

TRIP REPORT

Calvert Cliffs PRE-APPLICATION SITE VISIT

REVIEW OF THE PRE-OPERATIONAL AND OPERATIONAL ONSITE METEOROLOGICAL MONITORING PROGRAM

June 5, 2007

Subject

Site visit to the Calvert Cliffs COL site to review the pre-operational and operational onsite meteorological monitoring programs.

Travel Dates

June 5, 2007

NRC Staff Participants

- Tom Galletta, NRO/DSER/RSAC
- Joseph Hoch, NRO/DSER/RSAC
- Laura Quinn, NRO/DSER/RAP2
- Getachew Tesfaye, NRO/DSRA/SPCV
- Bill Sandusky, PNNL

Applicant Staff Participants

- Ted Messier, AREVA NP
- J.H. Snooks, AREVA NP
- Brian Allen, Calvert Cliffs
- Clyde Thomas, Calvert Cliffs
- Ed Munch, Constellation Energy
- Richard Mervine, UniStar
- George Wrobel, UniStar

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 Calvert Cliffs COL site. The information presented 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 Tuesday morning, June 5, UniStar Nuclear provided the NRC staff with an introduction to the Calvert Cliffs site. Constellation Energy currently operates Calvert Cliffs Units 1 & 2. UniStar Nuclear, an alliance between AREVA and Constellation Energy, plans to construct and operate a US-EPR 1650 MW plant (i.e. proposed Unit 3) at the current operational site.

A van tour of the site was provided. The tour included stops at various proposed plant structures (e.g., reactor containment, cooling tower, intake structure, etc.) and an overlook of the existing plants' structures. The morning session concluded with a presentation by Rich McClain, Manager of Nuclear Programs - State of Maryland. His presentation included the Certificate of Public Convenience (CPCN) process for the State of Maryland. The importance of coordination with the NRC process was stressed.

On Tuesday afternoon, introductions concluded and technical breakout sessions commenced. A tour of the meteorological tower and instrument shed was provided. After the tour, meteorological system documents (e.g., sensor types, technical specifications, calibration procedures, inspection and testing reports, etc.) were reviewed and various meteorological topics, as provided by the staff in advance of the visit, were discussed.

Discussion

The prospective applicant plans to use five years of onsite meteorological data (2000-2004) for accident X/Q modeling input and six years of onsite meteorological data (2000-2005) for routine X/Q modeling input and subsequent NRC review of the onsite meteorological measurements program. The prospective applicant also stated that a ground-level release mode would be used for accident X/Q modeling and a mixed-mode release would be used for routine X/Q modeling, including the use of re-circulation correction factors.

Meteorological Monitoring Program

a. Tower Location and Exposure

The Calvert Cliffs primary meteorological tower is a 60-meter, two-level (60-meter & 10-meter), guyed, Rohn 55G with an instrument elevator system. The instrumentation and data logging equipment were upgraded in December 2005. A fold-down 10-meter backup tower was also added at this time. Met One instrumentation and Campbell Scientific data logging equipment are currently used onsite. Conventional cup & vane wind sensors are used on the primary tower, while a Met One Sonic wind sensor plus a temperature sensor are mounted on the backup tower.

Natural vegetation (i.e. grass) surrounds the tower base. A natural obstruction (i.e. stand of trees) exists to the southwest of the primary tower, outside the fenced area. The trees were estimated to range from 50 to 75 feet in height and cover an azimuth 200°-265°, with the closest point at ~215° azimuth. The staff notes that Calvert Cliffs is committed to Reg. Guide 1.23 rev. 0 which is silent on natural obstructions to air flow. The perspective applicant was informed that natural obstructions to air flow are addressed in revision 1 of Reg. Guide 1.23.

The following provides a site perspective using the primary meteorological tower as the reference point, distances are approximate.

- Instrument shelter ~50 feet NE of primary tower
- Backup tower ~100 feet SE of primary tower within the tower fenced area
- Reference guy anchor (1 of 3) ~90 feet SW (~215°) within tower fenced area
- Stand of trees (>50 feet high) >120 feet but <200 feet to SW (azimuth 200°-265°)
(closest pt. 215°)

- Unit 1 & 2 reactors ~2300 feet to NE
- Chesapeake Bay ~3000 feet to NE
- Proposed Unit 3 ~3900 feet to East
- Proposed Unit 3 Cooling Tower ~4500 feet to SE

The terrain of the site is characterized by gentle rolling hills. The Chesapeake Bay shoreline runs northwest/southeast.

Noted site elevations above mean sea level (MSL):

- Meteorological tower base 120 feet MSL
- Proposed Unit 3 Cooling Tower grade 100 feet MSL
- Proposed Unit 3 plant grade 85 feet MSL
- Plant grade (Unit 1 & 2) 45 feet MSL

Noted structure heights above ground level (AGL) and (MSL):

- Meteorological tower (primary) 200 feet AGL (320 MSL)
- Meteorological tower (backup) 33 feet AGL (153 MSL)
- Proposed Unit 3 reactor building stack 194 feet AGL (279 MSL)
- Proposed Unit 3 reactor building 190 feet AGL (275 MSL)
- Proposed Unit 3 cooling tower 165 feet AGL (265 MSL)

b. Instrumentation

Calvert Cliffs did a meteorological monitoring system upgrade in December 2005. The 60-meter Primary tower was outfitted with Met One cup and vane wind sensors and dual train (A&B) temperature sensors. The 10-meter fold-down backup tower was erected and outfitted with a Met One Sonic wind sensor and a temperature sensor. Ambient moisture data is not currently collected at the Calvert Cliffs site. UniStar plans to use Patuxent River Naval Air Station moisture data for their Environmental report and potentially install onsite moisture measurement equipment at a later date.

Primary tower:

- 60m level - wind speed and direction, temperature (A&B trains)
- 10m level - wind speed and direction, temperature (A&B trains)
- 1 m level - precipitation (no wind screen), pressure (in shelter)

Backup tower (new December 2005):

- 10m level - wind speed and direction, temperature

Delta-temperature data (A&B trains) are compiled between the 60m level and the 10m level by a

subtraction routine in the data logger.

The wind and temperature sensors are mounted on 8-foot instrument booms on the primary tower. The instrument booms were mounted on the west side of the tower (azimuth 275°) and oriented into the prevailing westerly winds (i.e. WSW per the perspective applicant).

Performance specifications for the meteorological monitoring system are provided in Table 1.

c. Data Recording

The meteorological data recording at Calvert Cliffs is a double-digital system with no analog recorders. Dual Campbell Scientific model 23X data loggers were installed at the tower site. The sampling rate is once per second and 5-minute averages are stored in the loggers. A MIDAS computer at the plant generates 15-minute averages. This data is available in the control rooms.

d. Calibration and Surveillance

The primary tower's meteorological data is downloaded by a consultant (ABS Consulting) for review on a daily basis. The instrumentation is calibrated semi-annually, and daily channel checks are performed by Operations in the control room.

Calvert Cliffs' "Meteorological Calibration" procedure (Rev. 1400) was reviewed by the staff. The procedure calls for semi-annual calibration and preventive maintenance for wind speed, wind direction, temperature, and precipitation instruments. A separate annual Preventive Maintenance (PM) procedure provides calibration techniques for the barometric pressure instrument.

e. Data Processing

Data validation is performed by a meteorological consultant, ABS Consulting. Validation is performed on the 15-minute data downloaded daily from the PC MIDAS system. The consultant in-turn notifies the applicant of potential problems.

Table 1. Meteorological Tower Instrumentation

	PRE DEC '05	DEC '05 - PRESENT
Wind Speed		
Make	MRI	Met One
Model	1074-12	1564D
Accuracy	± 0.25 mph	± 0.15 mph
Range	0 - 125 mph	0 - 100 mph
Wind Direction		
Make	MRI	Met One
Model	1074-12	1565D
Accuracy	± 3.6 °	± 1.5 °
Range	0 - 540 °	0 - 540 °
Temperature		
Make	Rosemont	Met One
Model	78 Series	T-200
Accuracy	± 0.26 °C @ 0 °C ± 0.53 °C @ 100 °C	± 0.25 °C @ 0 °C ± 0.05 °C @ 100 °C
Range	-100 °C - 40 °C	-50 °C - 50 °C
Rain Gauge		
Make	MRI	Met One
Model	382B	375
Accuracy	± 1.0 % @ 3"/Hr ± 5.0 % @ 10"/Hr	± 0.05 % @ 0.5"/Hr ± 1.0 % @ 1-3"/Hr
Range	N/A	N/A
Datalogger		
Make	Logic Beach	Campbell Scientific
Model	Modulogger	CR23X