LOUISIANA POWER & LIGHT COMPANY

WATERFORD SES UNIT NO. 3

INTERIM REPORT OF

SIGNIFICENT CONSTRUCTION DEFICIENCY NUMBER 13

REACTOR CONTAINMENT BUILDING DOME CONCRETE

960084

SECTION I - SUMMARY

During the placement of concrete for Reactor Containment Building dome parapet wall placement 521-1B, improper consolidation of concrete in the lower portion of the wall occurred. Proper consolidation of the concrete as required per Fegles Power Services' Procedure CP 303-3 and Ebasco Concrete Masonry Specification LOU 1564.472 was not achieved. Upon removal of the exterior wall forms, numerous honeycomb and rock pockets randomly distributed in the lower portion of the wall were evident. Fegles Power Services initiated Nonconformance Report W3-1576 describing these defects. The concrete defects were primarily due to improper, random vibration during the concrete placement.

Testing and repair procedures are currently being developed. It is expected that this report will be updated, and a final report issued no later than February 1, 1980.

SECTION II - DESCRIPTION OF DEFICIENCY

The Reactor Containment Building dome placement 521-1B is a curved reinforced concrete structure 118'-7" long, 3'-0" thick, and 11'-6" in height. The placement is between elevation +179.00' to +190.50' with a haunch for the initial section of the dome concrete. The concrete placement commenced at 6:15 a.m. on August 8, 1979. At approximately 10:00 a.m., the concrete pump line plugged and the placement continued by placing the concrete with the use of crane and buckets. The concrete vibrators in use were inadequate in both size and number to provide proper vibration of the concrete. In some situations, concrete was allowed to fall without the use of the tremies in excess of the specified limit of five (5) feet. Concrete was also allowed to dry on the reinforcing steel and measures taken to remove it were inadequate.

At approximately 12:00 (noon), additional vibrators, men, and wire brushes were added to the existing placement crews to insure proper vibration of the concrete and cleaning of the reinforcing steel of dry concrete. The placement proceeded without further incident and was completed by 6:00 p.m.

On August 13, 1979, the outside wall forms were removed. Numerous surface honeycomb and voids were encountered in the lower portion of the placement with some of these areas extending past the embedded reinforcing steel. This indicated that consolidation of the concrete as required by Fegles Procedure CP-303-3 and Ebasco Specification LOU 1564.472 was not achieved.

SECTION III - ANALYSIS OF THE SAFETY IMPLICATIONS

If left uncorrected, this noncompliance with concrete placement practices would compromise the ability of the Reactor Containment Building to satisfy some of the design bases loads and loading combinations as set forth in Sub-section 3.8.4 of the Final Safety Analysis Report.

For example, the capability of the concrete Reactor Containment Building to protect the primary steel containment vessel from adverse external environmental conditions, such as high winds and/or tornado missiles, would be in doubt.

SECTION IV - CORRECTIVE ACTION

The immediate corrective action taken after the discovery of the inadequate consolidation of the concrete was to add an adequate number of vibrators, laborers, and inspectors to ensure proper placement of the concrete. Tremies were replaced back onto the placement to ensure that the concrete drop was within the specified limit of five (5) feet. Additional laborers with wire brushes were assigned to remove dried concrete from the resteel. After the removal of the wall forms, Fegles initiated Nonconformance Report W3-1576 on August 15, 1979.

Corrective action implemented to prevent the recurrence of the problems encountered was the issuance of a Stop Work Order on any additional dome concrete placement by Fegles Power Services until the following corrective actions are completed:

1. Fegles shall provide a qualified job Superintendent.

2. Fegles shall assign an experienced placement supervisor who has ultimate charge at the placement to direct the overall placement. Additionally, one general foreman shall be assigned for each separate placement (each side).

3. Fegles personnel shall be indoctrinated and trained to the requirements of Ebasco Specification LOU 1564.472 for concrete placement with particular attention to lift height restrictions, vibration requirements, cold joint determination and subsequent action requirements. This training shall take place at the Waterford Site. LP&L and Ebasco shall review the plans for this training and shall be notified when the training classes will take place so that the training may be witnessed by LP&L and Ebasco. Fegles personnel who shall be trained shall include the following:

   a. Project Superintendent
   b. Concrete Supervisors
   c. Foreman
   d. QC Personnel

Vibrator operators shall be trained in the use of vibrators and the proper method of vibration.

4. A third concrete pump shall be supplied as backup.

5. Gas driven generators shall be provided as backup for vibrators.

6. Larger vibrators shall be provided.

7. A "bull" hose and air manifold shall be set up to supply the dome area and the pneumatic vibrators which shall be available.

8. More lights shall be used to light the dome.

9. A sufficient number of trained craft personnel shall be available to adequately place concrete, vibrate concrete, and to clean exposed rebar and forms of concrete spillage.

10. The concrete lines shall be modified to eliminate severe bends.

11. Adequate concrete buckets shall be supplied for backup.

12. Four concrete inspectors shall be available. At least two of the inspectors shall be certified Level II concrete inspectors. The remaining inspectors shall at least be certified as Level I concrete inspectors.

13. A pre-placement meeting shall be conducted at least 48 hours prior to placement with Fegles, Ebasco, and LP&L in attendance, to discuss in detail the plans for concrete placement.

14. LP&L QA will be notified at least 24 hours prior to scheduled placement commencement so that LP&L can conduct a pre-placement inspection and to verify that all of the above (Items 1 through 13) have been accomplished.

The evaluation of the integrity of the wall has begun with the removal of the honeycombs and voids on the outside face of the wall. Three 2" Ø vertical cores, two 4" Ø vertical cores, and one 4" Ø horizontal core at the construction joint at elevation +179.00' were taken for additional evaluation. In addition to the above, Fegles Power Services has obtained a consultant who is to conduct sonic testing of the placement in order to evaluate the integrity of the interior wall concrete. This section of the report will be updated to include any testing and repair procedures which are presently being developed.