TRIP REPORT

WILLIAM S. LEE PRE-APPLICATION SITE VISIT

REVIEW OF THE PRE-OPERATIONAL ONSITE METEOROLOGICAL MONITORING PROGRAM

MAY 9-10, 2007

Subject

Site visit to the Lee COL site to review the pre-operational onsite meteorological monitoring programs.

Travel Dates

May 9-10, 2007

NRC Staff Participants

- Tom Galletta, NRO/DSER/RSAC
- Joseph Hoch, NRO/DSER/RSAC
- Van Ramsdell, PNNL

Applicant Staff Participants

- Marsha Kinley, Duke Energy
- Mark Knapp, Duke Energy
- Mike Pollard, Duke Energy
- Marvin Morris, Enercon

Purpose

The purpose of the visit was to (1) become familiar with the prospective applicant's site and site selection process, plans, schedules, and initiatives, (2) observe and review the pre-operational onsite meteorological monitoring program and (3) review the prospective applicant's plans for its operational onsite meteorological monitoring program.

This trip report documents the staff's pre-application site visit conducted at the prospective Lee COL site. The information presented in this trip report was gathered through interviews with the prospective applicant's staff as well as a review of the prospective applicant's system documentation and procedures.

Activities

On Wednesday afternoon, May 9, 2007, Duke Energy provided the NRC staff with an introduction to the Lee site, a description of current and planned interactions with state and local regulators, and an overview of the environmental report, the site selection process, the transmission siting process, the emergency plan, and onsite environmental monitoring. Informal discussions were also held with Duke staff listed above regarding the meteorological system sensors, data

recording, instrument surveillance, data acquisition, and reduction.

On Thursday, May 10, 2007, Duke Energy provided the NRC staff with a tour of the proposed Lee COL site. Lee is a green-field site with no operating power plants. The tour included extended stops at meteorological tower-1, meteorological tower-2, and proposed location for meteorological tower-3. On Thursday afternoon, additional discussions occurred regarding sampling frequencies and averaging algorithms, system accuracies, data review processes, and emergency response meteorological data sources and atmospheric dispersion modeling. A demonstration of Duke's electronic calibration check process was also given at meteorological tower-2.

Discussion

The prospective applicant plans to use one year data beginning December 2005 collected at meteorological tower-2 in its COL application FSAR and ER to represent meteorological conditions for the proposed Lee site. The prospective applicant plans to submit a second year of onsite meteorological data as a supplement to the COL application.

Meteorological tower-2 is the prospective applicants tower of choice. It is a state-of-the-art Rohn 55G, narrow-faced, guyed meteorological tower. Tower-1 is an older tapered, free-standing "radio" tower with a wide base that dates back to the original planned Cherokee Nuclear Plant. The widely tapered base of tower-1 caused the prospective applicant to install a separate 10-meter platformed pole adjacent to tower-1 to collect 10-meter data. Both tower-1 and tower-2 are instrumented with the same instruments that provide backup and data comparison.

Due to planned construction activities, both the current meteorological towers-1 & 2 will be taken down after two years of meteorological data are collected for the COL application. A new meteorological tower site for meteorological tower-3 has been identified by Duke's meteorological staff. The perspective applicant stated the new tower is expected to be a Rohn 45GS (solid legs) because of its location and limited space for the guy anchors. The perspective applicant also stated the new tower will use the same meteorological instrumentation to support the operational monitoring requirements.

Meteorological Monitoring Program

a. Tower Location and Exposure

For perspective, Meteorological tower-2 is located east of the center of the Lee site. Meteorological tower-1 is located in the southeast quadrant. Proposed location for meteorological tower-3 is in the northwest quadrant. McKowns mountain, a prominent land feature on site, is located in the southwest quadrant.

Meteorological tower-2 is approximately:

- 2089 feet from of meteorological tower 1
- 5059 feet from the proposed location of meteorological tower 3
- 4900 feet from the micro wave tower on McKown's mountain

Proposed meteorological tower-3 is located approximately:

- 5353 feet from meteorological tower-1
- 5059 feet from meteorological tower-2

- 3794 feet from the micro wave tower on McKown's mountain

The terrain of the site is rather complex. The central, southern and eastern portions of the site are generally flat. The northern and western portions have more notable terrain features. The most noticeable terrain feature onsite is McKowns mountain in the southwest quadrant. The mountain is oriented north-south and approximately 1-mile in length. There is a vertical drop in excess of 200 feet to a low-flow reservoir on the west side of the mountain.

Noted site elevations above mean sea level (MSL):

- 816.1 feet - McKowns mountain peak
- 735.7 feet - McKowns mountain microwave tower
- 595 feet - plant grade
- 550 feet - river elevation

b. Instrumentation

Both meteorological tower-2 and meteorological tower-1 have the same instrumentation and data logger.

Note: Meteorological tower-2's upper measurement level is 60-meters and
Meteorological tower-1's upper measurement level is 55-meters.

- 55/60m level - wind speed and direction, temperature
- 10m level - wind speed and direction, temperature, dewpoint
- 2m level - temperature, pressure
- 1m level - incoming solar radiation, outgoing terrestrial radiation, precipitation

Delta-temperature data are compiled between the 55/60m level and the 10m level by a subtraction routine in the data logger.

The wind and temperature instruments were mounted on 8-foot instrument booms on each tower. The instrument booms were mounted on the west-northwest side of the tower oriented perpendicular to the prevailing winds.

Performance specifications for the meteorological tower-2 and meteorological tower-1 are provided in Table 1.

c. Data Recording

The Environmental Systems Corporation (ESC) model 8832 data logger was used at each tower. The sampling rate was once per second. The ESC logger generates 1, 15 and 60- minute averages. Currently, only the 1-minute and 60-minute averages are being stored long term.

d. Calibration and Surveillance

The primary meteorological systems are reviewed on a daily basis, compared with other sites, and calibrated semi-annually. The towers are inspected by Duke personnel bi-weekly to monthly.

The following lists procedure numbers for calibration:

Wind Direction: Procedure Numbers 7321.1 and 7374.3

The wind vanes and cables are expected. The vanes are put in the following positions and tested for accuracy: 0, 45, 90, 135, 180, 225, 270, 315, 360 deg.

Wind Speed: Procedure Numbers 7353.1 and 7367

A starting torque test is performed. The anemometer is set for the following speeds and tested for accuracy: 0.0, 10.2, 19.8, 30.0, 40.1, 50.3, 60.0 mph

Temperature: Procedure Number 7326.2

A resistance-to-temperature calibration curve is used to test the temperature sensors. The following temperatures are used to calibrate the sensors: -20.0 , -5.0, 10.0, 25.0, 40.0 degC

Precipitation: Procedure Number 7313.1 and 7814.0

The tipping bucket is emptied and individual drops are placed in the sensor for the following amounts to test the accuracy of the sensor: 0.0, 0.25, 0.50, 0.75, and 1.0 inches

Dewpoint: Procedure Number 7819.0 and 7820.0

The dewpoint temperature sensor is calibrated against the following reference dewpoint temperatures: -50.0, -25.0, 0.0, 25.0, 50.0 deg C

e. Data Processing

The following data processing techniques are used by the Duke staff:

- Meteorological monitoring site checks were performed twice per week or monthly to identify abnormal functions and check site conditions. These checks included a visual check of the tower, verification that the booms were raised in their operating position, etc.

- Daily data reviews were performed several times a week to identify equipment failures.

- Monthly data analyses and reviews were performed to identify periods of erroneous indication. Backup data were used to fill in periods of missing data.

The ESC datalogger processes the 1-minute and 60-minute average meteorological data. This data is processed by Duke staff, quality controlled, and archived for later uses, such as the COL application.

TABLE 1

Instrumentation on Meteorological Towers-1 & 2
(Since November/December 2005 respectively)

Channel	Sensor	Model Number(s)	Measurement Height(s)	Accuracy
Wind Speed	Met One Platinum RTD	1564B	55/60m, 10m	± 0.5 mph
Wind Direction	Met One	1565C	55/60m, 10m	± 5 deg
Temperature	Rosemount	78N	55/60m, 10m, 2m	± 0.1 deg
Precipitation	Climatronics	Not Avail.	1m	± 10%
Dewpoint	Edgetech	D2	10m	± 1.5 deg
Pressure	Met One	090D	2m	± 0.025%
Incoming Solar	N/A	N/A	1m	± 5%
Outgoing Terrestrial Radiation	N/A	N/A	1m	± 5%