Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CP/0/B/8150/05
Change(s) 0 to
0 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Hydrazine, Auto-Analyzer

(4) PREPARED BY: R L Painter DATE: 11-15-82

(5) REVIEWED BY: L D Evans DATE: 11-16-82

Cross-Disciplinary Review By: ______ N/R TLE

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: ______ (SRO) Date: ______

By: ______ Date: ______

(7) APPROVED BY: M. S. Tuckman Date: 11/18/82

(8) MISCELLANEOUS:

Reviewed/Approved By: ______ Date: ______

Reviewed/Approved By: ______ Date: ______

MASTER FILE

DUKE POWER COMPANY
NUCLEAR SAFETY EVALUATION CHECK LIST

(1) STATION: Catawba UNIT: 1 X 2 X 3 ____
OTHER: ____

(2) CHECK LIST APPLICABLE TO: GP/0/B/8150/05

(3) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents:

Yes ____ No ✓ A change to the station or procedures as described in the FSA or a test or experiment not described in the FSAR?

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and an identification of the affected section(s) of the FSAR.

(4) SAFETY EVALUATION - PART B

Yes ____ No ✓ Will this item require a change to the station Technical Specifications?

If the answer to the above is "Yes," identify the specification(s) affected and/or attach the applicable pages(s) with the change(s) indicated.

(5) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

Yes ____ No ✓ Will the probability of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of an accident which is different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the preceding is "Yes", an unreviewed safety question is involved. Justify the conclusion that an unreviewed safety question is or is not involved. Attach additional pages as necessary.

(6) PREPARED BY: R L Painter DATE: 11-15-82

(7) REVIEWED BY: L D Evans DATE: 11-16-82

(8) Page 1 of 1

Form 18855 (3-80)

DUKE POWER COMPANY

ALARA EVALUATION CHECKLIST

(1) Station Catawba Unit: 1 X 2 X 3 ____

Other: ____________________

(2) Checklist Applicable to: CP/0/B/8150/05

(3) ALARA Evaluation

Check those items below which were considered applicable during the preparation and review of this document.

____ Flushing and draining were used to minimize source - strength and contamination levels prior to performing an operation.

____ Permanent and/or movable shielding was specified for reduction of levels.

____ Use of permanent or temporary local exhaust ventilation systems was used for control of airborne contamination.

____ Operation was designed to be completed with the least practicable time spent in the radiation field.

____ Appropriate tools and equipment were specified for the operation to be performed.

____ The operation was designed considering the minimum number of people necessary for safe job completion.

____ Remote handling equipment and other special tools were specified to reduce external dose.

____ Contamination - control techniques were specified.

____ The operation was designed to be conducted in areas of as low an exposure as practicable.

____ Additional ALARA considerations were:

____

____

____

✓ ALARA Principles were not considered since the procedure did not involve work in a radiation area.

(5) Prepared by: R L Painter Date 11-15-82

(6) Reviewed by: L D Evans Date 11-16-82

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CHEMISTRY PROCEDURE FOR THE DETERMINATION
OF HYDRAZINE, AUTO-ANALYZER

1.0 DISCUSSION

1.1 Scope

This procedure describes the determination of hydrazine in feedwater using the continuous flow (Redox Electrode) analyzer.

1.2 Principle

Hydrazine (N_2H_4) inhibits corrosion by minimizing the oxygen content of the water according to the following reaction:

$$N_2H_4 + O_2 \quad 2H_2O + N_2$$

A hydrazine residual is maintained at all times and is monitored by a continuous flow hydrazine analyzer. The feedwater sample enters at the back of the analyzer, and is directed through a flow control valve, a flow rate meter, and then to a galvanic cell. The cell consists of a silver oxide cathode immersed in a solution of potassium hydroxide electrolyte, and a platinum anode wrapped around a porous sleeve which is positioned around the silver oxide cathode.

Thus, the electrolyte solution is held between the cathode and anode of the cell where it acts as a salt bridge. Hydrazine in the sample is oxidized at the platinum wire anode, and the electrons released from the reaction reduce silver oxide to silver metal at the cathode. The electrical current produced by the electron flow in the cell is amplified and a response is indicated on the analyzer panel and a strip chart recorder.

1.3 Precision and Interferences

The precision of this method is ± 2%. Substances normally present in industrial waters do not interfere with this procedure; however, hydrazine concentrations will be diminished by oxidizing agents introduced at the sampling point or upstream of the analyzer.

1.4 Limits and Precautions

The upper limit for this procedure is 250 ppb hydrazine, the lower limit is $\simeq$ 1 ppb hydrazine.

When preparing potassium hydroxide or hydrazine solutions, a labcoat, gloves, and eye protection shall be worn.

2.0 APPARATUS

2.1 Delphi, Model E Hydrazine Analyzer

2.2 1000 ml graduated cylinder

2.3 One liter poly bottle

2.4 1000 ml glass beaker

2.5 Recorder

3.0 REAGENTS

3.1 Potassium Hydroxide (2.5% by wt.)
Dissolve 20 ± 0.1 gms of potassium hydroxide in 780 ± 10 ml of demineralized water. Cool and store in a poly bottle.

4.0 PROCEDURE

4.1 Electrode Preparation (as required)

4.1.1 Close sample valves 1CT71 (Unit I) or 2CT71 (Unit 2).

4.1.2 Close the electrolyte tube by using a pinch clamp.

4.1.3 Slide out the electrolyte reservoir and check the potassium hydroxide solution level. If necessary, fill the reservoir. Return the reservoir to its normal position.

NOTE: This will provide the electrolyte requirements of the analyzer for approximately forty (40) days.

4.1.4 Open the pinch clamp on the electrolyte tube and allow electrolyte to fill the cell.

4.1.5 Loosen the cell cap (anode) and allow the air bubbles to escape from the anode liquid space. Tighten the cap and wipe the excess electrolyte from the top of the cell.

4.1.6 Open sample valves 1CT71 (Unit 1) and 2CT71 (Unit 2).

4.2 Instrumentation Calibration (Weekly)

4.2.1 Turn the range switch to the "OFF" position and adjust the mechanical zero of the analyzer meter by turning the screw on the meter face.

4.2.2 Turn the range switch to the lowest usable range.

4.2.3 Verify adequate amount of electrolyte solution in the instrument reservoir.

4.2.4 Adjust the flow to 100 ml/min.

4.2.5 Take sample at FINAL FEEDWATER SAMPLE ISOLATION VALVES 1CT25 and 2CT25 for the respective instrument, and run manual hydrazine as per CP/0/B/8100/17 (Chemistry Procedure for the Determination of Hydrazine).

4.2.6 Recheck sample flow for 100 ml/min.

4.2.7 Adjust the meter to the actual hydrazine concentration using the span potentiometer.

5.0 REFERENCES

5.1 Delphi Industries. Instructions for Model E Hydrazine Analyzer. South El Monte, California. Delphi Industries.

5.2 Olin Chemical Product Data Sheet. CD-108-373, Olin Chemical Company. Stanford, Connecticut.

5.3 McGuire Nuclear Station Chemistry Procedure For the Determination of Hydrazine in Feedwater (CP/0/B/8100/13).

6.0 ENCLOSURES

None