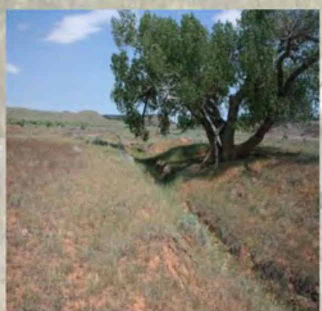


APP-016-I

POWERTECH (USA) INC.

Dewey-Burdock Project

Application for NRC
Uranium Recovery License
Fall River and Custer Counties, South Dakota

Technical Report RAI Responses

June 2011

Prepared for

U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852

Prepared by

Powertech (USA) Inc.
5575 DTC Parkway, Suite #140
Greenwood Village, CO 80111
Phone: 303-790-7528

Volume 3 of 4

Appendices 2.5-D through 2.7-L

Table of Contents - Volume 3 of 4

List of Appendices - Volume 3 of 4

APPENDIX 2.5-D

Newcastle Meteorological Station Audit Reports

POWERTECH (USA) INC.

Table 1

METEOROLOGICAL STATION AUDIT SUMMARY

Met Station: Wyoming Refining, Newcastle
Audit Date: 15-Mar-07
Audit Performed by: B. Kelly, C. Medill - IML Air Science

Sensor	Mfr./Model	Reference Device
Wind Speed (WS):	RM Young Wind Monitor AQ	quartz referenced drive motor
Wind Direction (WD):	RM Young Wind Monitor AQ	transit, compass
Temperature (T):	Fenwal 107	digital thermistor
Data acquisition system (DAS):	Campbell Scientific CR510	N/A

Audit Results

		Reference	DAS Value	|Difference|	Specification	
WS (mph)		0.00	0.00	0.00	0.56	(1)
		3.44	3.44	0.00	0.56	(1)
		9.16	9.16	0.00	0.56	(1)
		34.35	34.35	0.00	1.72	(1)
		91.60	91.60	0.00	4.58	(1)
WS start torque (gm-cm)		t<0.2	N/A	N/A	1.0	(3)
WD (degrees)		0	1.5	1	5	(1)
		90	89.9	0	5	(1)
		180	179.2	1	5	(1)
		270	268.7	1	5	(1)
Temperature (°F)		71.6	71.6	0.0	1.8	(1)
	ice water bath	32.3	32.1	0.2	1.8	(1)
	warm water bath	130.7	129.3	1.4	1.8	(1)

BOLD difference values exceed performance specifications
(1)= Performance specification listed in facilities' Quality Assurance Project Plan
(2)= Performance specification listed In EPA Quality Assurance Manual for Air Pollution Measurement Systems, Vol. IV, 1996
(3)= Manufacturer's Specifications

Notes, Recommendations

System off-line @ 0905
System on-line @ 1015
Replaced anemometer with new Wind Monitor AQ

Table 2

METEOROLOGICAL STATION AUDIT SUMMARY

Met Station: Wyoming Refining, Newcastle
Audit Date: 13-Sep-07
Audit Performed by: B. Kelly, C. Medill - IML Air Science

Sensor	Mfr./Model	Reference Device
Wind Speed (WS):	RM Young Wind Monitor AQ	quartz referenced drive motor
Wind Direction (WD):	RM Young Wind Monitor AQ	transit, compass
Temperature (T):	Fenwal 107	digital thermistor
Data acquisition system (DAS):	Campbell Scientific CR510	N/A

Audit Results

	Reference	DAS Value	|Difference|	Specification	
WS (mph)	0.00	0.00	0.00	0.56	(1)
	3.44	3.44	0.00	0.56	(1)
	9.16	9.16	0.00	0.56	(1)
	34.35	34.35	0.00	1.72	(1)
	91.60	91.60	0.00	4.58	(1)
WS start torque (gm-cm)	t<0.2	N/A	N/A	1.0	(3)
WD (degrees)	0	0.1	0	5	(1)
	90	89.9	0	5	(1)
	180	180.8	1	5	(1)
	270	268.1	2	5	(1)
Temperature (°F)	84.6	84.5	0.0	0.9	(1)
ice water bath	32.2	32.0	0.1	0.9	(1)
warm water bath	127.9	126.8	1.1	0.9	(1)

BOLD difference values exceed performance specifications
(1)= Performance specification listed in facilities' Quality Assurance Project Plan
(2)= Performance specification listed In EPA Quality Assurance Manual for Air Pollution Measurement Systems, Vol. IV, 1996
(3)= Manufacturer's Specifications

Notes, Recommendations

System off-line @ 0834
System on-line @ 0850

Powertech (USA) Inc.

Table 3

METEOROLOGICAL STATION AUDIT SUMMARY

Met Station: Wyoming Refining   Audit Date: 12-Mar-08

Audit Performed By: S. Hansen, C. Medill, IML-Air Science

Sensor	Mfr./Model	Serial Number	Reference Device	Serial/ID Number
Vert. Wind Speed 10m:	RM Young Wind Monitor AQ	NA	quartz referenced drive motor	CA02423
Wind Speed (WS):	RM Young Wind Monitor AQ	WM75308	quartz referenced drive motor	IML0853 & IML0858
Wind Direction (WD):	RM Young Wind Monitor AQ	WM75308	transit, compass	Brunton 5080393535
Temperature @ 2 Meters:	RM Young 41342, power aspirated	TS13799	digital thermistor	IML0987
Temperature @ 10 Meters:	RM Young 41342, power aspirated	TS13880	digital thermistor	IML0987
Relative Humidity:	Vaisala HMP50	C4240028	digital psychrometer	Thermo-Hygro 22087796
Barometric Pressure:	Vaisala PTB101B	C4240018	digital barometer	IML0968
Solar Radiation:	LI-COR LI200X	PY57681	Li-Cor	PY54289
Data acquisition system:	CSI CR1000 datalogger	13147	N/A	N/A

Audit Results

		Reference RPM	Reference MPH	DAS Value	|Difference|	Specification	
WS (mph)		0	0.00	0.00	0.00	below threshold	
		300	3.44	3.44	0.00	0.56	(2)
		800	9.16	9.16	0.00	0.56	(2)
		3000	34.35	34.35	0.00	1.72	(2)
		8000	91.60	91.60	0.00	4.58	(2)
			Reference	DAS Value	|Difference|	Specification	
WS start torque (gm-cm)			<.1	N/A	N/A	1.0	(3)
WD (degrees)			0.0	0.3	0.3	5.0	(2)
			90.0	90.4	0.4	5.0	(2)
			180.0	180.2	0.2	5.0	(2)
			270.0	269.8	0.2	5.0	(2)
Temp. (°C): Upper Sensor			49.22	49.36	0.14	0.5	(2)
			5.09	5.34	0.25	0.5	(2)
			18.13	18.16	0.03	0.5	(2)
Temp. (°C): Lower Sensor			49.22	49.33	0.11	0.5	(2)
			5.09	5.39	0.30	0.5	(2)
			18.13	18.10	0.03	0.5	(2)
			Upper Sensor	Lower Sensor	|Difference|	Specification	
Delta T. (°C)			49.36	49.33	0.03	0.10	(2)
			5.34	5.39	0.05	0.10	(2)
			18.16	18.10	0.06	0.10	(2)
			Reference	DAS Value	|Difference|	Specification	
Relative Humidity (%)			32.0	29.6	2.4	7.0	(2)
Solar Radiation (W/m^2)	uncovered		NA	123.8	NA	5.0%	(4)
	covered		NA	0.0	NA	5.0%	(4)
Barometric Pressure ("Hg)			25.51	25.47	0.04	0.09	(2)

		Reference RPM	Reference cm/s	DAS Value	|Difference|	Specification	
Vert WS 10 meters (cm/s)		0	0.00	0.00	0.00	below threshold	
(CW)		20	-100.00	-99.63	0.37	25.00	(2)
	U:	60	-300.00	-302.30	2.30	35.00	(2)
		100	-1000.00	-1001.30	1.30	70.00	(2)
		500	-2500.00	-2499.30	0.70	145.00	(2)
		RPM	cm/s	DAS Value	|Difference|	Specification	
Vert WS 10 meters (cm/s)		0	0.00	0.00	0.00	below threshold	
(CCW)		20	100.00	98.41	1.59	25.00	(2)
	U:	60	300.00	300.90	0.90	35.00	(2)
		100	1000.00	1001.10	1.10	70.00	(2)
		500	2500.00	2497.30	2.70	145.00	(2)

BOLD difference values exceed performance specifications

(1)= Performance specification listed in facilities' Quality Assurance Project Plan

(2)= EPA Quality Assurance Manual for Air Pollution Measurement Systems, Vol. IV, 1989

(3)= Manufacturer's Specifications

(4)= EPA On-Site Meteorological Program Guidance for Regulatory Modeling Applications

Notes, Recommendations

Datalogger taken off line @ 0852 MST -- returned on-line 1352 MST.
Complettion of AERMOD and solar equipement installation.

Powertech (USA) Inc.

Table 4

METEOROLOGICAL STATION AUDIT SUMMARY

Met Station: Wyoming Refining — Audit Date: 27-Aug-08

Audit Performed By: C. Medill - IML Air Science

Sensor	Mfr./Model	Serial Number	Reference Device	Serial/ID Number
Vert. Wind Speed 10m:	RM Young Wind Monitor AQ	NA	quartz referenced drive motor	CA02423
Wind Speed (WS):	RM Young Wind Monitor AQ	WM75308	quartz referenced drive motor	IML0853 & IML0858
Wind Direction (WD):	RM Young Wind Monitor AQ	WM75308	transit, compass	Brunton 5080393535
Temperature @ 2 Meters:	Fenwall 107	NA	digital thermistor	IML0987
Relative Humidity:	Vaisala HMP50	C4240028	digital psychrometer	Thermo-Hygro 22087796
Barometric Pressure:	Vaisala PTB101B	C4240018	digital barometer	IML0968
Solar Radiation:	LI-COR LI200X	PY57681	Li-Cor	PY54289
Data acquisition system:	CSI CR1000 datalogger	13147	N/A	N/A

Audit Results

		RPM	MPH	DAS Value	|Difference|	Specification	
WS (mph)		0	0.00	0.00	0.00	below threshold	
		300	3.44	3.44	0.00	0.56	(2)
		800	9.16	9.16	0.00	0.56	(2)
		3000	34.35	34.35	0.00	1.72	(2)
		8000	91.60	91.60	0.00	4.58	(2)

	Reference	DAS Value	|Difference|	Specification	
WS start torque (gm-cm)	<.1	N/A	N/A	1.0	(3)
WD (degrees)	0.0	0.1	0.1	5.0	(2)
	90.0	89.4	0.6	5.0	(2)
	180.0	179.6	0.4	5.0	(2)
	270.0	270.0	0.0	5.0	(2)

	Reference	DAS Value	|Difference|	Specification	
Temp. (°F):	0.93	0.87	0.06	0.5	(2)
	23.28	23.32	0.04	0.5	(2)
	45.41	45.29	0.12	0.5	(2)

	Reference	DAS Value	|Difference|	Specification	
Relative Humidity (%)	27.0	26.9	0.1	7.0	(2)
Barometric Pressure ("Hg)	25.56	25.58	0.02	0.09	(2)

		Reference RPM	Reference cm/s	DAS Value	|Difference|	Specification	
Vert WS 10 meters (cm/s)		0	0.00	0.00	0.00	below threshold	
(CW)		20	100.00	100.80	0.80	25.00	(2)
	U:	60	300.00	300.10	0.10	35.00	(2)
		100	1000.00	1001.00	1.00	70.00	(2)
		500	2500.00	2500.00	0.00	145.00	(2)

		RPM	cm/s	DAS Value	|Difference|	Specification	
Vert WS 10 meters (cm/s)		0	0.00	0.00	0.00	below threshold	
(CCW)		20	100.00	100.80	0.80	25.00	(2)
	U:	60	300.00	295.30	4.70	35.00	(2)
		100	1000.00	999.10	0.90	70.00	(2)
		500	2500.00	2503.00	3.00	145.00	(2)

BOLD difference values exceed performance specifications

(1)= Performance specification listed in facilities' Quality Assurance Project Plan

(2)= EPA Quality Assurance Manual for Air Pollution Measurement Systems, Vol. IV, 1989

(3)= Manufacturer's Specifications

(4)= EPA On-Site Meteorological Program Guidance for Regulatory Modeling Applications

Notes, Recommendations

Datalogger taken off line @ 0826 MST -- returned on-line 1027 MST.

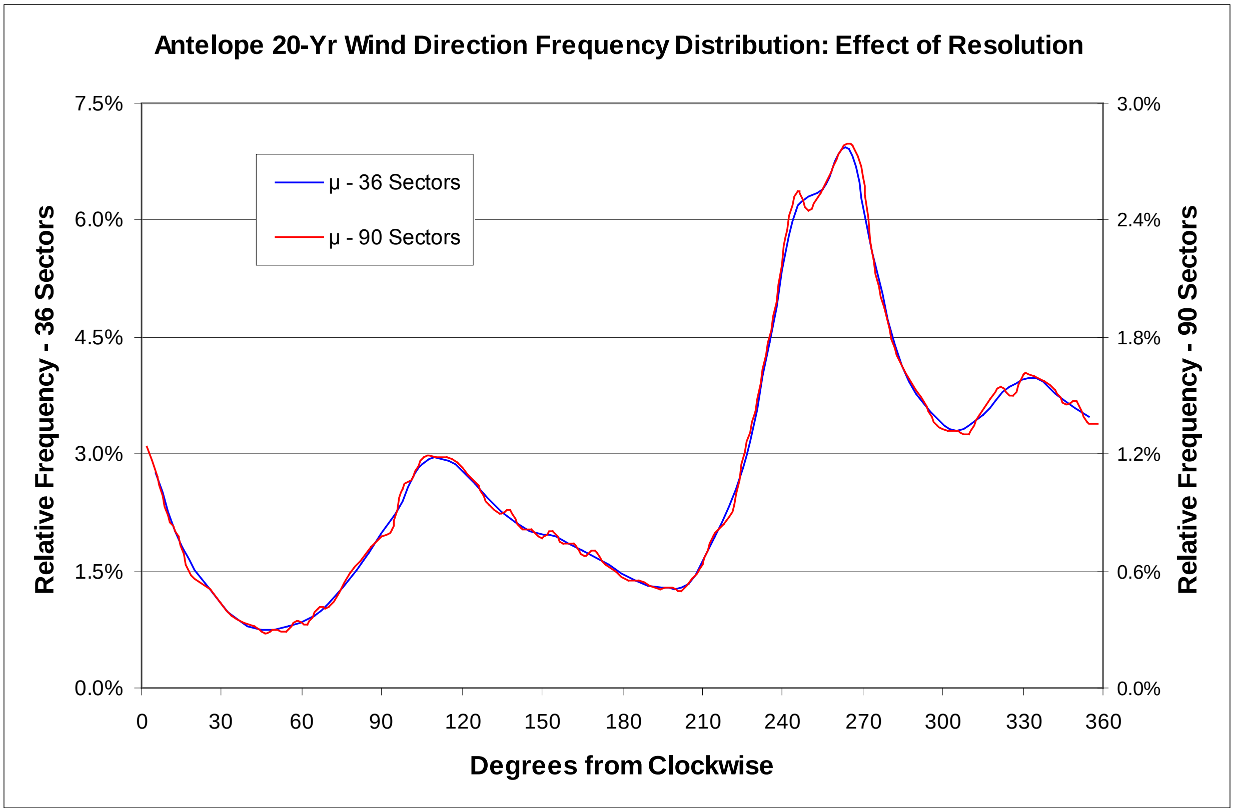
APPENDIX 2.5-E

Statistical Methodology for Assessing Representativeness of Wind Data

In this study, IML Air Science presents a methodology for assessing the degree to which the distribution of wind direction frequencies from one year of monitoring at a particular location represents the long-term wind direction distribution at that same location. The study considers four sites, some having generated more than 20 years of hourly meteorological data. The Dry Fork Mine and Buckskin Mine met stations are located near the Gillette Airport site in the northern Powder River Basin (PRB). The Antelope Mine met station is located in the southern PRB.

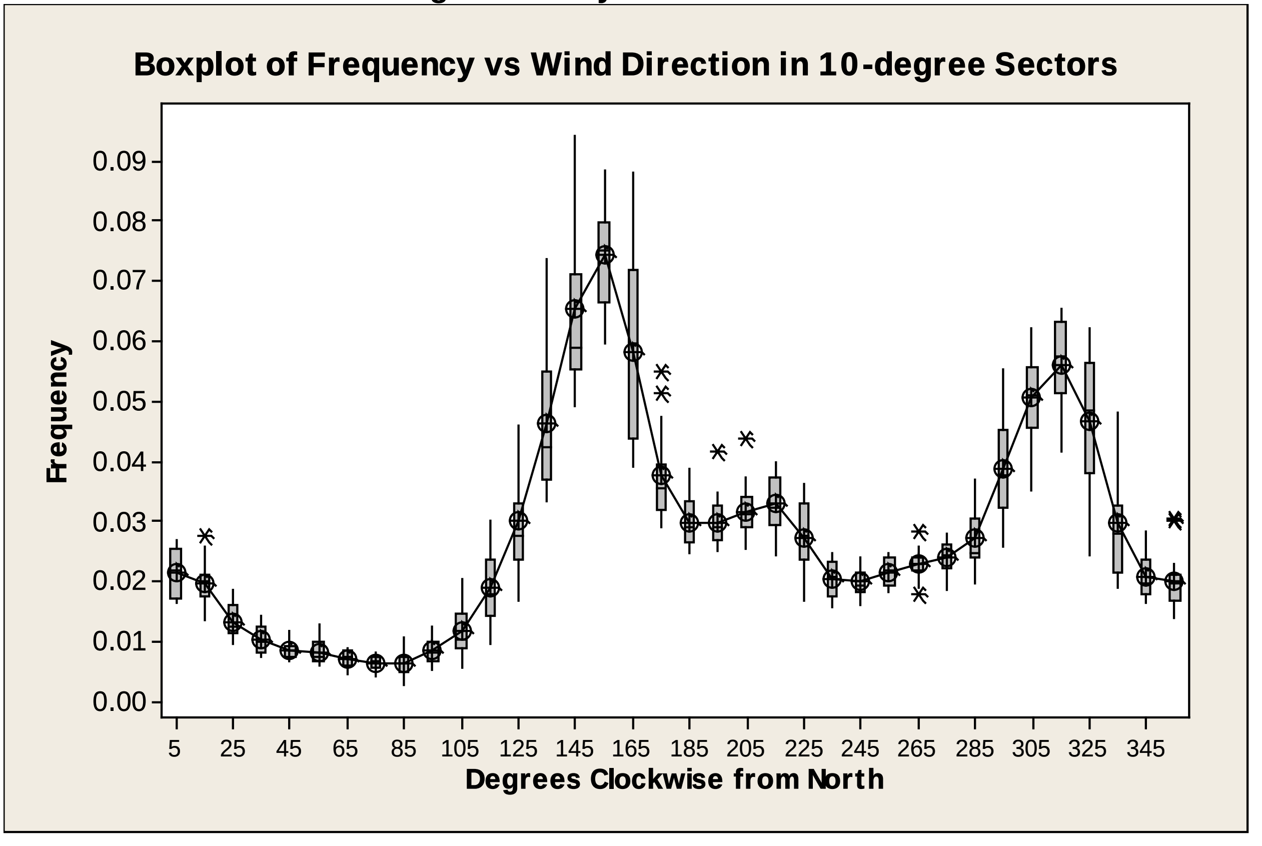
To balance the need for sufficiently large sample sizes with the need to minimize the artifacts of discrete classification, wind directions were divided into 36 sectors of 10º each (0º represents true North). Figure 1 compares 20 years of hourly wind direction data split into 90 sectors with the same data distributed among 36 sectors. It shows the latter to be a suitable representation without imparting the granular quality exhibited by the 90-sector distribution.

Figure 1 – Antelope 1990-2009



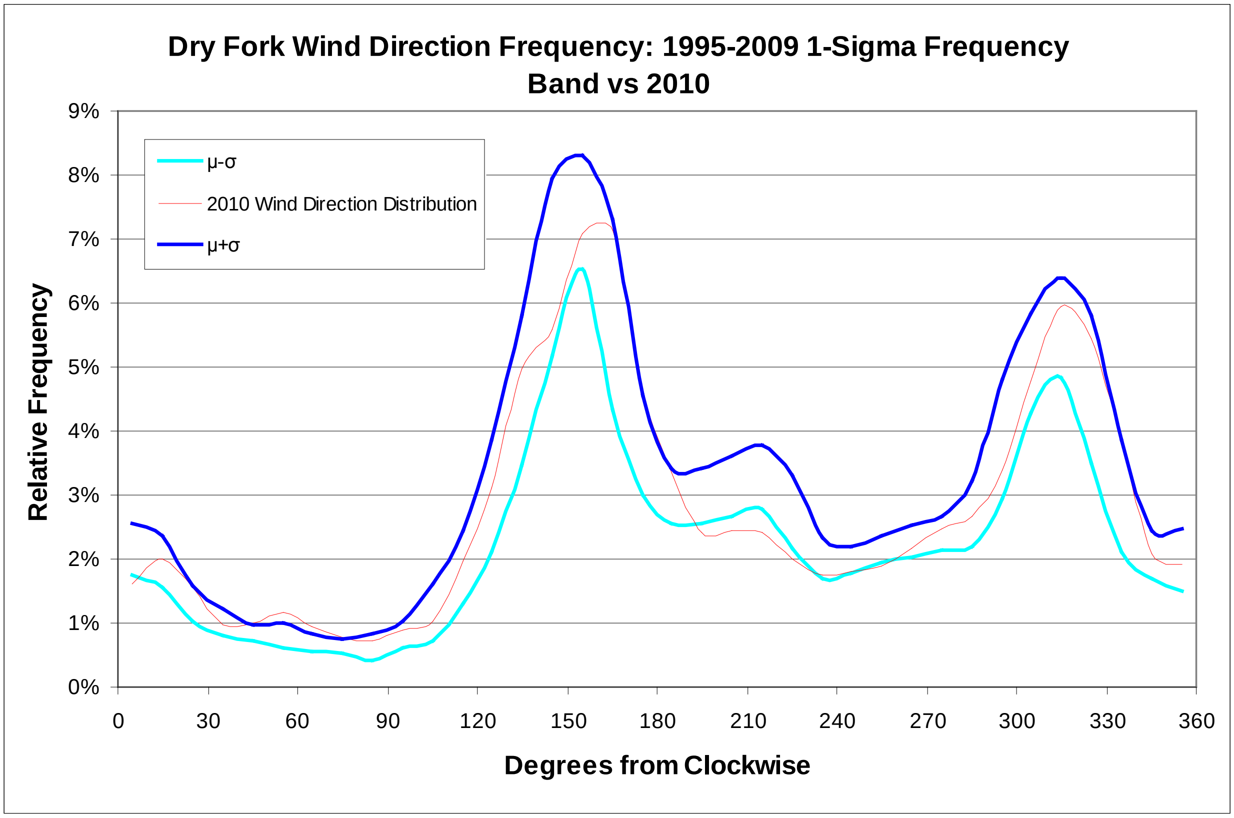
Dry Fork 15 -Year Wind Direction Distribution
Hourly wind directions were compiled from the Dry Fork Mine for the 15-year period from 1/1/1995 through 12/31/2009. Figure 2 shows the distribution of annual wind direction frequencies by sector, in the form of a box plot. The boxes represent frequencies from the 25th percentile to the 75th percentile. The lines represent the entire range of frequencies (excepting outliers), while the asterisks represent outliers.

Figure 2 – Dry Fork 1995-2009



Dry Fork Year 2010 Compared to Long-Term Frequency Distribution
Figure 3 presents the Dry Fork 15-year wind direction frequency distribution in the form of a band of frequencies for each direction sector. This band ranges from one standard deviation below the 15-year mean frequency to one standard deviation above the mean frequency. Superimposed on this statistical plot is the 2010 actual direction frequency distribution. Figure 3 shows that nearly all of the 2010 frequencies fall within the 15-year band. This is not surprising, since the probability that the direction frequency for any given sector and year will fall within one standard deviation of the long-term mean is 68% (assuming normally distributed data).

Figure 3 – Dry Fork 1995-2010



More significant than the adherence of one year to the 15-year frequency band is the width and shape of the band itself, which might be regarded as the "signature" for a given site. The narrower and more contoured the frequency band, the more distinctive the signature. It will be shown below that even a slight spatial difference between two monitoring stations can alter this signature significantly.

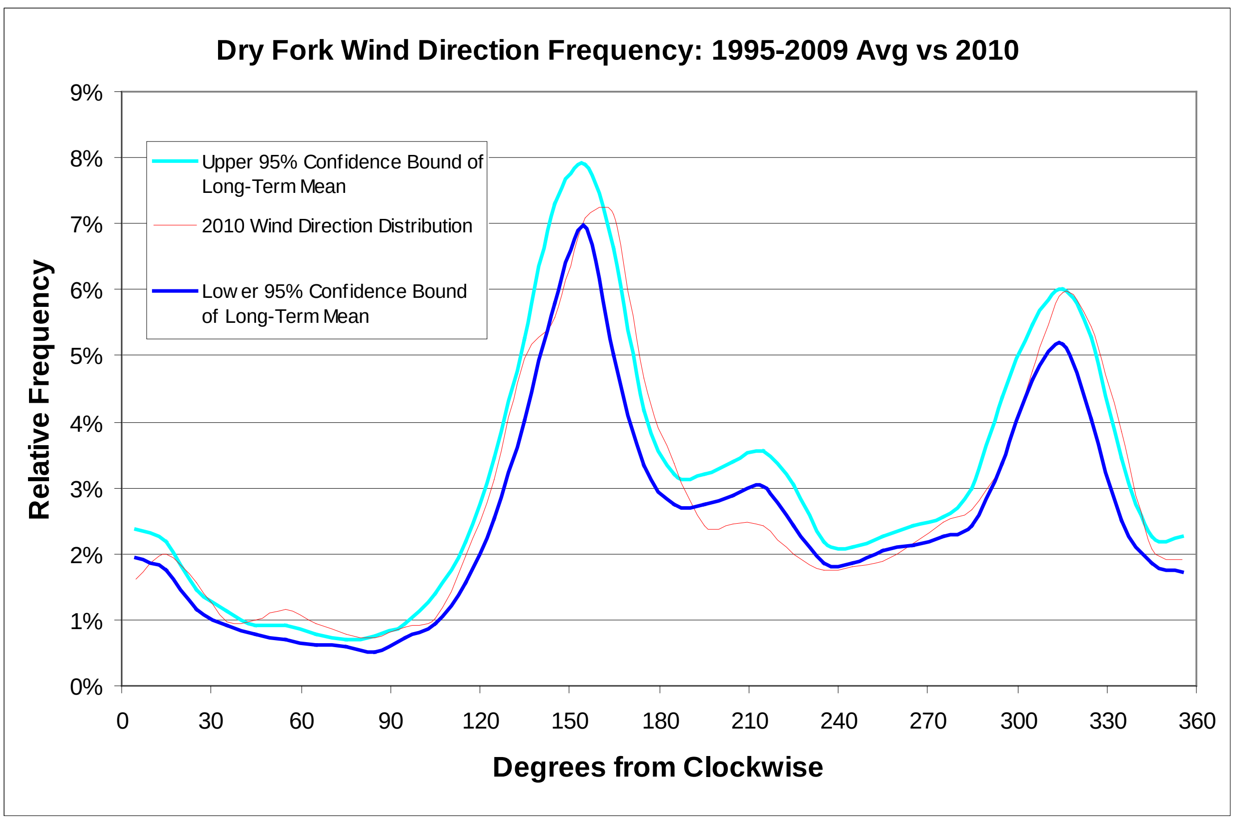
<u>Hypothesis Testing</u>
A series of hypothesis tests represents one approach to quantifying the goodness of fit between a one-year wind direction distribution and the long-term distribution. For the Dry Fork Mine example, the one-year direction frequency for each sector can be compared to the set of direction frequencies available from the previous 15 years (long-term). The null hypotheses are that the one-year frequencies do not belong to the long-term or "population" frequencies. Statistically, this can be accomplished through a one-sample t-test for each of the 36 sectors. Each t-test yields a p-value which predicts the probability of wrongly asserting a statistical difference between the one-year direction frequency and the long term frequency. Two such tests on the Dry Fork Mine data are shown below for the direction sectors centered on 5º and 15º respectively.

```
Test of mu = 0.0162367 vs not = 0.0162367
Variable    N      Mean     StDev   SE Mean         95% CI             T      P
5º         15  0.021532  0.004133  0.001067  (0.019243, 0.023821)  4.96  0.000
Test of mu = 0.020063 vs not = 0.020063
Variable    N      Mean     StDev   SE Mean         95% CI              T      P
15º       15  0.019560  0.003950  0.001020  (0.017372, 0.021747)  -0.49  0.629
```

At 5º the one-year (2010) frequency of 0.0162367 falls below the 95% confidence interval (CI) for the long-term mean frequency (0.019243 to 0.023821). A p-value of 0.000 confirms this point to be decidedly outside the CI. One might conclude (with 95% confidence) that 2010 was an atypical year for the direction sector centered on 5º. Conversely, the 15º test shows the 2010 frequency to be well within the 95% confidence interval for the long-term mean. A p-value of 0.629 indicates one cannot conclude any difference between the 2010 and long-term frequencies.

The t-test could be repeated for each of the 36 sectors, with some directions showing no statistical difference and others showing a slight difference. Figure 4 presents the results of a more efficient method, graphing the 95% confidence interval of frequencies as a function of wind direction. The confidence interval is calculated from the standard error of the mean frequency for each sector, and the two-tail t-value at 95% confidence. The 2010 frequency distribution is also shown on Figure 4.

Figure 4 – Dry Fork 1995-2010



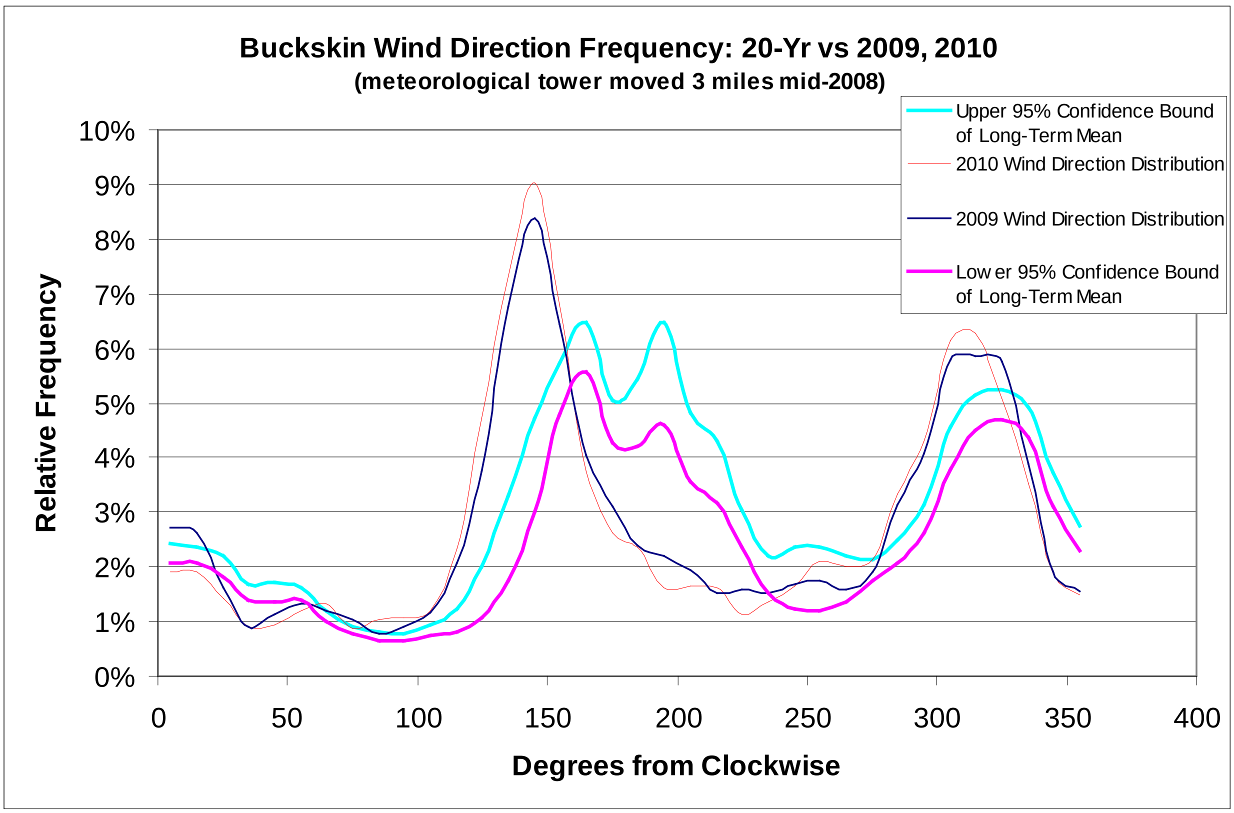
Roughly half of the 36 sectors used to produce Figure 4 show a slight departure of the 2010 frequency from the 95% confidence interval (CI) obtained from the previous

15 years. This result indicates that the occurrence of winds from half of the sectors in 2010 is not significantly different than the long-term occurrence. Moreover, among the sectors failing to meet this standard, the average departure from the 95% CI is only 11.5% of the mean frequency. The time-weighted average of all such departures is a mere 5% of the mean frequency (5 hours out of every 100 hours). Such minor deviations from the long-term pattern, illustrated in Figure 4, tend to confirm the concept of a site signature discussed above.

Influence of Meteorological Station Location

To corroborate the test results from Dry Fork Mine data, a similar study was conducted for the Buckskin Mine. Figure 5 graphs the results, which show a significant departure of annual frequencies in 2009 and 2010 from the 95% CI of long-term (20-year) mean frequencies. This result would tend to refute the applicability of a site signature to the Buckskin Mine. Further investigation, however, revealed that Buckskin moved the meteorological station approximately three miles to the northeast in mid-2008.

Figure 5 – Buckskin 1990-2010



Differences in elevation and terrain between the two sites may account for the change in wind direction patterns (note the similarity between 2009 and 2010 data sets, both of which were collected at the new location).

In order to test this theory, the effect of the met station move was eliminated by shifting the period of analysis back from 1990-2010 to 1986-2007. Figure 6 presents the revised results, with years 2006 and 2007 graphed against the 95% CI for long-term mean direction frequencies. In this case, the confidence interval was developed using data from 1986 through 2005.

Figure 6 – Buckskin 1986-2007

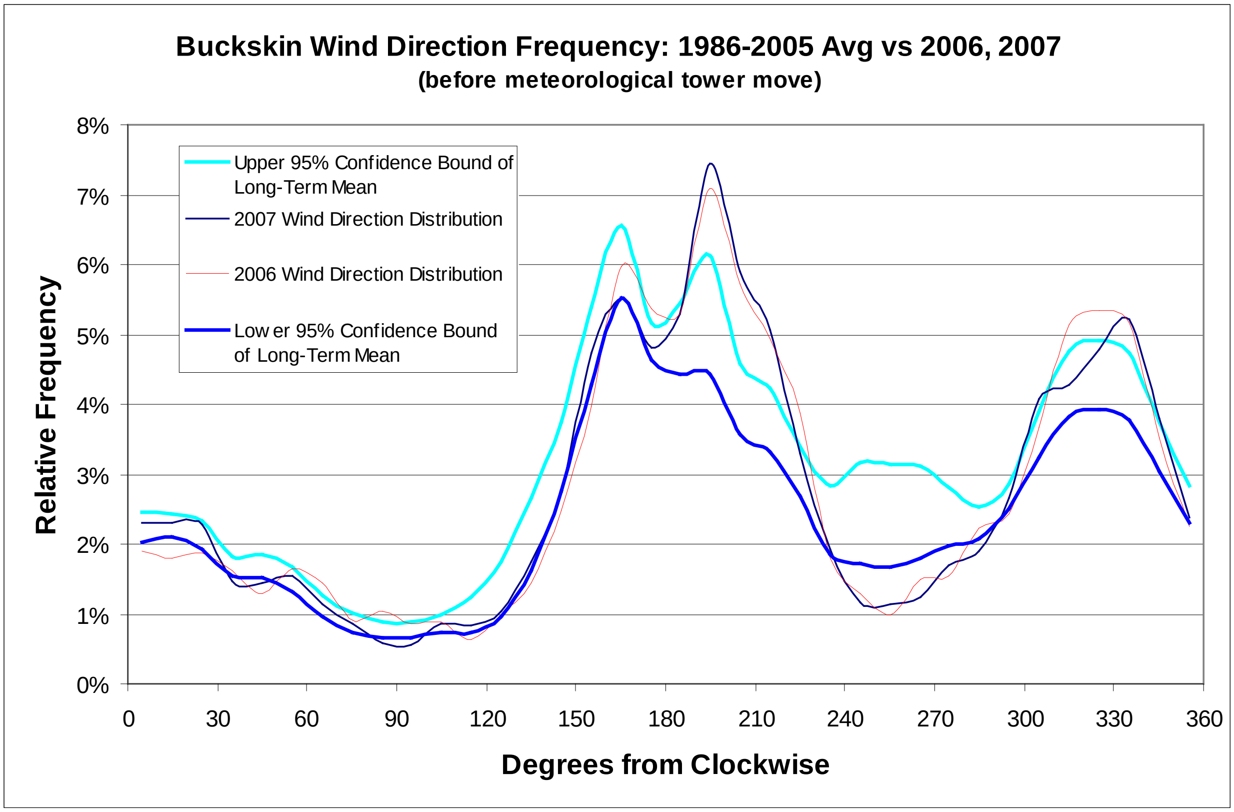


Figure 6 reflects only data collected at the original met station site. It shows a much stronger parallel between short-term and long-term data than Figure 5, which includes both sites. Although the departures from the CI are more pronounced for Buckskin than for Dry Fork (Figure 4), a site signature is certainly more apparent in Figure 6 than in Figure 5. It can be seen that the departures from the CI in Figure 6 actually accentuate that signature.

Regression Analysis

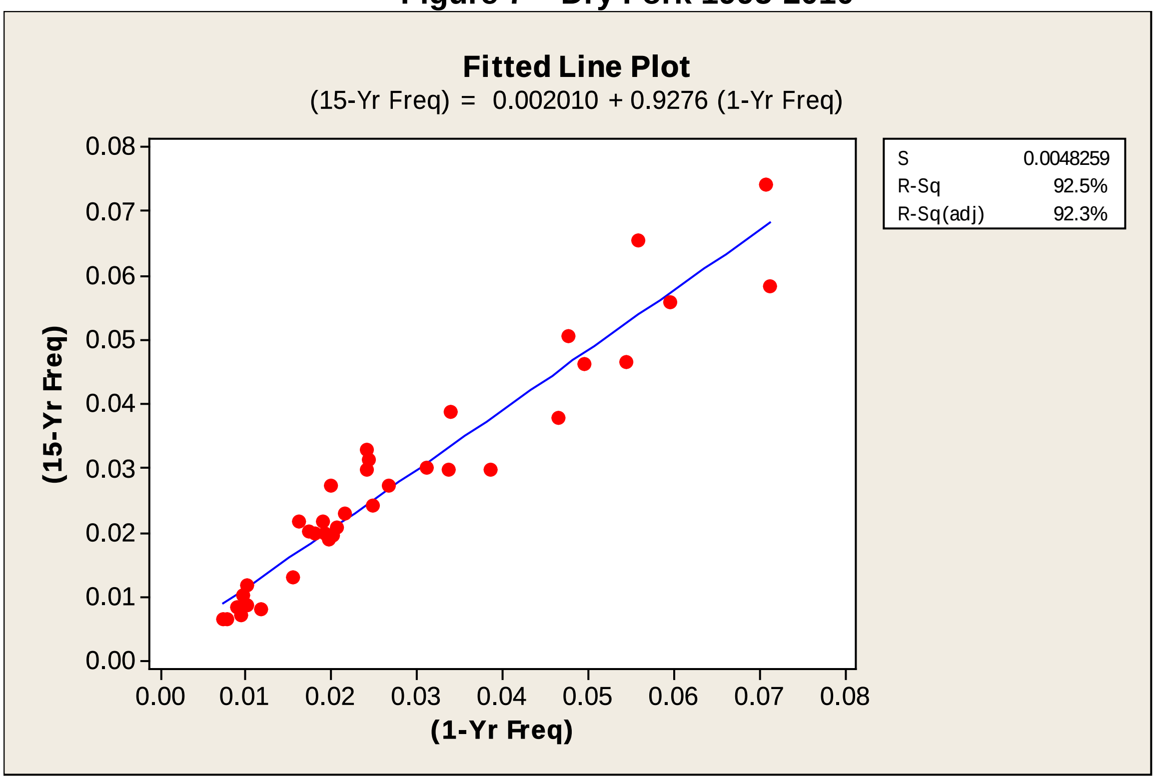
Hypothesis testing does not yield a single quantitative measure of how well one data set represents, or fits another. To overcome this limitation, a linear regression analysis was performed on 36 data pairs – each pair containing one value from the Dry Fork 15-year frequency distribution and one from the Dry Fork one-year (2010) distribution. With an R^2 value of 92.5%, the one-year frequency is a good predictor of the 20-year average frequency for any given sector (or vice versa). One interpretation of this result is that 92.5% of the variance in wind frequency between short and long-term data can be explained or predicted by knowing the direction sector (note that each data pair represents a specific sector). The other 7.5% of the frequency variance must be attributed to random differences in wind direction from year to year.

Dry Fork Regression Analysis: (15-Yr Freq) versus (1-Yr Freq)

```
The regression equation is
(15-Yr Freq) = 0.00201 + 0.928 (1-Yr Freq)

Predictor         Coef   SE Coef      T      P
Constant      0.002010  0.001494   1.35  0.187
(1-Yr Freq)    0.92763   0.04531  20.47  0.000

S = 0.00482587   R-Sq = 92.5%   R-Sq(adj) = 92.3%

Analysis of Variance

Source          DF         SS         MS       F      P
Regression       1  0.0097620  0.0097620  419.17  0.000
Residual Error  34  0.0007918  0.0000233
Total           35  0.0105539
```

Figure 7 graphs these data pairs along with the straight line fit and confirms the R^2 value of 92.5%. In the fitted line equation, an intercept of 0 and a slope of 1 would indicate exact linear correlation. The actual, least-squares intercept of 0.00201 and slope of 0.9276 only approach this condition.

Figure 7 – Dry Fork 1995-2010



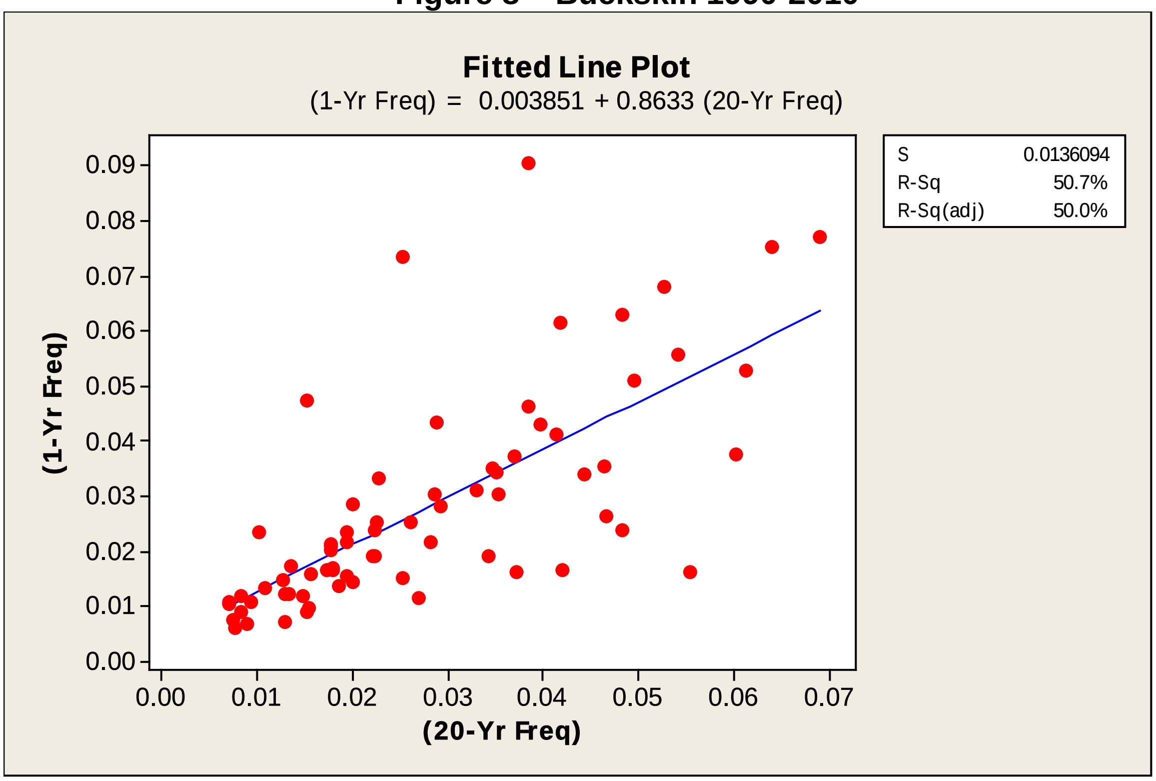
The linear correlation method shows 2010 to be representative of the long term at Dry Fork Mine. At Buckskin, where the met station was moved in 2008, one might expect a much weaker correlation between 2010 data and 1990-2009 data. Indeed that is the case, as shown below.

Buckskin Regression Analysis: (1-Yr Freq) versus (20-Yr Freq)

```
The regression equation is
(1-Yr Freq) = 0.00385 + 0.863 (20-Yr Freq)

Predictor          Coef   SE Coef     T      P
Constant       0.003851  0.003274  1.18  0.244
(20-Yr Freq)     0.8633    0.1025  8.42  0.000

S = 0.0136094   R-Sq = 50.7%   R-Sq(adj) = 50.0%

Analysis of Variance

Source          DF        SS        MS      F      P
Regression       1  0.013138  0.013138  70.94  0.000
Residual Error  69  0.012780  0.000185
Total           70  0.025918
```

An R^2 value of 50% indicates very weak correlation between 1990-2009 data and 2010 data. Figure 8 illustrates this graphically.

Figure 8 – Buckskin 1990-2010



If this analysis is shifted backward in time to avoid data collected after the Buckskin met station move, the correlation improves markedly. Comparing wind direction data from 1986-2005 with either the 2006 or 2007 data sets yields an R^2 value of around 87% (Figures 9 and 10).

Figure 9 – Buckskin 1986-2006

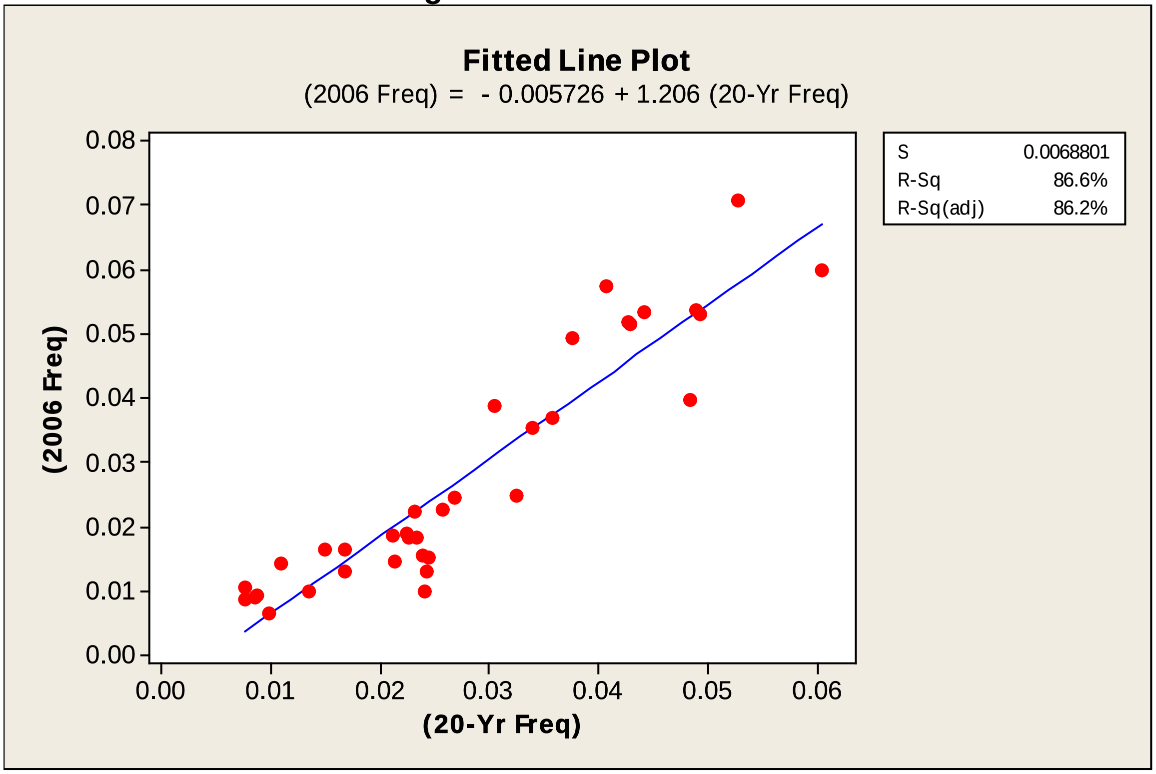
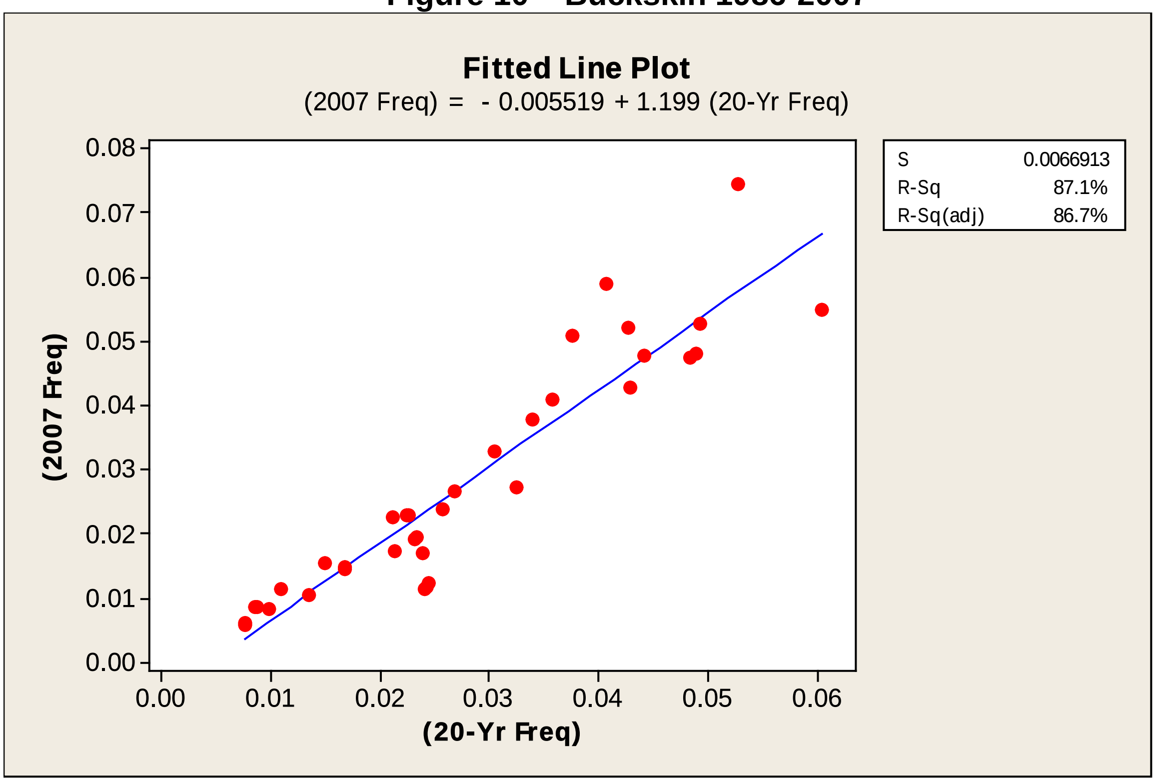


Figure 10 – Buckskin 1986-2007



Other Site Signatures
Wind direction data from Antelope Mine and the Gillette Airport were considered in an attempt to confirm the concept of a site signature and the linear correlation between short and long-term data. The wind data from Antelope Mine (southeast of Wright) spans a period of 21 years (1990 through 2010). For this site, the long-term average was computed from the first 20 years and compared to year 2010. Figure 11 reveals a wind direction signature for Antelope that is distinct from either Dry Fork or Buckskin.

Figure 11 – Antelope 1990-2010

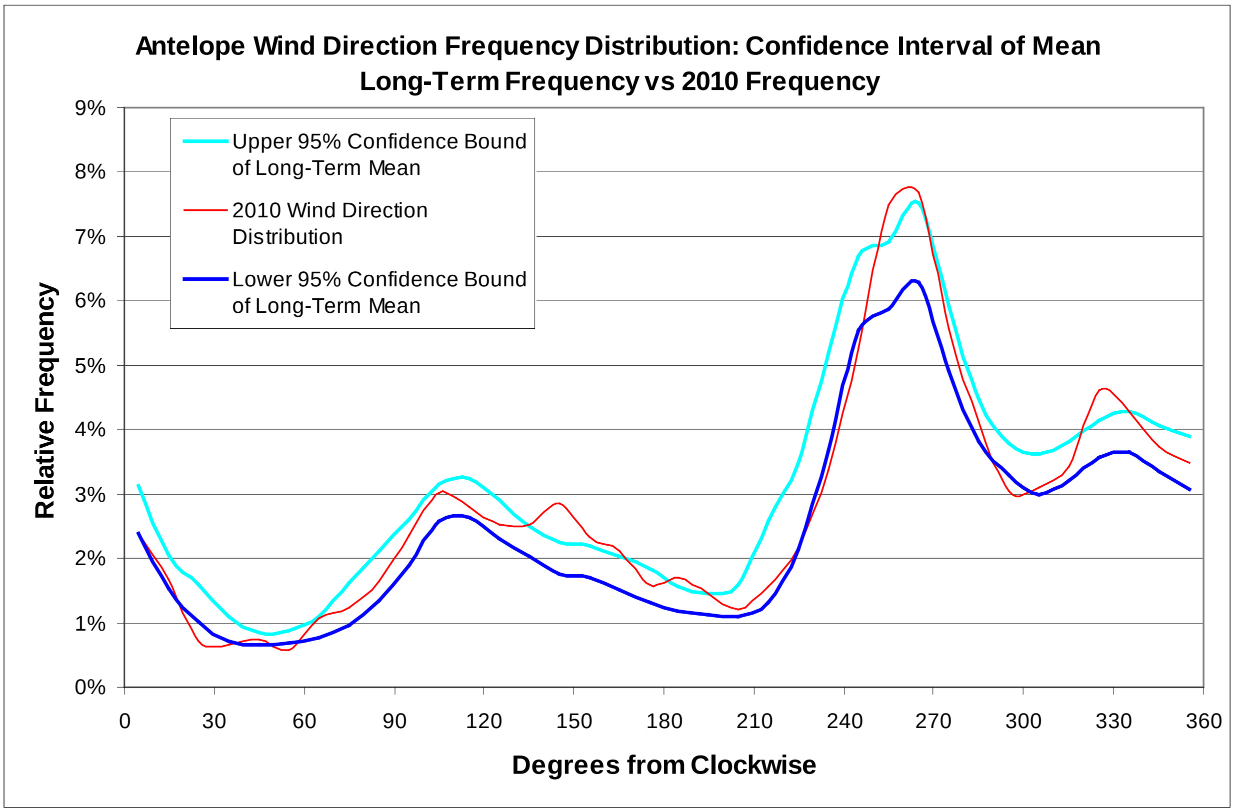


Figure 12 shows a correlation between short and long-term wind direction frequencies at Antelope. The R^2 value of 93.4% is nearly the same as that produced by the Dry Fork correlation, and denotes a strong relationship (or "fit") between 2010 and 1990-2009.

Figures 13 and 14 represent a similar analysis of wind data from the Gillette Airport. Data from a five-year period (2005 to 2009) were compiled to serve as long-term wind direction frequencies and compared to 2010 data. Once again, a site signature is apparent in Figure 13. The R^2 value of 74.2% signifies a weaker correlation, much of which may be explained by poor data resolution. The Gillette Airport wind directions are only available in 10º increments, whereas Antelope, Buckskin and Dry Fork instruments (all operated by IML Air Science) offer 0.1º precision.

Figure 12 – Antelope 1990-2010

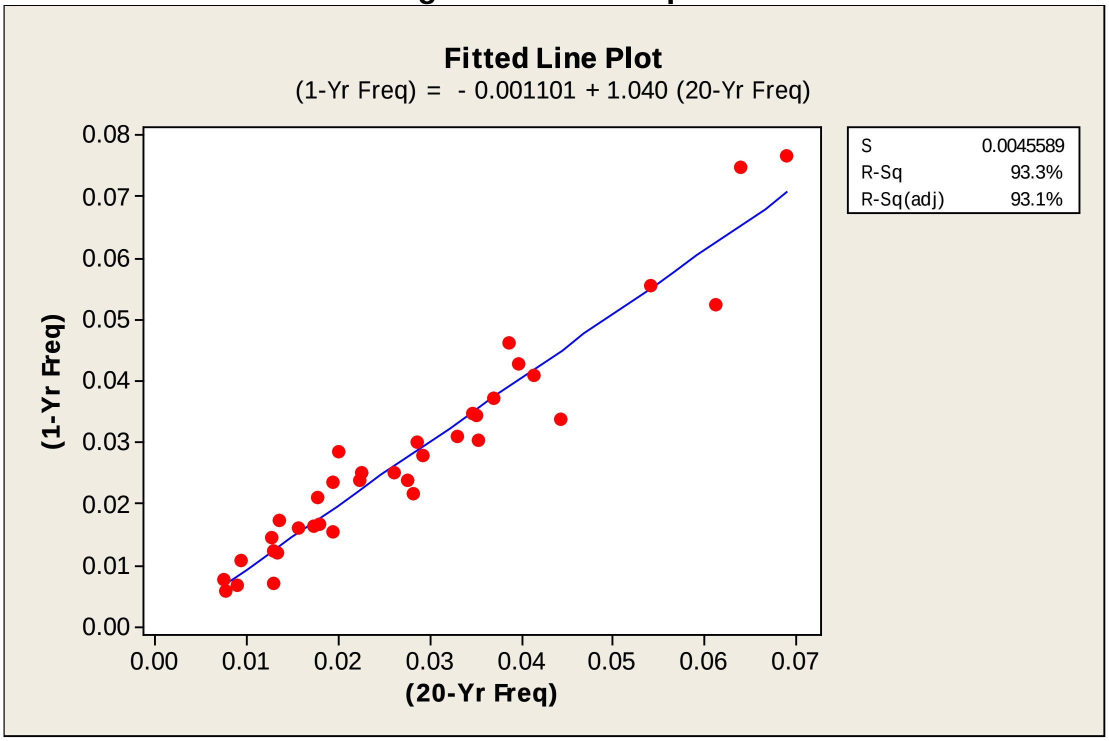


Figure 13 – Gillette AP 2005-2010

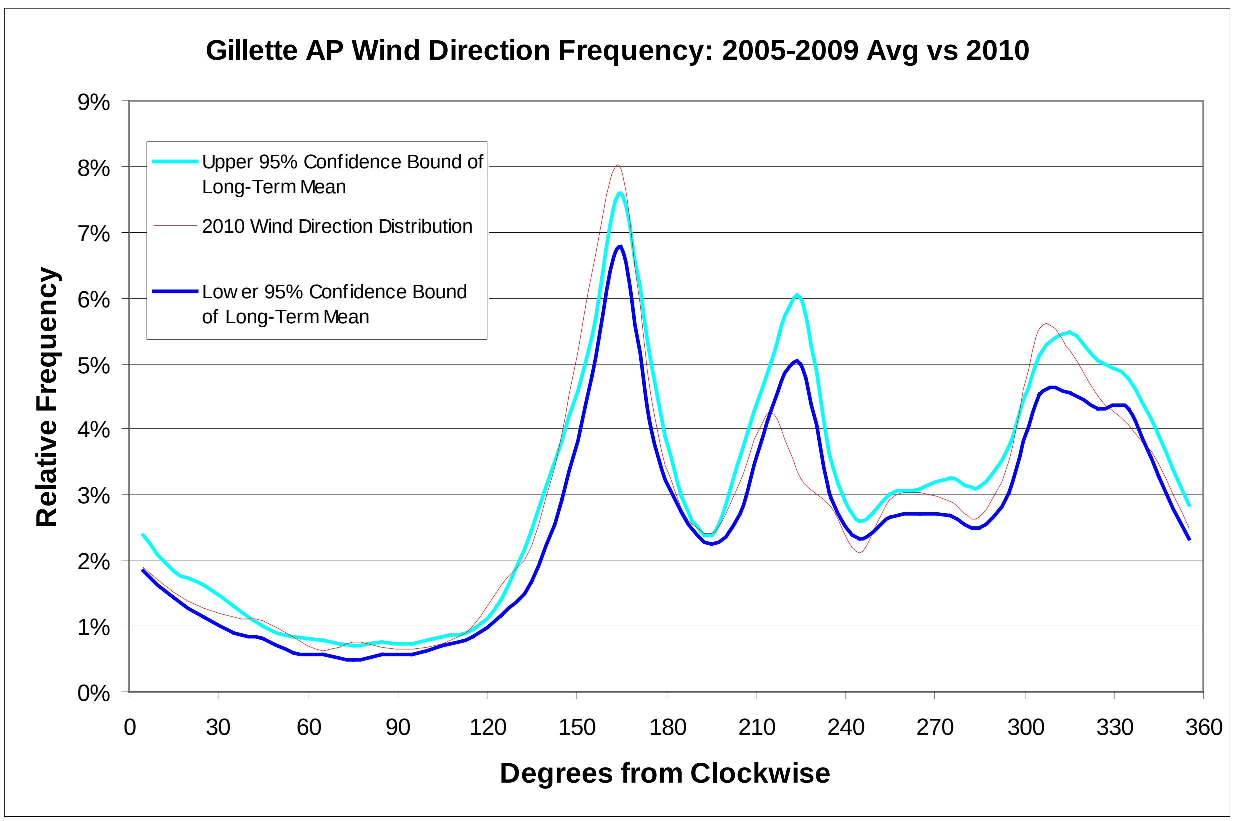
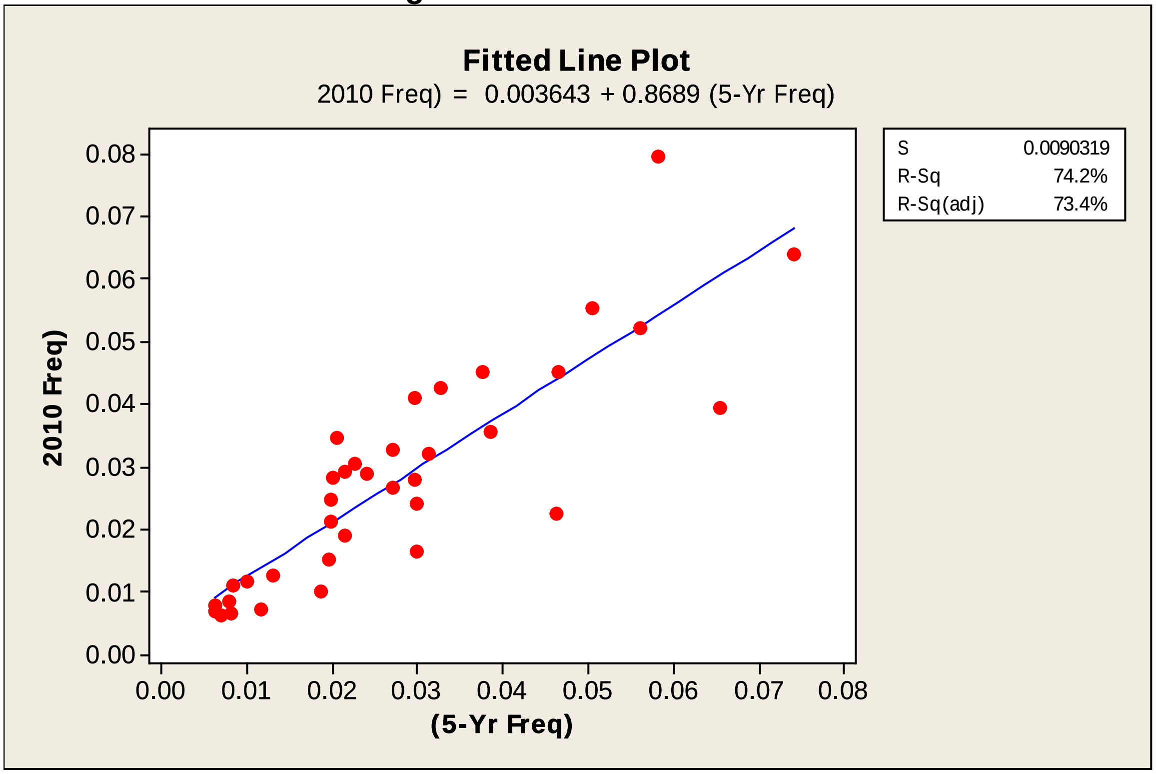


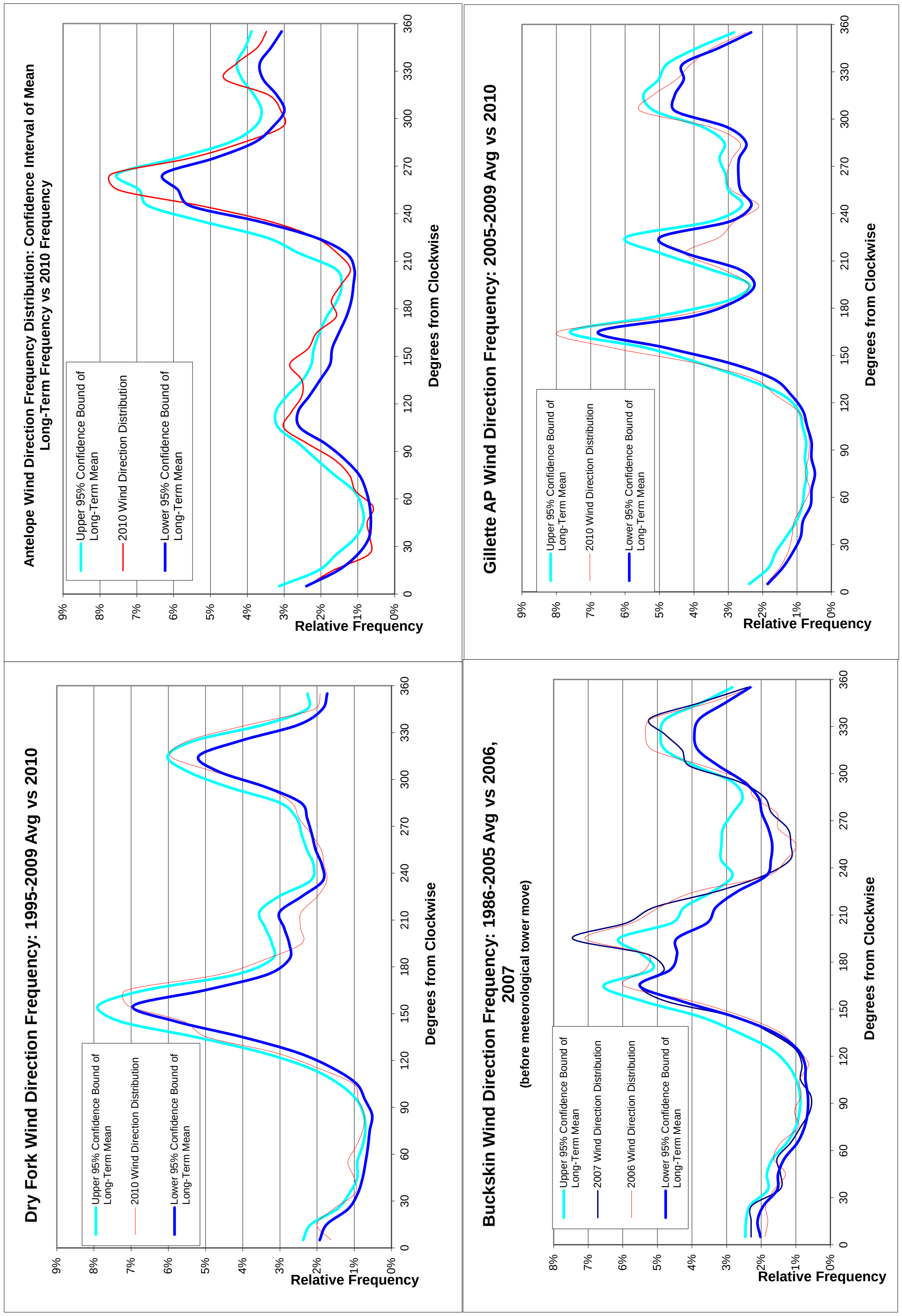
Figure 14 – Gillette AP 2005-2010



<u>Conclusion</u>

This limited study indicates that at least in the Powder River Basin, the location of a wind monitor has greater influence on the distribution of wind directions than does the year in which data are collected. If true, this confirms the need for on-site meteorological monitoring. It also underscores the need to locate the monitoring tower in conditions representative of the anticipated air emission sources. At the same time, it suggests that one year of data is generally adequate to establish a site signature within the tolerance required to assure valid dispersion modeling and to determine appropriate locations for air quality monitoring instruments. Figure 15 shows the site signatures for all four sites in this study to be distinct from one another.

Figure 15 – Comparative Site Signatures



APPENDIX 2.5-F

Dewey-Burdock Meteorological Station Operation and Maintenance

POWERTECH (USA) INC.

South Dakota State University

SDSU

College of Agriculture and Biological Science
and College of Engineering

Agricultural and Biosystems
Engineering Department
Box 2120, SDSU
Brookings, SD 57007-1496

April 6, 2011

Richard Blubaugh
VP-EH & S Resources Resources
Powertech (USA) Inc.

To Whom It May Concern:

The automated weather station at Dewey-Burdock was installed at the request of Powertech to monitor atmospheric conditions in the vicinity as required by the NRC. The automated station is part of the South Dakota Automated Weather Station Network (AWDN), one of 40 stations currently running across the state.

The station was completely new and fully functioning when installed in 2007. Our data technician completed two visits after installation to assure station was working according to needs. Data from the stations have a visual QA/QC to compare data to nearby stations. Because of the remote nature of the station and remoteness of the location for basic access to the station and because of the distance from our home data center in eastern South Dakota (Brookings) we only make annual visits to stations for annual maintenance. Addition trips occur as needed during other times of the year.

We therefore utilize comparisons of data to nearby stations with the ongoing data collection to determine the data quality. We found no issues that required special visits during the time in question.

Sincerely,

Dr. Dennis Todey
South Dakota State Climatologist

APPENDIX 2.6-G

USGS Earthquake Database Results

NEIC: Earthquake Search Results

U. S. GEOLOGICAL SURVEY

EARTHQUAKE DATA BASE

FILE CREATED: Tue May 17 15:00:32 2011
Circle Search Earthquakes= 55
Circle Center Point Latitude: 43.478N Longitude: 103.985W
Radius: 200.000 km
Catalog Used: PDE
Data Selection: Historical & Preliminary Data

CAT	YEAR	MO	DA	ORIG TIME	LAT	LONG	DEP	MAGNITUDE	IEM NFO TF	DTSVNWG	DIST km
PDE	1975	05	16	055701.50	43.24	-103.68	5		4F.	....	36
PDE	1976	09	03	041816.20	44.04	-106.15	10	4.2 MLGS	.F.	....	185
PDE	1978	01	16	035001.70	42.44	-105.32	5	3.0 MLGS	.F.	....	159
PDE	1981	09	13	221629.74	43.04	-101.85	5	3.4 LgTUL	5F.	....	179
PDE	1983	02	13	134444.09	42.23	-105.73	5	4.0 MLGS	4F.	....	198
PDE	1983	05	06	061446.95	42.96	-102.20	5	3.3 MLGS	...	....	156
PDE	1983	11	15	123312.19	43.02	-105.96	5	3.0 MLGS	3F.	....	167
PDE	1984	05	29	201832.68	44.23	-105.96	18	5.0 mbGS	5F.	....	179
PDE	1984	09	08	005931.10	44.24	-106.02	20	5.1 mbGS	5F.	....	184
PDE	1984	10	18	153023.06	42.38	-105.72	33	5.5 MLGOL	6DM	....	187
PDE	1984	10	18	155737.38	42.37	-105.81	33	4.2 MLGOL	.F.	....	193
PDE	1984	10	18	173827.41	42.41	-105.77	33	3.8 MLGOL	...	....	187
PDE	1984	10	19	162904.44	42.41	-105.77	33	3.3 MLGS	...	....	188
PDE	1984	10	20	115108.63	42.40	-105.87	33	3.5 MLGS	...	....	195
PDE	1984	10	22	111756.30	42.40	-105.88	33	3.1 MLGS	...	....	195
PDE	1984	10	24	090354.78	42.32	-105.72	21	3.2 MLGS	...	....	191
PDE	1984	10	29	190800.10	44.35	-106.00	20	2.5 MLGS	.F.	....	188
PDE	1984	11	06	113852.51	42.31	-105.71	33	3.3 MLGS	...	....	191
PDE	1984	12	06	040452.33	42.44	-105.82	20	2.9 MLGS	...	....	188
PDE	1984	12	17	093132.24	42.36	-105.73	33	3.3 MLGS	...	....	189
PDE	1986	06	12	151434.03	42.40	-105.69	20	3.0 MLGS	...	....	184
PDE	1987	01	01	080224.07	42.79	-103.48	5	3.5 LgGS	3F.	....	86
PDE	1989	02	09	051545.80	42.69	-101.90	5	3.8 LgGS	5F.	....	191
PDE	1990	01	28	045959.19	43.31	-102.50	5	4.0 LgTUL	5F.	....	121
PDE	1990	03	02	041527	43.30	-102.50	5	3.2 MLGS	4F.	....	121
PDE	1991	11	05	161849	44.35	-103.75	0	2.5 MLGS	.F.	....R..	98
PDE	1992	11	02	065410.34	42.74	-104.39	5	3.0 MLGS	5F.	....	88
PDE	1993	02	24	235217.58	43.71	-105.29	0	3.6 MLGS	.F.	....E..	108
PDE	1993	06	30	065057.83	42.99	-105.37	5	3.0 MLGS	...	....	125
PDE	1993	07	23	063023.84	42.48	-105.70	5	3.7 MLGS	4F.	....	178
PDE	1993	09	05	081235.50	44.40	-103.80	5	2.7 MLGS	3F.	....	103
PDE	1993	10	10	041746.76	42.42	-105.87	5	3.7 MLGS	4F.	....	193
PDE	1993	12	13	145103.05	42.33	-105.50	5	3.5 MLGS	...	....	177
PDE	1994	03	18	225143.15	43.40	-103.50	5	2.8 LgGS	.F.	....	40
PDE	1994	03	20	071506	43.40	-103.50	5	2.3 LgGS	.F.	....	40
PDE	1996	02	06	160836.75	43.98	-103.73	5	3.7 LgGS	5F.	....	59
PDE	1996	04	09	024808.19	43.07	-104.10	5	3.7 LgGS	3F.	....	46
PDE	1996	05	03	074751.53	43.04	-104.02	5	3.1 LgGS	...	....	48

PDE	1996	10	19	132757.97	43.09	-106.06	5	4.2 MLGS	.F.	....	173
PDE	1998	06	18	162638.32	42.62	-103.00	5	3.4 LgGS	.F.	....	124
PDE	2000	04	13	181731.73	42.41	-105.81	5	3.3 MLGS	...	....	190
PDE	2003	02	01	184411.53	43.08	-106.18	5	3.7 MLGS	.F.	....	183
PDE	2003	05	25	073233.39	43.09	-101.79	5	4.0 LgGS	4F.	....	183
PDE	2004	01	05	025316.58	43.60	-104.00	5	2.8 LgGS	.F.	....	13
PDE	2004	01	24	040901.30	44.00	-103.20	5	2.5 LgGS	.F.	....	85
PDE	2004	02	15	031818.02	42.94	-105.40	10	3.5 MLGS	3F.	....	129
PDE	2004	08	29	184944.26	42.89	-105.49	5	3.8 MLGS	4F.	....	138
PDE	2006	08	17	164058.28	44.22	-106.17	5	3.1 LgGS	...	....	193
PDE	2006	09	07	062320.02	42.98	-102.24	5	2.6 LgGS	...	....	152
PDE	2007	02	07	103558.70	44.03	-102.58	5	3.1 LgGS	3F.	....	128
PDE	2007	04	24	093501.26	42.58	-102.94	5	2.7 LgGS	...	....	131
PDE	2008	08	22	230131.81	43.08	-104.29	5	3.1 MLGS	...	....	51
PDE	2008	11	03	131412.45	42.83	-105.18	5	3.5 MwRMT	3FM	....	121
PDE	2009	09	25	151134.10	45.02	-104.21	4	4.2 MLBUT	2F.	....	172
PDE-Q	2011	03	10	013813.68	42.86	-104.09	5	2.8 LgGS	2F.	....	69

USGS National Earthquake Information Center