UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

APR 18 1984

Report No. 50-413/84-41

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

Facility Name: Catawba 1

Docket No.: 50-413

License No.: CPPR-116

Inspection at Catawba site near Rock Hill, South Carolina

Inspector: John R Wray 4/12/84
J. R. Wray Date Signed

Approved by: for L. K. Jenkins 4/13/84
K. P. Barr, Section Chief Date Signed
Division of Engineering and Operational and
Programs

SUMMARY

Inspection on March 26-30, 1984

Areas Inspected

This routine unannounced inspection involved 32 inspector-hours on site in the areas of external exposure controls, internal exposure controls, portable survey instruments, shielding, and licensee action on previous inspector identified items.

Results

No violations or deviations were identified in the five areas inspected.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. Vaughn, General Manager Nuclear Stations
*J. W. Cox, Technical Services Superintendent
*G. T. Mode, Acting Station Health Physicist
C. L. Hartzell, Licensing and Projects Engineer
*R. G. LeRoy, Licensing
*R. W. Ouellette, Corporate Licensing
F. L. Wilson, Instrumentation Calibration Supervisor
C. V. Wray, Count Room Supervisor
R. G. Wright, Dosimetry Supervisor

NRC Resident Inspectors

*P. S. Skinner, Senior Resident Inspector - Operations
*P. K. Van Doorn, Senior Resident Inspector - Construction

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 30, 1984, with those persons indicated in paragraph 1 above.

3. Licensee Action on Previous Enforcement Matters

(Closed) UNR (84-10-03) Adequacy of Existing Shield Thicknesses. The inspector reviewed a letter from Duke Power Corporate Design Engineering Group dated March 23, 1984, indicating that hatch thicknesses of 3.0 feet have been determined to be adequate shielding for the pits in question and that because access to the 522 foot elevation is prohibited after an accident, the wall thicknesses questioned in that area are adequate. The licensee has initiated the required documents to modify Table 12.3.2.-1 of the FSAR in its next amendment. The inspector had no further questions.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. External Exposure Controls

a. The inspector reviewed procedures and discussed with licensee representatives the Radiation Work Permit (RWP) Program. A review of existing RWPs identified no problems in the description of protective clothing and dosimetry required for work to be performed. The inspector was informed that the licensee's RWP system does not require individuals to initial the permit to ensure the worker has read it and

is aware of all requirements and limitations concerning his job. Furthermore, the licensee's system is one that requires each worker to maintain an individual daily card on which he is responsible for logging RWP numbers he worked under that day, time and total accumulated exposure received on each RWP, and time spent in airborne radioactivity areas for MPC-hr calculations. The health physics department is not responsible for signing workers in and out of RWPs. The inspector suggested that the licensee consider a system with tighter controls over who is signed in on an RWP and require workers to acknowledge that they have read and understand the requirements and limitations of the RWP. In recent years, other facilities have delegated the responsibility to sign workers in and out of RWPs to the health physcis department.

b. The licensee maintains a dosimetry system consisting of TLDs (teflon pad impregnated with CaSO4(Dy) powder) and Pocket Dosimeters (normally 0-500 mr range). Both these dosimeters are stored on racks accessible to all workers as they enter the facility. Total daily dose is recorded by the health physics department by entering daily dose card data into a computer for a daily report which is circulated for worker information. The inspector discussed potential problem areas with this system such as dosimeters being used by the wrong people, total daily exposure not being accurately recorded on the dose cards and, therefore, by the health physics department, and tampering with the dosimeters. The inspector suggested, as a minimum, the licensee should consider modifying their program to require TLDs be attached to the individuals security badge and that health physics personnel read each pocket dosimeter on a daily basis to track exposure. The former will reduce the chance of tampering with a TLD and the latter will be a check on the dose card system to ensure workers are recording each RWP on which they worked. Both will reduce temptation to violate regulatory and station procedures and maintain better control over dosimetry.

c. The TLD system is a service provided by the corporate office. Daily QC checks (heat and reference light) are performed on chip annealing equipment. Processing equipment is calibrated annually with monthly spiked samples from the plants offering further quality assurance. The program has performed well in the University of Michigan studies. The TLDs are sensitive to beta and gamma. However, the beta response, although favorably responsive to Sr-90 energies, may be underresponding to low energy beta spectras. A study is underway to establish each facility's beta spectrum within the Duke Power nuclear system and correct internal algorithms if necessary. A corporate study has established that the teledyne TLD underresponds by 14 percent to N-16. The corporate office performs TLD/PD comparison studies each month when the TLDs are processed.

d. Neutron exposures are maintained based on stay time calculations and survey results. This method conforms with the recommendations of Regulatory Guide 8.14, "Personnel Neutron Dosimetry".

e. Licensee procedures appear to be adequate to maintain control of access into high radiation areas. The licensee has defined areas exceeding 1000 mrem/hour as extremely high radiation areas. If these areas can not be locked or guarded, they must have a flashing light. Furthermore, each door into such areas will have two locks, keys for which will be in a locked box. The Surveillance and Control (S&C) Coordinator will maintain control over these keys. They will not be transferable during periods of issuance and will be inventoried daily. Master keys will be maintained by the Station Health Physicist and the ALARA Health Physics Supervisor. The inspector had no futher questions or comments on controlling access to high radiation areas.

f. The inspector reviewed the station's administrative dose limits. The Station Health Physicist's (SHP) approval is needed to exceed graduated exposure limits up to 1000 mrem per calendar quarter based on the week within that quarter (i.e. SHP approval required to exceed 500 mrem anytime within first five weeks of calendar quarter, 500 mrem plus 100 mrem for each week after five weeks until the tenth week, after which approval is needed to exceed 1000 mrem). No worker is normally approved above 2500 mrem per calendar quarter. The Station Manager's approval is required in addition to the Station Health Physicist's approval, if the extension will result in the worker exceeding 3000 mrem per year. Maximum extentions for extremity exposures are described in Station Directive 3.8.5 and do not exceed regulatory guidelines (2.5 Rem/quarter whole body; 6.0 Rem/quarter skin; 15 Rem/quarter extremities).

g. To exceed 1250 mrem per calender quarter, a completed NRC Form 4 must be on file. The inspector was informed that the licensee does not have a transient worker form because dosimetry is not issued to anyone until an NRC Form 4 is completed. This appears to satisfy the requirements of 10 CFR 20.102(a). However, the inspector stated that this policy may prove to be overly restrictive and that a document conforming with the requirements of 10 CFR 20.102(a) must be established if the program changes. No person under 18 years of age is permitted into the radiation controlled area. Therefore, the licensee will comply with 10 CFR 20.104.

h. Procedure HP/O/B/1000/26, "Placement of Personnel Dosimetry", was reviewed. The licensee appears to have an adequate program for monitoring extremities and multi badging. This procedure identifies ten body locations for badging purposes and defines when dosimeters should be placed in locations other than the chest. The inspector had no further questions.

i. The inspector reviewed Emergency Procedure HP/O/B/1009/09, "Guidelines for Accident and Emergency Response", and verified that acceptable criteria has been established for exceeding 10 CFR 20 exposure limits in the event of abnormal or emergency situations. Individuals with the authority to authorize these extensions have been designated. To remedy a situation immediately hazardous to life and property, an

individual may be extended to 25 rem (whole body), 125 rem (skin or thyroid), and 75 rem (extremities). For life saving activities, exposures can be extended to 75 rem (whole body), 150 rem (skin or thyroid), and 375 rem (extremities). A criteria for selection of workers to receive these exposures has been formulated including volunteers, workers exceeding 45 years of age, and not selecting women capable of reproduction. The inspector had no further questions.

6. Internal Exposure Controls

a. Control of internal exposures to radioactive material is maintained through plant procedures, station directives, and the system health physics manual. Station Directive 3.8.6 establishes the administrative internal exposure limit at 35 MPC-hrs in any seven consecutive days. This is less than the control guidance in 10 CFR 20.103. Entry into posted airborne radioactivity areas between ten and forty times MPC requires the approval of the Station Health Physicist. At levels between forty and one hundred times MPC, the Station Manager's approval is required in addition to the Station Health Physicist. Entries into areas greater than 100 MPC are not authorized except if localized (i.e., steam generator channel head).

b. Procedure HP/0/B/1009/10, "Body Burden Analysis Following Suspected Uptakes of Mixed Fission or Activation Products", establishes criteria for performing whole body counts and biossays. The program appears to be adequate. It requires initial and terminating body burden analyses as well as annual counts for workers. If an individual was involved in a real or suspected accidental internal exposure incident, a body burden analysis would be performed. The inspector was informed that the Station will adopt a program similar to another Duke Power Company nuclear facility whereby a certain percentage of respirator users will be selected at random and whole body counted to aid in checking the licensee's respiratory protection program. In addition, the Surveillance and Control Section of the Health Physics department will randomly select respirator users and non-users for body burden analyses to further check internal exposure controls. The inspector stated this program should be adequate. The count room supervisor reviews all body burden analyses ensuring the proper level of management review.

c. The inspector reviewed procedure HP/0/B/1001/17, "Body Burden Analysis Following Intake of Tritium". The procedure requires urine samples to be taken between four and eight hours after exposure (never before four hours), and weekly urine samples until results are less than 20 microcuries per liter. An equation for calculating MPC-hr exposure is provided. The inspector identified no problems. The inspector discussed with licensee representatives the station's capability to assess internal doses from long lived alpha contamination. A licensee representatives stated that if an internal alpha contamination event occurred, bioassay samples will be taken and analyzed by their contract service. The inspector had no further questions.

d. The inspector reviewed procedure HP/O/B/1001/09, "Operating/Calibration Procedure for Body Burden Analyzer". The licensee performs a daily source and performance check using mixed source standards in a phantom. A daily background count is made for each detector (chest and thyroid). A daily check of channel versus energy is performed on the NaI spectrum (8 Kev per channel, 256 channels). The body burden analyzer is calibrated yearly. The inspector reviewed all required body burden analyzer checks and calibration results and identified no violations or deviations. The inspector was informed that the present thyroid detector is a 1 inch by 1 inch crystal and will be replaced by a 2x2 inch NaI crystal. This will increase the licensee's sensitivity from approximately ten percent MPOB to approximately five percent MPOB. The System Health Physics Manual recommends the first action point for body burden analysis result be 10 percent MPOB pursuant to ICRP recommendations. The station has established an initial action point at 5 percent MPOB. The inspector was informed that if an individual were found to have an internal deposition greater than 10 percent MPOB, the corporate office health physics department will be responsible for additional follow-up analyses and dose assessment.

e. The onsite body burden analyzer is a two detector chair type instrument. The inspector was told that the body burden analyzer is provided with a dedicated power source. The inspector was informed that the software program permits quantitative analysis of Cs-134, Cs-137, Co-58, Co-60, and I-131 only. Other isotope peaks are detected and recorded providing the capability for long-hand analyses for other isotopes. A more sensitive body burden analyzer is operated at Duke Power's corporate office where an individual would be sent, if necessary, for more detailed assessment.

f. The inspector reviewed emergency procedures relating to internal exposure control in abnormal situations. Procedure HP/O/B/1009/10, Section 4.2, discusses issuance of potassium iodide (KI) tablets if an intake of I-131 has occurred or is imminent. Procedure HP/O/B/1009/16, "Distribution of Potassium Iodide Tablets in the Event of a Radioactive Release", states that for best results, KI tables must be administered within two hours after exposure. The inspector had no further questions.

7. Portable Survey Instrumentation

a. The inspector reviewed the licensee's portable survey instrumentation program. Calibration procedures for portable air samplers, portal monitors, beta/gamma survey instruments (G-M and ion chambers), neutron survey meters, contamination survey meters, and dosimeters were reviewed. The licensee's calibration facility was examined. The program requires quarterly calibration of instruments with a plus or minus 20 percent acceptance level on each piece of equipment. Pocket dosimeters are leak and drift checked every 6 months with plus or minus

4 percent drift from full scale and plus or minus 10 percent calibration at mid-scale acceptance. The inspector noted all survey instruments, except the PIC-6A, are calibrated on at least two points on each scale. After bringing this to their attention, the licensee modified their PIC-6A calibrator procedure to require two point calibrations on each scale in accordance with ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration". The inspector also noted that licensee procedures assumed a 15 percent efficiency of RM-14 contamination survey instruments. These friskers are source checked daily at the primary exit points from the controlled area with a 1000 dpm Cs-137 source. The inspector asked for documentation verifying the 15 percent efficiency. Following a limited exercise, the licensee modified their procedure to reference a 10 percent efficiency for RM-14 friskers. Alarm setpoints for the friskers are based on 5000 dpm per 100 square centimeters pursuant to IE Circular 81-07. The inspector had no further questions on procedures.

b. The inspector discussed beta survey instrumentation with licensee representatives. The licensee maintains Eberline RO-2A instruments for beta detection. The corporate office is modifying a number of RO-2A instruments to read direct beta exposure rates. The study is establishing an effective beta spectrum at each Duke Power Company nuclear facility so that calibration factors can be obtained for the instrument (as well as TLDs). The study should be completed in time to provide adequate beta radiation surveillance capability at Catawba before startup.

c. The licensee calibrates and source checks the PNR-4 neutron survey instrument with a 5 curie PuBe source. The calibration facility is equipped with remote controls when exposing the source. The inspector discussed the effect on instrument calibration of the different neutron energy spectrum of the PuBe source (approximately 4.2 MeV neutron) to the expected thermal neutron energy spectrum (approximately 700 Kev neutrons) at Catawba. A licensee representative showed the inspector a letter from corporate office dated April 27, 1982, which specifies the established percent over-response exhibited by the PNR-4 for heavy water moderated Cf-252 neutron spectrum (spectra shown to approximate that of a typical PWR). The inspector had no further questions.

d. The inspector reviewed the licensee's inventory of portable survey instruments for type and number. The licensee has enough instruments of each necessary type to provide adequate coverage assuming twenty to twenty-five percent out of service time. Initially instrument repair will be performed by the I&E department onsite. This relationship has worked satisfactorily at Oconee but unsatisfactorily at McGuire. If experience proves that this relationship is unsatisfactorily at Catawba, the station will arrange for contract service assistance.

e. On March 28, 1984, the inspector observed the licensee calibrate an E-520, PIC-6A, RO-2A, and a teletector in its onsite calibration facility. No problems were encountered. No violations or deviations

were identified. The inspector ascertained that the station does not possess any survey instruments with a range greater than 1000 R/hr.

f. The licensee maintains emergency instrumentation. Procedure HP/0/B/1001/06, "Emergency Equipment Functional Check and Inventory", addresses functional and inventory checks which are performed monthly. Procedure HP/0/B/1009/07, "Inplant Particulate and Iodine Monitoring under Accident Conditions", specifies use of Silver Zeolite cartridges under such conditions. A technician is instructed to purge the cartridge and count it in a low background area. The inspector had no further questions.

8. Shielding

a. The inspector discussed shielding of high source term equipment. Technical Specifications 3.4.7 states that every snubber must be periodically inspected. The inspector noted the existance of several snubbers in high source term equipment shielded bunkers in the Auxiliary Building. The licensee stated that this issue was raised at McGuire and that Catawba is negotiating with NRR for the same in-service-inspection program for such inaccessible snubbers as McGuire is using. The inspector stated that this snubber inspection program will be reviewed during future inspections (84-41-01).

b. Section 1.9 of the FSAR discusses NUREG 0737, Items II.B.3 (Post Accident Sampling System) and II.B.2. (Plant Shielding for Vital Area Access). Maps are provided which designate calculated dose rates following an accident. However, they do not identify the PAS system being in Room 238 of the Auxiliary Building. The discussion of time required in the PASS designated vital area is such that the inspector questioned the ability to maintain PASS operator exposures less than the applicable limits. The licensee is re-studying the projected dose rates, stay times, and expected personnel exposure in the PASS room. This item will be examined during future inspections (84-41-02).

9. Licensee Action on Previous Inspector Identified Items

(Closed) (83-38-02) Laundry Room Facilities. The inspector noted that two washers and four dryers are in place onsite. A licensee representative stated that future plans include installation of a couple of dry cleaning units. The inspector verified that FSAR required laundry facilities are presently onsite and had no further questions.

(Closed) (83-38-04) Portable Instrument Equipment Procurement. The inspector reviewed the licensee's inventory of portable survey instruments and verified that the specified number and type of portable survey instruments have arrived and are available for use. The licensee appears to have an adequate supply of portable health physics survey instruments to support the operation of the facility. The inspector had no further questions.

(Closed) (83-38-05) Respiratory Protection Procedure Change. The inspector reviewed health physics procedure HP/0/B/1005/01, "Respiratory Protection Training and Qualitative Fit Testing" and verified that it had been modified to include a requirement for running in place. The inspector had no further questions.

(Open) (84-10-01) Helium Leak Test of Waste Gas System. The inspector reviewed the preoperational test procedure for leak testing the waste gas (WG) system and verified that it had been modified to require the initial test to be performed using helium as the testing agent. The inspector also reviewed a memorandum from the station's performance engineering staff stating that the cover gas system is normally at a higher operating pressure than the WG system and that, by design, is isolatable should the cover gas system be depressurized. Based on this data, the inspector agreed that helium leak testing of the cover gas system as recommended by NUREG 0737 does not appear to be necessary. This item will remain open pending completion of the initial helium leak test of the WG system.

(Closed) (84-10-02) FSAR table 11.4.2-2 Modification. The inspector reviewed a letter dated February 24, 1984, from corporate design engineering, that verified Table 11.4.2-2 is incorrect by listing two ECBTs. The licensee has initiated the required documents to modify FSAR Table 11.4.2-2 in the next FSAR revision. The inspector had no further questions.

(Closed) (83-C6-01) IEN 82-49, "Correction for Sampling Conditions for Air and Gas Monitoring". The inspector reviewed health physics procedure HP/0/B/1001/12, "Gaseous Waste Sampling and Analysis", and verified that the licensee has addressed the concerns of the IE Notice. The inspector had no further questions.