GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775

AREA CODE 504 635-6094 346-8651

March 11, 1985
RBG- 20404
File Nos. G9.5, G9.25.1.1

RECEIVED
MAR 19 1985

Mr. Robert D. Martin, Regional Administrator
U. S. Nuclear Regualtory Commission, Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Martin:

River Bend Station - Unit 1
Docket No. 50-458
Final Report/DR-283

On February 7, 1985, GSU notified Region IV of DR-283 concerning Nelson Electric Company multicable transit modules used as the pressure barrier seal in the drywell wall sleeve electrical penetrations. GSU had determined DR-283 to be reportable under 10CFR50.55(e). The attachment to this letter is GSU's final 30-day written report pursuant to 10CFR50.55(e)(3) with regard to this deficiency.

Sincerely,

J. E. Booker

J. E. Booker
Manager-Engineering,
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/PJD/trp

Attachment

cc: Director of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC Resident Inspector-Site

INPO

8503280809 850311
PDR ADOCK 05000458
S PDR

85-57

IE-27 1/1

ATTACHMENT

March 11, 1985
RBG-20404

DR-283/Nelson Electric Company
Multicable Transit Modules

Background and Description of the Problem

The deficiency concerns the failure of the Nelson Electric Company multicable transit modules used as the pressure barrier seal in the drywell wall sleeve electrical penetrations due to a lack of adhesion between individual modules and between the module transit frame and conduit attachment housing. This condition was originally identified on Nonconformance and Disposition Report (N&D) No. 10,413.

A total of 169 conduit sleeves were installed as drywell wall sleeve electrical penetrations in accordance with Drawing No. EE-37P. Of these sleeves, 166 were a 5 in. diameter and 3 were a 4-in. diameter. Sleeve utilization is as follows:

8 - sealed with grout - not to be used
12 - reserved for lighting and communication - with cable modules
54 - reserved for service level cables - with blank modules
95 - cables installed - with cable modules

Stone and Webster Engineering Corporation (SWEC) cable mark numbers and Nelson module numbers were cross-referenced, and installation procedures were provided as Appendix S to Specification No. 248.000, Revision 7, Addendum No. 5. These procedures expanded those which were provided by the manufacturer, taking into consideration the specific application at River Bend Station (RBS). A tallow lubricant was specified by Nelson to allow modules to slide easily over each other especially when installing the upper rows in each module frame. After discussions with the vendor, an alternate lubricant (Johnson Stik Wax 140) was used for this installation.

The failure of multicable transits was first identified when the structural integrity test (SIT) commenced on February 4, 1985. During this test, the Nelson modules did not have the HDSE radiation barrier installed. When the initial drywell test pressure reached 2 psig, extensive leakage occurred. PQTG-FQC engineers recorded leakage at 23 modules and reported that modules/frames had popped out at sleeves 1WX503P04, 1WX502U03, and 1WS503N11.

An initial inspection of the failed modules indicated that Stik wax on the transit frame housings and on the unit modules inside the housings created a low coefficient of friction between the module elements and contributed

to the release of the transit frame and/or modules from the compressed position.

A review of the failures led to the conclusion that there was a high probability of further failures as pressure was increased during the SIT.

The failure is due to the inherent problems associated with the installation of Nelson seals which requires equalizing compression across a variety of modules in a compression frame (matrix).

The following problems, which are common to field installation, were encountered during the installation of Nelson seals as originally designed:

1. The variation in cable diameters in most sleeves required the use of different size modules in adjacent positions. As these modules were installed in rows, minute gaps (20 or 30 thousandths of an in.) developed between the rows and contributed to the distortion of the modules when the frame segments were tightened.

2. The stik wax used to facilitate installation of modules contributed to the problem by lowering the coefficient of friction between the module elements.

3. The installation procedures (reviewed with and concurred by Nelson) relied on visual inspection and the "turn of the nut method" to provide equal distribution of compressive forces. Since torquing of bolts indicates forces applied to each frame segment with no consideration of equilibrium forces, torquing was not considered feasible. This was due to the variety of modules used (15, 20, 30, 40, 50, and 60 millimeters) which do not compress or transmit forces equally.

4. Any (slight) distortion that may occur while tightening frame segments would create unequal pressure at the inside or outside edge of the transit frame, causing the modules to slide in or out of the frames (pop out).

Safety Implication

The RBS design basis safety analysis for the containment design is 15 psig following a loss of coolant accident (LOCA) with suppression pool bypass area ($A/\sqrt{K}$) of 1 sq. ft.

During the SIT, the three drywell penetrations popped out at 2 psi. It can be conservatively assumed, without taking credit for the pressure-retaining capability of the high density steel elastomer (HDSE), that at the drywell design pressure level, a substantial number of the penetrations would have failed if these modules were providing the pressure retaining boundary. Thus, drywell bypass leakage exceeding 1 sq. ft. could have occurred.

Corrective Action

It was determined that an acceptable alternative to the Nelson seals was to take full credit for the pressure-retaining capability of the HDSE that is to be applied to all drywell sleeves containing cable. The original design uses the HDSE as a radiation barrier and calls for approximately a 5-ft. depth in each sleeve.

N&D No. 10,413 provides for installation of high density steel/lead elastomer (HDSE/HDLE) as pressure boundary seals in the drywell penetrations with cables installed. Engineering and Design Coordination Report (E&DCR) No. C-27,208A requires installation of tapered thread pipe plugs in all sleeves with no cables installed (unoccupied sleeves) to provide a pressure barrier seal and to remove all installed insert modules and frames. E&DCR No. C-27,209 provides for installation of pressure boundary seals by injecting an HDSE plug at the inboard side of occupied sleeves in accordance with Specification No. 229.180. Qualification documentation of the HDSE as a pressure barrier is under preparation by Engineering.

Pressure seals (HDSE to a depth of 6 in. on the inboard side) were installed in all drywell sleeves as noted above, and the SIT test was completed. The measured leakage rate for the drywell pressure test at 25 psig was within the established leak rate criteria, and the test was successfully concluded.

Filling of occupied sleeves to the full 5-ft 0-in. (nominal) length of each sleeve with HDSE creates a radiation barrier and reinforces the integrity of each sleeve by providing a greater depth of sleeve-fill to prevent loosening or movement of the pressure barrier plug.