Attachment

Technical Specification Change

TS 3.17 Limiting Linear Heat Generation Rate

TS 3.18 Power Distribution Monitoring and Control
(Power vs. Offset Envelopes)

3.17 LIMITING LINEAR HEAT GENERATION RATE

Applicability: Applies to measured peak linear heat generation rate (Kw/ft) in the reactor core.

Objective: To establish limits on linear heat generation rate (Kw/ft) which are based on the postulated loss of coolant accident (LOCA) with (1) appropriate allowances for fuel densification and (2) a reanalysis of LOCA considering upper head fluid temperature equal to reactor vessel outlet temperature and (3) reanalysis considering an increased fuel pellet/clad gap and fuel rod pre-pressurization.

Specification:

A. During steady state power operation, the peak linear heat rate values shall not exceed those limits shown below as defined in Reference (2) and modified by Reference (4).

1. Cycle residency time less than 3000 EFPH:

   13.85 Kw/ft

2. Cycle residency time greater than or equal to 3000 EFPH but less than 6000 EFPH:

   13.9 Kw/ft

3. Cycle residency time greater than or equal to 6000 EFPH but less than 9000 EFPH:

   15.5 Kw/ft

4. Cycle residency time greater than or equal to 9000 EFPH:

   16.1 Kw/ft

B. Measured values of core power peaking factors used in determining measured linear heat generation rates in the Section A specification shall include allowances for the following:

1. Normal power peaking.

2. Flux peaking augmentation factors (Power Spike), using Figure 3.17.1.

3. Measurement uncertainty (1.05)

4. Statistical density factor (1.012)

5. Engineering factor (1.04).

6. Stack shortening/thermal expansion factor (1.007).

7. Power level uncertainty (1.02).

These factors are multiplicative and Items 1 and 2 shall be chosen at a core height so as to maximize their product.

C. Three loop operation at above 65% of full licensed power shall not be permitted until additonal analysis is performed and proposed technical specification changes submitted. During three loop operation, the (Kw/ft) limits of Specification 3.17.A shall be multiplied by 0.65.

Basis:

Specification A sets limits that assure the peak cladding temperature following the postulated design basis loss-of-coolant accident will not exceed the 2300°F limit specified in the Interim Acceptance Criteria (IAC) issued in June, 1971, considering the postulated effects of fuel densification.

These limits incorporate the results of a recalculation of the LOCA event considering upper head fluid temperature equal to the reactor vessel outlet temperature (T_{HOT}), and an increased pellet/clad gap and fuel rod pre-pressurization incorporated in Batch XIV and subsequent reloads.

The basis for the multiplicative factors in Specification B are described in Section 8.1 of Reference (2).

The basis for Specification C is that previous analysis submitted December 5, 1972, showed the acceptability of 75% of rated power for three loop operation. (3) An additional 10% margin in rated power was added as a conservative allowance for fuel densification.

Bases:

A.1 Use of the movable incore neutron detectors provides an accurate means for determination of three dimensional power distributions when evaluated using the Westinghouse INCORE program.(1) Results of these measurements are used to check compliance with Technical Specification 3.17 limits.

A.2 Full core power distribution measurement at or below 80% of rated power for the startup of each new operating cycle provides verification of design predictions to assure compliance with core thermal limits before proceeding to 100% of rated power.

A.3 An additional full core power distribution measurement at 100% of rated power just after reaching equilibrium xenon conditions for each new operating cycle provides further verification of the acceptability of the power distribution.

B.1 Monitoring below 40% of rated power is considered unnecessary because of the substantial margin in local fuel rod heat flux at this reduced power.

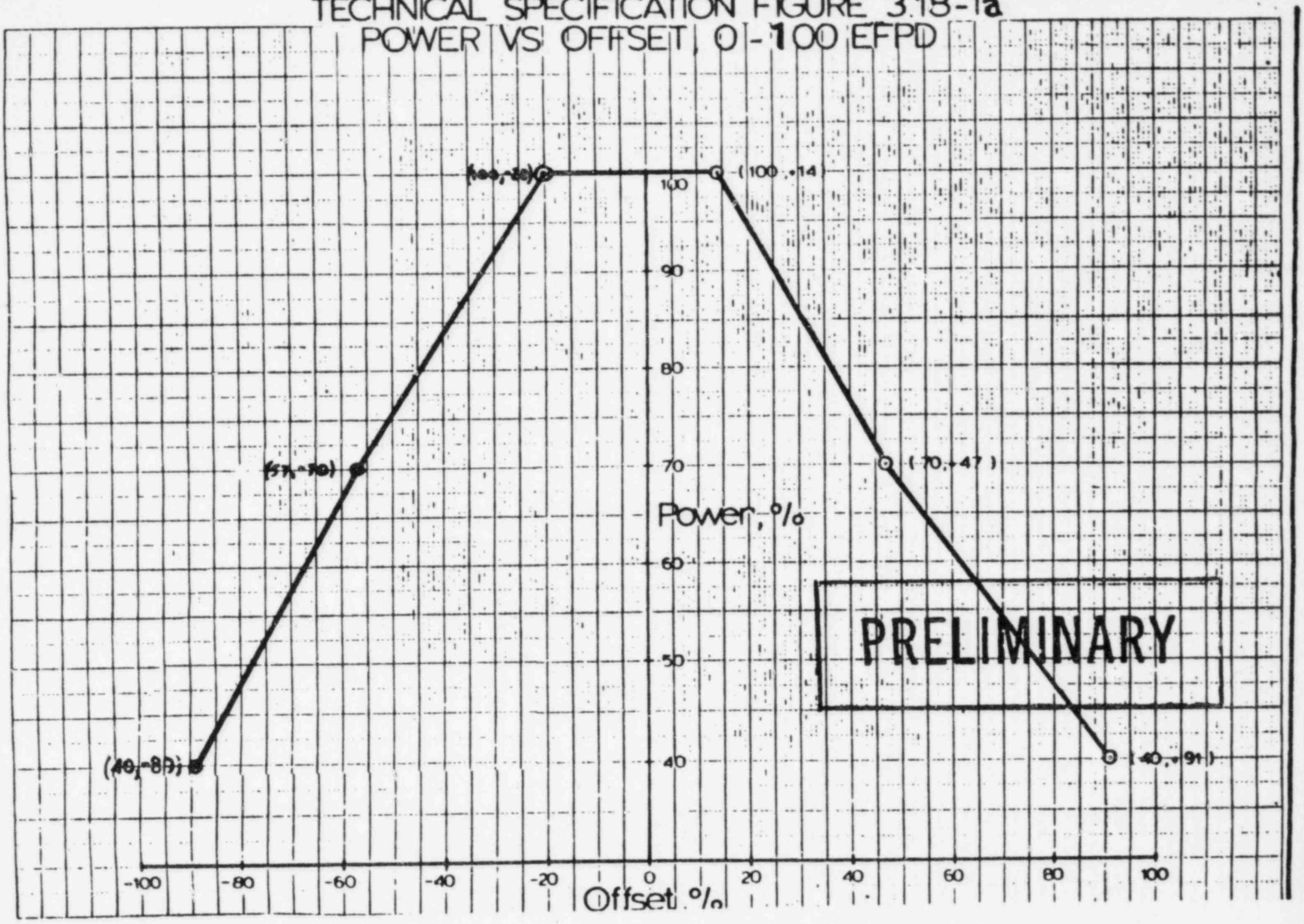
B.1.1.a Provides continuous monitoring of the incore power distribution by means of the out-of-core power range detectors. Operation within the axial offset envelope of Figure 3.18-1 assures that the local heat flux will not exceed the peak linear heat rate limits defined in Specification 3.17. Specific axial offset versus power curves for future reloads will be calculated and checked against Figure 3.18-1 to insure continued applicability.

B.1.1.b An appropriate allowance for incore/excore calibration uncertainty is used by the reactor operator. The bases for the excore detector calibration and its uncertainty are described in Appendix B to Reference 3.

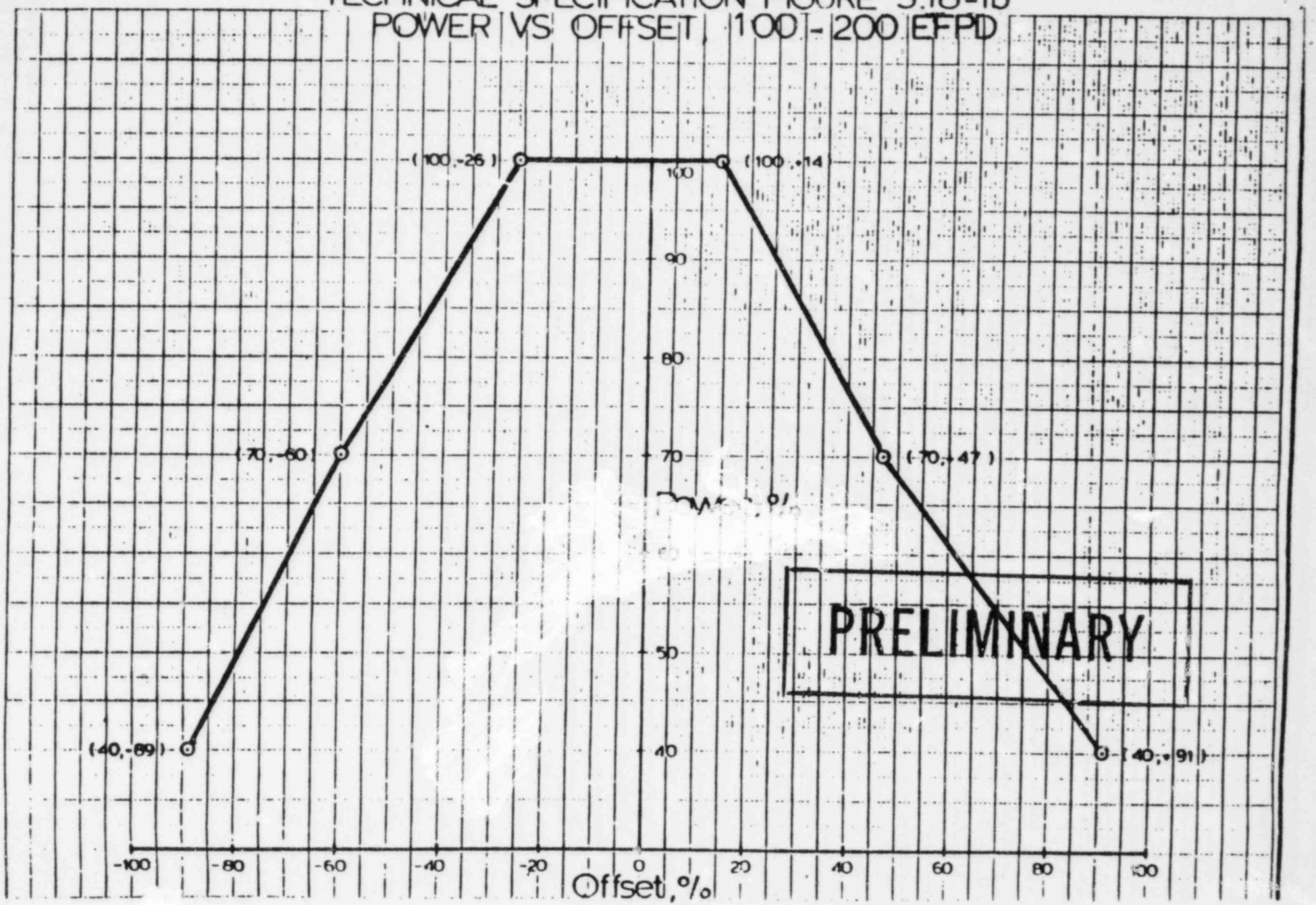
B.1.1.c Monthly checks and calibrations every three full power months assure maintenance of the excore detector calibration. Provides for axial offset monitoring calibration after a new core loading or changes in nuclear instrumentation.

B.1.2 Use of two movable incore thimble measurements along with an appropriate correlation

TECHNICAL SPECIFICATION FIGURE 3.18-1a
POWER VS OFFSET, 0-100 EFPD



TECHNICAL SPECIFICATION FIGURE 3.18-1b
POWER VS OFFSET, 100 - 200 EFPD



TECHNICAL SPECIFICATION FIGURE 3.18-1c
POWER VS OFFSET, 200 EFPD TO EOC