DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

February 7, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Section 9.3.2.2 of the Catawba Safety Evaluation Report discusses License Condition 17. Post Accident Sampling System. Additional information needed by the Staff to complete their review of NUREG-0737, Item II.B.3 is provided below.

Criterion (2) requests a procedure to estimate core damage based on radionuclide concentrations. Procedure AP/0/A/5500/31, Estimate of Failed Fuel Based on I-131 Concentration, is attached.

Criterion (10) requests:

> "All equipment and procedures that are used for post accident sampling and analysis should be calibrated or tested at a frequency that will ensure (to a high degree of reliability) availability when required. Operators should receive initial and refresher training in post accident sampling and analysis and transport. A minimum frequency for the above efforts is considered to be every 6 months if indicated by testing. These provisions should be submitted in Technical Specifications in accordance with Enclosure 1 of NUREG-0737."

The Post Accident Liquid and Gas Sampling procedures will include a checklist which must be completed periodically to verify the operability and reliability of the panels. A request for such a Technical Specification has been submitted. It reads:

> "Post accident sampling and analysis shall be calibrated or tested at a minimum frequency of 6 months. Operators shall receive initial training and refresher training shall be provided thereafter at least every 6 months if indicated by testing."

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Criterion (10) also requests:

> "The applicant should provide information on the accuracy and sensitivity of the procedure to demonstrate that the selected procedures and instruments will achieve the above-listed accuracies."

See Attachment A.

In addition, Section (10) states:

> "The staff will require the applicant to provide information demonstrating the applicability of these procedures and instrumentation in the post accident water chemistry environment as a condition of the license."

See Attachment B.

Section (11) states that the applicant should provide information regarding heat tracing of the containment atmosphere sample line to aid in obtaining representative samples.

The containment atmosphere sample lines are to be heat traced as shown on Attachment C (CN-1572-1.6). Also, instrument detail drawing CN-1499-M126 states in Note 2: "Inlet lines outside of containment shall be heat traced."

Very truly yours,

Hal B. Tucker

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Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
P. O. Box 12097
Charleston, South Carolina 29412

cc: Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

ATTACHMENT A
Accuracy and Sensitivity of Analyses

Gross Activity, Gamma Spectrum - Criterion (10) states that these analyses should be accurate within a factor of two across the entire range. Existing procedures at Catawba and computer-based multi-channel gamma analyzer with multiple Ge(Li) detectors, used for identification and measurement of gamma emitting radionuclides in the samples of reactor coolant, liquid and gaseous waste and airborne contaminants provide adequate accuracy which is well within the recommended factor of two across the entire range.

Chloride - Criterion (10) states that for concentrations between 0.5 and 20.0 ppm chloride the analysis should be accurate within ± 10% of the measured valve. At concentrations below 0.05 ppm the tolerance band remains at ±0.05 ppm.

Chloride analysis by ion-chromatography on diluted samples can provide results with a tolerance factor of ± 20% (at minimum detection limit) or better. This depends on the chloride concentration level and the dilution factor. Under a post-accident environment, it is our opinion that a tolerance factor of ± 20% is quite adequate for the purpose of assessing coolant corrosion potential.

pH - Criterion (10) states that between a pH of 5 and 9, the reading should be accurate within ± 0.3 pH units. For all other ranges ± 0.5 pH units is acceptable. At the Oconee Plant, which has the same type pH monitors, they have proved that a pH measurement of ± 0.3 pH units can be achieved with the post accident liquid sample panel. This was tested by comparing panel readings with bench top pH meter readings on the test samples.

Boron - Criterion (10) states that the analysis should be accurate within ± 5% of the measured valve. For concentrations below 1000 ppm the tolerance band should remain ± 50 ppm.

The two sources of error are the dilution error and the analytical technique error. Since the dilution error is a function of how well the post accident liquid sample panel performs the dilution step, this error will be calculated at a later time when the panel is functional.

Hydrogen or Total Gas - Criterion (10) calls for an accuracy of ± 20% between 50 and 2000 cc/kg. For concentrations below 50 cc/kg the tolerance remains at ± 5.0 cc/kg.

The Hydrogen and total gas accuracy cannot be accessed until the post accident liquid sample panel is functional. The gas stripping and dilution steps must be performed to evaluate their contribution to error. This will be done at a later time when the panel is functional.

Oxygen - Criterion (10) calls for an accuracy of ± 10% when the oxygen concentration is in the range of 0.5 to 20.0 ppm. At concentrations below 0.5 ppm the tolerance band remains at ± 0.05 ppm.

Again, as in hydrogen and total gas analysis, the error due to gas stripping and dilution steps must be accessed at a later time when the panel is functional.

ATTACHMENT B
Post Accident Water Chemistry Analysis

Matrix Effect

Boron - Alkali and alkaline earths metal ions, NH_4^+ Ce^{+4} and Cℓ ions do not have any matrix interference in the analysis of B by Carminic acid method (ASTM D3082-74, 1979 Annual Book of ASTM Standards, Part 31). Iodide and nitrate ions do not present any spectral interference in the absorption band of Boron-Carminic acid complex (λmax.=590nm).

No interference is expected from La^{+3} since La and Ce are neighboring elements in the Lanthanide series. Moreover, La^{+3} and Ce^{+4} ions, being isoelectronic, have very similar chemical characteristics.

Chloride - None of the anions listed in the standard test matrix have any interference in chloride analysis by ion-chromatographic techniques. The peaks are well resolved.

pH - Reversibility of pH electrodes with respect to hydrogen ions remains unaffected by the presence of ions listed in the standard test matrix. Therefore, no interference is expected.

Radiation Effect

None of the various off-line analytical techniques described earlier are affected by a high radiation field. Recent studies (NSAC Project No. TSAS-399, Final Report, January 1982) indicate that effect of high radiation field on pH measurement by pH probes is insignificant. Probes subjected to even integrated exposure of 1.8×10^7 rads were found to produce very reliable results within close tolerance factor (±0.1 pH units).

ATTACHMENT C
Heat Tracing on the Containment Air Sample Line
From CN-1572-1.6, Rev. 1