DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
OPERATING PROCEDURE FOR THE
POST ACCIDENT LIQUID SAMPLING SYSTEMS

1.0 PURPOSE

The purpose of the Post Accident Liquid Sampling System is to provide a method for promptly obtaining reactor coolant samples under a nuclear reactor accident condition.

Samples acquired during accident conditions (normal sample points are not useable due to high radiation conditions) will aid in the evaluation of information related to:

1) The extent of core damage which has occurred.

2) Types and quantities of fission products released to containment liquid.

3) Reactor Coolant Chemistry and Radiochemistry.

2.0 LIMITS AND PRECAUTIONS

2.1 In an accident situation the decision to collect a post-accident sample will originate from the Technical Support Center. The management involved in this decision should take two factors into consideration in making this decision:

(a) Has the situation stabilized to a degree so as to minimize the risk to individuals involved in the sampling?

(b) From the present information available, has the system stabilized to a degree that a representative sample may be obtained?

2.2 The PALS panel should only be used under the following circumstances:

(a) Caution: 1/2EMF48 must have flow for readings to be valid.

The Reactor Coolant System (NC) Gross Specific Activity is expected to be or is known to be greater than 200 μCi/ml. This corresponds to a reading on 1/2EMF48 of equal to or greater than 1.64×10^5 counts per minute. (Correlation factor from HP/0/B/1000/10 is 1.22×10^{-3} (μCi/ml)/(CPM))

(b) Primary Systems Sample Sinks 1A/2A and 1B/2B are inaccessible due to the radiation levels or for other identified reasons.

(c) The Station Chemist or his designee has requested that the PALS panel be put in service.

(d) The PALS panel is being run for monthly operational verification, maintenance, or training purposes.

(e) When use of the normal Primary Sample systems will create a Radiation Exposure problem in the NM Lab.

2.3 The undiluted sample volume is 5.2 ml (for Unit 1) and 4.4 (for Unit 2) and the final dilution volume shall be controlled between 250-3500 ml.

2.4 Health Physics personnel must perform continuous radiation monitoring during sampling at the liquid sample or control panel. During an accident situation, Health Physics personnel from the OSC must monitor all personnel entering the Auxiliary Building.

2.5 When handling radioactive samples, good laboratory practices are essential to prevent radioactive contamination of personnel equipment, and physical structures. Reference applicable SRWP(s) and RWP(s).

2.6 Individuals that have been trained on this procedure are qualified to use this procedure. Individuals shall be trained at a minimum frequency of (6) months (if indicated by testing).

2.7 Due to the nature of this procedure, a Working Copy shall be used to ensure compliance.

2.8 Do not leave the selector knob in "Grab Sample", Position 4 longer than is required to complete all necessary steps of that position.

3.0 PANEL PREPARATION

3.1 Initial Conditions

3.1.1 In order to expedite the process, the Primary Supervisor or his designee should send two Chemistry Technicians to collect the sample.

The technicians should be chosen taking into consideration the following:

(a) Being qualified on the PALS procedure
(b) Being respiratory qualified
(c) Age
(d) Accumulated Exposure
(e) Sex
(f) Physical Strength

Their responsibilities are outlined below:

(c) The Station Chemist or his designee has requested that the PALS panel be put in service.

(d) The PALS panel is being run for monthly operational verification, maintenance, or training purposes.

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Their responsibilities are outlined below:

Technician #1

(a) Completes the Initial Conditions Checklist Enclosure 8.1 from OP/0/A/6200/21 at the TSC and returns the checklist to Technician #2.
(b) Informs Health Physics at the OSC that he/she will be traveling to the Hot Lab.
(c) Dresses out as necessary.
(d) Travels to the Hot Lab and prepares for the analyses.
(e) Transports samples from the NM Lab to the Hot Lab, if necessary.
(f) Analyzes the samples.
(g) Reports results by phone to the Station Chemist at the TSC and returns to the OSC.
(h) Transports the completed data sheet to Station Chemist at the TSC.

Technician #2

(a) Obtains the PALS panel keys. (Location: Secondary Supervisor's Office Key Box or Cold Lab Key Box)
(b) Dresses out as directed by Health Physics at the OSC.
(c) Health Physics plans out a path to be taken to the NM Lab, Hot Lab, Count Room and to exit the Auxiliary Building.
(d) Travels to the NM Lab and uses the PALS to collect liquid and gas samples.
(e) Transports the samples to the Hot Lab.
(f) Assists in the analysis of samples, if necessary.
(g) Reports results by phone to the Station Chemist at the TSC and returns to the OSC.

3.1.2 (Technician #1) - Complete the Initial Conditions Checklist (Enclosure 8.1) at the TSC and return it to Technician #2 at the OSC.

3.1.3 (Technician #1) - Inform Health Physics at the OSC of your plans to travel to the Hot Lab. Inform Health Physics that travels to the outside east backside of the Auxiliary Building may be required in order to calibrate the Gas Chromatograph. Also, inform them that you may transport the sample from the NM Lab to the Hot Lab. Dress out as required by Health Physics. The Hot Lab may be locked so bring the key.

3.1.4 (Technician #1) - In the Hot Lab, prepare for the sample analyses required in Section 7.0 of OP/0/A/6200/21.

3.1.5 (Technician #2) - Obtain the PALS panel keys from the Secondary Supervisor's office Key Box or the Cold Lab key box.

3.1.6 (Technician #2) - Report to the OSC and inform Health Physics of plans to obtain a post-accident liquid sample. Dress out as required by Health Physics. Health Physics personnel will decide the route to be taken to the PALS panel, the route to carry sample to the Hot Lab and Count Room, and the exit route back to the OSC. They will also address stay times (1-2 hours at the PALS Control Panel) and protective radiological dress and equipment. A Health Physics technician must be with any Chemistry personnel entering the Auxiliary Building at all times. Remember: The buddy system is in effect.

3.1.7 (Technician #2) - Travel to the NM lab with Health Physics coverage to collect a sample using the PALS panel. Remember to bring the required equipment listed on Enclosure 8.1, Part III.

3.2 Control Panel Preparation (Technician #2 - 543' Elev. NM Sample Room)

3.2.1 Close the following valves: (Omit during periodic testing and training)

	Unit 1	Unit 2
NC Hot Leg Smpl Hdr to Radiation Monitor	1NM29	2NM29
NC Hot Leg Smpl HX 1A Outlet	1NM264	2NM264
NC Hot Leg Smpl HX 1B Outlet	1NM278	2NM278
ND Smpl HX Outlet	1NM265	2NM265

3.2.2 Obtain Operations permission to open (or have Operations open) the following Operations valves:

	Unit 1	Unit 2
Post Accident Liquid Sample Panel Hx Inlet	1KCA8	2KCA8
Post Accident Liquid Sample Panel Hx Outlet	1KCA10	2KCA10

For Unit 2, the following additional valves have to be OPENED: For A Train KC-2KCD03 and 2KCD05, For Train B KC-2KCD04 and 2KCD06.

3.2.3 OPEN 1NM462 (2NM462), PASP Deaerator Tank Inlet.

3.2.3.1 Fill a 50 ml Nalgene sample bottle labeled "Dilution Water Sample" by OPENING valve 1NM456, (2NM456). When bottle is full CLOSE 1NM456, (2NM456).

3.2.3.2 Ensure liquid and gas sample bombs are attached to the PALS panel.

3.2.4 Call the Control Room and obtain the official time on the Control Room clocks. Set the clock near the PALS panel to the correct time.

3.2.5 Contact the Control Room and have them open the appropriate valve(s) listed below to obtain the desired sample. Reference Enclosure 8.1, Part II(b). (May be omitted during periodic testing)

	Unit 1	Unit 2
NC Hot Leg A		
Hot Leg Smpl Hdr Cont. Isol.	1NM26B	2NM26B
Hot Leg A Smpl Cont. Isol.	1NM22A	2NM22A
NC Hot Leg C		
Hot Leg Smpl Hdr Cont. Isol	1NM26B	2NM26B
Hot Leg C Smpl Cont. Isol.	1NM25A	2NM25A
ND Pump 1A Discharge		
ND Pump 1A Disch Smpl Line Isol.	1NM39	2NM39
ND Pump 1B Discharge		
ND Pump 1B Disch Smpl Line Isol.	1NM40	2NM40

3.2.6 Turn the position selector knob to "RESET" position. Place the key in the keylock power switch and turn to the right. ("Sample Position"). Press "Reset" button.

3.2.7 Place the toggle switch for the dilution water flow totalizer to "ON".

3.2.8 Place the toggle switch for the radiation monitor to "ON". Turn the scale switch to "BAT" to check the battery. The needle should travel to full scale. Turn the scale switch to "mR/hour". The "Rem/hour" scale may be used if readings are off the scale. Always rely on Health Physics surveys to determine access to the sample panels.

3.2.9 Push in the pH probe "Standardize" knob.

3.2.10 Select the system to be sampled with the system selector - RX COOLANT (refers to NC Hot Legs), RX SUMP (refers to ND Pump Discharge).

3.2.11 Verify that the pH 6.86 buffer solution has been changed within the last 30 days by referencing Enclosure 6.8 from OP/0/A/6200/11. This enclosure is located in a notebook in the PALS drawer.

3.2.12 Connect the PALS nitrogen cylinder to the PALS by connecting the quick disconnect to the N_2 supply line. Open the cylinder valve and set the pressure regulator to 110 psig. (Always connect quick connect before OPENING the N_2 cylinder valve).

3.2.13 Flush (Position 6)

3.2.13.1 Turn the SELECTOR KNOB TO "Flush", Position 6.

3.2.13.2 Press the "SELECTION POWER-ACTIVATE" button.

3.2.13.3 Press the "FLUSH STEP" button momentarily and wait 1 minute. The first flush light should be lit. (Gas Tank).

3.2.13.4 Press the "FLUSH STEP" button momentarily and wait 2 minutes. Second flush light should be lit. (Probes).

3.2.13.5 Press the "FLUSH STEP" button momentarily and wait 2 minutes. Third flush light should be lit. (Dilution Tank).

3.2.13.6 Press the "FLUSH STEP" button momentarily and wait 1 minute. Fourth flush light should be lit. (Liquid Tank).

3.2.13.7 Press the "FLUSH STEP" button momentarily. This terminates the flushing cycles and the "COMPLETE" light turns on.

3.2.13.8 Turn the selector knob to "DRAIN", Position 7.

3.2.14 Drain (Position 7)

3.2.14.1 Press the "SELECTION POWER-ACTIVATE" button.

3.2.14.2 Press the "DRAIN STEP" button momentarily and wait 4 minutes. The first drain light should be lit. (Dilution Tank).

3.2.14.3 Press the "DRAIN STEP" button momentarily and wait 1 minute. The second drain light should be lit. (Gas Line).

3.2.14.4 Press the "DRAIN STEP" button momentarily and wait 1 minute. Third flush light should be lit. (Gas Tank).

3.2.14.5 Press the "DRAIN STEP" button momentarily and wait 1 minute. Fourth flush light should be lit. (Probe refill and system vent).

3.2.14.6 Press the "DRAIN STEP" button momentarily. This terminates the draining cycles and the "COMPLETE" light is illuminated.

4.0 PANEL OPERATION (Technician #2)

4.1 Initial Conditions

4.1.1 Section 3.0 is complete with the Enclosure 8.1 signed off.

4.2 Panel Prep (Position 1)

4.2.1 Turn the selector knob to the "PANEL PREP" position.

4.2.2 Press the "SELECTOR POWER - ACTIVATE" button.

4.2.3 Press the "PURGE" button, hold for 30 seconds and release.

4.2.4 Press the "DRAIN" button and hold for 30 seconds then release.

4.2.5 Press the "CALIBRATE" button and hold until the pH meter stabilizes.

4.2.6 Adjust the pH meter to the known pH of the standard.

4.2.7 Press the "PURGE" button, hold for 30 seconds and then release.

4.2.8 Press the "FLUSH" button and hold until the pH meter stabilizes (1 to 3 minutes) (pH of demineralized water) then release.

4.2.9 Press the "PURGE" button, hold for 30 seconds and release.

4.2.10 Press the "DRAIN" button, hold for 30 seconds and release.

4.2.11 Record the radiation monitor reading on Enclosure 8.2. (Background)

4.2.12 Turn the selector knob to "SAMPLE", Position 2.

4.3 Sample (Position 2)

4.3.1 Press the "SELECTION POWER - ACTIVATE" button. Record the 'Time Sample Purged Started' on Enclosure 8.2. Verify a flow rate of 0.3-1 GPM on 1NMP5430 (2NMP5430) Sample Purge Flow Indicator. (For Periodic Testing, purge for ten minutes (NC), fifteen minutes (ND) before proceeding.) Refer to Enclosure 8.7 Step 6 for proper purge times in an accident situation.

4.3.2 If TC1 goes above 50°C, turn the selector knob to "Reset" and press the "Reset" button. Call the Primary Supervisor or his designee. At the completion of the purge time, record the radiation reading and TC1 temperature on Enclosure 8.2.

4.3.3 Press the "PRESSURIZE" button momentarily. When the pressure stabilizes (read on (1NMP5240 (2NMP5240)) the reading on Enclosure 8.2.

4.3.4 Press the "TRAP" button momentarily. Record the time as the "Sample Trap Time" on Enclosure 8.2.

4.3.5 Turn the selector knob to "DEPRESSURIZATION AND GAS STRIPPING", Position 3.

4.4 Depressurization and Gas Stripping (Position 3)

4.4.1 Verify that the vacuum gauge on the control panel shows at least -25 ± 2 inches mercury (1NMP5190 (2NMP5190)).

4.4.2 Press the "SELECTION POWER-ACTIVATE" button. Wait at least 60 seconds and then verify the Incoming Sample Pressure gauge reads less than 400 psig pressure (1NMP5240 (2NMP5240)).

4.4.3 Press the "GAS STRIPPING START" button momentarily beneath the flow totalizer and monitor the vacuum gauge. Press the "GAS STRIPPING STOP" button momentarily when the vacuum gauge needle reads + 15 ± 1 inch mercury (for Unit 1), +10 ± 1 inch mercury (For Unit 2). If ± 1 inch is not achieved, a new stripped gas sample will need to be taken (i.e.) start from Section 4.3.

4.4.4 Turn the selector knob to "GRAB SAMPLE", Position 4.

4.5 Grab Sample (Position 4)

4.5.1 Press the "SELECTION POWER-ACTIVATE" button.

4.5.2 Press the "GRAB ML" button momentarily. Wait 1 minute.

4.5.3 Set the dilution water FLOW TOTALIZER to 02500 (for testing). In an accident situation, refer to the Station Chemist's Recommended dilution factor, Enclosure 8.1, Part IV. Press the "RESET" button on the flow totalizer. Press the "START" button and let the dilution continue to completion. Record the flow totalizer setting on Enclosure 8.2.

4.5.4 Press the "MIXING" button and hold for 10 seconds.

4.5.5 Press the "GRAB SAMPLE-pH" button, momentarily. Allow the meter to stabilize.

4.5.6 Record the pH reading on Enclosure 8.2.

4.5.7 Press the "GAS SAMPLE - TRAP OPEN" button momentarily. Wait 10 seconds.

4.5.8 Press the "GAS SAMPLE - TRAP CLOSE" button momentarily.

4.5.9 Turn the selector knob to position 5 "LIQUID SAMPLE".

4.6 Liquid Sample (Position 5)

4.6.1 Press the "SELECTION POWER-ACTIVATE" button.

4.6.2 Hold the "LIQUID SAMPLE-TRAP OPEN" button for 10 ± 3 seconds.

4.6.3 Immediately after 10 ± 3 seconds, press the "LIQUID SAMPLE-TRAP CLOSE" button momentarily.

4.6.4 Turn the selector knob to "FLUSH", Position 6.

4.7 Flush (Position 6)

4.7.1 Press the "SELECTION POWER-ACTIVATE" button.

4.7.2 Press the "FLUSH STEP" button momentarily and wait 1 minute. The first flush light should be lit. (Gas Tank)

4.7.3 Press the "FLUSH STEP" button momentarily and wait for 2 minutes. Second flush light should be lit. (Probes)

4.7.4 Press the "FLUSH STEP" button momentarily and wait 4 minutes. Third flush light should be lit. (Dilution Tank).

4.7.5 Press the "FLUSH STEP" button momentarily and wait 1 minute. Fourth flush light should be lit. (Liquid Tank).

4.7.6 Press the "FLUSH STEP" button momentarily. This terminates the flushing cycles and the "COMPLETE" light turns on.

4.7.7 Turn the selector knob to "DRAIN", Position 7.

4.8 Drain (Position 7)

4.8.1 Press the "SELECTION POWER-ACTIVATE" button.

4.8.2 Press the "DRAIN STEP" button momentarily and wait 4 minutes. First drain light should be lit. (Dilution Tank)

4.8.3 Press the "DRAIN STEP" button momentarily and wait for 1 minute. The second drain light should be lit. (Gas Line)

4.8.4 Press the "DRAIN STEP" button momentarily and wait 1 minute. The third drain light should be lit. (Gas Tank).

4.8.5 Press the "DRAIN STEP" button momentarily and wait 1 minute. The fourth drain light should be lit. (Probe refill and system vent).

4.8.6 Press the "DRAIN STEP" button momentarily. This terminates the draining cycles and the "COMPLETE" light is illuminated.

4.9 Reset

4.9.1 Turn the selector knob to "RESET" and press the "RESET" button.

4.9.2 Contact the Control Room and have them close the valves opened in Sections 3.2.2 and 3.2.5. (May be omitted during Periodic Testing.)

4.9.3 If the "PUMP SUMP" light is lit, it indicates the sump has water in it. Turn the SYSTEM POWER KEY to the left to operate the sump pump. The "PUMP ON" light will light and remain on until the pump has stopped.

4.9.4 After the "PUMP COMPLETE" light turns on, indicating that the pump has stopped, turn the SYSTEM POWER KEY to the right to re-energize the PALS.

4.9.5 Record the radiation level on Enclosure 8.2. If the field at the panel is greater than 3 Rem/hr. (3000 mR/hr.), go to Section 5.0.

4.9.6 If this is the last sample to be collected this trip, proceed to Section 4.10, Sample Panel Shutdown. If other samples are to be collected this trip proceed to Section 6.0, Sample Retrieval.

4.10 Sample Panel Shutdown

4.10.1 Turn the SYSTEM POWER KEY to the vertical off position and turn the position selector knob to "RESET".

4.10.2 Place the panel keys in a plastic bag with Enclosure 8.1 (NC or ND Loop data). (Omit during periodic testing.)

4.10.3 Turn the toggle switch for the flow totalizer to "OFF".

4.10.4 Turn the toggle switch for the radiation monitor to "OFF".

4.10.5 Pull out the pH probe standardize knob.

4.10.6 Close nitrogen cylinder valve and disconnect the quick disconnect.

4.10.7 Turn System Selector Knob to off.

4.10.8 Enter 00000 on flow totalizer.

4.10.9 Proceed to Section 6.0, Sample Retrieval.

5.0 DECONTAMINATION

5.1 Repeat the panel Flush, Drain and Reset Modes: Section 4.6.4 through 4.9.3.

5.2 If the level is less than 3 Rem/hour, turn the SYSTEM POWER KEY to the vertical position and continue with Section 4.9.6. If however, the radiation level remains greater than 3 Rem/hour, contact the Station Chemist at the TSC for his recommendations.

6.0 SAMPLE RETRIEVAL

6.1 Initial Conditions

6.1.1 A gas and degassed liquid sample are in the gas and liquid samplers.

6.1.2 Health Physics personnel are providing continuous monitoring of the area.

6.2 Sampling

6.2.1 Fill out remaining information on gas and liquid sample labels.

6.2.2 The "Sample Trap Time" and "Dilution Factor" may be found on Enclosure 8.2.

6.2.3 Take the completed labels and place each one on a plastic bag. Place another plastic bag inside of each of the two labeled plastic bags. These will be used later for double bagging the samples.

CAUTION: Do not approach the samplers on the sample panel until a Health Physics Technician has surveyed the area. Do not relay solely on the PALS panel's radiation monitor (1NMMT5350/ 2NMT5350) as indication of the radiation in the area. (Omit during periodic testing).

6.2.4 Approach the samplers located on the sides of the sample panel. If possible, have the Health Physics Technician take on contact readings on each sample vessel. (Omit during periodic testing). Record these readings on labels on sample bags.

6.2.5 Detach the quick-disconnects on each sample vessel. Place the samplers in the labeled plastic bags. Seal tightly.

6.2.6 Place the samples in the sample carrier.

6.2.7 Close 1NM462 (2NM462).

6.2.8 After returning to the outer room, record the "On Contact" liquid and gas radiation readings on Enclosure 8.2. (Omit during periodic testing).

6.2.9 If this is the last sample to be collected this trip, take the samples to the Hot Lab in the sample carrier and place in an operating fume hood behind a lead brick shield to await analysis. However, if another sample is to be collected, call Technician #1 at the Hot Lab and have him come down and transport the samples and the completed portion of Enclosure 8.2 up to the lab. Then proceed with Section 6.2.10 to begin the collection of a second sample.

One of the sample hoods in the Hot Lab should be designated specifically for sample storage. Lead bricks should line the front of the sample hood so that samples may be placed behind them.

6.2.10 In order to begin the process of collecting a second sample perform Steps 3.2.5 and 3.2.10.

6.2.11 Attach new liquid and gas samplers on the side of the PALS panel. New samplers are located in the PALS drawer.

6.2.12 Begin at Step 4.2, Panel Prep. and repeat the procedure for the new sample.

7.0 SAMPLE ANALYSIS

7.1 Initial Conditions (Technician #1)

7.1.1 A fume hood in the Hot Lab is prepared to accept a post-accident sample: (1) the ventilation fan is on and (2) Lead bricks line the front of the panel.

7.1.2 Two 5cc lockable sample syringes have been verified workable and evacuated.

7.1.3 A 5cc vial has been evacuated and placed in the fume hood.

7.1.4 A clean 50 ml nalgene sample bottle has been placed in the sample hood.

7.1.5 Reagents to run CP/0/A/8100/16 have been prepared and standards have been run.

7.1.6 The Gas Chromatograph has been started up and standardized per CP/0/A/8100/48, Chemistry Procedure for the Determination of Stripped Gas by G. C.

7.2 Stripped Gas Samples

CAUTION: Perform all actions involving the transfer, preparation, or analysis of the gas sample under the fume hood.

7.2.1 Insert a lockable 5cc syringe into the gas sampler and withdraw 1cc of sample. While still under the fume hood, inject the sample into an evacuated 5cc vial.

7.2.2 Double bag the vial. Seal tightly. Prepare a label for the bag as follows:

"Liquid Sample Name _____
Initials _____
Date _____
Sample Trap Time _____
Sample Factor _____"

The "Gas Sample Name" and "Sample Trap Time" may be obtained from the gas sampler label. Calculate the actual sample volume as follows:

Unit 1: $\text{Sample Volume} = \frac{110\ \text{ml}}{260\ \text{ml}} \times 1\ \text{ml} = 0.42\ \text{ml}$

Where: 110 ml = liquid tank volume (including tubing)
260 ml = gas tank volume (including tubing)
1 ml = sample volume injected into vial

Unit 2: $\text{Sample Volume} = \frac{105\ \text{ml}}{286\ \text{ml}} \times 1\ \text{ml} = 0.37\ \text{ml}$

Where: 105 ml = liquid tank volume (including tubing)
286 ml = gas tank volume (including tubing)
1 ml = sample volume injected into vial

Complete the Sample Requisition form using the sample volume calculated above to fill in the "Sample Volume" blank on the form. This will allow Health Physics to adjust isotopic activities from diluted samples to reflect reactor coolant activity.

7.2.3 Using a sample carrier, transport the sample to the Health Physics Count Room, or elsewhere for gamma spectral analysis.

7.2.4 Insert a lockable 5cc syringe into the gas sampler and withdraw 5cc of sample. Lock the syringe.

7.2.5 Analyze the 5cc sample of stripped gas per CP/0/B/8100/48.

7.3 Liquid Sample

CAUTION: Perform all actions involving the transfer, preparation, or analysis of the liquid sample in the fume hood.

7.3.1 Take 5 cc of liquid sample and prepare for analysis per CP/0/A/8200/04, Chemistry Procedure for the Determination of Gamma Isotopic Activity. Dilute 5 cc in a 50 cc bottle per the procedure. Report the actual sample volume being counted on the sample requisition form under "Sample Volume" and submit to Health Physics so that the appropriate adjustment of isotopic activities occurs.

Unit 1 "Sample Volume" (ml)	DF	Flow Totalizer Setting
0.103	48.4	02500
0.052	96.7	05000
0.029	172.3	09000
0.007	673.5	35000

Unit 2 "Sample Volume" (ml)	DF	Flow Totalizer Setting
0.086	58.2	02500
0.043	115.0	05000
0.024	207.0	09000
0.006	808.2	35000

Double bag the vial. Seal tightly. Prepare a label for the bag as follows:

"LIQUID SAMPLE NAME _____
INITIALS _____
DATE _____
SAMPLE TRAP TIME _____
SAMPLE VOLUME _____"

The "LIQUID SAMPLE NAME" and "SAMPLE TRAP TIME" can be obtained from the liquid sampler label. The "SAMPLE VOLUME" is obtained from the chart in this step.

7.3.2 Take 50 ml of liquid sample and analyze for boron per CP/0/A/8100/16.

Then, multiply the ppm BORON MEASURED, i.e. the value obtained per CP/0/A/8100/16 by the Dilution Factor to obtain the ppm Boron in the Reactor Coolant.

ppm BORON IN THE REACTOR COOLANT =

ppm BORON MEASURED X DILUTION FACTOR

Record the "Boron Concentration" on Enclosure 8.2.

7.3.3 Subtract the radiation field (background), #1 - Enclosure 8.2, from sample activity found at purge time completion (#3) and record on Enclosure 8.2. This is the radiation due to the sample.

7.3.4 Chloride Analysis

CAUTION: Perform all actions which involve the transfer of the liquid sample to another container under the fume hood.

7.3.4.1 Contact the Station Chemist at the TSC (#2531). Ask him to contact the General Office personnel (at the Crisis Management Center during an accident situation). Inform them that a post-accident liquid sample is to be transported to the Applied Science Center for chloride analysis on the ion-chromatograph.

They should contact A. M. Deak for workload clearance. Also, ask the Station Chemist to fill out a Chemical Sciences Analysis Request Form, Enclosure 8.9 for the sample.

7.3.4.2 A hard copy of the gamma spectrum and tritium data as well as the sample volume should be transferred to the Applied Science Center Radiation Protection Officer (Charmaine Bonus) or her designee. A telecopy can be sent to the Applied Science Center (CHEMPLOT can also be used).

7.3.4.3 Transfer 20 ml ± 5 ml of sample from the liquid sample to a 50 ml nalgene bottle.

7.3.4.4 Double bag the bottle. Seal tightly. Label the bag as follows

"LIQUID SAMPLE NAME _____
INITIALS _____
DATE _____
SAMPLE TRAP TIME _____
DILUTION FACTOR _____"

The "SAMPLE TRAP TIME" and "DILUTION FACTOR" can be obtained from the liquid Enclosure 8.2. Place the bag in a shielded container for transport.

7.3.4.5 Once the sample shipment has been authorized by the Radiation Protection Officer, the sample shipment should be sent to the Physical Sciences Building in care of the Radiation Protection Officer. The dilution water sample obtained in Step 3.2.3 should also be sent for analysis at this time.

7.3.4.6 When the sample results are obtained record the results on Enclosure 8.2.

7.4 If the dilution proves inadequate for any of the above procedures contact the Station Chemist or his designee.

7.5 Report all results in the Primary Chemistry Legal Log. In an accident situation results should be relayed by phone to the Station Chemist at the TSC as soon as possible. Phone number, 2531.

7.6 Clean the liquid and gas samplers under the fume hood: Remove and replace the septum in the gas sampler. Flush the liquid sampler with Super Q water.

7.7 With Enclosure 8.2 in a plastic bag, exit the Auxiliary Building. Check out through the Operation's Support Center.

7.8 Transport Enclosure 8.2 to the Station Chemist at the TSC.

8.0 ENCLOSURES

8.1 Initial Conditions Checklist

8.2 PALS Data Sheet

8.3 Valve Alignment (Unit 1)

8.4 Valve Alignment (Unit 2)

8.5 PALS Control Panel Layout

8.6 Valve Sequence Table

8.7 General Information

8.8 Operation's Supply - Valve Alignment

8.9 Chemical Sciences Analysis Request Form

ENCLOSURE 8.1
OP/0/A/6200/21

INITIAL CONDITIONS CHECKLIST

Date: _____/_____/_____

PART I. (Verifying the System's Ability to Function) Initial/Date

1. Verify that the Post Accident Liquid Sampling System Periodic Test, PT/1/A/4208/08 (PT/2/A/4208/08) is current prior to sampling. (Periodic Test Program - Computer Printout) _____/_____

PART II. (Interfacing Groups) Initial/Date

1. Contact Operations (complete at TSC).

   (a) If this is an accident situation, the containment should have been isolated by an ST signal. Verify that the signal has been cleared. _____/_____

   Initial/Date

   CAUTION: Warn Operations not to open any sample lines until Chemistry has realigned valves in the NM lab. Opening containment isolation sample valves too early could increase radiation levels in the NM lab.

   (b) Request permission to open the desired valves out of the list below. Place a check beside the sample point(s) to be used. _____/_____

NC Hot Leg A	Unit 1	Unit 2	Check
Hot Leg Smpl Hdr Cont Isol	1NM26B	2NM26B	
Hot Leg Smpl A Cont Isol	1NM22A	2NM22A	_____
NC Hot Leg C			
Hot Leg Smpl Hdr Cont Isol	1NM26B	2NM26B	
Hot Leg C Smpl Cont Isol	1NM25A	2NM25A	_____
ND Pump 1A Discharge	**Unit 1**	**Unit 2**	
*ND Pump 1A Disch Smpl Line Isol	1NM39	2NM39	_____
ND Pump 1B Discharge	**Unit 1**	**Unit 2**	
*ND Pump 1B Disch Smpl Line Isol	1NM40	2NM40	_____

*Verify with Operations that the respective A or B Train is in service.

Initial/Time

   (c) Verify with Operations that a 1KC Essential Supply Header is in operation for Unit 1 Sampling. For Unit 2, verify with Operations that a 2KC Essential Supply Header is in operation for Unit 2 Sampling. _____/_____

ENCLOSURE 8.1
OP/0/A/6200/21

INITIAL CONDITIONS CHECKLIST

Date: ____/____/____

Initial/Time

(d) Request permission to open or to have an operator open the following Operations valves in order to provide cooling water flow to the panel. These valves are locked closed. The keys should be obtained prior to proceeding to the panel. ____/____

	Unit 1	Unit 2
Post Accident Liquid Sample Panel Hx Inlet	1KCA8	2KCA8
Post Accident Liquid Sample Panel Hx Outlet	1KCA10	2KCA10

For Unit 2, the following additional valves have to be OPENED: A Train KC-2KCD03 and 2KCD05, B Train KC-2KC-D04 and 2KCD06.

(e) Verify Power Panel Boards 1KXPA and 1KXPB are energized for Unit 1 sampling. 2KXPA and 2KXPB for Unit 2 sampling. ____/____

2. Contact Radwaste Chemistry (Complete at TSC). Initial/Date

Notify Radwaste Chemistry that the PALS panel will be operated. Waste Liquid from the panel is pumped to WEFT Sump "A". (For Unit 1 sampling). For Unit 2 sampling the waste liquid is pumped to WEFT Sump "B". ____/____

3. Contact Health Physics (Complete at TSC). Initial/Date

(a) Request Health Physic's Coverage for obtaining a post-accident liquid sample. ____/____

Initial/Date

(b) Verify Health Physic's ability to count a sample in the Count Room or elsewhere. ____/____

PART III. (Required Equipment) Check

1. Technician #2 should have the following items before departing to the NM lab:

(a) The PALS panel keys (A set of keys are located in the Secondary Supervisor's office and the Cold Lab) _____

(b) A Working Copy of OP/0/A/6200/21 with Enclosure 8.1 completed. _____

(c) A High Radiation Area Key for the NM Lab. _____

(d) A Shielded Sample Carrier _____

ENCLOSURE 8.1
OP/0/A/6200/21

INITIAL CONDITION CHECKLIST

Date: ____/____/____

Check

(e) Plastic bags left on Cold Side _____

(f) Black ball point pen _____

(g) A 50 ml Nalgene Sample bottle labeled "Dilution Water Sample" _____

(h) Fill out two labels as follows:

Label one: "Liquid Sample Name _____
Initials _____
Date _____
*Sample Trap Time _____
*Dilution Factor _____

Label the second: "Gas Sample Name _____
Initials _____
*Sample Trap Time _____

*The "Sample Trap Time" and "Dilution Factor" will be entered after the samples have been obtained. This information will be on Enclosure 8.2.

PART IV Recommended Dilution Volume (From Station Chemist at TSC)

Unit 1 Dilution Factor	Flow Totalizer Setting	Check One
48.4	02500	_____
96.7	05000	_____
172.3	09000	_____
673.5	35000	_____

ENCLOSURE 8.1
OP/0/A/6200/21

INITIAL CONDITION CHECKLIST

Date: _____/_____/_____

Unit 2 Dilution Factor	Flow Totalizer Setting	Check One
58.2	02500	_____
115.0	05000	_____
207.0	09000	_____
808.2	35000	_____

Station Chemist

Initial/Date

_____/_____

ENCLOSURE 8.2
OP/0/A/6200/21

PALS DATA SHEET

(Circle One)
NC Loop A - C Data (Page I of II)

Initial/Date

_____/_____

PART I. (Complete at Control Panel)		TIME
1. Radiation Field (Background)	____mR/hr	_____
2. Time sample purge started.		_____
3. Radiation field (sample purge time completion)	____mR/hr	_____
4. TC1 temperature (stabilized with Sample Flowing)	____°C	_____
5. Radiation due to sample, (#3) - (#1) (Complete after Sample Collection)	____mR/hr	_____
6. Pressure at isolation	____ psig	_____
7. Sample Trap Time		_____
8. Flow totalizer setting	____	_____
9. pH of sample	____	_____
10. Radiation reading (From 4.9.5)	____mR/hr	_____
11. Radiation reading on contact with samplers. (Omit during Periodic Testing.)	Gas ____mR/hr Liquid ____mR/hr	_____ _____

ENCLOSURE 8.2
OP/0/A/6200/21

PALS DATA SHEET

(Circle One)
NC Loop A - C Data (Page II of II)

Initial/Date

_____/_____

PART II. (Complete at Hot Lab) TIME

1. Hydrogen Concentration _____ cc/kg H_2 _____

2. Boron Concentration _____ ppm B

3. Dilution Factor _____ Reference Enclosure 8.1, number 7

4. Chloride Concentration _____ ppb Cl^- _____

5. Gamma Spectral Analysis (Gas) (Attach H.P. Data Sheet) _____

6. Gamma Spectral Analysis (Liquid) (Attach H.P. Data Sheet) _____

In an accident situation, the results from this data sheet should be forwarded to the Station Chemist at the Technical Support Center as soon as possible. TSC phone number [redacted]

Initial/Date

_____/_____

ENCLOSURE 8.2
OP/0/A/6200/21

PALS DATA SHEET

(Circle One)
ND Loop A - B Data (Page I of II)

Initial/Date

_____/_____

PART I. (Complete at Control Panel)		TIME
1. Radiation Field (Background)	____mR/hr	_____
2. Time sample purge started.		_____
3. Radiation field (sample purge time completion)	____mR/hr	_____
4. TC' temperature (stabilized with Sample Flowing)	____°C	_____
5. Radiation due to sample, (#3) - (#1) (Complete after Sample Collection)	____mR/hr	_____
6. Pressure at isolation	____ psig	_____
7. Sample Trap Time		_____
8. Flow totalizer setting	____	_____
9. pH of sample	____	_____
10. Radiation reading (From 4.9.5)	____mR/hr	_____
11. Radiation reading on contact with samplers. (Omit during Periodic Testing.)	Gas ____mR/hr Liquid ____mR/hr	_____ _____

ENCLOSURE 8.2
OP/0/A/6200/21

PALS DATA SHEET

(Circle One)
ND Loop A - B Data (Page II of II)

Initial/Date

_____/_____

PART II. • (Complete at Hot Lab) TIME

1. Hydrogen Concentration _____ cc/kg H_2 _____

2. Boron Concentration _____ ppm B

3. Dilution Factor _____ Reference Enclosure 8.7, number 7

4. Chloride Concentration _____ ppb Cl^- _____

5. Gamma Spectral Analysis (Gas) (Attach H.P. Data Sheet) _____

6. Gamma Spectral Analysis (Liquid) (Attach H.P. Data Sheet) _____

In an accident situation, the results from this data sheet should be forwarded to the Station Chemist at the Technical Support Center as soon as possible. TSC phone number - [redacted]

Initial/Date

_____/_____

Form 18768 (R8-81)

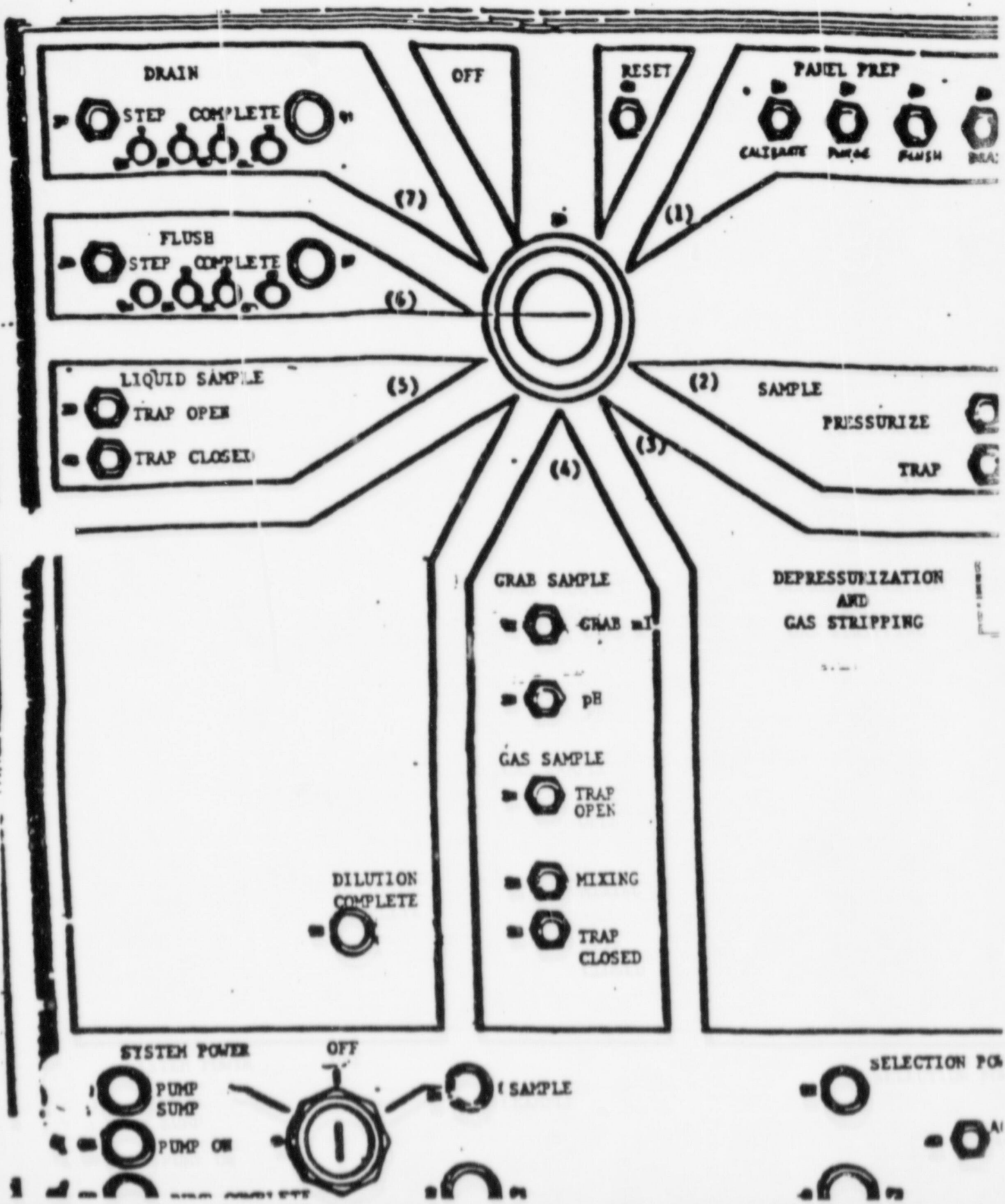
DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ENCLOSURE 8.3
OP/0/A/6200/21 (Unit 1)
VALVE ALIGNMENT LOCATION

VALVE NO.	VALVE NAME	LOCATION	POSITION	INITIAL
1NM342	PASP Demin Supply Flow Meter Influent	AB-543 EE-54 Rm. 238	THROTTLED	
1NM343	PASP Demin. Supply Isol to Smpl Hdr	AB-543 EE-54 Rm. 238	OPEN	
1NM351	PASP Air Eductor Isolation From VI	AB-543 EE-54 Rm. 238	OPEN	
1NM298	Nitrogen Supply to PASP	AB-543 EE-54 Rm. 238	OPEN	
1NM393	PASP Effluent to WEFT Sump A Isol	AB-543 EE-54 Rm. 238	OPEN	
1NM321	PASP Liquid Tank Effluent to WEFT	AB-543 EE-54 Rm. 238	THROTTLED	
1NM334	PASP Calibration Tank Vent to Aux Bldg Exhaust	AB-543 EE-54 Rm. 238	CLOSED	
1NM328	PASP Sample Line Nitrogen Supply Isolation	AB-543 EE-54 Rm. 238	OPEN	
1NM452	PASP Dilution Tank Sample	AB-543 EE-54 Rm. 238	CLOSED	
1NM449	PASP Calibration Tank Drain	AB-543 EE-54 Rm. 238	CLOSED	
1KCC99	Sample Cooler Outlet Valve	AB-543 EE-54 Rm. 238	OPEN	
1NM456	PASP Deaerator Tank Sample	AB-543 EE-54 Rm. 238	CLOSED	
1NM453	PASP Liquid Tank Sample	AB-543 EE-54 Rm. 238	CLOSED	
1NM448	PASP Nitrogen Inlet to Liquid Tank	AB-543 EE-54 Rm. 238	OPEN	
1NM462	PASP Deaerator Tank Inlet	AB-543 EE-54 Rm. 238	CLOSED	
1NM427	PASP N_2 Vent Valve	AB-543 EE-54 Rm 238	CLOSED	

Form 18768 (R8-81)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ENCLOSURE 8.4
OP/0/A/6200/21 (Unit 2)
VALVE ALIGNMENT LOCATION

VALVE NO.	VALVE NAME	LOCATION	POSITION	INITIAL
2NM342	PASP Demin Supply Flow Meter Influent	AB-543 EE-61 Rm. 248 61	THROTTLED	
2NM343	PASP Demin. Supply Isol to Smpl Hdr	AB-543 EE-61 Rm. 248	OPEN	
2NM351	PASP Air Eductor Isolation From VI	AB-543 EE-61 Rm. 248	OPEN	
2NM298	Nitrogen Supply to PASP	AB-543 EE-61 Rm. 248	OPEN	
2NM393	PASP Effluent to WEFT Sump A Isol	AB-543 EE-61 Rm. 248	OPEN	
2NM321	PASP Liquid Tank Effluent to WEFT	AB-543 EE-61 Rm. 248	THROTTLED	
2NM334	PASP Calibration Tank Vent to Aux Bldg Exhaust	AB-543 EE-61 Rm. 248	CLOSED	
2NM328	PASP Sample Line Nitrogen Supply Isolation	AB-543 EE-61 Rm. 248	OPEN	
2NM452	PASP Dilution Tank Sample	AB-543 EE-61 Rm. 248	CLOSED	
2NM449	PASP Calibration Tank Drain	AB-543 EE-61 Rm. 248	CLOSED	
2KCC99	Sample Cooler Outlet Valve	AB-543 EE-61 Rm. 248	OPEN	
2NM456	PASP Deaerator Tank Sample	AB-543 EE-61 Rm. 248	CLOSED	
2NM453	PASP Liquid Tank Sample	AB-543 EE-61 Rm. 248	CLOSED	
2NM448	PASP Nitrogen Inlet to Liquid Tank	AB-543 EE-61 Rm. 248	OPEN	
2NM462	PASP Deaerator Tank Inlet	AB-543 EE-61 Rm. 248	CLOSED	
2NM427	PASP N_2 Vent Valve	AB-543 EE-61 Rm. 248	CLOSED	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(6)
LIQUID SAMPLE
(5)
TRAP OPEN
TRAP CLOSED
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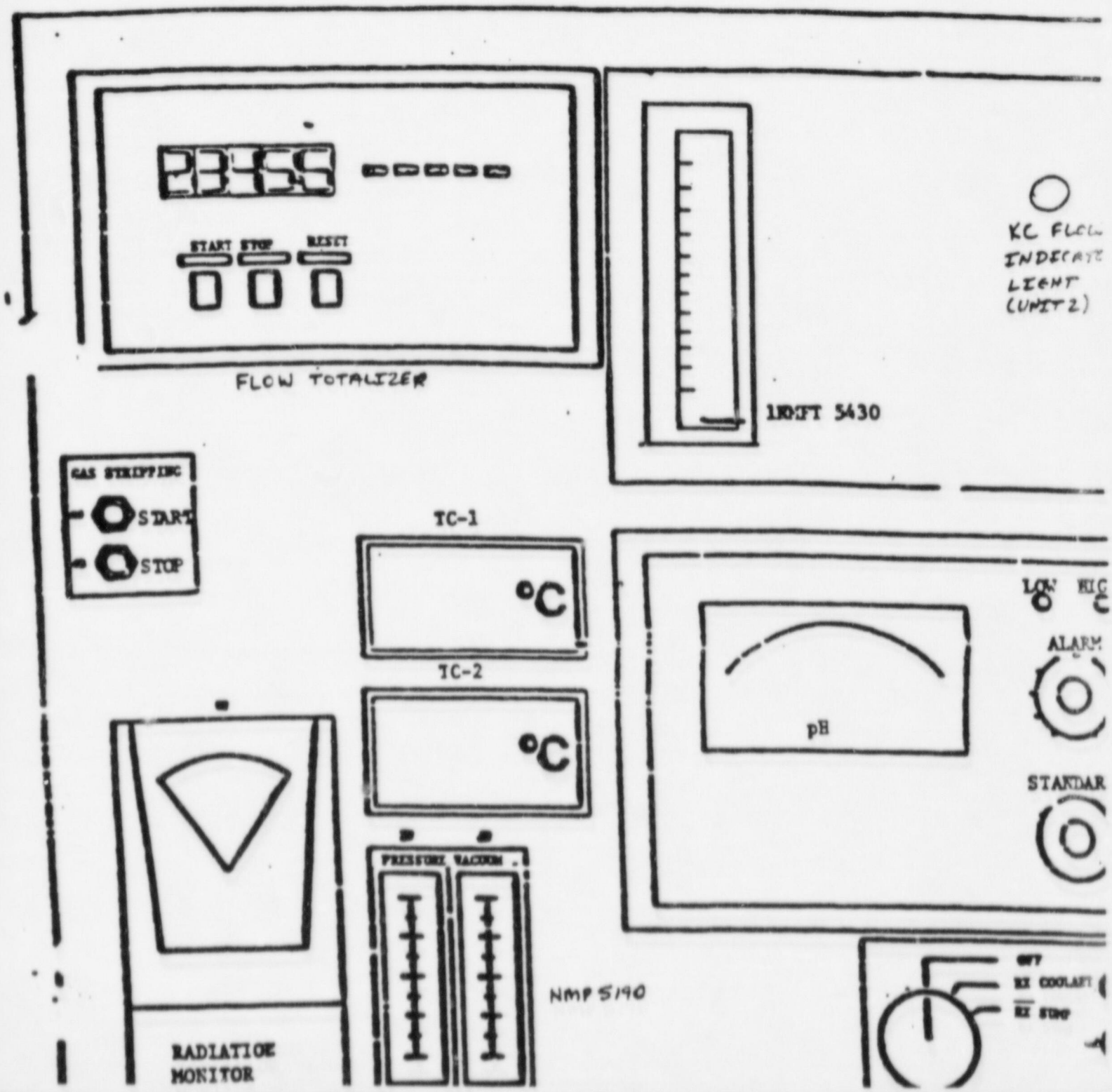
SAMPLE
PRESSURIZE
TRAP
(4)
(3)
GRAB SAMPLE
GRAB
pH
GAS SAMPLE
TRAP
OPEN
MIXING
TRAP
CLOSED
DEPRESSURIZATION
AND
GAS STRIPPING
DILUTION
COMPLETE
SYSTEM POWER
OFF
PUMP
SUMP
PUMP ON
SAMPLE
SELECTION

ENCLOSURE 8.5
PALS CONTROL PANEL LAYOUT
OP/O/A/6200/21



ENCLOSURE 8.6
OP/0/A/6200/21
VALVES SEQUENCE TABLE

Function		Pushbotton Activation	Valves
1.0	Panel Prep		1NM313, 1NM312, 1NM315 1NMSV0311, 1NM311, 1NM310, 1NM314, 1NMSV3201
1.1	Calibrate	H	1NM333, 1NM332
1.2	Purge	H	1NM330, 1NM338 1NM307, 1NM305
1.3	Flush	H	1NM331, 1NM338, 1NM307, 1NM309
1.4	Drain	H	1NM338, 1NM307, 1NM305
2.0	Sample Trap		1KCA9, 1NM294, 1NM324 1NM319, 1NM313, 1NM312 1NMSV0311, 1NM314
2.1	Pressurize	M	$\overline{\text{1NM319}}$
2.2	Trap	M	$\overline{\text{1NM324}}$
3.0	Depressurization		1NM317, 1NM315
3.1	Gas Stripping Start	M	1NM325, 1NM327
3.2	Gas Stripping Stop	M	$\overline{\text{1NM325}}$, $\overline{\text{1NM327}}$
4.0	Grab Sample		1NM339, 1NM346
4.1	Grab ml	M	1NM318, 1NM325, 1NM329, 1NMSV0336
4.2	D.M. Flow Meter Start	M	1NM341, 1NM346
4.3	D.M. Flow Meter Stop	M	$\overline{\text{1NM341}}$, 1NM346
4.4	Mixing	H	1NM340
4.5	pH	M	$\overline{\text{1NMSV0336}}$
4.6	Trap Open	M	1NM315, 1NM312, 1NMSV0311, 1NM324, 1NM319, 1NM345, 1NM322

ENCLOSURE 8.6
OP/O/A/6200/21
VALVES SEQUENCE TABLE

	Function	Pushbotton Activation	Valves*
4.7	Trap Close	M	1NM315, 1NM312 1NMSV0311
5.0	Liquid Sample		1NM324, 1NM319 1NM345, 1NM322, 1NM348 1NMSV0350, 1NM346
5.1	Trap Open	H	1NM319, 1NM346, 1NM309 1NM304, 1NM376
5.2	Trap Close	H	1NMSV0350
6.0	Flush		
6.1	Gas Tank	M	1NM316, 1NM312, 1NM308, 1NM309
6.2	Probes	M	1NM331, 1NM338, 1NM307, 1NM309
6.3	Dilute tank	M	1NM347, 1NM301, 1NM309
6.4	Liquid Tank	M	1NM331, 1NM329, 1NM325 1NM319, 1NM322
7.0	Drain		
7.1	Dilute Tank	M	1NM376, 1NM348, 1NM304, 1NM305
7.2	Gas Line	M	1NM323, 1NM315, 1NM312 1NM308, 1NM305
7.3	Gas Tank	M	1NM323, 1NM315, 1NM317, 1NM325, 1NM329, 1NM338, 1NM307, 1NM305
7.4	Probe Refill & System Vent	M	1NM331, 1NM338, 1NM307 1NM309, 1NM312, 1NM313 1NM346, 1NM348, 1NM315 1NMSV3200

ENCLOSURE 8.6
OP/0/A/6200/21
VALVES SEQUENCE TABLE

LEGEND:

M - Momentarily depressing the button initiates the function.

H - The function will operate as long as the pushbutton is depressed.

$\bar{N}$ - Indicates that the valve is de-energized when the pushbutton is depressed.

* - The same valve sequence is used for Unit 2 PALS; therefore, the valves will simply be labeled with a 2 prefix.

ENCLOSURE 8.7
OP/O/A/6200/21

GENERAL INFORMATION

1. PALS Panel Location: Unit 1 - (Room 238, Col. FF-55, AB-543)
Unit 2 - (Room 248, Col. FF-59, AB-543)

See Page 2 of this enclosure for a general arrangement drawing.

2. Telephone Number at Control Panel - Ext. [redacted] (Unit 1), Ext. [redacted] (Unit 2)

3. Breaker Information:

Unit 1

Fdr. Breaker	Comp/Breaker	Description	Location
1KXPA	#3	Post Accident Sampling Sample Pump and Sol. Vlvs.	AB 554' RM 350 CC-57
1KXPB	#34	Post Accident Liquid Sampling Control Panel	AB 554' RM 350 CC-56

Unit 2

Fdr. Breaker	Comp/Breaker	Description	Location
2KXPA	#3	Post Accident Sample Pump and Sol. Vlvs.	AB 554' RM 340 CC-57
2KXPB	#34	Post Accident Liquid Sampling Control Panel	AB 554' RM 340 CC-58

4. Area Radiation Monitor: 1EMF-2 is located in Room 238.
2EMF-2 is located in Room 248.

5. Station Chemist phone number at TSC - [redacted]

6. Sample Line Purge Volumes

Unit 1

NC Loop A to PALS - 22.5 gallons (45 minute purge @ .5 GPM)
NC Loop C to PALS - 19.5 gallons (39 minute purge @ .5 GPM)
ND Loop A to PALS - 25.0 gallons (50 minute purge @ .5 GPM)
ND Loop B to PALS - 32.5 gallons (65 minute purge @ .5 GPM)

Unit 2

NC Loop A to PALS - 21.5 gallons (43 minute purge @ .5 GPM)
NC Loop C to PALS - 19.2 gallons (38 minute purge @ .5 GPM)
ND Loop A to PALS - 9.6 gallons (20 minute purge @ .5 GPM)
ND Loop B to PALS - 12.6 gallons (25 minute purge @ .5 GPM)

ENCLOSURE 8.7
OP/O/A/6200/21

GENERAL INFORMATION

7. Dilution Factors

Unit 1/Unit 2 Flow Totalizer Setting	Dilution Factor	Dilution Water Added (ml)
02500/02500	46.4/58.2	250.0/250.0
05000/05000	96.7/115.0	500.0/500.0
09000/09000	172.3/207.4	900.0/900.0
35000/35000	673.5/808.2	3500.0/3500.0

Form 18768.(R8-81)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ENCLOSURE 8.8
OP/0/A/6200/21
OPERATION'S SUPPLY VALVES - VALVE ALIGNMENT

VALVE NO.	VALVE NAME	LOCATION	POSITION	INITIAL
	Unit 1 PALS Supply Valves			
1VI230	Root Isol.	AB-553 GG-56 Rm. 200	OPEN	
1VI86	Aux. Bldg. 543 Elev. VI Supply	AB-543 EE-53 Rm. 217	OPEN	
1YM436	Post Accident Unit 1 Sample Isol.	AB-543 FF-54 Rm. 238	OPEN	
1YM256	YM Header Isol	AB-543 FF-54 Rm. 238	OPEN	
1KCA8	Post Accident Liquid Sample Panel Hx Inlet	AB-546 EE-54 Rm. 238	LOCKED CLOSED	
1KCA10	Post Accident Liquid Sample Panel Hx Outlet	AB-546 EE-54 Rm. 238	LOCKED CLOSED	
	Unit 2 PALS Supply Valves			
2VI402	Liquid Sample Panel Supply Isol.	AB-543	OPEN	
2VI230	Unit 2 Aux. Bldg. Root Isol.	AB-543	OPEN	
2VI86	Aux Bldg 543 Elev. VI Supply	AB-543	OPEN	
1YM437	Post Accident Unit 2 Sample Isol.	AB-543 FF-60 Rm. 248	OPEN	
1YM140	YM Header Isolation	AB-543 FF-57 Rm. 200	OPEN	
2KCA8	Post Accident Liquid Sample Panel Hx Inlet	AB, 543, EE-FF, 60-61	LOCKED CLOSED	
2KCA10	Post Accident Liquid Sample Panel Hx Outlet	AB, 543 EE-FF, 60-61	LOCKED CLOSED	
	NOTE: The valves listed above all belong to Operations. Contact Operations if a valve is			
	found in an incorrect position.			

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
ENCLOSURE 8.8
OP/0/A/6200/21
OPERATION'S SUPPLY VALVES - VALVE ALIGNMENT

VALVE NO.	VALVE NAME	LOCATION	POSITION	INITIAL
2KCD05	KC Isolation Essential Return Header 2A	AB, 577+6' FF-58	LOCKED CLOSED	
2KCD03	KC Isolation Essential Return Header 2A	AB, 577+12' HH-JJ, 59	LOCKED CLOSED	
2KCD04	KC Isolation Essential Return Header 2B	AB, 577+12' HH-JJ, 59	LOCKED CLOSED	
2KCD06	KC Isolation Essential Return Header 2B	AB, 577+6' FF-58	LOCKED CLOSED	

ATTACHMENT 1

ENCLOSURE 8.9
OP/0/A/6200/21
CHEMICAL SCIENCES ANALYSIS REQUEST FORM

DUKE POWER COMPANY - PRODUCTION SUPPORT DEPARTMENT
Chemical Sciences - Analysis Request

Initiator _____ Station/Dept./Phone _____ Request Date _____ Results Reported To _____

Sample Description	Sample Station #	Sample ChemSci #	Volume/Wt	Requested Analyses	Exempt Concentrations see 10CFR30.70 Y or N	Shipping Papers Attached Y or N	GeLi Spectrum #	N Activity (if applicable) Ci

Additional information _____
Turnaround, accuracy, _____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CLASSIFICATION OF EMERGENCY

1.0 SYMPTOMS

1.1 Notification of Unusual Event

1.1.1 Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant.

1.1.2 No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety occurs.

1.2 Alert

1.2.1 Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.

1.2.2 Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

1.3 Site Area Emergency

1.3.1 Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.

1.3.2 Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

1.4 General Emergency

1.4.1 Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

1.4.2 Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

2.0 IMMEDIATE ACTIONS

2.1 Compare actual plant conditions to the Emergency Action Level(s) listed in Enclosure 4.1 then declare the appropriate Emergency Class as indicated.

2.2 Refer to the applicable Emergency Response Procedure (RP) for the classification found in Enclosure 4.1:

Notification of Unusual Event	RP/0/A/5000/02
Alert	RP/0/A/5000/03
Site Area Emergency	RP/0/A/5000/04
General Emergency	RP/0/A/5000/05

3.0 SUBSEQUENT ACTIONS

3.1 To escalate, de-escalate or close out the Emergency, compare plant conditions to the Initiating Conditions of Enclosure 4.2.

4.0 ENCLOSURES

4.1 Emergency Event List for Emergency Classes

4.2 Emergency Classification Guide Flowchart

CATAWBA NUCLEAR STATION
EMERGENCY ACTION LEVEL'S FOR

EVENT #: 4.1.1 Primary Coolant Leak

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. NC Leakage > Tech. Specs. LCO: •NC Leak > 10 gpm identified primary leakage OR •>500 gpd from any S/G OR •> 1 gpm total P-S through all S/G OR •Any press boundary leakage OR •> 1 gpm unidentified leakage OR •> 40 gpm controlled leakage at 2235 psig OR •> 1 gpm from NC press isolation valve at 2235 psig AND Tech. Spec. Action Statement Time Limit is exceeded. 2. NC Leak > 50 gpm *For Modes 5 & 6 only* CONTINUED	1. NC Leak > 50 gpm ** For Modes 1, 2, 3 & 4 only ** 2. P-S Leak > 10 gpm AND a steam line break. SYMPTOMS Rapidly decreasing •NC Tavg •PZR Press •PZR Level AND •EMF-33 & 34 in alarm. •Steam Line Radiation Monitor in alarm on the affected S/G. •Steam Line low Press S/I signal. •Hi steam flow and Low-Low Tavg CONTINUED	1. NC Leak > Total ECCS capacity: SYMPTOMS •PZR low Press Rx Trip •PZR Low Press S/I Signal •High Containment Press •High Containment Humidity •High Contament Sump Level •EMF-38,39 & 40 in alarm •EMF-53 A&B in alarm 2. Multiple S/G tube ruptures: (Several hundred gpm P-S leakage) AND loss of offsite power: SYMPTOMS •PZR Low Press Alarm •PZR Low Press Rx Trip •PZR Low Level Alarm •EMF-33 & 34 in Alarm •EMF-53 A&B in alarm •Steam Line Radiation Monitor in alarm on the affected S/G. AND •UV alarm on 7KV buses AND •Possible lifting of S/G PRV's and/or safety valves CONTINUED	1. Small or large LOCA with failure of ECCS, leads to core melt: SYMPTOMS •S/I signal and Rx trip AND •N/I & ND pumps are not running AND •N/I Flow indicates "No flow" AND •High Containment Sump Level 2. Small LOCA and initially sucessful ECCS with failure of NS System over several hours leads to core melt and failure of containment: SYMPTOMS •PZR low press Rx trip •PZR low press S/I signal •NC temperature is rising AND •NS flow indicators show "No flow" after > 2 hours END

EVENT # 4.1.1: Primary Coolant Leak (Continued)

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
3. Failure of a PZR PORV or safety valve to close following a reduction of NC Press: •Valid accoustical monitor indication of valve failure. END	3. S/G Tube Rupture AND loss of offsite power: SYMPTOMS •PZR low press alarm •PZR low press trip •PZR low level alarm •PZR low press S/I signal •EMF-33&34 in alarm •EMF-53 A&B in alarm •Steam Line Radiation Monitor in alarm on the affected S/G. AND •UV alarm on all 7 KV buses 4. Multiple S/G tube ruptures: (Several hundred gpm P-S leak) SYMPTOMS •PZR low press alarm •PZR low press Rx Trip •PZR low level alarm •PZR low press S/I signal AND •EMF-33&34 in alarm •EMF-53 A&B in alarm •Steam Line radiation Monitor in alarm on the affected S/G. END	3. > 50 gpm P-S leakage AND a steam line break AND identification of fuel damage. SYMPTOMS Rapidly decreasing: •NC Tavg •PZR Press •PZR Level AND •EMF-33 & 34 in alarm •Steam Line Radiation Monitor in alarm on the affected S/G AND •Steam line Low Press S/I signal •High Steam Flow and Low Low Tavg AND •EMF-48 in alarm with either or both of the following: •Loose Parts Monitoring Alarm •Laboratory Analysis indicating fuel damage •EMF-53A and/or B indicates > 3R/hr END	

EVENT # 4.1.2: Fuel Damage

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. High coolant activity: a. > 1 μCi/gram Dose Equivalent I-131 OR > 100 μCi/Gram $\bar{E}$ gross activity. b. > 0.1% increase in fuel failure within 30 min. OR 1% to 5% fuel failures SYMPTOMS •EMF-48 alarm AND •I-131 concentration increases by 4 μCi/ml over a 30 min. period OR •I-131 concentration 40 μCi/ml to 200 μCi/ml See Notes END	1. Severe loss of fuel cladding; mechanical clad failure: a. Very high coolant activity sample 200 μCi/ml to 1000 μCi/ml equivalent I-131. b. EMF-48 indicates increase > 1% fuel failures (> 40 μCi/ml) within 30 min. OR •5% to 25% total fuel failures (> 200 μCi/ml I-131) See Notes 2. NC pump seizure leads fuel failure: SYMPTOMS •NC pump trip alarm AND •Rx trip on low flow AND •> 1% increase fuel failures within 30 min. (> 40 μCi/ml within 30 min.) OR •5% total fuel failures (> 200 μCi/ml I-131) See Notes END	1. Degraded core with possible loss of coolable geometry: •Inadequate Core Cooling See EP/1/A/5000/2B •Mechanical Clad Failure > 25% fuel failures (> 1000 μCi/ml I-131) •Severe Fuel Overtemperature 1% to 10% fuel failures as estimated by AP/0/A/5500/31 •Fuel Melt .5% to 5% fuel failures as estimated by AP/0/A/5500/31 See Notes END	1. Loss of 2 of 3 fission product barriers with a potential for loss of 3rd barrier: a. LOCA as identified in Event 4.1.1 Site Area Emergency, Item #1 AND Incomplete Cont. Isol b. LOCA as identified in Event 4.1.1 Site Area Emergency, Item #1 AND •EMF-53A and/or B > 10^4 R/hr AND •Containment press > 14.8 psig for at least 2 minutes 2. Severe Fuel Damage •Fuel Overtemperature > 10% fuel failures as estimated by AP/0/A/5500/31 •Fuel Melt > 5% fuel failures as estimated by AP/0/A/5500/31 END

NOTES: 1. Determined by Laboratory Analysis
2. Concentration may vary with ECCS dilution

EVENT # 4,1,3: Steam System Failure

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Failure of a safety or PORV on an S/G to close, following a reduction of SM pressure. 2. Rapid depressurization of secondary side: SYMPTOMS a. S/I signal b. As observed END	1. P-S Leak > 10 gpm AND a steam line break SYMPTOMS Rapidly decreasing: •NC Tavg •PZR Press •PZR Level AND •EMF-33 & 34 in alarm. •Steam Line Radiation Monitor in alarm on the affected S/G. •Steam line low Press S/I signal •High steam flow and Low-Low Tavg END	1. > 50 gpm P-S leakage AND a steam line break AND identification of fuel damage. SYMPTOMS Rapidly decreasing: •NC Tavg •PZR Press •PZR Level AND •EMF-33 & 34 in alarm •Steam Line Radiation Monitor in alarm on the affected S/G. AND •Steam line Low Press S/I signal •High steam flow and Low-Low Tavg AND •EMF-48 in alarm, with either or both of the following: •Loose Parts Monitor Alarm •Laboratory Analysis indicating fuel Damage •EMF-53A and/or B indicates > 3R/hr. END	N/A

EVENT # 4,1,4; High Radiation/Radiological Effluents

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Radiological Effluents Tech Specs Exceeded: SYMPTOMS •EMF-31, 35, 36, 37, 49 or 50 in alarm AND •uncontrolled releases continued indicating Radiological Effluent Tech. Specs. exceeded. END	1. High radiation level or high airborne contamination: increase by a factor of 1000 in radiation monitor readings within station. 2. Airborne radiological effluents > 10X TS limits (instantaneous rate): SYMPTOMS •EMF-37 Low range $\geq 1.3 \times 10^{4}$ cpm •EMF-36 Low Range $\geq 8.1 \times 10^{4}$ cpm •EMF-37 $\geq 7.25 \times 10^{3}$ cpm/min END	1. Radiological effluents at the site boundary FOR ADVERSE METEROLOGY SEE NOTE 1 •Whole Body > 50 mr/hr for 30 min. OR > 500 mr/hr for 2 min. OR •5X these levels to Thyroid OR •EPA PAG's are projected to be exceeded outside the Site Boundary. See Notes 2 & 3 SYMPTOMS •EMF-36 Low Range $\geq 2.5 \times 10^{5}$ cpm for 30 min •EMF-36 Low Range $\geq 2.5 \times 10^{6}$ cpm for 2 min AND/OR High Range $\geq 3.7 \times 10^{2}$ cpm for 2 min •EMF-37 change of 2.9×10^{3} cpm/minute for 30 minutes or a change of 2.9×10^{4} cpm/minute for 2 minutes as determined from recorder trace observation or OAC. END	1. Effluent monitor detect levels corresponding to: FOR ACTUAL METEROLOGY 1 R/hr Whole Body OR 5 R/hr Thyroid at the Site Boundary: See Notes 2 & 3 SYMPTOM •EMF-36 Low Range $\geq 4.98 \times 10^{6}$ cpm AND/OR •EMF-36 High Range $\geq 7.35 \times 10^{2}$ cpm •EMF-37 change of 5.8×10^{4} cpm minute over any time interval as determined from recorder trace. END

Notes: 1. These values are worst case calculation based on Stability Class "G", and Unit Vent flowrate of 1.9×10^{5} cfm.
2. These dose rates are projected based on plant radiation monitors or are measured in the environment.
3. Potential Source Term origins are not summed.

EVENT # 4.1.5: Loss of Shutdown Functions

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
N/A	1. Complete loss of function needed for unit cold shutdown: SYMPTOMS •Failure of both trains of ND AND •Inability to maintain natural or forced circulation. 2. Failure of the Reactor Protection System to initiate and complete a trip which brings the reactor subcritical: •Reactor remains critical after all attempts to trip have been completed. END	1. Complete loss of functions needed for unit hot shutdown: SYMPTOMS •Inability to establish NV pump injection AND •Inability to establish CA flow OR •Inability to establish KC flow. 2. TRANSIENT requiring operation of shutdown system with failure to trip: •Reactor remains critical after all attempts to trip have been completed. END	1. Transient requiring Rx trip with failure to trip. AND Additional failure of core cooling and ECCS would lead to core melt: SYMPTOMS •Rx remains critical after all attempts to trip the Rx are complete AND •No ND and NI Flow indicated. 2. Transient initiated by loss of CF and CM Systems followed by failure of CA System for extended period. Core melting is possible in several hours with ultimate failure of containment likely: SYMPTOMS •Rx trip on Lo-Lo S/G level AND •wide range S/G level toward offscale low on all S/G AND •No CA flow indicated OR •CA pumps not running and cannot be restored within 30 minutes END

CATAWBA NUCLEAR STATION
EMERGENCY ACTION LEVEL'S FOR

EVENT # 4.1.6: Loss of Power

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Loss of offsite Power: SYMPTOM •UV alarm on all 7 KV buses 2. Loss of onsite power capability: SYMPTOMS a. Modes 1-4 •Main generators are incapable of supplying in-house loads AND •D/G's are incapable (for > 2 hours) of powering essential buses. b. Modes 5-6 •D/G's incapable (for > 8 hours) of powering essential buses. END	1. Loss of offsite power and loss of all onsite AC power for ≤ 15 min. SYMPTOMS •UV alarm on all 7 KV buses AND •UV alarm on 4160V buses 2. Loss of all vital DC buses for ≤ 15 min. SYMPTOM •UV alarm on all vital DC buses END	1. Loss of offsite power and loss of all onsite AC power for > 15 min. SYMPTOMS •UV alarms on all 7 KV buses AND •UV alarm on 4160V buses 2. Loss of all vital DC power for > 15 min. SYMPTOM •UV alarm on all vital DC buses END	1. Failure of offsite and onsite power with total loss of CA makeup for several hours, leads to core melt and failure of containment: SYMPTOMS •UV alarms on all 7 KV buses AND •Blackout load sequencer actuated AND •CA pump(s) fail to start. END

EVENT # 4,1,7: Fires and Security Actions

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Fire within Plant lasting more than 10 minutes: (Note*) •Observation of a fire lasting > 10 minutes. 2. Security threat OR •Attempted entry OR •Attempted sabotage As reported by Security force. END	1. Fire potentially affecting safety systems: •Observation of a fire that could affect safety systems. 2. Ongoing Security compromise: •As reported by Security Force END	1. Fire compromising the functions of safety systems: •Observation of a major fire that defeats redundant safety system or functions. 2. Imminent loss of physical control of the plant (Note*): •Physical attack on the plant (Note*) including imminent occupancy of Control Room and auxiliary shutdown panels. END	1. Any major internal or external events (e.g., fires, earthquakes substantially beyond design levels) which could cause massive common damage to the unit. 2. Loss of physical control of the plant (Note*): •Physical attack on the plant has resulted in occupation of the Control Room and auxiliary shutdown panels. END

NOTE: Plant is defined as: Aux. Bldg., TB, SB, RB, D/G Rm.

EVENT # 4.1.8: Loss of Alarms and/or Communication

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Indications or alarms on process or effluent parameters not functional in Control Room to an extent requiring unit shutdown AND A power reduction is initiated with intent to enter Mode 3: SYMPTOM •Loss of process or effluent Radiation monitoring system 2. Other significant loss of assessment or communication capability. SYMPTOMS a. Loss of all meteorological instrumentation onsite AND •Inability to call National Weather Service for back up source of meterorological data. OR b. Loss of all radio AND telephone communications capability. END	1. Most or all alarms (annunicators) lost. END	1. Most or all alarms (annunciators) lost. AND An uncontrolled transient initiated while alarms lost. END	N/A

EVENT # 4,1,9: Spent Fuel Damage

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
N/A	1. Fuel damage accident with release of radioactivity to Containment or Fuel Handling Building: SYMPTOMS •Unit #1 EMF-15, 17 OR •Unit #2 EMF-2, 4 AND •EMF-38, 39, 40 or 42 in alarm AND •Observation of damage to spent fuel assembly following an accident in fuel handling areas that, in the opinion of the Shift Supervisor, may have resulted in damaged spent fuel. END	1. Major damage to spent fuel in containment or Fuel Handling Building: SYMPTOMS •Unit #1 EMF-15, 17 OR •Unit #2 EMF-2, 4 AND •EMF-38, 39, 40 or 42 in alarm AND •Observation of major damage to spent fuel assemblies OR •Water level below fuel level following an accident in fuel handling areas that, in the opinion of the Shift Supervisor, may have resulted in damaged spent fuel. END	N/A

EVENT # 4.1.10: Natural Disasters and Other Hazards

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1.a. Earthquake < OBE felt or detected in plant (NOTE*) < 0.08g Horizontal OR < 0.053g Vertical b. Lake level •High > 580 ft. to 592.2 ft. •Low 559.9 ft. to 550 ft. c. Any tornado on site d. Sustained Winds > 73 mph 2.a. Aircraft crash on-site or unusual aircraft activity over site b. Train derailed onsite c. Explosion within the site boundary d. Toxic or flammable gas release within the site boundary e. Turbine rotating component failure causes rapid unit shutdown. END	1.a. Earthquake > OBE: > 0.08g Horizontal OR > 0.053g Vertical b. Lake level: •High 592 ft. 594.6 ft •Low < 550 ft. AND SNSWP available c. Any tornado striking the plant (NOTE*): d. Sustained Winds approaching 95 mph 2.a Aircraft crash on site affecting safe operation of the unit. b. Missile impact on site affecting safe operation of the unit. c. Explosion damage to site affecting safe operation of the unit. d. Uncontrolled entry of toxic or flammable gas into site affecting safe operation of the unit. e. Turbine rotating component failure causing penetration of turbine casing. END	1. When unit is not in cold shutdown: a. Earthquake > SSE: > 0.15g Horizontal OR > 0.10g Vertical b. Lake Level: •High > 594.6 ft. •Low < 550 ft. AND Loss of SNSWP c. Sustained Winds > 95 mphs 2. When unit is not in cold shutdown: a. Aircraft crash causing damage or fire to Containment Building, Control Room, Auxiliary Building, Fuel Building or RN Intake Structure b. Damage from missile or explosion causes inability to establish: 1) charging pump injection 2) CA flow 3) KC or RN flow c. Entry of uncontrolled toxic or flammable gases into Control Room, Cable Spreading Room, Containment Building, Switchgear Room, Auxiliary Shutdown Panels or Diesel Rooms, affecting safe operation of the unit. END	1. Any major internal or external events (e.g., fires, earthquakes substantially beyond design levels) which could cause massive common damage to the unit. END NOTE: Plant is defined as: Aux. Bldg., TB, SB, RB, D/G Rm.

EVENT # 4.1.11: Other Abnormal Plant Conditions

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. ECCS initiated: S/I signal verified by redundant indication and discharge into vessel.	1. Evacuation of Control Room anticipated or required with control of shutdown systems established from local station.	1. Evacuation of Control Room and control of shutdown systems not established from local stations in 15 minutes.	1. Other unit conditions exist, from whatever source, that in the judgement of the Shift Supervisor, the Operations Duty Engineer, the Superintendent of Operations or the Plant Manager make release of large amounts of radioactivity in a short time period possible (e.g., any core melt situation). END
2. Abnormal coolant temperature and/or pressure or abnormal Reactor fuel temperature: •Figure 2.1-1 Tech Specs exceeded. OR •Core Sub-cooling Monitor less than acceptable (Outside Acceptable Region)	2. Other unit conditions exist that in the judgement of the Shift Supervisor, the Operations Duty Engineer, the Superintendent of Operations, or the Plant Manager warrant precautionary activation of TSC & OSC. END	2. Other unit conditions exist that in the judgement of the Shift Supervisor, the Operations Duty Engineer, the Superintendent of Operations or the Plant Manager warrant activation of TSC & CMC and monitoring teams and a precautionary public notification. END	
3. Loss of containment integrity requiring shutdown by Tech. Spec. AND A power reduction is initiated with intent to enter Mode 3: •Any automatic containment isolation valve found to be open and inoperable and unisolable. OR •Both air lock doors on a lock inoperable, or penetrations fail leak test per Tech Spec when containment integrity is required. CONTINUED			

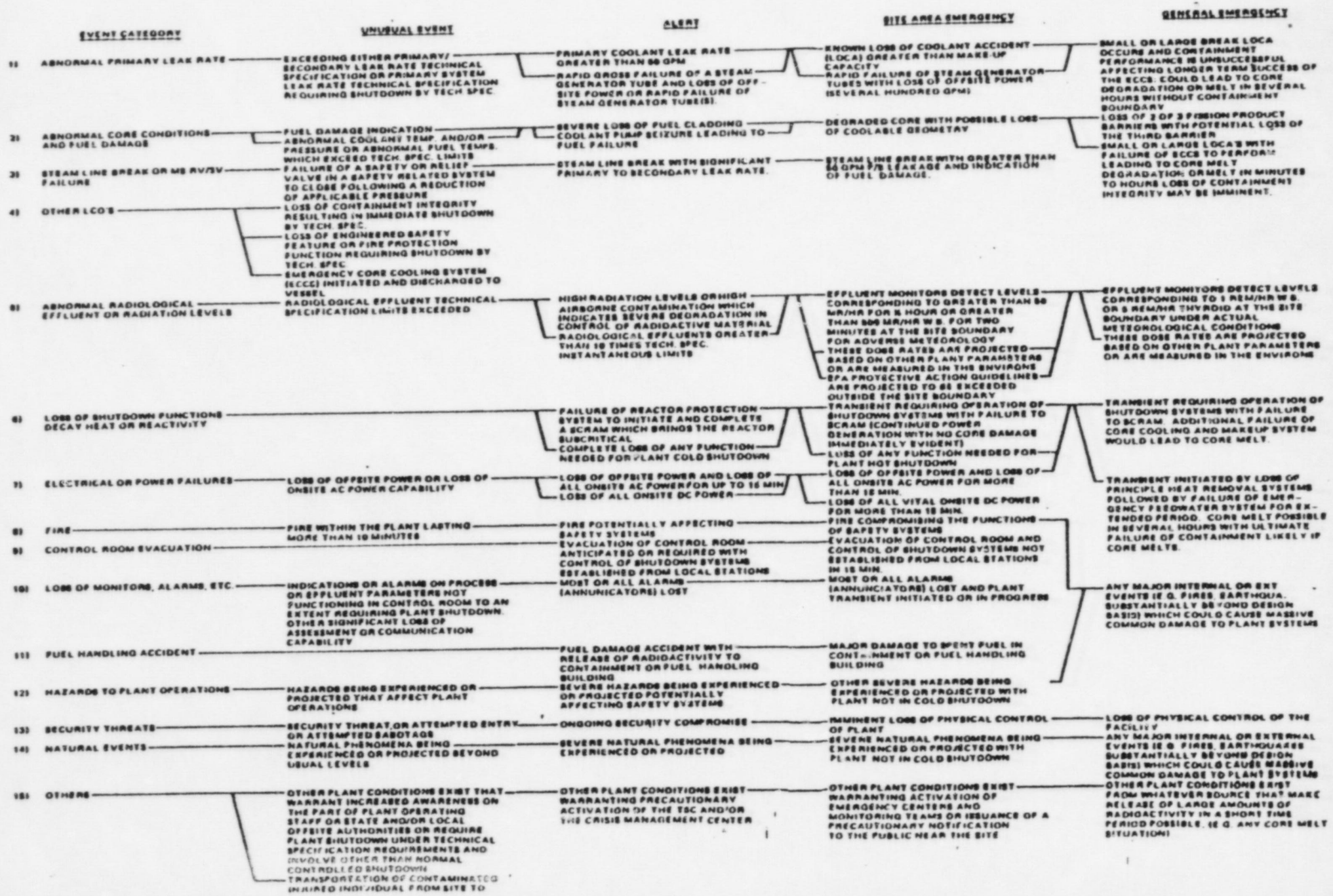
EVENT # 4.1.11: Other Abnormal Plant Conditions (Continued)

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
4. Loss of Engineered Safety Feature or Fire Protection System Function requiring shutdown by Tech Specs AND A power reduction is initiated with intent to enter Mode 3: •ESF actuation system found inoperable. OR •Fire Protection Water System found inoperable per Tech Spec.			
5. Other unit conditions exist that in the judgement of the Shift Supervisor, the Operations Duty Engineer, the Superintendant of Operations or the Station Manager: a. Warrant increased awareness of local authorities OR b. Require unit shutdown under Tech Spec requirements AND •involve other than normal controlled shutdown. END			

EVENT # 4.1.12: Contaminated and Injured Individual

Class Notification of Unusual Event	Alert	Site Area Emergency	General Emergency
1. Transportation of a contaminated injured individual from site to offsite medical facility. •Contamination > 5000 dpm as determined by HP END	N/A	N/A	N/A

EMERGENCY CLASSIFICATION GUIDE FLOWCHART



RP/0/B/5000/13

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
NRC NOTIFICATION REQUIREMENTS

1.0 SYMPTOMS

1.1 Plant conditions requiring NRC notification in accordance with: 10 CFR50.72, 10 CFR20.205, 10 CFR20.403, and 10 CFR73.71.

1.1.1 Immediate, 1 Hour and 4 Hour Notifications.

1.1.2 24 Hour Notifications for Operating License Condition Deviations.

1.2 See Enclosure 4.1 for determination of appropriate notification requirement.

2.0 IMMEDIATE ACTIONS

2.1 Complete one of the following enclosures:

2.1.1 Enclosure 4.2 "Checklist for Significant Event Notification"

or

2.1.2 Enclosure 4.3 "Report of Serious Physical Security Events"

When reporting from Section 4.1.2.7 of Enclosure 4.1

2.2 Notify the NRC Operations Center by the following means:

2.2.1 Pri. - Emergency Notification System Phone

or

2.2.2 Alt. [redacted]

2.3 Notify the NRC Region II Office at [redacted] of any event listed in Section 4.1.1.5 of Enclosure 4.1.

NOTE: No Enclosure for reporting to Region II from Section 4.1.1.5 of Enclosure 4.1

3.0 SUBSEQUENT ACTIONS

3.1 Provide follow-up notification as described below:

3.1.1 Emergency Classes

3.1.1.1 Any further degradation in level of safety of the plant including those that require declaration of any Emergency Class, if such a declaration has not been previously made.

3.1.1.2 Any change in the Emergency Class

3.1.1.3 Termination of the Emergency

3.1.2 Results of ensuing evaluations or assessments of plant conditions

3.1.3 Effectiveness of response or protective measures taken

3.1.4 Information related to plant behavior that is not understood

3.2 Maintain an "Open", continuous, communications channel with the NRC Operations Center, upon request by the NRC.

3.3 Notify the following individual:

3.3.1 Compliance Engineer

Primary	Alternate
Duty Compliance Engineer (See current Station Duty List)	C. L. Hartzell Office: Home: [redacted]

3.3.2 If neither the Compliance Engineer nor the Duty Compliance Engineer can be reached then call directly to the:

NRC Resident Inspector

Primary - Unit 1 Alternate - Unit 2		Primary - Unit 2 Alternate - Unit 1
P. H. Skinner Office: [redacted] Home:	or	P. K. VanDoorn Office: [redacted] Home:

3.4 Upon completion of this procedure, attach a completed Procedure Process Record Form and forward to the Compliance Engineer for review prior to submission to Master File.

4.0 ENCLOSURES

4.1 Events Requiring NRC Notification

4.2 Checklist for Serious Event Notification

4.3 Report of Serious Physical Security Events

4.1.1 Events Requiring "IMMEDIATE NOTIFICATIONS":

Immediately after notification to states and counties and not later than one hour after the time the Emergency Class was declared.

4.1.1.1 The declaration of any of the Emergency Classes specified in the Catawba Emergency Plan

4.1.1.2 Any change from one Emergency Class to another

4.1.1.3 Termination of the Emergency

4.1.1.4 For any incident involving byproduct, source or special nuclear material which may have caused or threatens to cause the following:

4.1.1.4.1 Individual Exposure

≥ 25 Rem Whole Body

or

≥ 150 Rem Skin of Whole Body

or

≥ 375 Rem Extremities

4.1.1.4.2 Release of radioactive material in concentration which if averaged over a 24 hour period would exceed 5,000 times the applicable concentration of the limits specified in 10 CFR 20, Appendix B, Table II.

4.1.1.4.3 Loss of one working week or more of the operation of any unit.

4.1.1.4.4 Damage to property in excess of $200,000.

4.1.1.5 Notification to NRC Reginal Office, Region II, Atlanta, GA. (see Step 2.3). Receipt of a package of radioactive materials with:

4.1.1.5.1 ≥0.01 uCi/100cm^2 loose radioactive material on the external surface

or

4.1.1.5.2 >200 MR/hr. on external surface

or

4.1.1.5.3 >10 MR/hr. at three (3) feet from the external surface

4.1.2 Events Requiring "ONE HOUR REPORTS":

As soon as practical and within one hour of the occurrence.

4.1.2.1 The initiation of any nuclear plant shutdown required by Technical Specifications (i.e. Safety Limit Violation). See notes:

NOTE: 1. The Initiation of a Shutdown is defined as, "A reduction in Power required by an action statement of Tech. Specs. or any unplanned trip (automatic or manual) to Mode 3."

2. A Shutdown is defined (for reporting requirements) as, "Mode 3 and below".

4.1.2.2 Any deviation from a plant License Condition or Technical Specification authorized in 10CFR50.54(x).
(Licensee may take reasonable action that departs from a license condition or a technical specification in an emergency when this action is immediately needed to protect the health and safety of the public and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent.)

4.1.2.3 Any event or condition during operation that results in the condition of the plant, including the principle safety barriers, being seriously degraded, or results in the plant being:

4.1.2.3.1 In an unanalyzed condition that significantly compromises plant safety.

4.1.2.3.2 In a condition that is outside the design basis of the plant.

4.1.2.3.3 In a condition not covered by the plant's operating and emergency procedures.

4.1.2.4 Any event that results or should have resulted in Emergency Core Cooling System (ECCS) discharge into the reactor coolant system as a result of a valid signal.

4.1.2.5 Any event that results in a major loss of emergency assessment capability, offsite response capability, or communications capability (e.g., significant portion of control room indication, Emergency Notification System or Offsite Notification System).

Note: A loss of 25% of the Prompt Alerting Siren System for Catawba Nuclear Station is reportable when 19 or more sirens are reported inoperable for > 4 hours.

4.1.2.6 Any natural phenomenon or other external condition or any event that poses an actual threat to the safety of the plant or significantly hampers site personnel in the performance of duties necessary for the safe operation of the plant, including fires, toxic gas releases or radioactive releases.

4.1.2.7 Safeguard events as determined by Security personnel and Station Management.

4.1.2.7.1 A trace investigation of a lost or unaccounted for shipment pursuant to 10 CFR 73.27.

4.1.2.7.2 An attempt (actual or suspected) to commit a theft or unlawful diversion of Special Nuclear Material.

4.1.2.7.3 Any event which significantly threatens or lessens the effectiveness of the physical security system:

One (1) Hour Safeguards Events

a. Threat-related Events Compensated or Uncompensated.

1. Suspected or Confirmed Intrusion or Sabotage Attempt.

2. Attempted Entry of Unauthorized Weapons, Explosives or Incendiary Devices into PA.

3. Stated or Perceived Threat to Sabotage/Extortion Threat.

4. Personnel/Civil Disturbance inside PA.

5. Discovery of Suspected Sabotage or Sabotage Device.

b. Loss of Physical Security Effectiveness Events Uncompensated.

1. Loss of both the CAS and the SAS.

2. Loss of Offsite Communications with Local Law Enforcement Agencies (LLEA).

3. Total Loss of Power Supply to Security Systems.

4. Security Force Personnel Strike or Other Unavailability of the Security Force that Results in an Unavailability of the Minimum Number of Security Force Members.

5. Decreased Effectiveness of Physical Barriers (Vital).

4.1.3 Events Requiring "FOUR HOUR REPORTS"

As soon as practical and within four hours of the occurrence.

4.1.3.1 Any event found while the reactor(s) is/are shutdown, that had it been found while the reactor(s) was/were in operation would have resulted in the plant, including its principle safety barriers, being seriously degraded or being in an unanalyzed condition that significantly compromises plant safety.

4.1.3.2 Any event or condition that results in manual or automatic activation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS). (However, activation of an ESF including the RPS, that results from and is part of the preplanned sequence during testing or reactor operation need not be reported).

4.1.3.3 Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to:

4.1.3.3.1 Shutdown the reactor and maintain it in a safe shutdown condition.

4.1.3.3.2 Remove residual heat.

4.1.3.3.3 Control the release of radioactive material.

4.1.3.3.4 Mitigate the consequences of an accident.

4.1.3.4 Any airborne radioactive release that exceeds 2 times the applicable concentrations of the limits specified in 10CFR20, Appendix B, Table II in unrestricted areas when averaged over a time period of one hour.

4.1.3.5 Any liquid effluent release that exceeds 2 times the limiting combined MPC (See 10CFR20, Appendix B, Note 1.) at the point of entry into the receiving water (unrestricted area) for all radionuclides except tritium and dissolved noble gases, when averaged over a time period of one hour. (Immediate Notifications made under this requirement also satisfy the requirements of 10CFR20.403, Paragraph (a)(2) and (b)(2)). (See 4.1.1.4.2).

4.1.3.6 Any event requiring the transport of a radioactively contaminated person to an offsite medical facility for treatment.

4.1.3.7 Any event or situation, related to the health and safety of the public or onsite personnel, or protection of the environment, for which a News Release is planned

or

Notification to Other Government Agencies has been or will be made. Such an event may include an onsite fatality or inadventent release of radioactively contaminated materials.

4.1.4 Operating License Conditions Deviations Requiring "24 Hr. Notifications":

4.1.4.1 Refer to Operating License

4.1.5 Follow-up Notifications

4.1.5.1 During the course of the event, report:

4.1.5.1.1 Any further degradation in the level of safety of the plant or other worsening plant conditions, including those that require the declaration of any of the Emergency Classes, if such a delcaration has not been previously made

or

Any change in the Emergency Class

or

Termination of the Emergency.

4.1.5.1.2 The results of ensuing evaluations or assessments of plant conditions

4.1.5.1.3 The effectiveness of response or protective measures taken.

4.1.5.1.4 Information related to plant behavior that is not understood.

CHECKLIST FOR SIGNIFICANT EVENT NOTIFICATION

Complete the applicable portions of this enclosure and transmit to the NRC Operations Center as required by Enclosure 4.1.

State the following to the NRC Operations Center:

"THIS NOTIFICATION IS MADE IN ACCORDANCE WITH 10CFR50.72. THIS IS DUKE POWER COMPANY'S CATAWBA NUCLEAR STATION IN NRC REGION II MAKING THE NOTIFICATION."

1. a. My Name is: _____ My title is: _____

   My Location is: Catawba Nuclear Station, Concerning Unit ____ (1/2/Both)

   I can be called-back at _____

   b. "Your Name Please" _____

2. Time of Notification _____ Date of Notification _____

3. Event Classification: Check appropriate box(s).

   a. ☐-Emergency Plan Declaration ☐-Other Immediate Notification

   ☐- Notification of Unusual Event ☐- Alert

   ☐- Site Area Emergency ☐- General Emergency

   b. ☐-A "ONE-HOUR" Notification

   c. ☐-A "FOUR-HOUR" Notification

   d. ☐-A "24-HOUR" Notification

4. Event Description:

Category		Initiation Signal	
____	Reactor Trip	_____	
____	ESF Actuation	_____	
____	ECCS Actuation	_____	
____	Safety Injection Flow	_____	____ Other
____	LCO Action Statement	_____	

System _____ Component _____

Cause: ____ Mechanical ____ Electrical ____ Personnel Error

____ Procedural Inadequacy ____ Other

Event Time _____ EDT/ Event Date _____ (Mo./Day)

Event Description:

_____

_____

5. Plant Status:

   a. Power prior to event: _____

   b. Power at time of report: _____

   c. Did all systems function as required? _____ (Yes/No) (If no, explain below.

   d. Anything "unusual" or not understood? _____ (Yes/No) (If yes, explain below).

   _____

   _____

   e. Corrective Actions:

   _____

   _____

   f. Mode of Operation till correction _____

   g. Estimate of time to restart _____

6. Outside agencies or personnel notified:

   ____ State: N.C. & S.C.

   ____ County: York, Gaston & Mecklenburg

   NRC Resident _____ (Yes), _____ (No), _____ (will be)

   Other: _____ Press Release: _____ (Yes/No)

7. Radiological Release: _____ (Yes/No) (If yes, complete this paragraph)

   a. Release: ____ Liquid ____ Gaseous

   ____ Planned ____ Unplanned

   b. Location/Source: _____

   _____

c. Release Rate: _____

d. Duration of Release: _____

e. Estimated Total Activity: _____

f. Estimated Total Iodine: _____

g. Grab Sample: _____

h. Monitor Reading: _____

i. Tech Spec Limit: _____

j. Personnel Exposed or Contaminated: _____

_____

k. Areas Evacuated: _____

_____

l. Plant HP Backup Requested: _____

_____

m. Additional Information: _____

_____

8. Additional Information on NC System Leaks or S/G Tube Leaks:

a. Sudden or Long Term Development: _____

b. Start Date & Time: _____

c. Leak Rate: _____

d. Leak Volume: _____

e. Tech Spec Limit _____

f. Primary Coolant Activity: _____

g. Secondary Coolant Activity: _____

h. Radiation Monitor Readings:

1. Condenser _____

2. Main Steam Line _____

3. S/G Blowdown _____

i. Safety Related Equipment Not Operational:

_____

_____

j. Special Actions Taken (if any):

_____

_____

REPORT OF SERIOUS PHYSICAL SECURITY EVENTS

DATE/TIME OF NOTIFICATION _____

NRC PERSON NOTIFIED _____

State the following to the NRC Operations Center:

"THIS NOTIFICATION IS MADE IN ACCORDANCE WITH 10CFR73.71. THIS IS DUKE POWER COMPANY'S CATAWBA NUCLEAR STATION IN NRC REGION II MAKING THE NOTIFICATION."

My Name is: _____ My title is: _____

I can be reached at _____.

"Your Name Please" _____.

1. *DATE OF OCCURRENCE: _____ 3.*POWER LEVEL OF UNITS:

2. *TIME OF OCCURRENCE: _____ Unit 1 _____

Unit 2 _____

*If date and time of occurrence are not known, indicate the date and time of discovery.

4. DESCRIPTION OF EVENT: _____

_____

_____

5. SECURITY RESPONSE/COMPENSATORY MEASURES ESTABLISHED: _____

_____

_____

6. LLEA (Local Law Enforcement Agency) NOTIFIED? YES ___ NO ___
(If Yes, name organization and telephone number) _____

_____

7. CONSEQUENCES AT PLANT:
Description of Equipment Systems Affected _____

_____

_____

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: ~~8606180428~~ DOC. DATE: 86/06/02 NOTARIZED: NO DOCKET #
FACIL: 50-413 Catawba Nuclear Station, Unit 1, Duke Power Co. 05000413
50-414 Catawba Nuclear Station, Unit 2, Duke Power Co. 05000414
AUTH. NAME AUTHOR AFFILIATION
TUCKER, H. B. Duke Power Co.
RECIP. NAME RECIPIENT AFFILIATION
Record Services Branch (Document Control Desk)

SUBJECT: Forwards Central Files version of revised emergency plan implementing procedures, including OP/O/A/6200/21, "Post-Accident Liquid Sampling Sys" & RP/O/A-5000/01, "Classification of Emergency." Withheld.

DISTRIBUTION CODE: X005D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 2+67
TITLE: Emerg Plan (CF Avail)

NOTES: LPDR 2cys AMDTS to FSAR. ASLB 1cy. 05000413
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