Cooper Industries
Cooper-Bessemer
Reciprocating Products Division
14490 Catalina Street
San Leandro, California 94577-5516
415 614-7400

COOPER
Cooper Energy Services

March 13, 1992

Report #159
Amendment 1

Director of Nuclear Reactor Regulations
Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

Dear Sir:

On January 15, 1992, Cooper Industries notified the Nuclear Regulatory Commission of a potential defect in a power cylinder liner. In that letter, we advised that further information would be made available upon completion of our investigation. We have completed our investigation as to root cause and corrective/preventive action. While we continue to review elements of this subject, the recommendations contained herein are not expected to change.

The purpose of this letter is twofold. First, to correct information provided in the original report. Secondly, to provide further information and recommendations for corrective action.

Two figures were provided incorrectly in the original report:

- Actual operating hours at the time the cylinder liner failed was reported as 14,700 hours. Our further investigation shows this number to be 8,150 hours.
- We also reported that there were no nuclear sites with over 2,000 operating hours. We are advised by Entergy that they have accumulated 2,297 hours on their Division 1 diesel through March 9, 1992.

We continue to consider the referenced failed liner as worst case. We also continue to consider the primary root cause to be the liner/block fit, exacerbated by variables including localized material microstructure. All drawings and specifications have been revised addressing dimensional and material design requirements.

Due to the critical nature of the fit characteristics, it is our recommendation that all liners delivered after 1983 be replaced in a scheduled manner. In the interim, a programmatic inspection plan should be implemented to ensure product integrity. Based on the referenced failure and subsequent analysis, an inspection limit of 6,000 operating hours has been established for commercial installations. A 3,000 hour inspection limit is recommended for nuclear installations due to the large concentration of converted liner/block fits and the frequent startup requirements relative to accumulated engine hours. The 3,000 hour limit provides an adequate factor of safety against the worst case failure (3,150 hours) and has been re-established on the basis of further investigation.

Our recommendation is to inspect cylinder liners consistent with the 25% five-year sampling plan required in the Cooper-Enterprise Clearinghouse matrix. Upon NDE inspection (LP, UT) any liners exhibiting a continuous circumferential (360°) indication in the collar radius should be removed from service. Liners with less than a 360° continuous indication require further evaluation on an individual basis.

A copy of this letter will be forwarded to all of the above affected sites as noted by the carbon copy list.

Sincerely,

Bruce Guntrum
Manager, Quality Assurance

BG/jm

Attachment

U.S. Nuclear Regulatory Commission Report
cc:

Gulf States Utilities
P.O. Box 220, MA-3
St. Francisville, LA 70775
Attention: Director,
Nuclear Licensing

Carolina Power and Light Co
Harris Nuclear Project
P.O. Box 165
New Hill, NC 27562
Attn: Department
Manager

Carolina Power and Light Co
Harris Nuclear Project
P.O. Box 165
New Hill, NC 27562
Attn: Mr. C.S. Hinnant
Plant Gen Mgr

Carolina Power and Light Co
P.O. Box 1551
Raleigh, NC 27602
Attention: R. A. Watson
Sr. Vice President

Carolina Power and Light
Shearon Harris Nuclear Project
P.O. Box 1551
411 Fayetteville Street
Raleigh, NC 27602
Attn: S.D. Floyd
Manager of Nuclear Licensing

Carolina Power and Light
Shearon Harris Nuclear Project
P.O. Box 165
New Hill, NC 27562
Attn: Mr. O.C. Olexik
Manager of Regulatory
Compliance

Carolina Power and Light Co
Shearon Harris Nuclear Plant
P.O. Box 165
New Hill, NC 27562
Attention: Jerry R. Cribb
Manager, QC

Duke Power Company
P.O. Box 1007
Charlotte, NC 28201-1007
Attention: W.T. Robertson
V.P. Procurement

U.S. Nuclear Regulatory Commission Report
cc:

Southern California Edison
P.O. Box 128
San Clemente, CA 92674-0128
Attention: Mgr of Nuclear
Oversight

Texas Utilities Electric
400 North Olive Street, L.B.81
Dallas, TX 75201
Attn: W.J. Cahill, Jr.
Group Vice President

Cleveland Electric Illuminating
Perry Nuclear Power Plant
P.O. Box 97
Perry, OH 44081
Attention: M. Lister

Cleveland Electric Illuminating
Perry Nuclear Power Plant
P.O. Box 97
Perry, OH 44081
Attn: Russell J. Tadych,
Manager, QC

Cleveland Electric Illuminating
Perry Nuclear Power Plant
P.O. Box 97
Perry OH 44081
Attn: Harold M. Coon

Tennessee Valley Authority
1101 Market Street, LP 5B
Chattanooga, TN 37402
Attn: Mr. M. J. Fecht
Manager Nuclear
Experience Review

Tennessee Valley Authority
1101 Market Street, LP 4F
Chattanooga, TN 37402
Attention: Tim Chan

Washington Public Power Supply
P.O. Box 460
Richland, WA 99352
Attn: Mr. L.C. Oakes
Manager, WNP-1
Engineer

Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801
Attn: W.F. Adcock LP4F-C

U.S. Nuclear Regulatory Commission Report
cc:

Georgia Power Company
Plant Vogtle
P.O. Box 1295
Birmingham, AL 35201
Attn: Mr. T. Green
Manager, Engineering
and Licensing

Long Island Lighting Co
Shoreham Nuclear Power Station
P.O. Box 618, N Country Rd
Wading River, NY 11792
Attn: Mgr. Nuclear Operat.
Support Department

Duke Power Company
Nuclear Generation Department
P.O. Box 1007
Charlotte, NC 28201-1007
Attn: Mgr, Nuclear Safety

Cooper-Enterprise Clearinghouse
Mr. Mike Anthony
Duke Engineering and Services
230 South Tryon Street
P.O. Box 1004
Charlotte, NC 28201-1004

ENTERGY
P.O. Box 756
Port Gibson, MS 39150
Attn: Vice President of
Nuclear Operations

ENTERGY
P.O. Box 756
Port Gibson, MS 39150
Attn: C.R. Hutchinson
General Plant Mgr

ENTERGY
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Attn: D.L. Pace
Design Engineering