LOUISIANA POWER & LIGHT / 142 DELARONDE STREET
P. O. BOX 6008 • NEW ORLEANS, LOUISIANA 70174 • (504) 366-2345
MIDDLE SOUTH UTILITIES SYSTEM

November 30, 1981

L.V. MAURIN
Vice President Nuclear Operations

W3P81-2606
Q-3-A29
Q-3-B11

D. G. Eisenhut
Director, Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20355

SUBJECT: Waterford SES No. 3
Docket No. 50-382
Response to Generic Letter 81-21
Natural Circulation Cooldown

Dear Mr. Eisenhut:

The Combustion Engineering Owners Group, of which LP&L is a member, has sponsored an analysis for the purpose of providing detailed information and recommendations regarding natural circulation evolutions. This analysis, described in CE-NPSD-154 titled Natural Circulation Cooldown (NCC), demonstrates that NCC can be achieved without drawing a bubble in the reactor vessel dome, if the operating guidelines of CE-NPSD-154 are followed. However, if a void were to occur during RCS depressurization, no structural damage would occur to the reactor vessel shell or internals. A draft of CE-NPSD-154 has been reviewed by the NRC and a final version is scheduled for issuance in early 1982.

Furthermore, a review of the adequacy of condensate-grade auxiliary feed water supplies has been undertaken, the results of which show that water supply is more than adequate.

In addition, a natural circulation test program will be performed at Waterford prior to commercial operation. This program will consist of three parts:

I. Low Power Natural Circulation (<5% power)

The low power natural circulation test program will be conducted after the completion of the low power physics test, and will consist of three individual tests:

1) Natural Circulation verification
2) Natural Circulation at reduced pressures (pressurizer heaters secured)
3) Natural Circulation with reduction of heat removal capacity (one steam generator isolated)

A052
S
1/0

A. These tests will demonstrate such plant characteristics as the length of time required to stabilize natural circulation and core flow distribution, thus providing analysis verification and additional technical information.

B. In addition, these tests will serve as a supplement to operator training. The tests will be performed as often as necessary to allow each licensed operator to participate ("hands-on") in at least one of the tests, and as a minimum, observe at least one of the remaining tests. This will enable the operators to experience the initiation, maintenance and recovery from natural circulation mode, using nuclear heat to stimulate decay heat. Operators will be trained to recognize when natural circulation has stabilized and to control saturation margin and RCS pressure.

II. 80% Loss of Flow Test

The 80% loss of flow test will be completed at the end of the 80% power plateau. All four reactor coolant pumps will be simultaneously turned off, tripping the reactor, at which time natural circulation flow will be verified and a controlled steam down performed to calculate the natural circulation power to flow ratio.

III. Loss of Offsite Power Test

The loss of offsite power test will be conducted at approximately 10% turbine-generator power following the 80% loss of flow trip. The test will consist of two parts, and in both parts natural circulation flow will remove decay heat from the core:

1) The reactor will be tripped (generator trip) with no offsite AC power available. The plant will be brought to stable, hot standby conditions, using only safety grade power and held at these conditions for at least thirty minutes.

2) After thirty minutes, selected (e.g., EFW pumps, pressurizer heaters) AC loads will be de-energized to simulate a loss of onsite AC power. The intent of this test is to provide operator natural circulation training under the conditions of a total loss of AC power sources.

Development of the operating procedures will include consideration of CE-NPSD-154 as well as other CE topicals such as CEN-152. The general provisions of these procedures will include:

A. Cooldown Procedures:

1) Use of either a maximum rate cooldown while maintaining high RCS pressure to maximize reactor vessel upper head heat loss while preventing void formation, or a reduced rate cooldown to allow ambient cooling of the reactor vessel head.

2) Maintain at least 20° F subcooling margin throughout the cooldown.

3) Maintain normal pressurizer level.

4) Use of auxiliary spray during the RCS depressurization and pressurizer cooldown.

B. Appropriate notes and cautions will be used to aid the operator to recognize reactor vessel voiding:

1) Unexplained pressurizer level changes while using auxiliary spray.

2) Letdown flow greater than charging flow while in automatic control.

C. Actions the operator should take if voiding is experienced:

1) Stop the depressurization and cooldown.

2) Isolate letdown flow.

3) Take manual control of pressurizer level controls.

4) Re-establish at least 20° subcooling margin.

5) Possible use of the reactor head vent to eliminate upper head non-condensible gases.

We feel that the development and subsequent implementation of these procedures, together with the comprehensive tests and analyses performed, demonstrate that Waterford can be safely shutdown in a NCC situation.

Yours very truly,

L.V. Maurin

LVM/RMF/jmt

cc: E.L. Blake, L. Constable