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VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Provides addl info & corrections to Pages 7,8,9,11,13,14 & 30 util 830812 submittal re NUREG-0737,Item II.B.3, "Post-Accident Sampling Sys." W/three oversize drawings. Aperture cards are available in PDR.

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CP&L

Carolina Power & Light Company

APR 20 1984

SERIAL: NLS-84-077

Director of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
NUREG-0737 ITEM II.B.3
POST-ACCIDENT SAMPLING SYSTEM

Dear Mr. Varga:

The intent of this letter is to provide additional information and to make some corrections to Carolina Power & Light Company's (CP&L) August 12, 1983 submittal concerning the Post-Accident Sampling System (PASS) at the H. B. Robinson Steam Electric Plant Unit No. 2 (HBR2). Carolina Power & Light Company believes that these corrections are within the scope of NUREG-0737 Item II.B.3. In addition, CP&L's original submittal plus these corrections still meet the original design requirements for the HBR2 PASS.

1. On pages 7, 8, and 9 - The Grab Sampling Facility bypass line does not have a valve in it.

2. On page 11, line 5 - Valves 955A and 955B are not automatic isolation valves, i.e., they do not shut on containment isolation signal.

3. On page 11, line 6 - The switches near the PASS are not key operated control switches. They are hand operated control switches and do not override an automatic closure feature (as stated in line 7).

4. On page 11, last paragraph - Instrument air supply to containment <u>does</u> become isolated on containment isolation signal. The isolation valve can be opened by turning a switch on the reactor and turbine-generator board (RTGB).

5. On page 13, line 3; page 13, second paragraph; and page 14, line 7 - The wording concerning the oxygen analysis might lead the reader to believe that HBR2 has an inline oxygen monitor; it does not. References to the oxygen analysis should be deleted so that no presence of an inline oxygen monitor will be inferred.

6. On page 29, response (11)(a) - The response does not mention that the PASS, inside containment, will be environmentally qualified by March 31, 1985.

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7. On page 30, (Part (A) response) - Although not originally mentioned, the valves inside containment that will replace passive flow restricters are environmentally qualified.

The corrected pages are attached with vertical bars in the margin showing changes. Please replace the appropriate pages from our August 12, 1984 submittal with those attached. Several of the PASS drawings have also been updated and are attached for your use. Drawing number G-190261 (attached) supersedes drawing number G-190304 previously submitted. Also, drawing number HBR2-8261 (Sheets 1 and 2, attached) supersedes drawings HBR2-8256 and HBR2-8261 (Sheets 1 and 2) previously submitted with CP&L's August 12, 1983 letter.

In addition, as mentioned in IE Inspection Report No. 50-261/83-33 (on pages 9 and 10), a sample cannot be taken from the Residual Heat Removal (RHR) System with the PASS when the Reactor Coolant System (RCS) is depressurized. This is due to the current location of the RHR sample point downstream of a throttled flow control valve. Therefore, the sample point is being relocated to the discharge of the RHR pumps so that there will be adequate pressure to draw a sample when the RCS is depressurized. This modification is scheduled to be completed prior to startup from our current Steam Generator Replacement Outage.

If you have any question, please contact a member of the Nuclear Licensing Staff.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

ONH/pgp (9148DCS)
Attachments

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)
Mr. Steve Weise (NRC-HBR)

depressurization and circulation. When degassing of the sample is completed, burette level is recorded for total gas concentration determination and the gas is circulated through in-line instruments to determine hydrogen and oxygen concentrations. The gas is then diluted with nitrogen so that the existing radioanalysis equipment can be used to quantify the radioisotopes in the gas sample. A volume of degassed liquid sample is likewise diluted with primary demineralized water so that existing radioanalysis equipment can be used to determine the radioisotopes within the liquid sample. The system is then purged with nitrogen and demineralized water and placed in standby for the next sample.

The system permits the operator to remotely purge the containment atmosphere sample using an air pump. A containment atmosphere sample is then isolated and diluted with nitrogen so that analysis of hydrogen, oxygen and radiological content can be performed with minimum exposure.

The Grab Sample Facility, an accessory of the PASS, provides the capability to collect an undiluted reactor coolant liquid grab sample for Chloride, pH, Boron and Radionuclide analysis. The Grab Sampling Facility consists of an undiluted depressurized liquid sample vessel enclosed in a shielded cask, isolation valves with stem extensions penetrating the shielding for connection to the PASS, a

pallet lift hand truck, and double end shut-off quick disconnects for interface connections to the PASS sample station liquid sample return line. Sampling is performed as follows:

The hand truck containing the cask is maneuvered to the PASS sample station liquid sample return line tees and the assembly is connected to the system by means of the double ended shut-off quick disconnects. Once connected, the grab sampling assembly is flushed with primary demineralized water via the PASS sample station connection. The liquid sample path pressure indicator PCH-4158 can be used to check for leaks before any contaminated fluid is allowed to enter. Following satisfactory pressurization, an undiluted sample is purged through the PASS. When a representative reactor coolant sample is available, the sample vessel and connection tee isolation valves are opened to allow flow through the Undiluted Liquid Sample Vessel.

When purging of the sample vessel is complete, the sample is isolated by closing the isolation valves. Sample purge flow through the PASS is secured. Prior to disconnecting the cask, a demineralized water flush is accomplished by establishing flow via the PASS sample station connection through the normal liquid sample return line path. The connection tee isolation valves are opened

allowing a primary demineralized water flush of all tubing except for the sample vessel and isolation valves.

This minimizes radiation exposures and the possibility of contamination when the cask is disconnected. The cask is disconnected from the system by means of manually detaching the double end shut-off quick disconnects. The cask is then transported on the hand truck to a safe storage location prior to subsequent chloride or other analysis of the collected sample.

RESPONSE (2)(d):

The PASS provides the capability to calibrate remotely the hydrogen and oxygen meters and to perform calibration checks for boron, pH, total gas, hydrogen, and oxygen measurements. Individual components were designed and selected for their performance in a post accident chemistry environment and design integral radiation environment. The boron, pH, H_2, and O_2 instruments are calibrated on a refueling interval.

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feature and allow these valves to be operated to take a PASS sample. These valves are located outside of containment and therefore are not required to be environmentally qualified to a harsh environment.

These valves are located inside containment and have been environmentally qualified. Primary water isolation valve 519C to the pressurizer relief tank is an automatic isolation valve. This valve is located inside containment and is presently not environmentally qualified. Plans are to environmentally qualify this valve during the upcoming steam generator replacement outage. In the interim, an alternate return path to the chemical drain tank does exist, so a primary liquid sample can be taken even if valve 519C should fail.

The other systems associated with PASS (component cooling water, primary water, and ventilation systems) do not become isolated. Instrument air supply to containment, however, does become isolated on containment isolation signal. The isolation valve can be opened by turning a switch on the reactor and turbine-generator board (RTGB).

RESPONSE (4):

The PASS provides both the capability to obtain a pressurized reactor coolant sample and the capability to quantify the amount of hydrogen and total dissolved gases in the reactor coolant.

The method used to measure and relate reactor coolant hydrogen and total dissolved gas is as follows:

Sampling of the Reactor Coolant System is initiated by opening system isolation valves (including containment isolation valves using the containment isolation override, if necessary) and purging a reactor coolant sample through the PASS sample vessel/heat exchanger, where it is cooled, and then through a throttle valve to reduce the pressure, and finally through the in-line chemistry analysis equipment, to the pressurizer relief tank. At reactor coolant pressures less than 200 psig, containment sump sample flow is purged in the same manner using the RHR pump discharge connection. After sufficient purging, a pressurized sample is then collected by isolating the sample vessel/heat exchanger. Total dissolved gas concentration is determined by degassing the sample. This is accomplished by depressurization and circulation by alternate operation of the burette isolation valve and the sample circulation pump. The resulting displacement of liquid into the burette is used to calculate

the dissolved gas concentration. The collected gases, which have been stripped from the liquid, are then directed through a float valve for moisture separation and circulated through hydrogen analyzers. The H_2 analyzer is a thermal conductivity device that determines and indicates the volume percent of H_2 present in the gas removed from the liquid sample.

After recording the hydrogen gas concentration, the gas sample vessel, which contains nitrogen, is placed on-line to dilute the gas volume. This dilution operation reduces the radiation levels such that a sample can be drawn from the gas sample vessel by injection of a syringe through a septum plug mounted in the vessel. This sample can be transferred to the chemistry lab for subsequent radioisotope quantification. Prior to sample withdrawal, additional dilution, which may be necessary for this quantification, may be performed by further nitrogen addition, circulation, and venting. The radiochemistry and gaseous measurement portions of the system are flushed with primary demineralized water and purged with N_2, respectively, to reduce personnel exposure during withdrawal of the sample and to reduce contamination plateout between samples.

disposal via returning the sample to containment thereby precluding unnecessary contamination of external environments and remote calibration sampling and purging capabilities. The PASS provides additional features which serve to maintain sample integrity and limit radiological exposure or release. Piping lengths are kept as short as possible thus limiting plateout in sample lines. Pipe diameter downstream of existing sample paths are 1/2" to 3/8" thus providing high velocity turbulent sample and purge flow at achievable flow rates. Sample and purge flow velocity and Reynolds number for the reactor coolant sample at the recommended flow rate of .5 to 1 gpm are of the order of 1.5 ft/sec and 10^4, respectively. Sample purge and sample velocity for the containment atmosphere sample at recommended flow rates are 7.5 to 10 ft/sec and 2.5 ft/sec, respectively.

A strainer upstream of the sample vessel heat exchanger is designed to remove insoluble particles which may cause sample station chemistry instrumentation to become plugged. The strainer can be backflushed with demineralized water remotely by operation of valves at the control panel.

The PASS, inside containment, will be environmentally qualified by March 31, 1985.

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