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October 17, 1989

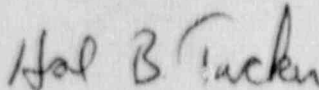
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Direct Generation Response Spectra

Gentlemen:

Your August 29, 1989 letter transmitted a request for additional information regarding our May 10, 1989 submittal. Please find attached a response to your questions. This response was scheduled to be submitted on September 28, 1989. Question 2 of your request required the evaluation of NUREG/CR 5347, Appendix B. My response to your August 29, 1989 letter was delayed because NUREG/CR 5347 was recently published and was not available to my staff at the time of your request. I apologize for the slight delay.

Very truly yours,



H. B. Tucker *MR*

JGT/5/DIRGEN

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**RESPONSE TO AUGUST 29, 1989
REQUEST FOR ADDITIONAL INFORMATION**

1. In references 2 and 3, the staff had suggested two options which Duke Power can use to demonstrate the appropriateness of the input response spectra. The latest submittal (reference 1) neither discusses these options nor provides any additional bases for the use of the Catawba ground response spectra (CNS-GRS). Table 1 of reference 4 clearly indicated that the system responses calculated using the site-specific spectra could be as high as 18% above the responses calculated using the CNS-GRS. For some yet to be analyzed systems, the differences could be still higher. Therefore, the staff requests that Duke Power provide information as to how the input spectra conservatively represent the site characteristics.

2. Reference 1 indicates that Duke Power is aware of the potential resolution of public comments on the proposed resolution of USI A-40 (revision to SRPs 2.5.2, 3.7.1, 3.7.2, 3.7.3). It should be noted, however, that the assessment of the adequacy of power is still required. It is more critical when the input response spectra do not represent the site characteristics adequately. Target power spectral density function (PSDF) developed using the site-specific data and the recommendations of NUREG/CR 5347, Appendix B, is acceptable. Duke Power is requested to provide information to demonstrate that the CNS-GRS would satisfy the minimum PSDF criteria.

Response

Two staff items of concern are noted:

- 1) input response spectra should represent the site characteristics adequately

- 2) input response spectra should meet minimum power spectral density requirements (recommendations of NUREG/CR 5347, Appendix B was referenced as being acceptable)

The input responses for the design and licensing of Catawba utilizes the Newmark Spectra, termed as Design Responses Spectra (DRS) or Ground Response Spectra (GRS), anchored at 0.15g peak ground acceleration. A response spectra representing the site characteristics or a site specific curve was first introduced by the staff when reviewing the Catawba design prior to issuance of an operating license. The staff constructed a site specific spectrum in the SER, date February 1983. (NUREG-0954), that was stated to be reasonably representative for Catawba.

The use of the Newmark Spectra alone, anchored at 0.15g, meets the minimum power spectral density requirements as outlined in NUREG/CR 5437, Appendix B. This is illustrated in Figure 1 which shows the PSD from the Newmark Spectra exceeding the minimum requirements from the referenced NUREG at all frequency points.

Even though the minimum power spectral density requirements are met, the concern about the input spectra representing the site characteristics would not be addressed with the Newmark Spectra. Since a representative site specific spectra for Catawba was constructed by the Staff, the use of this spectra would satisfy the first concern, but it by itself would not meet the minimum PSD requirements across all frequency ranges.

In order to satisfy both concerns of the staff, a composite spectra was constructed using the Design Response Spectra (DRS) and the staff provided site specific spectra. The composite input response spectra is shown in Figure 2. A PSD was computed from the composite spectra, and it is compared to the minimum PSD requirements in Figure 3 & 4. The PSD's shown in Figure 3 & 4 were computed from response spectra anchored at 1.0g ZPA to agree with format of NUREG curves. The PSD from the composite response spectrum curve envelopes the minimum required PSD curve at every frequency point.

The staff indicated that the target power spectral density function (PSDF) using the site specific data and the recommendations of NUREG/CR 5347, Appendix B, is acceptable. Since the composite response spectrum (reference Figure 2, constructed from the licensed Catawba Newmark Spectra and the staff provided site specific spectrum) represent the site characteristics and meet the power spectral density requirements as outlined in NUREG/CR 5347, Appendix B, Duke intends to proceed with the use of direct generation of response spectra using the composite curve as the input response spectra.

NUREG/CR-5347 PSD vs CNS DRS PSD from 5.0% RS

(Two-sided PSDs anchored at 0.15g ZPA)

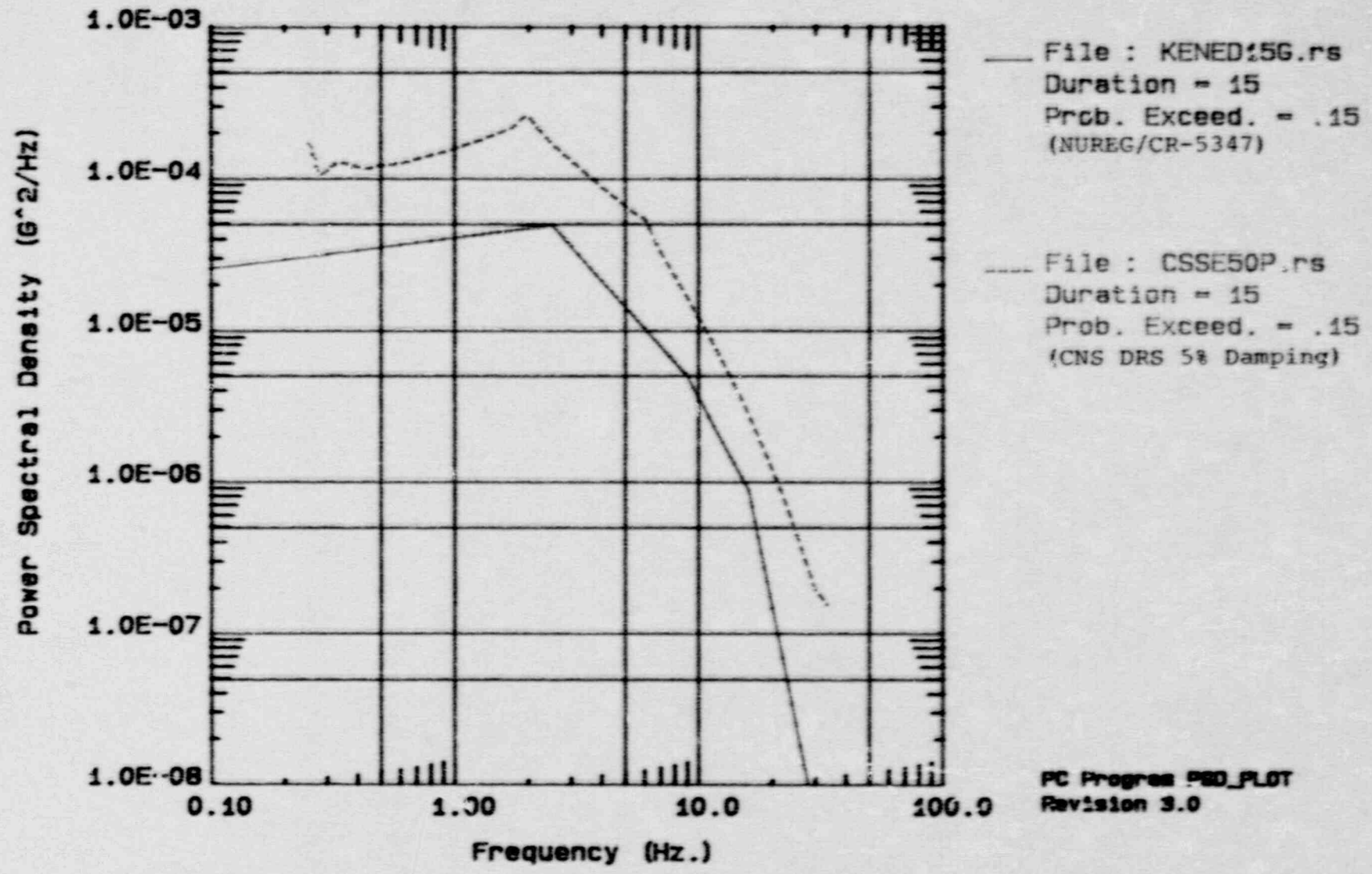
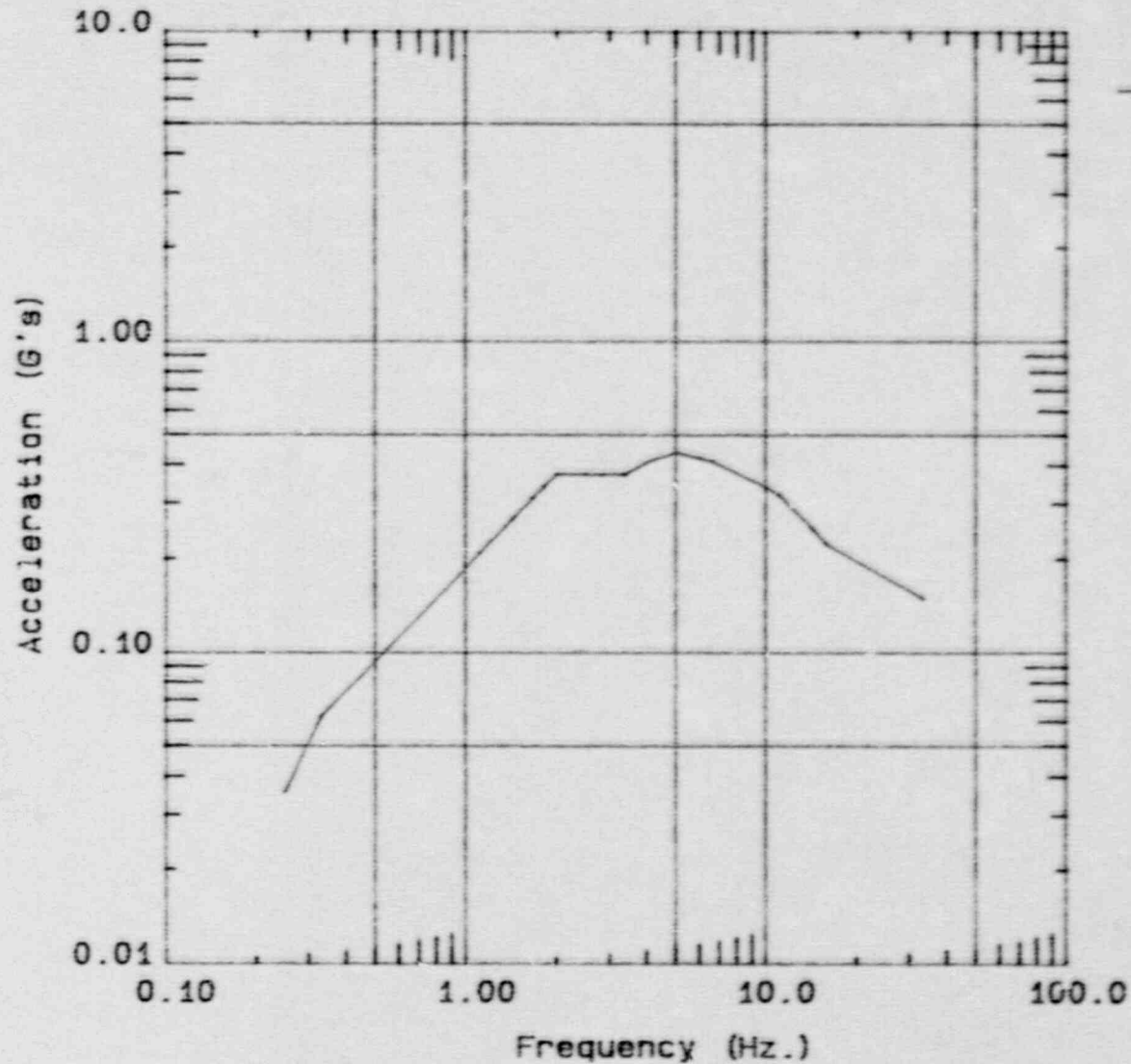


Figure 1

Composite RS from the DRS & the Site Specific RS
(SSE Response Spectra anchored at 0.15g ZPA)



PC Program RS_PLOT
Revision 2.1 01/11/89

Figure 2

PSD from Composite CNS DRS & Site RS vs NUREG/CR-5347.

(One-Sided PSDs anchored at 1.0g ZPA)*

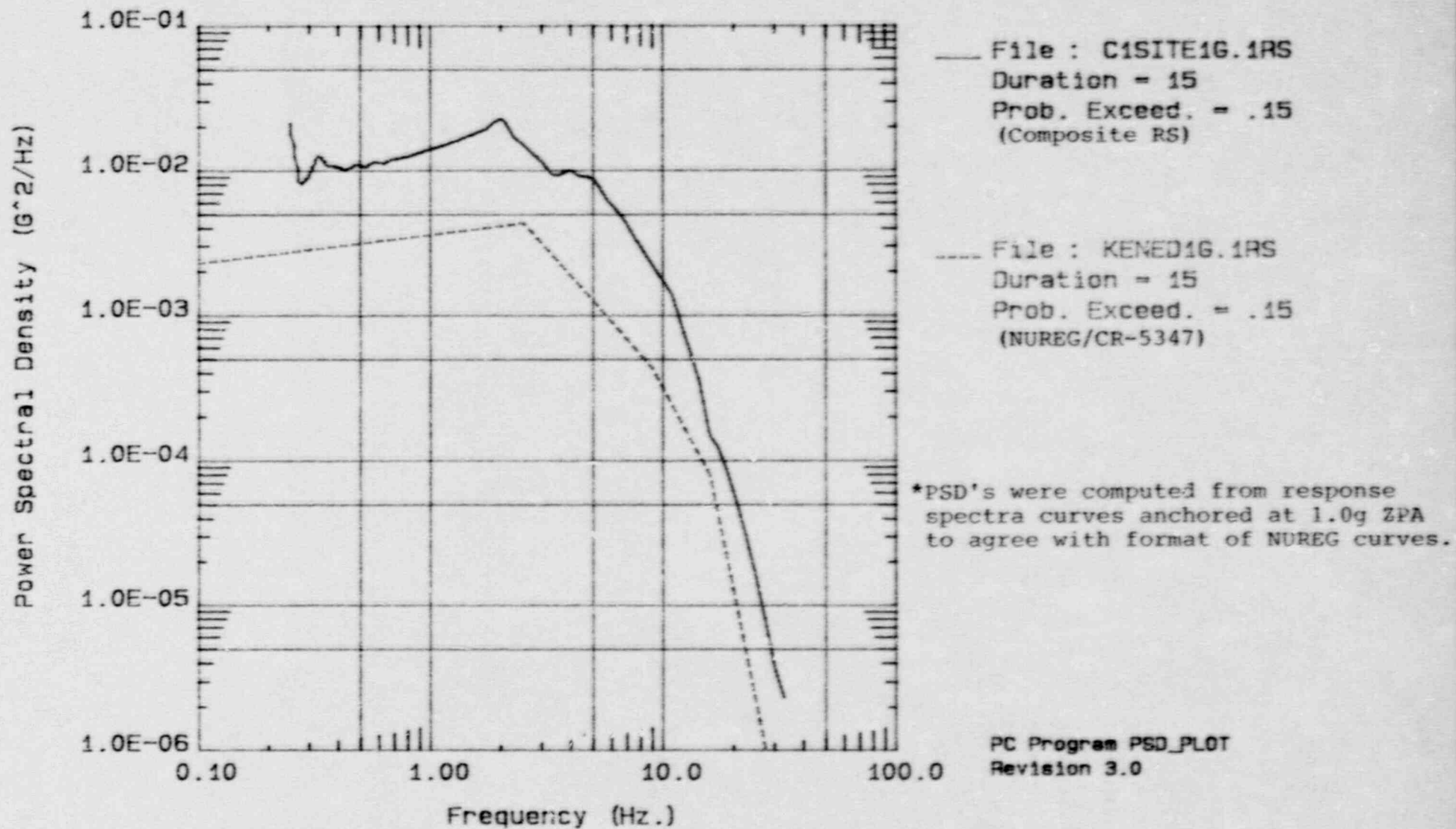


Figure 3

PSD from Composite CNS DRS & Site RS vs NUREG/CR-5347.

(One-Sided PSDs anchored at 1.0g ZPA)*

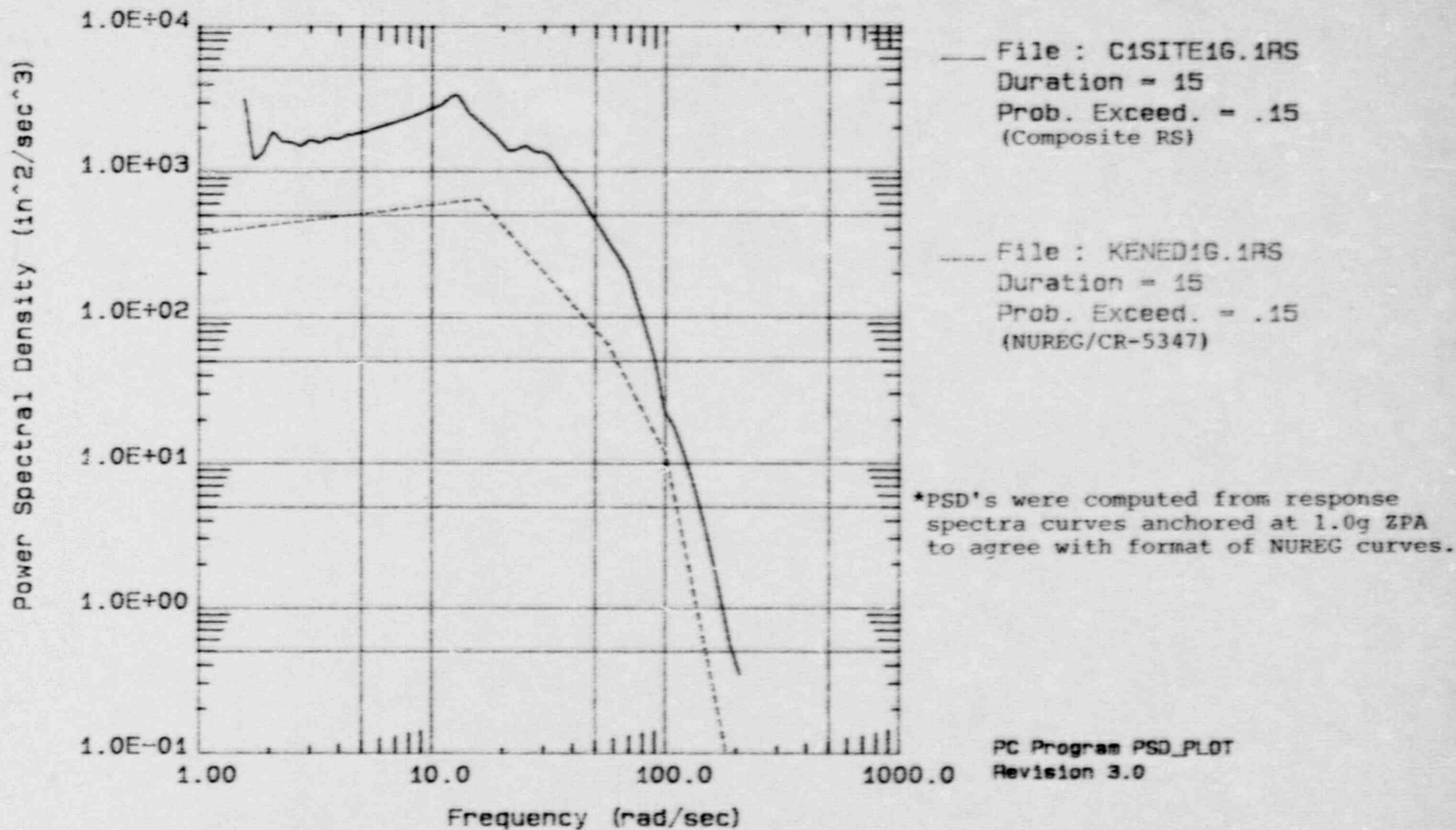


Figure 4