UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

AUG 14 1989

Report Nos.: 50-413/89-18 and 50-414/89-18

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-413 and 50-414 License Nos.: NPF-35 and NPF-52

Facility Name: Catawba 1 and 2

Inspection Conducted: July 17-21, 1989

Inspector: Thomas R Decker for 8/11/89
S. S. Adamovitz Date Signed

Approved by: Thomas R Decker 8/11/89
T. R. Decker, Chief Date Signed
Radiological Effluents and Chemistry Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of plant chemistry, liquid waste controls, and previously identified inspector followup items.

Results:

The licensee had effectively maintained primary chemistry well within Technical Specification requirements and secondary chemistry well within the limits recommended by the Steam Generators Owners Group (SGOG) (Paragraphs 3.a and 3.b). Biofouling problems in the service water systems (Paragraphs 3.d and 4.a) had received increased attention. The licensee had increased maintenance inspections and cleaning of the systems susceptible to this type of corrosion.

One noncited violation (Paragraph 2.b) was identified for failure to conduct analyses of turbine building sump (TBS) liquid on a 24 hour basis when the TBS monitor was inoperable.

REPORT DETAILS

1. Persons Contacted

   Licensee Employees

   D. Bain, Chemistry Supervisor, Primary
   B. Cherndrlik, Scientist, Health Physics
   *W. Deal, Station Health Physicist
   *J. Forber, Superintendent, Technical Services
   J. Glenn, Nuclear Production Engineer
   *R. Glover, Compliance Manager
   *D. Kick, Nuclear Production Engineer
   *U. King, Nuclear Production Engineer
   J. Mode, General Supervisor, Health Physics
   *T. Owen, Station Manager
   J. Painter, Nuclear Supervisor, Chemistry
   *R. Propst, Chemistry Manager
   B. Sorber, Senior Scientist, Radiation Protection
   C. Therrian, Supervising Scientist

   NRC Resident Inspectors

   M. Lesser
   *W. Orders

   *Attended exit interview

2. Licensee Action on Previous Enforcement Matters (92702)

   (Closed) Violation (VIO) 50-413, 414/89-10-01: Failure to include a description of unplanned releases in the Semiannual Effluent Release Report as required by Technical Specification (TS) 6.9.1.7. The licensee had provided an updated effluent report which included the required description of unplanned releases. Additionally, the personnel responsible for the report had been provided additional training concerning the requirements for the contents of the report. This item is considered closed.

   (Closed) Unresolved Item (URI) 50-413, 414/89-16-04: Interpretation of requirement to analyze compensatory samples once per 24 hours. This URI was originally identified by the resident inspectors. The Unit 2 Turbine Building Sump radiation monitor, 2EMF 31, was initially declared out-of-service on March 1, 1989. The monitor remained out-of-service and was placed on a backlog list May 21, 1989. On July 5, a work request was written to repair the flow switch. Between July 5 and 20, the flow switch was repaired and a backflush valve replaced. As of July 20, 1989, Health Physics (HP) personnel were waiting the results of functional tests. Additionally, a work request had been issued to determine the cause of the low flow rate out of the pump. Blocked lines or valves were suspected as being the cause. The licensee had been in an action statement since March 1 when 2EMF 31 was declared out of service. TS 3.3.3.10 specifies that when 2EMF 31 is inoperable, effluent releases may continue provided grab samples are analyzed for radioactivity at least once per 24 hours if the specific activity of the secondary coolant is less than or equal to 0.01 microcuries/gram dose equivalent I-131. The inspector reviewed a summary of actual sampling and analysis times for 2EMF 31 covering the period between March 1 and June 14, 1989. For this time period which included 106 tests, 49 percent of the analyses times exceeded 24 hours. These times exceeded the 24 hour analysis requirement by amounts ranging from several minutes to a maximum time of 1 hour and 48 minutes. Discussion with the licensee indicated that collection time had been tracked as meeting the TS 3.3.3.10 requirement. A review of the sample collection times for the March 1 - June 14 period revealed that sample collections had been made on a 24 hour basis. During the week of the inspection, the licensee revised the procedure HP/0/B/1009/11, "EMF Loss," to require analysis, review/evaluation, and appropriate actions to be initiated within three hours of sample collections. The analysis would not be considered complete until the review and evaluation had been finished. This violation met the criteria specified in Section II of the NRC Enforcement Policy for issuing a Non-Cited Violation (NCV). The inspector informed the licensee that this issue would be considered a NCV of TS 3.3.3.10. Since the licensee had completed corrective actions, a written response would not be required. The inspector and licensee also discussed the importance of repairing the monitor and returning it to service in order to get the plant out of the action statement condition requiring 24 hour analyses.

NCV 50-413,414/89-18-01: Failure to conduct analyses of TBS liquid on a 24 hour basis when the TBS monitor was inoperable.

3. Plant Chemistry (84750)

At the time of this inspection, Catawba Units 1 and 2 were operating at 100 percent power. Unit 1 was in its fourth fuel cycle after a planned refueling maintenance outage which lasted from November 24, 1988 to February 6, 1989. Unit 2 was in its third fuel cycle after a planned outage from March 14 to June 7, 1989. The inspector reviewed the plant chemistry controls and operational controls affecting plant chemistry during 1988 and 1989.

a. Review of Units 1 and 2 Reactor Coolant Chemistry Controls

(1) TS 3/4.4.4 requires that the concentrations of dissolved oxygen, chloride, and fluoride in the reactor coolant systems be maintained below 0.10 ppm, 0.15 ppm and 0.15 ppm, respectively. The inspector reviewed 1989 daily results for these chemistry variables and determined that these parameter values were maintained well below TS limits for both units. Typical values for dissolved oxygen, chloride and fluoride when the units were

at 100 percent power were <5 ppb, <10 ppb, and <50 ppb respectively.

(2) The licensee had induced crud bursts for both units during past outages. The crud bursts were accomplished by the addition of hydrogen peroxide to the reactor coolant systems and were designed to reduce out-of-core radiation/contamination levels by solubilizing fission and activation products deposited on out-of-core metal surfaces. During a previous chemistry inspection (50-413, 414/87-29) conducted August 31 - September 4, 1987, the licensee was planning to perform a "water solid" crud burst for Unit 1 and a "mid-plane" crud burst for Unit 2. The "water solid" crud burst would be performed with the reactor coolant system (RCS) filled and a reactor coolant pump circulating the water. The "mid-plane" crud burst would be accomplished by draining the reactor coolant to mid-plane and cycling the water with a residual heat removal (RHR) pump. The licensee was considering the "mid-plane" burst at the time in order to reduce the critical path time for the outage.

This type of crud burst would reduce radiation levels at the refueling bridge but not in the vicinity of the steam generator. However; due to the effectiveness of the Unit 1 "water solid" crud burst, the licensee opted to perform all "water solid" bursts and did not use the "mid-plane" method.

(3) The licensee performed the following preventative actions to reduce primary side stress corrosion cracking (PSSCC) of the steam generator tubes:

(a) During 1987, all the Unit 1 tubes in the D-3 steam generators were shot peened to a distance of 23 inches (full-depth) above the bottom of the tube sheet on the hot leg side. The shot peening of the tubes was performed to reduce or eliminate residual stresses remaining from steam generator construction. Additionally, U-bend stress relief in the steam generator was performed in 1988. The licensee planned to perform shot peening of the cold leg side for Unit 1 during 1992. Shot peening of the tubes in the Unit 1 steam generators had not been performed and was not planned since these were D-5 generators and had been stress relieved during assembly.

(b) The licensee had adopted an optimum range of 25 to 35 cc/kg for hydrogen overpressure in the RCS. This was a reduction from the 25-50 cc/kg range since it was determined that increased dissolved hydrogen accelerated the effect for PSSCC. The inspector reviewed hydrogen data for 1988 and 1989. In general, Unit 1 hydrogen values ranged from 20 to 40 cc/kg and Unit 2 from 25 to 45 cc/kg.

(c) The licensee had incorporated the Electric Power Research Institute (EPRI) guidelines for a coordinated boron/lithuim program with a constant pH of approximately 6.9-7.0 at 300 degrees C. At the beginning the cycle, lithium is maintained from 1.9 ppm to 2.2 ppm at 1200 ppm boron. By the end of cycle, lithium concentrations have decreased to 0.2 ppm to 0.5 ppm at 0 ppm boron. The licensee was waiting for the result from current tests at Millstone before considering a program to increase lithium concentrations above the upper limit of 2.2 ppm. Higher lithium concentrations with the correspondingly higher pH have been predicted to lower primary system dose rates. However, there are potential concerns for increased fuel corrosion and PSSCC of steam generator tubes with the increased lithium concentrations in the primary system. The Millstone study will include a fuel examination to document lithium's effects on fuel cladding. The results are expected by late 1989.

b. Review of Units 1 and 2 Secondary Chemistry

Controls and System Operations

(1) There had not been any circulating water leaks into the condenser in either unit since 1985. Currently, above-the-waterline air inleakage into the condenser was not routinely monitored. Air inleakage was tracked by measuring the amount of dissolved oxygen in the condenser and feedwater. The inspector reviewed 1988 and 1989 condenser hotwell dissolved oxygen values for Units 1 and 2. Typical values at 100 percent power ranged from 1 to 2 ppb for both units which indicated tight condenser integrity and little inleakage.

(2) Condensate Cleanup Systems

The original design of the condensate polishing demineralizer (CPD) filter elements consisted of a wire mesh screen wrapped around a stainless steel core tube. Although this configuration allowed large flow-through, resin leakage problems into the secondary system also occurred. Beginning November 1986, the licensee began replacing the CPD filter elements with a new design of filter tube. The new sintered metal elements (Pall Porous Metal membrane) corrected the leakage of resin fines but maintained some initial problems with fouling and subsequent high differential pressure across the CPDs. The licensee determined that the fouling was due to operational problems. Insufficient filter precoat, combined with lack of inspection of the elements after the precoat was applied, caused the fouling. The licensee had remedied the situation by inspecting the elements after the precoat and currently gets greater than 30 precoats before the bundles have to be sent offsite for cleaning. The low resin leakage had contributed to low cation conductivity in the steam generator.

Proper maintenance and operation of the polisher was evidenced by the low conductivity of the polisher effluent. For 1988 and 1989, polisher effluent conductivity in both units had typically remained at 0.06 microsiemens (uS). (The conductivity of pure water is 0.054 uS.)

(3) Steam Generators

The inspector examined 1988 and 1989 cation conductivity data for both units' steam generators. During the past 18 months, typical values for both units were less than 0.12 uS. This was an improvement over values listed in a previous inspection report (50-413, 414/87-29). During 1987, cation conductivity of the water in the steam generators varied between 0.13 and 0.15 uS for Unit 1 and between 0.18 and 0.19 uS for Unit 2. The low cation conductivity values resulted from a combination of clean feedwater and high steam generator blowdown rates which effectively removed contaminants. During 1987, Unit 1 steam generator blowdown was maintained at 110 gpm per generator and Unit 2 at 90 gpm per generator. Westinghouse had approved an increase in Unit 2's blowdown rate in 1989, and the licensee had since increased the rate to 110 gpm per generator. This increased Unit 2 blowdown rate contributed to the current lower cation conductivity values (0.18 uS in 1987 as compared to <0.12 uS in 1989).

The licensee continually operated steam generator blowdown recovery systems for both units. The recovery system recycled essentially pure water (cation conductivity of <0.1 uS) back to the condenser hotwell.

Sludge lancing had been performed on all four generators on Unit 1 during the first and second refueling outages. A total of 101 pounds of sludge was removed during the first outage and a total of 82 pounds during the second outage. Due to the small amounts of sludge removed, the licensee opted not to perform Unit 1 lancing during the third refueling outage (November 1988 - February 1989).

For Unit 2, sludge lancing was performed during the first refueling outage and a total of 41 pounds was removed from all four steam generators. Again the licensee opted not to perform sludge lancing during the second refueling outage (March - June 1989) since such small amounts had been removed during the first sludge lancing. Based on the low amounts of sludge in both units, the licensee was considering steam generator sludge lancing on an every-other outage basis.

The licensee performed eddy current testing of Units 1 and 2 steam generators during the refueling outages. The testing generally consisted of three percent or six percent random sampling and 100 percent in areas of known or potential problems such as: the periphery for damage from loose parts; rows 48 and 49 for defects from preheater expansion; rows 1 and 2 for U-bend stress; and previously identified defects. Also during refueling outage 2 for Unit 1, 100 percent of the hot leg tube sheet had been tested. For Unit 2, during the refueling outage 2, the random sampling was increased to 20 percent. This addition resulted from the steam generator tube rupture at McGuire and an increased awareness of potential problems. Units 1 and 2 eddy current testing resulted in a total of 76 plugged tubes for Unit 1 and 29 plugged tubes for Unit 2. In Unit 1, 56 of the tubes were plugged due to PSSCC in the hotleg or U-bend. For Unit 2 none of the tubes had been plugged due to PSSCC.

The licensee had experienced few problems with primary to secondary leaks for both units. During July 1988, Unit 1 developed a leak which peaked at 100 gallons per day in August. The unit was brought down from power and the leaking tubes plugged. Current leak rates for both units were less than one gallon per day.

A "hotsoak" of all steam generators was performed during the cooldown prior to a refueling outage. The purpose of the hotsoak was to reduce hideout return. Hideout return can be defined as chemical contaminants that collect or "hide out" in steam generator crevices during power operation and then return to the liquid as temperature is reduced. The licensee held the steam generator bulk liquid at 325°F for four hours. The inspector reviewed hotsoak data for Unit 2 EOC2 and Unit 1 EOC3. For Unit 1 cation conductivity peaked at 0.40 uS in steam generator A and 0.29 uS in steam generator C. Sulfate and phosphate levels remained below 30 ppb and 3 ppb respectively. For Unit 2, cation conductivity peaked at 0.80 uS in steam generator A. Sulfate and phosphate levels peaked at 9.5 ppb and 74 ppb, respectively. These low values for cation conductivity and ionic contaminants indicated little hideout return existed in the steam generators.

(4) Secondary System Corrosion Product Transport Study

The licensee was currently performing a corrosion product transport study for the secondary system. The study was initiated to determine the source of various corrosion products within the system and subsequent transport to the steam generators. Six sampling points had been established which consisted of the hotwell, polisher effluent, "C" high pressure heater drain tank, final feedwater, steam generator blowdown and

"E" heater. The sampling train consisted of one 0.45 micron millipore membrane to collect filterable species and three cation resin impregnated filters to remove ionic species. The licensee had not completed the study as of the week of this inspection.

(5) Summary

The licensee had maintained primary chemistry well within TS requirements and secondary chemistry well within the limits recommended by the SGOG. Good control was evidenced by:

- low levels of ionic contaminants in the primary and secondary systems
- low levels of dissolved oxygen in the condenser water which indicated little air inleakage
- no circulating water leaks in the main condenser since 1985
- very little hideout return in the steam generators
- only small amounts of sludge removed from the steam generators
- the conductivity of the effluent from the condensate cleanup systems was .06 uS (almost pure water)
- few steam generator tubes required plugging

c. Review of the Licensee's Chemistry Control Program

(1) Organization

The Chemistry Department was staffed by a total of 77 people, including 15 supervisors.

The department had undergone a major reorganization of shift and day personnel during February 1988. The position of Manager of the Chemistry Department had been recently filled by a chemist from the general office. The department had three vacancies, and the licensee was actively recruiting personnel to fill these positions.

(2) Training

The inspector discussed chemistry staff training with licensee personnel and reviewed chemistry Guideline 5.2 "Implementation of the Employee Training and Qualification System," Revision 0, dated May 13, 1989. Staff instruction included a combination of classroom and on-the-job training.

Emphasis was placed on qualifying the technicians for mandatory tasks, and promotion eligibility was based upon completion of specific tasks at a certain level of expertise. Requalification was required for significant changes to procedures or guides, as dictated by task frequency or difficulty, or by poor job performance. The licensee had also established a series of 24 topics related to plant chemistry. The training included discussions of regulatory requirements, system components, and theory of operation or analysis. The training was provided by Production Support personnel and topics included chemistry TSs, selected system components and operation, in-line and laboratory instrumentation, quality control, and resin theory. Of the 24 subjects identified, the licensee had completed training for seven. Chemistry personnel estimated that four subjects were presented each year.

(3) Data Management and Review

The inspector reviewed data acquired by the primary and secondary laboratories during the past 18 months. The licensee maintained a computerized bank of primary and secondary analytical results. Typically, the chemistry technicians entered analytical data into the computer network which generated a daily report for review by supervision. The computer program could also supply graphed results for any designated time period for trending purposes. The inspector reviewed 1989 weekly data for inline monitor calibrations and noted that monitors were calibrated per procedural requirements.

(4) Laboratory Facilities

The inspector toured the secondary chemistry laboratory and discussed instrument maintenance. The laboratory was equipped with inline and table-top ion chromatographs and inline monitors for measurements of sodium, chloride, pH, ammonia, hydorgen, dissolved oxygen and cation conductivity. The licensee performed bench top measurements for suspended solids, specific conductivity, pH, iron and copper. The laboratory was also equipped with sampling sinks for pulling secondary chemistry samples. During 1989, new inline dissolved oxygen instrumentation had been installed for monitoring final feedwater and the hotwell.

(5) Audit

The inspector reviewed the departmental audit: NP-89-20(CM) "Chemistry/Process Control" conducted April 24, 1989 to May 16, 1989. The inspector noted that the various program areas were audited against applicable sections of the plant's TSs, approved operating procedures and manuals, and regulatory requirements. The audit scope included a review of selected documents and procedures, personnel interviews and observation of various work activities. The audit appeared indepth, and followup on identified problems was completed in a timely manner.

d. Biological Fouling

Both units of Catawba obtained make-up water for service water systems from Lake Wylie. During 1988 and 1989, the plant has experienced problems with clam, bryozoan (fresh water jellyfish), and sponge infestation. Also the appearance of microbiological induced corrosion (MIC) had been noted in some heat exchangers. Recent environmental conditions had contributed to the biological fouling problems. Current drought conditions supported stagnant, nutrient-rich and low turbidity water which promoted the bryozoan growth. During March 1988, Catawba experienced a unit shutdown because the flow control valves of the auxiliary feedwater system pumps became clogged with shredded clams. The plant has also experienced MIC and subsequent deposit buildup in heat exchangers which used raw water for cooling. The component cooling system (KC) heat exchanger had been retubed in December 1988 and a total of 144 tubes had been plugged. The licensee increased visual inspections, cleaning with brushes, and pressure tests for this heat exchanger from an annual basis to every six months. Eddy current testing for a minimum of 25 percent of the tubes was also being performed every six months. The recirculated cooling water (KR) system heat exchanger "D" was at its design maximum for plugged tubes and had been retubed this year with Seacure. Seacure was an experimental metal which had tested well against various types of corrosion mechanisms. The other three KR heat exchangers were close to the maximum number of allowable plugged tubes but had not been retubed as yet. The diesel generator engine cooling water (KD) system heat exchangers had not experienced biological fouling but had channeling problems due to a small amount of fast flow water. In general, the licensee was performing 100 percent eddy current testing and brush changing each outage for all heat exchangers which used raw cooling water.

One exception was the diesel generator engine starting air (VG) system aftercoolers which were not tested or cleaned but replaced every six months. The licensee had contracted with the University of Tennessee for the University to perform MIC studies of various metals in order to identify the material that would be the least susceptible to degradation.

The inspector reviewed a design study of possible modifications to the nuclear service water (RN) system that would reduce fouling and corrosion. Possible modifications included the use of cooling towers, chemical additions, piping replacement, or altering the system to a closed loop cooling water system.

Additionally, the licensee had increased cleaning and visual inspections of the RN intake. The inspector accompanied a licensee representative to observe cleaning of the intake screen by vendor personnel.

No violations or deviations were identified.

4. Secondary Systems (84750)

a. Asiatic Clam Infestation in the Nuclear Service Water System

The event occurred on March 9, 1988, when Unit 2 tripped from approximately 20 percent of full power. The three auxiliary feedwater (CA) pumps started automatically but one pump, the motor driven CA pump (MDCAP) 2A, swapped suction to the Nuclear Service Water (RN) System due to a sustained low suction pressure signal. After the suction swap, it was noted that CA flow to steam generators (SGs) 2A and 2B had degraded. The flow from MDCAP2A to SGs 2A and 2B was determined to be approximately 220 gpm and 100 gpm, respectively, when normal flow rates were expected to be approximately 320 gpm Inspection of the SGs 2A and 2B flow control valves revealed that the valves were clogged with shredded asiatic clam shells. This finding resulted in all CA pumps for both units being declared inoperable and both units being taken to hot shutdown. Immediate corrective actions included flushing the Unit 2 Train A CA system and cleaning the valves. Additionally, all stagnent lines, including instrumentation lines, were examined and flushed. The licensee had continued monthly flushing and planned chemical treatments to kill the adult clams and clam larvae. As of the date of this inspection the licensee had not performed the chemical additions due to restrictions by the state on concentrations of chemical effluents from the plant. The licensee had completed installation of two chemical addition tanks and was holding discussions with the State to determine an allowable chemical concentration. Plans for intermediate corrective actions included pipe replacement as required, and possible long term corrective actions were described in the design study of possible modifications to the RN system (Paragraph 3.d).

b. Steam Generator and Feedwater Chemistry Events

During July 1988, the demineralizer beds in the water treatment plant were being regenerated with sulfuric acid, and the acid flow leaked, through a faulty diaphragm valve, into the upper surge tank. At the time the leak was not detected. On July 19, 1988, high concentrations of sulfate ions were detected in the Unit 1 SG. The Unit 1 power was reduced to 30 percent per abnormal operating procedures. The sulfate concentration was reduced by maximizing SG blowdown and use of the condensate polishing demineralizers. When the water purity was restored to less than Action Level 1 limits, the unit's power was then increased. On August 3, 1988, the leaking diaphragm valve was replaced.

A second event occurred during August 1, 1988, when the Unit 2 SGs C and D sodium concentrations exceeded Action Level 2 limits. Unit power was decreased and cleanup was accomplished by use of the polishers and maximizing SG blowdown. The licensee determined that the source of the high sodium concentration was a recently precoated polisher which had been precoated with demineralizer water containing high sodium concentrations. The sodium contamination of the demineralizer water occurred at the water treatment plant (WTP). Coagulant was overfed into the clarified tank of the WTP because the injection system was not calibrated. The excess coagulant loaded the downstream resin beds and allowed the sodium ions to pass through the beds into the system. Subsequently this water was used to backwash freshly regenerated resins in the condensate polishers, thereby contaminating these resins with sodium ions. The sodium ions were released from the resins into the feedwater and then into the steam generators.

The inspector reviewed the Catawba Safety Review Group Evaluation Report CSRG/88-069, concerning these two events. Recommendations for corrective actions included: system drawings to reflect the current status; expanded instrument calibration for all filtered water and demineralized water systems; evaluation of current procedures and guidelines to provide complete information concerning new systems or operational changes; and development of a method to regulary monitor secondary chemistry laboratory chart recorders. Chemistry personnel had subsequently taken actions to address these issues.

c. Resin Intrusion Incident

During October 1988, the condensate polisher demineralizers (CPDs) 3B and 2C became severely fouled as indicated by low flow and high differential pressure conditions. The tube bundle in CPD 2C was removed from service and sent offsite to be cleaned. The empty CPD vessel was then placed back into service so that the CPD 2C could be used as a flowpath while the tubes were being cleaned. On October 16, 1988, when CPD 2C was valved back into service (minus the tube bundle), the Unit 2 steam generators cation conductivity and sulfate concentrations increased substantially. Cation conductivity values peaked at 16 uS compared to normal values of 0.15 uS and the highest sulfate concentrations recorded were 1019 ppb as comparison to a normal value of <1 ppb. The increases resulted from trapped resin in the inlet piping being flushed into the secondary system when the empty vessel was valved into service. To prevent further occurrences, chemistry personnel ordered a second spare tube bundle and made procedural changes to slow the CPD tube fouling. Additionally, operations personnel were to generate guidelines for maximum CPD unit differential pressure.

No violations or deviations were identified.

5. Environmental Monitoring (84750)

The inspector reviewed the licensee's Environmental Report for 1988, and discussed the report with licensee personnel. The report identified increasing trends for H-3 in surface water; Co-58, Co-60 and Co-137 in fish; and Co-60 in shoreline sediment. All sampling points were at the discharge canal. Average tritium concentrations in surface water had increased from 4,170 pCi/l in 1987 to 6,030 pCi/l in 1988. For the fish samples, data review indicated that nuclide detection frequencies and concentrations were higher for forager and bottom feeding fish as compared to predatory fish. Average Co-58 concentration in fish increased from 182 pCi/wet kilogram in 1987 to 281 pCi/wet kilogram in 1988. Cobalt-60 concentrations also increased from 115 pCi/wet kilogram in 1987 to 291 pCi/wet kilogram in 1988. Cesium-137 concentrations increased from 51.2 pCi/wet kilogram to 89.9 pCi/wet kilogram. For shoreline sediment samples, average Co-60 concentrations increased from 1987 values of 161 pCi/dry kilogram to 287 pCi/dry kilograms in 1988. All other levels of radioactivity in environmental samples attributable to plant operations remained constant or decreased.

The inspector reviewed the results of the NRC thermoluminescent dosimeter (TLD) network for Catawba covering the first quarter for 1989. Average exposure rates ranged from 15.2 mR/standard quarter to 20.6 mR/standard quarter. These values were slightly above the upwind control reading of 13.6 mR/standard quarter.

No violations or deviations were identified.

6. Licensee Actions on Previous Followup Items (92701)

a. (Open) IFI 50-413, 414/88-28-01: Evaluate contractor report of tests to determine sampling losses of iodine species in sampling lines for plant vent iodine sampler/monitor. As of the date of this inspection, the licensee had not received the final report from the vendor. This item remains open.

b. (Open) IFI 50-413, 414/88-28-02: Evaluate licensee report of tests to quantify sampling line losses of iodine species in sampling lines for containment atmosphere iodine sampler and monitor. Since the last inspection (50-413,414/89-10) the licensee had opted for a vendor to complete the tests rather than performing the tests in-house.

   The tests were not completed but the licensee expected a final report by the end of 1989. This item remains open.

c. (Closed) IFI 50-413, 414/89-10-02: Track PAGSS vacuum gauge modification and performance testing. The inspector reviewed completed test packages for these modifications. "Post Accident Containment Air Sampling Periodic Test," PT/0/B/4600/17, was completed April 10, 1989 for Unit 1 and April 6, 1989 for Unit 2. This item is considered closed.

17. Exit Interview

The inspection scope and results were summarized on July 21, 1989, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

The licensee's chemistry program evidenced good control by:

low levels of ionic contaminants in the primary and secondary systems (Paragraph 3.a and 3.b)

little air inleakage into the main condenser and no circulating water leaks since 1985 (Paragraph 3.b)

little "hideout return" to the steam generator bulk solution (Paragraph 3.b)

small amounts of sludge removed by sludge lancing the steam generators (Paragraph 3.b)

conductivity of the cleanup system effluent was 0.06 uS as compared to pure water 0.054 (Paragraph 3.b)

few steam generator tubes plugged (Paragraph 3.a)

The inspector discussed the plant's biofouling problems in secondary systems and the licensee's corrective actions (Paragraphs 3.d and 4.a).

One URI (Paragraph 2.b) was closed and addressed as a NCV. The violation was identified as failure to conduct analyses of TBS liquid on a 24 hour basis when the TBS monitor was inoperable. This was a requirement of TS 3.3.3.10.

One VIO (Paragraph 2.a) concerning failure of the semiannual effluent report to include descriptions of abnormal releases was closed. One IFI (Paragraph 6.c) was closed concerning PAGSS vacuum gauge installation and testing.