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LOST CREEK ISR, LLC

November 17, 2017

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Request for Removal of License Condition 10.19
Lost Creek ISR Project, License SUA-1598 Docket 40-9068

To Whom It May Concern:

In support of the original request by Lost Creek ISR, LLC (LCI) dated March 4, 2016 for removal of License Condition (LC) 10.19 from Lost Creek Project Materials License SUA-1598, LCI provides the attached report "METEOROLOGICAL DATA EVALUATION TO DEMONSTRATE LONG-TERM REPRESENTATIVENESS AT THE LOST CREEK ISR PROJECT".

The report is a revised evaluation of meteorological data collected at the Lost Creek Project site provided as an alternative method for demonstrating long-term representativeness of the data. Please review the attached report to facilitate removal of LC 10.19.

A Form 313 was submitted with the previous request. If you have any questions regarding this submittal please contact me at the Casper office.

Sincerely,

Michael D. Gaither
Manager EHS and Regulatory Affairs
Ur-Energy USA, Inc

Attachments: As stated

NMSS01

Cc: Deputy Director, Division of Decommissioning
Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
11545 Rockville Pike, Two White Flint North
Rockville, MD 20852-2738
John Saxton, NRC (via e-mail)
Nancy Williams, WDEQ-LQD, Lander (via email)
Mark Newman, BLM Rawlins Office (via email)
Theresa Horne, Ur-Energy, Littleton (via email)

METEOROLOGICAL DATA EVALUATION TO DEMONSTRATE LONG-TERM REPRESENTATIVENESS AT THE LOST CREEK ISR PROJECT

LOST CREEK ISR, LLC

November 17, 2017

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INTRODUCTION

Lost Creek ISR, LLC (LCI) has been collecting meteorological data from a calibrated on-site weather station at the Lost Creek ISR Project site since April 2006. Data collection has been ongoing in accordance with NRC License SUA-1598 License Condition (LC) 10.19. In an effort to have the condition removed and terminate meteorological monitoring, LCI has opted to use an alternative method for demonstrating long-term representativeness of meteorological data by providing qualitative evaluation of at least five years of valid data that includes three consecutive years. The alternative method is proposed in accordance with Section D of NRC Regulatory Guide 3.63. Data has been collected continuously for approximately ten years and over that period there are five years with three consecutive years of valid data that will be used in the evaluation. The data sets are valid if the annual data collection rate for each parameter is 90% or greater and the joint data recovery rate for wind parameters is 75% or greater.

The summary of meteorology at Lost Creek and the meteorological data collected in the pre-operational phase is detailed in the NRC License Application Technical Report (TR) Section 2.5. Weather station siting and data collection methodology was determined to be acceptable as described in the Safety Evaluation Report for the Lost Creek Project Section 2.2.4 but the data was not shown to be representative of long-term conditions and therefore LC 10.19 had been imposed.

The following evaluation presents the annual data sets and provides a comparison from year to year to show that there is little variation in the data sets. The invariable nature of the data is likely to demonstrate that the meteorological data collected thus far is representative of long-term conditions.

PARAMETERS AND PERIOD OF RECORD

The minimum required parameters in RG 3.63 include:

- Temperature
- Precipitation
- Wind speed
- Wind direction
- Annual wind rose
- Summary of stability classification

Data for these parameters as well as others were collected since 2006 at Lost Creek. Data was originally collected and evaluated for establishment of the baseline meteorology for a period from May 2006 through April 2007 as reported in TR Section 2.5 and is referred to herein as applicable. The data collection rate for other annual data sets was evaluated to determine if they are valid based on the data recovery rate. **Table 1** shows the annual recovery rate for hourly data since 2006:

TABLE 1: Annual Data Recovery Rates

Year	Hours per Period	Hours of Data Collected	% Recovery	% Joint Recovery	Status	Comment
2006-2007	8688	8152	93.8%	93.8%	Acceptable	1 Year Evaluation Period for Permit Application (TR)
2006	8760	5575	63.6%	---	Reject	Not full year
2007	8760	4068	46.4%	---	Reject	Below 90%
2008	8784	7489	85.3%	---	Reject	Below 90%
2009	**8760**	**8760**	**100.0%**	**99.9%**	**Accept**	
2010	**8760**	**8691**	**99.2%**	**99.2%**	**Accept**	
2011	8760	7638	87.2%	---	Reject	Below 90%
2012	**8784**	**8209**	**93.5%**	**93.4%**	**Accept**	
2013	**8760**	**8249**	**94.2%**	**94.1%**	**Accept**	
2014	**8760**	**8026**	**91.6%**	**91.6%**	**Accept**	
2015	8760	6362	72.6%	---	Reject	Below 90%
2016	8784	6903	78.6%	---	Reject	Below 90%

Therefore, the established Period of Record (POR) that will be used for comparison herein includes 5 years of data (2009-2010 and 2012-2014). Additionally, for several of the data parameters, basic statistics are provided to show the relative invariability of the data to include standard deviation and a control range of plus or minus 3 standard deviations (3-sigma tolerance).

PARAMETER EVALUATION

Temperature

Since temperature is variable from year to year, the average values on a monthly basis are provided for qualitative comparison. The average temperatures by month averaged over the entire period are shown below for comparison.

Overall, as shown by both of the averages chart (**Figure 1 and Figure 2**), the warmest month is July and the coldest is January consistent with the evaluation in Technical Report Section 2.5.1.1.

FIGURE 1

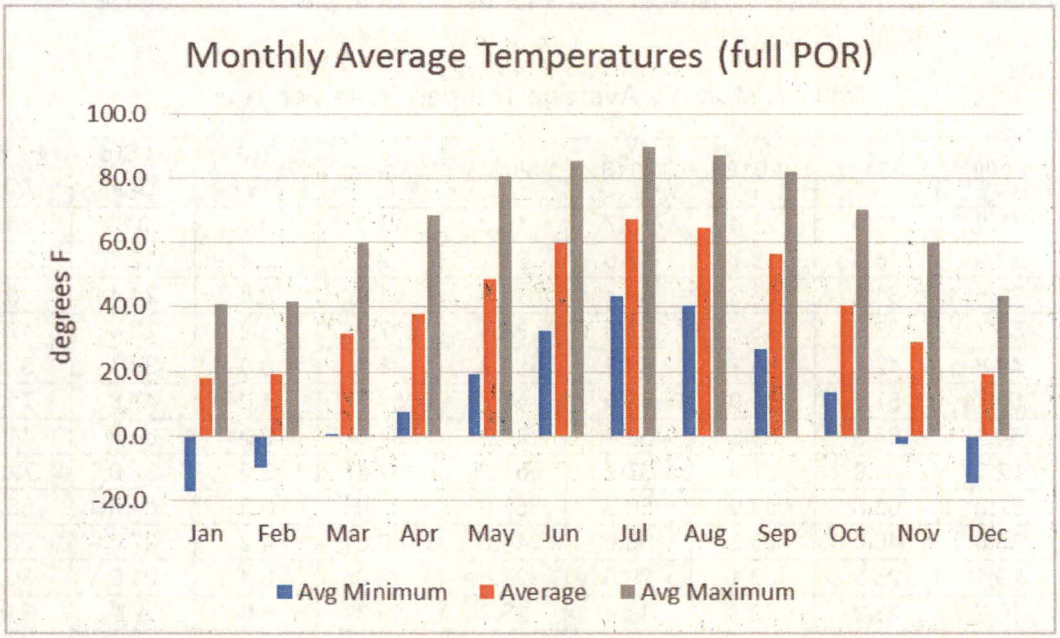
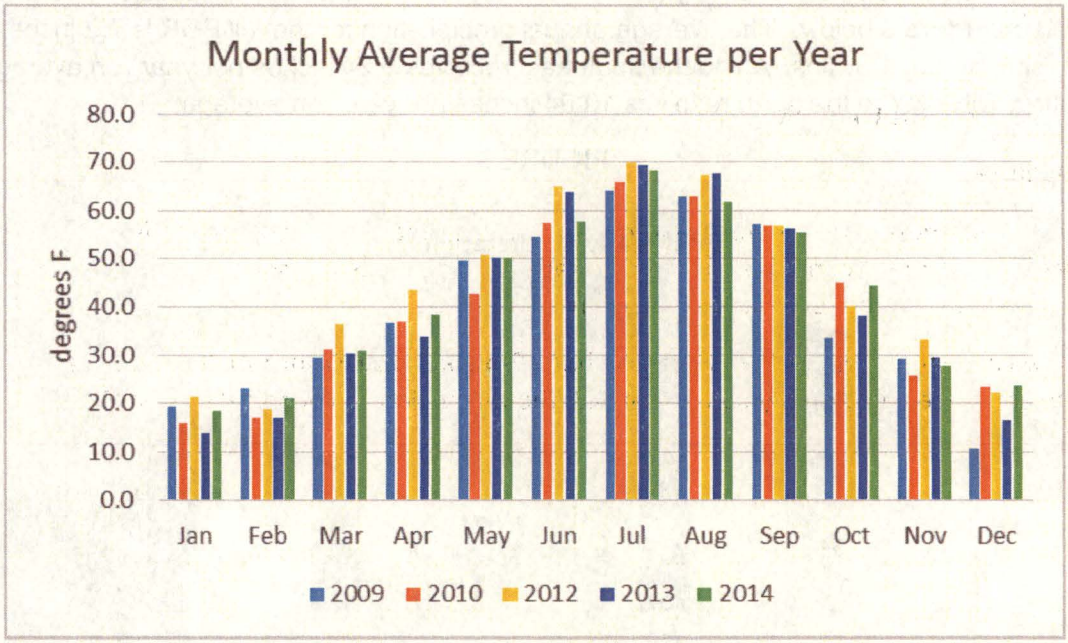


FIGURE 2



The variation in the monthly averages from year-to-year are within 3 sigma tolerance. The data show (**Table 2**) that the variation between years for each month are relatively stable over the POR.

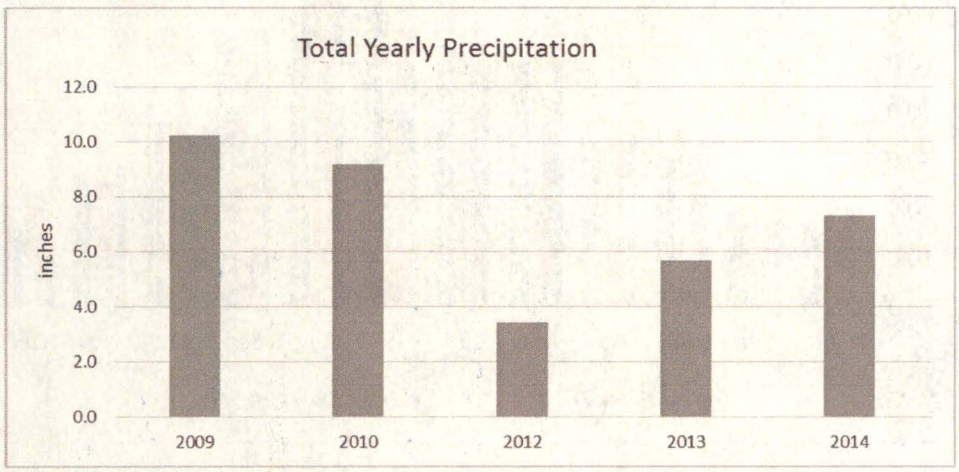
Table 2: Monthly Average Temperatures per Year

Deg F	2009	2010	2012	2013	2014	Mean	Std Dev	-3 Std Dev	+3 Std Dev
Jan	19.3	16.0	21.4	13.7	18.3	17.7	2.7	9.8	25.7
Feb	22.9	16.9	18.7	17.0	21.1	19.3	2.4	12.3	26.4
Mar	29.5	31.3	36.3	30.4	30.8	31.6	2.4	24.4	38.8
Apr	36.7	37.0	43.5	33.8	38.4	37.9	3.2	28.4	47.4
May	49.8	42.7	50.7	50.2	50.2	48.7	3.0	39.7	57.8
Jun	54.7	57.5	64.9	63.9	57.7	59.7	4.0	47.8	71.6
Jul	64.0	65.9	69.8	69.4	68.2	67.5	2.2	60.9	74.0
Aug	62.8	63.0	67.4	67.7	61.7	64.5	2.5	57.0	72.0
Sep	57.3	56.8	56.9	56.3	55.6	56.6	0.6	54.8	58.4
Oct	33.6	45.0	40.2	38.0	44.5	40.3	4.2	27.6	53.0
Nov	29.1	25.8	33.1	29.5	27.6	29.0	2.4	21.8	36.3
Dec	10.7	23.2	22.3	16.4	23.7	19.3	5.0	4.2	34.3

Precipitation

Precipitation is variable from year to year and typically low. The total precipitation by year is provided on **Figure 3** below. The average annual precipitation for the full POR is 7.2 inches. In comparison, nearby Rawlins, WY to the southeast receives 9.24 inches per year[1] on average and Jeffrey City, WY to the north receives 10.04 inches per year[2] on average.

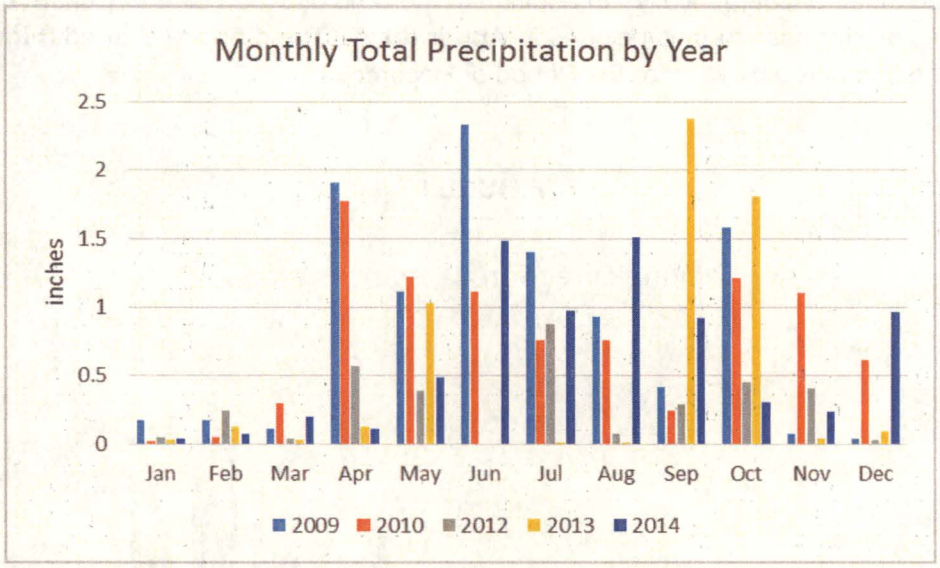
FIGURE 3



[1] *US Climate Data - Average weather Rawlins, WY - 82301 - 1981-2010 normals*
[2] *US Climate Data - Average weather Jeffrey City, WY - 82310 - 1981-2010 normals*

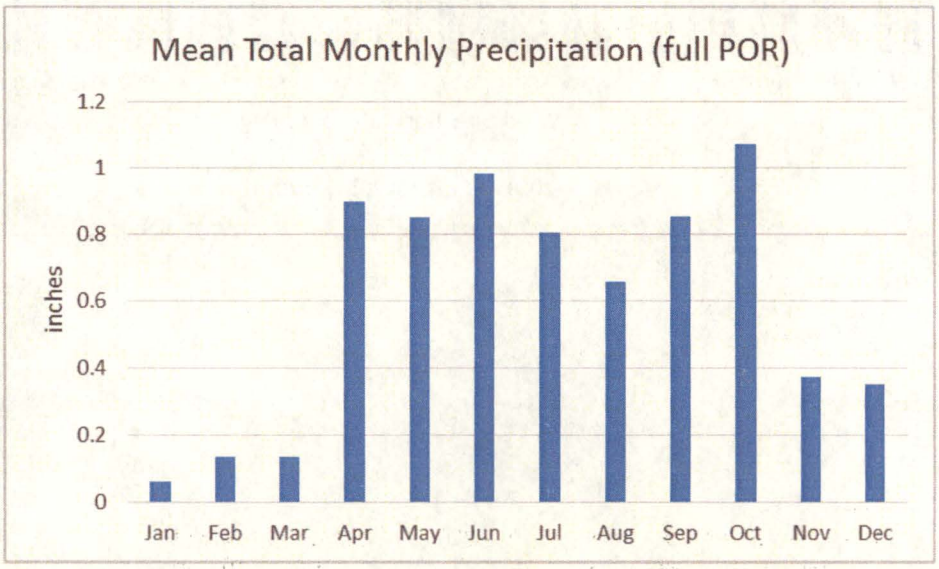
As shown on **Figure 4** below, the monthly precipitation is widely variable.

FIGURE 4



Oddly, the mean total monthly precipitation (**Figure 5**) shows that October has been the wettest month, compared to the original evaluation (see TR Figure 2.5-2b) showing that from 2007-2009, June was the wettest month. However, even though the monthly totals per year are variable, the monthly mean precipitation over the full POR (**Figure 5**) is relatively consistent with the LC precipitation shown on TR Figure 2.5-2b. The local precipitation shows variability compared to regional precipitation (i.e. Rawlins, Jeffrey City) typically for which May is the wettest month overall.

FIGURE 5



Wind Speed and Direction

Wind speed and direction are the primary parameters for determining dispersion of material and are evaluated together categorically. In addition to the wind direction category chart, the data are presented in wind rose format included in **Appendix A**. The data are charted (**Figure 6** and **Figure 7**) and compared by year for the Period of Record:

FIGURE 6

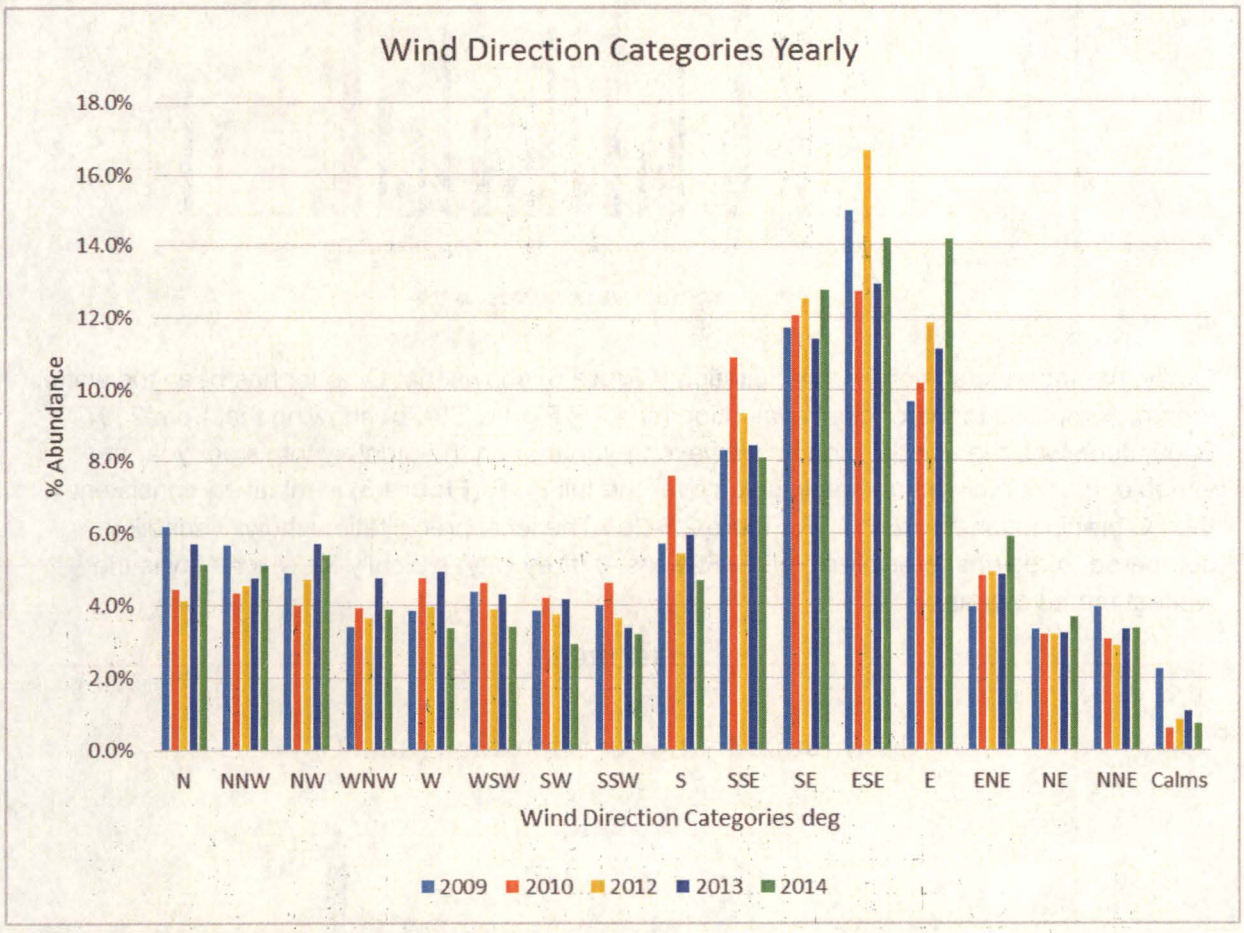
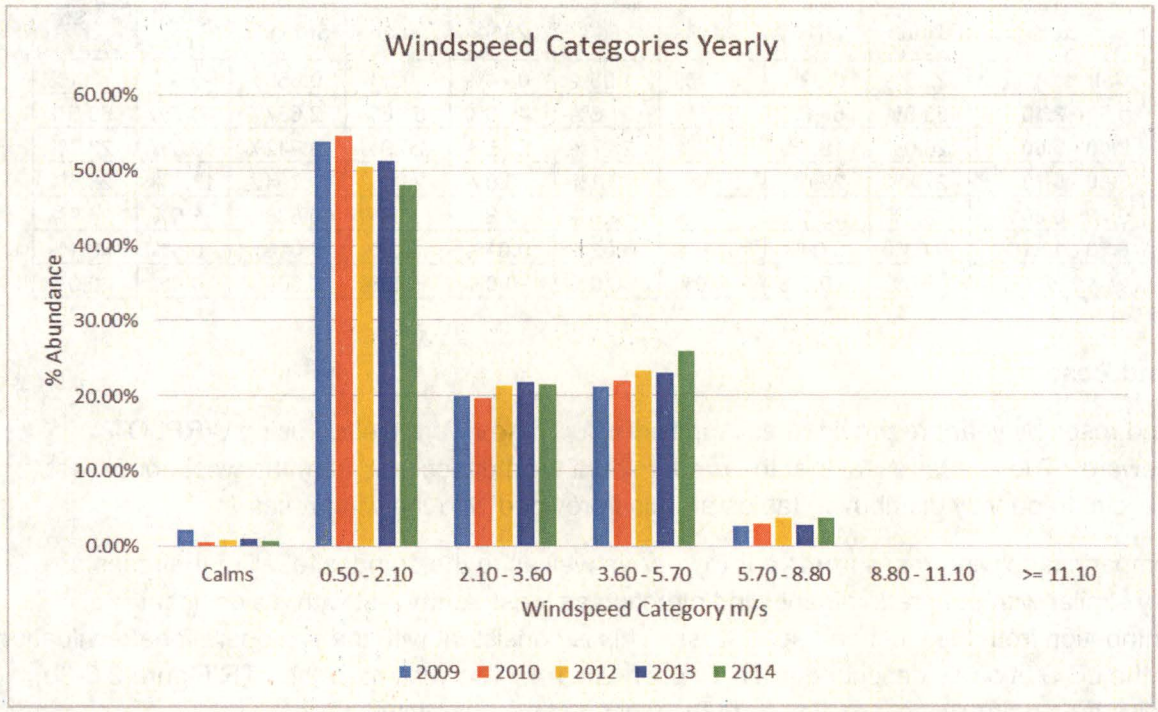


FIGURE 7



Both the wind direction and windspeed category abundances (**Table 3** and **Table 4**) are very similar between years and show little variation.

TABLE 3: Wind Direction Category Abundances (%) per Year

	2009	2010	2012	2013	2014	Mean	Std Dev	-3 Std Dev	+3 Std Dev
N	6.2%	4.4%	4.1%	5.7%	5.1%	5.1%	0.853%	2.6%	7.7%
NNW	5.7%	4.3%	4.5%	4.8%	5.1%	4.9%	0.516%	3.3%	6.4%
NW	4.9%	4.0%	4.7%	5.7%	5.4%	4.9%	0.665%	2.9%	6.9%
WNW	3.4%	3.9%	3.7%	4.7%	3.9%	3.9%	0.497%	2.4%	5.4%
W	3.8%	4.7%	4.0%	4.9%	3.4%	4.2%	0.642%	2.2%	6.1%
WSW	4.4%	4.6%	3.9%	4.3%	3.4%	4.1%	0.469%	2.7%	5.5%
SW	3.8%	4.2%	3.8%	4.1%	2.9%	3.8%	0.505%	2.3%	5.3%
SSW	4.0%	4.6%	3.7%	3.4%	3.2%	3.8%	0.552%	2.1%	5.4%
S	5.7%	7.6%	5.4%	6.0%	4.7%	5.9%	1.078%	2.6%	9.1%
SSE	8.3%	10.9%	9.3%	8.4%	8.1%	9.0%	1.155%	5.5%	12.5%
SE	11.7%	12.0%	12.5%	11.4%	12.8%	12.1%	0.562%	10.4%	13.8%
ESE	15.0%	12.7%	16.7%	12.9%	14.2%	14.3%	1.610%	9.5%	19.1%
E	9.7%	10.2%	11.9%	11.1%	14.2%	11.4%	1.769%	6.1%	16.7%
ENE	4.0%	4.8%	4.9%	4.8%	5.9%	4.9%	0.686%	2.8%	6.9%
NE	3.3%	3.2%	3.2%	3.2%	3.7%	3.3%	0.203%	2.7%	3.9%
NNE	4.0%	3.1%	2.9%	3.4%	3.4%	3.3%	0.398%	2.1%	4.5%
Calms	2.2%	0.6%	0.9%	1.1%	0.7%	1.1%	0.659%	-0.9%	3.1%

TABLE 4: Wind Speed (m/s) Category Abundances (%) per Year

m/s	2009	2010	2012	2013	2014	Mean	Std Dev	-3 Std Dev	+3 Std Dev
Calms	2.25%	0.62%	0.87%	1.08%	0.74%	1.1%	0.659%	-0.9%	3.1%
0.50 - 2.10	53.8%	54.6%	50.5%	51.3%	48.0%	51.6%	2.637%	43.7%	59.5%
2.10 - 3.60	20.0%	19.7%	21.4%	21.7%	21.5%	20.9%	0.942%	18.0%	23.7%
3.60 - 5.70	21.3%	22.0%	23.4%	23.1%	26.0%	23.1%	1.794%	17.7%	28.5%
5.70 - 8.80	2.7%	3.1%	3.8%	2.8%	3.8%	3.3%	0.538%	1.6%	4.9%
8.80 - 11.10	0.03%	0.04%	0.06%	0.02%	0.01%	0.0%	0.018%	0.0%	0.1%
>= 11.10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.000%	0.0%	0.0%

Wind Rose

Wind roses by year are provided as **Appendix A**. Roses were plotted using WRPLOT freeware. The charts reveal that the predominant wind direction is from the west-southwest. The joint frequency distribution tables are also provided with the wind roses.

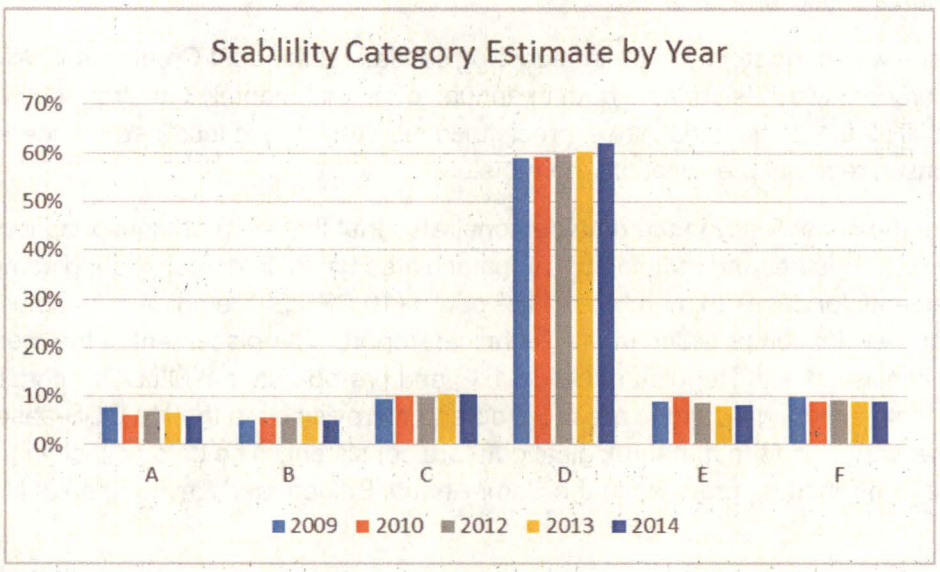
Comparing the wind roses from year to year as well as to the composite, all of the roses are very similar with the predominant wind direction as west-southwest with a significant contribution from the west and southwest. This is consistent with the pre-operational evaluation for the LC Station as described in TR Section 2.5.1.4. The wind rose (see TR Figure 2.5-3b) shows the primary wind direction from the west and west-southwest.

Atmospheric Stability

The atmospheric stability was categorized in to the Pasquill Stability Categories A-E (**Figure 8**) and are based on sigma theta with wind speed adjustments[3] and are displayed as the percent abundance on a yearly basis. The most predominant is Class D which is indicative of relatively stable atmospheric conditions.

[3] *USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, 2000*

FIGURE 8



As shown by the chart, the variation in year-to-year percent abundance for stability is very consistent. The stability is consistent with the classification described in TR Section 2.5.1.4 (see TR Figure 2.5-4). Evaluating the percentages (**Table 5**) statistically show very little variation (i.e. within 3-sigma threshold) between the data sets from year-to-year.

TABLE 5: Stability Category Abundances (%) per Year

	2009	2010	2012	2013	2014	Mean	Std Dev	-3 Std Dev	+3 Std Dev
A	7.5%	6.2%	6.9%	6.6%	5.8%	6.6%	0.7%	4.6%	8.6%
B	5.1%	5.6%	5.6%	5.8%	5.0%	5.4%	0.3%	4.4%	6.4%
C	9.5%	10.1%	10.0%	10.4%	10.3%	10.1%	0.4%	9.0%	11.2%
D	59.0%	59.2%	59.9%	60.4%	62.0%	60.1%	1.2%	56.5%	63.7%
E	8.8%	9.9%	8.6%	7.9%	8.1%	8.7%	0.8%	6.3%	11.0%
F	10.0%	9.0%	9.1%	8.9%	8.9%	9.2%	0.5%	7.8%	10.6%

CONCLUSION

A valid POR was established and the data were compared from year-to-year as well as to the initial baseline evaluation for the original permit application. The consistency in five years of meteorological data should provide conclusive evidence that the data collected is representative of long-term conditions at the Lost Creek ISR Project site without resorting to the tedious process of statistically comparing one or more years of onsite data to long-term data collected

from an off-site weather station. Moreover, the stability of data confirms the suitability of the siting of the data collection station.

The only issue with consistency in the meteorological data at the Lost Creek site is with the precipitation record which is variable both in annual totals and monthly total from year-to-year. As stated in TR 2.5.1.2, the variability in precipitation is likely due to localized thunderstorms and variations in regional precipitation and moisture.

Furthermore, the consistency in the data demonstrates that the siting of monitoring locations for radon, gamma exposure, and radiological air particulates useful in demonstrating compliance with requirements for doses to members of the public (10 CFR 20) remains valid as established in the baseline evaluation provided in the Technical Report. The placement of the monitoring locations is consistent with Regulatory Guide 4.14 and pre-operational MILDOS modeling. No adjustments to monitoring locations are required and no revisions to the MILDOS-based monitor siting is necessary since the meteorological data are consistent. The data collection process will continue with reporting provided in the Semi-Annual Effluent and Environmental Monitoring Report.

APPENDIX A

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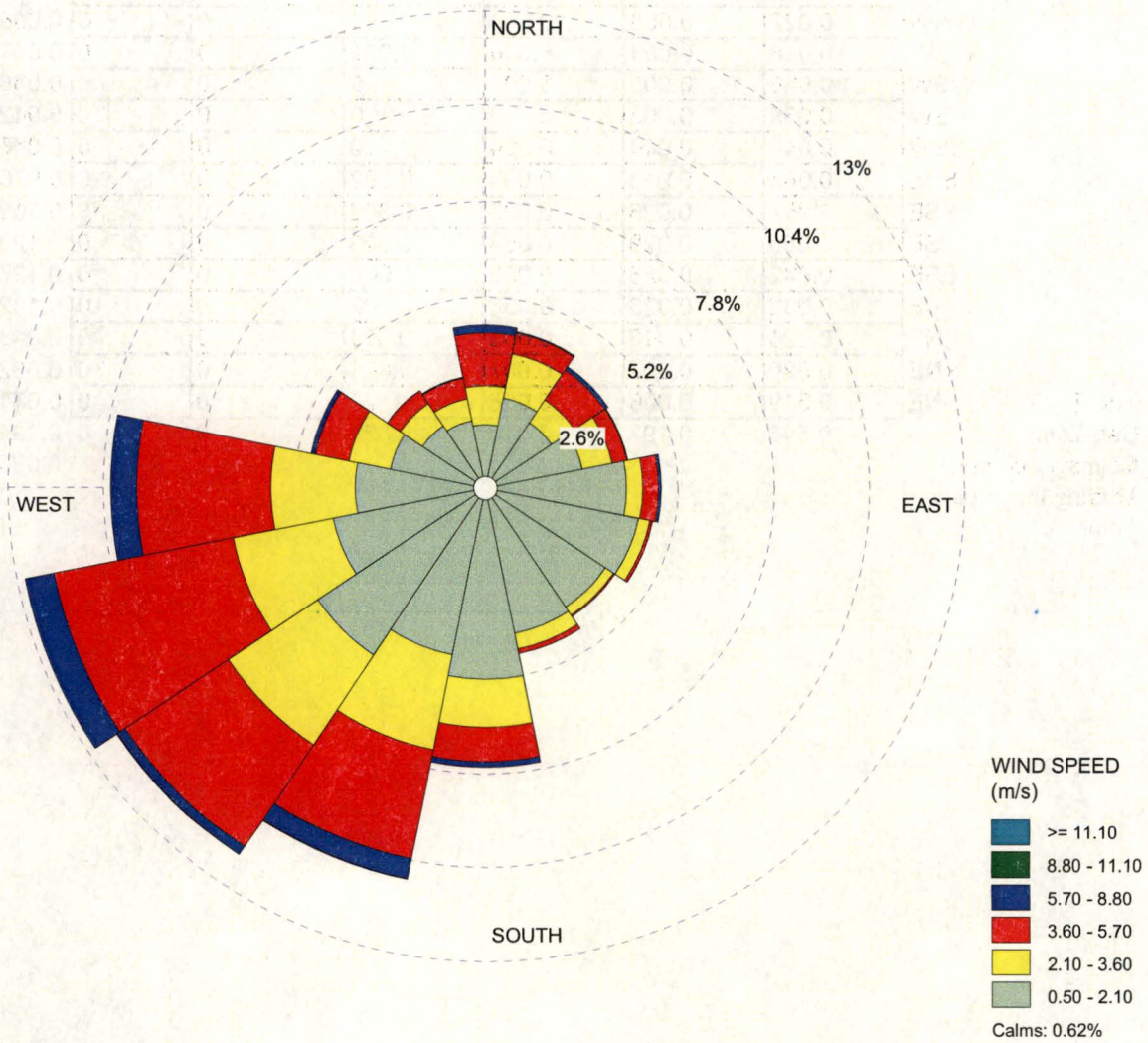
WIND ROSE PLOT: **Station**
Lost Creek

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2010	**Start Date: 1/1/2010 - 00:00** **End Date: 12/29/2010 - 16:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS: **0.62%**	TOTAL COUNT: **8691 hrs.**	
	AVG. WIND SPEED: **2.49 m/s**	DATE: **10/11/2017**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

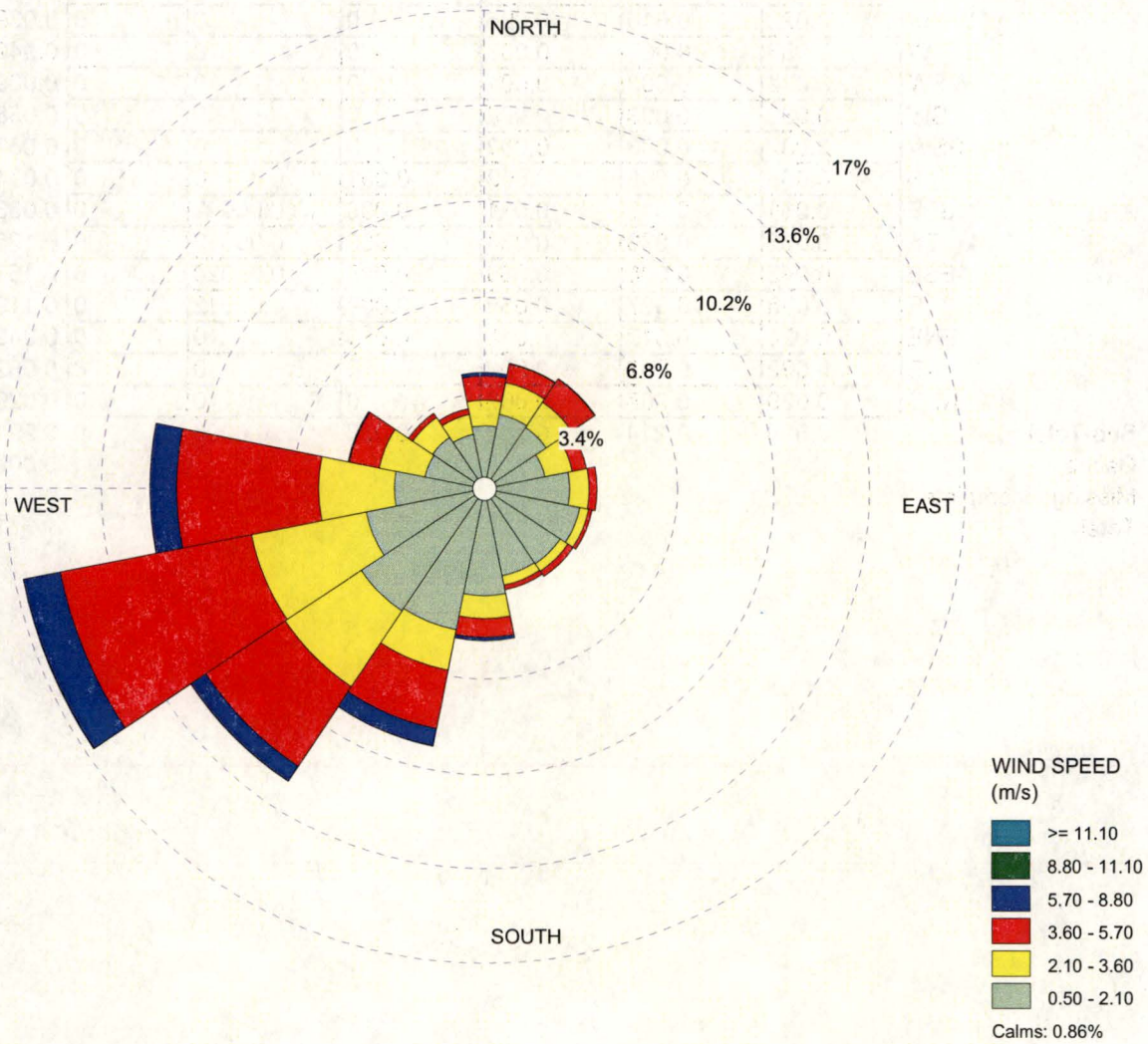
2009		**Wind Classes (m/s)**						
Directions		0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
	N	0.026	0.017	0.018	0.001	0	0	0.062
	NNW	0.029	0.014	0.011	0.003	0	0	0.057
	NW	0.029	0.009	0.011	0.001	0	0	0.049
	WNW	0.023	0.007	0.004	0	0	0	0.034
	W	0.033	0.003	0.002	0	0	0	0.038
	WSW	0.041	0.003	0	0	0	0	0.044
	SW	0.036	0.002	0.001	0	0	0	0.038
	SSW	0.036	0.003	0.001	0	0	0	0.040
	S	0.041	0.010	0.004	0.001	0	0	0.057
	SSE	0.045	0.018	0.018	0.001	0	0	0.083
	SE	0.052	0.033	0.030	0.002	0	0	0.117
	ESE	0.045	0.035	0.059	0.011	0	0	0.150
	E	0.031	0.023	0.037	0.005	0	0	0.097
	ENE	0.022	0.011	0.006	0	0	0	0.040
	NE	0.024	0.006	0.003	0	0	0	0.033
	NNE	0.024	0.007	0.007	0.001	0	0	0.040
Sub-Total		0.538	0.200	0.213	0.027	0	0	0.978
Calms								0.022
Missing/Incomplete								0
Total								1

WIND ROSE PLOT: **Station**

Lost Creek

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2012	**Start Date: 1/1/2012 - 00:00** **End Date: 12/31/2012 - 23:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS: **0.86%**	TOTAL COUNT: **8209 hrs.**	
	AVG. WIND SPEED: **2.64 m/s**	DATE: **9/22/2017**	PROJECT NO.:

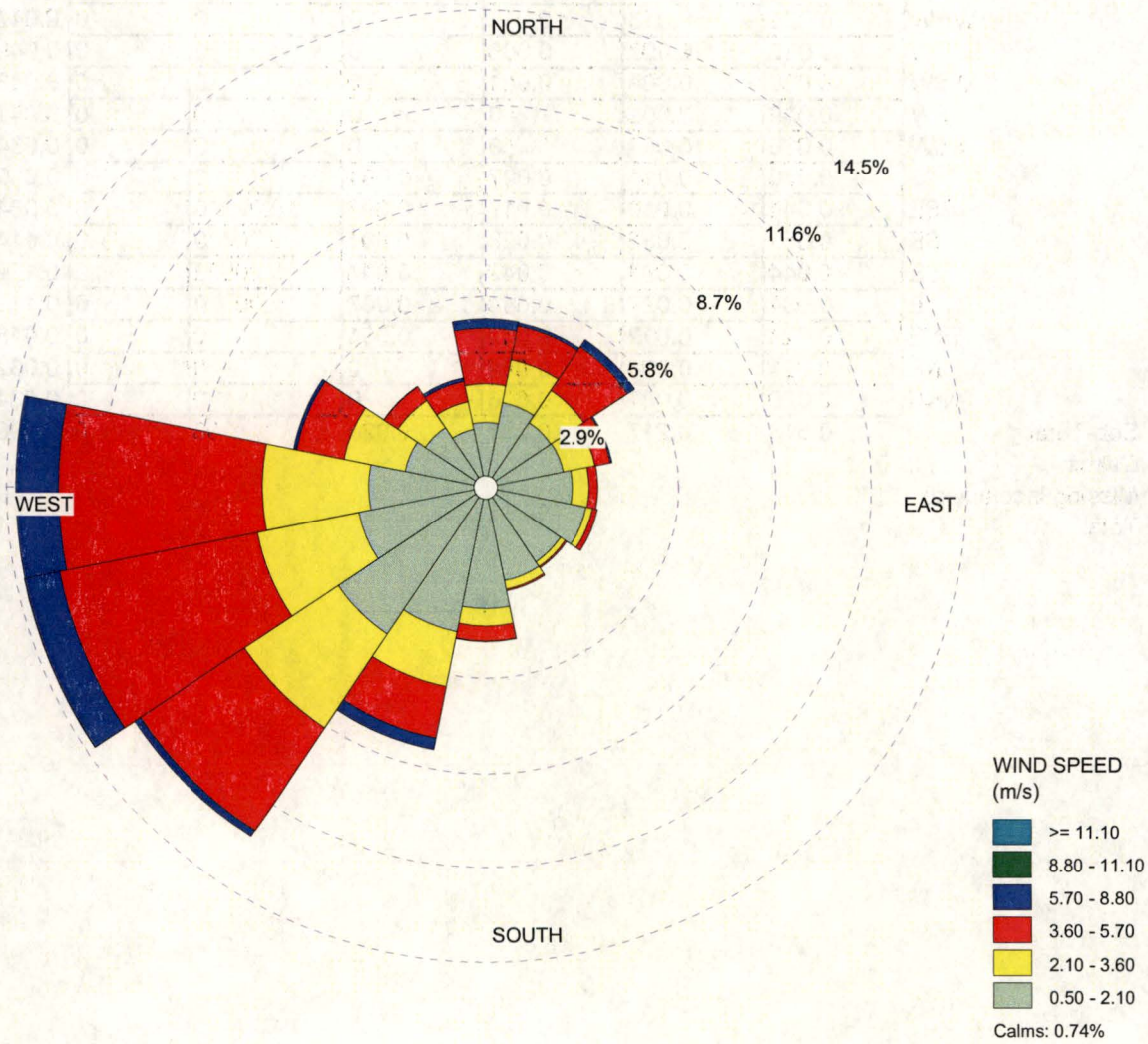
WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

2010	**Wind Classes (m/s)**						
Directions	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
N	0.017	0.011	0.014	0.002	0	0	0.044
NNW	0.025	0.012	0.006	0	0	0	0.043
NW	0.022	0.007	0.010	0.001	0	0	0.040
WNW	0.027	0.008	0.004	0	0	0	0.039
W	0.038	0.004	0.004	0.001	0	0	0.047
WSW	0.042	0.003	0.001	0	0	0	0.046
SW	0.039	0.003	0	0	0	0	0.042
SSW	0.040	0.004	0.001	0	0	0	0.046
S	0.052	0.013	0.009	0.002	0	0	0.076
SSE	0.046	0.026	0.031	0.006	0	0	0.109
SE	0.055	0.029	0.034	0.003	0	0	0.120
ESE	0.042	0.028	0.050	0.008	0	0	0.127
E	0.035	0.023	0.036	0.007	0	0	0.102
ENE	0.026	0.012	0.009	0.001	0	0	0.048
NE	0.020	0.007	0.004	0	0	0	0.032
NNE	0.019	0.006	0.006	0	0	0	0.031
Sub-Total	0.546	0.197	0.220	0.031	0	0	0.994
Calms							0.006
Missing/Incomplete							0
Total							1

WIND ROSE PLOT: **Station**
Lost Creek

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2013	**Start Date: 1/1/2014 - 00:00** **End Date: 12/31/2014 - 23:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS: **0.74%**	TOTAL COUNT: **8026 hrs.**	
	AVG. WIND SPEED: **2.69 m/s**	DATE: **9/22/2017**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

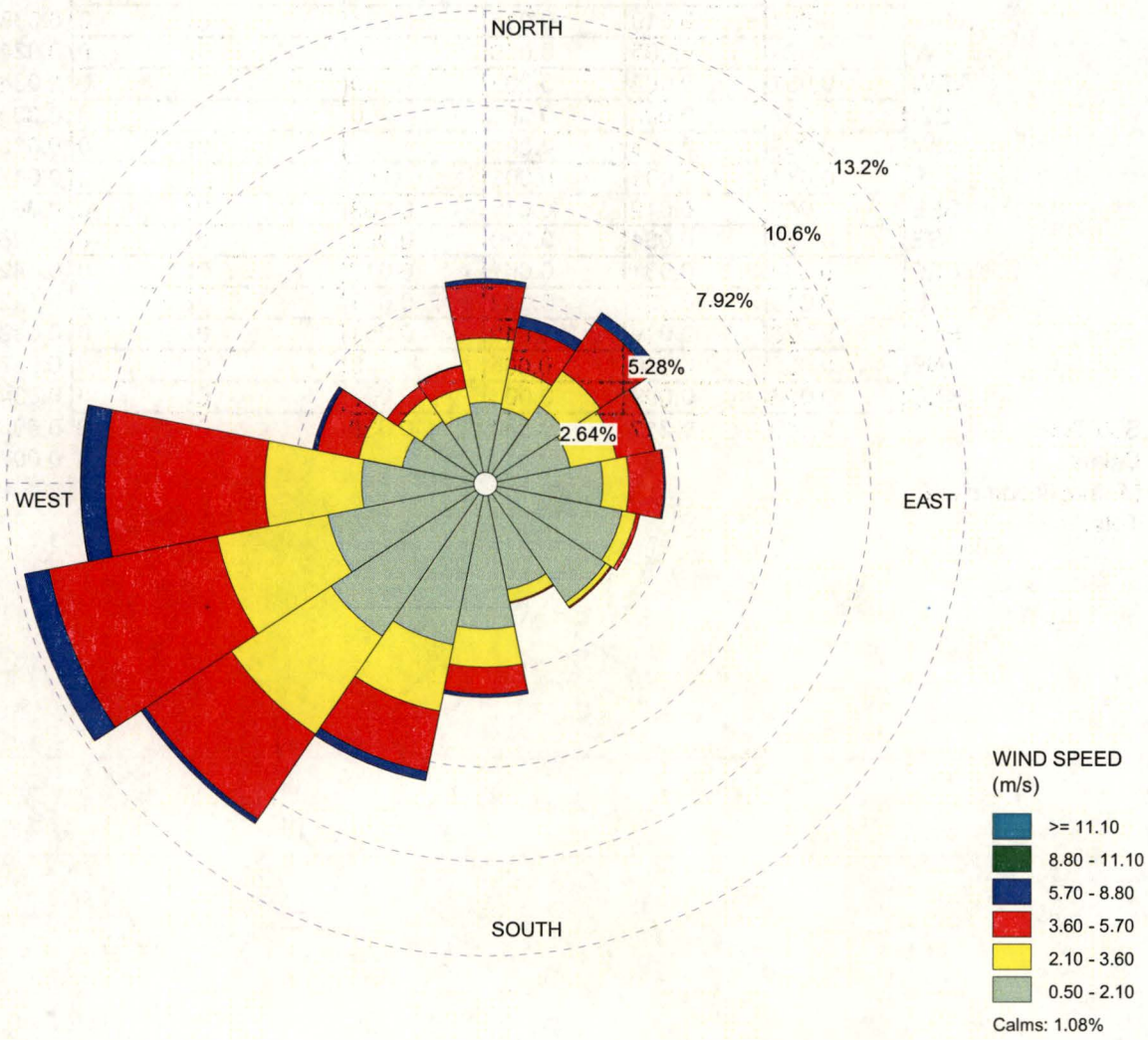
2012	Wind Classes (m/s)						
Directions	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
N	0.022	0.009	0.009	0.001	0	0	0.041
NNW	0.027	0.011	0.007	0	0	0	0.045
NW	0.026	0.011	0.010	0	0	0	0.047
WNW	0.022	0.010	0.005	0	0	0	0.037
W	0.030	0.007	0.003	0	0	0	0.040
WSW	0.034	0.003	0.001	0	0	0	0.039
SW	0.032	0.003	0.002	0	0	0	0.038
SSW	0.032	0.003	0.002	0	0	0	0.037
S	0.038	0.008	0.007	0.001	0	0	0.054
SSE	0.051	0.015	0.021	0.006	0.00012	0	0.093
SE	0.052	0.033	0.034	0.006	0.00012	0	0.125
ESE	0.043	0.041	0.069	0.013	0.00024	0	0.167
E	0.032	0.027	0.050	0.009	0.00012	0	0.119
ENE	0.021	0.017	0.011	0	0	0	0.049
NE	0.022	0.008	0.002	0	0	0	0.032
NNE	0.020	0.007	0.002	0	0	0	0.029
Sub-Total	0.505	0.214	0.234	0.038	0.0006	0	0.991
Calms							0.009
Missing/Incomplete							0
Total							1

WIND ROSE PLOT: **Station**

Lost Creek

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
2014	**Start Date: 1/1/2013 - 00:00** **End Date: 12/31/2013 - 23:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS: **1.08%**	TOTAL COUNT: **8249 hrs.**	
	AVG. WIND SPEED: **2.55 m/s**	DATE: **9/22/2017**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

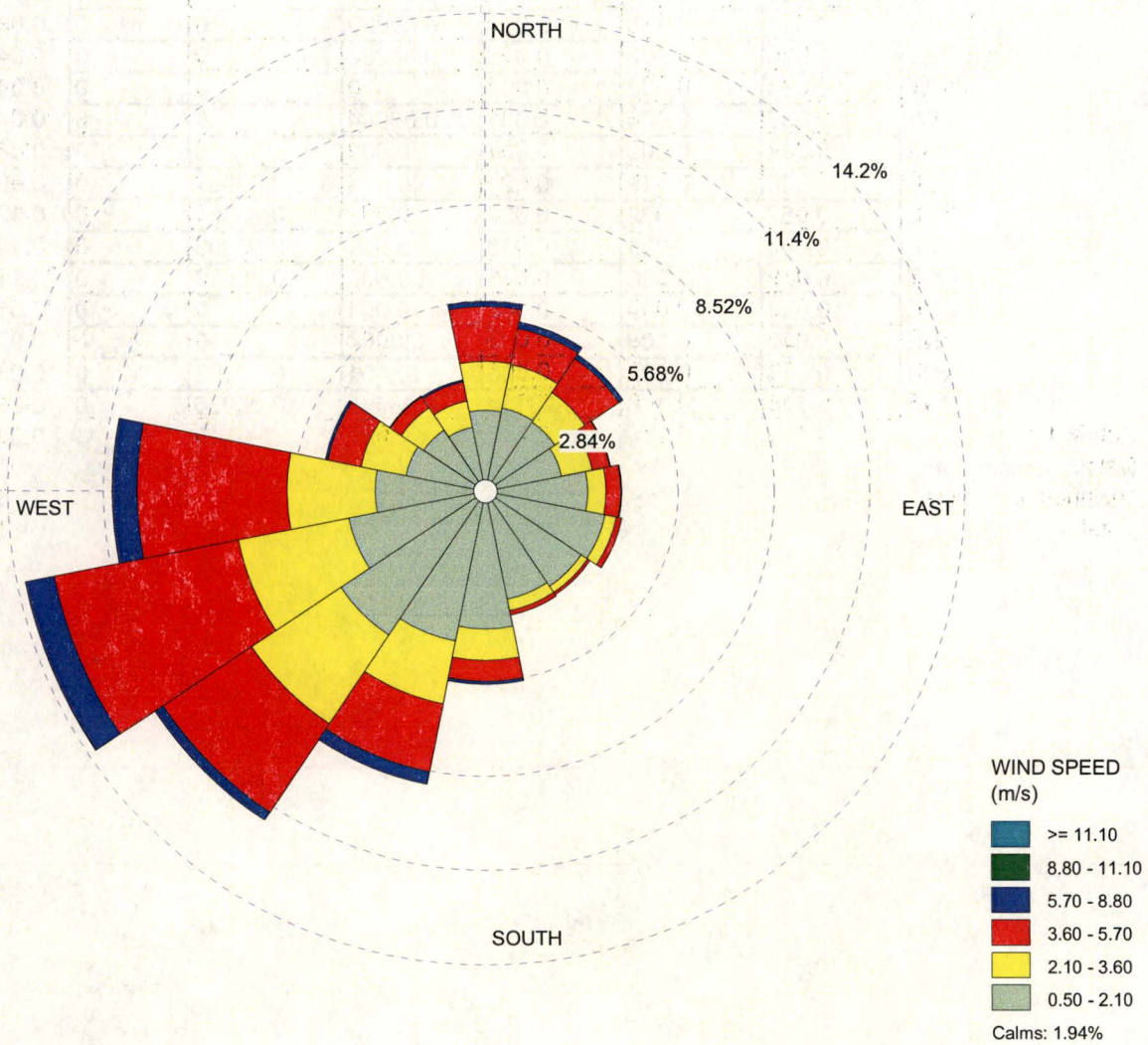
2013		**Wind Classes (m/s)**						
Directions		0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
	N	0.023	0.018	0.015	0.001	0	0	0.057
	NNW	0.021	0.011	0.012	0.003	0	0	0.048
	NW	0.026	0.012	0.016	0.003	0	0	0.057
	WNW	0.024	0.013	0.011	0	0	0	0.047
	W	0.032	0.007	0.009	0	0	0	0.049
	WSW	0.038	0.004	0.001	0	0	0	0.043
	SW	0.039	0.002	0	0	0	0	0.041
	SSW	0.030	0.004	0	0	0	0	0.034
	S	0.040	0.011	0.007	0.001	0	0	0.060
	SSE	0.046	0.019	0.017	0.003	0	0	0.084
	SE	0.051	0.033	0.028	0.001	0	0	0.114
	ESE	0.044	0.031	0.047	0.007	0	0	0.129
	E	0.034	0.027	0.044	0.007	0	0	0.111
	ENE	0.023	0.012	0.012	0.001	0	0	0.048
	NE	0.021	0.008	0.004	0	0	0	0.032
	NNE	0.020	0.007	0.006	0	0	0	0.034
Sub-Total		0.513	0.217	0.231	0.028	0	0	0.989
Calms								0.011
Missing/Incomplete								0
Total								1

WIND ROSE PLOT: **Station**

Lost Creek

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Composite for Period of Record (2009-2010, 2012-2014)	**Start Date: 1/1/2009 - 00:00** **End Date: 12/31/2015 - 23:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS:	TOTAL COUNT:	
	1.94%	**55935 hrs.**	
	AVG. WIND SPEED:	DATE:	PROJECT NO.:
	2.54 m/s	**11/14/2017**	

WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

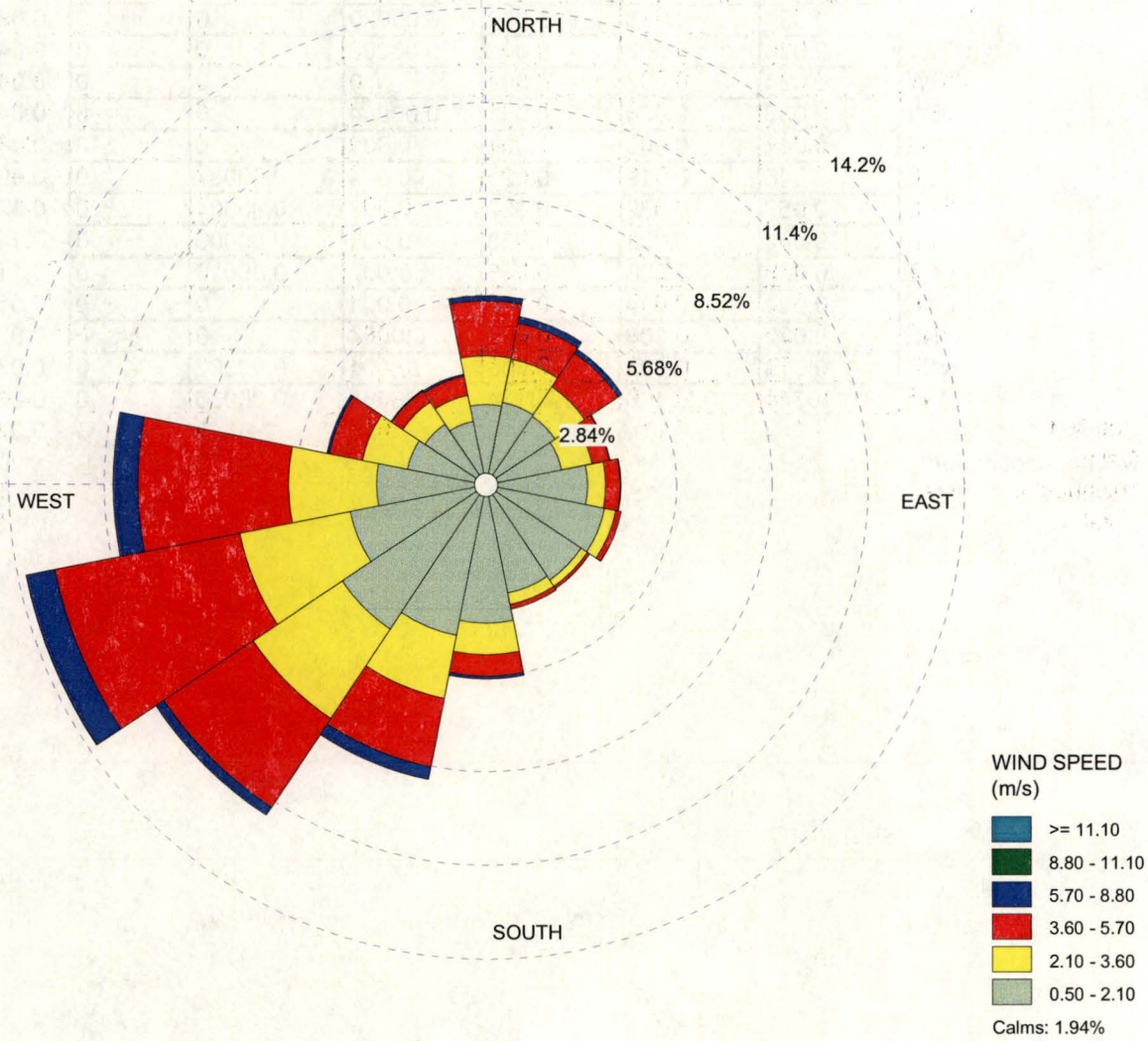
2014	**Wind Classes (m/s)**						
Directions	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
N	0.020	0.012	0.017	0.003	0	0	0.051
NNW	0.026	0.013	0.010	0.001	0	0	0.051
NW	0.024	0.012	0.016	0.002	0	0	0.054
WNW	0.024	0.010	0.005	0.001	0	0	0.039
W	0.026	0.005	0.003	0	0	0	0.034
WSW	0.031	0.002	0.002	0	0	0	0.034
SW	0.027	0.002	0.001	0	0	0	0.029
SSW	0.029	0.003	0.001	0	0	0	0.032
S	0.037	0.005	0.005	0	0	0	0.047
SSE	0.045	0.017	0.016	0.004	0	0	0.081
SE	0.053	0.034	0.038	0.002	0	0	0.128
ESE	0.039	0.031	0.061	0.011	0	0	0.142
E	0.035	0.032	0.062	0.013	0	0	0.142
ENE	0.025	0.019	0.015	0.001	0	0	0.059
NE	0.022	0.010	0.005	0	0	0	0.037
NNE	0.018	0.009	0.006	0.001	0	0	0.034
Sub-Total	0.480	0.215	0.260	0.038	0	0	0.993
Calms							0.007
Missing/Incomplete							0
Total							1

WIND ROSE PLOT: **Station**

Lost Creek

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Composite for Period of Record (2009-2010, 2012-2014)	**Start Date: 1/1/2009 - 00:00** **End Date: 12/31/2015 - 23:00**	Lost Creek ISR, LLC	
		MODELER:	
	CALM WINDS: **1.94%**	TOTAL COUNT: **55935 hrs.**	
	AVG. WIND SPEED: **2.54 m/s**	DATE: **11/14/2017**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Joint Frequency Distribution
Lost Creek ISR Project

POR Composite Directions	Wind Classes (m/s) 0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
N	0.024	0.015	0.016	0.002	0	0	0.06
NNW	0.025	0.013	0.011	0.002	0.00002	0	0.05
NW	0.025	0.011	0.012	0.001	0	0	0.05
WNW	0.023	0.009	0.005	0.00021	0	0	0.04
W	0.030	0.005	0.004	0.00020	0	0	0.04
WSW	0.036	0.003	0.002	0.00002	0	0	0.04
SW	0.034	0.002	0.001	0	0	0	0.04
SSW	0.033	0.004	0.001	0.00004	0	0	0.04
S	0.041	0.009	0.006	0.001	0	0	0.06
SSE	0.046	0.019	0.021	0.004	0.00007	0	0.09
SE	0.052	0.032	0.032	0.003	0.00004	0	0.12
ESE	0.041	0.033	0.056	0.009	0.00009	0	0.14
E	0.033	0.026	0.045	0.007	0.00013	0	0.11
ENE	0.024	0.014	0.010	0.001	0	0	0.05
NE	0.022	0.008	0.004	0.0004	0	0	0.03
NNE	0.019	0.008	0.006	0.001	0.00002	0	0.03
Sub-Total	0.50741	0.21116	0.23114	0.03055	0.00036	0	0.98
Calms							0.02
Missing/Incomplete							0
Total							1