



# THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

P.O. BOX 5000 ■ CLEVELAND, OHIO 44101 ■ TELEPHONE (216) 622-9800 ■ ILLUMINATING BLDG. ■ 55 PUBLIC SQUARE

**Dalwyn R. Davidson**

VICE PRESIDENT

SYSTEM ENGINEERING AND CONSTRUCTION

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April 15, 1982



Mr. James G. Keppler  
Director, Region III  
Office of Inspection and Enforcement  
US Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

50-440  
RE: Perry Nuclear Power Plant Docket  
Nos. ~~50-550~~; 50-441, Final Report  
on Socket Welds of Unequal Leg  
Fillet (RDC 50(82))

Dear Mr. Keppler:

This letter serves as a final report as required by 10CFR50.55(e) concerning piping socket welds of the control rod drive system. This was first reported by Mr. E. Riley of The Cleveland Electric Illuminating Company to Mr. P. Pelke of your office, on March 19, 1982.

This report includes a description of the deficiency, an analysis of the safety implication and the corrective action taken.

## DESCRIPTION OF DEFICIENCY

Welding of unequal leg fillet socket welds per specification requirements either has resulted or is likely to result in the "bottoming out" of these welded joints. Bottoming out is defined as not having an axial gap between the inserted pipe end and the bottom of the mounting fitting in the as-welded condition.

While the existing fit-up criteria were sufficient to prevent bottoming out, due to equal leg fillets, adequate clearance was not provided where the additional shrinkage from welding of unequal leg fillets was imposed on socket weld joints. The specification had been revised to require the unequal leg fillets for specific joints in the 1C11 control rod drive system due to a change in design criteria. Unequal leg fillets were added to allow use of a more favorable stress concentration factor in the design analysis.

Perry Site Quality Control Inspection has identified that in some cases the 1/16 inch minimum gap does not always prevent the socket welds with unequal legs from bottoming out.

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ANALYSIS OF THE SAFETY IMPLICATIONS

As a result of this condition, there is no assurance that a stress load is not imposed across the weld due to shrinkage of the molten puddle during cooling. The resultant residual stresses may reduce the ultimate strength of the welded joint by an indeterminate amount. This condition could also reduce the fatigue and thermal fatigue resistance of the welded joint.

CORRECTIVE ACTION TAKEN

All socket welds with the unequal leg added or which will require addition of the unequal leg have been visually inspected. Those which have bottomed out or which are likely to bottom out will be removed and reworked/repared in such a manner that the original CRD piping will be installed in accordance with the present requirements of the codes, drawings, and specifications.

Observation and experimentation have shown that where a 1/16 inch minimum gap exists on joints with equal leg fillets, it is likely that the unequal leg can be added without causing the joint to bottom out.

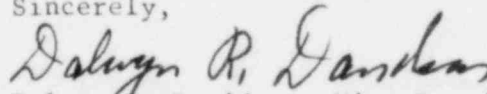
Site QC Inspection now has established a "hold point" for visual inspection of the joints being reworked/repared. If a gap exists in the as-welded condition, the welds will be considered acceptable. In cases when the 1/16 inch minimum gap does not prevent the socket welds from bottoming out, the weld would be considered unacceptable.

Mock-up testing and visual inspection by Project Personnel has determined and verified that when a 1/8 inch minimum gap exists between the end of the pipe and the land in the socket fitting, no bottoming out will occur.

For all future socket welds, a Field Variance Authorization has been issued which states that an 1/8 inch minimum gap is required prior to welding unequal leg fillets. This new installation requirement applies to all re-worked socket welds identified as unacceptable.

The adequacy of the corrective action plan described above is under constant evaluation and if any changes are found to be necessary we will inform you. The projected completion date for this work is July 30, 1982.

Sincerely,



Dalwyn R. Davidson, Vice President  
System Engineering and Construction

cc: Mr. M. L. Gildner  
NRC Site Office

Director - Office of Inspection and Enforcement  
US Nuclear Regulatory Commission  
Washington, DC 20555

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c/o Document Management Branch  
Washington, DC 20555