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May 1, 1984

Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Crutchfield:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Oyster Creek Cycle 10 Reload Application
General Electric NEDO 24195
Response to NRC Request for Additional Information

As a result of previous discussions with members of your staff, this letter provides the response to a request for additional information regarding the Oyster Creek Cycle 10 Reload Application. Attached are the questions and their respective responses.

If you have any questions on this information, please contact Mr. M. W. Laggart at 201-299-2341.

Very truly yours,

P. B. Fiedler
Vice President and Director
Oyster Creek

lr/0198e

cc: Administrator
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631 Park Avenue
King of Prussia, Pa. 19406

NRC Resident Inspector
Oyster Creek Nuclear Generating Station
Forked River, N.J. 08731

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QUESTION:

492.1 (5.1.2) Supply additional information which demonstrates that the large core reload analysis applies to the Oyster Creek reloads. Also demonstrate that the bounding analysis is conservative though some of the plant unique uncertainties for Oyster Creek are greater than those required in the generic reload application NEDE-24011-P-A, "General Electric Reload Application."

RESPONSE:

The reactor core selected for the statistical analysis is a 251/764 reload core. The large core analysis results conservatively apply for a BWR-2. The histogram of relative bundle powers used in the statistical analysis is shown in Figure 1 (Figure 5-1 from NEDO-24195). The method to generate the power distribution is described in response to Question 492.2. For comparison purposes, the power distributions for the Oyster Creek reference cycle at BOC and EOC are shown in Figures 2 and 3. It can be seen that the statistical analysis power distribution is skewed more to the high power side than the Oyster Creek power distribution. Figure 4 is the CPR histogram for Oyster Creek. The statistical analysis CPR distribution has more bundles skewed to MCPR than the Oyster Creek CPR distribution. Therefore, the statistical analysis results for large cores would be conservative when applied to Oyster Creek.

The GE position is that although some plant-unique variable uncertainties may be greater than those assumed, the statistical data base used to develop the uncertainties justifies their combined use for all plants and reloads. The documentation listed below concentrates on development of the uncertainties, application to reloads, and NRC approval:

1. NEDO-20340, J. F. Carew, "Process Computer Performance Evaluation Accuracy", June, 1974 (Amendment 1 -Dec. 1974; Amendment 2 - Sept. 1975).

2. NEDO-10598-A, "GE BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application", January 1977.

3. NEDE-24011-P-A-2, "GE Generic Reload Fuel Application", July 1981, Appendix B, Pages B109-B110C.

4. Letter, R. L. Gridley (GE) to D. G. Eisenhut (NRC), "TIP Uncertainty for GETAB Safety Limit", April 13, 1978.

5. "Safety Evaluation for NEDO-24011-P, GE Generic Reload Fuel Application", dated April 1978 (Appendix C to NEDE-24011-P-A).

The generic nominal values of the plant process variables (e.g., core flow, dome pressure) used in the GETAB statistical analysis (Table 5.2 of NEDO-24195) were shown to be applicable to Oyster Creek. The uncertainties in these variables should be no different for Oyster Creek than other BWR's. These uncertainties are the same as used for Nine Mile Point which is also a BWR-2. The uncertainties which appear in Table 5.1 of NEDO-24195 which are reload core or fuel dependent are TIP readings, R-Factor, GEXL correlation and channel flow area uncertainties. The application of these uncertainties to a mixed core of GE and non-GE fuel designs is new and is discussed below. The GE reload fuel of 8 x 8R and the uncertainties given in Table 5.1 have been reviewed and approved by the NRC. Therefore, the discussion is limited to non-GE fuel. The non-GE fuel for Cycle 10 reload is the ENC Type VB fuel design described in Amendment 76 to the OC FDSAR.

The R-Factor uncertainty is derived from the uncertainty in the local peaking distribution calculation. The calculation of the local peaking for non-GE fuel was done by GE using the same lattice physics code as was used for the GE 8 x 8R. Since the same code was used, the nuclear uncertainty of the LPF for the ENC and GE fuel types should be the same; therefore, the R-Factor uncertainty for the non-GE types are not greater than 8 x 8R.

The TIP uncertainty in Table 5.1 is based upon core thermal limits calculations using a GE process computer. Oyster Creek does not have a GE process computer; however, the uncertainty in the bundle power calculation with the methods and computer used at Oyster Creek are within the 8.7% uncertainty. The methods employed can be applied to GE and ENC fuel designs.

The flow area for non-GE fuel is different from a GE 8 x 8 bundle. However, the tolerances for non-GE fuel designs are small enough to be within the 3.0% uncertainty used in Table 5.1.

QUESTION:
494.2
(5.1.2)

How are the parameters listed in Table 5.2 used in the bounding statistical analyses?

RESPONSE:

The input parameters in Table 5.2 are nominal values for a typical BWR plant with a 251/764 reload core. This core was selected for the statistical analysis and conservatively applies to the BWR-2 cores.

A power distribution is generated with a 3-D reactor model using the parameters in Table 5.2 as input. The control rod pattern is arranged so that as many fuel assemblies as possible are at or near the MCPR limit in accordance with the procedure described in Appendix IV, GETAB Licensing Topical Report.

For purposes of the statistical analysis, the parameters in Table 5.2 are allowed to vary randomly by a Monte Carlo Program according to an assigned frequency distribution. In each trial, the CPR is calculated for every bundle in the core. The uncertainties in these parameters are used to produce the uncertainty in the MCPR calculation.

QUESTION:

494.3 (5.2) The second paragraph on Page 5-7 does not contain a discussion on safety valve setpoints during transients (Paragraph 2, Page 5-7 of NEDE-24011-P-A). Why has this discussion been eliminated for the Oyster Creek reload application?

RESPONSE:

The margin between peak transient pressure and the setpoint of safety valves which vent to the drywell directly is a consideration only for operational convenience. It does not represent a safety issue. Therefore, the discussion of this pressure margin to safety valve setpoint was deleted in both NEDE-24011 and NEDO-24195 in their latest versions.

QUESTION:

494.4 (4.0) Provide additional information which demonstrates that the non-GE bundles, approximately 80% of the reload core, can be accurately modeled by GE bundles.

RESPONSE:

The non-GE fuel was modeled using the GE TH model for orifices, lower tie plates, fuel rods, spacers and upper tie plate. The bundle flow area for non-GE fuel used in the analysis was the flow area calculated from the dimensions of the non-GE fuel bundle. A comparison of GE and ENC pressure drop data show that the difference between the GE and ENC fuel in terms of pressure drop is primarily due to the difference in flow area between the fuel designs. Therefore, the use of the GE TH model for non-GE fuel with the correct flow area is reasonable. The results of Appendix A to NEDO-24195 (submitted to the NRC on March 9, 1981) use this model.

Subsequent to this submittal, GE was to perform ODYN analysis for the Oyster Creek reload. The ODYN analysis is required for all reloads after January 1983. Prior to beginning this work, GPUN and GE agreed to develop a thermal hydraulic model of non-GE fuel. GPUN has supplied pressure drop data for non-GE fuel.

The TH model for non-GE fuel uses the same values as the GE fuel for: (1) non-spacer local pressure coefficients; (2) friction pressure loss coefficients; (3) two-phase multipliers; (4) exposure dependent bypass leakage fraction; and (5) exposure dependent surface coefficient. Using the above parameters, GE determined a spacer loss coefficient for the non-GE fuel such that the pressure drop for non-GE fuel would match the target pressure drop across the bundle. This model was used for the ODYN analysis for Oyster Creek. NEDO-24195 has been updated to include the TH model for non-GE fuel, and the ODYN results for non-GE fuel. These results have been included in Appendix B to NEDO-24195.

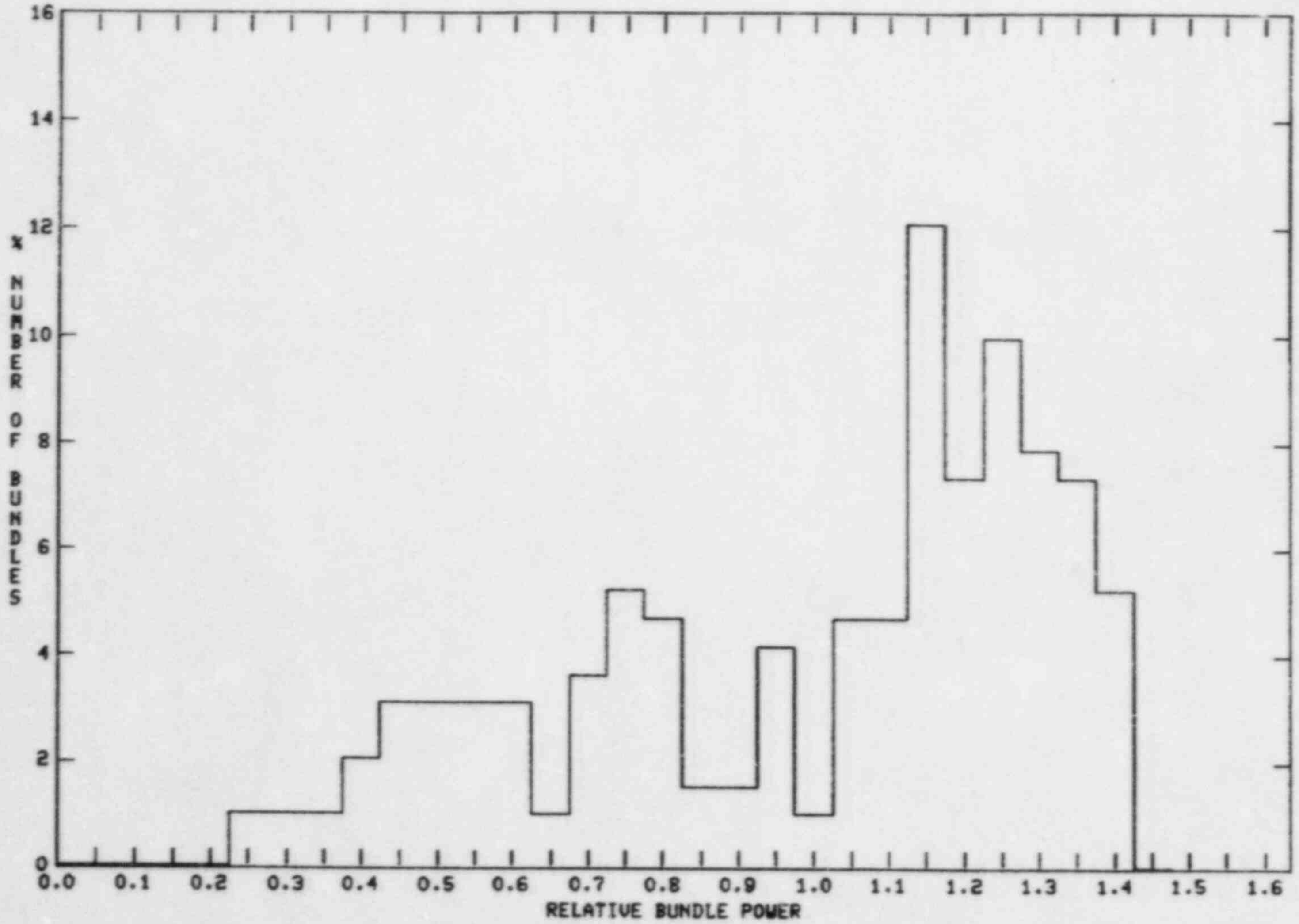

Fig. 1 Histogram used in statistical analysis for P8x8R reloads.

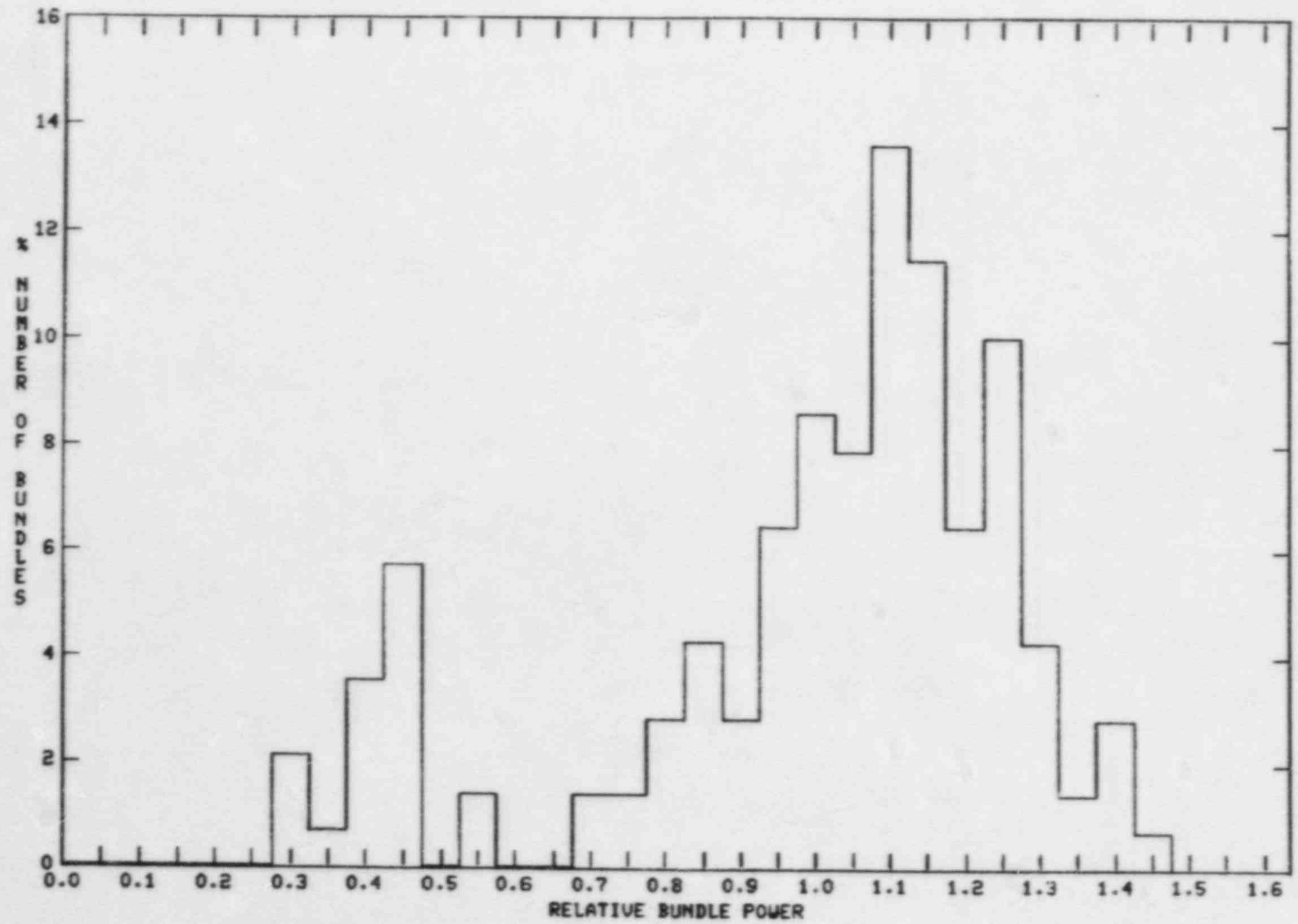

Fig. 2 Oyster Creek reference cycle relative bundle power histogram - BOC

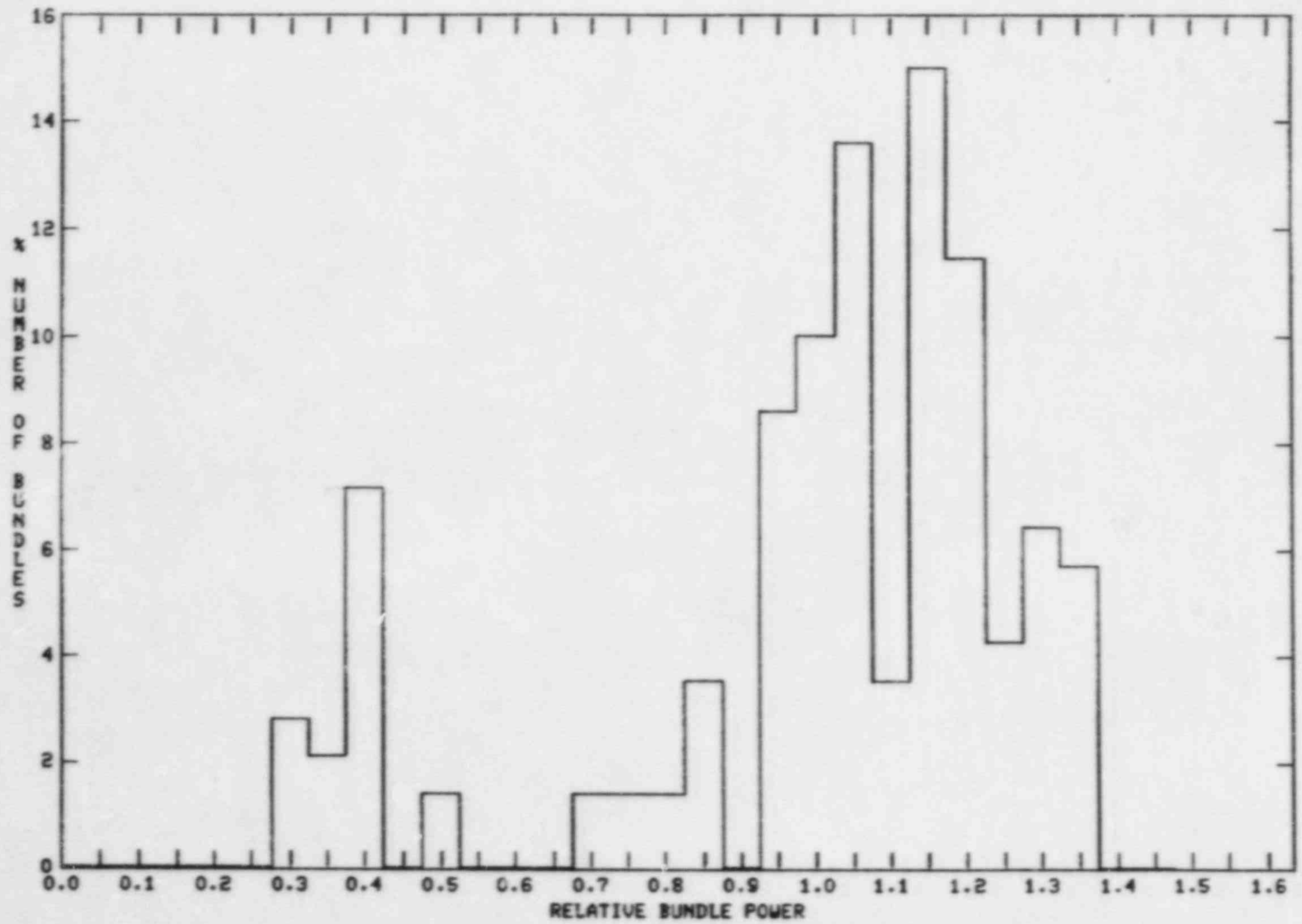

Fig. 3 Oyster Creek reference cycle relative bundle power histogram - EOC

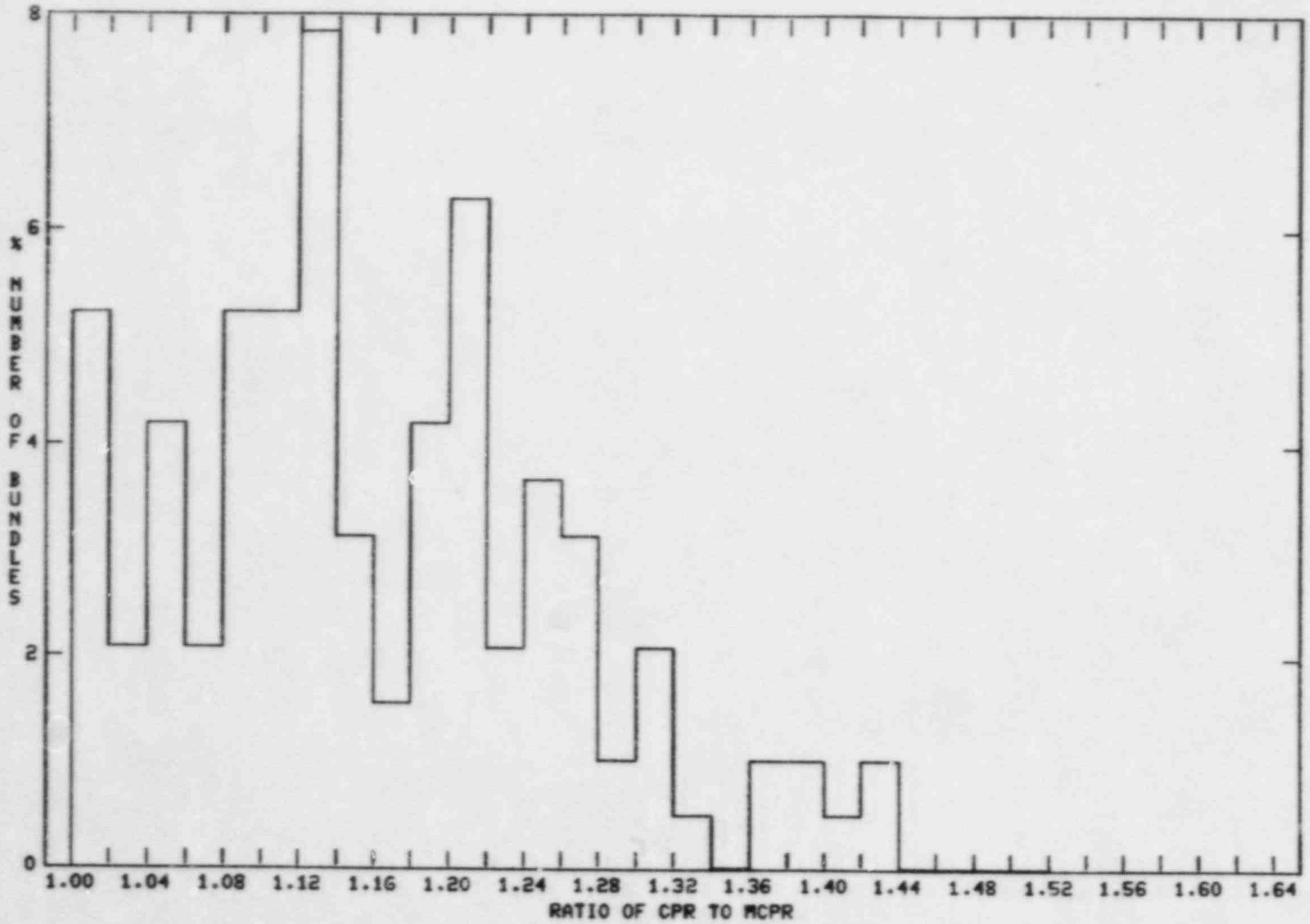

Fig. 4 CPR histogram used in statistical analysis for P8x8R reloads.

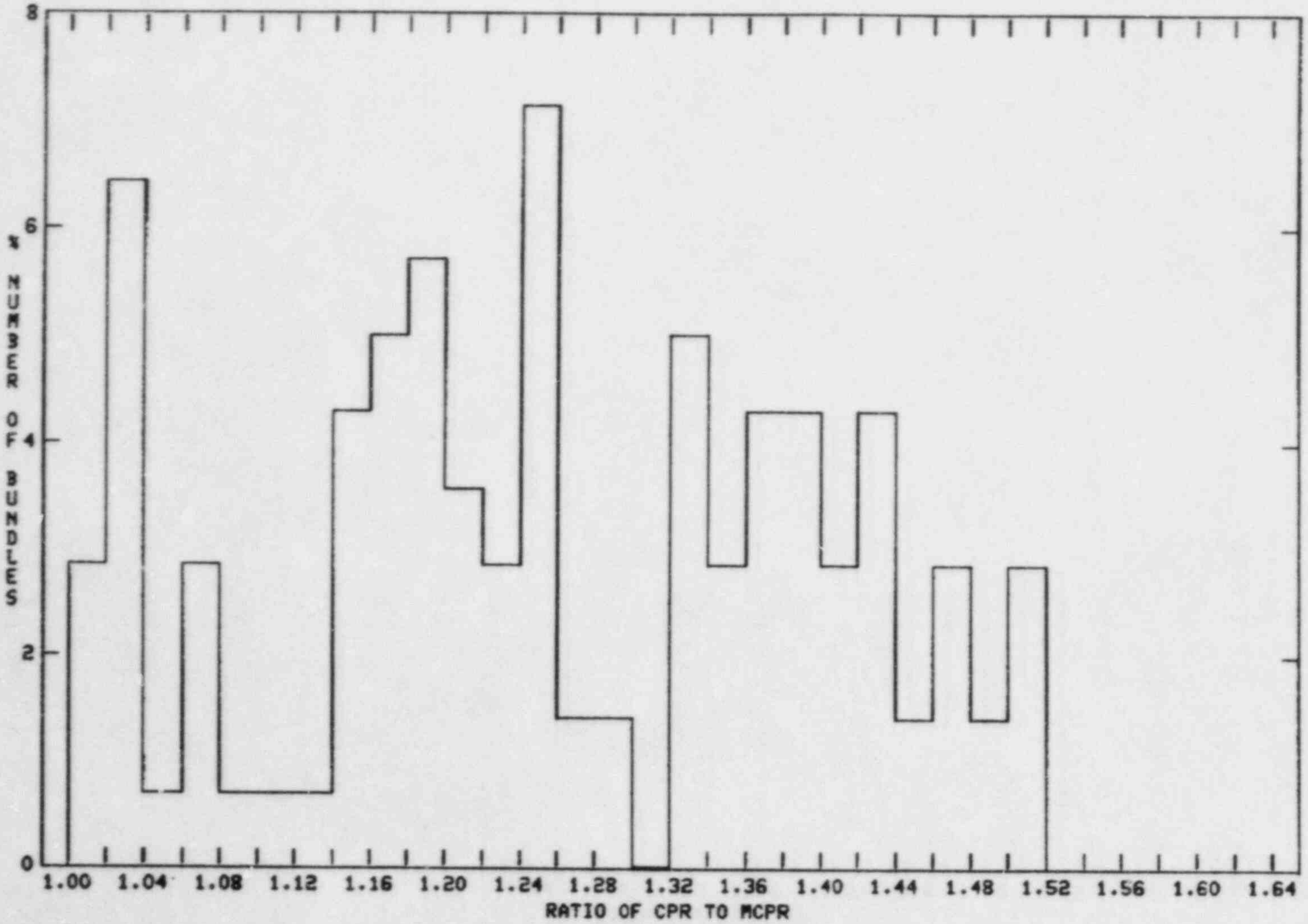

Fig. 5 Oyster Creek reference cycle CPR histogram.