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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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ALEXICH,M.P. Indiana & Michigan Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Summarizes 841113 meeting re 840828 application for amend to License DPR-74, changing Tech Specs to permit total power peak limit of 2.04 & corresponding limit of 1.49. Status of evaluation of impact of potential delays provided.

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INDIANA & MICHIGAN ELECTRIC COMPANY

P.O. BOX 16631
COLUMBUS, OHIO 43216

December 7, 1984
AEP:NRC:0860V

Donald C. Cook Nuclear Plant Unit No. 2
Docket No. 50-316
License No. DPR-74
UNIT 2 TECHNICAL SPECIFICATION CHANGES ($F^N_{\Delta H}$) FOR CYCLE 5 AND ADMINISTRATIVE LIMITS IMPOSED DURING ANALYSIS

Mr. Harold R. Denton, Director
Office of Nuclear Regulator Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

An application for amendment to the Donald C. Cook Unit 2 Technical Specifications which would permit a total power peak limit (F_Q^T) of 2.04 and a corresponding $F^N_{\Delta H}$ limit of 1.49 was submitted in letter AEP:NRC:0860J dated August 28, 1984. This submission was supported by an analysis performed by our fuel vendor, Exxon Nuclear Company. Subsequently, a meeting was held in Bethesda on November 13, 1984 to discuss questions raised by your staff regarding this submission and to elaborate on conservative measures AEP has taken pending final resolution of the questions. This letter is to summarize this presentation and also to provide the current status of our analysis and our evaluation of the impact of potential delays in resolving the staff's questions. Members of your staff present at the meeting concurred with the action we've taken and our planning for the immediate future.

Your staff asked us to provide justification that the analysis performed considered a range of power distribution shapes and peaking factors that would represent power distributions that may occur over the core life time. Prior to this submittal Exxon Nuclear Company supported this requirement by referencing a generic Westinghouse methodology. During the November 13, 1984 meeting a new approach to developing an Exxon methodology in the near term, was presented. This methodology will limit the peaks in the top of the core by placing limits on axial offset. The limit on axial offset may be relaxed by tightening the limit on $F^N_{\Delta H}$. Power distributions which the operating restrictions permit will be reviewed to select those which most closely approach the LOCA acceptance criteria for LOCA analysis. It is our intention that the methodology of this approach and Cook specific analysis be submitted to your staff for review in January 1985. A status report and preliminary discussion of results has been planned for December 13, 1984.

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In order to assure margin to 10 CFR 50.46 limits while the near term Exxon methodology is being developed, we have imposed a new administrative K(Z) curve. This K(Z) is based on preliminary calculations performed by Exxon Nuclear Company. The calculation was performed by utilizing a heatup code with an axial profile peaked in a conservative manner at the top of the core. It was coupled with results from blowdown and reflood analyses which were computed with a chopped cosine power distribution. Our vendor's belief that the calculation is conservative is based on the nature of the power distribution assumed in the heatup calculation. It is anticipated that complete LOCA calculations with physically achievable power distributions will meet the acceptance criteria of 10 CFR 50.46. The large break LOCA segment of this administrative K(Z) curve and the old K(Z) curve are shown in Figure 1 of the attachment. The administrative K(Z) curve has been reviewed by PNSRC and NSDRC.

We have conducted studies comparing the current and anticipated power distribution with $F_{\Delta H}^{N}$ limits and F_Q limits obtained from the administrative K(Z) curve. This comparison indicates that we can operate the plant at full power until approximately March or April 1985 with an $F_{\Delta H}^{N}$ limit of 1.415. The results of this work were presented at the November 13 meeting, copies of the transparencies from this presentation are attached as requested.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

M. P. Alexich
Vice President

12/7/84

tm

Attachment

cc: John E. Dolan
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Bruchmann
G. Charnoff
NRC Resident Inspector - Bridgman

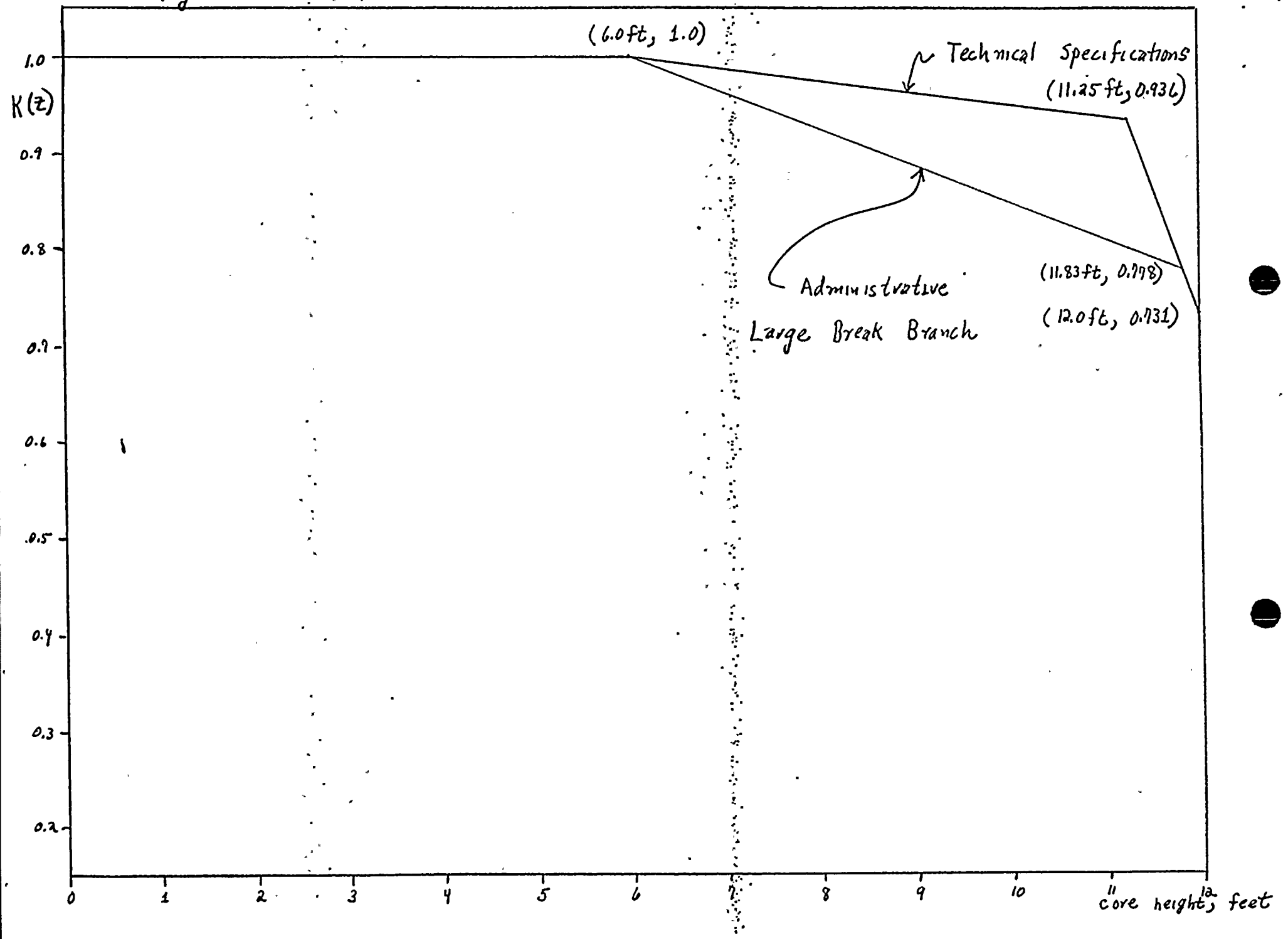
TRANSPARENCIES PRESENTED BY AEPSC ON NOVEMBER 13, 1984

COMPARING CURRENT AND ANTICIPATED POWER DISTRIBUTIONS

WITH $F^{N}_{\Delta H}$ AND F_{Q} LIMITS FOR DONALD C. COOK NUCLEAR

PLANT UNIT 2.

Figure 1 : Comparison Between Administrative and Technical Specification K(z)'s



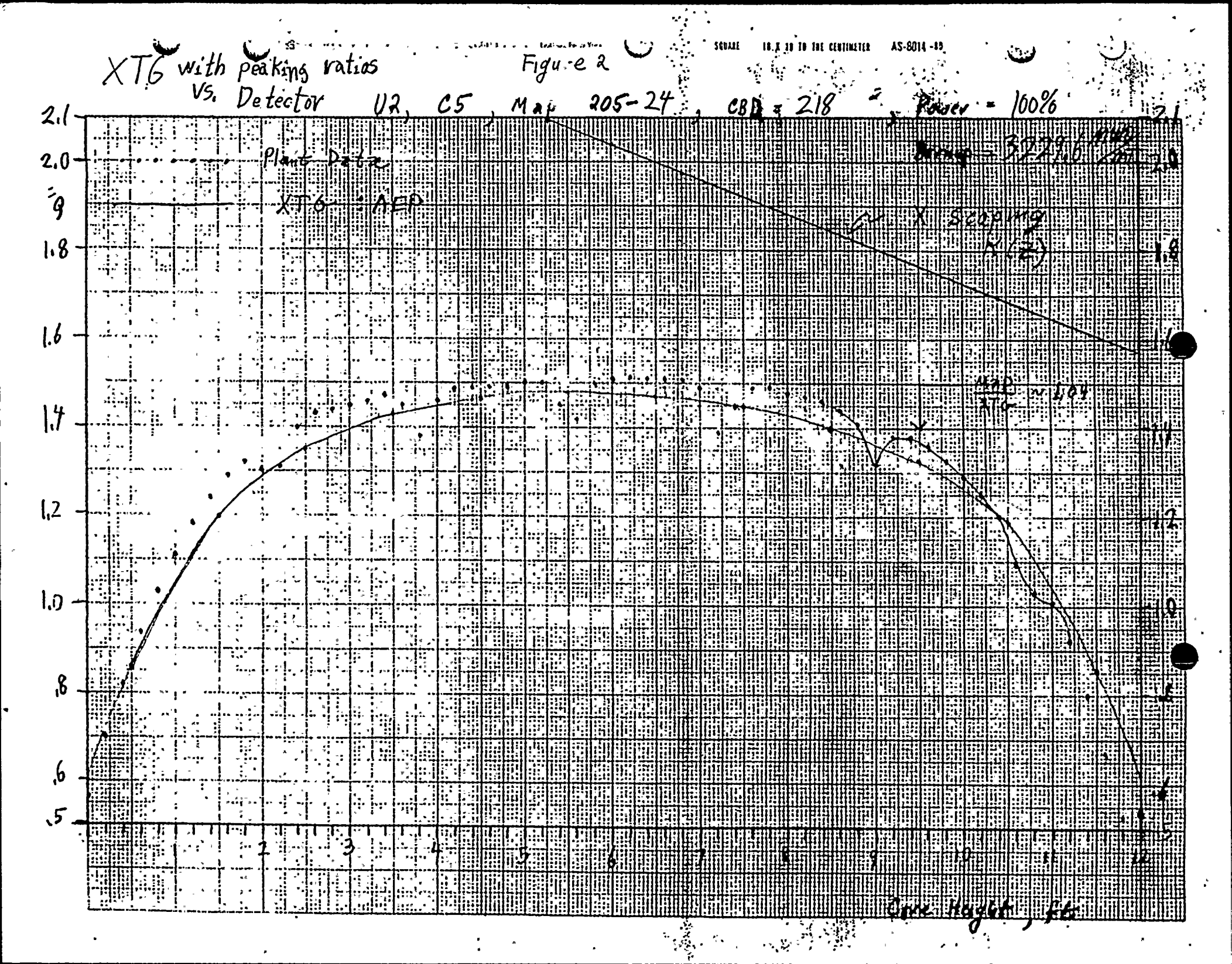

XTG with peaking ratios
Figure 2
Vs. Detector U2, C5, Map 205-24, CBC = 218, Power = 100%
Plant Data
XTG - AFD
Axial Shape Index
Core Height, ft
SQUARE 10 X 10 TO THE CENTIMETER AS-8014-99

Figure 3

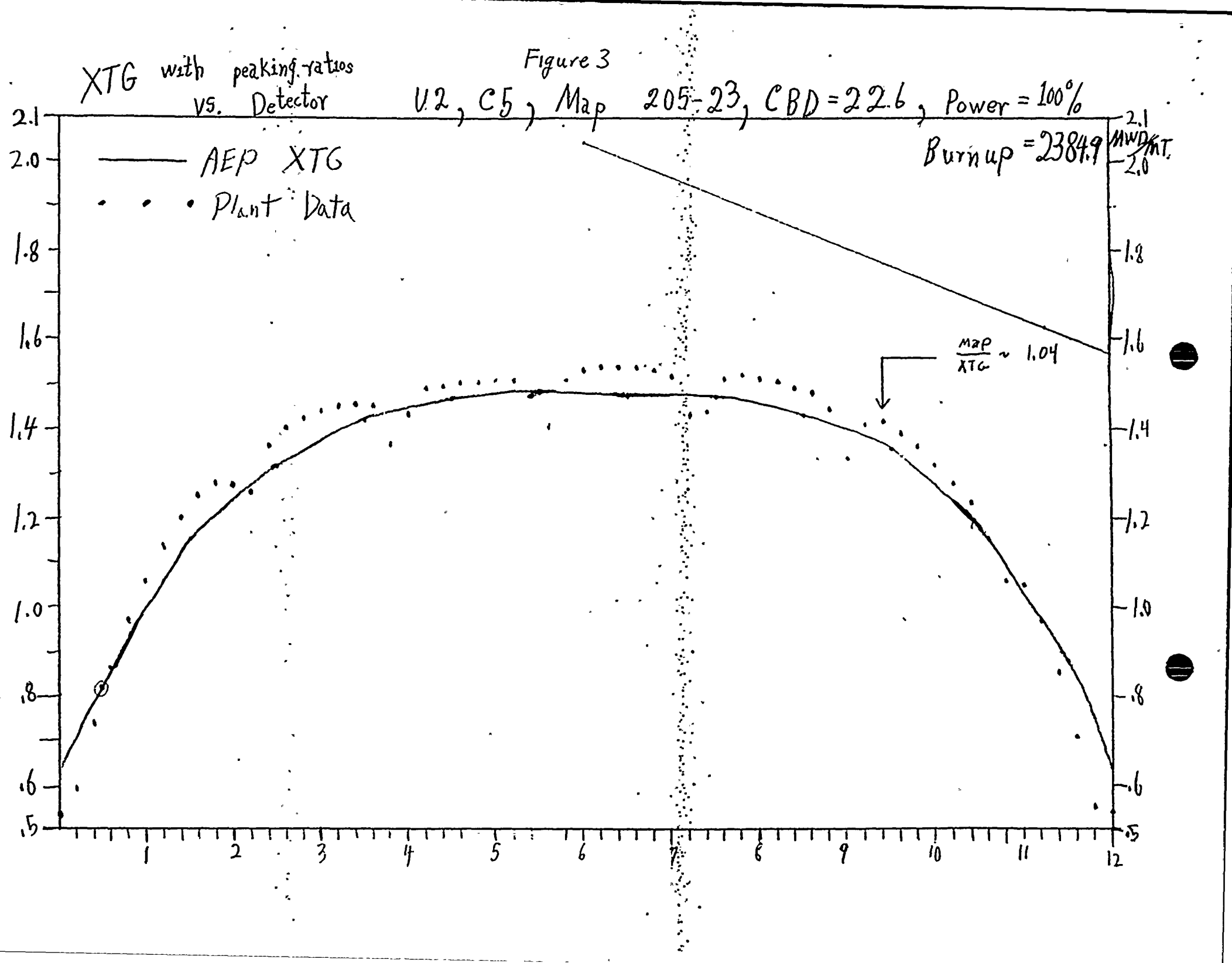

XTG with peaking ratios vs. Detector
U2, C5, Map 205-23, CBD = 22.6, Power = 100%
Burnup = 2384.9 MWD/MT
AEP XTG
Plant Data
Map/XTG ~ 1.04
2.1
2.0
1.8
1.6
1.4
1.2
1.0
.8
.6
.5
1
2
3
4
5
6
7
8
9
10
11
12

Figure 4. U2 C5 Map 205-24 CBD = 218 BU 3229 MWD/MT

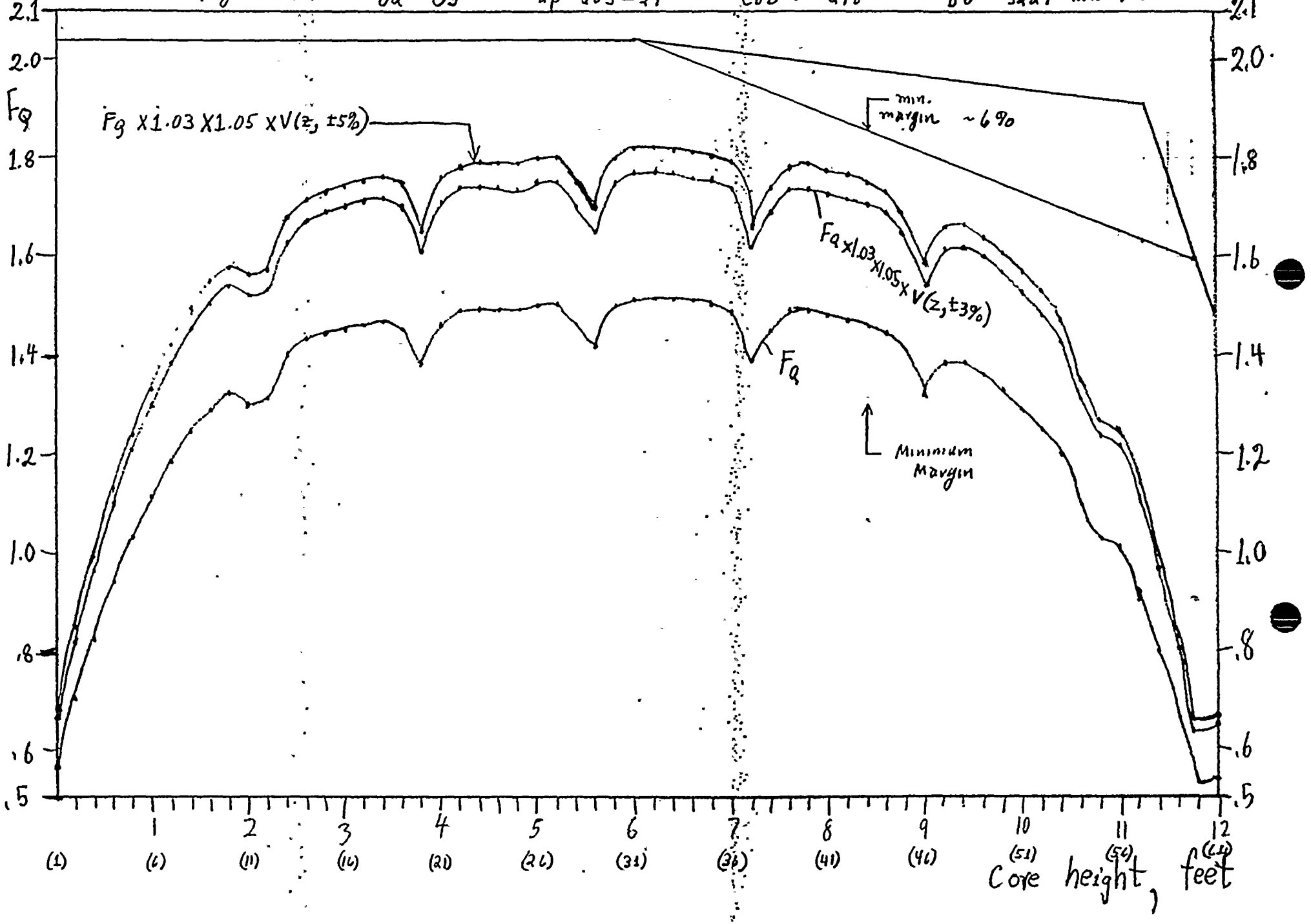


Figure 5

U2, C5 Map-20533 run on 11/01/84

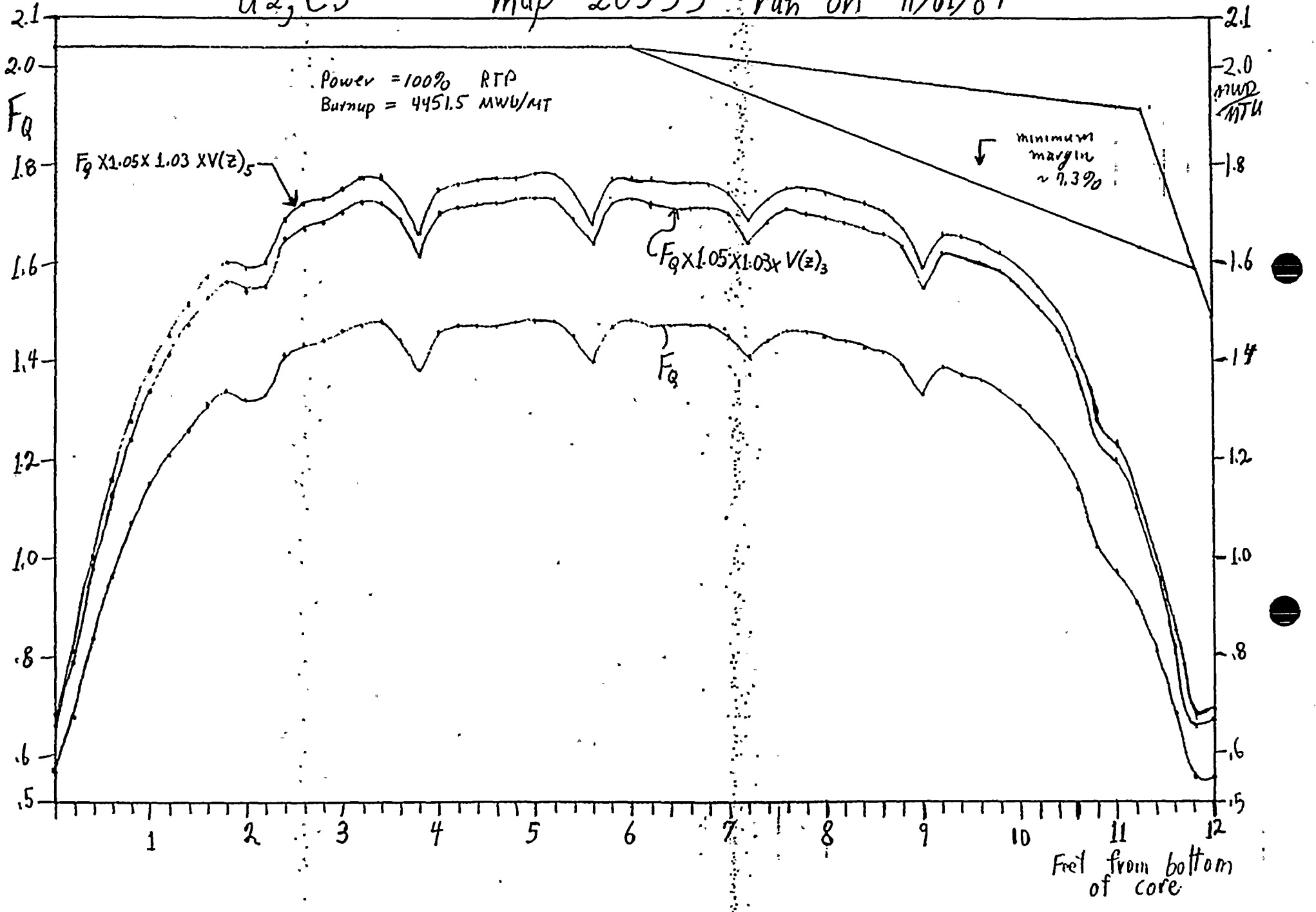


Figure 6

Exxon XTG 10,000 MWD/MT

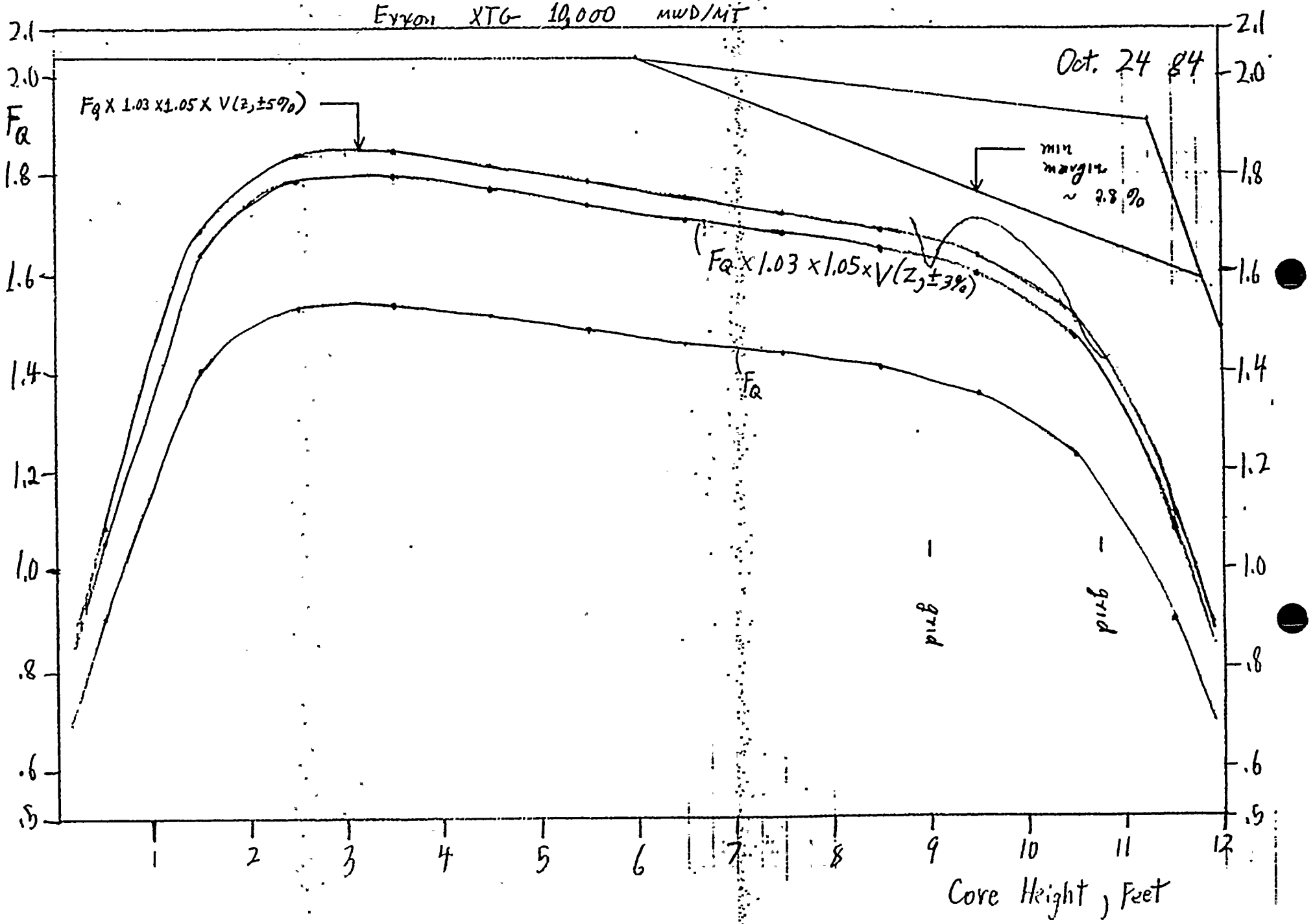


Figure 7

Exxon XTG 16,000 MWD/MT U2, C5

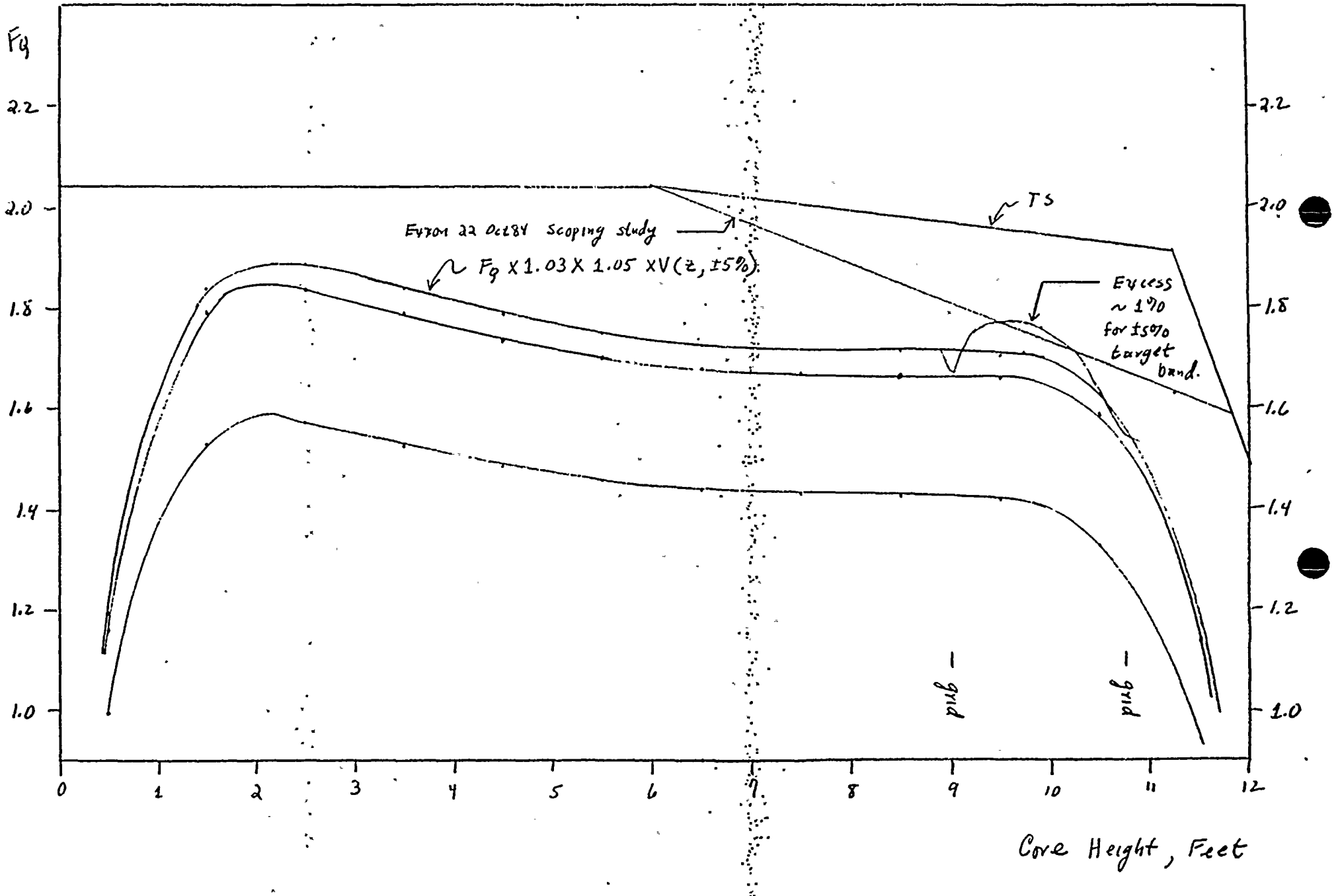


Figure 8 : Exxon XTG 17,790 MWD/MT U2, C5

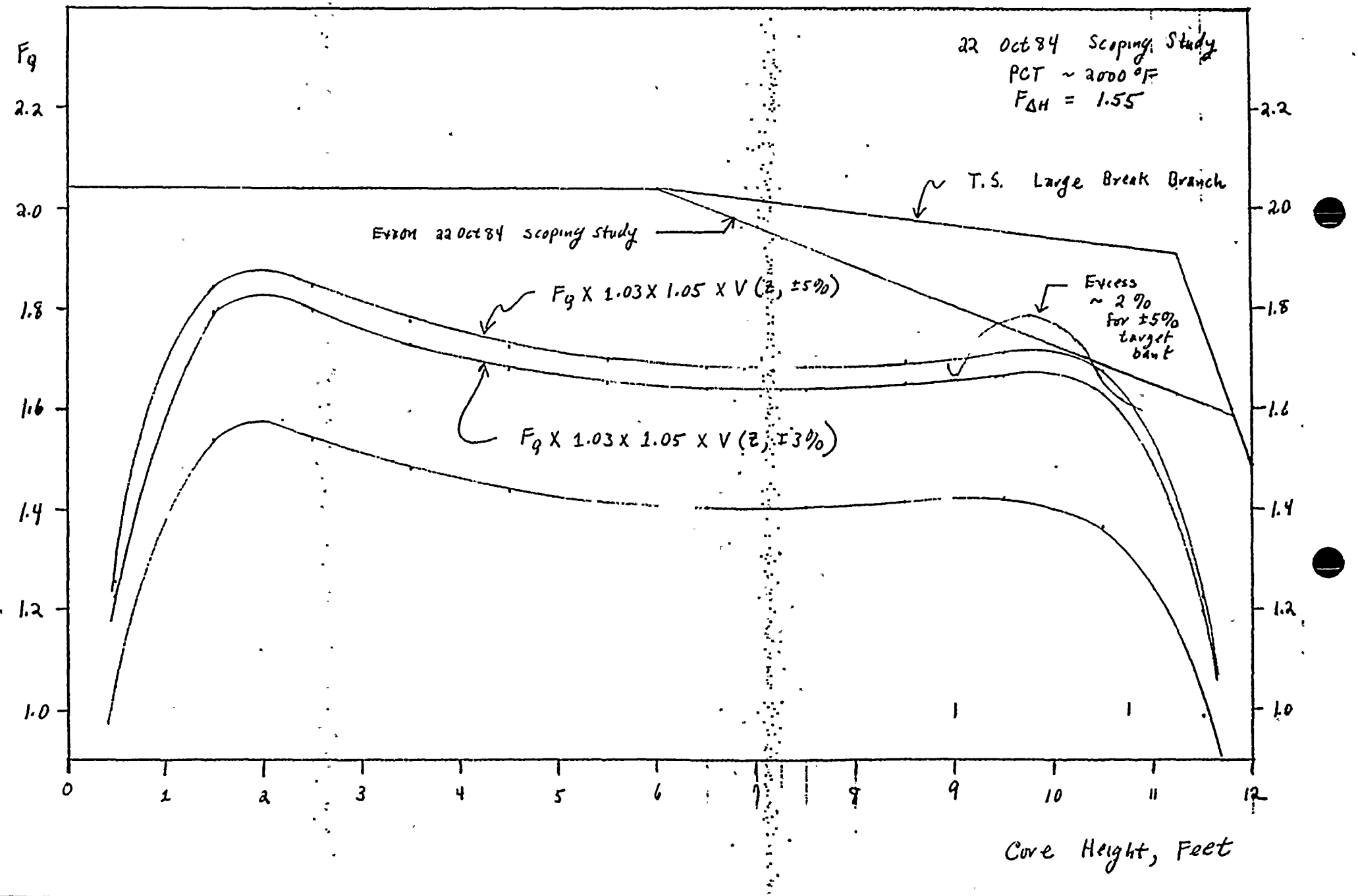


Figure 9: F_Q Margin

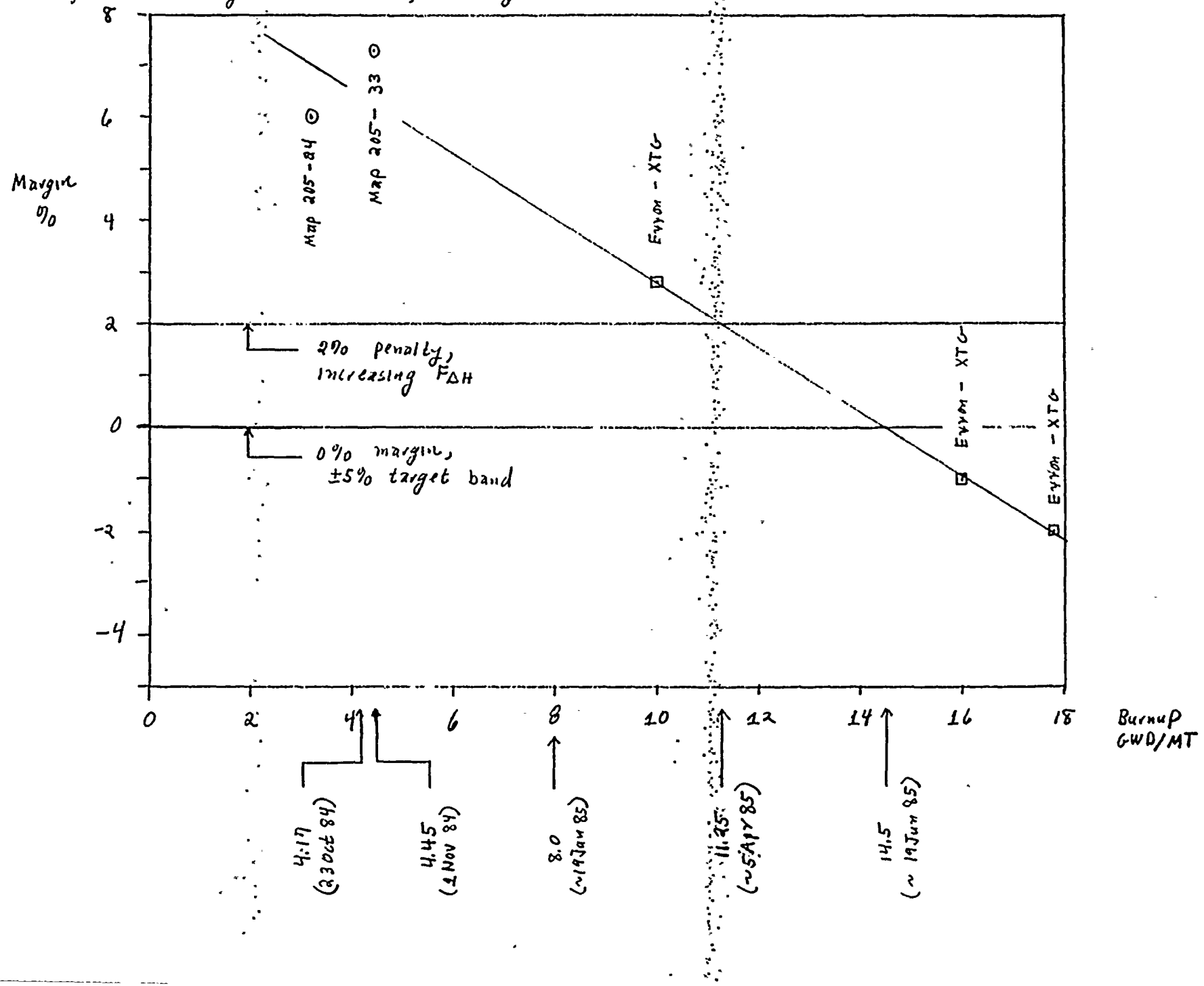
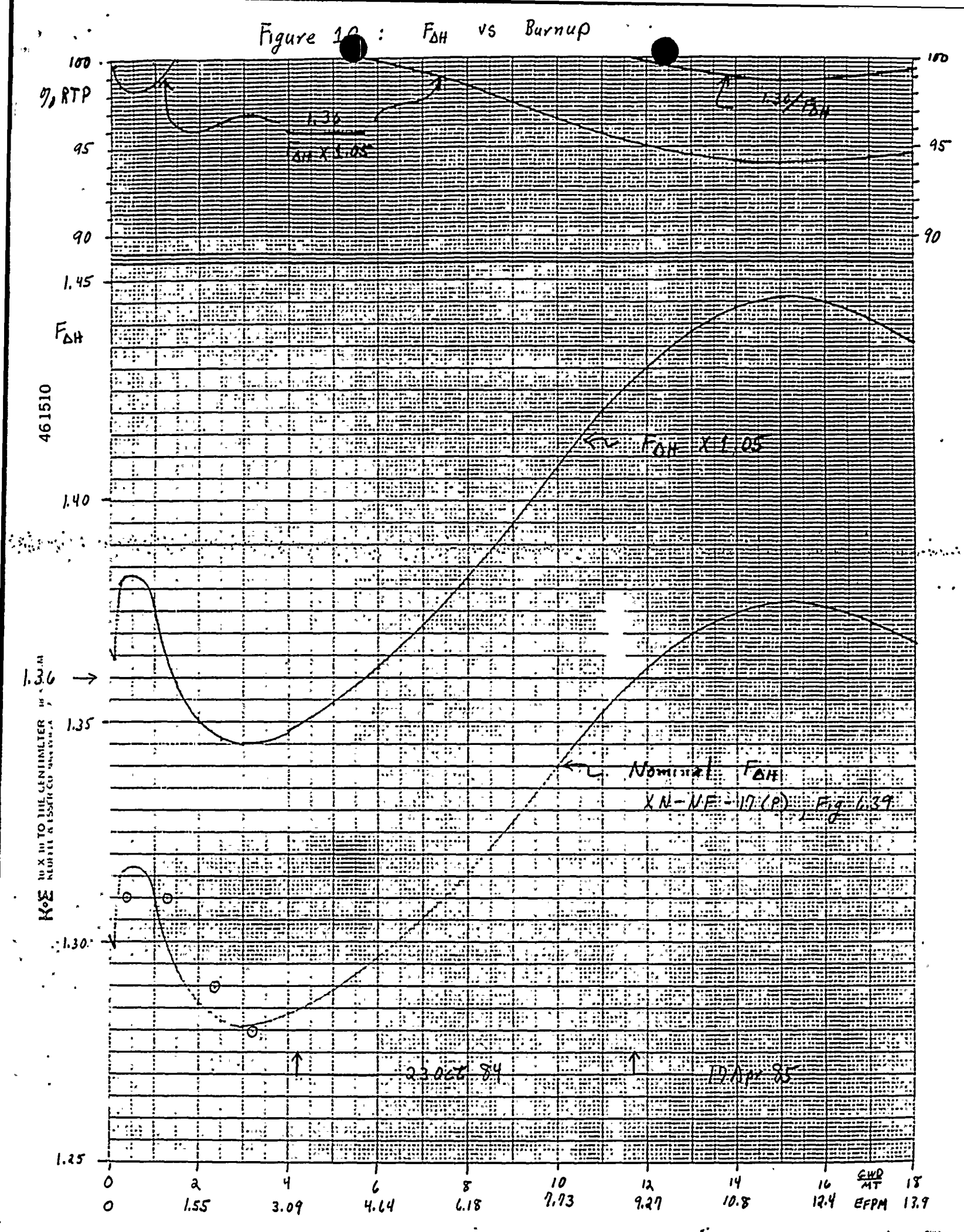


Figure 10 : $F_{\Delta H}$ vs Burnup



AMERICAN ELECTRIC POWER SERVICE CORPORATION

AMERICAN ELECTRIC AEP POWER SYSTEM

DATE: October 29, 1984

SUBJECT: Unit 2 K(Z) Curve

Figure 11 a

FROM: J.M. Cleveland

TO: W.G. Smith, Jr.

On August 28, 1984 a new Unit 2 LOCA analysis was submitted to the NRC. This analysis supports an $F_{\Delta H}$ of 1.55 (1.49 measured). The NRC reviewer of this submission does not consider it appropriate for the submission to reference the Westinghouse K(Z) analysis described in WCAP 8356. Therefore, Exxon is performing calculations with the Exxon LOCA model to develop a K(Z) curve which will potentially become a supplement to the August 28, 1984 submission.

Preliminary calculations performed by Exxon show that the Exxon model can support a revised K(Z) curve lower than the current K(Z) curve based on WCAP 8356. In order to prevent exceeding Appendix K peak clad temperature limits, we requested Exxon to develop an interim conservative K(Z) curve. This interim K(Z) is attached. We request this curve to be applied on an administrative basis. Doing so is expected to ensure continued compliance with Appendix K while further analysis continues.

Data sets for the detector code have been prepared which include the new K(Z) curve. These data sets are:

Source Library:	SRC.LIB02.S418010
Member for burnups 4000-5000 MWD/MT:	E254500A
Member for burnups 5000-6000 MWD/MT:	E255500A

J.M. Cleveland

J.G. Feinstein, Concurrence

M.P. Alexich, Approval

cc: V. Vanderburg/G. John
A. Blind/R. Hennen
NMFM #84-0559

INTRA-SYSTEM

Figure 11.0

Administrative K(Z), Exxon Fuel, V2, 25Oct84