NUCLEAR ENVIRONMENTAL ENGINEERING SECTION
2008-2009 FACT SHEET
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Environmental Thermoluminescent Dosimetry Program

The BNE's Nuclear Environmental Engineering Section (NEES) maintains a Thermoluminescent Dosimetry (TLD) Program, independent from that of each nuclear power plant operator, in order to determine the ambient gross gamma radiation levels in the vicinity of the Oyster Creek and Salem/Hope Creek nuclear plants. A TLD is a passive radiation detector that requires no power source and is designed to have the same sensitivity to radiation as human tissue.

The BNE deploys and retrieves about 130 Panasonic TLD badges each quarter. Once collected, BNE staff use a Panasonic TLD reader to obtain data from the badges. Control and transit TLD badges are read along with each set of field TLD badges to estimate TLD storage and transit exposures. Results for each quarter may be summed to estimate an annual dose to the public living in the communities around Oyster Creek and Salem/Hope Creek. Site selection for the TLD badge locations follows NRC's criteria described in NUREG-0837, "NRC TLD Direction Radiation Monitoring Network", and is summarized below:

- Within five miles of each nuclear power plant site, TLD badges are located offsite in each standard wind compass sector (such as North, South, North Northeast, and South Southwest). TLD badges are not placed in sectors that consist entirely of open water or are unoccupied or inaccessible.

- Additional TLD locations are selected relative to major population centers and areas of interest such as government buildings, schools, and/or hospitals. The population center closest to Oyster Creek is in Forked River, approximately two miles from the nuclear plant. The closest population center to Salem/Hope Creek is approximately 9.5 miles from the site, in Salem, New Jersey.

In order to assess the contribution of radioactivity in the environment from the nuclear power plants in New Jersey, the BNE established two TLD background locations at (1) Brendan T. Byrne State Forest in New Lisbon, New Jersey and at (2) the BNE Offices in Ewing, New Jersey. A background location is one that is considered beyond the influence of either the Oyster Creek or Salem/Hope Creek site and is used to evaluate normal levels of radionuclides in the environment from natural sources and fallout from previous years' weapons testing (weapons tests conducted in the 1950's, 1960's and Chinese weapons tests during the late 1970's through October of 1980).

The BNE accomplished a number of improvements to the TLD program in 2008 that included:

- Completion of revisions to standard operating procedures in response to comments received from an internal Department's Technical Systems Audit of the BNE's TLD Program.
- Generation of element correction factors (ECFs) for over 500 TLD badges during the months of August and December 2008. This represents the entire population of BNE

TLD badges available for deployment in the field. The application of ECF's compensates for the slight variations in readings between individual badges, thus normalizing TLD performance.

- Completion of a one week, onsite TLD training course conducted by Mr. Bruce Dicey of Dosimetry Resources, International, Inc.
- Annual calibration of the TLD reader in May of 2008.
- Initiation of a cross training program in January 2008 to train all BNE environmental staff in (1) annealing and analyzing TLD badges; (2) generating reports using T*he Doctor's Dosimetry* software; (3) cleaning the TLD reader; and (4) generating element correction factors.

The BNE plans to continue improving the TLD program in 2009 through the addition of more co-located TLD badges, obtained from an independent laboratory, to the BNE's existing TLD comparison program as a way to compare BNE results against those of the independent laboratory for precision and accuracy. The BNE has used Pennsylvania Power and Light and Global Technology for comparison studies.

Radiological Environmental Monitoring Program

Through its Radiological Environmental Monitoring Program (REMP), the BNE independently monitors environmental radiation in areas surrounding New Jersey's nuclear generating stations. Each year, the BNE obtains about 800 environmental samples from the environs of the Oyster Creek and Salem/Hope Creek nuclear power plants as well as two background locations. The samples are shipped to state contract laboratories for radiological analysis. Samples taken in the vicinity of the plant sites include air, water, raw milk, fish/shellfish, vegetation and soil/sediment. The BNE has established background locations for air and raw milk media. For air sampling, the BNE maintains a background location at Brendan T. Byrne State Park in New Lisbon, New Jersey and at the BNE Offices in Ewing, New Jersey. A background location for milk was established in August of 2004 at a dairy farm located in suburban Trenton, New Jersey. This dairy farm is approximately 50 miles from the Oyster Creek site and 80 miles from Salem/Hope Creek, well beyond the influence of either of New Jersey's nuclear power plant sites.

The BNE accomplished a number of improvements to the Radiological Environmental Monitoring Program in 2008 that included:

- The deployment and collection of air charcoal samples for the Finninger Farm air sampling location (OC06), initiated in April of 2008. Historically, the BNE only obtained air particulate filter samples from this location.
- The completion of a "Sample Collection and Processing" database. The database tracks sample receipt and analysis times and provides historical documentation of any sampling anomalies, such as low air sample volume or insufficient sample size. The database allows staff to generate electronic chain of custody forms that are sent in portable document format (PDF) to the Bureau's contract laboratories for use in sample processing.

- Initiation of the direct mailing of various split samples [vegetation, surface water, aquatic sediment, and aquatic biota (fish/shellfish)] collected from the environs of the Oyster Creek plant site to the BNE's contract laboratories for analysis. Direct mailing of these samples by Normandeau Associates (sampling contractor for Exelon), from the Oyster Creek site, reduces the laboratory sample receipt time, thereby reducing radioactive sample decay.

For additional information on the BNE's TLD and REMP programs, refer to the BNE's "Annual Environmental Monitoring and Surveillance Reports", found at the following website address: http://www.nj.gov/dep/rpp/bne/index.htm.