RESPONSES TO ASLB QUESTIONS

ASLB Question 2

With regard to page 6-2 of the Final Environmental Statement, provide more explanation of the on-site meteorological program. Explain what has been done to date.

Response

An on-site meteorological program has been initiated with data collection begun on March 23, 1973. The installation is located approximately one mile northeast of the plant site.

Tower location, parameters measured, sensor heights, accuracy, and data collection and analysis procedures are in accordance with guidelines set forth in AEC Regulatory Guide 1.23. The meteorological installation meets OSHA requirements.

The nine monitored parameters are wind speed, wind direction, wind variance (sigma), ambient temperature, differential (delta) temperature, dew point temperature, total precipitation, solar radiation, and barometric pressure.

Two identical Meteorology Research, Inc. (MRI) Wind Sensors are installed on the tower on 12 foot long instrument booms; one at the 35 foot level (10 meters), and one at the 200 foot level. The sensors are mounted approximately 8 feet from the tower to minimize tower shadow effects and are oriented such that the tower will be in line with the sensors and wind a minimum amount of time.

Four Rosemount Temperature Sensors are installed in separate Climet Aspirated Temperature Shields. At the 200 foot level, two single-element sensors provide the higher altitude measurements for the redundant differential temperature monitoring systems. At the 35 foot level, a single-element and a dual-element sensor are installed. The single-element sensor and one element of the dual-element sensor provide the lower altitude measurements for the differential temperature systems. The second element of the dual-element sensor provides the ambient air temperature measurement. The lower single-element aspirated shield also contains a Honeywell Dew Point Sensor. CP&L is preparing to retrofit a

Cambridge Dew Point Sensor at the 35 foot level and add a second Cambridge Dew Point Sensor at the 200 foot level by October, 1974.

The aspirated shields protect the sensors from solar and terrestrial radiation while, in each shield, the motor driven aspirator draws ambient air over the sensor. Using this system, radiation errors are limited to less than 0.2°F at maximum solar radiation.

An Epply Solar Radiation Sensor (pyranometer) and a Weather Measurement Total Precipitation Sensor (heated snow gage) are mounted on pedestals approximately five feet above ground level.

A Rosemount Barometric Pressure Sensor, the Westinghouse signal conditioning equipment and digital tape recorders, and the Esterline Angus Strip Chart Recorders are housed in a nearby aluminum building.

Data for all nine parameters are continuously monitored and 15 minute average values are recorded on magnetic tape. Strip chart recorders are used as a backup system for redundant recording of wind speed and directional data, as well as for information on peak gusts. As data is being recorded on magnetic tape, the pulses representing wind speed and direction, ambient temperature and differential temperature are counted and sorted in an encoder which is connected to a telephone data set. Upon telephonic command, the data stored in the encoder is transmitted, via the data set and normal voice grade telephone lines, to a remote interrogation station which is co-located with the Special Services Department computer. The remote terminal is presently used to acquire data on an hourly basis by automatic call. This adds a further redundancy to the data recording system, because CP&L will have a record of one 15 minute averaged reading per hour.

At the end of the month, the magnetic cartridges are retrieved from the station. Using a magnetic cartridge tape to 1/2-inch magnetic tape translator, the data is transferred to computer-readable magnetic tape. Thirteen months of the collected data has been converted to engineering units and placed on the history tape, which is stored for use as required.

ASLB Question 3

Where will the fill material for the dams come from? The concern is the 24-hour per day trucking operation which might occur and the resulting effect on the population adjacent to the site. Will the operation result in heavy trucking in the vicinity of residents?

Response

Fill material for the two dams will come from nearby borrow areas, spillway excavations and, in the case of the auxiliary dam and dike, from channel excavations in the main plant site and Auxiliary Reservoir.

Construction of both the main and auxiliary dam embankments is scheduled to be performed on a multiple shift basis.

The location of the auxiliary dam and its sources of embankment materials are within the 7,000 foot radius exclusion area and are remote from nearby presently inhabited dwellings. Accordingly the 24-hour per day earth moving should not affect any adjacent population. Crushed rock materials for the filter zones, riprap and bedding materials will be hauled from a quarry approximately 15 miles away, utilizing existing highways, generally during daylight hours.

The main dam and spillway are located between 3,000 and 4,500 feet from the nearest inhabited dwellings. Materials for the embankment filters and shell will be produced from required excavation in the adjacent spillway. Material for the core will be obtained from a borrow area adjacent to an inhabited dwelling, approximately 3,000 feet from the dam site. The haul road for transport of the core material will be routed away from existing State Highway NC 42 through the reservoir area. It is not considered that unusually heavy trucking will result on public roads from this construction, although delivery of concrete for the spillway structure will be required.

ASLB Question 4

With regard to page 78 of the AEC Safety Evaluation, clarification of the number of low pressure coolant injection pumps for each unit is required. Are there two pumps per loop or two pumps per unit?

Response

There are two residual heat removal low-head safety injection pumps per unit.

ASLB Question 5

The AEC Safety Evaluation Page 81 states that the temperature reaches 2300 degrees Fahrenheit. This should be clarified as it is not evident from the text just what is trying to be proved; any condition under which 2300°F is reached should be explained.

Response

Subsequent to the ASLB question of July 2, 1973, CP&L has amended the PSAR (Amendments 31 and 33 dated March 22, 1974 and April 8, 1974, respectively) to incorporate 17 x 17 fuel design in place of the 15 x 15. Appendix 3A of Amendment 31 shows that by utilizing the 17 x 17 fuel design under the Interim Acceptance Criteria including densification effects, the clad temperature will not reach 2300°F. This is based upon analyses performed for the Beaver Valley plant and incorporated by reference in the Shearon Harris Application. As indicated in Appendix 3A of Amendment 31, the improvement in peak clad temperature for the worst case Double Ended Cold Leg Guillotine Break provided by the 17 x 17 fuel design is 400°F, resulting in a peak clad temperature of about 1900°F for the equivalent conditions which yielded 2300°F in the Shearon Harris 15 x 15 analysis. This amendment was subsequently covered by the AEC in their Supplement #2 to the Safety Evaluation (page 9), dated May 6, 1974.

ASLB Question 6

With regard to page 111 of the AEC Safety Evaluation and protective action required following main steam line break, what scram action or actions would be initiated, and what would be the reaction time in case of a main steam line break?

Response

The AEC Safety Evaluation, page 111, discussed the venturi flow restrictors and steam line isolation valves, which will restrict steam flow and limit blowdown to the affected steam generator in the event of a main steam line break.

A description of this accident is presented in PSAR Section 14.4.2.1. PSAR Figure 14.4-32 shows significant core parameters for this transient. The order in which signals are generated and protection and engineered safety features (ESF) actions are generated is indicated in Table I.

The fast acting main steam line isolation valves are tripped by high steam flow in any two main steam lines in coincidence with low steam pressures in any two main steam lines. This trip signal arrives at the valves by time five seconds, and the valves are fully shut by time ten seconds.

The reactor is tripped (if all rods not already inserted at initiation of event) by the Safety Injection Signal at time five seconds. All RCC Assemblies (except the assumed stuck RCC assembly) are effectively inserted by time seven seconds.

There are other possible similar sequences of events. For instance, if the reactor were operating at power, the first reactor trip signal generated might be a power range high neutron flux trip, or an overpower or overtemperature ΔT trip, depending on the assumed initial conditions. In all cases, safety injection is initiated.

TABLE I

ACTIONS INITIATED IN THE EVENT OF A MAIN STEAM LINE BREAK

FOR THE SHEARON HARRIS NUCLEAR POWER PLANT

SEQUENCE OF EVENTS

Initial conditions: Steam line break upstream of the stop valve in one line; reactor initially hot shutdown; offsite emergency electric power available.

TIME (sec.)	EVENT
0	--Break
5	--High steam flow in any 2 main steam lines in coincidence with low steam pressure in any 2 main steam lines causes: a. Safety Injection Signal sent to ESF components: 1. Initiates ECCS active safety injection. 2. Trips main feedwater pumps, shuts pump discharge valves; shuts all main feedwater control valves; starts electric auxilliary feed pumps. 3. Initiates Phase A isolation (all containment isolation trip valves on non-essential process lines). 4. Starts emergency diesel generators. 5. Starts full capacity containment cooling. b. Closure signal sent to fast acting steam line stop valves. c. Safety Injection Signal initiates Reactor Trip (if any RCC Assemblies not fully inserted initially). d. Turbine tripped by Reactor Trip Signal; turbine stop valves, control valves, reheat stop valves and interceptor valves shut.
7	--RCC assemblies effectively inserted.

10	--Fast acting main steam line stop valves and main feedwater control valves fully shut (less than 5 sec. shutting time).
15	--Safety injection high head pumps at speed; valves aligned.
35	--20,000 ppm boric acid injected into cold leg and is diluted and swept into the core.

ASLB Question 7

With regard to page 131 of the AEC Safety Evaluation and page 12.2-9 and Figure 12.2-9 of the PSAR, what are the number of personnel per shift? Both 15 and 17 persons are listed.

Response

PSAR page 12.2-9 was amended and now agrees with the AEC Safety Evaluation and PSAR Figure 12.2-9 in that there will be 15 plant personnel per shift.

ASLB Question 8

With regard to PSAR Figure 12.2.9, what is the rationale for having radiation technicians available only for multi-unit operations and none for single unit operations?

Response

It is planned to operate a single unit at Harris in the same manner that has been successful for two full cycles at the single unit Robinson Plant. Radiation Control Technicians will be on-site during normal working hours. Radiation Control Technicians will be on 24-hour call to ensure that coverage is available outside of normal working hours. During outages and for special circumstances such as initial plant testing, sufficient radiation control technicians will be assigned on an as required basis to ensure compliance with all radiation control procedures. In addition, plant operators are trained in radiation control procedures and, as has been our experience at Robinson, will be capable of handling any situation until a radiation control technician arrives.

Educational and Professional Qualifications

NORMAN B. BESSAC

MANAGER - NUCLEAR GENERATION - CAROLINA POWER & LIGHT COMPANY

Mv name is Norman B. Bessac. My business address is Carolina Power & Light Company, (CP&L), 336 Fayetteville Street, Raleigh, North Carolina. I hold the position of Manager - Nuclear Generation, Bulk Power Supply Department. As Manager, Nuclear Generation, I exercise line responsibility for the operation of nuclear powered generating plants and support facilities in CP&L. Additionally, I am responsible for all operational startup activities at new nuclear powered generating plants.

In 1944 I graduated from the United States Naval Academy and was commissioned in the U. S. Navy. During the course of my naval service in 1951, I received a M.A. Degree from Stanford University.

From June 1944 until December 1965, I served both ashore and afloat in the U.S. Navy as a line officer in the submarine service. During my naval career, I commanded three submarines including two nuclear powered ships.

From December 1965 until joining CP&L in February 1969, I was employed by the General Dynamics Corporation as a member of the corporate staff in New York City. While with General Dynamics Corporation, I had a variety of assignments as Director Marine Program Development reporting to the corporate Vice-President, Engineering and Program Development.

Upon joining CP&L in February 1969, I was Director, Technical Services, until I assumed my current responsibilities as Manager, Nuclear Generation in December 1969.

I am a member of both the American Nuclear Society and American Society of Mechanical Engineers.

Educational and Professional Qualifications

R. J. STONE

SENIOR SCIENTIST - SITING - CAROLINA POWER & LIGHT COMPANY

My name is R. J. Stone. My business address is Carolina Power & Light Company (CP&L), 336 Fayetteville Street, Raleigh, North Carolina. I hold the position of Senior Scientist - Siting, in the Licensing and Technological Services Section. I am responsible for CP&L's meteorological program.

In 1964 I graduated from City College of New York with a B. S. Degree in Meteorology. In 1971 I received my M. S. Degree in Meteorology from New York University. I have completed all requirements, less dissertation, for my Ph.D. Degree.

Following graduation in 1964, I served for two years as a Signal Corps Officer in the U. S. Army. During 1966 and 1967 I was employed by the U. S. Weather Bureau as an observer - briefer.

Between 1967 and 1973, my research interest was the development of meteorological instrumentation.

I have served in my present capacity since March, 1973.

Educational and Professional Qualifications

THOMAS H. WYLLIE

SITE MANAGER - POWER PLANT CONSTRUCTION - CAROLINA POWER & LIGHT COMPANY

My name is Thomas H. Wyllie. My business address is Carolina Power & Light Company (CP&L), 336 Fayetteville St., Raleigh, North Carolina. I hold the position of Site Manager - Power Plant Construction Department and am assigned full time to the construction site of the Shearon Harris Nuclear Power Plant. In this position, I am responsible for all construction and site engineering activity at the plant site.

In 1948 I graduated from Worcester Polytechnic Institute with a B.S. Degree in Civil Engineering.

From 1948 until 1972, I was employed by Ebasco Services Incorporated and served in a variety of capacities, predominantly at power plant construction sites.

During my employment by Ebasco Services Incorporated, I was assigned to approximately 15 projects, filling at one time or another all of the normal civil engineering capacities which are required on large construction projects, including office, field, cost, resident engineering positions and latterly, construction superintendent and project superintendent assignments. Projects included fossil fueled power plants in Arkansas, Louisiana, Texas and North Carolina.

In 1967 I was assigned as resident engineer for construction of the 700 MW H. B. Robinson Nuclear Power Plant for CP&L. During the course of the project, I moved to the position of construction superintendent and finally to acting project superintendent for the latter part of the construction.

In July, 1972, I accepted my present position with Carolina Power and Light Company.

In addition to the preceding, I am registered as a Professional Engineer in Arkansas (since 1953) and a member of the American Society of Civil Engineers.

Educational and Professional Qualifications

M. G. ZAALOUK

PROJECT ENGINEER, NUCLEAR - NUCLEAR PLANT ENGINEERING I - CAROLINA POWER & LIGHT COMPANY

My name is M. G. Zaalouk. My business address is Carolina Power & Light Company (CP&L), 336 Fayetteville Street, Raleigh, North Carolina. I hold the position of Project Engineer, Nuclear - Nuclear Plant Engineering I, in the Power Plant Engineering Department. I am responsible for all the nuclear aspects of engineering and design review of the Shearon Harris Nuclear Power Plant Project.

In 1957 I graduated from Cairo University with a B. S. Degree in Electrical Engineering. I received an M. S. Degree in Nuclear Engineering and a Ph.D. Degree in Nuclear Engineering from North Carolina State University in 1962 and 1966, respectively.

Following graduation in 1966, I was awarded Post Doctoral Research and Development Fellowships by the Egyptian and Norwegian Atomic Energy Institutes. During this assignment, my duties were to supervise the uprating and bringing critical a research nuclear reactor and to develop a fuel burn-up analysis code for a 500 MWe nuclear power reactor.

In 1969 I was appointed Assistant Professor at North Carolina State University. In addition to my teaching duties, I co-supervised the development of a clad temperature control system for applications in nuclear power reactors. This development was sponsored by the National Science Foundation and the U. S. Atomic Energy Commission.

I joined Carolina Power & Light Company in 1972 as a Senior Nuclear Engineer in the Power Plant Engineering and Construction Department (reorganized and renamed the Power Plant Engineering Department), and have served in my present capacity as Project Engineer, Nuclear since 1973.

I am a co-author of 11 nationally and 4 internationally published technical papers. Also, I have authored 10 technical reports. The contents of these publications dealt with reactor core analysis and in particular temperature dynamics.

In addition to the preceding, I am a member of the American Nuclear Society, Society of Sigma Xi and ANS 19.3 Standards Committee.