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STATUS OF NUCLEAR PLANT NOISE SIGNATURE LIBRARY

PRESENTED AT THE SURVEILLANCE
AND NOISE DIAGNOSTICS RESEARCH REVIEW
GROUP MEETING IN BETHESDA, MD
SEPTEMBER 22, 1980

8011070115

THE INVESTIGATORS ON THE PROJECT ARE:

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WE ARE ASSEMBLING A BASELINE NOISE SIGNATURE
LIBRARY TO AID IN ASSESSMENT OF ANOMALOUS
BEHAVIOR IN OPERATING PLANTS

FY 1980 OBJECTIVE: TO ASSEMBLE A GENERIC LIBRARY
OF PWR BASELINE NOISE SIGNATURE
DATA

FY 1980 TASK: ACQUIRE BASELINE NOISE DATA
FROM ONE B&W AND AT LEAST ONE
WESTINGHOUSE PLANT

WHY IS BASELINE NOISE DATA NEEDED?

- NRR AND THEIR NOISE ANALYSIS CONSULTANTS HAVE BEEN LIMITED IN PREVIOUS ASSESSMENTS BECAUSE OF A LACK OF BASELINE DATA.
- LOOSE CORE BARREL AT PALISADES
- VIBRATING INSTRUMENT TUBES IN BWRs
- FLUX AND TEMPERATURE FLUCTUATIONS IN FORT ST. VRAIN
- POST-ACCIDENT CONDITIONS AT TMI-2

WE HAVE OBTAINED
BASELINE DATA FROM SIX PWR PLANTS

- CALVERT CLIFFS - 1 (CE)
- CALVERT CLIFFS - 2 (CE)
- ANO - 2 (CE)
- * ● ST. LUCIE (CE)
- ANO - 1 (B&W)
- * ● H. B. ROBINSON - 2 (W)

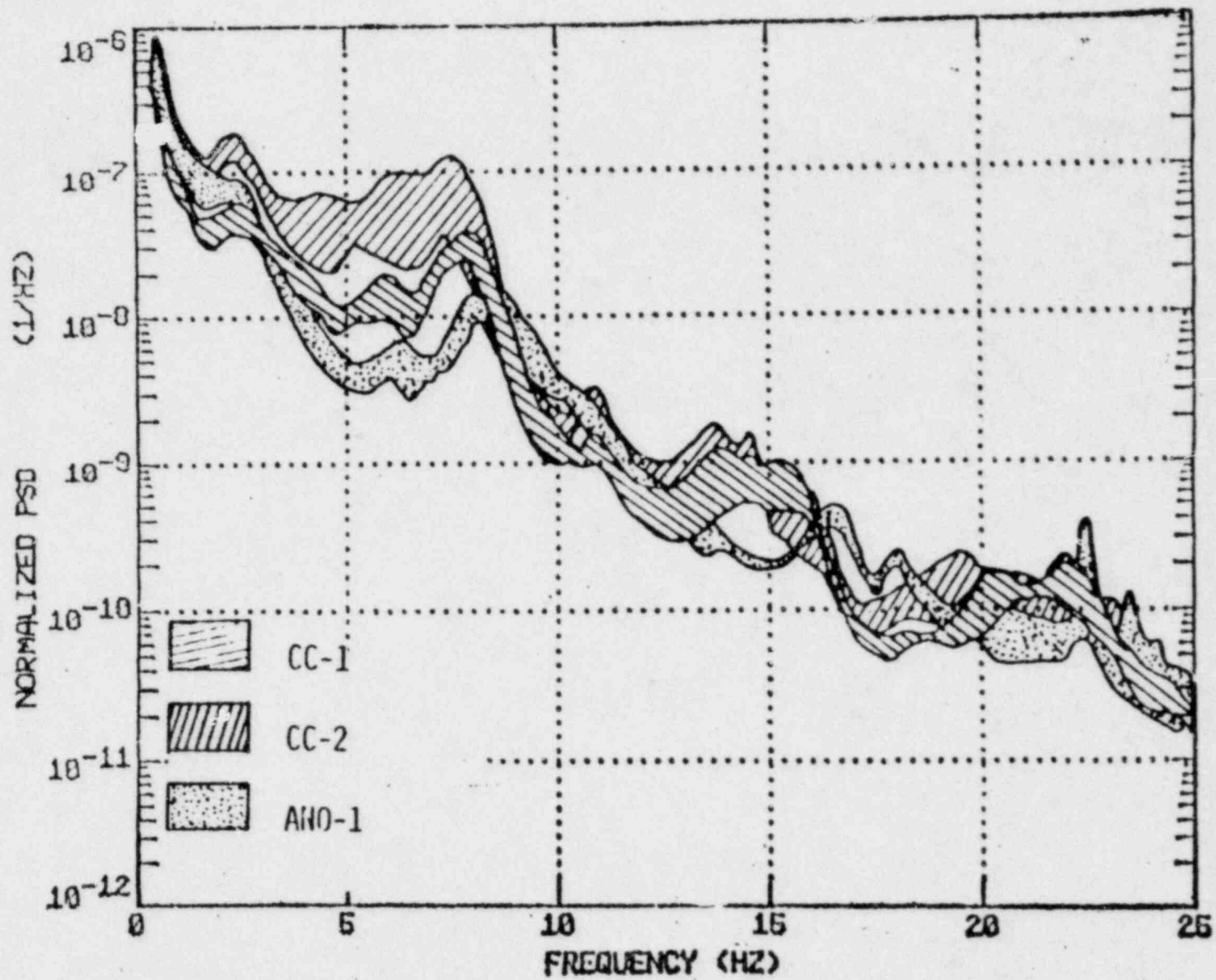
*DATA RECORDED BY OTHERS

WE PLAN TO OBTAIN
BASELINE DATA FROM TWO ADDITIONAL PLANTS

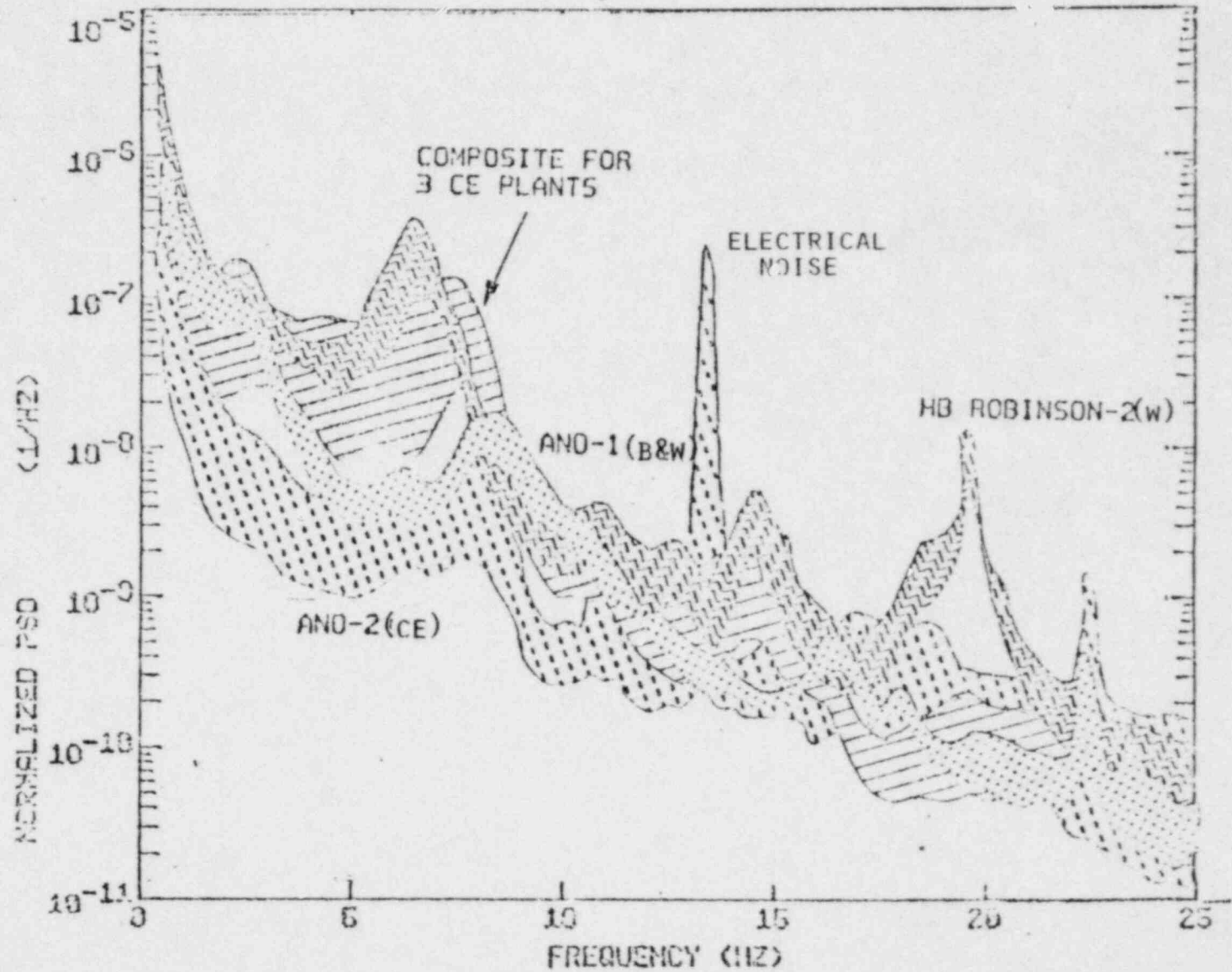
- * ● TROJAN
- SEQUOYAH - 1

*DATA TO BE RECORDED BY OTHERS

RESULTS SHOW PSD VARIATION IN THE RANGE 3-8 HZ

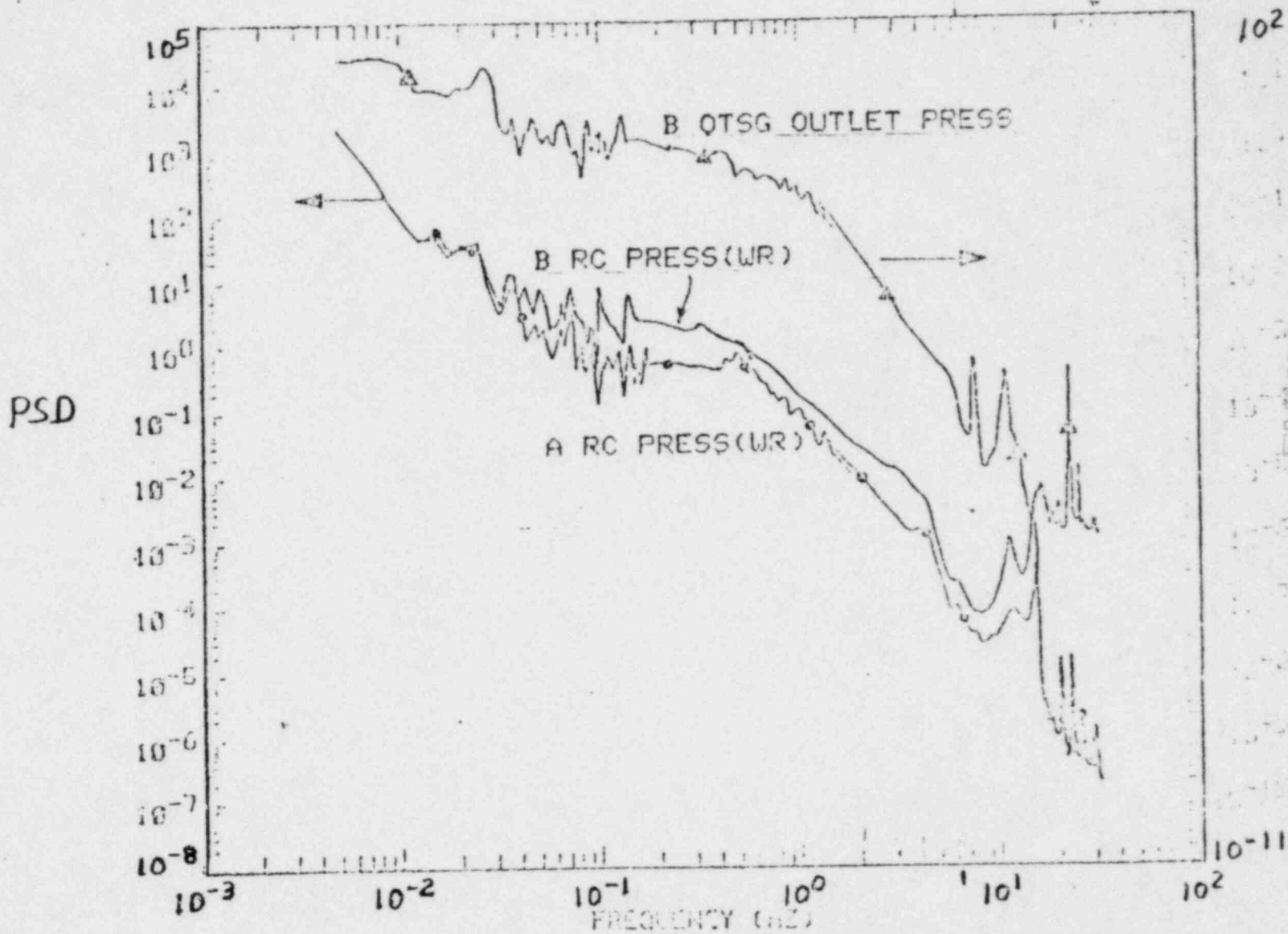


SIGNATURES FROM SIX PLANTS FALL IN A RATHER BROAD BAND

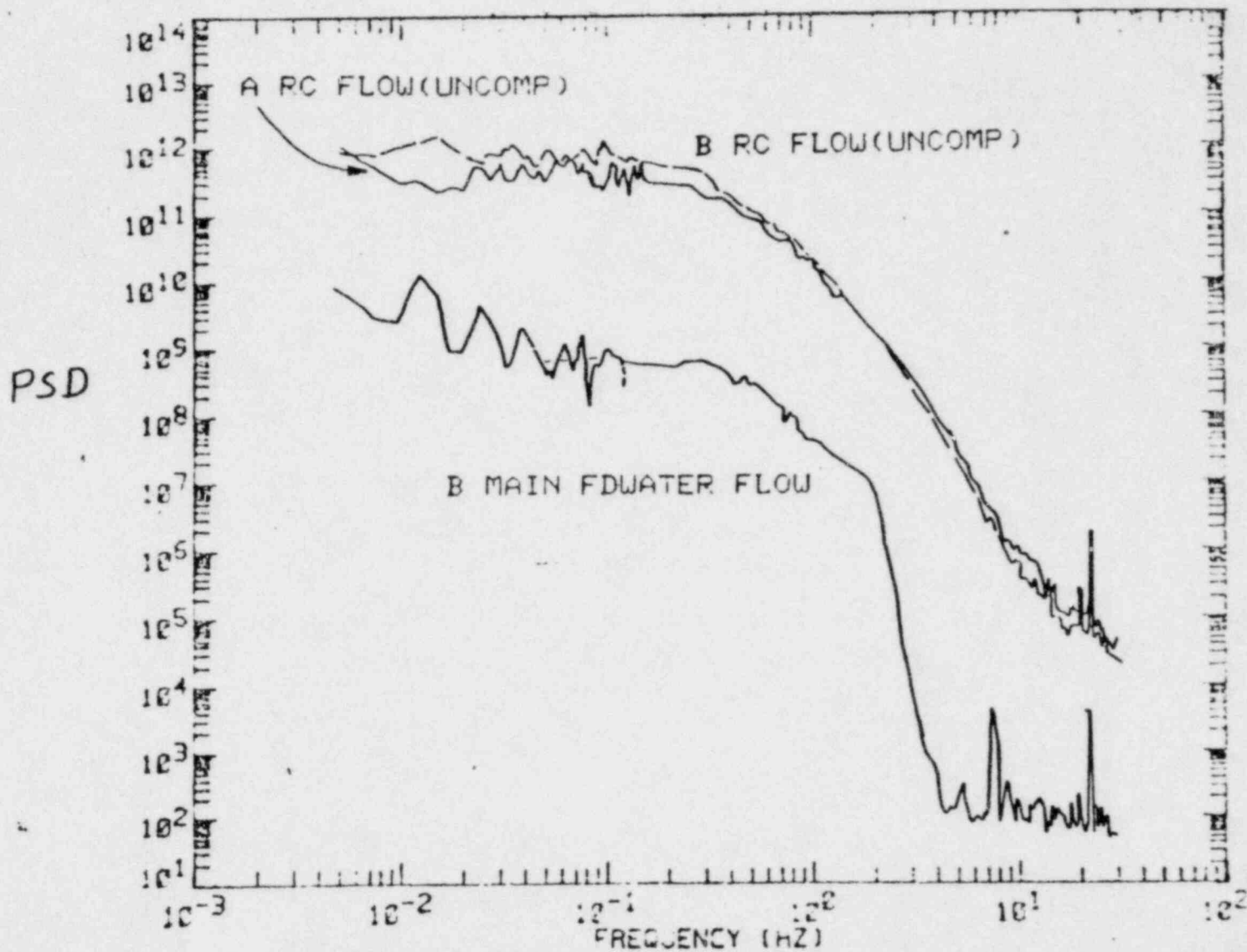


POOR ORIGINAL

PRESSURE SIGNAL MAY CONTAIN DIAGNOSTIC INFORMATION



FLOW NOISE HAS A BANDWIDTH OF ~ 1 HZ

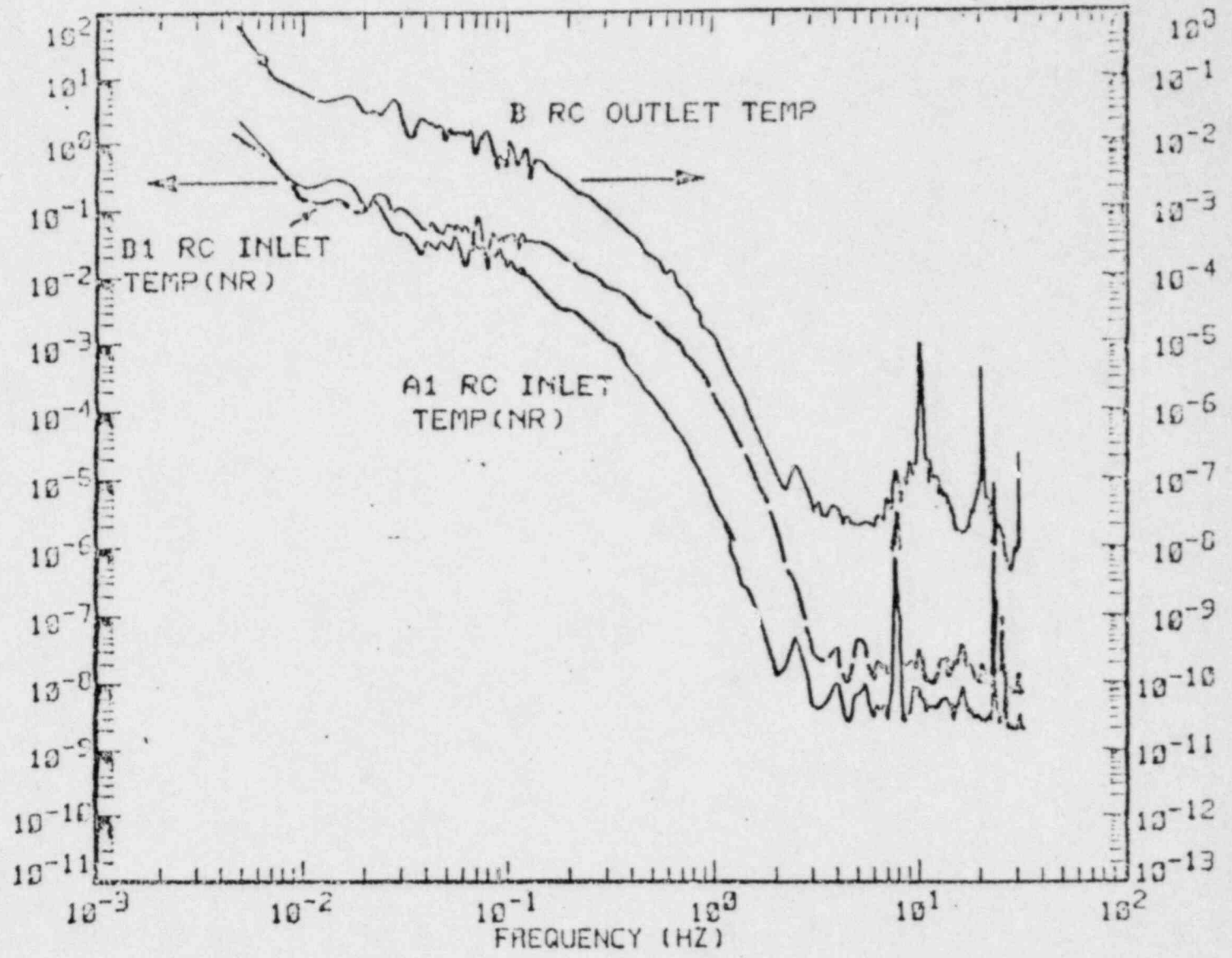


POOR ORIGINAL

POOR ORIGINAL

TEMPERATURE NOISE HAS A BANDWIDTH OF ≈ 0.1 HZ

PSD



WE OBSERVE THAT

- ANO-2 HAS LOWER AMPLITUDE NOISE THAN OTHER CE PLANTS - PROBABLY DUE TO ITS UNIQUE DESIGN
- MOST VARIATION IN SIGNATURES IS IN FREQUENCY RANGE 3 TO 8 HZ - MOST LIKELY DUE TO FUEL ASSEMBLY OR CORE BARREL VIBRATIONS
- THERE MAY BE USEFUL INFORMATION AT FREQUENCIES LESS THAN 1 HZ IN NEUTRON NOISE
- PRELIMINARY ANALYSIS OF PROCESS SIGNAL NOISE FROM ANO-1 INDICATES IT MAY CONTAIN USEFUL INFORMATION AT FREQUENCIES LESS THAN 1 HZ