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# BALTIMORE GAS AND ELECTRIC COMPANY

GAS AND ELECTRIC BUILDING  
BALTIMORE, MARYLAND 21203

ARTHUR E. LUNDVALL, JR.  
VICE PRESIDENT  
SUPPLY

June 11, 1979

Mr. Boyce H. Grier, Director  
Region I, Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
631 Park Avenue  
King of Prussia, PA 19406

Subject: Calvert Cliffs Nuclear Power Plant  
Units Nos. 1 & 2, Docket Nos. 50-317 & 50-318  
IE Bulletin No. 79-02  
Concrete Expansion Anchor Bolts

Dear Mr. Grier:

In recent discussions with members of your staff and the Regulatory Staff (ONRR), it has been pointed out that both offices are vitally interested in receiving some preliminary information on our investigation of hanger support plates and anchor bolts which is being conducted pursuant to the subject IE Bulletin. We also learned that there is a concern within NRC that the scope of the findings of our investigation has not been communicated effectively to appropriate NRC personnel.

In light of the above, we are submitting this letter to apprise you of the status of our hanger inspection program and to discuss other areas of interest such as:

1. A description of the program;
2. Contributing factors to the communications concerning this Bulletin;
3. Our intentions for the re-start of Unit No. 1;
4. Our justification for continued operation of Unit No. 2.

## INSPECTION STATUS

Upon receipt of IE Bulletin No. 79-02 on March 12, 1979 we made arrangements with our Architect-Engineer and our plant personnel to develop an inspection program. Inspections and tests were started just prior to the planned shutdown for refueling on April 21, 1979. Since that time, we have determined that the number of expansion anchor deficiencies discovered on Unit No. 1 is consistent with or somewhat lower than the number which was predicted by the Bulletin based on the Shoreham facility.

Specifically, we are conducting an inspection and test program on all of the large pipe hangers contained in all of the Seismic Class I systems in Unit No. 1 and those common to both Units. We will conduct a similar

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program on Unit No. 2 during our Fall 1979 refueling outage. To date, we have identified approximately 950 hangers supported by expansion anchors (each hanger has one or more support plates, each of which in turn has four or more anchor bolts). Of these 950, we have tested approximately 850 and have determined that about 125 are totally satisfactory. The remainder require further analysis. This "further analysis" may be indicated for any of several reasons including inaccessibility of the hanger plates (mostly due to high radiation levels) or any of the bolts for inspection, unsatisfactory test results on one or more bolts upon inspection, hangers not fully in accordance with existing drawings, etc.

By far the greatest number of unsatisfactory field tests are associated with a specific type of expansion anchor, Phillips shell-type fasteners (Red Heads). About half of the Unit No. 1 fasteners are this type. Of the remainder, about two-thirds are Wej-its and one third are Hilti Kwik-Bolts. The latter have the best inspection results (only about 10 percent unsatisfactory).

So far, of the hangers referred to our Architect-Engineer for further analysis, about two-thirds have required some sort of physical modifications. This is not expected to be representative of the final totals since we have requested that anchors with a greater likelihood of needing repairs be analyzed first. Subsequent analyses are expected to result in a substantially lower overall repair rate (about 40 percent). Of the 950 hangers identified, 163 are inside of containment. 124 of these were designated for further analysis, and 99 have been so analyzed with a repair figure of 50 (32 of which are already repaired). We have assigned the highest priority to the testing and repair of all hangers inside of containment so that it can be closed out. Meanwhile, we are continuing analysis/repair on the remaining hangers.

#### DESCRIPTION OF THE PROGRAM

The testing program for Seismic Class I hangers consists of applying a specified torque to the anchor bolts in the support plates, verifying clearance for shell-types and ultrasonic testing for imbedment of wedge-types. The resultant axial force applied is about equal to 25 percent of the design ultimate strength of the anchor bolt and anchor installation. In most cases the design load expected to be seen by the installation is much less than the test force. In no case is the design load greater than the test force. The use of a torque test is conservative in that a straight-pull test is expected to result in less failures since the concrete anchors are designed to withstand axial and shear forces but not to be twisted in the concrete. Additionally, if a pull test were applied to an entire support plate rather than individual bolts, there would be less failures due to the synergistic effect of all of the bolts acting together to anchor the plate. A further conservatism is the fact that the design loads on hangers do not take into account the inherent flexibility of the entire system but, rather, treat the hangers as rigid supports.

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If any hanger is not able to be properly tested for any reason or if the hanger does not pass the test, it is analyzed by our Architect-Engineer to determine if it is required for system support, if the number of bolts is more than necessary (thus allowing for some failures), if additional bolts can be inserted, if the plate can be enlarged or relocated to provide adequate support, etc. This analysis results in a repair order which is then implemented by the field forces.

This entire program is being closely monitored by our Quality Assurance personnel.

#### COMMUNICATIONS

Although our inspection thus far of the hanger supports for Unit No. 1 and common systems had identified a large number of potentially deficient anchor bolt installations, we had not yet submitted a formal written report on the subject. Our basis for this was as follows:

1. IE Bulletin 79-02 required an inspection to be conducted and documented by July 6, 1979. It was further specified that our response should include a schedule for repairs. We have chosen to proceed with identification and repair as soon as possible and to submit a summary response by the specified date. In so doing, we feel we are treating the matter expeditiously and responsibly.
2. With the great number of NRC personnel continually on-site, we felt that they were aware of the fact that we were carrying out an inspection and repair program for hanger supports. We now appreciate the fact that the sheer volume of work being conducted during a refueling outage may severely hamper an inspector's ability to keep abreast of all the repairs and modifications being made. This aspect has been further complicated by the current concern with treating the symptoms of the Three Mile Island incident.
3. IE Bulletin 79-02 actually predicted a potential failure rate of about 50 percent. Our projected repair rate, as discussed above, will probably be somewhat below that figure. Hence, the test results did not appear to be out of line with what NRC was expecting.
4. Unit No. 1 has been shutdown for refueling during this inspection/repair process.

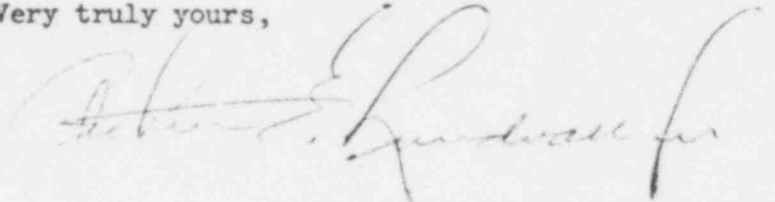
#### UNIT NO. 1 RE-START

It is our intention to complete all repairs to expansion anchors inside of containment and to complete all necessary repairs outside of containment prior to starting up. We feel that there will be some number of hangers outside of containment which will still need repair but whose repair prior to start-up is not required for system safety. We will proceed with these repairs expeditiously throughout the start-up program.

UNIT NO. 2 OPERATION

IE Bulletin 79-02 states that it is not necessary to shut down a plant for purposes of performing the required inspections. We have conducted a program to identify all of the hangers involved on Unit No. 2. The total number is around 990. Of these, over 800 use the Hilti anchors, which have experienced the lowest failure rate on Unit No. 1. In further support of Unit No. 2 operation is our belief that the deferred construction schedule of Unit No. 2 provided substantially more time for proper installation of hangers. Consequently, it is believed that the actual repair rate on Unit No. 2 will be lower and will not constitute a significant safety problem especially since the upcoming refueling outage is scheduled for October 1979. We intend to address this subject in our July 6, 1979 response to the Bulletin.

Very truly yours,



cc: J. A. Biddison, Esquire  
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