



**FREEPORT-McMoRAN
OIL & GAS**

METEOROLOGICAL STATION 2013 ANNUAL REPORT

**Inglewood Oil Field
Meteorological Station
Annual Audit and Data Validation**

Baldwin Hills CSD Condition E.2.j

June 2014

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1.0 INTRODUCTION

1.1 BACKGROUND, CSD CONDITIONS

Freeport-McMoRan Oil & Gas (FMOG), formerly PXP, installed and operate a Meteorological Station at the Inglewood Oil Field. Installation and operation of the station is a requirement of the Baldwin Hills Community Standards District (CSD). The station design was approved by the South Coast Air Quality Management District (SCAQMD) that has authority over air quality in the South Coast Air Basin. The SCAQMD approval was provided to the Los Angeles County Regional Planning Division, who oversees implementation of the CSD.

The CSD Section E.2.j states:

“j. Meteorological Station. The operator shall maintain and operate a meteorological station at the oil field in good operating condition and in compliance with all applicable Environmental Protection Agency ("EPA") and SCAQMD rules, regulations, and guidelines, and to the satisfaction of the director. The operator shall conduct an audit of the meteorological station on an annual basis and submit the results of the audit to the SCAQMD and the director. The operator shall maintain the data files for the meteorological station for a period of not less than 10 years. All such data shall be available upon request to the SCAQMD and the director.”

The CSD Section L.2.d further defines the schedule for the project:

“d. Meteorological Station. Within 120 days following the effective date, or at such later date as may be approved by the director for good cause shown, the operator shall submit to the SCAQMD a design for the installation of a meteorological station at the oil field that shall meet all the requirements of the United States Environmental Protection Agency ("EPA") guidelines on meteorological data as outlined in EPA Publication "Meteorological Monitoring Guidance for Regulatory Modeling Applications" (EPA-454/R-99-005) as published in February 2000. The operator shall take such actions as may be necessary to promptly secure SCAQMD approval of such design. The meteorological station shall be installed and fully operational within 180 days of receipt of approval of the design from the SCAQMD, or at such later date as may be approved by the director for good cause shown.”

1.2 PURPOSE OF THE METEOROLOGICAL STATION

Meteorological data from the West Los Angeles station for 1981 was used in the preparation of the health risk assessment (HRA) for the Baldwin Hills CSD Environmental Impact Report (EIR), in conjunction with the five-year (1985-1989) meteorological dataset from Los Angeles International Airport inherent to the Hotspots Analysis and Reporting Program (HARP) Model . FMOG’s meteorological station collects data representative of the local conditions at the oil field, so that after a five-year period a determination can be made if the oil field meteorological conditions are significantly different warranting a rerun of the HRA, per the CSD Condition E.2.k:

“k. Updated Health Risk Assessment. After every five years of operation of the meteorological station, the operator shall provide the previous five years of meteorological data to the SCAQMD and the director. If the SCAQMD or the director determines that the previous five years of meteorological data from the oil field could result in significant changes to the health risk assessment that was conducted as part of the Baldwin Hills Community Standards District Environmental Impact Report, then the county may elect to re-run the health risk assessment using the previous five years of meteorological data from the meteorological station.”

The purpose of the Meteorological Station is therefore two-fold:

1. To provide local representative wind speed and direction data in order to efficiently and effectively resolve potential odor complaints; and,
2. To collect representative data to determine if Inglewood Oil Field meteorological conditions are significantly different warranting a re-run of the HRA performed for the Baldwin Hills CSD EIR.

1.3 COMPLIANCE

The required Meteorological Station design was submitted to the County and the SCAQMD on March 25, 2009, which was within the CSD required deadline of 120 days of the CSD effective date. The design of the station is compliant with the United States Environmental Protection Agency (EPA) guidelines on meteorological data as outlined in EPA Publication "Meteorological Monitoring Guidance for Regulatory Modeling Applications" (EPA-454/R-99-005, February 2000). The station design was approved by the County and the SCAQMD on July 21, 2009.

The station was installed per the approved design, including the sensor sensitivities and accuracies. The station was fully operational within the CSD deadline: within 180 days after the approval of the design. The station installation started at the end of December 2009 and the station operation and meteorological data collection in full compliance started on Jan. 21, 2010.

The station collects the necessary data to enable preparation of a field-specific HRA, if a rerun of the EIR HRA is determined necessary as discussed above. The primary meteorological parameters that are measured by FMOG's meteorological station, per the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV (1995), are as follows:

- Wind speed (horizontal);
- Wind direction;
- Temperature
- Temperature difference (delta temperature); and,
- Solar radiation.

This report presents the required annual audit and data analysis per the CSD Section E.2.j requirements, for the data collected during 2013, the fourth year of the station operation.

2.0 METEOROLOGICAL STATION INSTALLATION & OPERATION

2.1 METEOROLOGICAL STATION LOCATION AND INSTRUMENTATION



Figure 1
Meteorological
Station at
Inglewood Oil Field

The station is comprised of a 10-meter (33 feet) tall tower, with meteorological sensors mounted on the tower, and a data logger at the base. Figure 1 shows a photo of the meteorological station in April 2010.

The meteorological station is located on the well pad of well #129 on Vickers Lease (see the maps on Figure 2 “Field view” and Figure 3 “Close-up view”). Geographic Coordinates of the station are 34° 00’ 32.00”N, 118° 22’ 43.30” W. The location is at an elevation of 122 meters (400 ft) above sea level, is free from vegetation, and is over 100 m (330 feet) away from the closest obstruction. The distance from the nearest obstruction meets the EPA requirement that the station is at least 10 times the height of the closest obstruction.

The station tower is mounted on a secure foundation and equipped with a lightning rod grounding system. The tower is specifically designed to support meteorological instruments. The station is powered from the grid. The sensors are secured to the station tower with mounting arms specifically designed to support meteorological instruments.

There are five required sensors mounted on the station tower:

- one wind direction sensor,
- one wind speed sensor,
- two temperature sensors to measure ambient temperature and temperature difference (delta temperature) at 2 meters and 10 meters, and
- one solar radiation sensor.

The two temperature sensors are shielded from direct sun with air-aspirated shields. These shields prevent heating of the temperature sensors by direct sun exposure and thus distorting the actual temperature measurement.

2.2 METEOROLOGICAL STATION OPERATION AND MAINTENANCE

The 2013 data was reviewed on a monthly basis for correct ranges, orders of magnitude, gaps, and that it was being continuously recorded.

Throughout 2013, the EHS Department conducted regular visual inspections for the following parameters:

- proper rotation (no noise or off-center rotation) of the wind anemometer and wind direction vane,
- that there are no obstructions to the sensors, and
- overall cleanliness and orderly appearance of the instruments, tower, and data logger.

FMOG maintains identical sensor duplicates for each of the sensors installed on the station. This is done so that when it is time for the scheduled calibration, an identical calibrated sensor can be installed quickly, while the one that needs to be calibrated is sent to the vendor facility. A FMOG technician is assigned to maintain the station and the instruments.

Met One Instruments Inc. (Met One), the vendor who provided the station and its instruments, will be contacted if a sensor needs maintenance or repair. Met One also calibrates the sensors, in their specialized laboratory. The vendor specified that calibration is recommended every 12 months of use. FMOG follows the recommended schedule. The sensors were replaced with newly calibrated sensors in November 2013, and the sensors that were in use were sent to the vendor for re-calibration. The next calibration is scheduled for November 2014 per the vendor's recommendation.

FMOG maintains logs of all meteorological station events, as follows. The EHS Department maintains a log of sensor malfunctions (none in 2013), repairs (none in 2013), maintenance (none in 2013), and calibration events (November 19th, 2013), including shipments to the vendor for calibration, as required.

2.3 DATA COLLECTION, ANALYSIS AND ARCHIVING

Data from the sensors is transmitted to a datalogger mounted at the base of the tower. The datalogger is located in a weatherproof case, equipped with a lock for security and to prevent data tampering. The datalogger computes and records hourly averages from all the station sensors. The data stored in the data logger is transmitted to the FMOG computer system in real time, via the radio system available at the Inglewood Oil Field. Therefore, the collected meteorological data can be viewed in real time by the facility operators in the control room or the EHS personnel on an office computer. Additionally, the data can be transferred directly from the data logger to a laptop computer at the tower and then transferred to a different data storage means.

During January through December 2013, the assigned FMOG personnel looked at the met station real time data daily and visually checked for proper operation and any anomalies (zero readings, power outages, too high or too low points or out of normal range data points). Every month, the data was reviewed for anomalies and out-of-range or missing data by an independent contractor (InterAct). Any missing or anomalous data was flagged. The wind speed and seasonal wind direction data was also plotted as wind roses (see Attachment 2).

The data stored in the data logger is retrieved on a regular basis. This is done to ensure that the data logger memory does not fill up and start recording over the earlier recorded and unretrieved data. A software package compatible with the station data logger is used to interface with the data logger. The software allows the meteorological data to be viewed, evaluated, printed, and exported in comma-separated values (CSV) format, which is accessible via Microsoft Excel software. When data is received from the datalogger in real time remotely, the software automatically collects the data from the station, and stores averaged hourly values from each meteorological instrument in a database. This enables the data to be viewed at any time and used to generate various meteorological charts and graphs from the collected data.

The data collected is sent to an off-site storage and back-up on a monthly basis, to prevent accidental deletion or damage. This data will be stored for a period of five years. After the first five years, the data will be evaluated and compared with the AQMD West Los Angeles and LAX meteorological stations data to determine if the HRA re-run is warranted. The overall storage time of the collected data will be 10 years from the collection time.

3.0 ANALYSIS OF DATA COLLECTED IN 2013

Meteorological data was collected from January 1 to December 31, 2013. The data points that were flagged on a monthly basis throughout the year were reviewed in more detail. At the end of the year, the collected data was analyzed for errors and inconsistencies per the EPA specifications on meteorological data validation.

3.1 DATA VALIDATION TECHNIQUES

The data was also compared to the AQMD's meteorological contractor T&B Systems data from a station located at the Los Angeles Airport (LAX) and available on the Internet at <http://tbsys.serveftp.net/tbsysnet/pamsdata.htm>; this set of data was QAQC'ed and recommended for use in the FMOG data validation effort by Kevin Durkee of the AQMD. The AQMD LAX data set for 2013 is from 1/1/13 to 12/31/13

Data validation was performed per the EPA's Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements (1995). The method included

- evaluating minimum, maximum and average for the whole data set for each meteorological parameter
- plotting the data versus time and looking for anomalies, data outliers such as too high or too low values, "no-activity", zero data, unusual spikes, unusual inactivity or repeated data for prolonged time periods, etc.
- comparisons with the upper and/or lower limit on the allowed data ranges, normal changes/variations in parameters, see Attachment 1 for the details on the various data validation techniques
- plotting wind roses and comparing with wind roses from other weather stations in Los Angeles area, see Attachment 2
- comparison with the validated/QCQA'ed data for the same period of time from the AQMD meteorological station which is located near LAX (T&B Systems).

3.2 DATA GAPS AND ANOMALIES

Using the techniques described above, several data gaps and anomalies were identified in the 2013 data, see Table 1 for the summary of the data gaps.

Overall the data has fewer than 10% gaps, erroneous or missing data. There were several power outages throughout the year when all sensors were not operational and did not record data. After the power outages, several sensors were showing out of range data, these data points were deleted. In several instances (see Table 1) sensors were showing out of range data, these values were deleted.

The anomalous data values were discarded, with the location in the data sheet flagged. For the solar radiation missing data or data that was above zero at night – the night data was filled in with zeros. Table 1 summarizes the identified data gaps and anomalies.

Table 1 Summary of 2013 Data Anomalies and Gaps

| Gap/Anomaly date, time | Data description | Action on the station or data |
|---|---|---|
| 1/25 and 2/5; 10:00–18:00 (10am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to SCAQMD data and kept as valid. |
| 2/8; 14:00–15:00 (2pm-3pm) | Wind speed of 74.0 was considered an error (too high). | Discarded |
| 2/11; 8:00 (8am) | Wind speed of 75.4 was considered an error (too high). | Discarded |
| 2/11; 13:00 (1pm) | Wind speed of 39.6 was considered an error (too high). | Discarded |
| 2/15; 5:00 (5am) | Delta Temperature of 4.37 considered an error (too high). | Noted as possibly anomalous, but kept as valid. |
| 2/19; 8:00–16:00 (8am to 4pm) | Low solar radiation, possibly a cloudy day. | Compared to SCAQMD data and considered an error, discarded |
| 3/13; 7:00 (7am) | Delta Temperature of 4.04 considered an error (too high). | Noted as possibly anomalous, but kept as valid. |
| 3/31; 10:00–15:00 (10am to 3pm) | Low solar radiation, possibly a cloudy day. | Compared to SCAQMD data and considered an error, discarded |
| 4/6; 16:00 (4pm) | Wind speed of 30 mph considered an error (too high). | Compared to AQMD data and kept |
| 4/13; 08:00–18:00 (8am to 6pm) | Low solar radiation, possibly a cloud day. | Compared to AQMD data and kept |
| 4/16; 15:00 – 17:00 (3-5pm) | Wind speed of 28 mph considered an error (too high). | Compared to AQMD data and kept |
| 4/23; 14:00–16:00 (2pm to 4pm) | Delta Temps. of -4.81, -4.71 & -4.48 considered an error (too low). | Noted as possibly anomalous, but kept as valid. |
| 4/24; 09:00–18:00 (9am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 5/6; 7:00–18:00 (7am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to SCAQMD data and considered an error, data discarded |
| 7/11; 7:00–19:00 (7am to 7pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 7/21; 7:00–19:00 (7am to 7pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 8/30; 11:00–12:00 (11am to 12pm) | High average temperature of 90.0 considered an error (too high). | Compared to regional high temperatures and kept as valid. |
| 8/31; 3:00 (3am) | Wind speed of 61.9 was considered an error (too high). | Discarded |
| 9/20; 7:00–18:00 (7am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 9/26; 15:00–16:00 (3– | Wind speed at 22 mph | Similar in SCAQMD data, kept |

| Gap/Anomaly date, time | Data description | Action on the station or data |
|--|---|---|
| 5pm) | | |
| 10/1; 9:00 (9am) | Wind speed of 79.4 was considered an error (too high). | Discarded |
| 10/9; 7:00–18:00 (7am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 11/12; 8:00–18:00 (8am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 11/29; 8:00–18:00 (8am to 6pm) | Low solar radiation, possibly a cloudy day. | Compared to AQMD data and kept |
| 12/11; 1:00 (1am) | Wind speed of 73.9 was considered an error (too high). | Discarded |
| 12/11; 4:00 (4am) | Wind speed of 96.5 was considered an error (too high). | Discarded |
| 12/12; 15:00 (3pm) | Wind speed of 67.7 was considered an error (too high). | Discarded |
| 12/25; 13:00 (1pm) | Wind speed of 42.9 was considered an error (too high). | Discarded |
| 2/8; 14:00 (2pm) and 17:00–18:00 (5–6pm) 2/11: 7:00–8:00 (7am to 8am) and 11:00–12:00 (11am to 12 pm) 5/26; 22:00 – 5/27;11:00 (10pm to 11am) 6/21; 8:00–10:00 (8–10am) 8/31; 1:00–2:00 (1–2am) 9/19; 16:00–18:00 (4–6pm) 10/1; 2:00–8:00 (2–8am) 10/21; 18:00 (6pm) 10/30; 8:00–10/31; 23:00 (8am to 11pm) 11/20; 12:00–20:00 (12pm to 8pm) 12/5; 11:00–12:00 (11am to 12 pm) | Data from all 5 sensors missing for a total of 111 hours. | Data from all sensors were missing. Data discarded. |

| Gap/Anomaly date, time | Data description | Action on the station or data |
|--|------------------|-------------------------------|
| 12/10; 7:00 – 12/11; 3:00 (7am to 3am) | | |
| 12/25; 9:00–12:00 (9am to 12pm) | | |

The data falls within the following data ranges and averages, see Table 2, which also contains the 2013 SCAQMD at LAX station data ranges (data validated by T&B Systems) for comparison purposes.

Table 2 2013 Data Summary and Comparison to AQMD Met Station Data

| Parameter | Range | AQMD | FMOG | Notes / Conclusions |
|-----------------------------------|-------|--------------|-------|--|
| Wind Speed, mph | Avg | 7.5 | 7.4 | The FMOG station shows a slightly lower average wind speed, a slightly higher minimum wind speed and a slightly lower maximum wind speed. Overall the two data sets are well correlated. |
| | Min | 0.3 | 1.0 | |
| | Max | 33.9 | 28.9 | |
| Wind Direction, degrees | Avg | 196.9 | 183.9 | LAX winds have a stronger west-southwest component while the FMOG station received wind predominantly from the southwest (see wind roses in Attachment 2). |
| | Min | 0.0 | 0.0 | |
| | Max | 359.8 | 360.0 | |
| Temp., deg F | Avg | 60.7 | 62.0 | The slightly higher max. temperature and average Temp. at the FMOG station is a result of its location further inland away from the coast where temperatures can be higher. The two data sets are well correlated. |
| | Min | 40.9 | 39.1 | |
| | Max | 84.3 | 90.3 | |
| Delta Temperature, deg F | Avg | No AQMD data | -0.73 | No data on temperature difference is provided for the AQMD station, thus no comparison. |
| | Min | | -4.81 | |
| | Max | | 4.37 | |
| Solar Radiation, w/m ² | Avg | 223.0 | 209.0 | Solar Radiation is slightly higher at the AQMD station as a result of its location near the coast where conditions are less cloudy. The two data sets are well correlated. |
| | Min | 0.0 | 0.0 | |
| | Max | 1084.0 | 975.8 | |

FMOG wind speed and direction data was plotted as wind roses (see Attachment 2), and compared to the AQMD weather station wind roses. Attachment 2 presents the resulting graphs. It can be seen that the winds have similar patterns. The winds at the LAX station are stronger (higher speed), as compared to the winds at the FMOG station. The patterns of the wind directions vary slightly. The wind direction at the LAX station varies more than that at the FMOG location. This can be explained by the fact that the FMOG station is located in the area that is shielded somewhat by terrain. The wind direction pattern at the FMOG station appears to be in-line with the terrain, while at the coastal open location of the AQMD station at the LAX, is not influenced or obstructed by the terrain.

The wind patterns were also compared to the ones from 2012, and the two year winds – 2012 and 2013 correlate well.

Temperatures obtained from the two stations exhibit a strong correlation. Average temperature and minimum temperature readings are closely related. The FMOG station registered a slightly higher maximum temperature reading in comparison to the AQMD station, approximately 7%. Inland temperatures are typically higher than coastal temperatures and the data between the two stations demonstrates this trend.

Obtained solar radiation data correlates well with the sunrise and sunset times in the area during the various seasons. The solar radiation data is within the similar ranges as the AQMD data for 2013. The instances where the FMOG station recorded solar lower than expected reading, the values were compared to the AQMD data and either discarded (if found inconsistent, or kept. However the majority of suspect lower radiation readings were found to be consistent with the validated AQMD data. Low solar radiation readings are most likely a result of cloud cover. Overall the AQMD station exhibits slightly higher solar radiation readings than the FMOG station. This can be attributed to the location of the AQMD station at the coast where there is typically greater sun exposure and conditions are sunnier.

The EPA allows for 10% missing or erroneous data, to consider the data valid for further studies. Table 3 below summarizes the missing data. For all the sensors the missing or discarded data is significantly less than 10%, at 1.4%, and thus meets the EPA requirement.

Table 3 Year 2013 FMOG Met Station Missing Data

| Parameter | Value | Notes |
|---|---|--|
| Total hours recorded | 8,760 | Jan 1 – Dec 31, 2013 hourly averages recorded. (note: 2013 is not a leap year) |
| TOTAL data points recorded (5 sensors) | 43,800 | |
| Number of missing data or discarded data points | (119 x 5 sensors) + 25 = 620 $620/43,800 = 0.014$ or 1.4% | Data from all five sensors is missing during 111 hours. Additionally 9 points for all sensors after the power outages were discarded, and 25 solar radiation points were discarded |
| Percentage (%) "bad data" | 1.4% | <10% = valid |

4.0 CONCLUSIONS

The FMOG station was collecting the CSD-required data during the entire year: Jan. 1 – Dec. 31, 2013. The process of maintaining the station in good working condition is being practiced per the CSD requirements. The collected data is being stored as required. The data is valid with less than 10% missing or discarded data at 1.4%. Therefore, the entire year data can be used (if determined necessary) for a Health Risk Assessment of the facility or other uses.

5.0 REFERENCES

1. EPA. 1995. Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements.
2. EPA. 2000. Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-005.



Figure 2 FMOG Meteorological Station Location – Field View

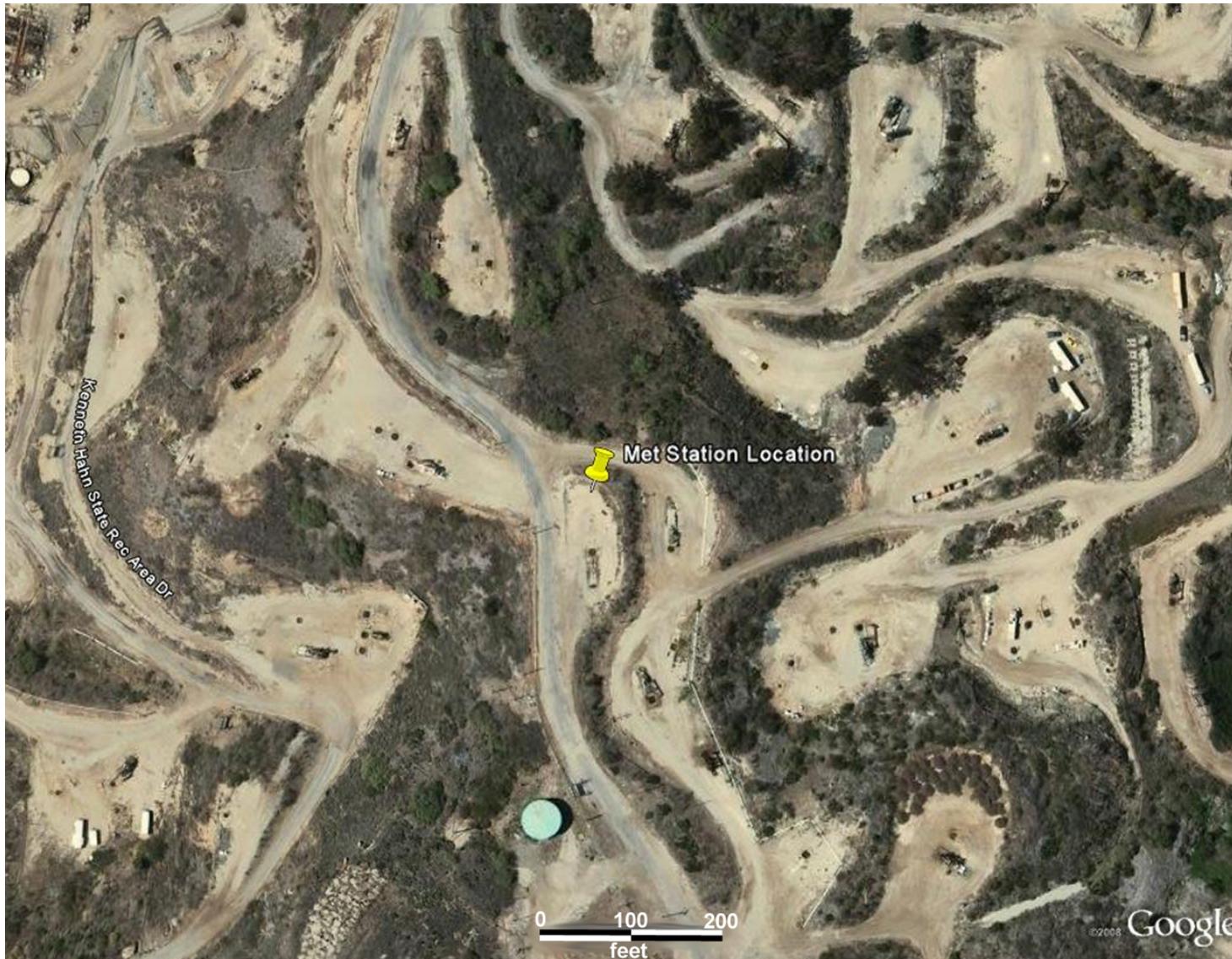


Figure 3 FMOG Meteorological Station Location – Close-up View

ATTACHMENT 1

Data Validation Techniques

| Variable | Criteria: flag data if the value |
|------------------------|--|
| Wind Speed | <ul style="list-style-type: none"> - is less than zero or greater than 25 m/s (56 mph) - does not vary by more than 0.1 m/s (0.22 mph) for 3 consecutive hours - does not vary by more than 0.5 m/s (1.1 mph) for 12 consecutive hours - correlates well with data from other stations in the same area |
| Wind Direction | <ul style="list-style-type: none"> - is less than zero or greater than 360° - does not vary by more than 1 degree for more than 3 consecutive hours - does not vary by more than 10 degrees for 18 consecutive hours - correlates well with data from other stations in the same area |
| Temperature | <ul style="list-style-type: none"> - is greater than the local record high - is less than the local record low - is greater than a 5 °C (9 °F) change from the previous hour - does not vary by more than 0.5 °C (0.8 °F) for 12 consecutive hours - correlates well with data from other stations in the same area |
| Temperature Difference | <ul style="list-style-type: none"> - is greater than 0.1 °C/m (1.8 °F for 10 m or 5.4 °F for 30 m) during daytime - is less than -0.1 °C/m (-1.8 °F for 10 m or -5.4 °F for 30 m) during night time - is greater than 5.0 °C (9.0 °F) or less than -3.0 °C (-5.4 °F) |
| Radiation | <ul style="list-style-type: none"> - is greater than zero at night - is greater than the maximum possible for the season and latitude - correlates well with data from other stations in the same area |

Source: http://www.webmet.com/met_monitoring/863.html

ATTACHMENT 2

Wind Roses: T&B Systems, PAMS Monitoring Network Surface Wind Data, 2013 as compared with FMOG Wind Data, 2013

IMPORTANT NOTE on reading the wind roses:

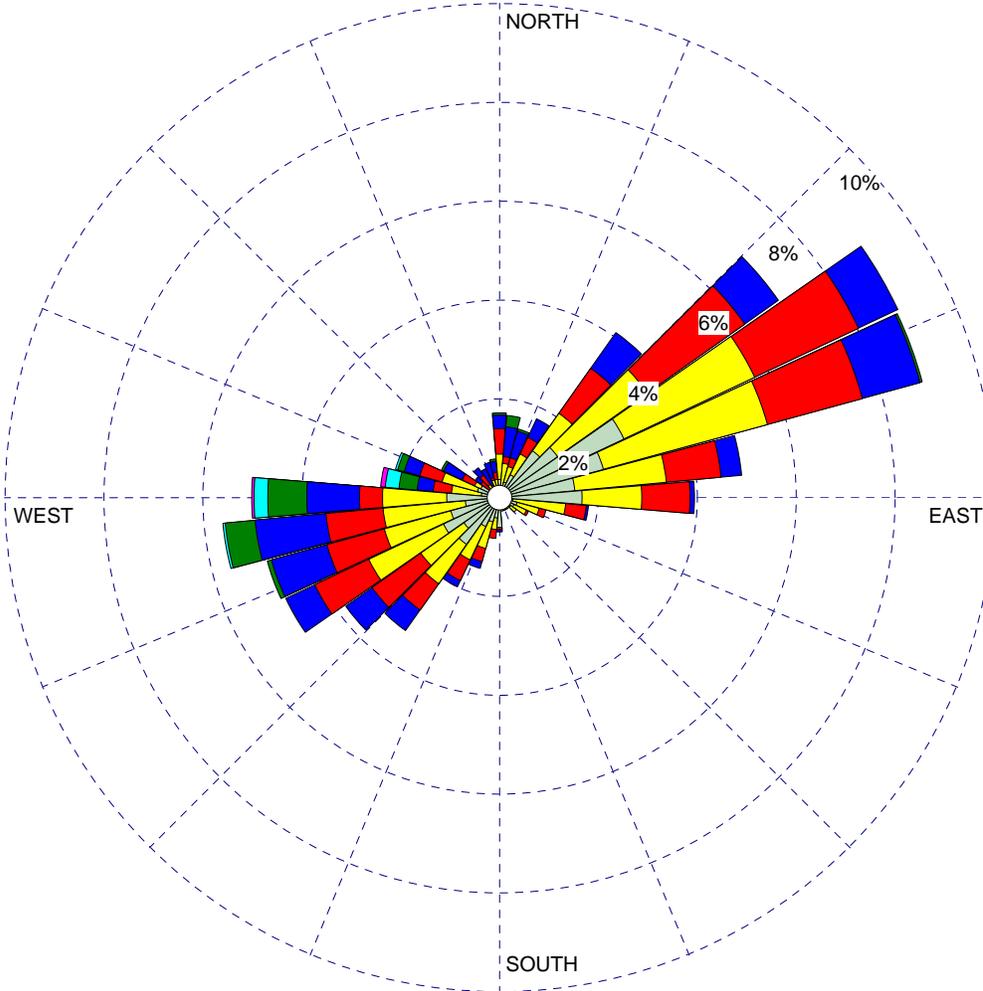
The graphs' colored segments show the winds as **BLOWING FROM** that direction.

WIND ROSE PLOT:

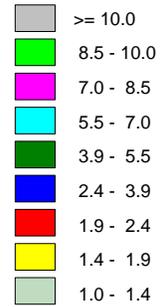
WINTER - December-February - 2013
LAX AQMD Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)



Calms: 9.21%

COMMENTS:

DATA PERIOD:

Start Date: 1/1/2013 - 00:00
End Date: 12/31/2013 - 23:00

AGENCY NAME:

South Coast Air Quality Management District (AQMD)

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

9.21%

TOTAL COUNT:

2160 hrs.

AVG. WIND SPEED:

1.67 m/s

DATE:

5/20/2014

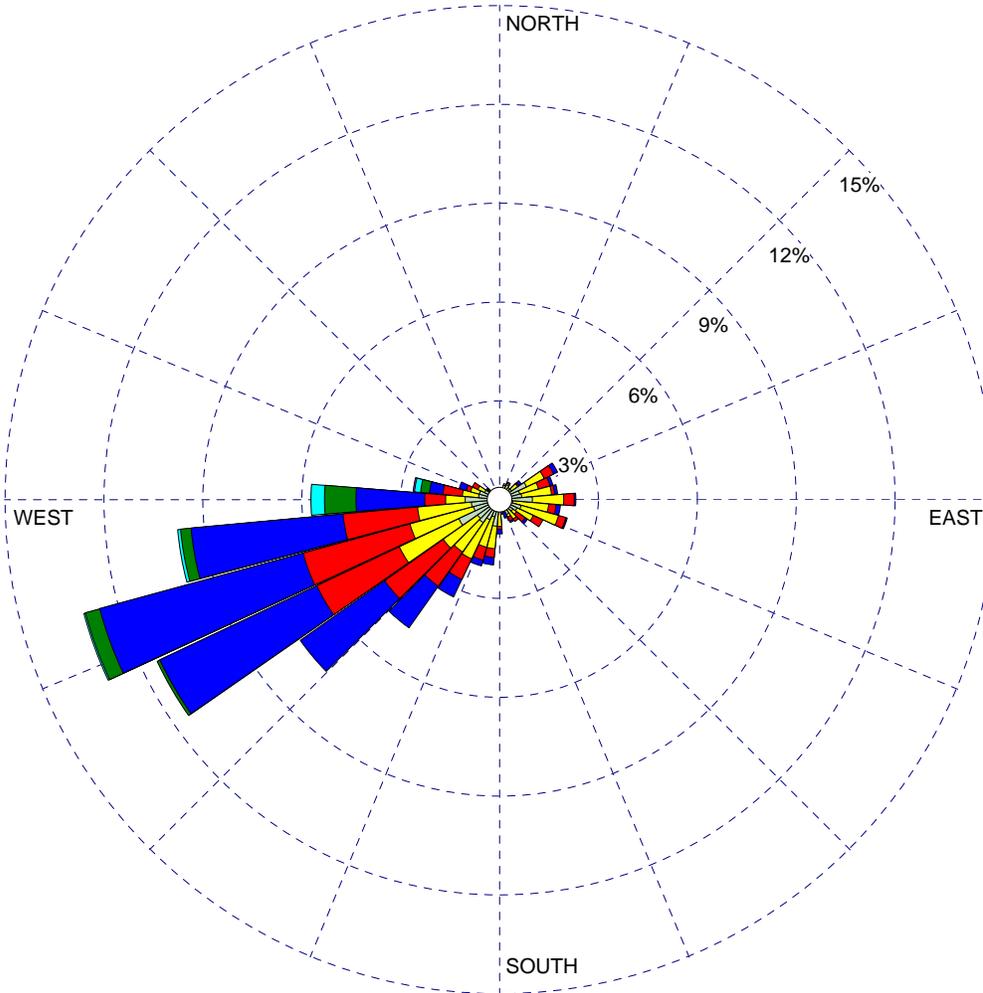
PROJECT: **Met Data Validation-CSD**

WIND ROSE PLOT:

SPRING - March-May - 2013
LAX AQMD Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 13.32%

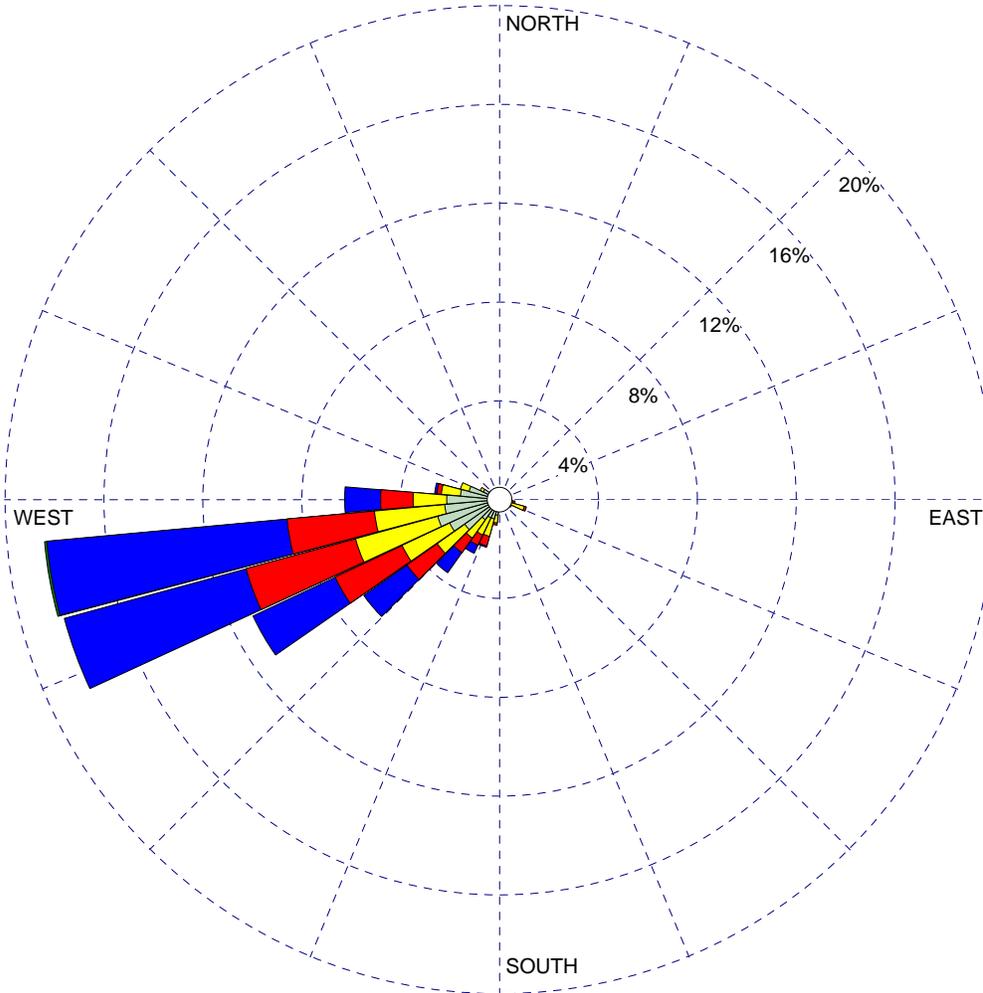
| | | | |
|------------------|---|---|---|
| COMMENTS: | DATA PERIOD: | AGENCY NAME: | |
| | Start Date: 3/1/2013 - 00:00 End Date: 5/31/2013 - 23:00 | South Coast Air Quality Management District (AQMD) | |
| | CALM WINDS: | MODELER: |  |
| | 13.32% | InterAct, tel. 805-658-5600 | |
| AVG. WIND SPEED: | TOTAL COUNT: | DATE: | PROJECT: Met Data Validation-CSD |
| 1.77 m/s | 2208 hrs. | 5/20/2014 | |

WIND ROSE PLOT:

SUMMER - June-August - 2013
LAX AQMD Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 18.89%

COMMENTS:

DATA PERIOD:

Start Date: 6/1/2013 - 00:00
End Date: 8/31/2013 - 23:00

AGENCY NAME:

South Coast Air Quality Management District (AQMD)

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

18.89%

TOTAL COUNT:

2208 hrs.

AVG. WIND SPEED:

1.56 m/s

DATE:

5/20/2014

PROJECT: **Met Data Validation-CSD**

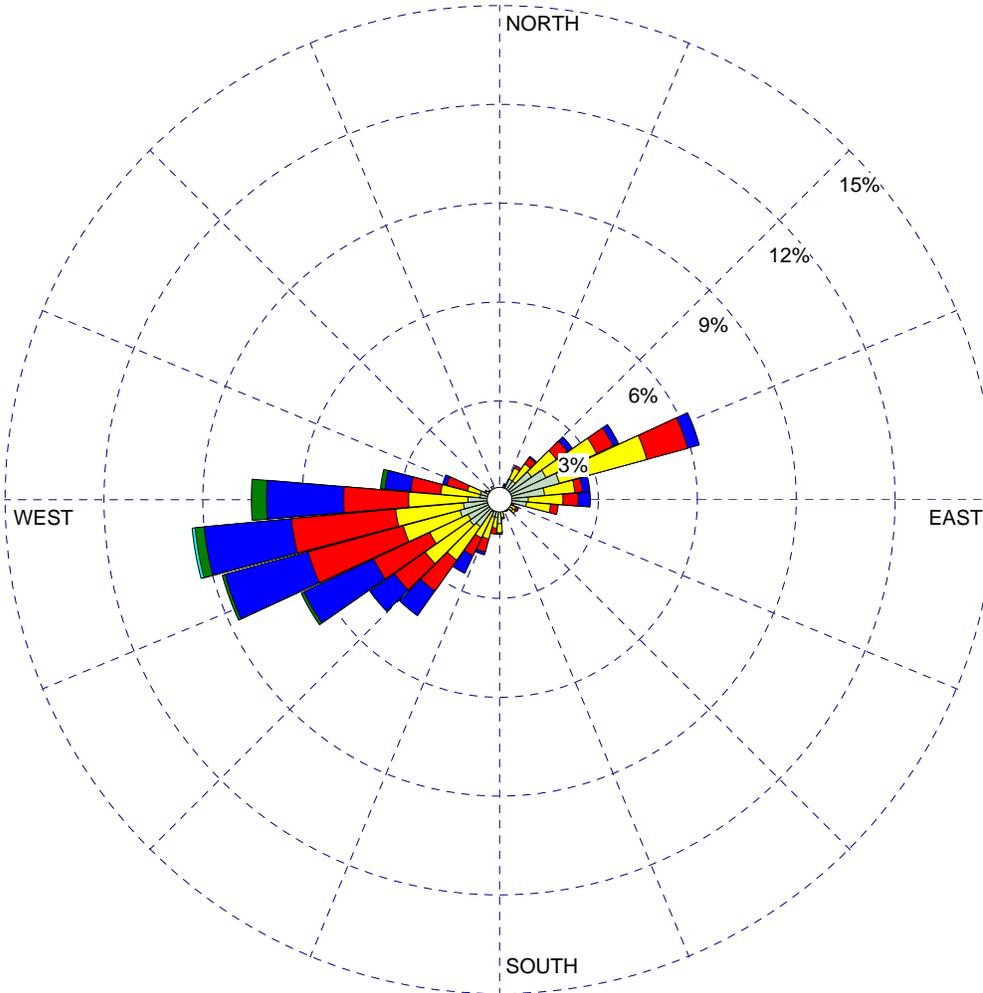


WIND ROSE PLOT:

FALL - September-November - 2013
LAX AQMD Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 17.40%

COMMENTS:

DATA PERIOD:

Start Date: 9/1/2013 - 00:00
End Date: 11/30/2013 - 23:00

AGENCY NAME:

South Coast Air Quality Management District (AQMD)

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

17.40%

TOTAL COUNT:

2184 hrs.

AVG. WIND SPEED:

1.46 m/s

DATE:

5/20/2014

PROJECT: **Met Data Validation-CSD**

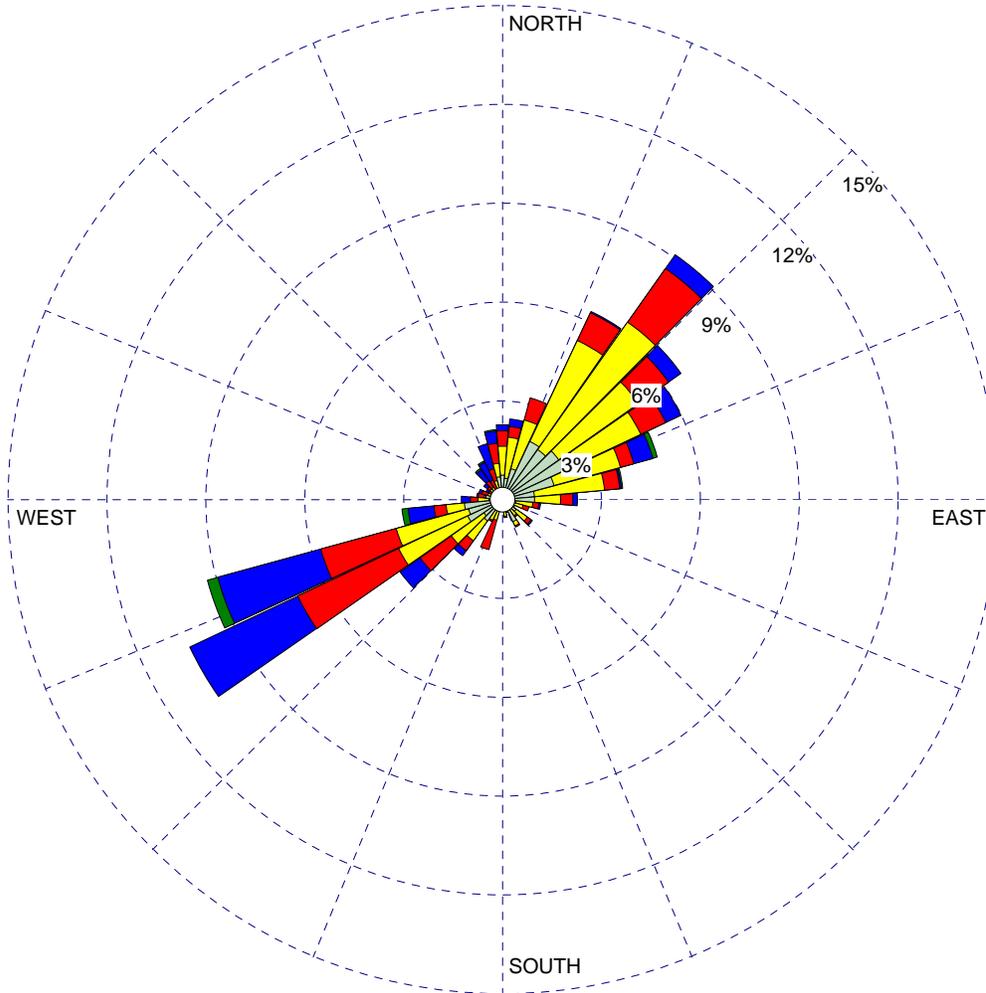
InterAct

WIND ROSE PLOT:

WINTER - December-February - 2013
FMOG Inglewood Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 5.28%

COMMENTS:

DATA PERIOD:

Start Date: 1/1/2013 - 00:00
End Date: 12/31/2013 - 23:00

AGENCY NAME:

FMOG, 5640 S. Fairfax ave., Los Angeles, CA

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

5.28%

TOTAL COUNT:

2160 hrs.

AVG. WIND SPEED:

1.64 m/s

DATE:

5/20/2014

PROJECT: **Met Data Validation-CSD**

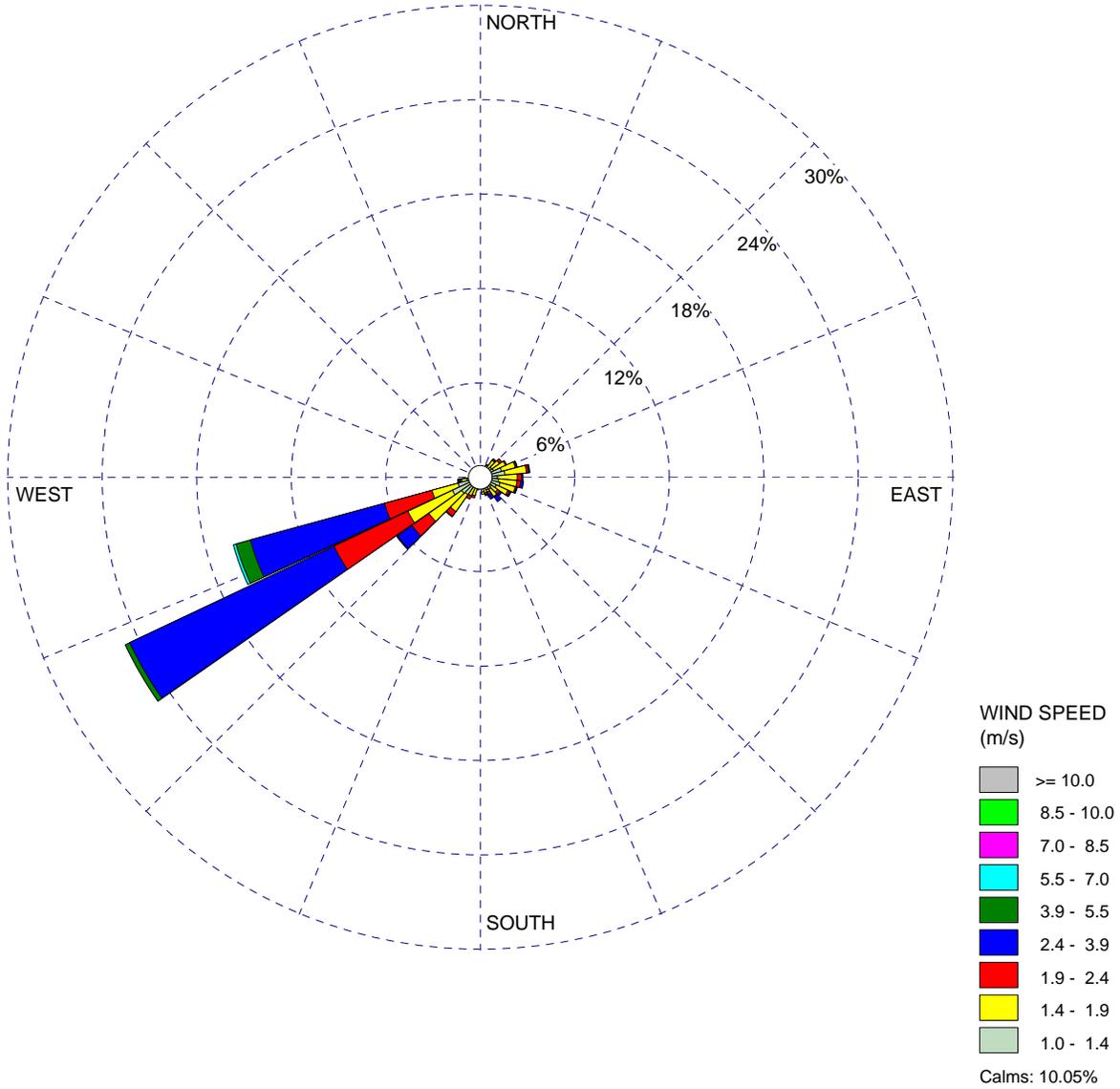
InterAct

WIND ROSE PLOT:

SPRING - March-May - 2013
FMOG Inglewood Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



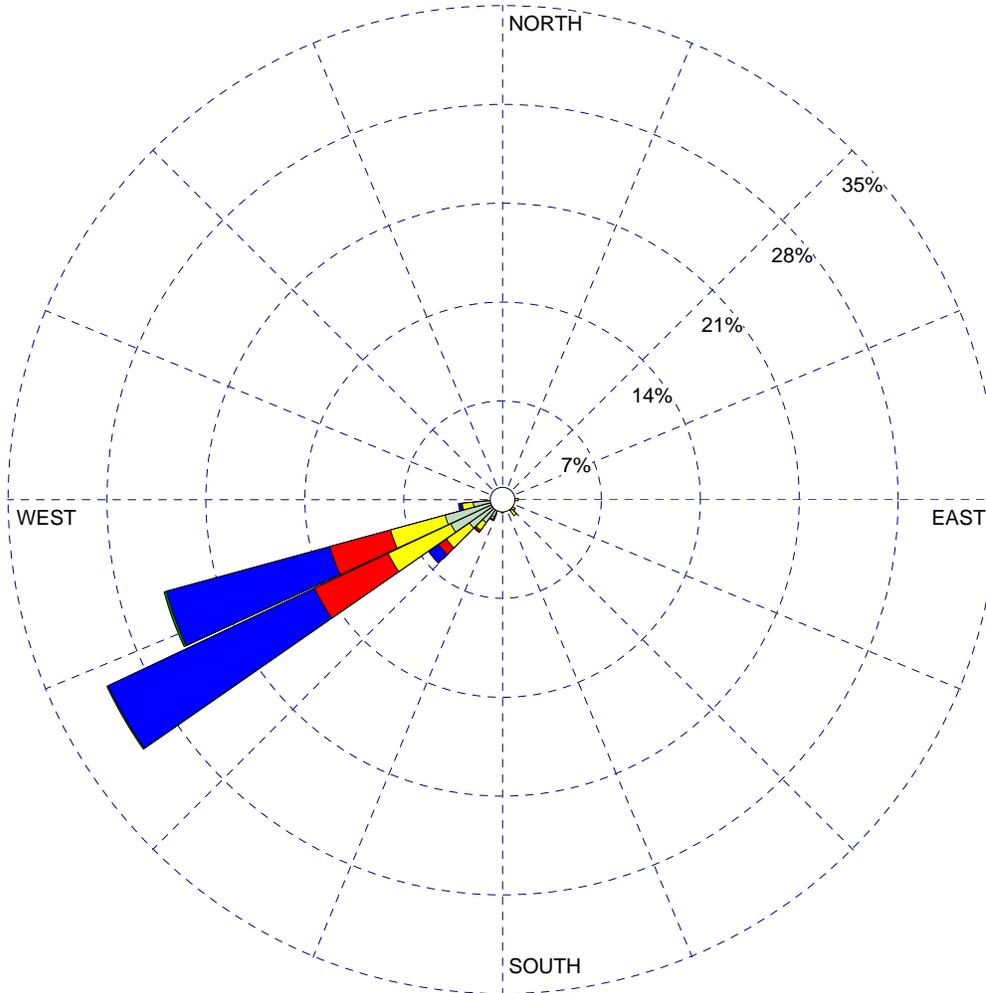
| | | | |
|------------------|---|---|--|
| COMMENTS: | DATA PERIOD: | AGENCY NAME: | |
| | Start Date: 3/1/2013 - 00:00 End Date: 5/31/2013 - 23:00 | FMOG, 5640 S. Fairfax ave., Los Angeles, CA | |
| | CALM WINDS: | MODELER: | |
| | 10.05% | InterAct, tel. 805-658-5600 | |
| AVG. WIND SPEED: | TOTAL COUNT: | PROJECT: Met Data Validation-CSD | |
| 1.74 m/s | 2208 hrs. | | |
| | DATE: | | |
| | 5/20/2014 | | |

WIND ROSE PLOT:

SUMMER - June-August - 2013
FMOG Inglewood Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 16.58%

COMMENTS:

DATA PERIOD:

Start Date: 6/1/2013 - 00:00
End Date: 8/31/2013 - 23:00

AGENCY NAME:

FMOG, 5640 S. Fairfax ave., Los Angeles, CA

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

16.58%

TOTAL COUNT:

2208 hrs.

AVG. WIND SPEED:

1.62 m/s

DATE:

5/20/2014

PROJECT: **Met Data Validation-CSD**

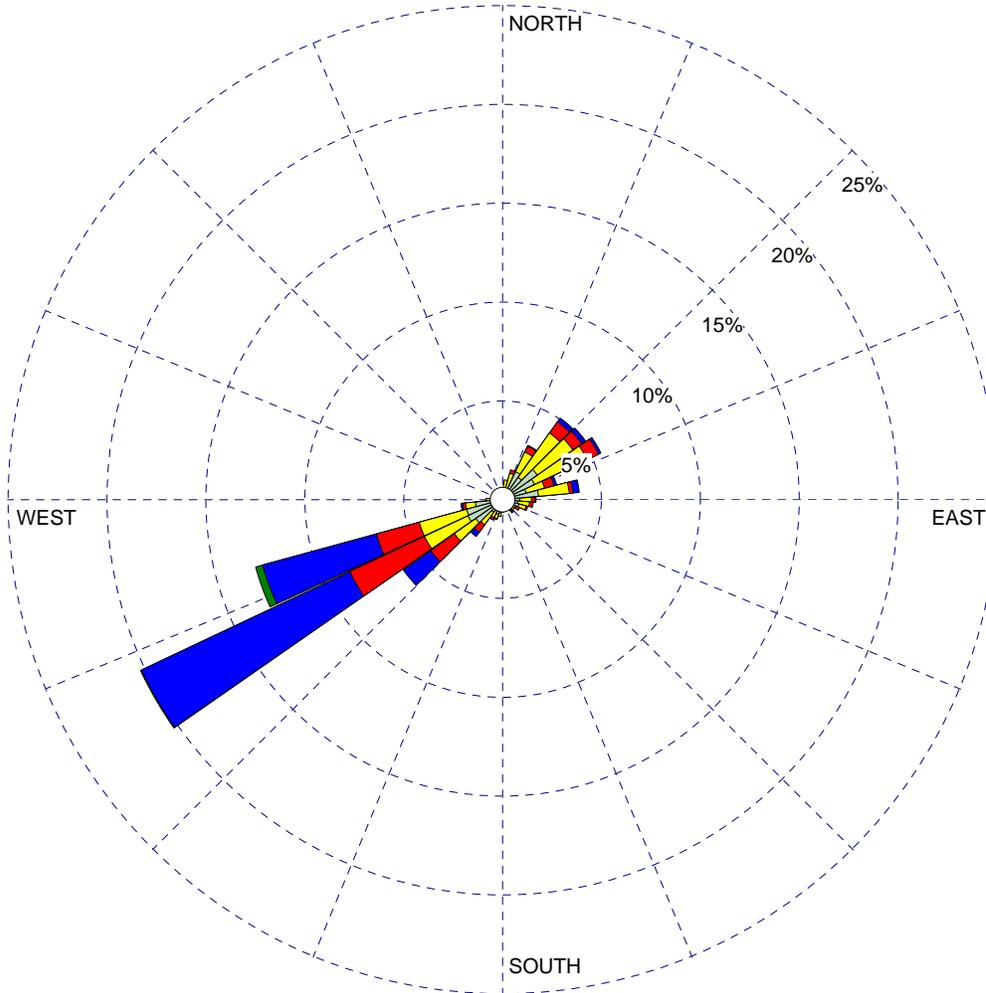
InterAct

WIND ROSE PLOT:

FALL - September-November - 2013
FMOG Inglewood Meterological Station

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 10.0
- 8.5 - 10.0
- 7.0 - 8.5
- 5.5 - 7.0
- 3.9 - 5.5
- 2.4 - 3.9
- 1.9 - 2.4
- 1.4 - 1.9
- 1.0 - 1.4

Calms: 12.27%

COMMENTS:

DATA PERIOD:

Start Date: 9/1/2013 - 00:00
End Date: 11/30/2013 - 23:00

AGENCY NAME:

FMOG, 5640 S. Fairfax ave., Los Angeles, CA

MODELER:

InterAct, tel. 805-658-5600

CALM WINDS:

12.27%

TOTAL COUNT:

2184 hrs.

AVG. WIND SPEED:

1.55 m/s

DATE:

5/20/2014

PROJECT: **Met Data Validation-CSD**

InterAct