Pass	
O_3	Slope	≥ 0.85 and ≤ 1.15	1.00	Pass	
	Intercept	≤ ±3% full scale	0.27%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
PM_{10}	Sample Flow	≤ ±10%	-6.7%	Pass	
	Total Flow	≤ ±10%	-6.7%	Pass	
	Mass Determination	≤ ±2.5%	0.99%	Pass	

TABLE 2-4C (CONTINUED)

FOURTH QUARTER 2004 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Meteorological Calibration November 16, 2004					
10-m Horizontal Wind Speed	Accuracy	≤ ±5%	0%	Pass	The calibration confirmed all meteorological monitoring systems were operating within acceptable limits. A solar radiation calibration could not be conducted due to low sun angles during this time of year.
	Starting Torque	≤ 1 g-cm	0.2 g-cm	Pass	
10-m Horizontal Wind Direction	Accuracy	≤ ±5 deg.	1.6 deg.	Pass	
	Linearity	≤ ±3 deg.	-2.7 deg.	Pass	
	Starting Torque	≤ 11.0 g-cm	6.0 g-cm	Pass	
10-m Vertical Wind Speed	Accuracy	≤ ±2.5 m/s	-0.06 m/s	Pass	
	Starting Torque	≤ 1 g-cm	0.3 g-cm	Pass	
10-m Temperature	Accuracy	≤ ±0.5 °C	-0.4 °C	Pass	
2-m Temperature	Accuracy	≤ ±0.5 °C	-0.5 °C	Pass	
10-2m Temperature Difference	Accuracy	≤ ±0.1 °C	0.06 °C	Pass	
Total Solar Radiation	Accuracy	≤ ±25 W/m^2	-	N.A.	

TABLE 2-4D

FIRST QUARTER 2005 CALIBRATION RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Calibration March 22-23, 2005					
SO_2	Slope	≥ 0.85 and ≤ 1.15	1.00	Pass	The calibration confirmed that following adjustment of the NO_x analyzer all air quality monitoring systems were operating within acceptable limits. The pre-adjustment NO_x analyzer calibration showed measurements were biased approximately 24% high.
	Intercept	≤ ±3% full scale	0.41%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	1.01	Pass	
	Intercept	≤ ±3% full scale	-0.41%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	1.01	Pass	
	Intercept	≤ ±3% full scale	-0.88%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
NO_2	Converter Eff.	≥ 96%	97%	Pass	
O_3	Slope	≥ 0.85 and ≤ 1.15	1.02	Pass	
	Intercept	≤ ±3% full scale	0.28%	Pass	
	Correlation Coef.	≥ 0.9950	1.00	Pass	
PM_{10}	Sample Flow	≤ ±10%	-1.9%	Pass	
	Total Flow	≤ ±10%	-1.2%	Pass	
	Mass Determination	≤ ±2.5%	1.2%	Pass	
Meteorological Calibration					
Conducting a calibration of meteorological monitoring instrumentation is only required semi-annually and was conducted during the fourth quarter 2004 and second calendar quarter of 2005.					

Multipoint calibrations were performed before and after analyzer adjustment. Results of these calibrations show the analyzer operating within acceptable limits following analyzer adjustment. Prior to the adjustment, the QC check slope was 0.75 and outside acceptable limits. Nightly Level I QC data were used to identify and correct NO_x data collected when the analyzer measurement error drift was unacceptable; therefore, no data was invalidated. Hourly data were corrected according to the procedure outlined in Appendix A, Section A.3.

The second quarter 2004 calibration of the air quality and meteorological monitoring systems was conducted from July 13 through 15, 2004. Calibration results showed all instrumentation was operating within acceptable limits following adjustment of the NO_x analyzer. Prior to the adjustment, the QC check slope was 1.21 and outside acceptable limits. Nightly Level I QC data were used to identify and correct NO_x data collected when the analyzer measurement error drift was unacceptable; therefore, no data was invalidated. Hourly data were corrected according to the procedure outlined in Appendix A, Section A.3.

Third Quarter 2004
The third quarter 2004 calibration of the meteorological and air quality monitoring systems was conducted from October 3 through 5, 2004. Calibration results of this quality assurance activity showed all instrumentation was operating within acceptable limits.

Fourth Quarter 2004
The fourth quarter 2004 calibration of the air quality and meteorological monitoring systems was conducted November 16 through 18, 2004. Calibration results showed all instrumentation was operating within acceptable limits following adjustment of the NO_x analyzer. Prior to the adjustment, the QC check intercept was just over 5% of instrument full scale and outside acceptable limits. Nightly Level I QC data were used to identify and correct NO_x data collected when the analyzer measurement error drift was unacceptable; therefore, no data was invalidated. Hourly data were corrected according to the procedure outlined in Appendix A, Section A.3.

First Quarter 2005
The first quarter 2004 calibration of the air quality monitoring systems was conducted March 22 through 23, 2005. Calibration results showed all air quality monitoring systems were operating within acceptable limits following repair and maintenance activities. As found exceedance of QC limits were a result of instrument failures discussed in Section 2.2.1 – Missing Invalid and Adjusted NO_x, SO_2 and O_3 Data – First Quarter 2005. That section also details periods of invalidated data related to the QC check failures.

2.5.2 Independent Quality Assurance Audits

A written description of quarterly independent quality assurance audits is presented by quarter below. These quarterly audit results are also summarized in Tables 2-5a through Table 2-5d for each measurement parameter during the monitoring year.

TABLE 2-5A

SECOND QUARTER 2004 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Audit May 18-19, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	0.94	Pass	With the exception of NO_x monitoring system, the audit confirmed all air quality monitoring systems were operating within acceptable limits. The NO_x analyzer had drifted outside acceptable limits in the absence of a trained onsite technician.
	Intercept	≤ ±3% full scale	-2.2%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	0.69	**Fail**	
	Intercept	≤ ±3% full scale	-1.0%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	0.69	Pass	
	Intercept	≤ ±3% full scale	-1.2%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	96.7%	Pass	
PM_{10}	Sample Flow	≤ ±10%	-1.6%	Pass	
	Total Flow	≤ ±10%	-2.5%	Pass	
	Mass Determination	≤ ±2.5%	1.2%	Pass	

TABLE 2-5A (CONTINUED)

SECOND QUARTER 2004 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Meteorological Audit May 18-19, 2004					
10-m Horizontal Wind Speed	Accuracy	≤ ±5%	-0.25%	Pass	The audit confirmed all meteorological monitoring systems were operating within acceptable limits.
	Starting Torque	≤ 1 g-cm	0.3 g-cm	Pass	
10-m Horizontal Wind Direction	Accuracy	≤ ±5 deg.	1.0 deg.	Pass	
	Linearity	≤ ±3 deg.	0.3 deg.	Pass	
	Starting Torque	≤ 11.0 g-cm	9.0 g-cm	Pass	
10-m Vertical Wind Speed	Accuracy	≤ ±2.5 m/s	0.01 m/s	Pass	
	Starting Torque	≤ 1 g-cm	0.5 g-cm	Pass	
10-m Temperature	Accuracy	≤ ±0.5 °C	0.20 °C	Pass	
2-m Temperature	Accuracy	≤ ±0.5 °C	0.20 °C	Pass	
10-2m Temperature Difference	Accuracy	≤ ±0.1 °C	0.01 °C	Pass	
Total Solar Radiation	Accuracy	≤ ±5% F.S.	1.8%	Pass	

TABLE 2-5B

THIRD QUARTER 2004 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Audit September 8-9, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	0.91	Pass	The audit confirmed all air quality monitoring systems were operating within acceptable limits.
	Intercept	≤ ±3% full scale	-0.80%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	1.04	Pass	
	Intercept	≤ ±3% full scale	-0.40%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	1.04	Pass	
	Intercept	≤ ±3% full scale	-0.40%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	99.3%	Pass	
PM_{10}	Sample Flow	≤ ±10%	-0.70%	Pass	
	Total Flow	≤ ±10%	-0.06%	Pass	
	Mass Determination	≤ ±2.5%	0.94%	Pass	
Meteorological Calibration					
Conducting a meteorological monitoring instrumentation audit is only required semi-annually and was conducted during the second and fourth calendar quarters of 2004.					

TABLE 2-5C

FOURTH QUARTER 2004 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Audit November 16-17, 2004					
SO_2	Slope	≥ 0.85 and ≤ 1.15	0.97	Pass	The audit confirmed all air quality monitoring systems were operating within acceptable limits. The ozone instrument became operational during the fourth quarter.
	Intercept	≤ ±3% full scale	0.40%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	0.96	Pass	
	Intercept	≤ ±3% full scale	0.40%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	0.97	Pass	
	Intercept	≤ ±3% full scale	0.0%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	100%	Pass	
O_3	Slope	≥ 0.85 and ≤ 1.15	1.02	Pass	
	Intercept	≤ ±3% full scale	0.40%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
PM_{10}	Sample Flow	≤ ±10%	2.1%	Pass	
	Total Flow	≤ ±10%	1.8%	Pass	
	Mass Determination	≤ ±2.5%	0.82%	Pass	

TABLE 2-5C (CONTINUED)

FOURTH QUARTER 2004 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Meteorological Audit November 16-17, 2004					
10-m Horizontal Wind Speed	Accuracy	≤ ±5%	-0.20%	Pass	The audit confirmed all meteorological monitoring systems were operating within acceptable limits. A solar radiation audit could not be conducted due to low sun angles during this time of year.
	Starting Torque	≤ 1 g-cm	0.2 g-cm	Pass	
10-m Horizontal Wind Direction	Accuracy	≤ ±5 deg.	1.3 deg.	Pass	
	Linearity	≤ ±3 deg.	1.1 deg.	Pass	
	Starting Torque	≤ 11.0 g-cm	6.0 g-cm	Pass	
10-m Vertical Wind Speed	Accuracy	≤ ±2.5 m/s	0.01 m/s	Pass	
	Starting Torque	≤ 1 g-cm	0.3 g-cm	Pass	
10-m Temperature	Accuracy	≤ ±0.5 °C	0.14 °C	Pass	
2-m Temperature	Accuracy	≤ ±0.5 °C	0.17 °C	Pass	
10-2m Temperature Difference	Accuracy	≤ ±0.1 °C	0.03 °C	Pass	
Total Solar Radiation	Accuracy	≤ ±25 W/m^2	-	N.A.	

TABLE 2-5D

FIRST QUARTER 2005 AUDIT RESULTS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Parameter	QC Check Category	QC Check Criteria	Measured Response	Results (Pass/Fail)	Comments
Air Quality Audit March 15-16, 2005					
SO_2	Slope	≥ 0.85 and ≤1.15	**1.18**	**Fail**	The audit confirmed only the NO and PM_{10} monitoring systems were operating within acceptable limits. Prior to the audit, monitoring system back pressure caused sample pump failures and excessive measurement drift resulting in the SO_2, NO_x, and O_3 instruments failing audit checks.
	Intercept	≤ ±3% full scale	-0.20%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_x	Slope	≥ 0.85 and ≤ 1.15	**1.22**	**Fail**	
	Intercept	≤ ±3% full scale	-1.4%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO	Slope	≥ 0.85 and ≤ 1.15	1.00	Pass	
	Intercept	≤ ±3% full scale	-1.4%	Pass	
	Correlation Coef.	≥ 0.9950	1.0	Pass	
NO_2	Converter Eff.	≥ 96%	100%	Pass	
O_3	Slope	≥ 0.85 and ≤ 1.15	-	N.A.	
	Intercept	≤ ±3% full scale	-	N.A.	
	Correlation Coef.	≥ 0.9950	-	N.A.	
PM_{10}	Sample Flow	≤ ±10%	0.70%	Pass	
	Total Flow	≤ ±10%	0.73%	Pass	
	Mass Determination	≤ ±2.5%	1.04%	Pass	
Meteorological Audit					
Conducting meteorological monitoring instrumentation audit is only required semi-annually and was conducted during the fourth quarter 2004 and second calendar quarter of 2005.					

Second Quarter 2004

The second quarter 2004 performance audit of the air quality monitoring systems was conducted by Air Monitoring Services and Technology (AMSTech) May 18 and 19, 2004. Audit results showed all instrumentation was operating within required accuracy limits except the NO_x analyzer. Normal drift of analyzer electronics caused the measurement accuracy to drift outside acceptable limits. The NO_x analyzer was adjusted on June 12, 2004 and post-adjustment-calibration results showed the analyzer operating within acceptable limits. Nightly Level I QC data were used to identify and correct NO_x data collected when the analyzer measurement error drift was unacceptable; therefore, no data was invalidated. Hourly data were corrected according to the procedure outlined in Appendix A, Section A.3.

Third Quarter 2004

The third quarter 2004 performance audit of the air quality monitoring systems was conducted by AMSTech September 8 and 9, 2004. Audit results showed all instrumentation was operating within required accuracy limits.

Fourth Quarter 2004

The fourth quarter 2004 performance audit of the air quality and meteorological monitoring systems was conducted by AMSTech November 16 through 18, 2004. Audit results showed all instrumentation was operating within required accuracy limits.

First Quarter 2005

The first quarter 2005 performance audit of the air quality monitoring systems was conducted by AMSTech March 15 and 16, 2005. During the audit, only the PM_{10} analyzer was found operating within acceptable limits. Audit criteria failures were a result of instrument failures discussed in Section 2.2.1 – Missing Invalid and Adjusted NO_x, SO_2 and O_3 Data – First Quarter 2005. That section also details periods of invalidated data related to audit failures.

Technical Systems Audit

The annual technical systems audit (TSA) of data handling, validation, processing, reporting procedures, and monitoring station siting and operation at the Nuiqsut Station and at the SECOR Air Resources Laboratory in Fort Collins, Colorado was conducted during December 2004. TSA results showed the monitoring station has been installed and is operating in accordance with the QAPP and USEPA-recommended guidelines. The audit also showed SECOR has the necessary organization, practical field experience, work facilities, and data processing procedures in place to accurately collect and report project ambient air quality data.

3.0 MONITORING DATA NETWORK SUMMARY

3.1 Air Quality Data Summary

Criteria pollutants monitored as part of the Nuiqsut Ambient Air Quality Monitoring Program are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate less than 10 µm in diameter (PM_{10}), and Ozone (O_3). Criteria pollutants are those air pollutants for which ADEC has established standards that provide a threshold above which risk to public health and welfare becomes an issue. These standards are referred to as the Alaska Ambient Air Quality Standards (AAAQS) and are the same as the national standards for the pollutants measured. Applicable AAAQS, along with ambient concentrations measured at the Nuiqsut Station, are presented in Tables 3-1 through 3-4 and summarized by pollutant below.

3.1.1 Nitrogen Dioxide

Table 3-1 shows the annual average NO_2 concentration was 0.002 ppm, compared to the annual NO_2 AAAQS of 0.053 ppm. The annual average NO_2 concentration is just above instrument detection level and only 3.8 percent of the NO_2 AAAQS. The annual average measured this year is lower than the historical Nuiqsut Station average of 0.005 ppm and the annual average measured the previous year (0.006 ppm).

The variation of average hourly NO_2 concentration by wind direction this year was typical of past years with an approximate negative 0.002 ppm average offset. This offset is consistent with the difference between the historical and current years annual averaged hourly concentrations. As shown in Figure 3-1, the historical trend shows the lowest concentrations are measured when winds transport background air to the Nuiqsut Station (west-southwest through east-southeast). Slightly higher concentrations occur for hourly concentrations associated with sources located in Nuiqsut (southeast through southwest of Nuiqsut Station). Except for the overall 0.002 ppm decrease, the difference in the two trends were minor (i.e. on the scale of the measurement accuracy) and not significant. In general, measured NO_2 concentrations at Nuiqsut are extremely low.

Monthly average NO_2 concentrations are presented in Figure 3-2. For this monitoring year, the trend of monthly measured concentrations showed very little seasonal variation. Historically, it is typical to observe increases in monthly averaged hourly NO_2 concentrations during late winter. The pattern of higher measured impacts in late winter has been attributed to differences in atmospheric dispersion characteristics between winter and summer, and potential changes in local emissions. Seasonal differences in atmospheric dispersion characteristics arise because there is an increase in stable and neutral atmospheric conditions during winter. During summer, solar radiation and heating of the surface induces more vertical mixing of the lower atmosphere than in winter, thereby increasing diffusion of air pollution. In winter, without the benefit of solar energy, the atmosphere remains relatively stable and vertical dispersion of pollution is reduced. In addition, the increased local use of heating systems and idling vehicles in winter contribute to the NO_2 load.

TABLE 3-1

MEASURED NITROGEN DIOXIDE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	Period Mean (ppm)	Number of Exceedances
2nd Qtr.	2004	0.002	None
3rd Qtr.	2004	0.001	None
4th Qtr.	2004	0.002	None
1st Qtr.	2005	0.002	None
Annual	2004	0.002	None

NAAQS/AAAQS:

- Annual - 0.053 ppm (100 µg/m^3) – Compared to the annual arithmetic mean.

TABLE 3-2

MEASURED SULFUR DIOXIDE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	3-hour (ppm)		24-hour (ppm)		Period Mean (ppm)	Number of Exceedances
		1st high	2nd high	1st high	2nd high		
2nd Qtr.	2004	0.002	0.002	0.000	0.000	0.000	None
3rd Qtr.	2004	0.005	0.004	0.002	0.001	0.000	None
4th Qtr.	2004	0.004	0.003	0.001	0.001	0.000	None
1st Qtr.	2005	0.007	0.007	0.003	0.003	0.000	None
Annual	2004	0.007	0.007	0.003	0.003	0.000	None

NAAQS/AAAQS:

- 3-hour - 0.5 ppm (1,300 $\mu g/m^3$) – Rolling average not to be exceeded more than once per year.
- 24-hour - 0.14 ppm – Midnight to midnight average not to be exceeded more than once per year.
- Annual - 0.03 ppm – Compared to the annual arithmetic mean.

TABLE 3-3

MEASURED PM_{10} DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	24-hour ($\mu g/m^3$)		Period Mean ($\mu g/m^3$)	Number of Exceedances
		1st high	2nd high		
2nd Qtr.	2004	54.0	34.3	8.3	None
3rd Qtr.	2004	119.4	88.9	11.2	None
		33.9[1]	22.5[1]	7.8[1]	None
4th Qtr.	2004	19.1	18.7	6.2	None
1st Qtr.	2005	13.6	10.3	4.9	None
Annual	2004	119.4	88.9	7.7	None
		54.0[1]	34.3[1]	6.9[1]	None

NAAQS/AAAQS:

- 24-hour – 150 $\mu g/m^3$ - Not to be exceeded more than once per year measured from midnight to midnight at USEPA Standard Conditions.
- Annual – 50 $\mu g/m^3$ – Compared to the 3-year average of the weighted annual arithmetic mean concentration measured at USEPA Standard Conditions.

[1] Averages do not include hours obviously influenced by naturally occurring forest fires.

TABLE 3-4

MEASURED OZONE DATA SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Monitoring Period	Year	8-hour (ppm)			Period Mean (ppm)	Number of Exceedances
		1st high	2nd high	4th high		
2nd Qtr.	2004	N.A.	N.A.	N.A.	N.A.	None
3rd Qtr.	2004	N.A.	N.A.	N.A.	N.A.	None
4th Qtr.[1]	2004	0.0381	0.0379	0.0376	0.0294	None
1st Qtr.	2005	0.0411	0.0411	0.0410	0.0250	None
Annual	2004	0.0411	0.0411	0.0410	0.0265	None

NAAQS/AAAQS:

- 8-hour - 0.08 ppm – Compared to the 3-year average of the fourth-highest daily maximum rolling 8-hour average concentrations.

[1] Based on a partial quarter of sampling. Ozone data collection officially began on November 19, 2004.

FIGURE 3-1

AVERAGE NO_2 CONCENTRATION BY WIND DIRECTION
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

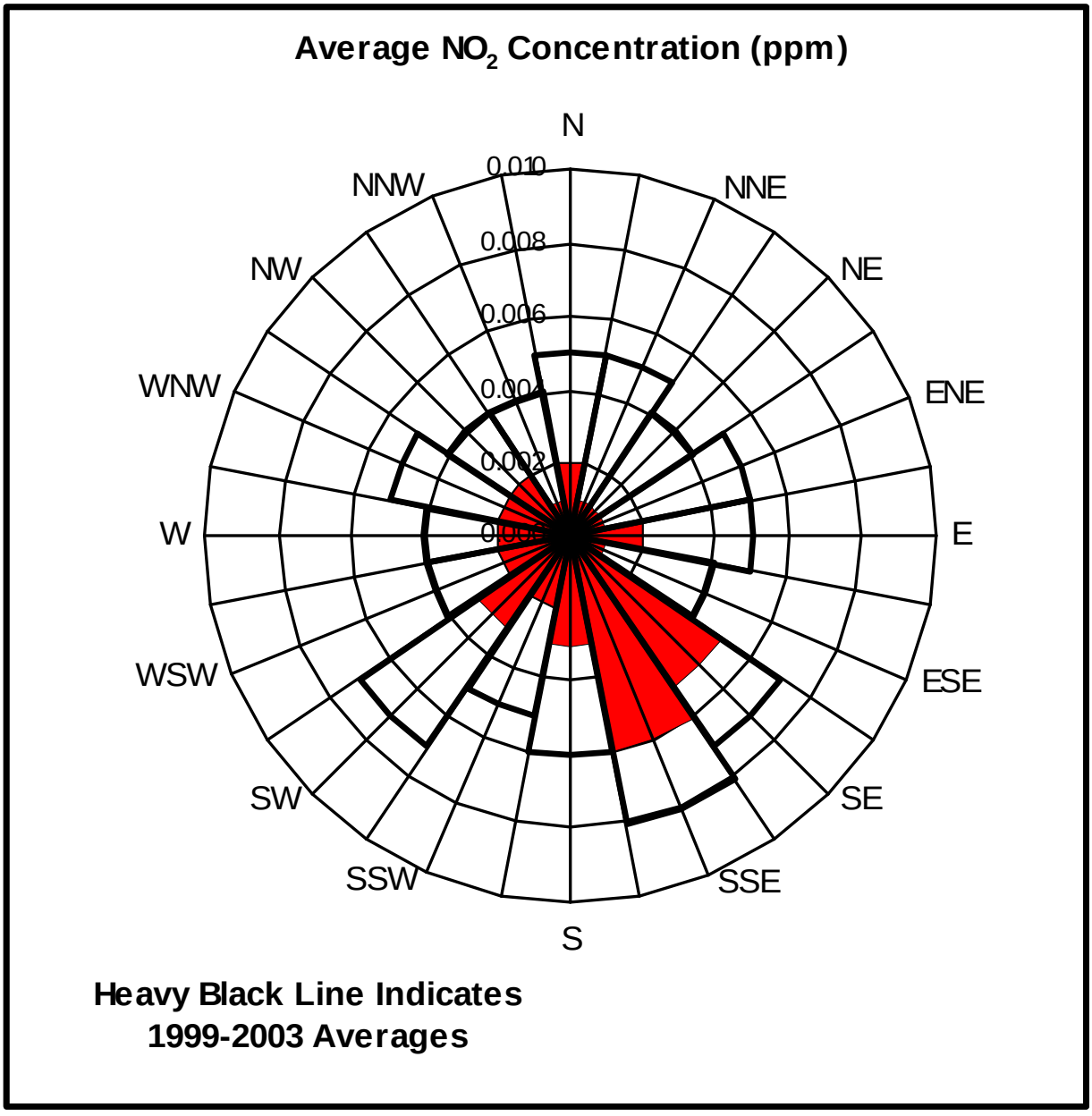
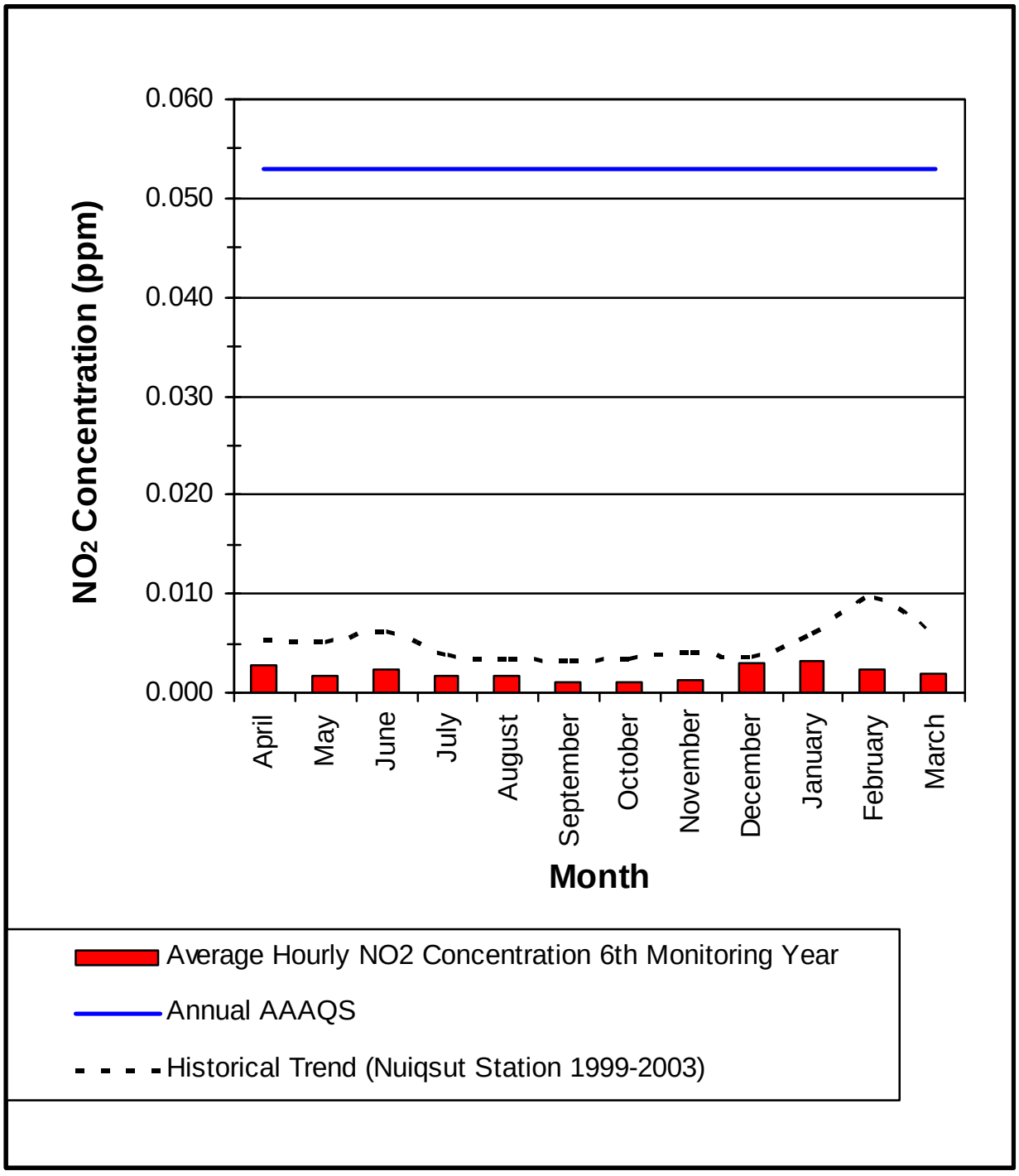


FIGURE 3-2

AVERAGE NO_2 CONCENTRATION BY MONTH
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY



3.1.2 Sulfur Dioxide

Table 3-2 lists measured maximum 3-hour (running), 24-hour (midnight-to-midnight), and the annual average hourly SO_2 concentration measured this monitoring year. Concentrations for all averaging periods were near or below instrument detection limit and well below applicable AAAQS. Measured SO_2 concentrations were typical of historical (1999-2003) values.

Measured hourly SO_2 concentrations were less than or equal to 0.002 ppm for 99 percent of the monitoring year. No hourly concentrations were greater than 0.008 ppm. The majority of measured SO_2 concentrations were just above the instrument detection limit making it difficult to discuss significant trends. Simply, there was no single near-field or far-field measurable SO_2 source observed in the data. Without identifiable sources, measured concentrations are representative of a regional or global background signature. The low average concentrations measured are consistent with an airshed containing relatively few and widely distributed sources. This trend has been typical of SO_2 measurements since monitoring began in Nuiqsut.

3.1.3 Respirable Particulate Matter (PM_{10})

Throughout the monitoring project history, the majority of elevated measured particulate concentrations result from naturally occurring wind blown fugitive dust from exposed or disturbed areas local to the Nuiqsut Station. Exposed areas identified in the program are:

- the exposed bank of the Nechelik channel east-northeast through east-southeast of the station,
- the exposed gravel mining area southeast of the station,
- disturbed ground due to residential construction along the utility right-of-way and road southeast through south-southeast of the station, and
- to a much lesser degree, disturbed ground associated with dirt roads within Nuiqsut south through west-southwest of the station.

In addition to these local fugitive sources, elevated particulate has also been measured from remote forest and tundra fires. The 2004 wildfire season was the most active on record across the state. Satellite images throughout July and August confirmed the transport of smoke from interior fires across the entire state. When particulate from local fugitive dust and smoke is not present (i.e., during winter), hourly concentrations decrease to at or below the instrument detection limit.

Respirable particulate matter less than 10 μm in diameter (PM_{10}) measured at USEPA standard temperature and pressure has a 24-hour and annual AAAQS of 150 $\mu g/m^3$ and 50 $\mu g/m^3$, respectively. As listed in Table 3-3, the maximum 24-hour PM_{10} concentration not obviously affected by particulate from naturally occurring fires measured during the monitoring year was 54.0 $\mu g/m^3$. This is well below the 24-hour AAAQS, and higher than the maximum 24-hour concentration of 31.5 $\mu g/m^3$ measured during the previous monitoring year. The yearly average PM_{10} concentration after removing hours obviously affected by particulate from naturally occurring forest fires was 6.9 $\mu g/m^3$. This is well below the annual AAAQS of 50 $\mu g/m^3$ and similar to the historical Nuiqsut Station average of 7.6 $\mu g/m^3$.

Figure 3-3 shows annual average hourly PM_{10} concentrations by wind direction measured this monitoring year. Concentrations for all wind directions were similar to historical annual averages and approximately equal to the overall annual average. Directional dependence is related to influence of local fugitive dust sources discussed previously.

Figure 3-4 compares the monthly average hourly PM_{10} concentrations measured this monitoring year to Nuiqsut station historical monthly average PM_{10} concentrations. Historical trends show that the fourth and first calendar quarters (October through March) typically experience lower average hourly PM_{10} concentrations reflecting snow covered conditions that suppress fugitive dust. In contrast, the second and third calendar quarters (April through September) record higher average hourly concentrations as fugitive dust sources become exposed and active. Average hourly concentrations reported by month generally followed this trend. The variability seen throughout this monitoring year compared to previous years is expected considering PM_{10} concentrations are highly dependent on the interplay of many meteorological characteristics such as wind speed and frequency, precipitation, and temperature.

3.1.4 Ozone

Table 3-4 lists measured 8-hour and annual average hourly O_3 concentrations measured during the monitoring year. Since the AAAQS for ozone is based on the 3-year average of the fourth highest measured daily maximum 8-hour average ozone concentration, it is difficult to discuss AAAQS compliance. However, since the maximum 8-hour average ozone concentration measured was half the AAAQS, it is anticipated the 3-year average of the fourth highest measured daily maximum 8-hour average concentration will be well below the AAAQS. Measured ozone concentrations are typical of seasonal averages on the Alaskan North Slope (Prudhoe Bay, Kuparuk River Unit and Barrow). In the absence of large combustion sources, strong frontal passages and high solar radiation, ambient ozone levels will be spatially homogenous and representative of a regional background.

3.2 Meteorological Data Summary

Temperature, wind speed, and wind direction data collected at the Nuiqsut Station during the monitoring year are summarized in the following subsections. Vertical wind speed and solar radiation data are also collected at the Nuiqsut Station, but are not specifically discussed in this section.

3.2.1 Wind Speed and Direction Climatology

The annual Nuiqsut bivariate wind frequency distribution (wind rose) is presented in Figure 3-5. Data presented in this figure is consistent with the North Slope wind climatology and typical of the Nuiqsut bimodal wind direction distribution demonstrated every year since monitoring began. This figure shows winds during the monitoring year were dominated by northeast through easterly (NE-E) and to a lesser degree south-southwest through westerly (SSW-W). Winds from these two sectors occurred nearly 79 percent of the time this year and are caused by persistent regional weather patterns. Without respect to direction, the mean 10 meter wind speed for the monitoring year was 5.2 m/s and the maximum was 20.4 m/s.

FIGURE 3-3

AVERAGE PM_{10} CONCENTRATION BY WIND DIRECTION
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

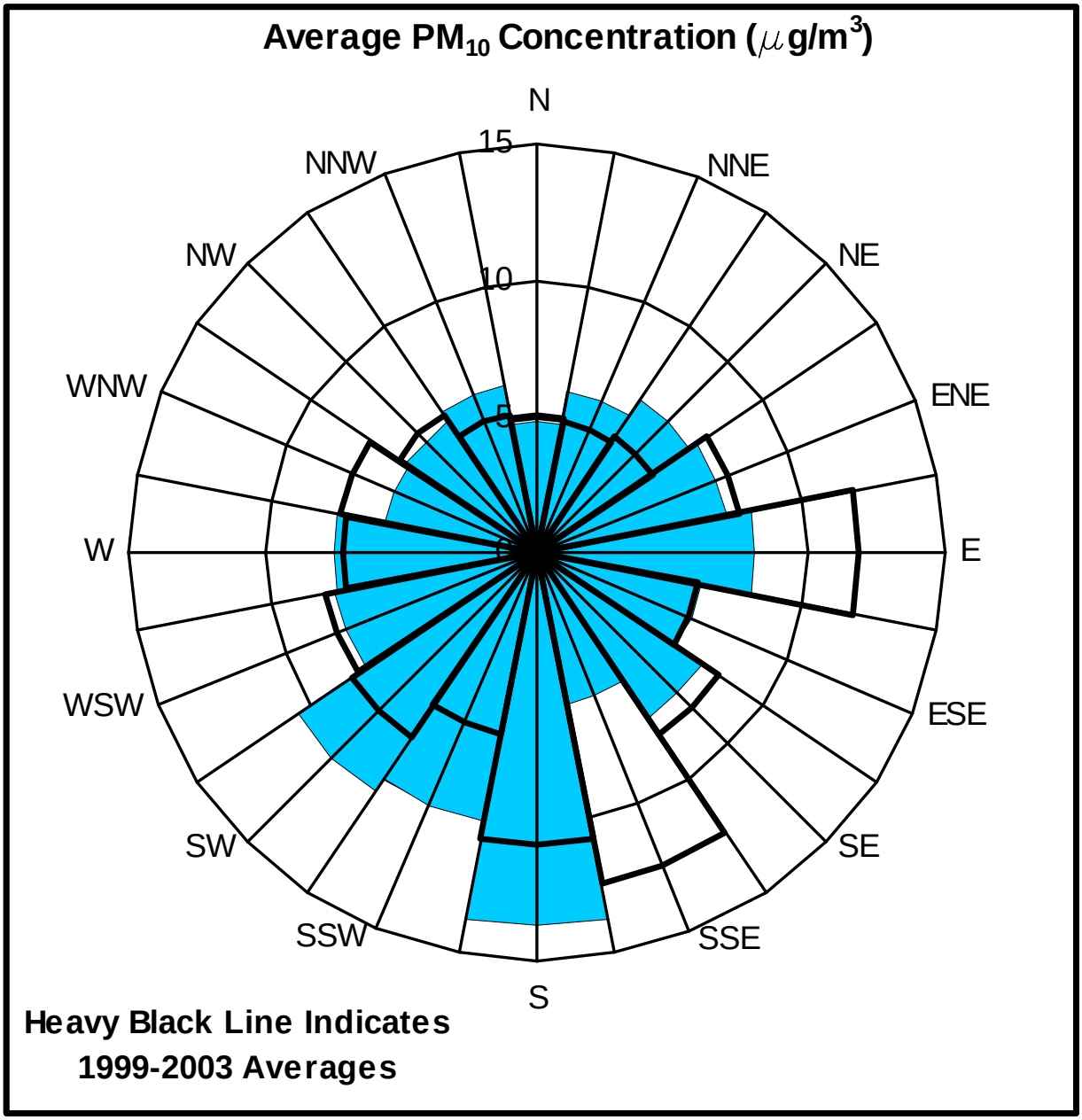


FIGURE 3-4

AVERAGE PM_{10} CONCENTRATION BY MONTH
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

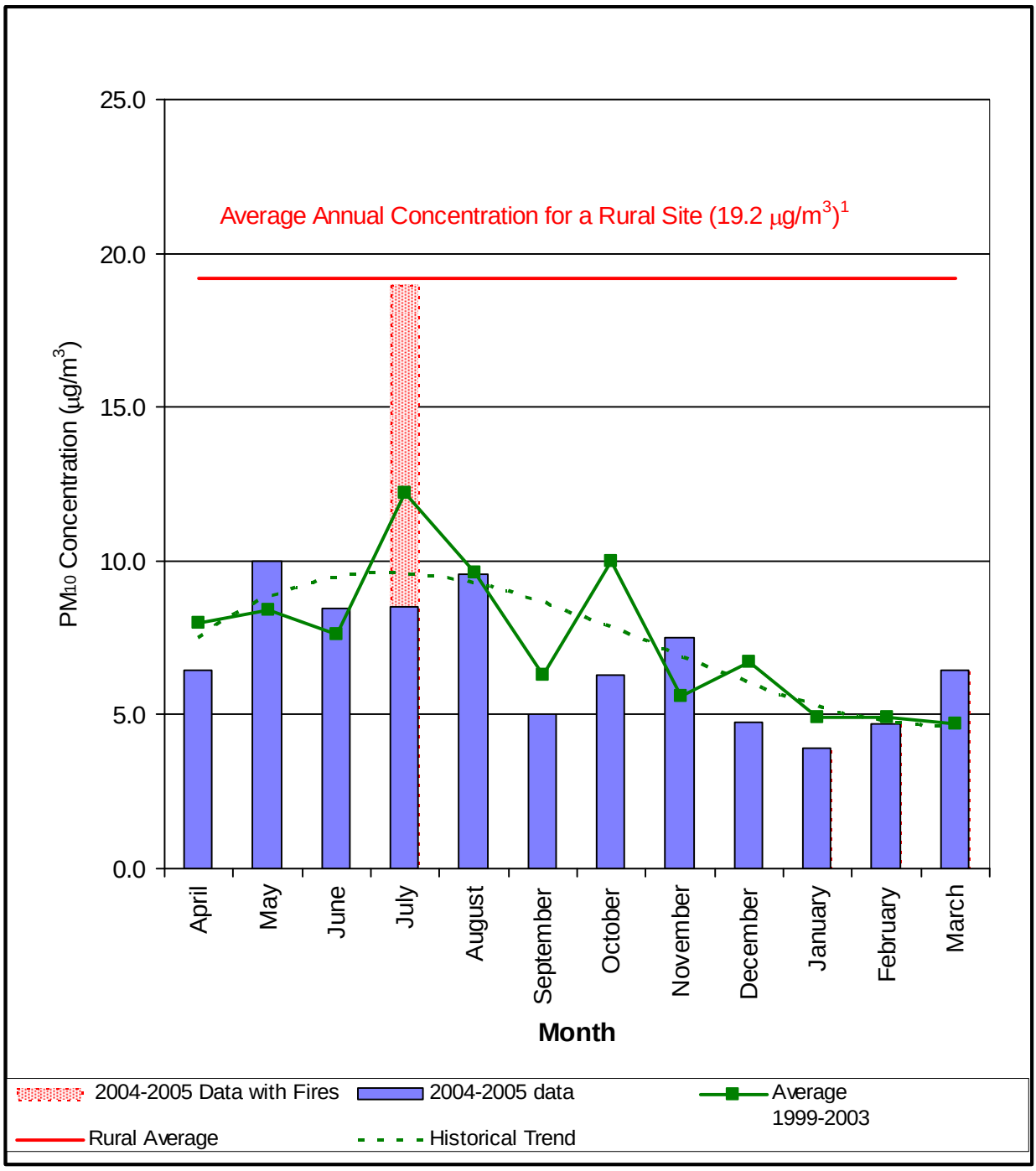
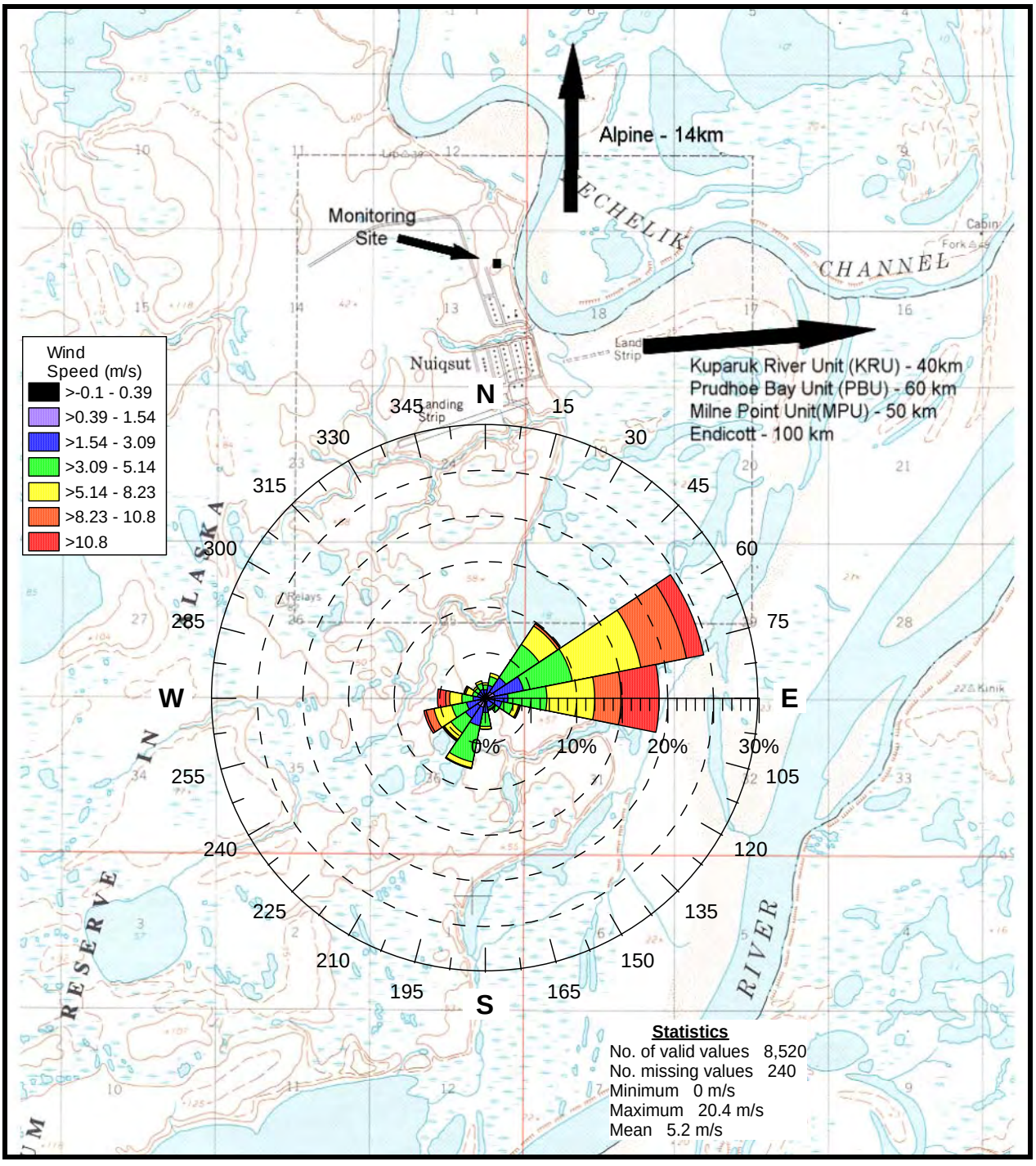


FIGURE 3-5

ANNUAL NUIQSUT WIND ROSE
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY



The persistence of weather patterns season to season can be inferred from Figures 3-6 through Figure 3-9 which present wind roses by calendar quarter. As was observed during the last five monitoring years, the quarterly wind roses collected this year indicate there is a persistence of NE-E and SSW-W winds all year long. In the winter, this pattern is more defined and is associated with higher wind speeds than the summer. The quarterly wind rose depictions are augmented by Tables 3-5 through 3-8 which present quarterly wind rose data as a percent of valid hours.

3.2.2 Temperature Climatology

During the monitoring year, the hourly averaged 2-meter ambient temperature reached a maximum of 26.2°C (79.2°F) on August 17, 2004 and a minimum of -40.7°C (41.3°F) on December 15, 2004. The Nuiqsut Station temperature climatology presented in Table 3-9 shows these annual hourly maximum and minimum did not set any records. Therefore, extremes measured this year are consistent with those measured during the last five monitoring years. This conclusion is a little different when viewed on a monthly basis. Table 3-9 shows the monthly hourly minimum was tied in April and October 2004 and two hourly maximums were broken in January and March 2005. The maximum hourly temperature measured in January 2005 was above freezing and odd for this time of year. The record maximums in January and March 2005 carry over into higher than normal monthly averages in January and March as well.

Figure 3-10 compares average hourly temperatures by month measured at Nuiqsut during the current monitoring year to historical data collected at Barrow and the Nuiqsut Station. Comparisons are made to Barrow data because that data, collected over a 49 year period, is less likely influenced by interannual variability. Consistent with past comparisons made between Nuiqsut Station and Barrow temperatures, Nuiqsut Station temperatures this year were consistently higher than those collected at Barrow from June through September. This difference has been relatively constant since monitoring began and is in part related to the fact that the Nuiqsut Station is located further inland than Barrow and away from moderating effects of the ocean. Contrary to previous years, Nuiqsut Station temperatures measured from January through March this year were one to two degrees higher than those at Barrow and the Nuiqsut Station historical average.

FIGURE 3-6

SECOND QUARTER 2004 NUIQSUT WIND ROSE
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

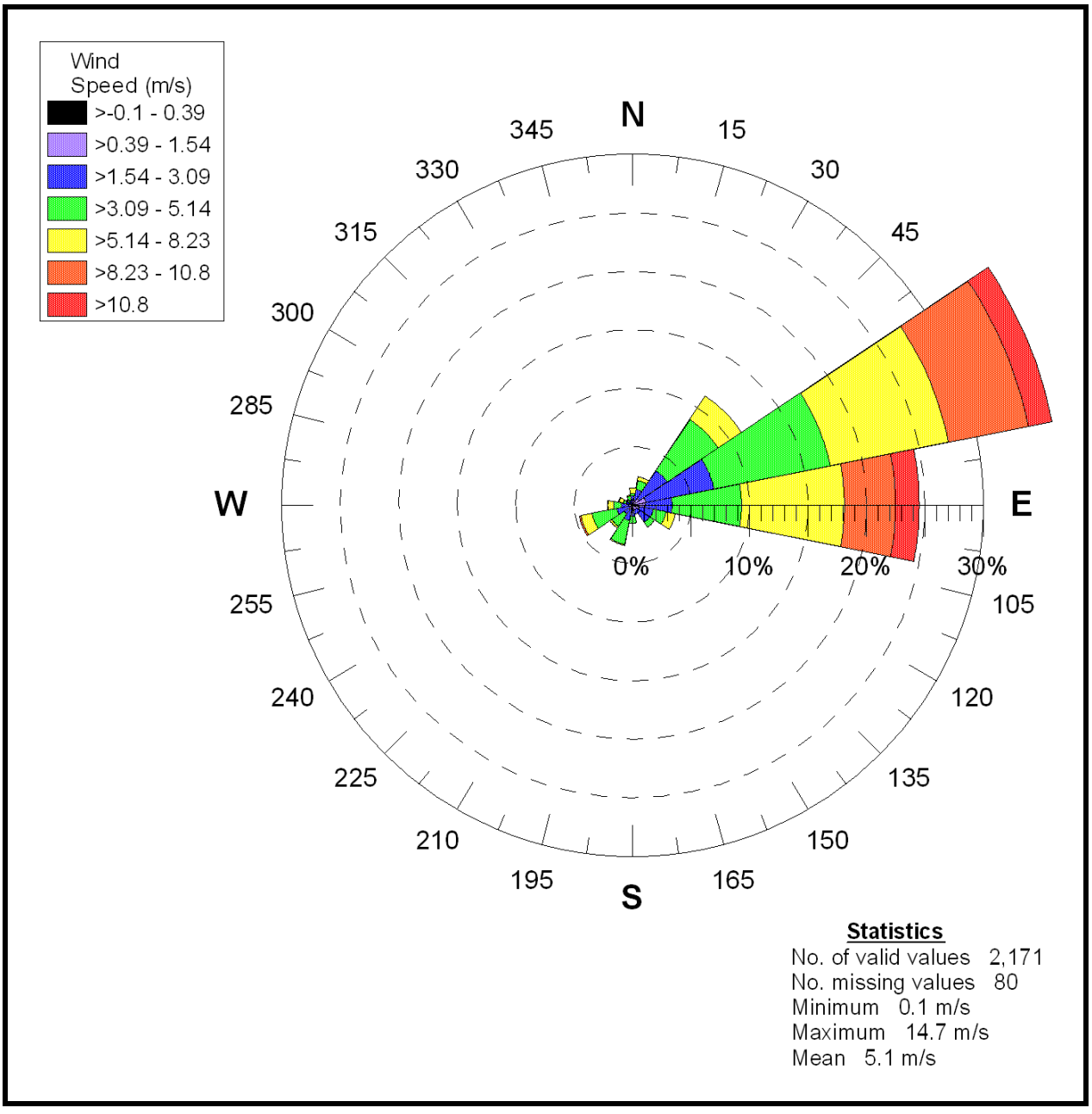


FIGURE 3-7

THIRD QUARTER 2004 NUIQSUT WIND ROSE
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

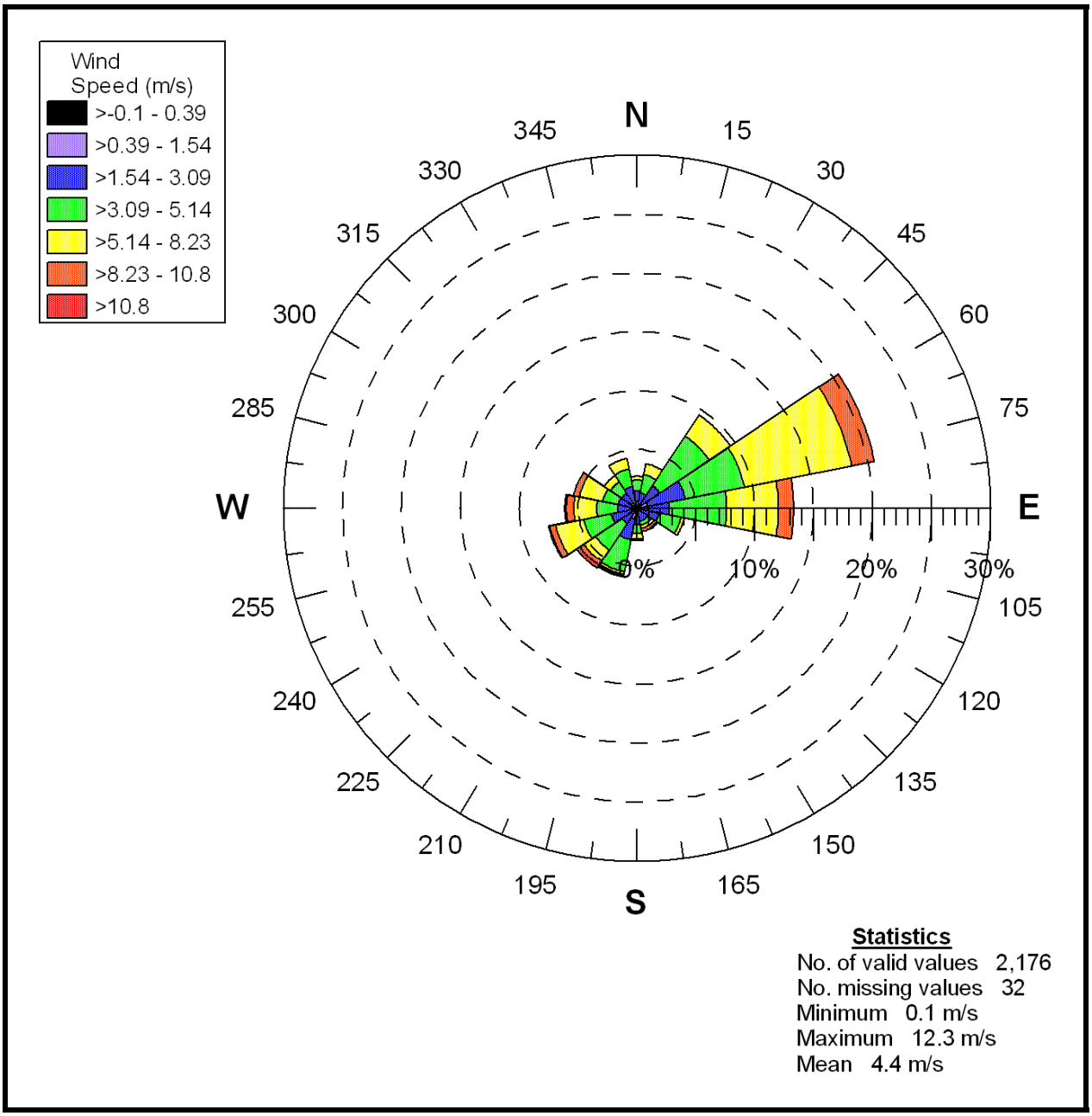


FIGURE 3-8

FOURTH QUARTER 2004 NUIQSUT WIND ROSE
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

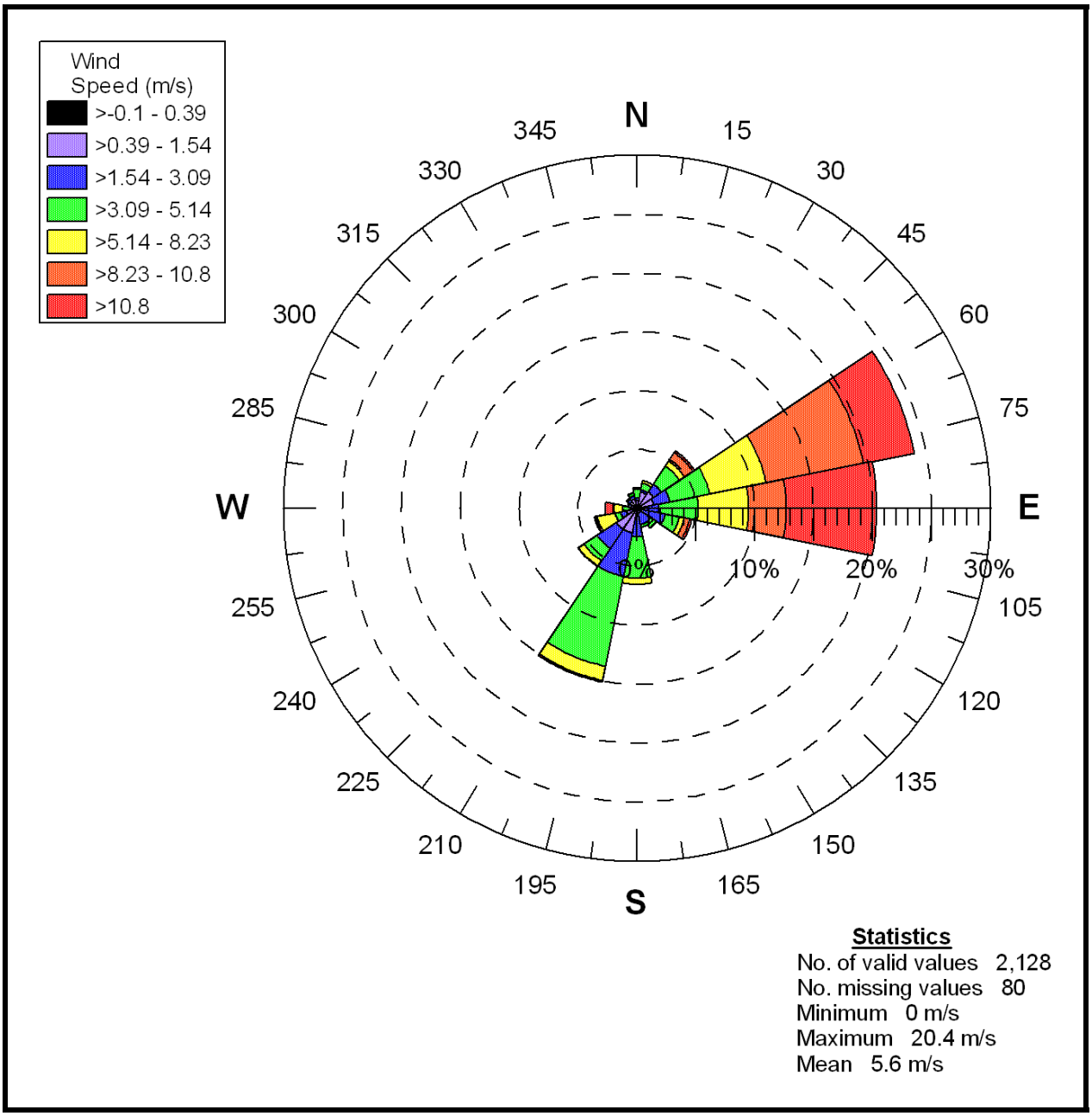


FIGURE 3-9

FIRST QUARTER 2005 NUIQSUT WIND ROSE
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

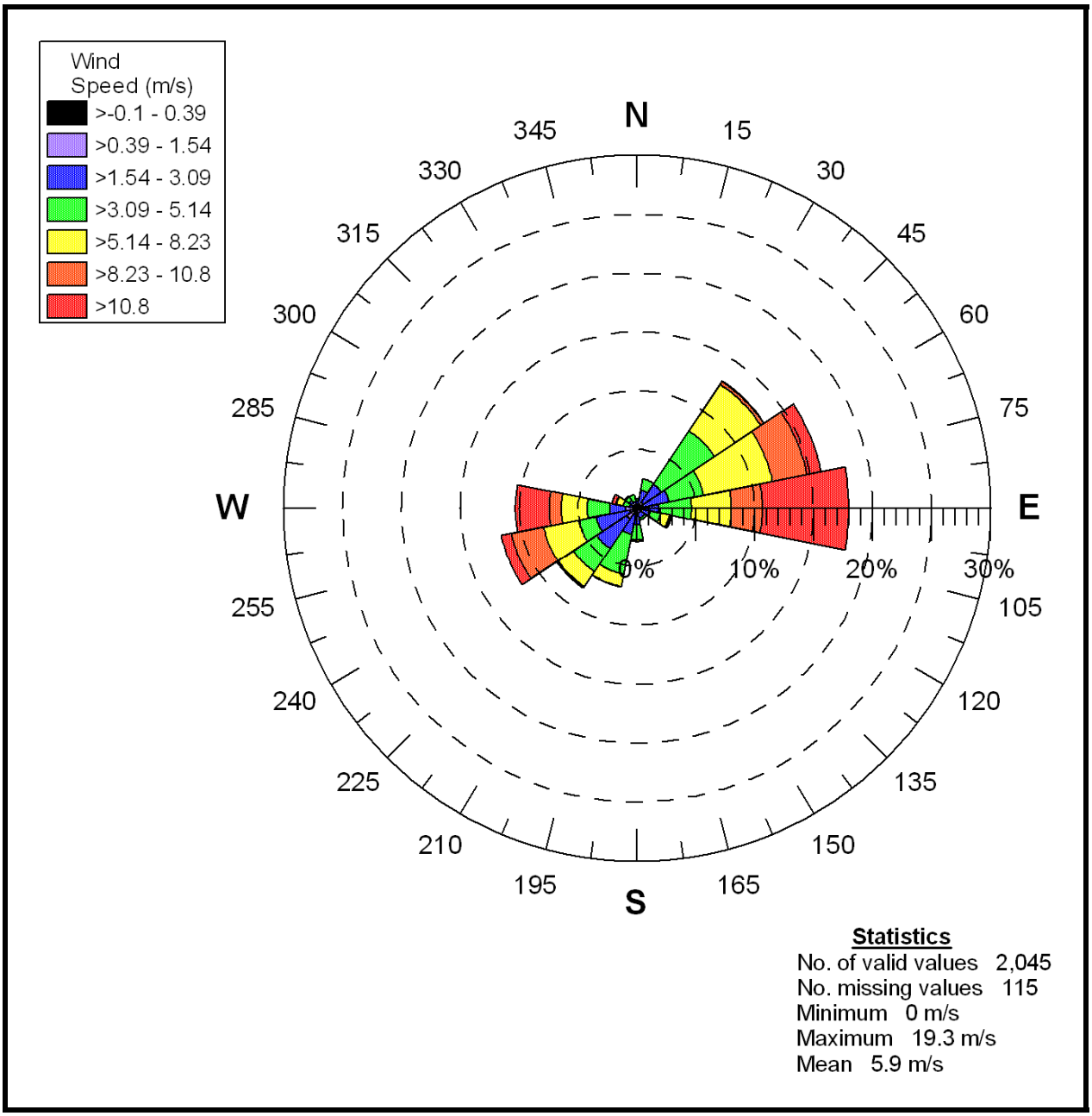


TABLE 3-5

SECOND QUARTER 2004 WIND DIRECTION/SPEED FREQUENCY ANALYSIS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Wind Rose Analysis – Percent of Valid Hourly Values (2,171 Valid Hours Used)									
Wind Direction	**Wind Speed – m/s**								**Average Speed**
	≤ 0.39	**≤ 1.54**	**≤ 3.09**	**≤ 5.14**	**≤ 8.23**	**≤ 10.8**	**> 10.8**	**Total**	
N		0.69	1.01	0.60	0.64	0.00	0.00	2.96	3.29
NE		1.47	6.45	11.65	7.78	2.03	0.28	29.68	4.65
E		1.89	5.80	10.82	14.37	9.30	3.82	46.03	6.19
SE		1.34	1.70	1.11	0.41	0.00	0.00	4.57	2.73
S		0.74	1.15	1.38	0.00	0.00	0.00	3.28	2.75
SW		0.74	1.80	3.41	0.46	0.00	0.00	6.41	3.41
W		0.51	1.24	2.21	1.57	0.23	0.00	5.77	4.34
NW		0.32	0.37	0.41	0.18	0.00	0.00	1.30	3.15
CALM	0.09								
Total	0.09	7.69	19.53	31.60	25.43	11.56	4.10	100	

TABLE 3-6

THIRD QUARTER 2004 WIND DIRECTION/SPEED FREQUENCY ANALYSIS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Wind Rose Analysis – Percent of Valid Hourly Values (2,176 Valid Hours Used)									
Wind Direction	**Wind Speed – m/s**								**Average Speed**
	≤ 0.39	**≤ 1.54**	**≤ 3.09**	**≤ 5.14**	**≤ 8.23**	**≤ 10.8**	**> 10.8**	**Total**	
N		0.87	1.98	2.71	1.38	0.00	0.00	6.96	3.69
NE		1.15	4.00	8.00	6.62	0.64	0.00	20.43	4.56
E		1.10	4.37	9.28	9.70	2.62	0.00	27.09	5.11
SE		0.60	2.76	1.29	0.23	0.14	0.00	5.03	2.99
S		1.01	1.79	2.02	0.87	0.28	0.00	6.00	3.64
SW		0.97	3.22	5.88	2.44	0.78	0.55	13.86	4.48
W		0.87	2.53	3.40	4.46	1.15	0.14	12.57	4.99
NW		0.55	3.13	2.21	1.93	0.23	0.00	8.07	3.94
CALM	0.18								
Total	0.18	7.12	23.76	34.79	27.62	5.84	0.69	100	

TABLE 3-7

FOURTH QUARTER 2004 WIND DIRECTION/SPEED FREQUENCY ANALYSIS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Wind Rose Analysis – Percent of Valid Hourly Values (2,128 Valid Hours Used)									
Wind Direction	**Wind Speed – m/s**								**Average Speed**
	≤ 0.39	**≤ 1.54**	**≤ 3.09**	**≤ 5.14**	**≤ 8.23**	**≤ 10.8**	**> 10.8**	**Total**	
N		1.64	0.38	1.13	0.28	0.00	0.00	3.59	2.56
NE		2.54	1.74	4.23	2.77	5.31	1.17	17.93	5.89
E		1.17	3.01	5.26	7.38	7.52	11.28	35.78	7.61
SE		0.94	2.44	1.46	0.14	0.09	0.00	5.24	2.78
S		1.36	4.04	8.88	1.22	0.00	0.00	15.67	3.53
SW		3.81	4.51	4.14	1.64	0.23	0.05	14.54	3.09
W		0.80	0.61	0.89	1.74	0.14	0.75	5.10	5.32
NW		1.17	0.56	0.23	0.00	0.00	0.00	2.14	1.70
CALM	1.32								
Total	1.32	13.44	17.29	26.22	15.18	13.30	13.25	100	

TABLE 3-8

FIRST QUARTER 2005 WIND DIRECTION/SPEED FREQUENCY ANALYSIS
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

Wind Rose Analysis – Percent of Valid Hourly Values (2,045 Valid Hours Used)									
Wind Direction	**Wind Speed – m/s**								**Average Speed**
	≤ 0.39	**≤ 1.54**	**≤ 3.09**	**≤ 5.14**	**≤ 8.23**	**≤ 10.8**	**> 10.8**	**Total**	
N		0.49	1.22	0.83	0.00	0.00	0.00	2.60	2.60
NE		0.78	3.72	7.29	8.61	1.61	0.39	22.46	5.17
E		0.93	2.79	4.74	6.11	4.40	8.31	27.35	7.28
SE		0.68	1.12	0.88	0.15	0.00	0.00	2.90	2.73
S		0.83	1.71	2.84	0.73	0.00	0.00	6.17	3.46
SW		1.52	5.62	5.13	3.81	0.88	0.29	17.32	4.18
W		1.42	3.13	2.93	3.77	3.08	3.81	18.20	6.38
NW		0.34	0.93	1.17	0.39	0.00	0.10	3.00	3.68
CALM	0.49								
Total	0.49	6.99	20.24	25.82	23.57	9.98	12.91	100	

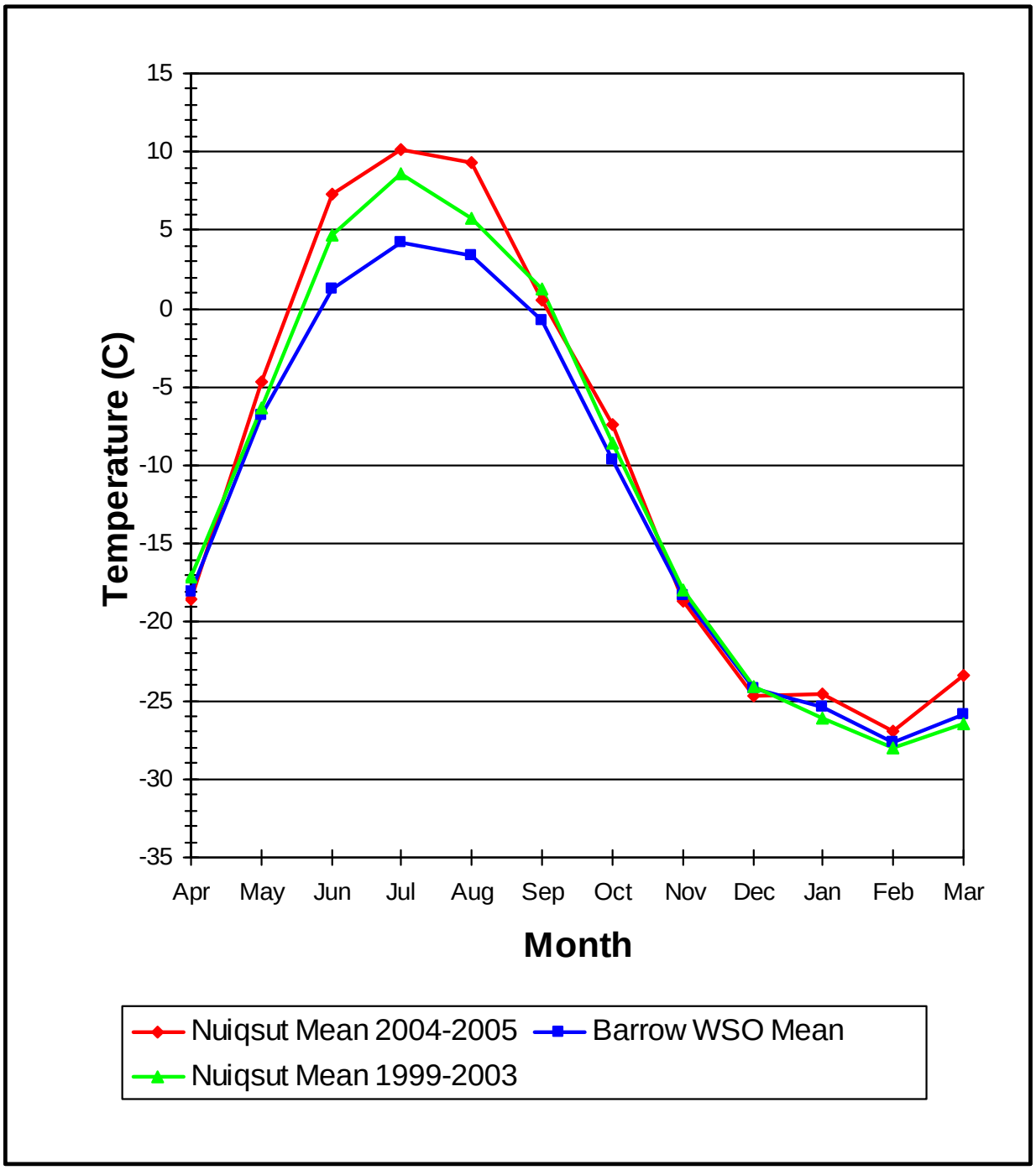
TABLE 3-9

NUIQSUT TEMPERATURE CLIMATE SUMMARY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY

2-Meter Temperature (°C)									
	Mean			Extreme					
Month	Maximum Daily (Monthly Average)	Minimum Daily (Monthly Average)	Monthly	Record Highest (Hourly Average)	Year	Day	Record Lowest (Hourly Average)	Year	Day
April 2004	-3.7	-31.6	-18.5	2.5	2002	26	-35.8	2004	2, 3
May 2004	3.2	-14.3	-4.7	18.5	2002	24	-28.7	2001	1
June 2004	17.1	-0.1	7.3	27.3	2003	29	-5.0	2000	5
July 2004	17.7	4.0	10.1	28.0	2001	16	-1.6	2002	26
August 2004	19.0	1.6	9.3	27.8	1999	5	-3.3	2000	27
September 2004	6.5	-3.0	0.5	18.8	2002	5	-13.6	1999	30
October 2004	-0.7	-24.4	-7.4	7.4	2003	2	-27.2	1999/ 2004	31/31
November 2004	-10.1	-30.9	-18.7	0.7	2003	6	-35.5	1999	5
December 2004	-8.3	-36.6	-24.7	-2.5	2001	28	-42.1	1999	18
January 2005	-1.2	-38.8	-24.6	0.6	2005	8	-43.1	2002	23
February 2005	-18.6	-32.7	-27.0	-14.9	2003	8	-45.9	2004	19
March 2005	-9.4	-35.0	-23.4	-3.1	2004	21	-40.0	2003	26
2nd Qtr. 2004	17.1	-31.6	-5.3	-	-	-	-	-	-
3rd Qtr. 2004	19.0	-3.0	6.7	-	-	-	-	-	-
4th Qtr. 2004	-0.7	-36.6	-16.9	-	-	-	-	-	-
1st Qtr. 2005	-1.2	-38.8	-24.9	-	-	-	-	-	-
Monitoring Year	19.0	-38.8	-10.1	28.0	2001	16	-45.9	2004	19

FIGURE 3-10

NUIQSUT STATION TEMPERATURE CLIMATOLOGY
CONOCOPHILLIPS ALASKA INC.
NUIQSUT AQ MONITORING PROGRAM ANNUAL DATA SUMMARY



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