CHARLES H. CRUSE
Vice President
Nuclear Energy

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410 495-4455

BGE

October 24, 1996

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
120-Day Response to Generic Letter 96-04, "Boraflex Degradation In Spent Fuel Pool Storage Racks"

REFERENCES:
(a) Letter from Mr. B. K. Grimes (NRC) to Mr. C. H. Cruse (BGE), dated June 26, 1996, "NRC Generic Letter 96-04: "Boraflex Degradation In Spent Fuel Pool Storage Racks"

(b) Updated Final Safety Analysis Report, Revision 19, Chapter 1, Appendix 1C

The purpose of this letter is to forward our 120-day response to Reference (a). The generic letter requests each user of Boraflex as a neutron absorber in their spent fuel storage racks to: (1) assess the capability of the Boraflex to maintain a 5-percent subcriticality margin; and (2) submit to the NRC a plan describing their proposed actions if this subcriticality margin cannot be maintained by Boraflex material because of current or projected future Boraflex degradation.

We understand that the NRC is requesting this information to ensure that the onsite storage of spent fuel is in compliance with General Design Criteria (GDC)-62 for the prevention of criticality in fuel storage and handling, and with the 5-percent subcriticality margin position that NRC staff takes to assure compliance with GDC-62. Please note that Calvert Cliffs Nuclear Power Plant Units 1 and 2 are designed and constructed to meet the intent of the draft GDC-66 of July 10, 1967 (Reference b). Draft GDC-66 is similar to GDC 62.

Attachment (1) contains our detailed response to the information requested.

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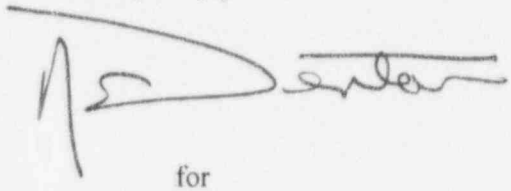
Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



for
C. H. Cruse
Vice President - Nuclear Energy

STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I hereby certify that on the 24th day of October, 1996, before me, the subscriber, a Notary Public of the State of Maryland in and for County of Calvert, personally appeared Robert E. Denton, being duly sworn, and states that he is Senior Vice President of the Baltimore Gas and Electric Company, a corporation of the State of Maryland; that he provides the foregoing response for the purposes therein set forth; that the statements made are true and correct to the best of his knowledge, information, and belief; and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal: Donna L. McCready
Notary Public

My Commission Expires: January 1, 1998
Date

CHC/JMO/dlm

Attachment: (1) Baltimore Gas & Electric Company's 120-Day Response to GL 96-04: Boraflex Degradation in Spent Fuel Pool Storage Racks

Enclosure: 1989-1996 Silica Data

cc: **(Without Enclosure)**
D. A. Brune, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
T. T. Martin, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

BALTIMORE GAS AND ELECTRIC COMPANY'S
120 - DAY RESPONSE
TO
GENERIC LETTER 96-04:
BORAFLEX DEGRADATION IN SPENT FUEL POOL
STORAGE RACKS

Calvert Cliffs Nuclear Power Plant
Units 1 & 2
October 24, 1996

ATTACHMENT (1)

BALTIMORE GAS AND ELECTRIC COMPANY'S 120-DAY RESPONSE TO GENERIC LETTER 96-04: BORAFLEX DEGRADATION IN SPENT FUEL POOL STORAGE RACKS

INFORMATION REQUESTED

All licensees of power reactors with installed spent fuel pool storage racks containing the neutron absorber Boraflex are requested to:

1) *Provide an assessment of the physical condition of the Boraflex, including any deterioration, on the basis of current accumulated gamma exposure and possible water ingress to the Boraflex and, state whether a subcritical margin of 5 percent can be maintained for the racks in unborated water. Monitoring programs or calculational models in effect or being developed, or an estimation of anticipated concerns based on the specific rack design, are considered an appropriate basis for this response.*

Response

The Calvert Cliffs spent fuel storage racks were designed by Nuclear Energy Services (NES). Only the Unit 2 racks contain Boraflex. The racks are flux trap Region 1 storage racks (i.e., fresh fuel containing the maximum design weight percent U-235 may be stored in them). The wrapper for the Boraflex poison material is a form-fitted design that minimizes water ingress. Calvert Cliffs has a coupon surveillance program to test the condition of the storage racks. The coupons are designated as long-term and accelerated. The long-term coupons are surrounded by typical fuel assemblies, while the accelerated coupons are placed next to the freshly discharged fuel every refueling outage.

The cumulative results of the coupon surveillance program indicate that the Boraflex panels show no significant deterioration, based on the NES surveillance program. Therefore, the Boraflex spent fuel storage racks will maintain a subcritical margin of 5 percent in unborated water. Note that the NES surveillance program predates the Electric Power Research Institute (EPRI) surveillance program (NP-6195).

Calvert Cliffs does believe that the surveillance coupons are a conservative representation of the panels in the storage racks in that the racks are "tighter" than the coupon holders. The coupon holder has a small gap between the top, bottom and side spacer bars. Additionally, the spacer bars are 0.01 inches thicker than the coupon. Therefore, these dimensional differences actually allow ingress of water to the coupon. The net effect is the coupon surveillance program conservatively predicts deterioration of Boraflex spent fuel storage racks.

Calvert Cliffs is currently developing a RACKLIFE computer model of the Boraflex spent fuel storage racks to evaluate Boraflex panel performance. We will monitor the program results when they are obtained.

2) *Submit to the NRC a description of any proposed actions to monitor or confirm that this 5-percent subcriticality margin can be maintained for the lifetime of the storage racks and describe what corrective actions could be taken in the event it cannot be maintained.*

Response

Calvert Cliffs will continue using the coupon surveillance program as the primary monitoring program until other methods, such as RACKLIFE and/or the BADGER (Boron Areal Density Gauge for Evaluating Racks), have been implemented and had their effectiveness evaluated.

Calvert Cliffs will consider using RACKLIFE as the primary means for predicting future rack performance after it has been determined to be an effective method. We understand that initial testing will be performed by Northeast Technology Corporation and EPRI to determine the effectiveness of the BADGER as a monitoring tool of flux trap design spent fuel racks.

If we determine that the 5-percent subcriticality margin cannot be maintained for the lifetime of the storage racks, we could take one or more of the following corrective actions:

- Credit Boron in the Spent Fuel Pool;
- Credit fuel burn-up;
- Intersperse old and new fuel (checkerboarding); and/or
- Install Boron-impregnated material around or in stored fuel assemblies.

3) *Describe the results from any previous post-operational blackness tests, and state whether blackness testing, or other in-situ tests or measurements, will be periodically performed.*

Response

We do not perform and have no plans to perform blackness testing. We use the coupon surveillance program (see the response to item 1 above) to evaluate Boraflex panel performance. If the BADGER proves to be an effective tool for evaluating flux trap design racks, then Calvert Cliffs will consider using it.

4) *Provide chronological trends of pool reactive silica levels, along with the timing of significant events such as refuelings, pool silica cleanups, etc., and describe the implications of how these pool silica levels relate to Boraflex performance.*

Response

The trend of silica concentration for the Spent Fuel Pool water is enclosed. During a refueling outage, the silica concentration lowers, as expected. When the fuel transfer tube is opened, the Spent Fuel Pool water tends to mix with the refueling pool water and lower silica concentration. The overall slope of the silica trend curve has not changed significantly as a result of the refueling. Note that in late 1990 through early 1991, we implemented a silica removal program. On the enclosed graphs, the duration of the silica removal program is indicated by "Begin BARS" and "End BARS." This program was implemented prior to the EPRI Boraflex guidance regarding silica in the Spent Fuel Pool water. The silica concentration in the Spent Fuel Pool water has not returned to the concentration prior to implementing the silica removal program. The slow rise in the silica concentration, in conjunction with the coupon surveillance testing program results, indicate that the Boraflex panels are performing their intended function and will maintain the fuel stored in the Spent Fuel Pool below or at the 5-percent subcriticality margin.

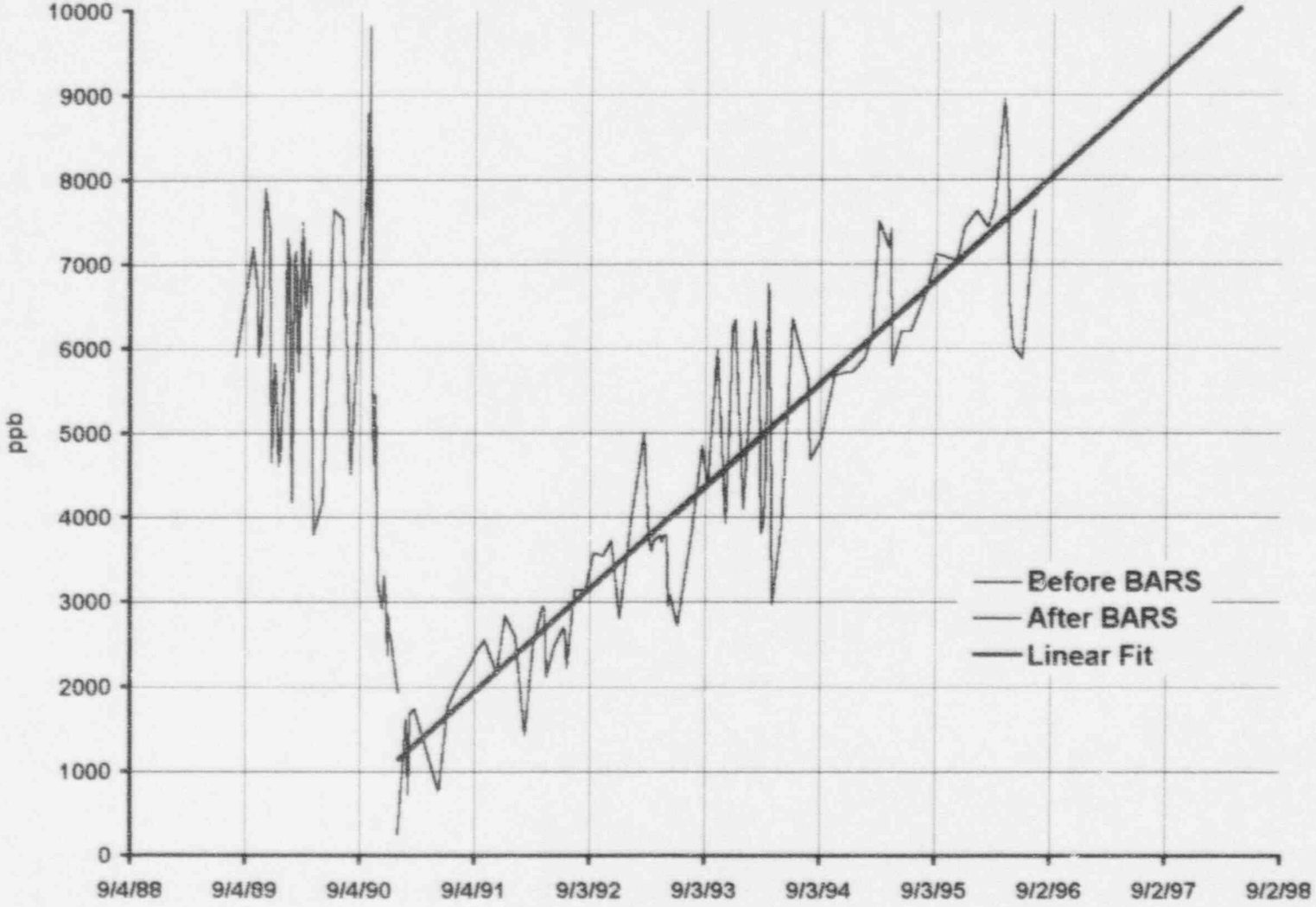
ENCLOSURE TO ATTACHMENT (1)

1989 - 1996 SILICA DATA

Calvert Cliffs Nuclear Power Plant
Units 1 & 2
October 24, 1996

CALVERT CLIFFS -- SFP SILICA

BARS = Boric Acid Removal System (RO)



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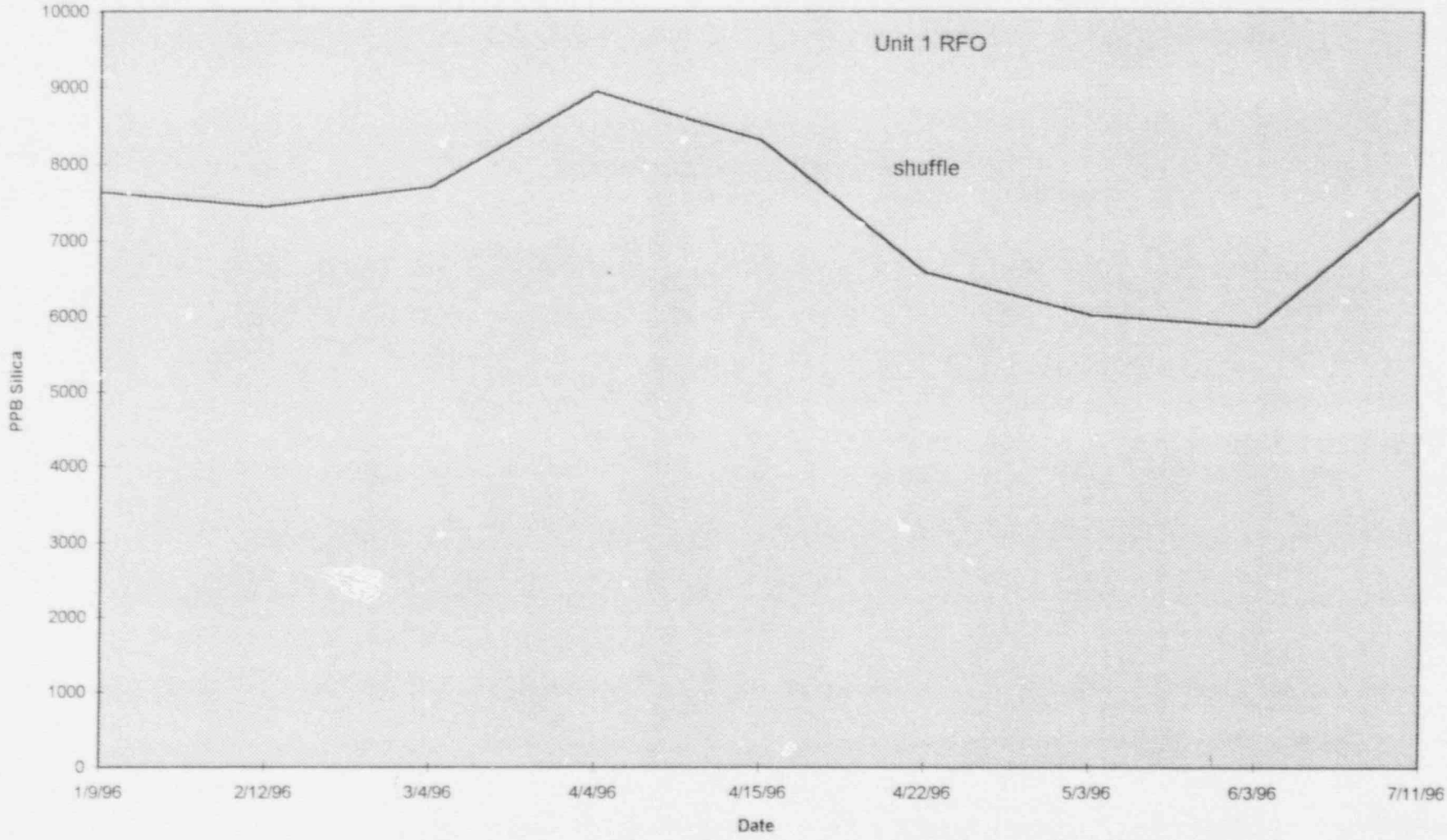

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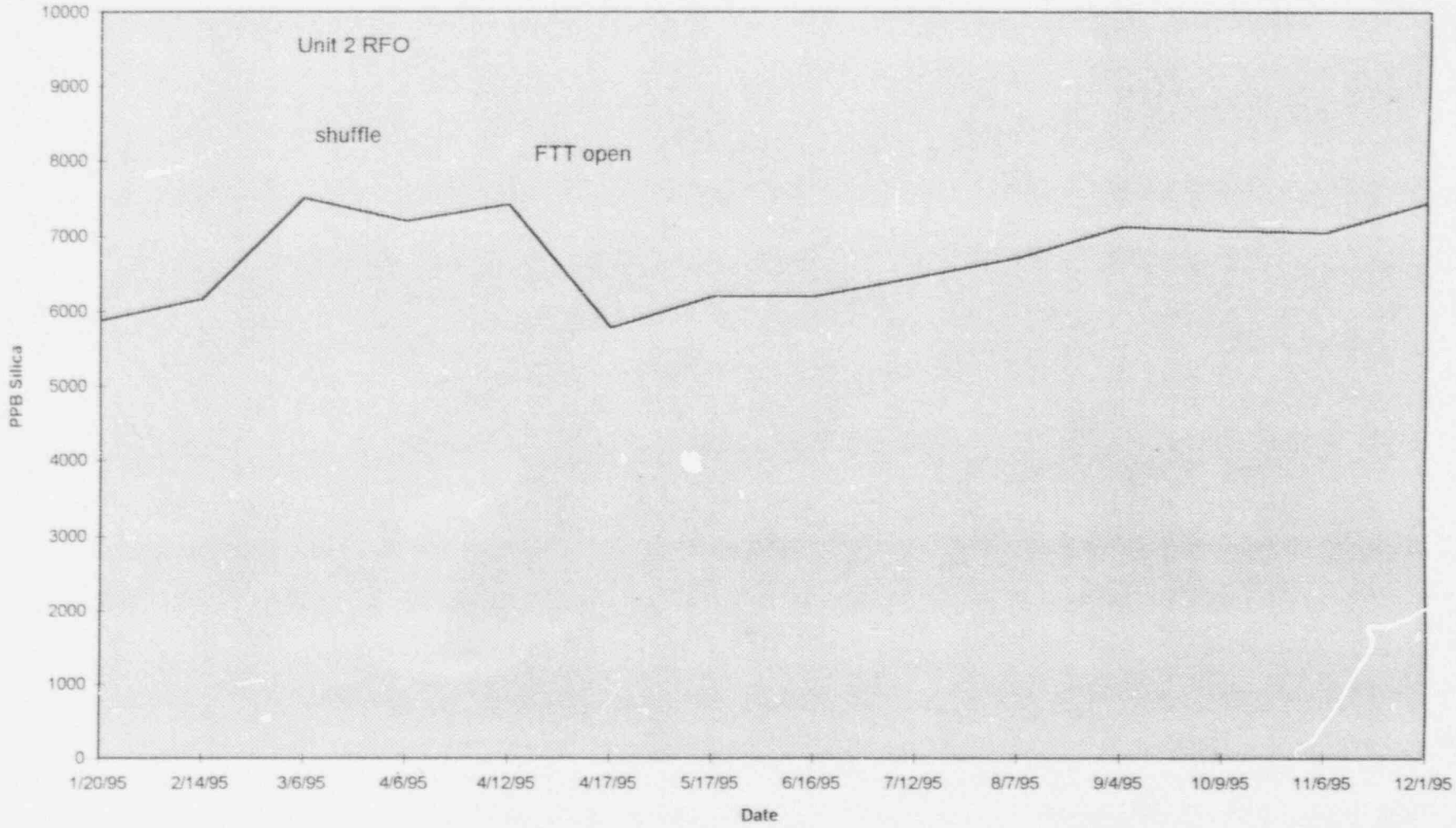

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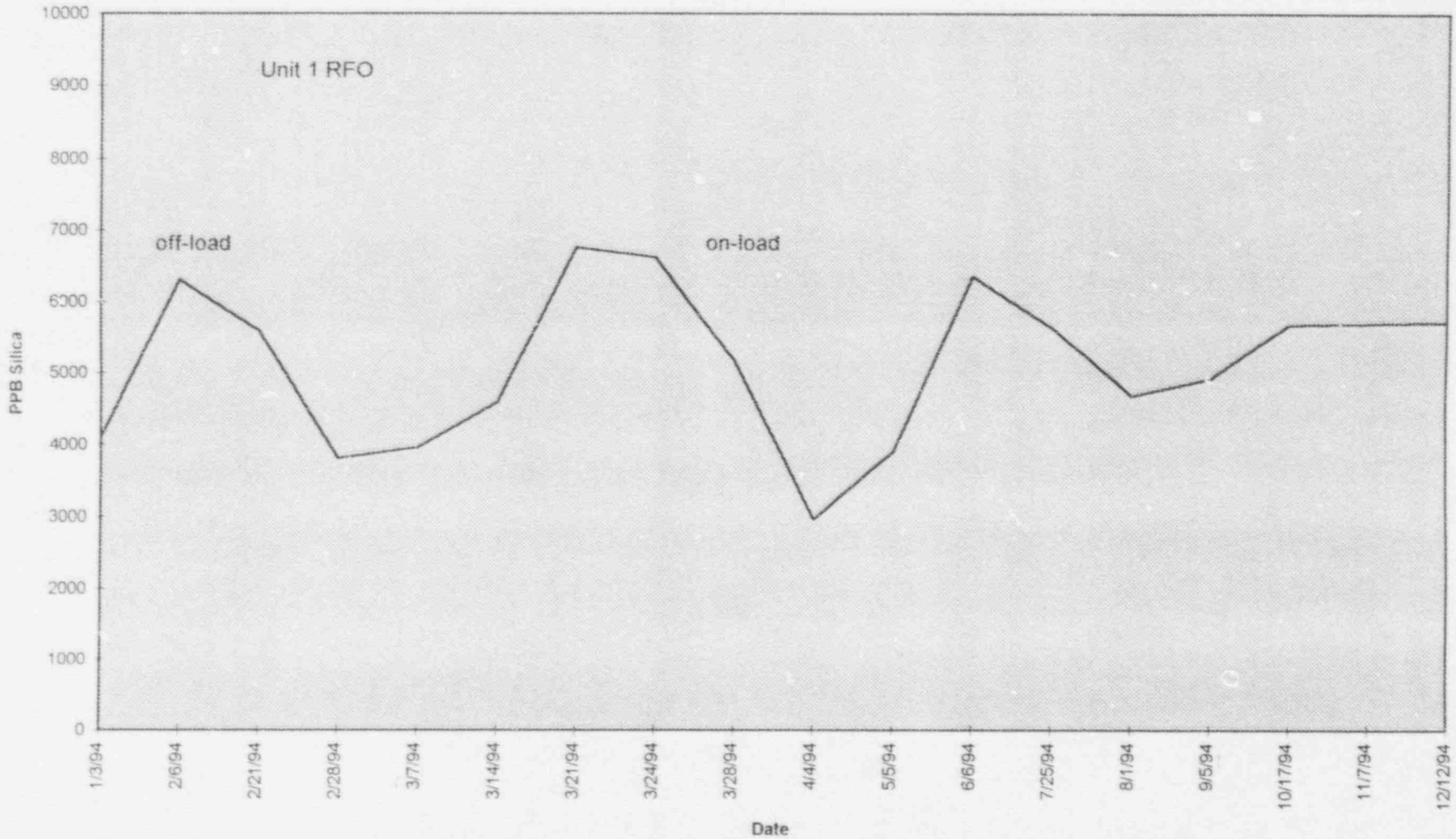

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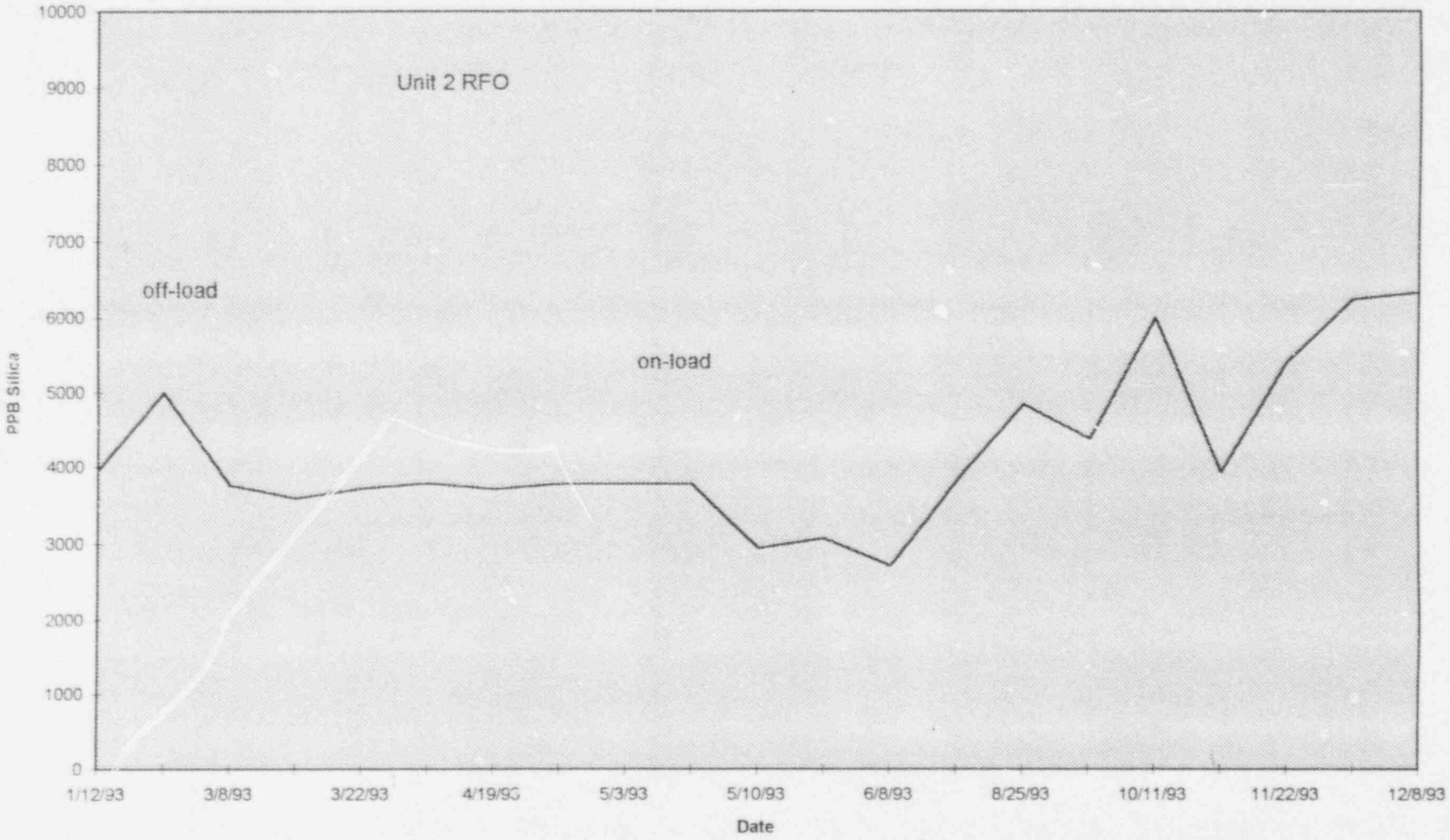

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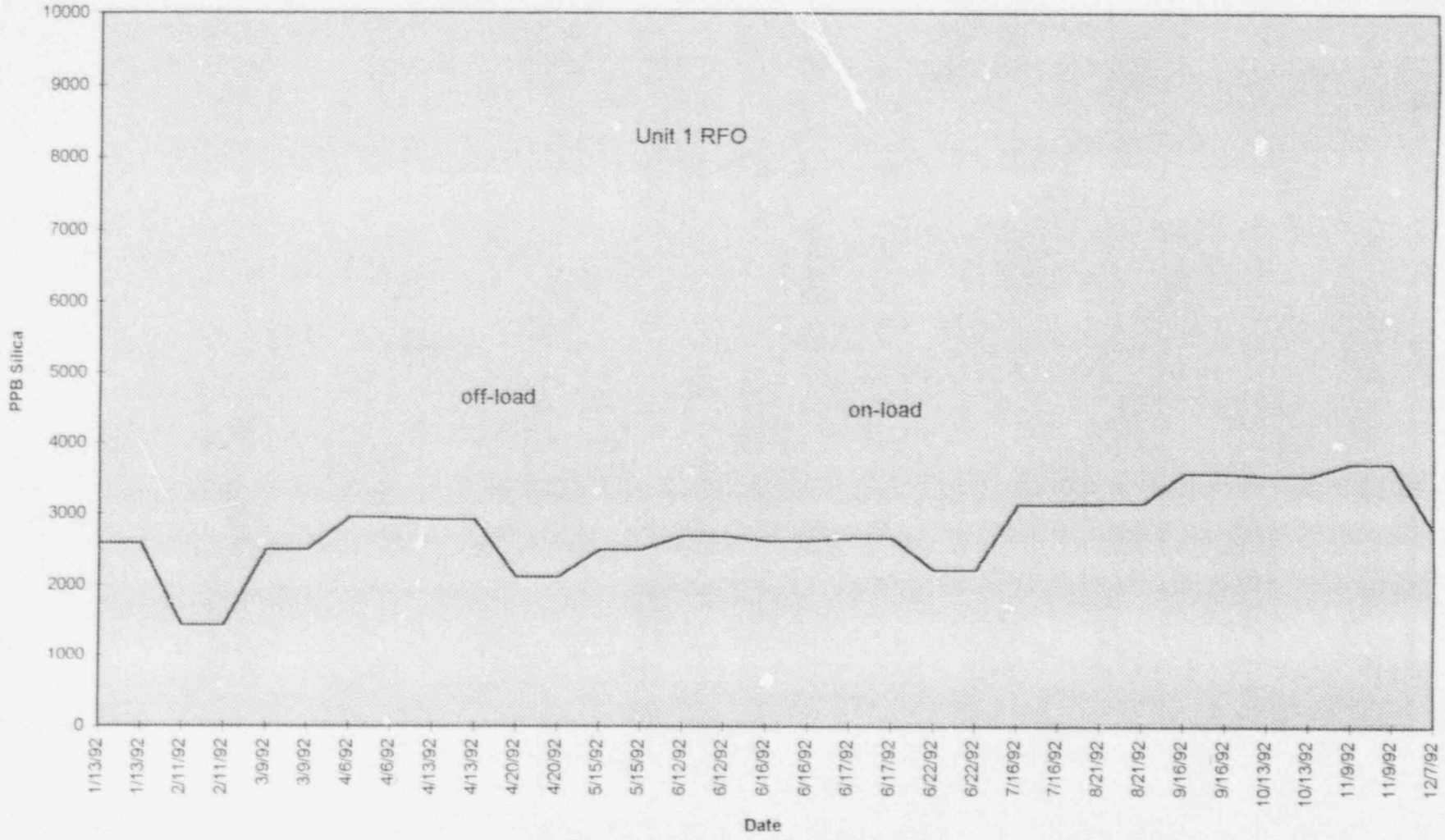

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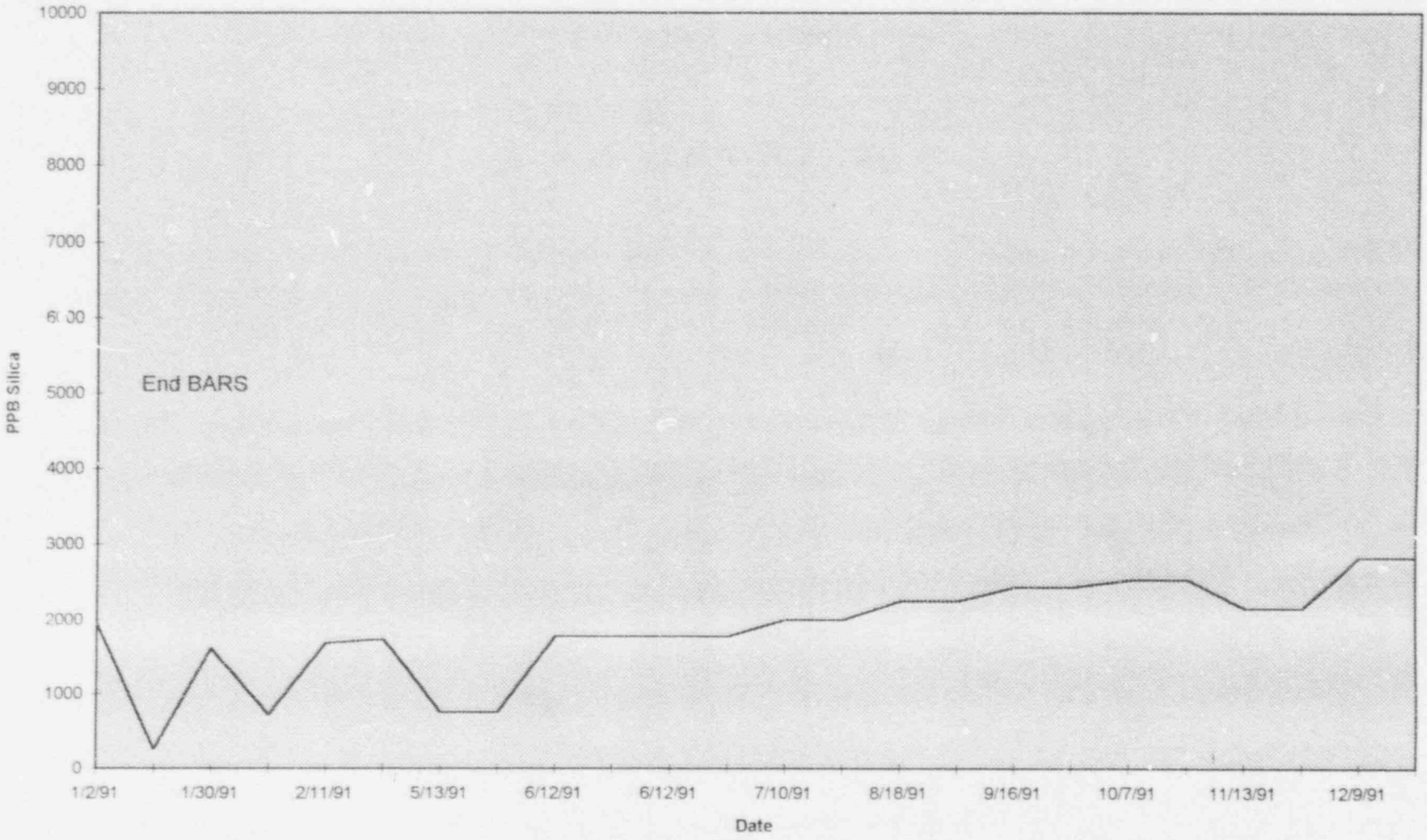

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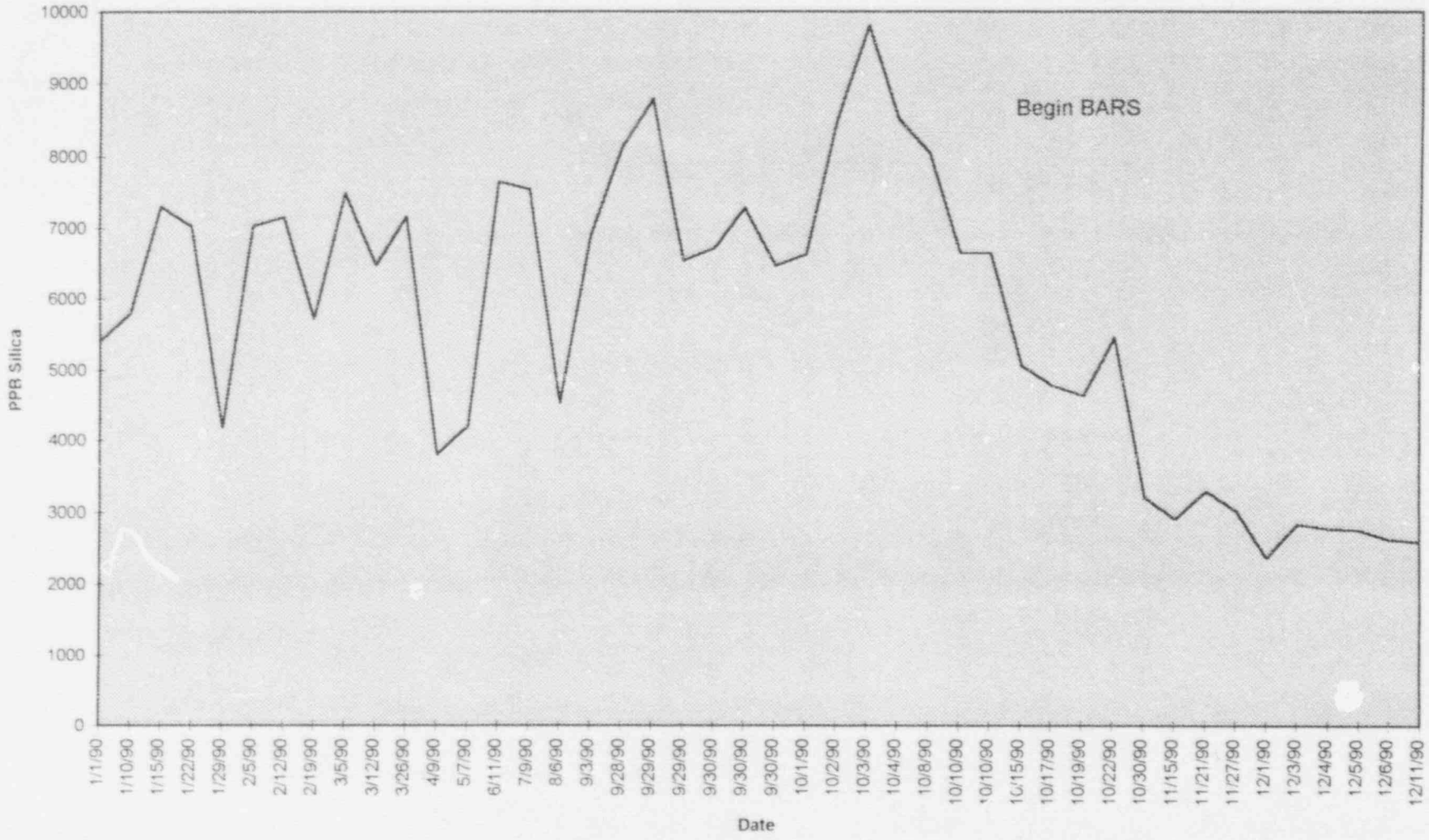

1989 SFP Silica Data