



Commonwealth Edison

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January 15, 1988

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Zion Nuclear Power Station Units 1 and 2
Amendment Nos. 98 and 88 to
DPR-39 and DPR-48
NRC Docket Nos. 50-295 and 50-304

References (a): November 18, 1986 letter from J.A. Norris
to D.L. Farrar

(b): September 24, 1986 letter from P.C. LeBlond
to H.R. Denton

Gentlemen:

Reference (a) issued Zion license Amendment Nos. 98 and 88 to Facility Operating Licenses Nos. DPR-39 and DPR-48. That amendment allowed the installation of sleeves in Zion's Steam generators to repair degraded tubes. Reference (b) supplied the NRC Staff with information in support of that amendment. Reference (b) committed to provide the NRC staff with information regarding the detectability threshold in the sleeve/tube combination. This submittal is providing the results of that additional work.

A summary of the investigative work is enclosed with this letter. If any further questions arise regarding this matter, please direct them to this office.

Very truly yours,

Peter LeBlond
P. C. LeBlond

Nuclear Licensing Administrator

cc: Resident Inspector - Zion
A. B. Davis
J. A. Norris

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ENCLOSURE

RESULTS OF DETECTABILITY THRESHOLD INVESTIGATION

Investigative work on the detection of defects in sleeved tubes has been completed and advanced development work is continuing. The first part of the investigations was to inspect and evaluate sleeve samples.

These inspections show defects that can be seen and evaluated in both the sleeve and the parent tube behind the sleeve using either a Bobbin Coil or a Motorized Rotating Pancake Coil (MRPC). Good correlation was seen by both Bobbin Coil and MRPC evaluations.

Simulated defects were made in samples in the expansion region including the weld. These were tested using the MRPC and showed good correlation with the actual defect. MRPC results showed that a 40% defect in the ID of the sleeve, a 40% defect in the OD of the original tube, a 20% indication in the ID of the sleeve and OD axial notches in the weld could all be seen and evaluated. An additional sample with a 20% indication at the weld in the tube O.D. was tested and evaluated, but the 20% indication could not be discerned. All evaluations of these samples were well within the normal range of eddy current evaluations. Copies of the evaluations (RPC scans and lissajous) and sketches of the samples are attached.

These examinations demonstrate the required detectability for I.D. indications as stated in Zion Technical Specification 4.3.1.B.4.A.6.a. Based on the Combustion Engineering Sleeve Licensing Report which shows that defects can be detected in all areas of the sleeve and tube and the testing described in this report which shows that defects in the weld area can be detected and sized in the I.D., defects in all areas of the tube and sleeve have been shown to be detectable except for indications less than 40% in the O.D. of the tube in the weld area.

Additional work is planned to investigate other types of probes to enhance detection. This work is part of Zion's normal practices to improve eddy current test capabilities and methods. Commonwealth Edison Company is also involved in other studies to enhance defect detection and evaluation techniques and methods with other organizations such as the Electric Power Research Institute.

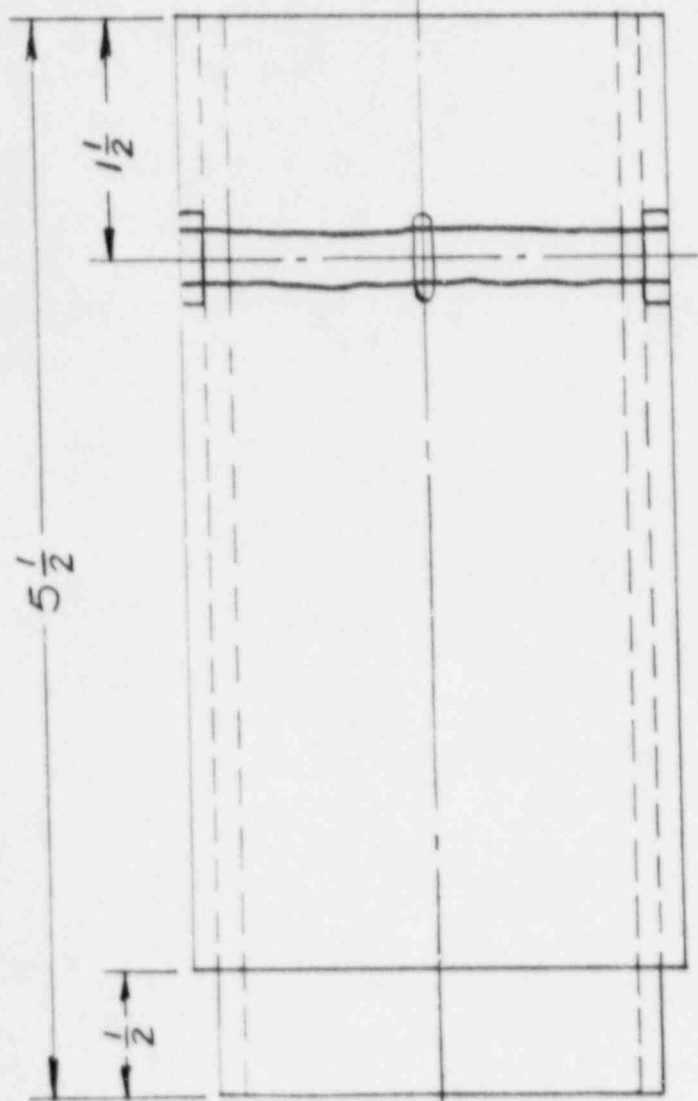
ROTOPROBE
& BOBBIN COIL

AXIAL NOTCH IN EXPANSION WITH WELD

ZION TUBE SAMPLE NUMBER 4

ATTACHMENT 1

Page	1-1	Sketch of Sample
	1-2	RPC Scan of Sample
		RPC Scan of Sample
	1-3	Lissajous of Sample



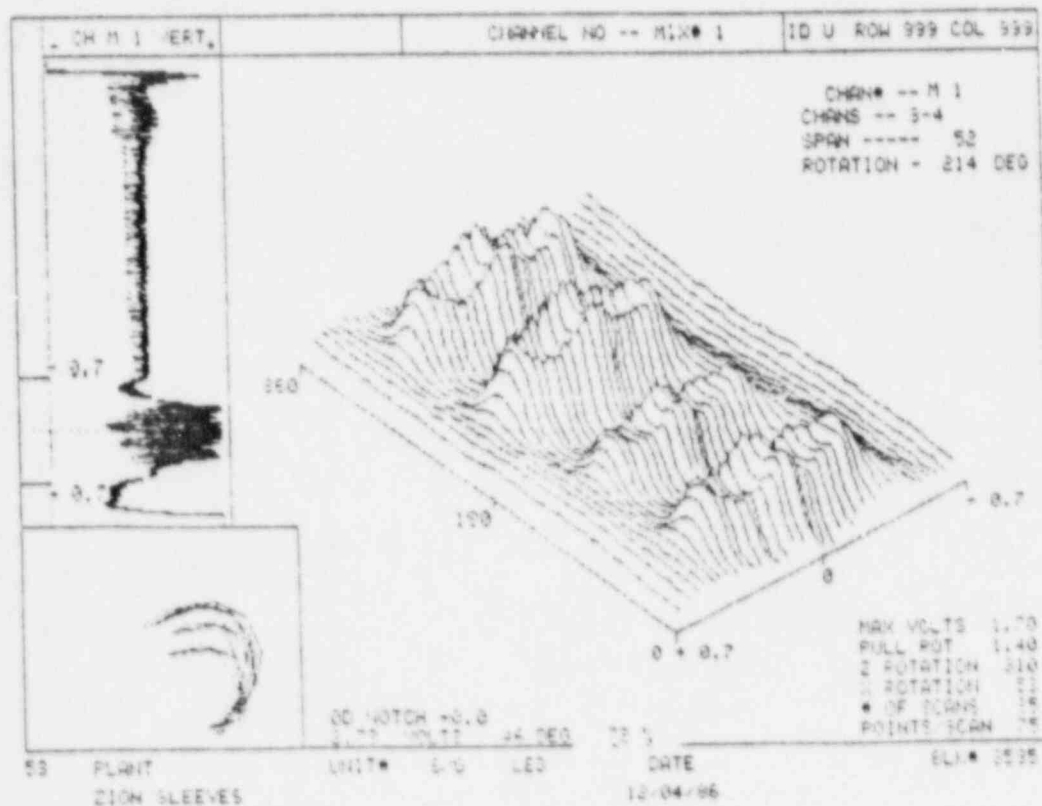
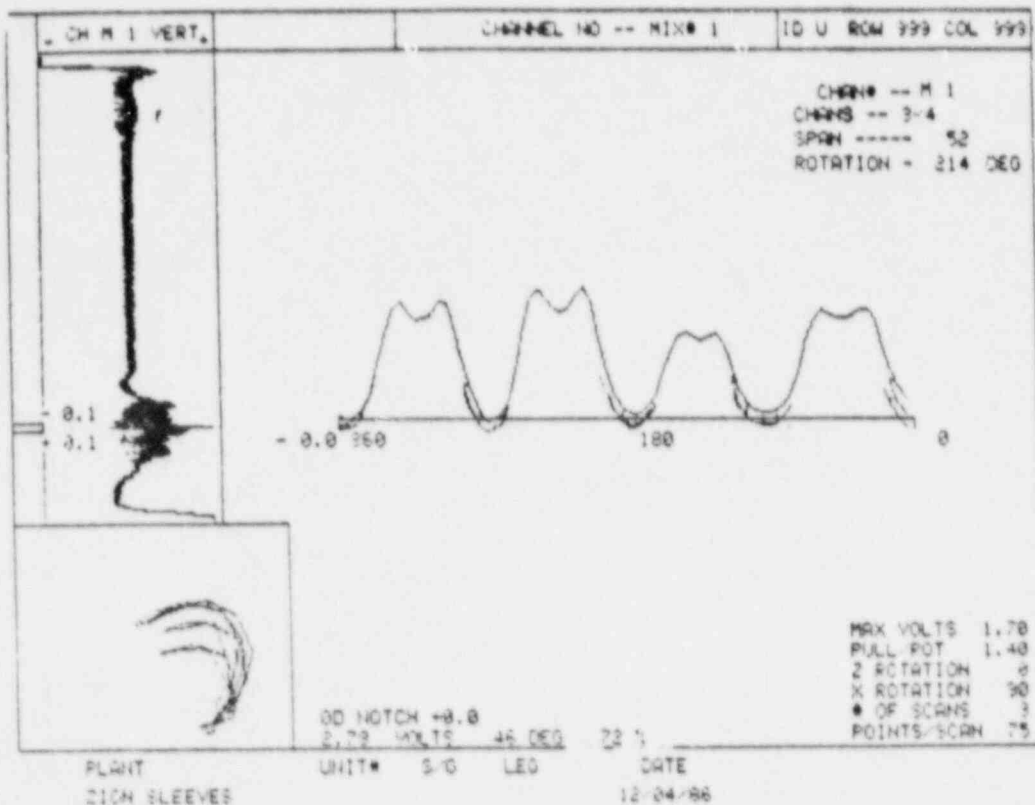
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STEAM GENERATOR TUBE/SLEEVE
Calibration Milled Notches

UT SAMPLE #4
AXIAL NOTCH IN EXPANSION
WITH WELD

1. (4) Milled notches
2. Width: .030", .050", .070", .090"
3. Length: completely across weld
4. Depth: .050" (through outer tube)
5. Spacing: 90 degree intervals

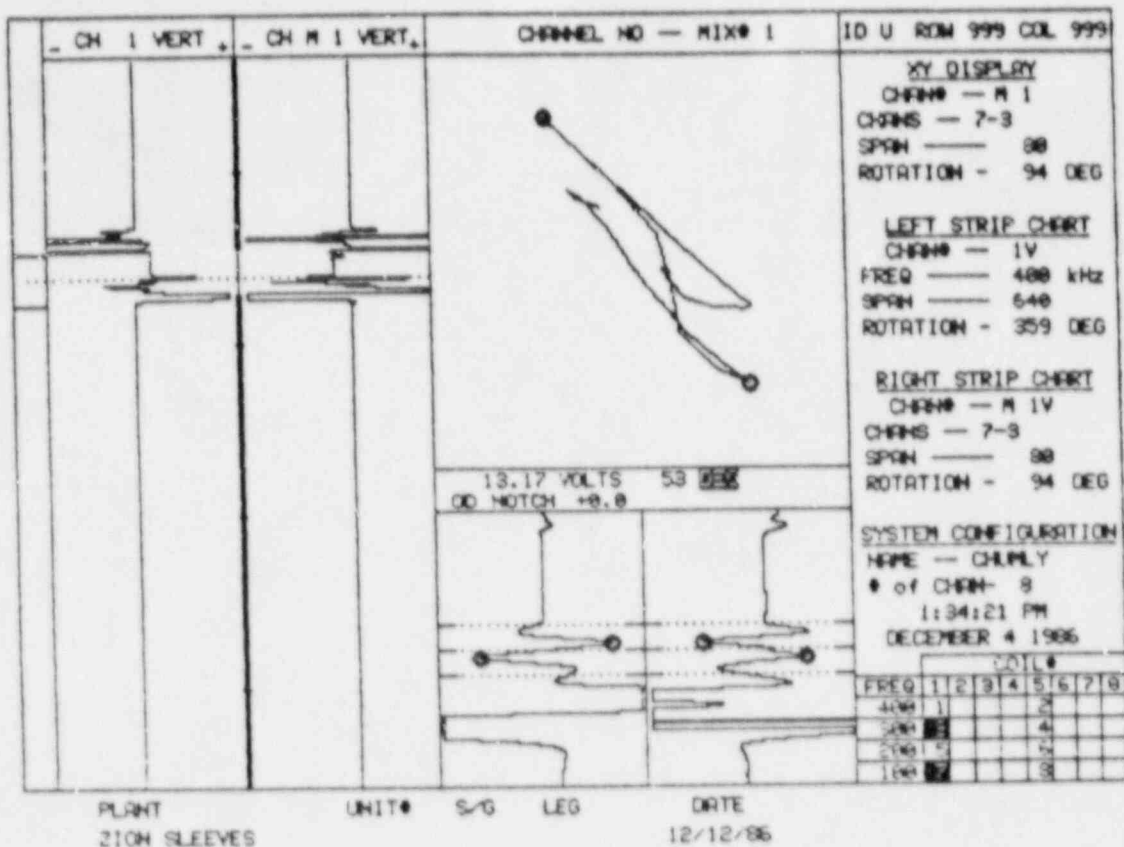
CONAM INSPECTION



ROTOPROBE

A UNIT OF QUALICORP

CONAM INSPECTION



BOBBIN COIL

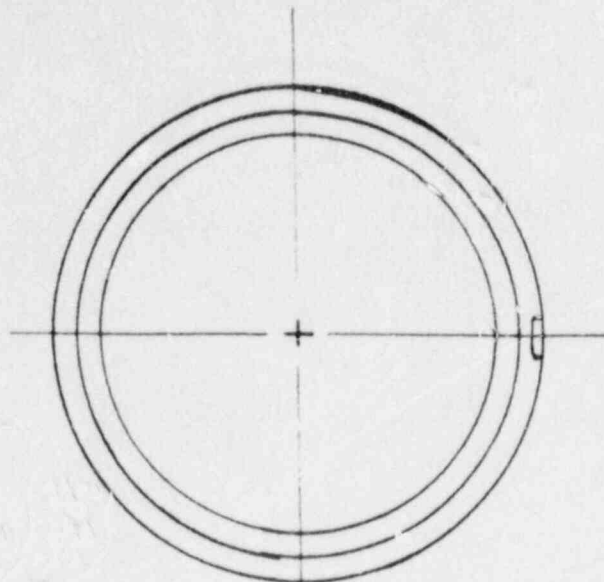
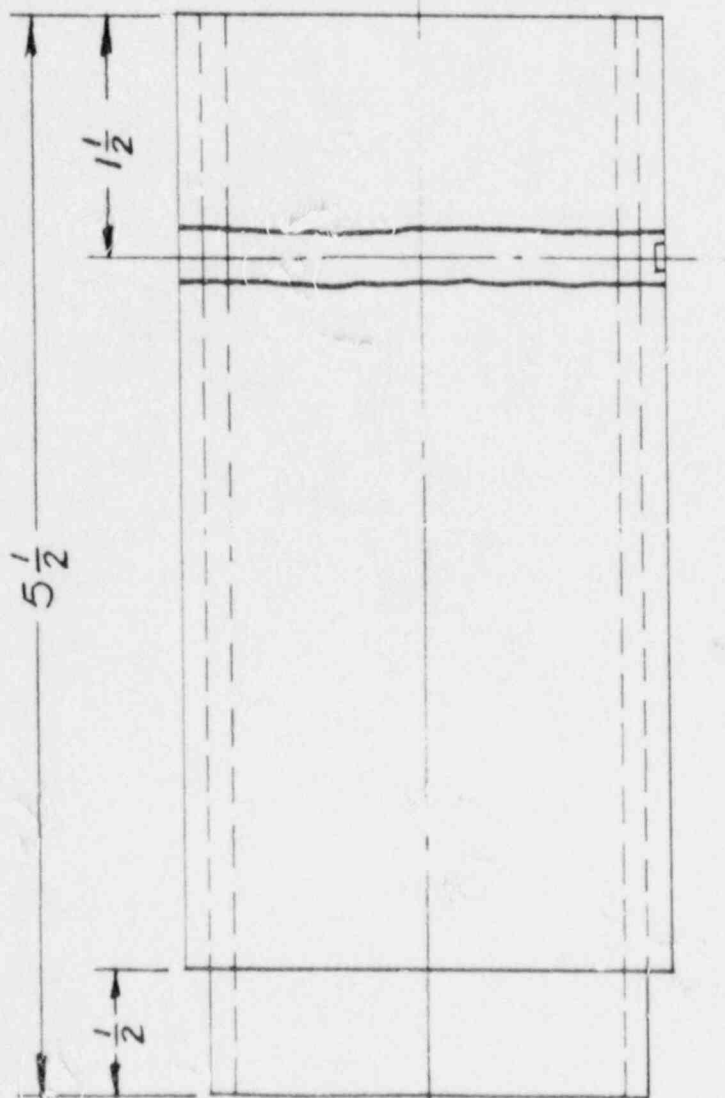
ROTOPROBE
& BOBBIN COIL

40% O.D. IN ORIGINAL TUBE

ZION TUBE SAMPLE NUMBER 4

ATTACHMENT 2

Page	2-1	Sketch of Sample
	2-2	RPC Scan of Sample
		RPC Scan of Sample
	2-3	Lissajous of Sample

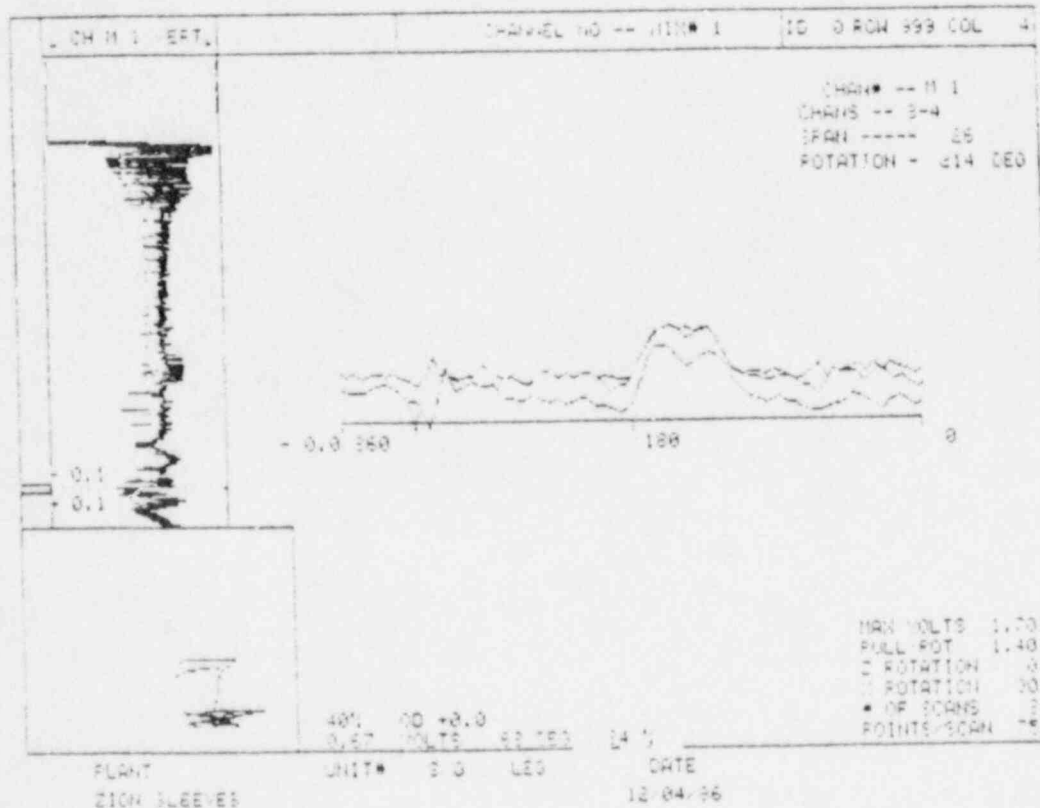
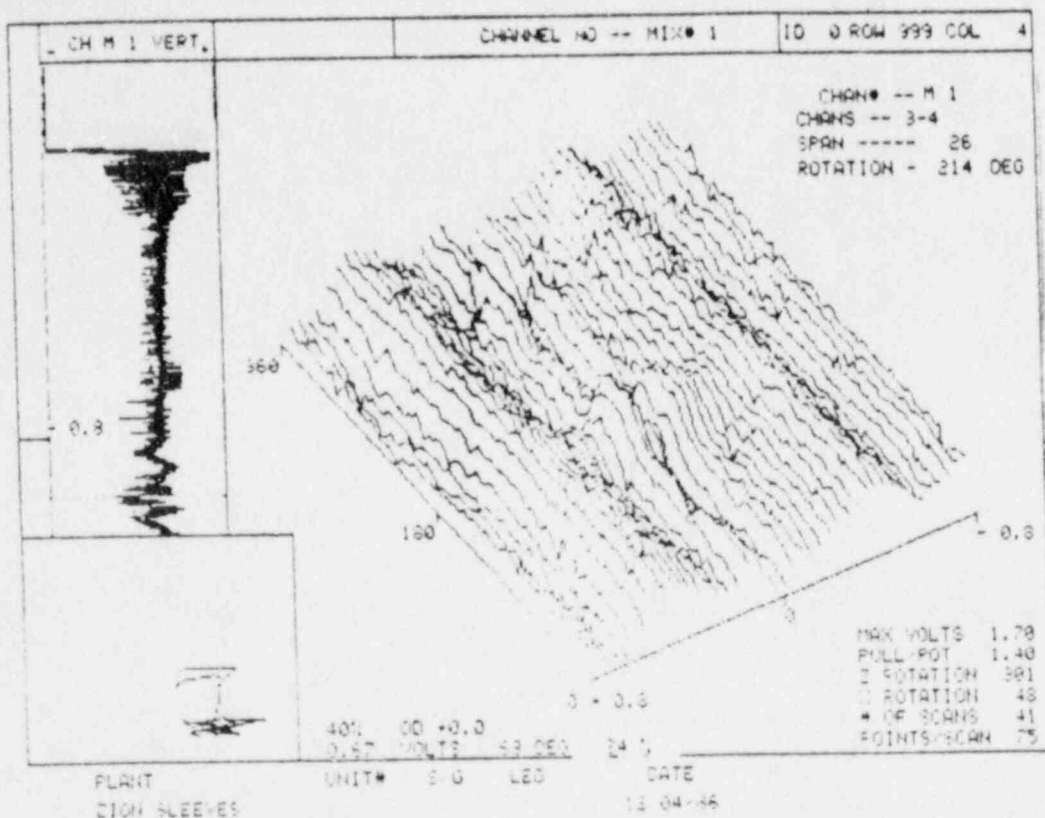


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TEST SAMPLE #4

40% THROUGH-WALL HOLE
IN PARENT TUBE OUTSIDE DIA

CONAM INSPECTION

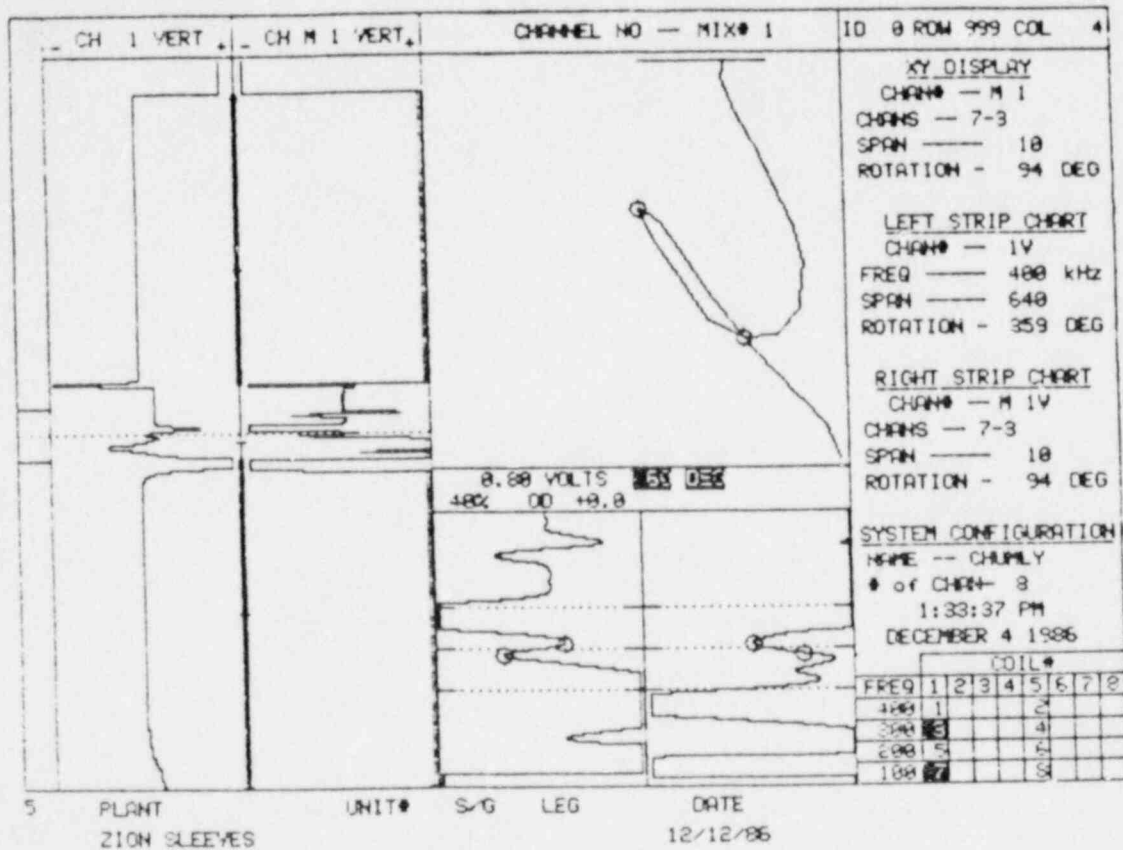


IN EXPANSION WITH WELD

ROTOPROBE

A UNIT OF QUALICORP

CONAM INSPECTION



IN EXPANSION WITH WELD

BOBBIN COIL

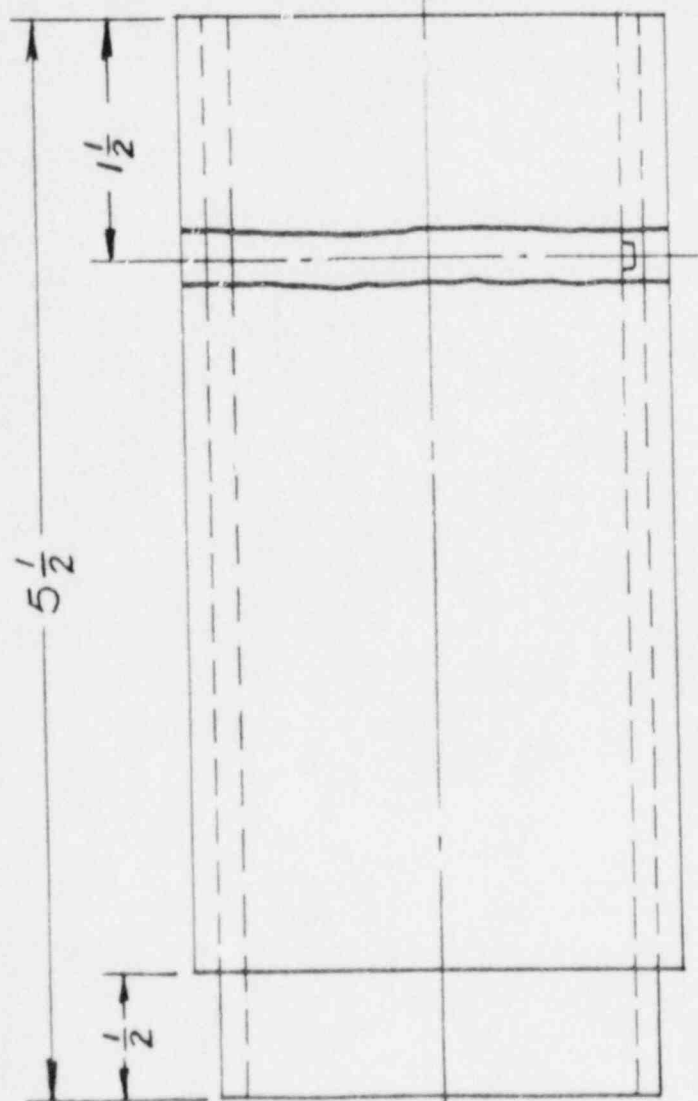
ROTOPROBE
& BOBBIN COIL

40% I.D. FLAW IN SLEEVE

ZION TUBE SAMPLE NUMBER 2

ATTACHMENT 3

Page	3-1	Sketch of Sample
	3-2	RPC Scan of Sample
	3-3	Lissajous of Sample

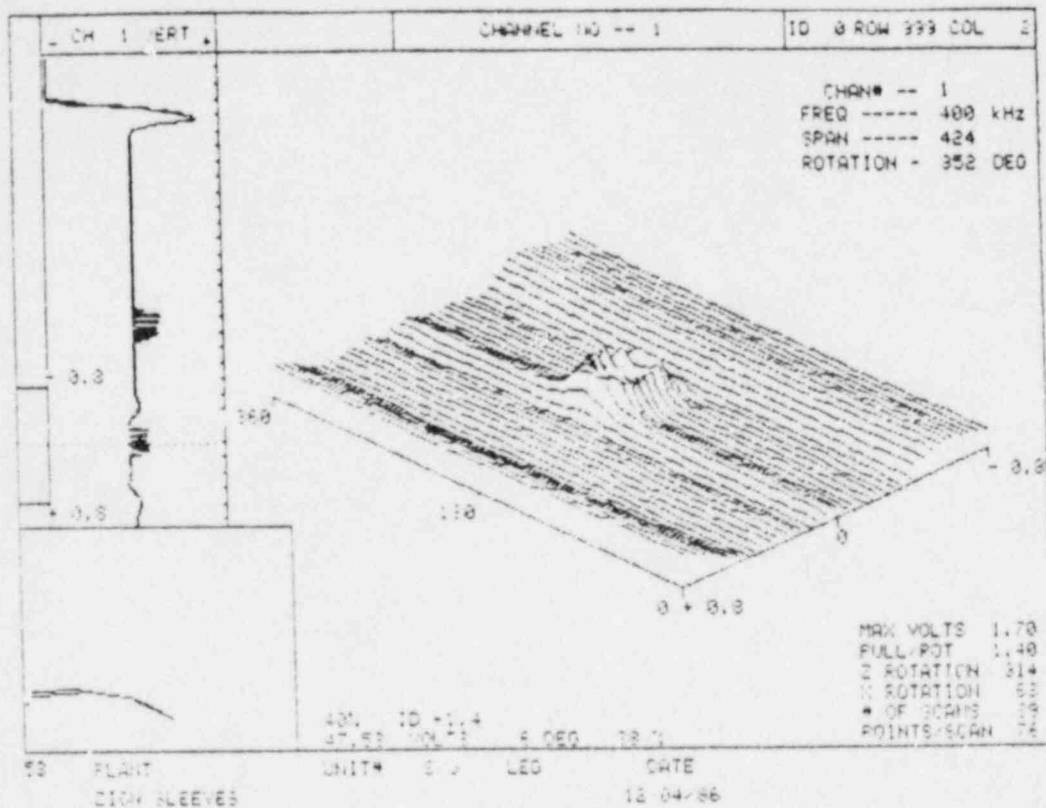


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TEST SAMPLE #2

40% FLAW IN SLEEVE
INNER DIAMETER

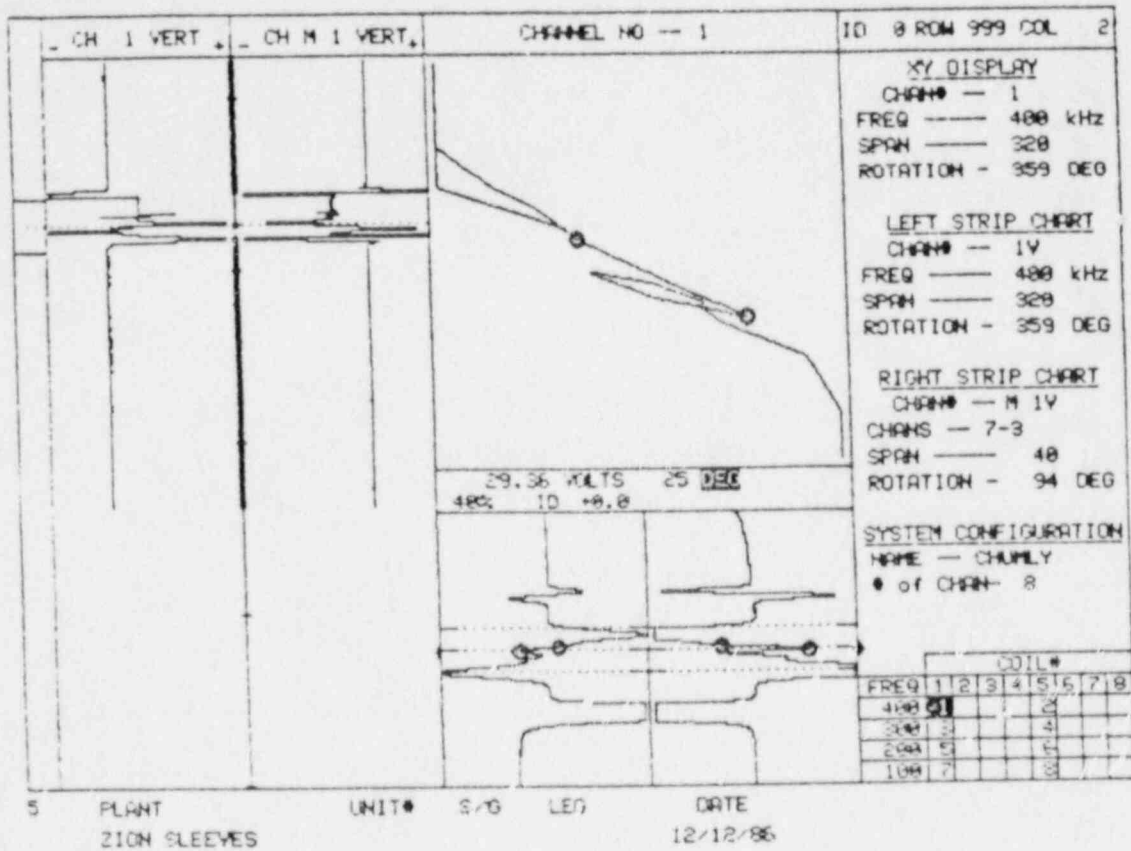
CONAM INSPECTION



IN EXPANSION WITH WELD

ROTOPROBE

CONAM INSPECTION



IN EXPANSION WITH WELD
 ROTOPROBE

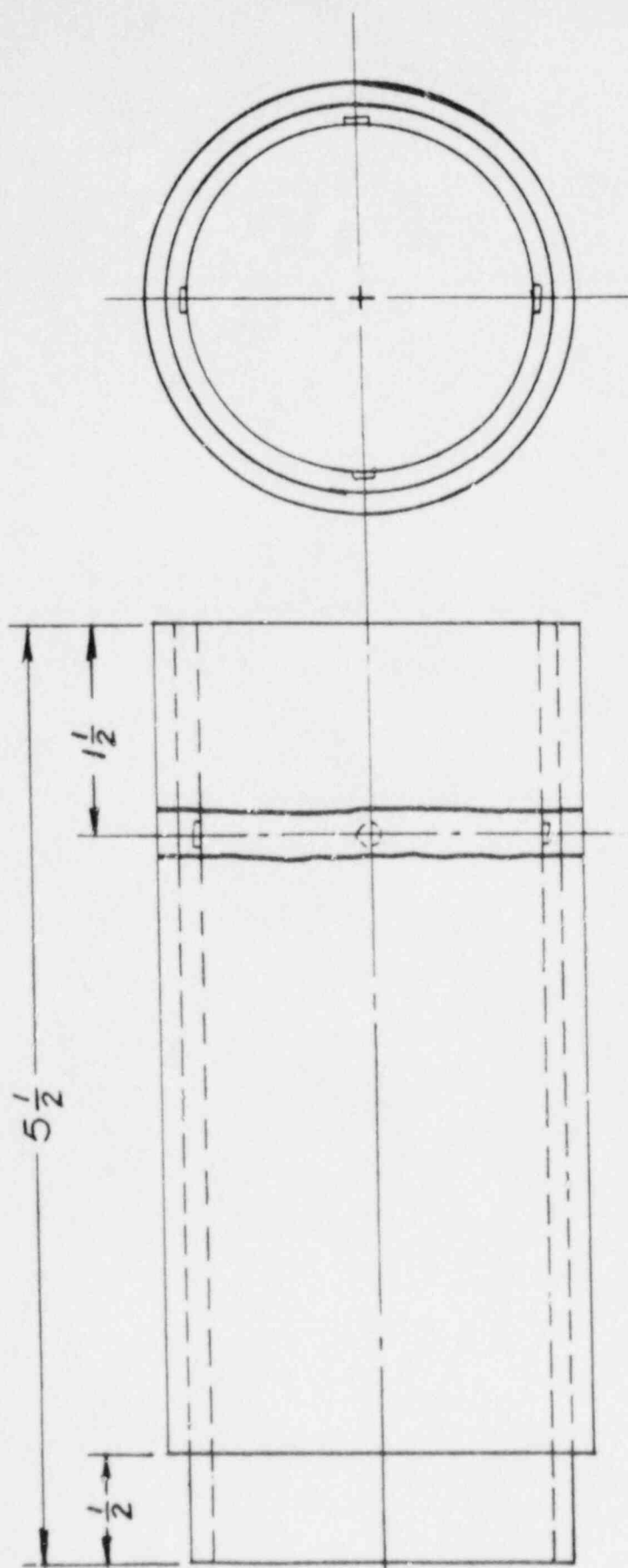
ROTOPROBE
& BOBBIN COIL

20% I.D. IN SLEEVE

ZION TUBE SAMPLE NUMBER 3

ATTACHMENT 4

Page	4-1	Sketch of Sample
	4-2	RPC Scan of Sample
		RPC Scan of Sample
	4-3	Lissajous of Sample

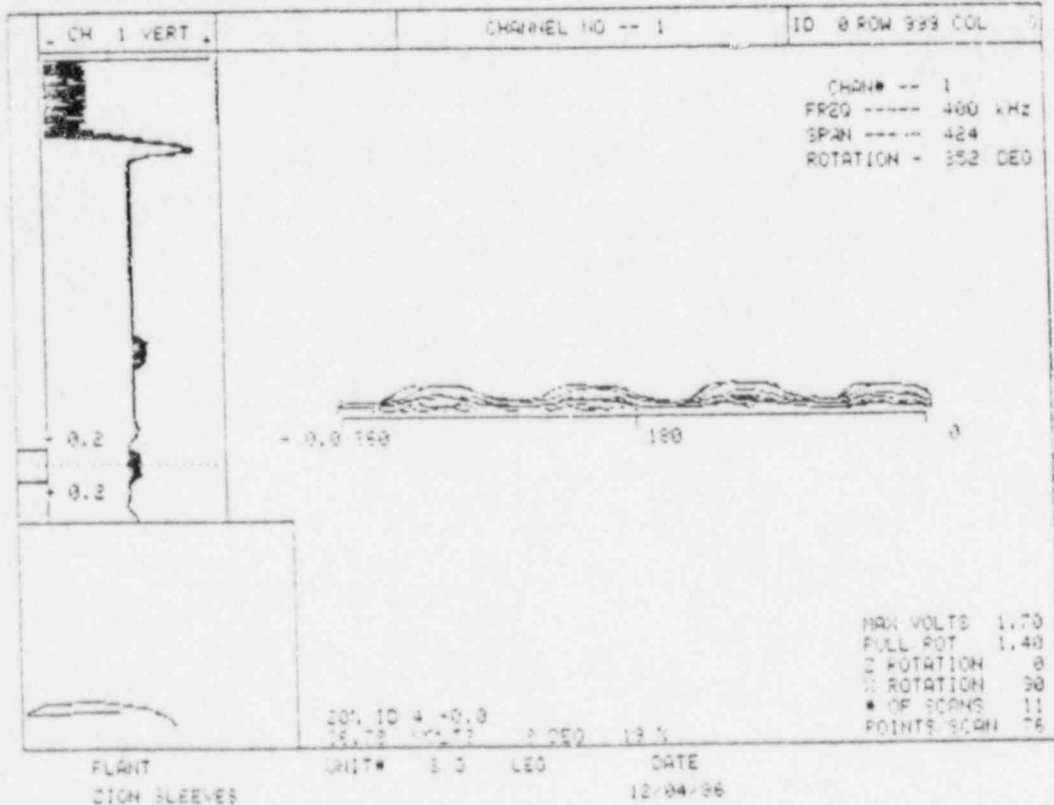
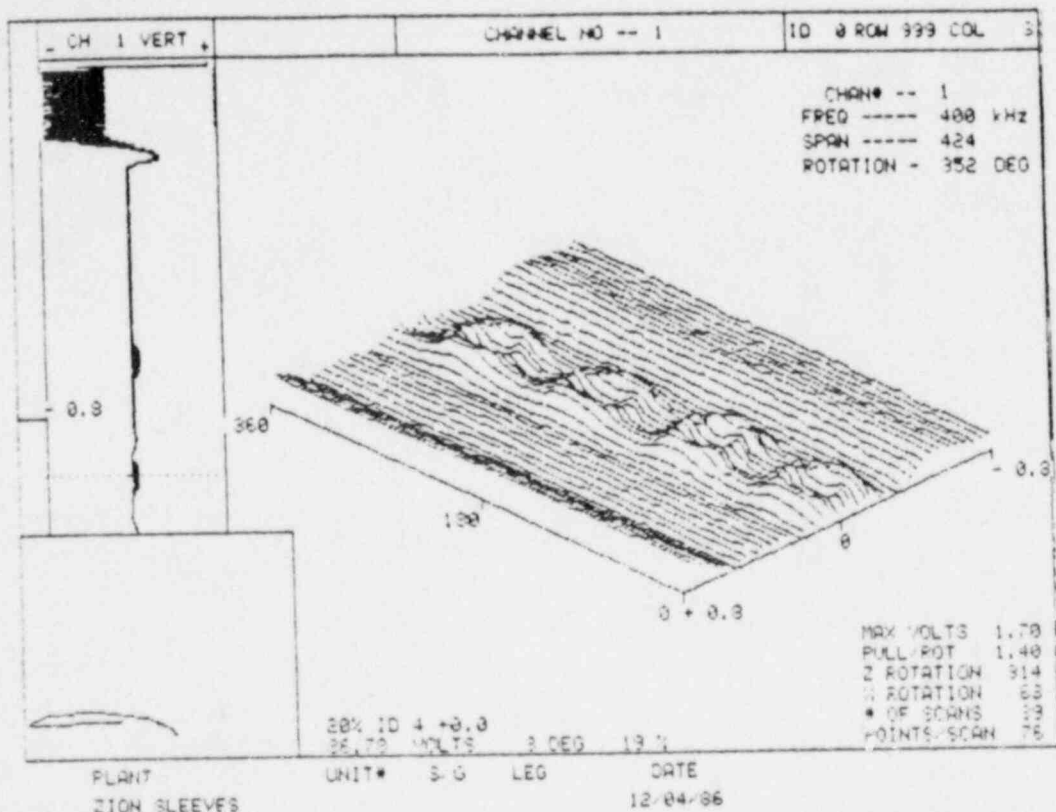


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TEST SAMPLE #3

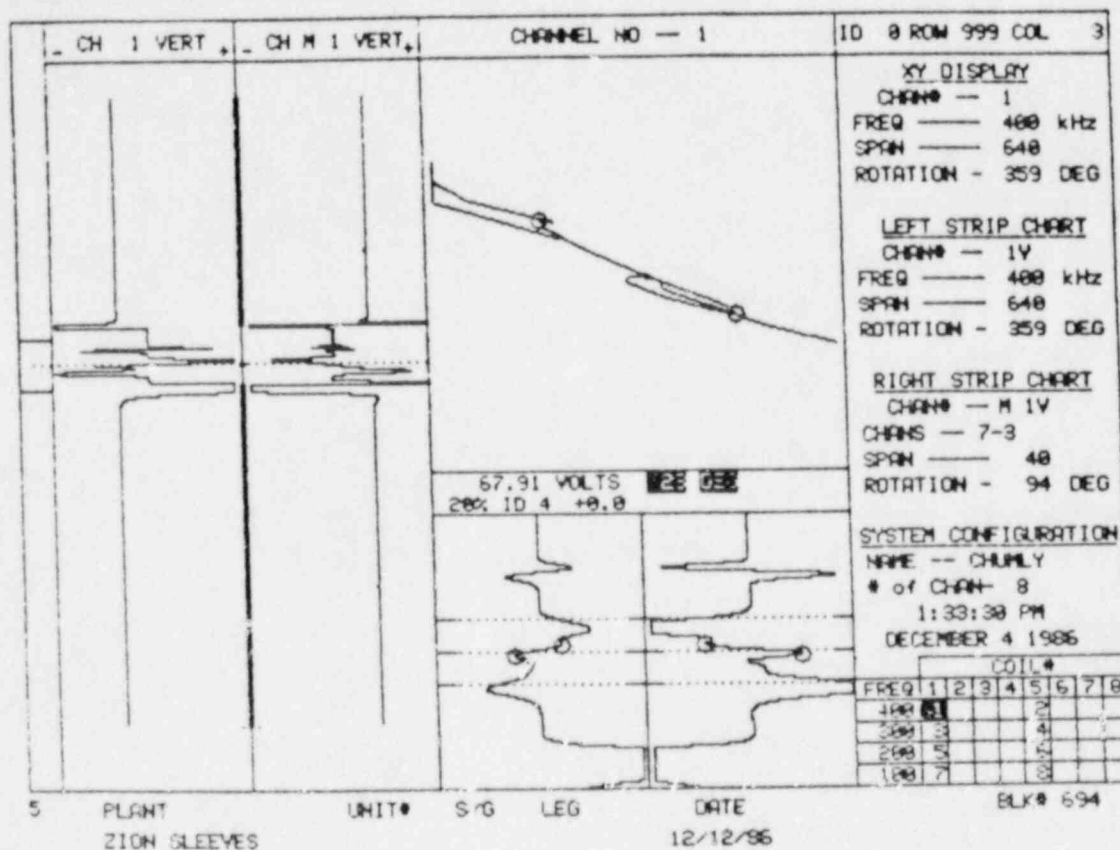
20 % THROUGH-WALL HOLE
IN SLEEVE INNER DIA

CONAM INSPECTION



**IN EXPANSION WITH WELD
 ROTOPROBE**

CONAM INSPECTION



IN EXPANSION WITH WELD

BOBBIN COIL