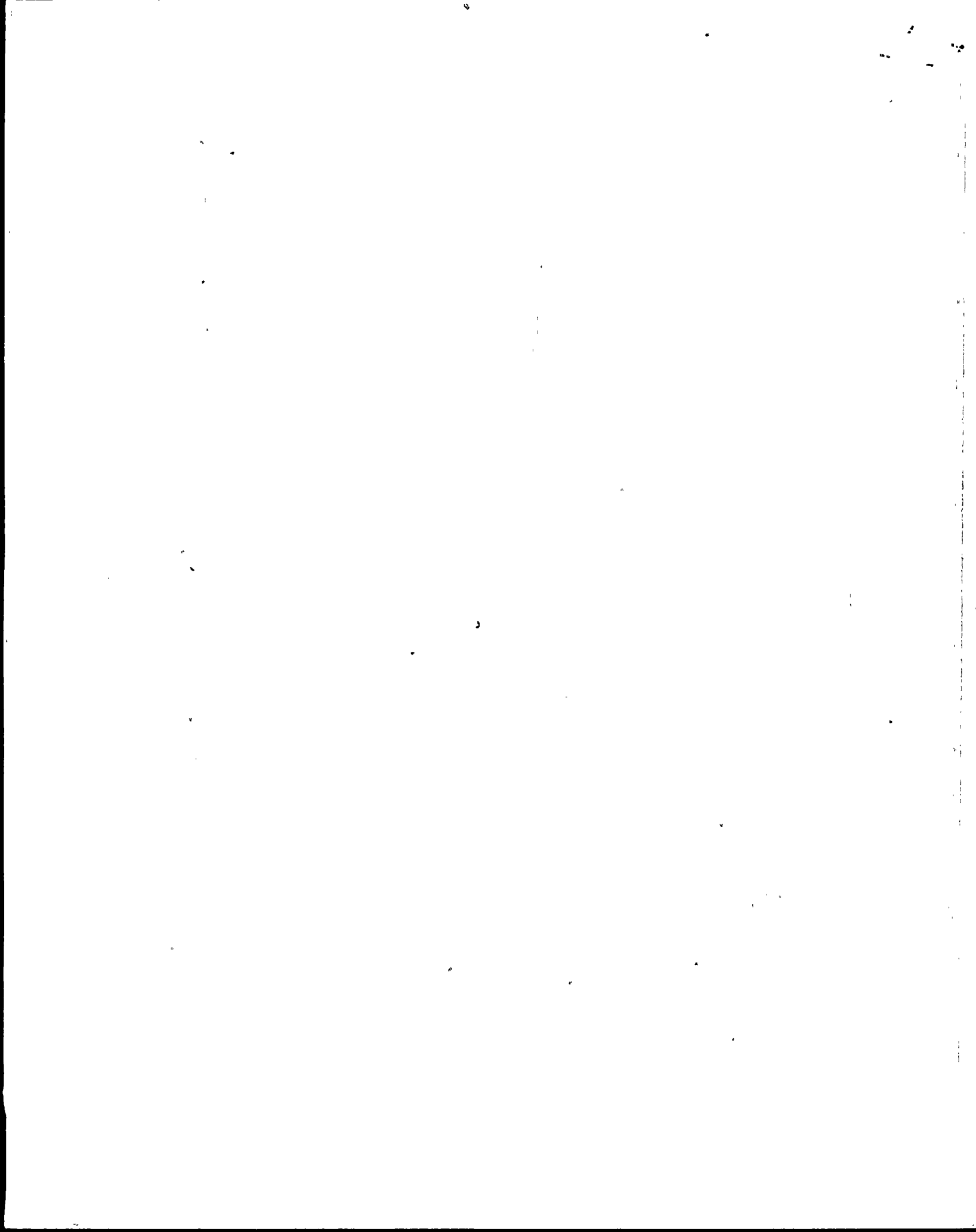
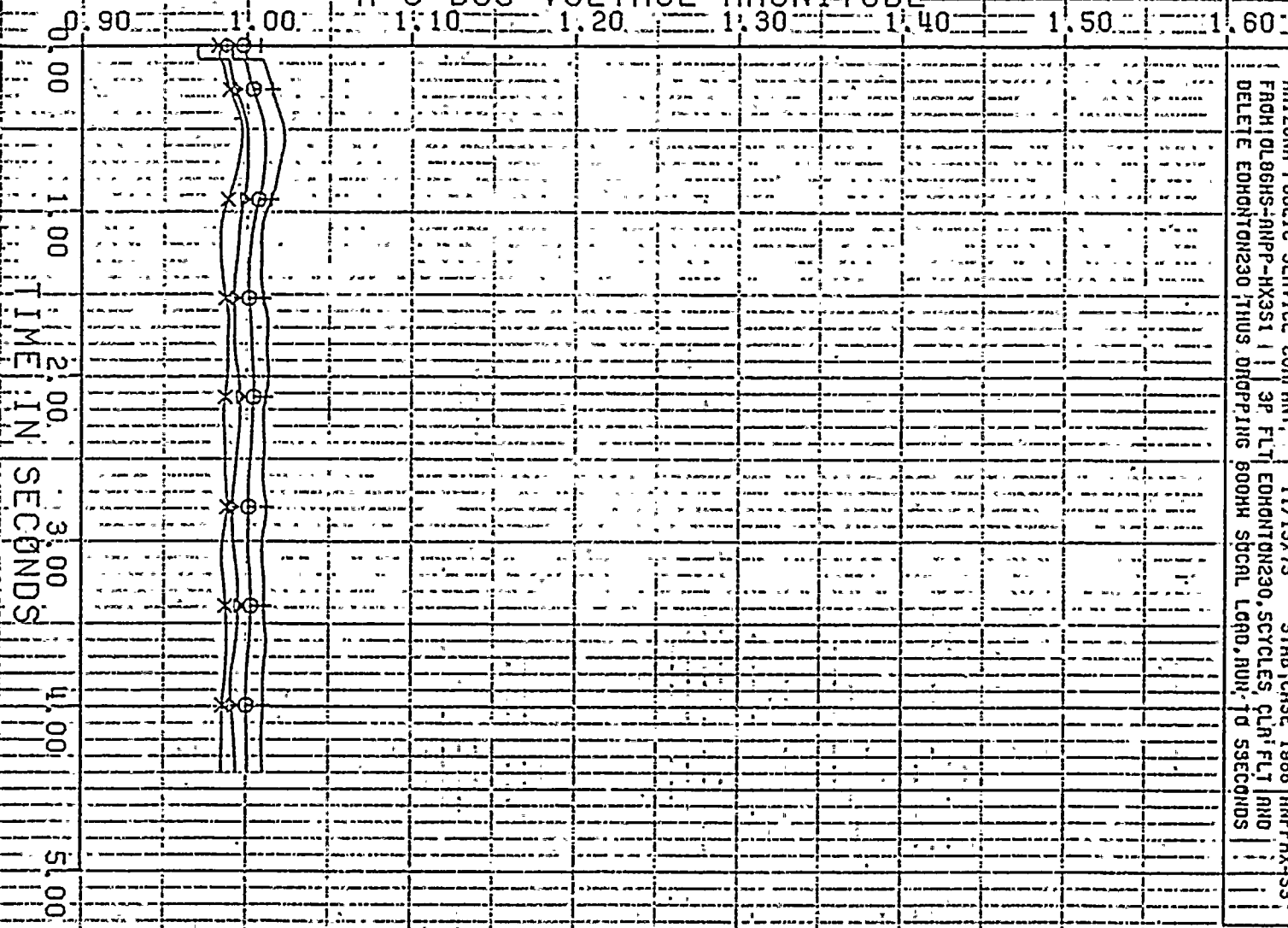


STUDY CASE 1986 MX-S3

System Condition "C": "The sudden loss of the largest single load on the 1986 six-participant system, a Southern California Edison served, 600 MW pump load at Edmonston Pumping Plant located near Bakersfield, California."

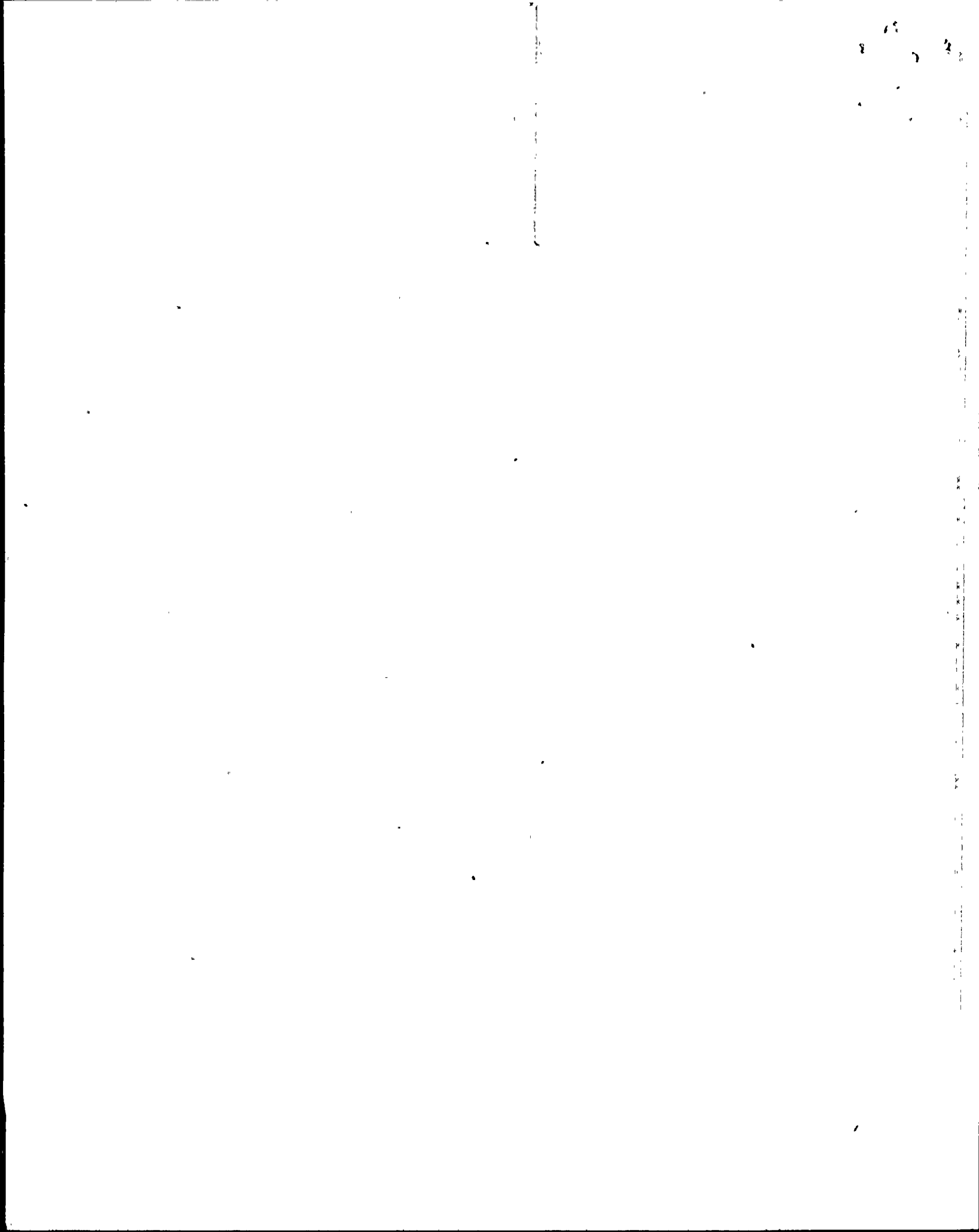


# A-C BUS VOLTAGE MAGNITUDE

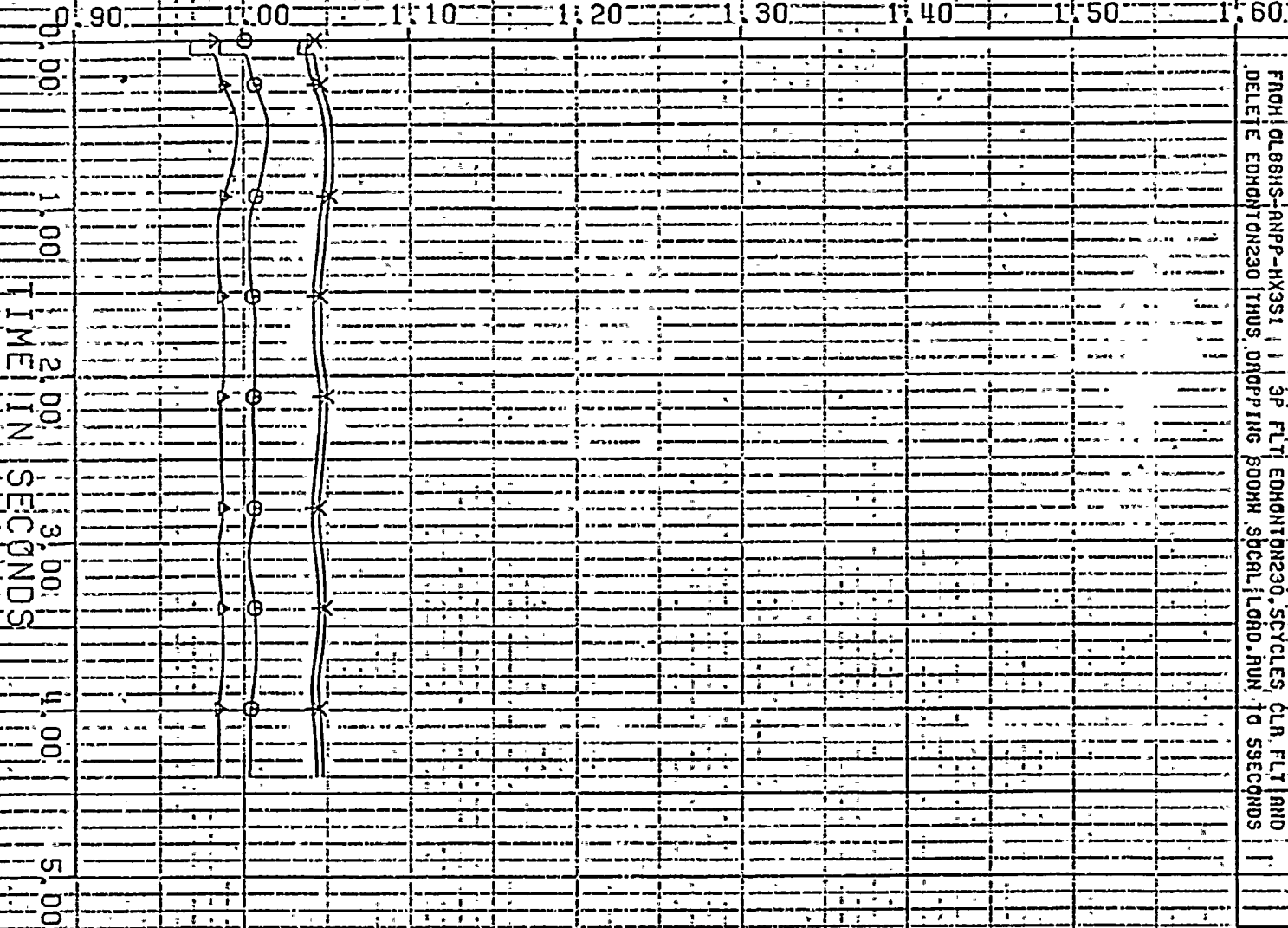


PLOT NO. 1  
 ARIZONA PUBLIC SERVICE COMPANY  
 11/13/75  
 STAB CASE 1986 ANPPHX-53  
 FROM 0186HS-ANPP-HX31 3P FLT EDHONTD230, SCYCLES, CLN FLT AND  
 DELETE EDHONTD230 THUS DRPPING 800H SPCAL LGAD, RWR TO 5SECONDS

KYRNE 230.  
 CHOLLA 230.  
 ANROT 345.  
 ANHNO 51345.  
 X  
 +  
 O



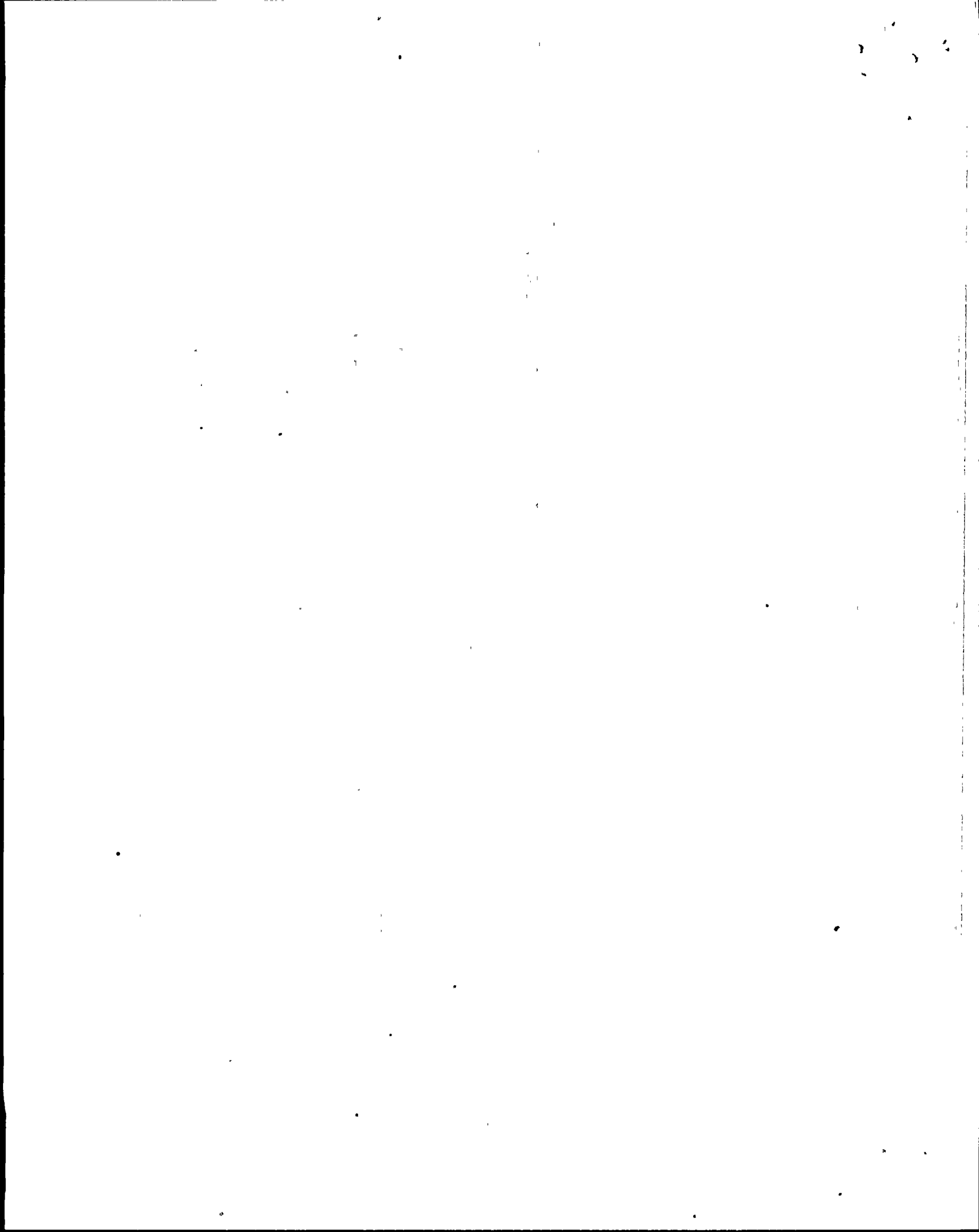
# A-C BUS VOLTAGE MAGNITUDE



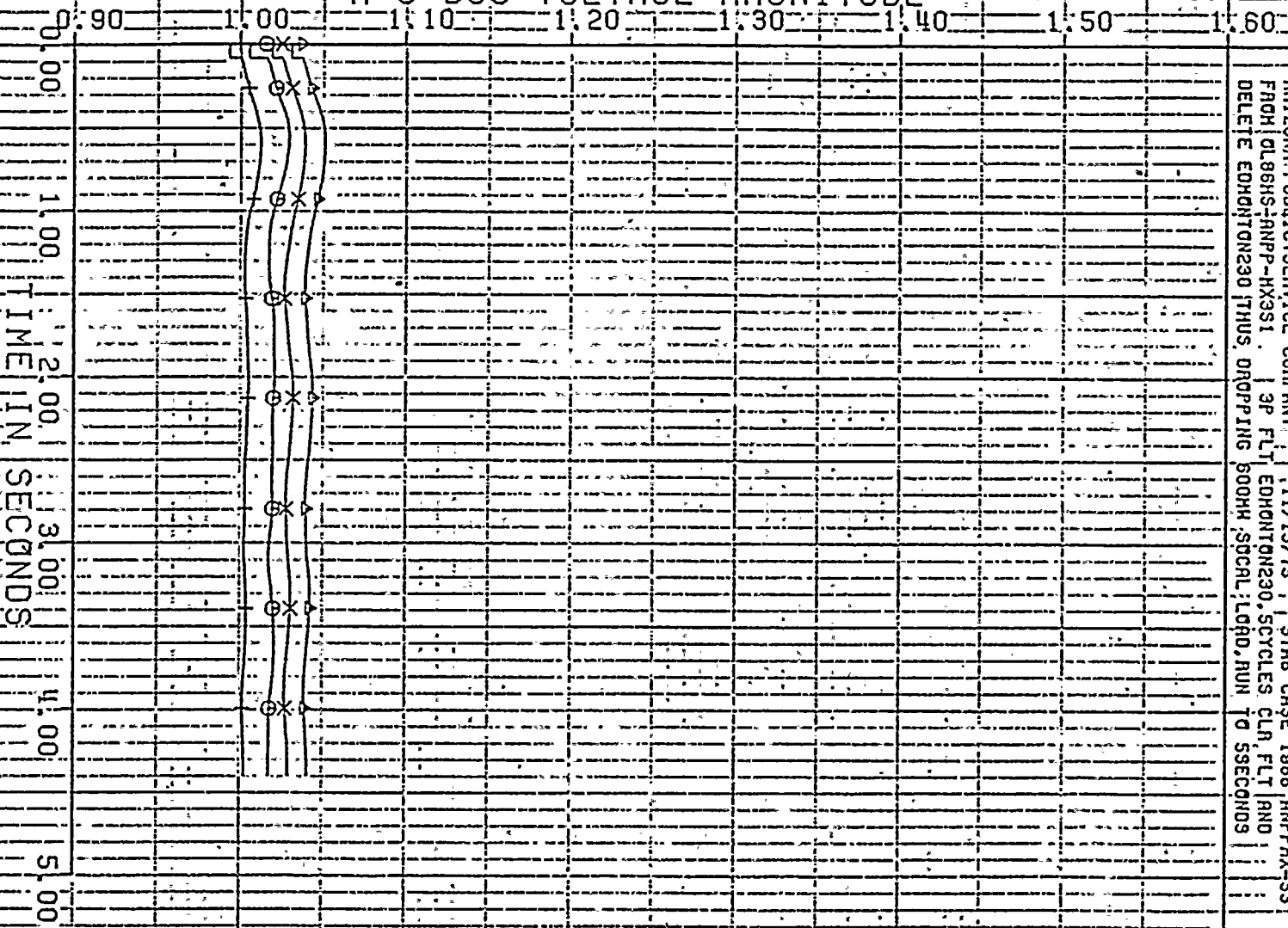
PLOT NO. 2  
 ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANPPHX-S3  
 FROM OL86HS-ANPP-HX351 1 3P FLT EDHONTON230 SCYCLES CLR FLT AND  
 DELETE EDHONTON230 THUS DROPPING 800K SOCIAL LOAD RUN TO 5SECONDS

NEHRM 115  
 A10GRAND115  
 ACUAFRAN230  
 LIBERTY 230

X  
 +  
 A  
 O

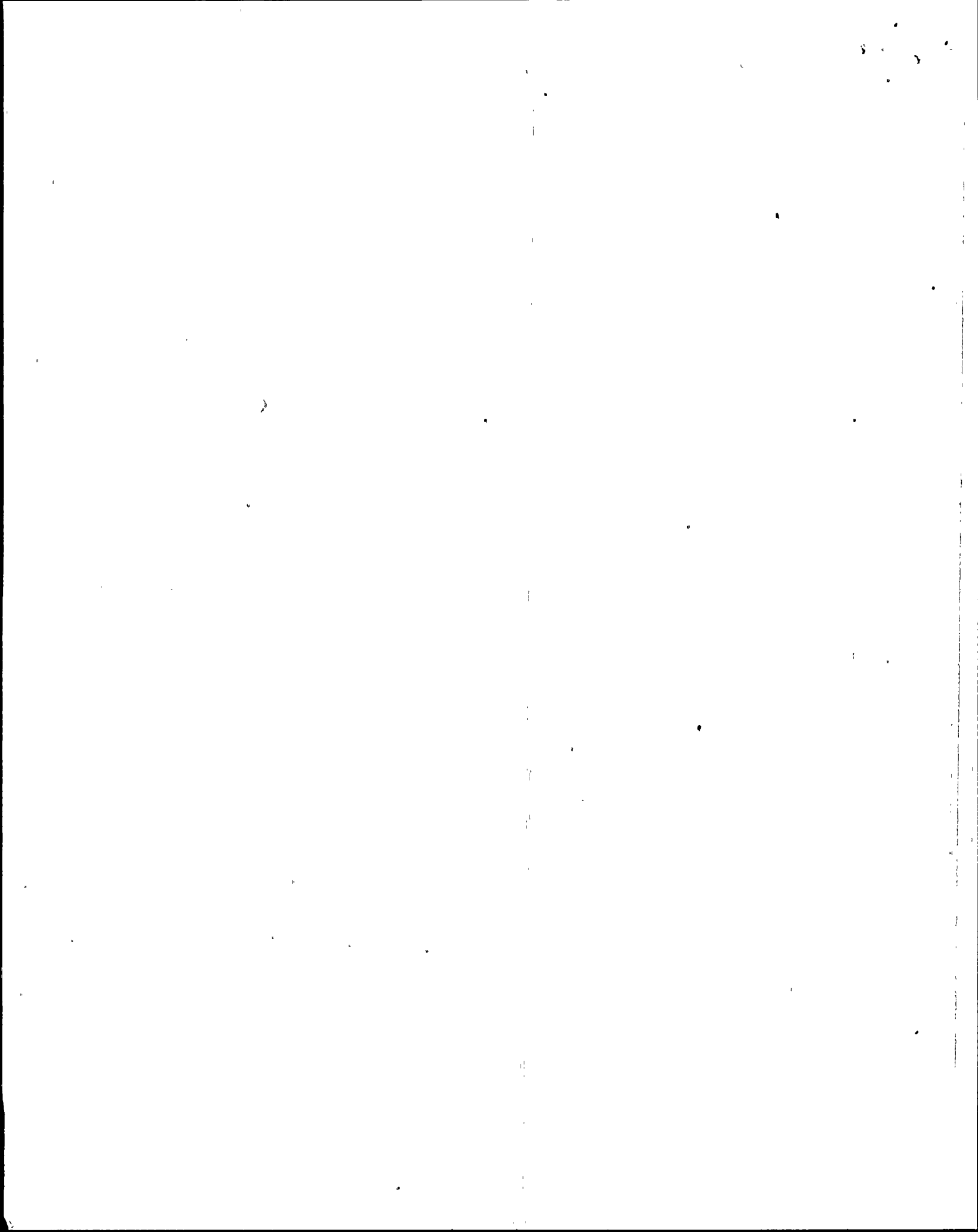


# A-C BUS VOLTAGE MAGNITUDE



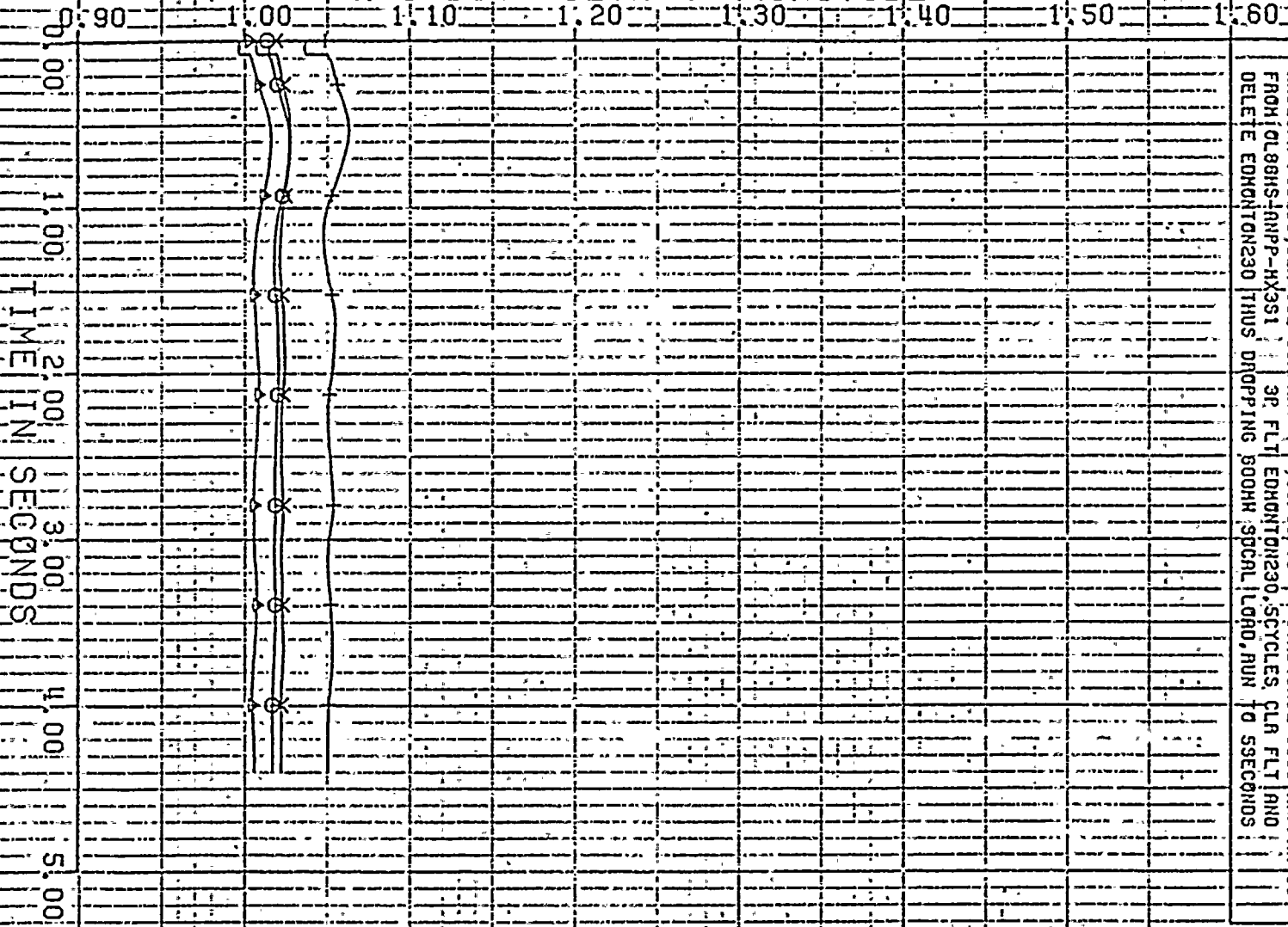
PLOT NO: 3  
 ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-93  
 FROM: DLBHS-ANP-HX351 3P FLT EDHONTON230, CTICLES CLR FLT AND  
 DELETE EDHONTON230 THUS, DROPPING 500MH, SICAL: LDR, RUN TO 5SECONDS

REEVES .115. X  
 HCKINLE 3US. -  
 HESTHERS115. -  
 SROURAD1115. -  
 O





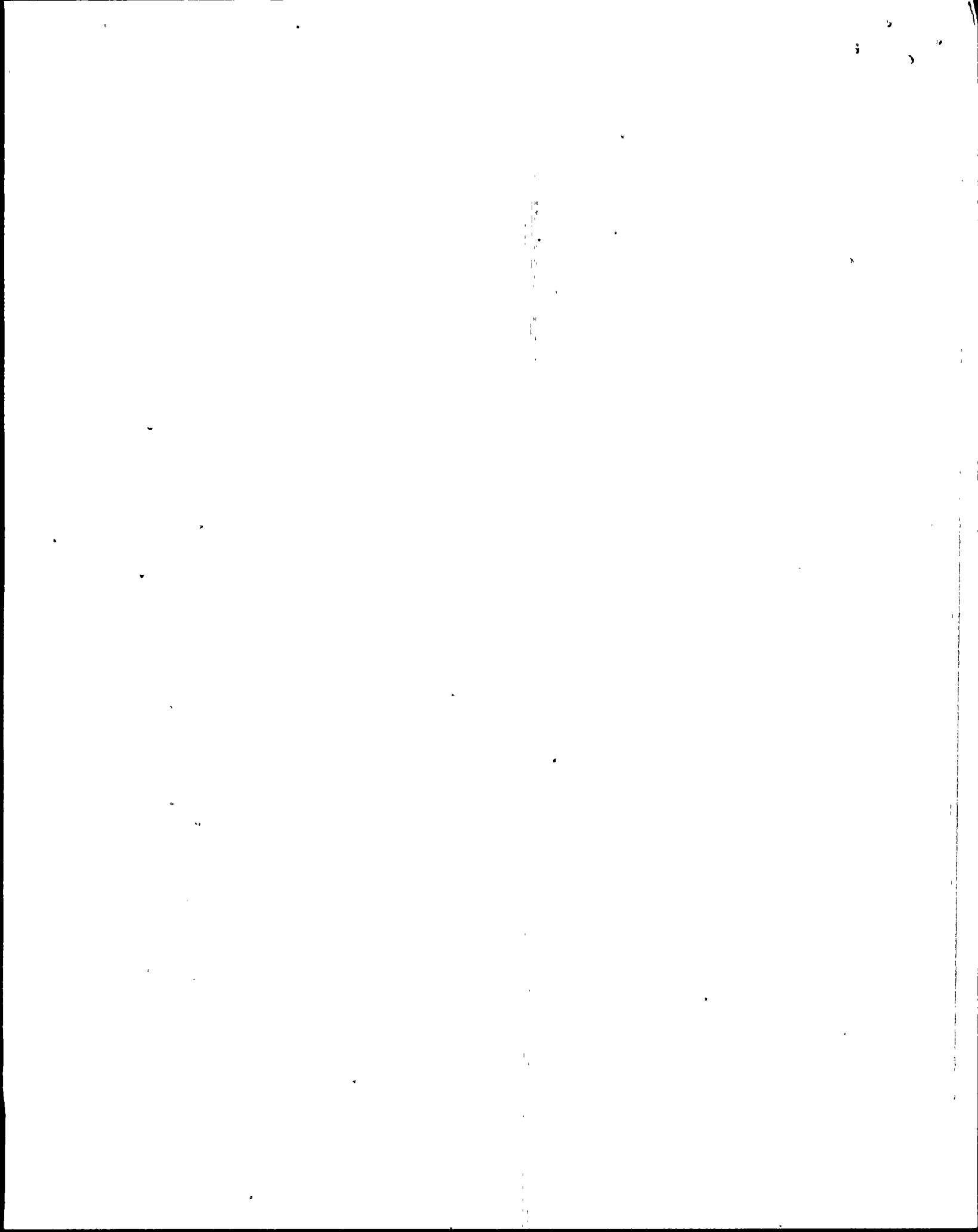
# A-C BUS VOLTAGE MAGNITUDE



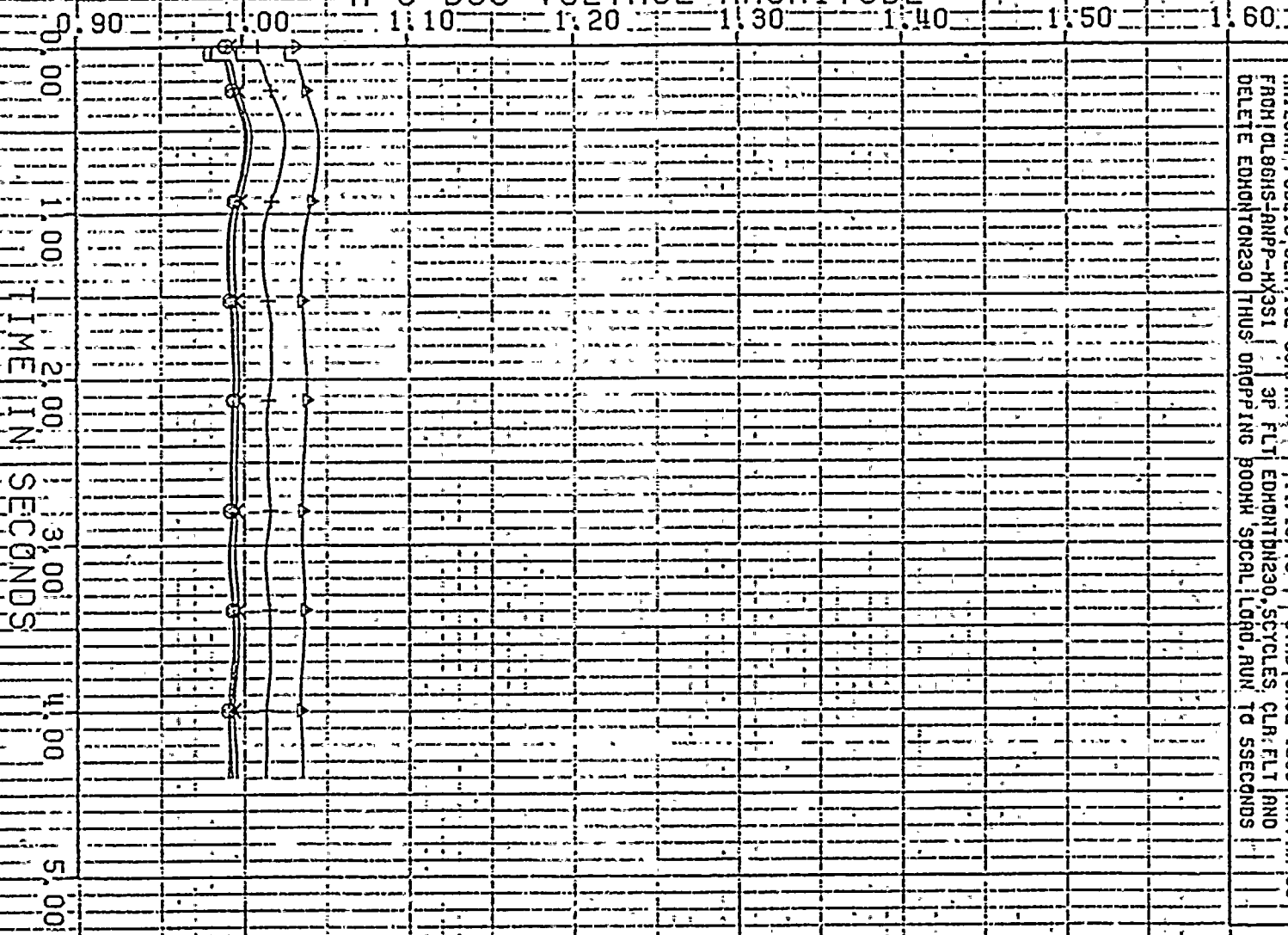
PLOT NO. 4  
 ARIZONA PUBLIC SERVICE COMPANY: 11/13/75 STAB CASE 1986 ANPPHX-S3  
 FROM 0888S-INP-HX3S1 3P FLT EDHONTN230, SCYCLES, CLR FLT AND  
 DELETE EDHONTN230 THUS DROPPING 800HR SPCAL LOAD, RUN TO SECONDS

APACHE 230  
 NUCLEAR 500  
 NORTON 345  
 FOURCORNER 345

X  
 +  
 A  
 D

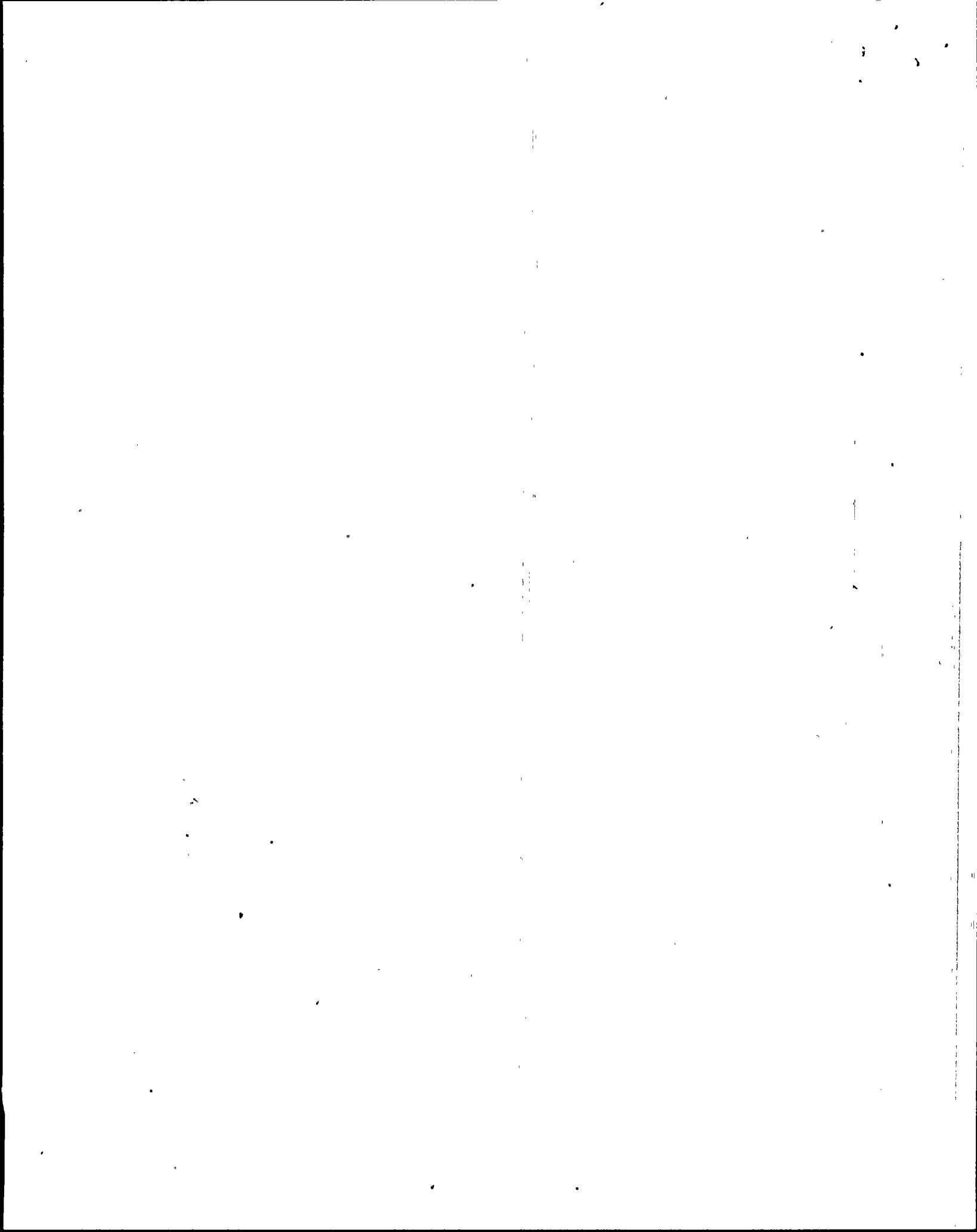


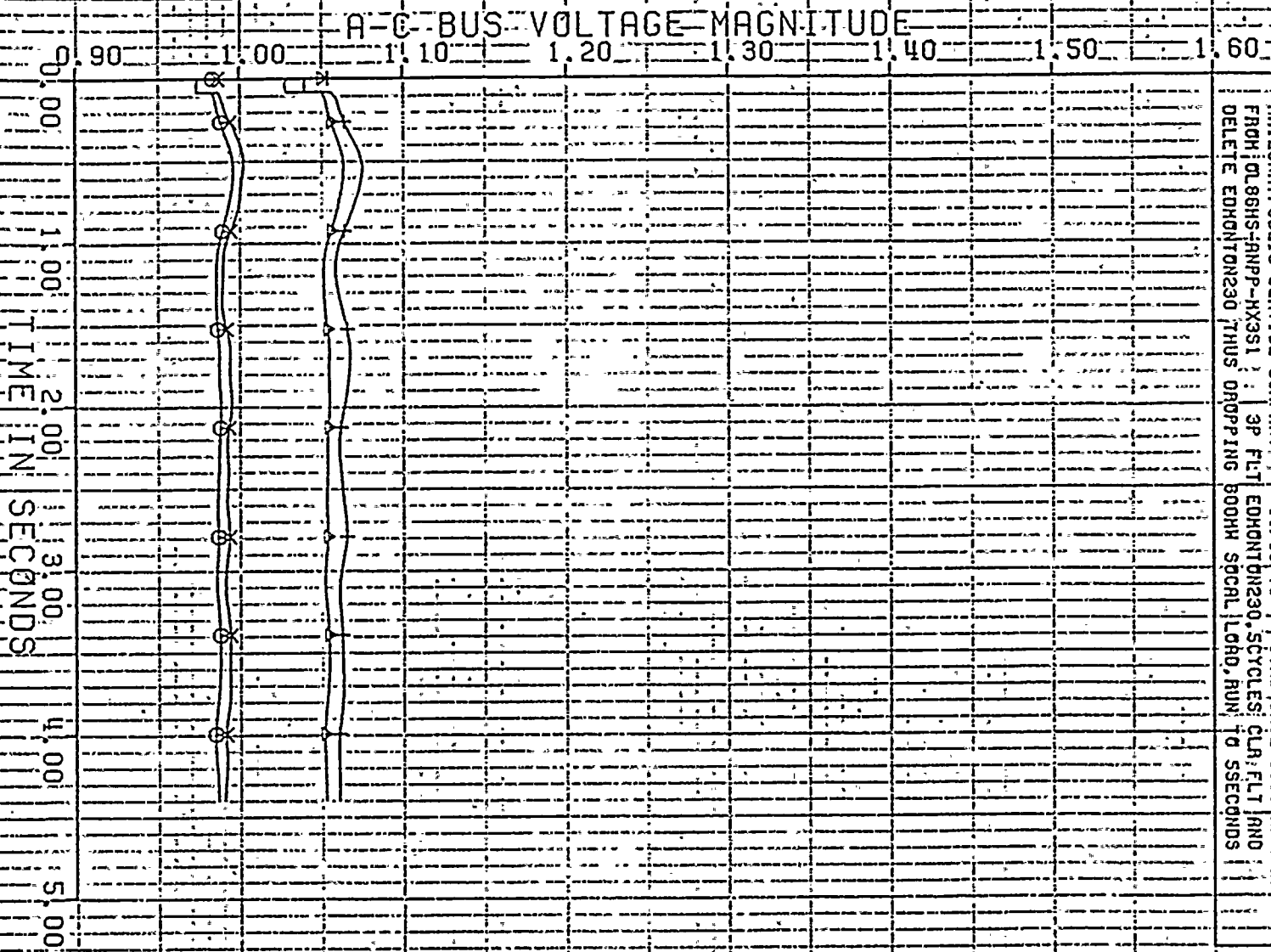
# A-C BUS VOLTAGE MAGNITUDE



PLOT NO.: 5  
 ARIZONA PUBLIC SERVICE COMPANY, 11/13/75, STAB CASE 1986 ANPHX-53  
 FROM: DLBMS-ANP-HX31 3P FLT EDONTH230, CYCLES CLR FLT AND  
 DELETE EDONTH230 THUS DROPPING BOOTH SPCL LOAD, RUN TO 5SECONDS

COOLIDGE 115.  
 SOUTH 138.  
 PNRKPS 230.  
 DJG 115.  
 IRVINGTN 138.  
 ◆ X  
 +  
 A  
 G



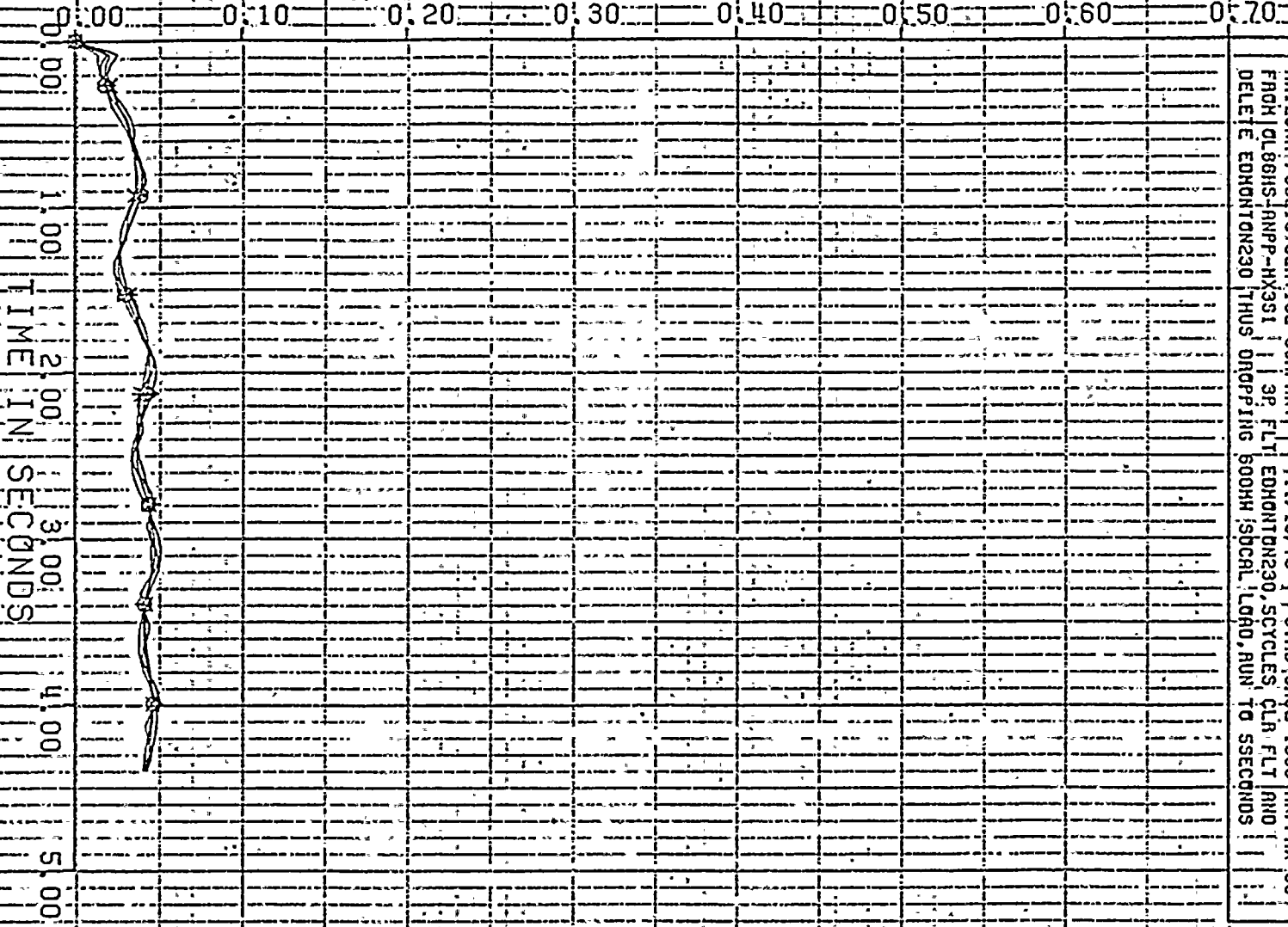


PLOT NO. 6  
 ARIZONA PUBLIC SERVICE COMPANY  
 FROM: 0186HS-ANPP-HX31 3P FLT EDONTON230, 5 CYCLES CLR: FLT AND  
 DELETE EDONTON230 THUS DROPPING BOHM SOCAL LOAD, RUN TO SECONDS

OC011L0230.  
 HCENK6P1500.  
 HINCHSTAS00.  
 VRIL: 138.

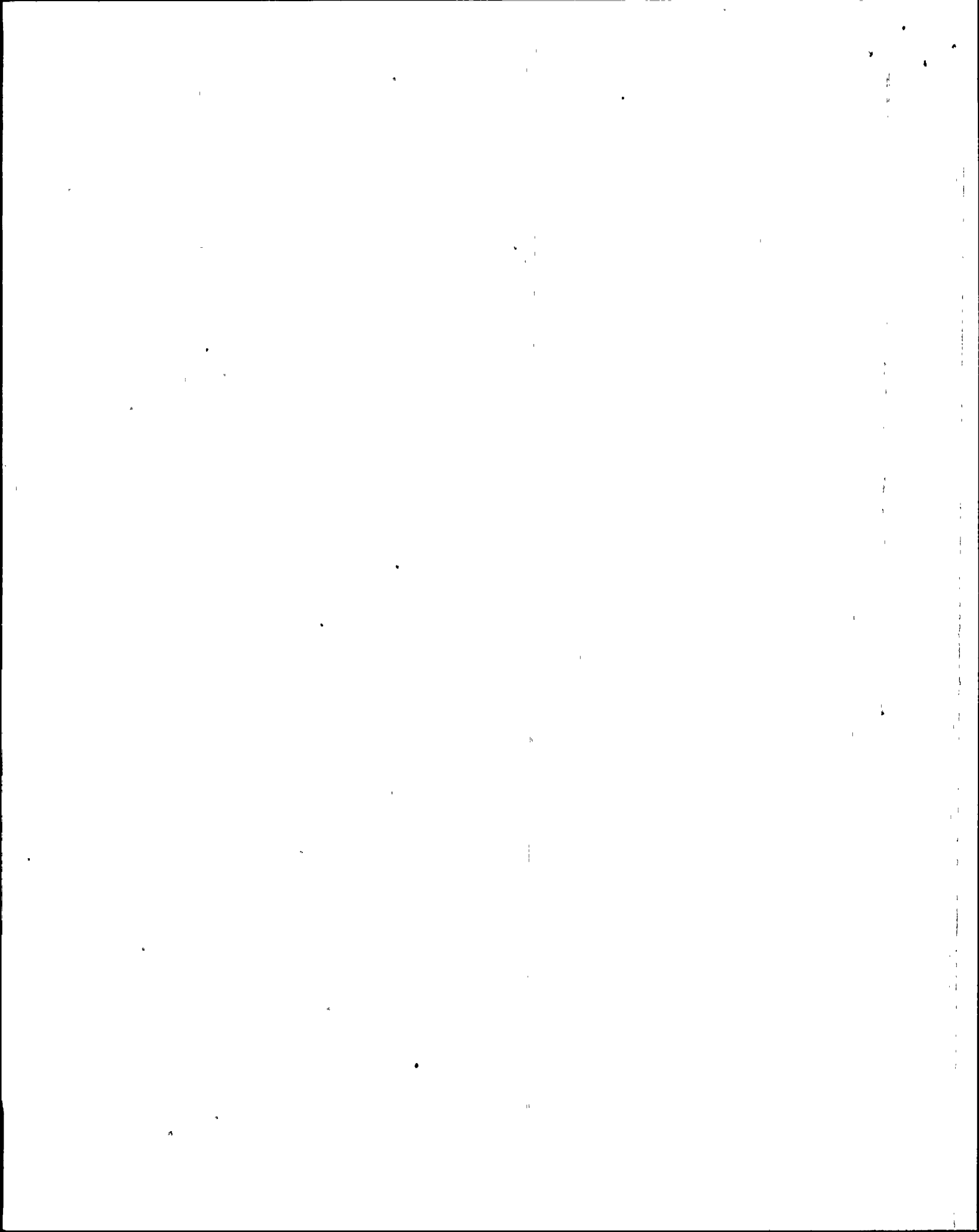
X  
 +  
 A  
 O

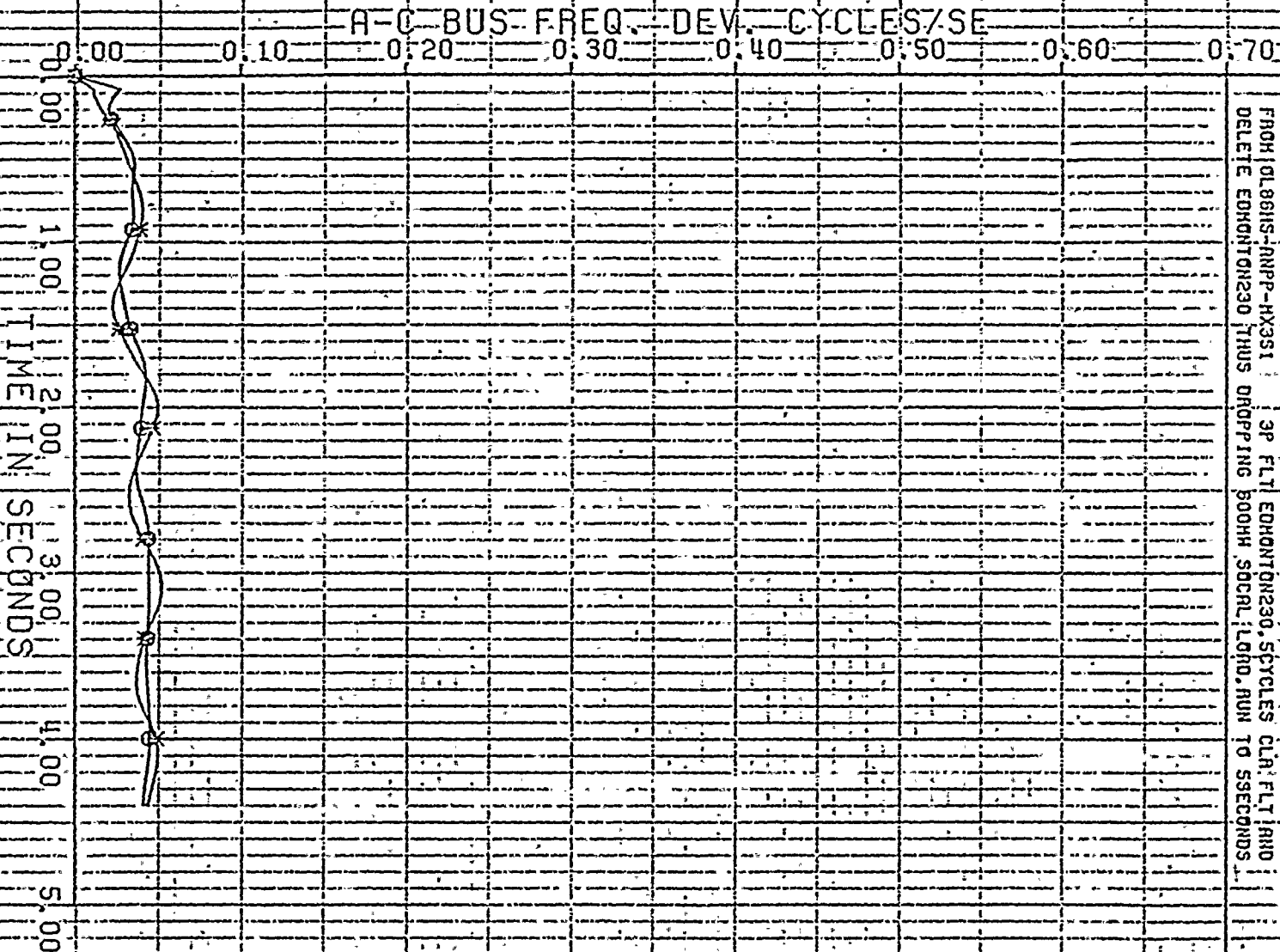
A-C BUS FREQ. DEV. CYCLES/SE



PLGT NO. 7  
 ARIZONA PUBLIC SERVICE COMPANY  
 FROM 0186HS ANPP-HX31 11/13/75 1117 STAB CASE 1986 ANPPHX-S3  
 DELETE EDHONTN230 THUS DRGPPING 800H ISCAL L040, RUN TO S5ECONDS

KYRENE 230.  
 CHOLLA 230.  
 ARROYO 345.  
 ARROYO 12345.  
 X  
 +  
 A  
 I  
 I  
 O

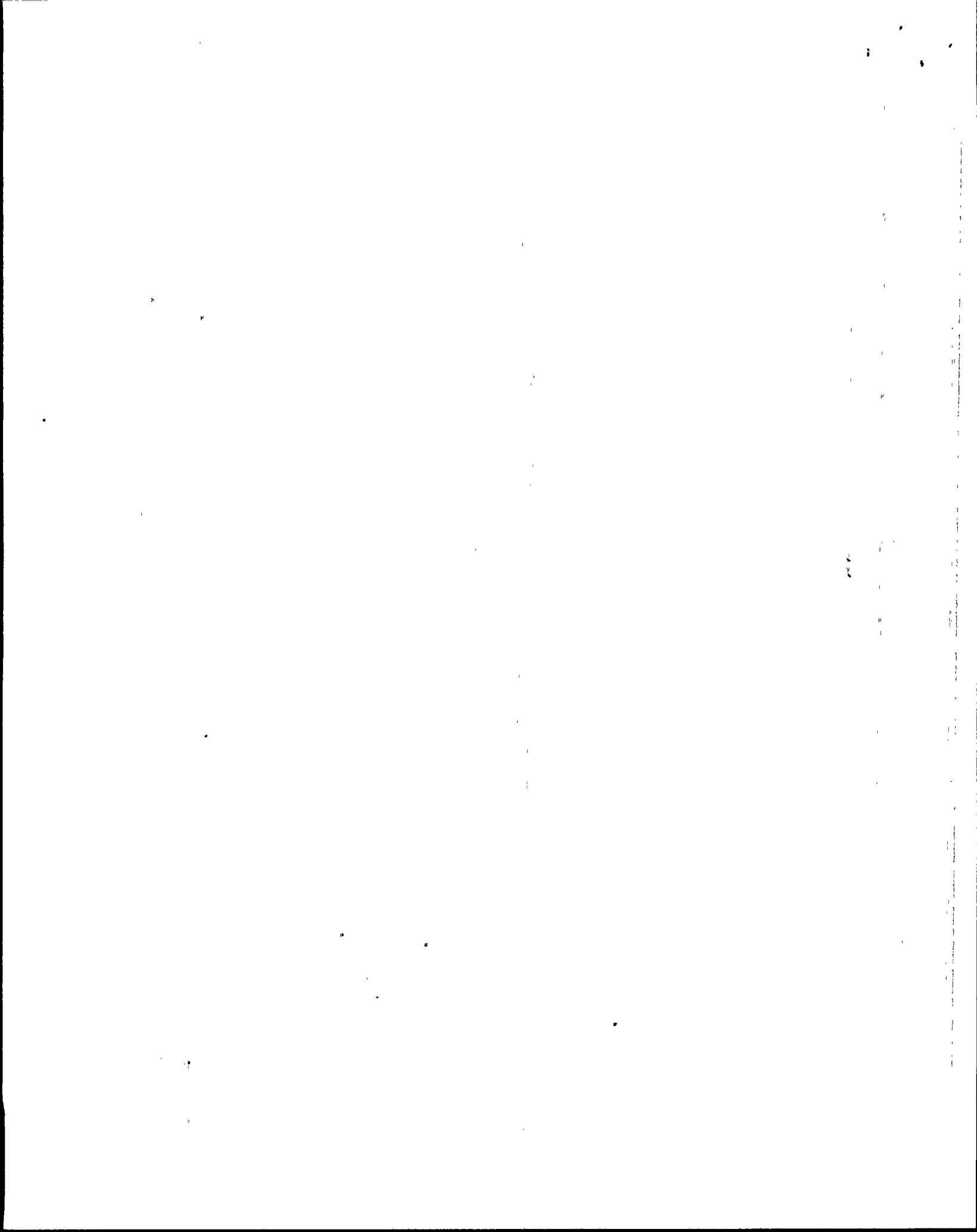




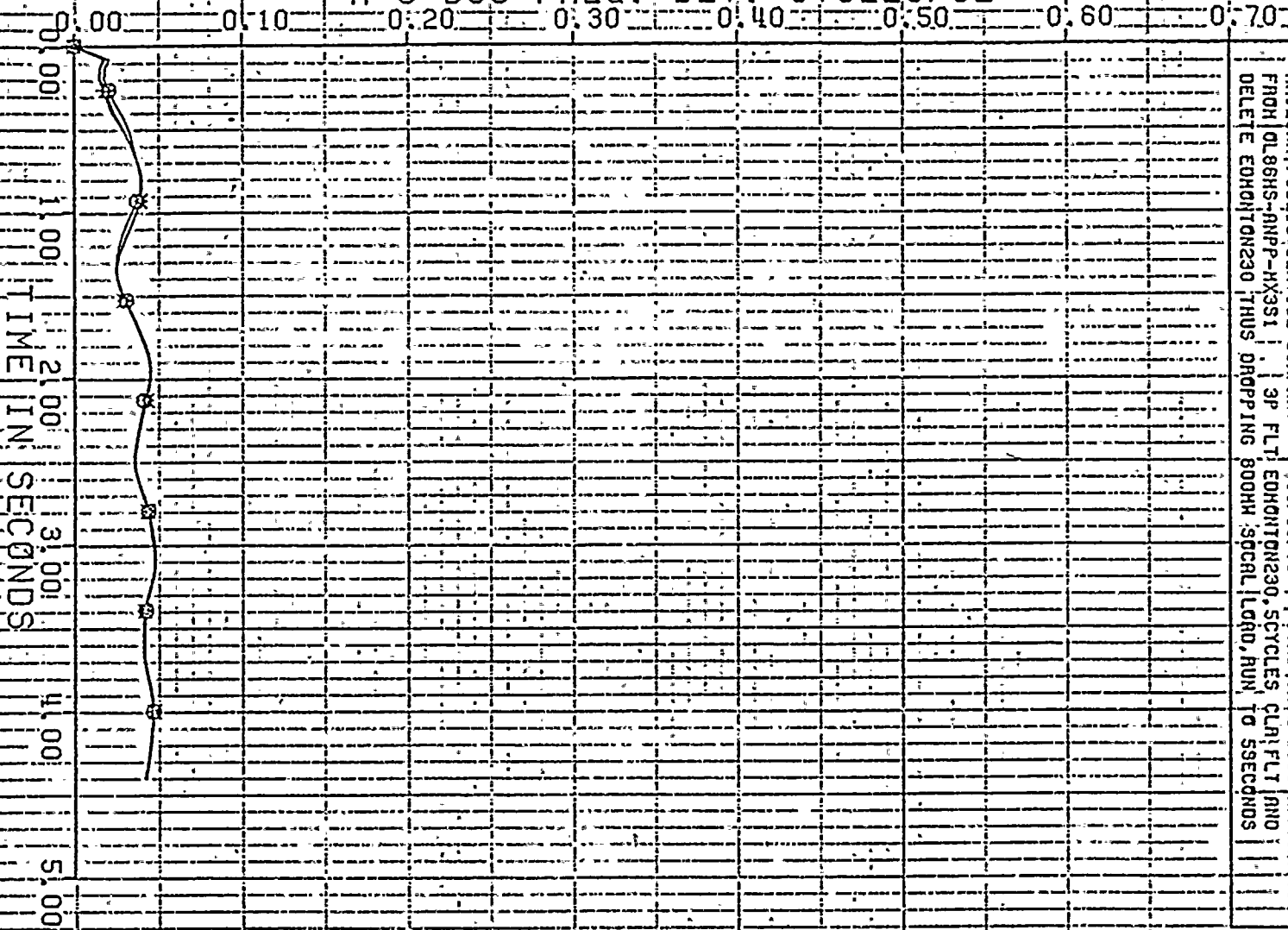
PLOT NO 8  
 ARIZONA PUBLIC SERVICE COMPANY  
 FROM: DL86HS-ANPP-KX31 3P FLT EDHONTN230, SCYCLES CLA, FLT AND  
 DELETE EDHONTN230 THUS DROPPING BOOH, SOCR, LOND, RUN TO SECONDS  
 11/13/75 STRD: CRSE 1986 ANPPHX-53  
 EDHONTN230, SCYCLES CLA, FLT AND

NEHRN . 115  
 RIGRAND115.  
 AGUARF1R230.  
 LIBEATY 230.  
 X  
 L  
 A  
 G





A-C BUS FREQ. DEV. CYCLES/SE

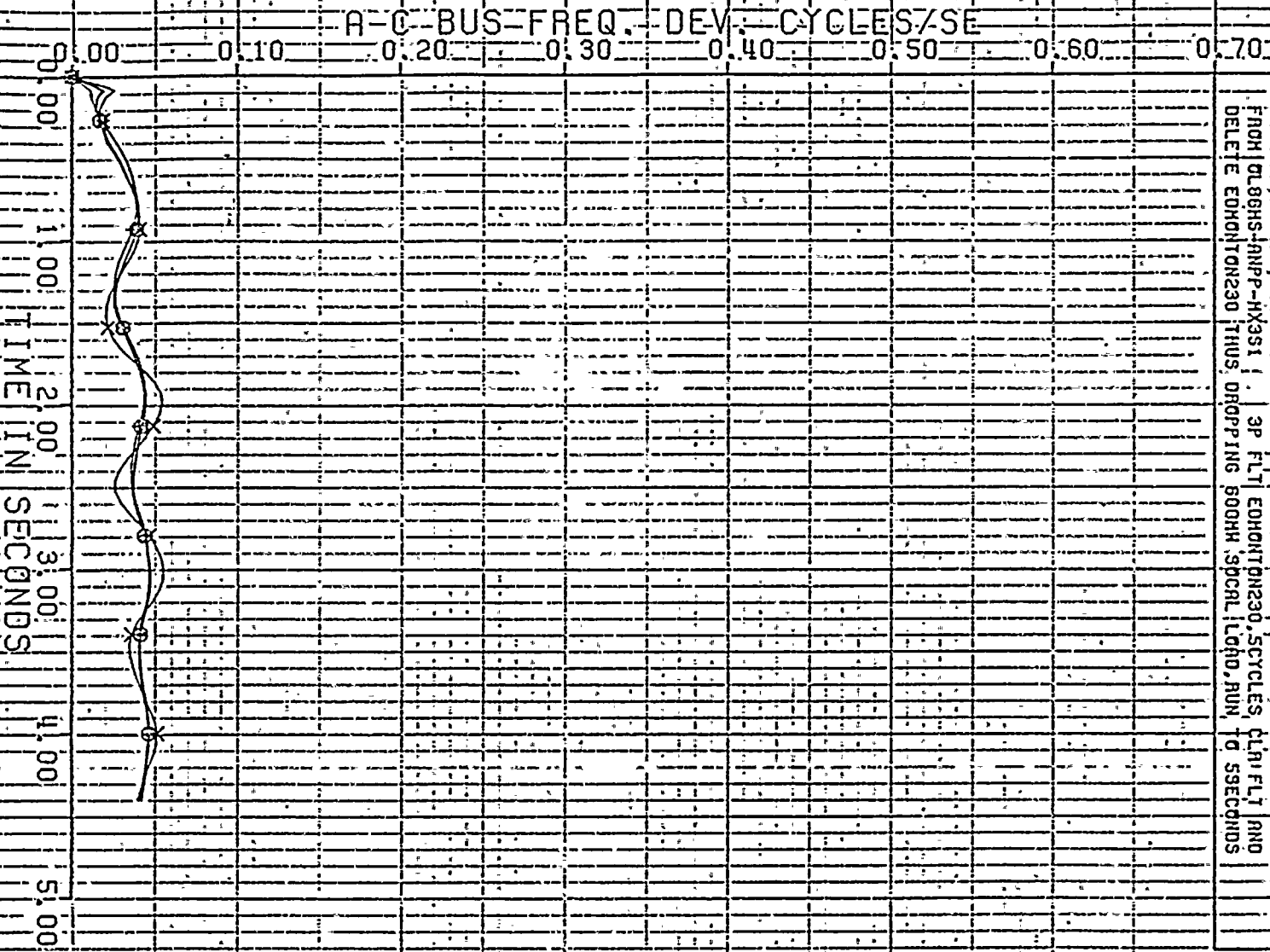


PLOT NO. 9

ARIZONA, PUBLIC SERVICE COMPANY  
 FROM 0186HS-ANPP-HX31 3P FLT. EDHONTOR230, SCYCLES CL1FLT AND  
 DELETE EDHONTOR230 THUS DROPPING 800HZ SOCAL LOAD, RUN TO 5SECONDS

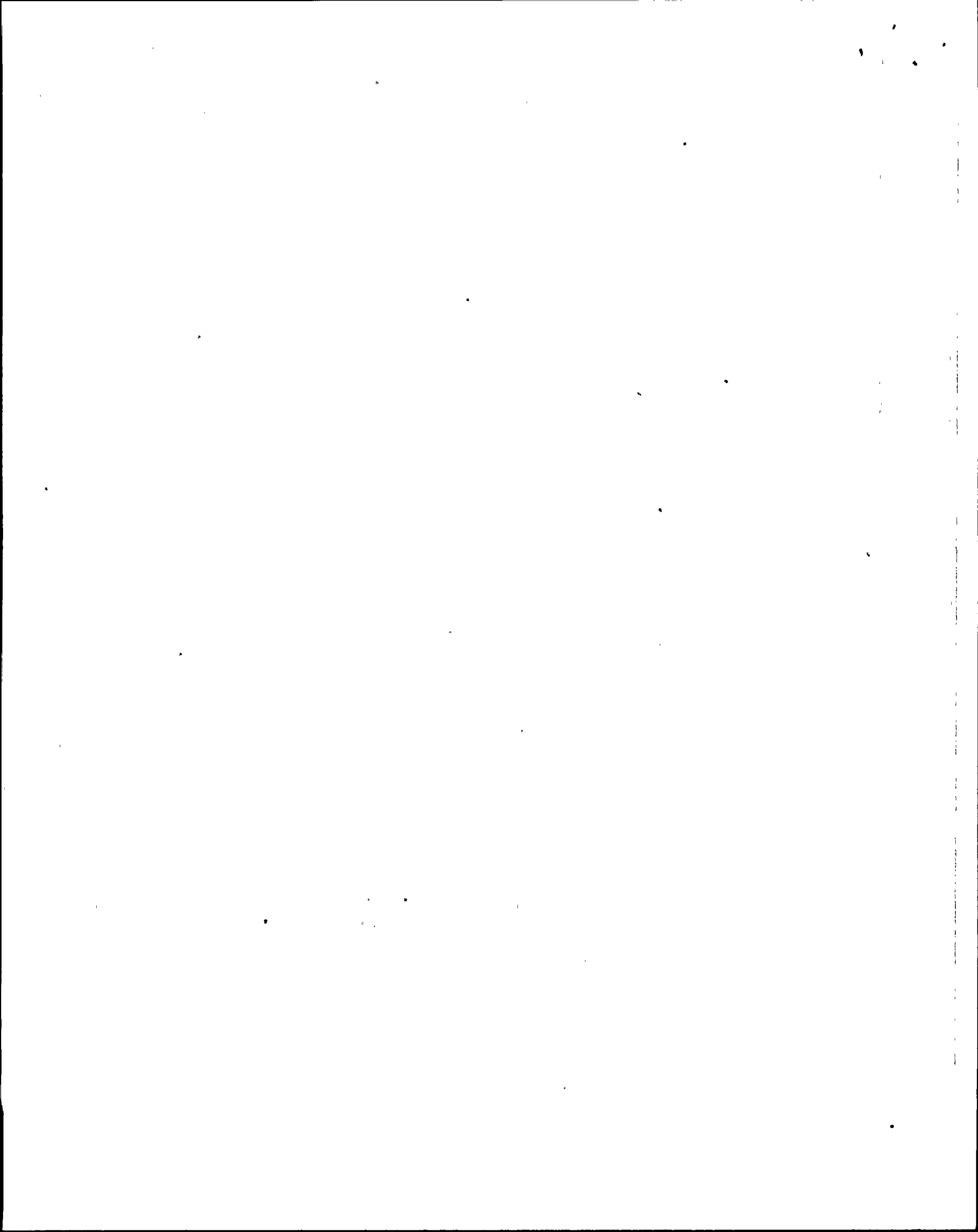
REEVES 1115.  
 MCKINLE 345.  
 HESTHES1115.  
 SARGUR1115.

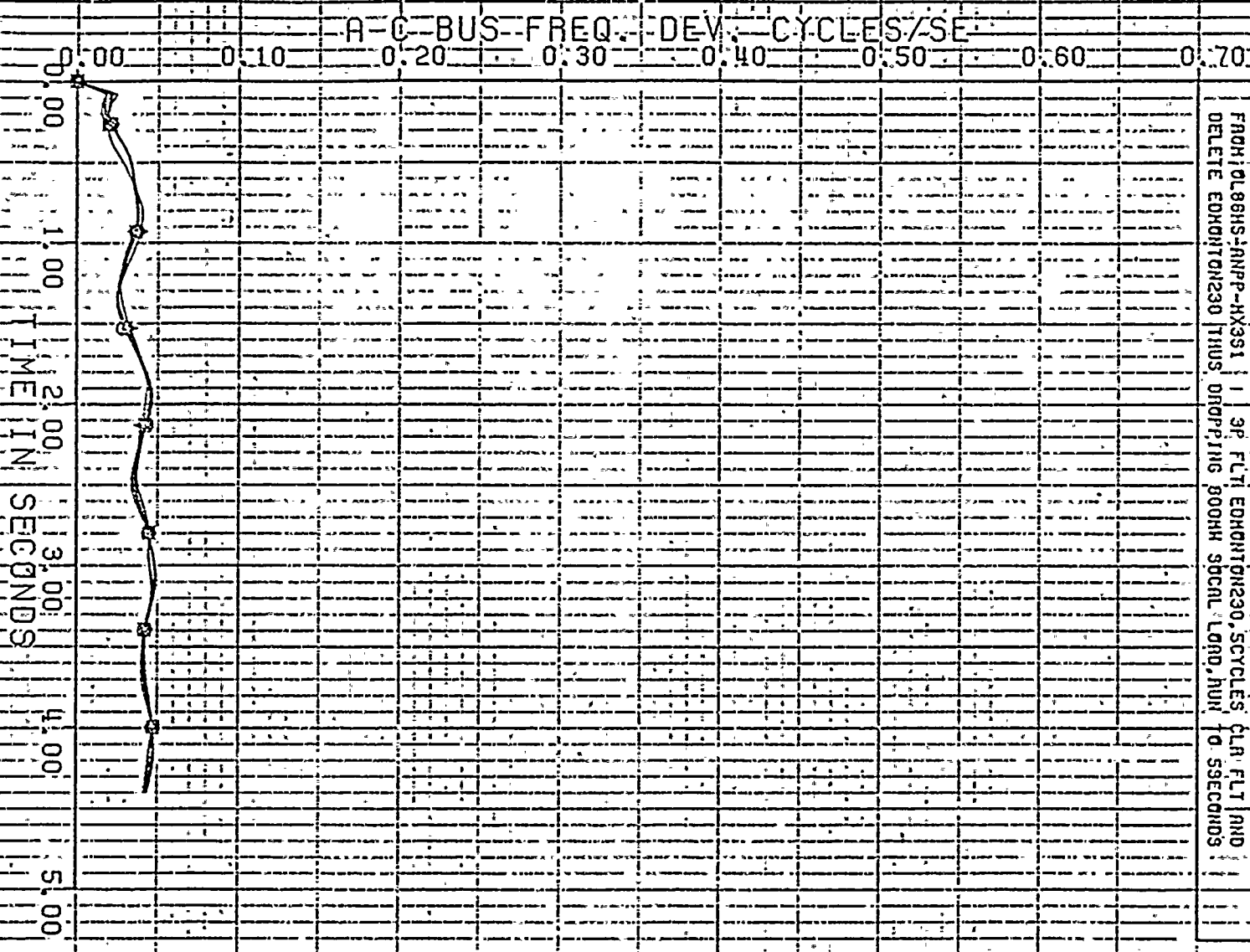
X  
 +  
 A  
 O



PLOT ING: 10  
 ARIZONA PUBLIC SERVICE COMPANY: 11/13/75 | STAB CASE 1986 ANP-PHX-83  
 FROM DL86HS-ANP-HX31 | 3P FLT EDHONTON230, SCYCLES CLR FLT AND  
 DELETE EDHONTON230 THUS: DROPPING 800HH 3PCL LCRD, RUN TO 59SECONDS

APRCSE: 230.  
 NUCLIN: 500.  
 NDNTON: 345.  
 FOUNDCON: 345.  
 X: +  
 A: ▲  
 O: ○

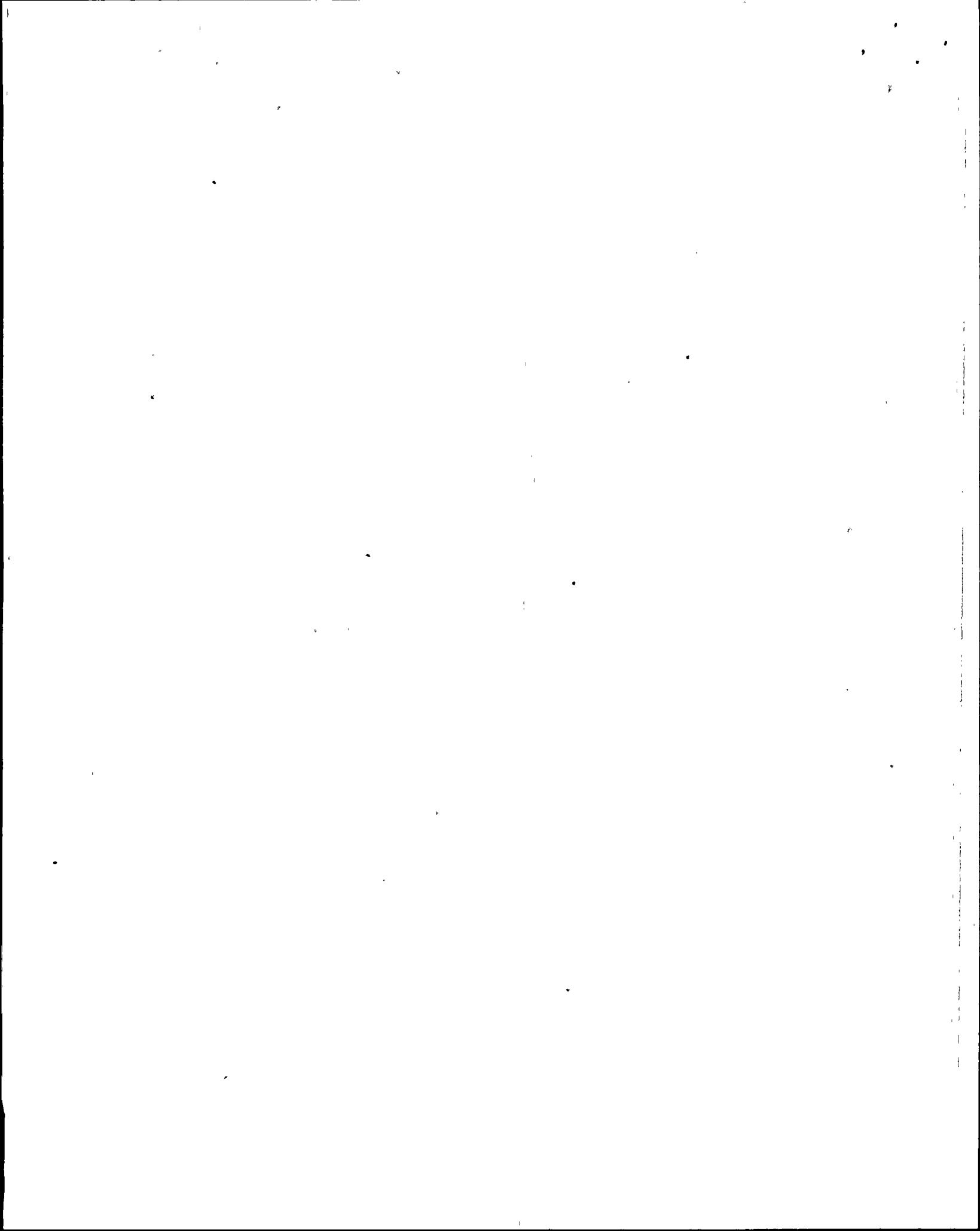




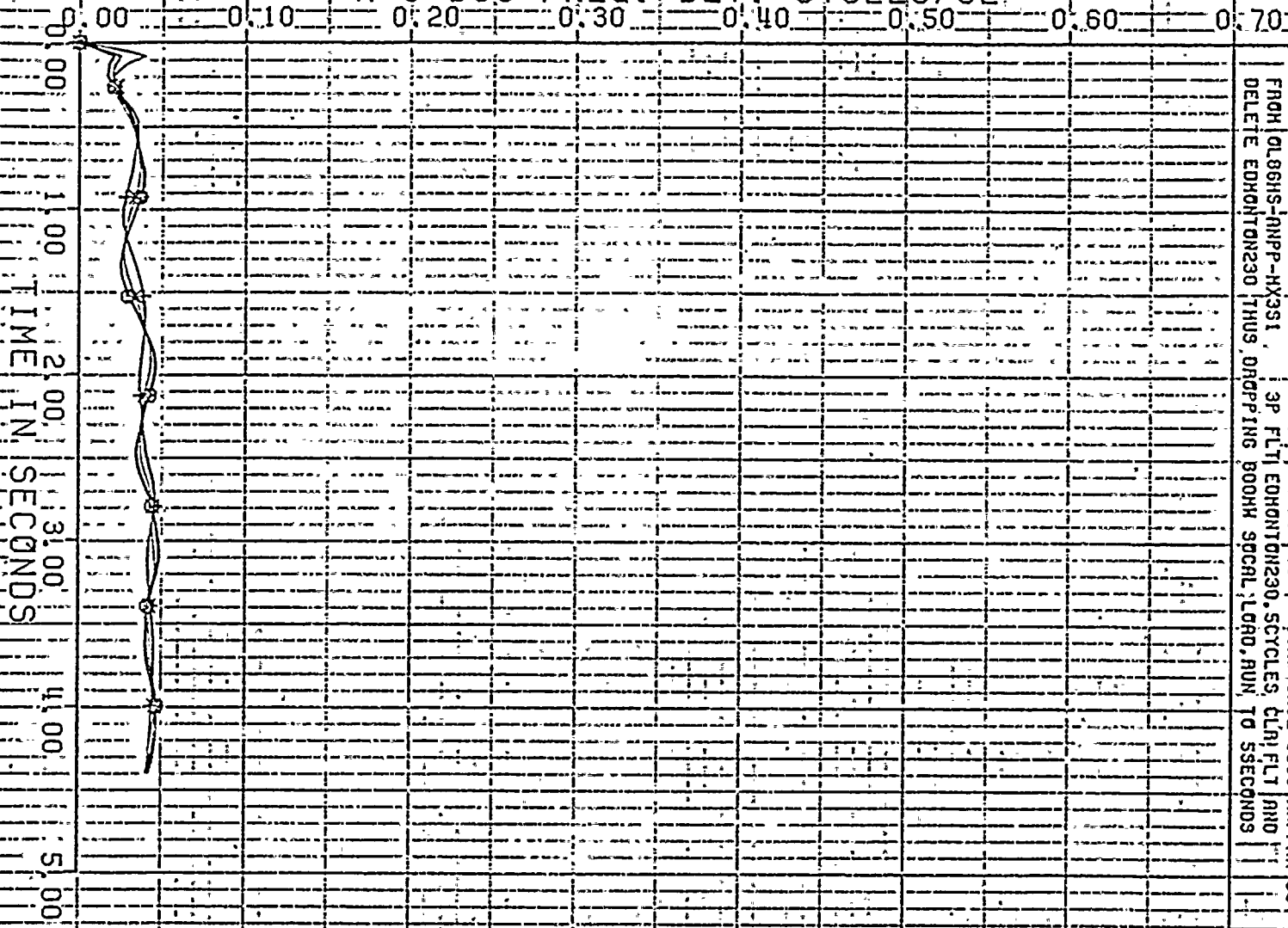
PLOT NO. 11  
 ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-531  
 FROM DL88HS-ANP-KX31 3P FLT EDKONT0230, CYCLES CLR FLT AND  
 DELETE EDKONT0230 THUS DROPPING 800HH SPCAL LOGD, HUN TO 5SECONDS

COLLIGETIS.  
 SOUTH 138.  
 PNPKPS 230.  
 QJ0 115.  
 IRVINGTN 138.

◆ X  
 +  
 △  
 ⊙



A-C-BUS-FREQ. DEV. CYCLES/SE

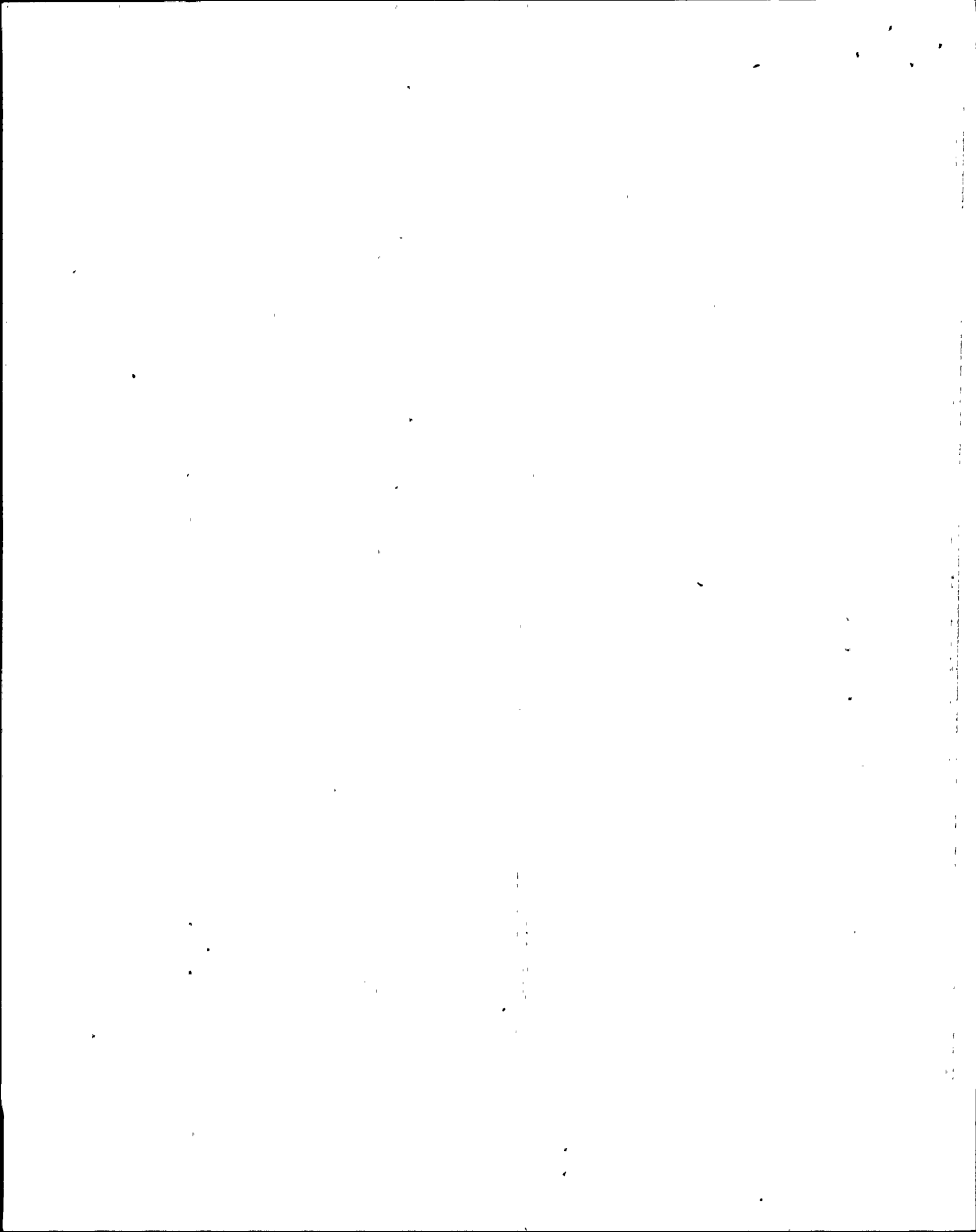


PLOT NO. 12

ARIZONA PUBLIC SERVICE COMPANY  
 FROM 0186HS-ANP-HX31 3P FLT EDHON10N230, SCYCLES, CLR, FLT AND  
 DELETE EDHON10N230 THUS, 0800P1NG BOOH SPCL, LGAD, RUN, TO 5SECONDS  
 11/13/75 STAB, CASE 1986 ANP-PHX-S3

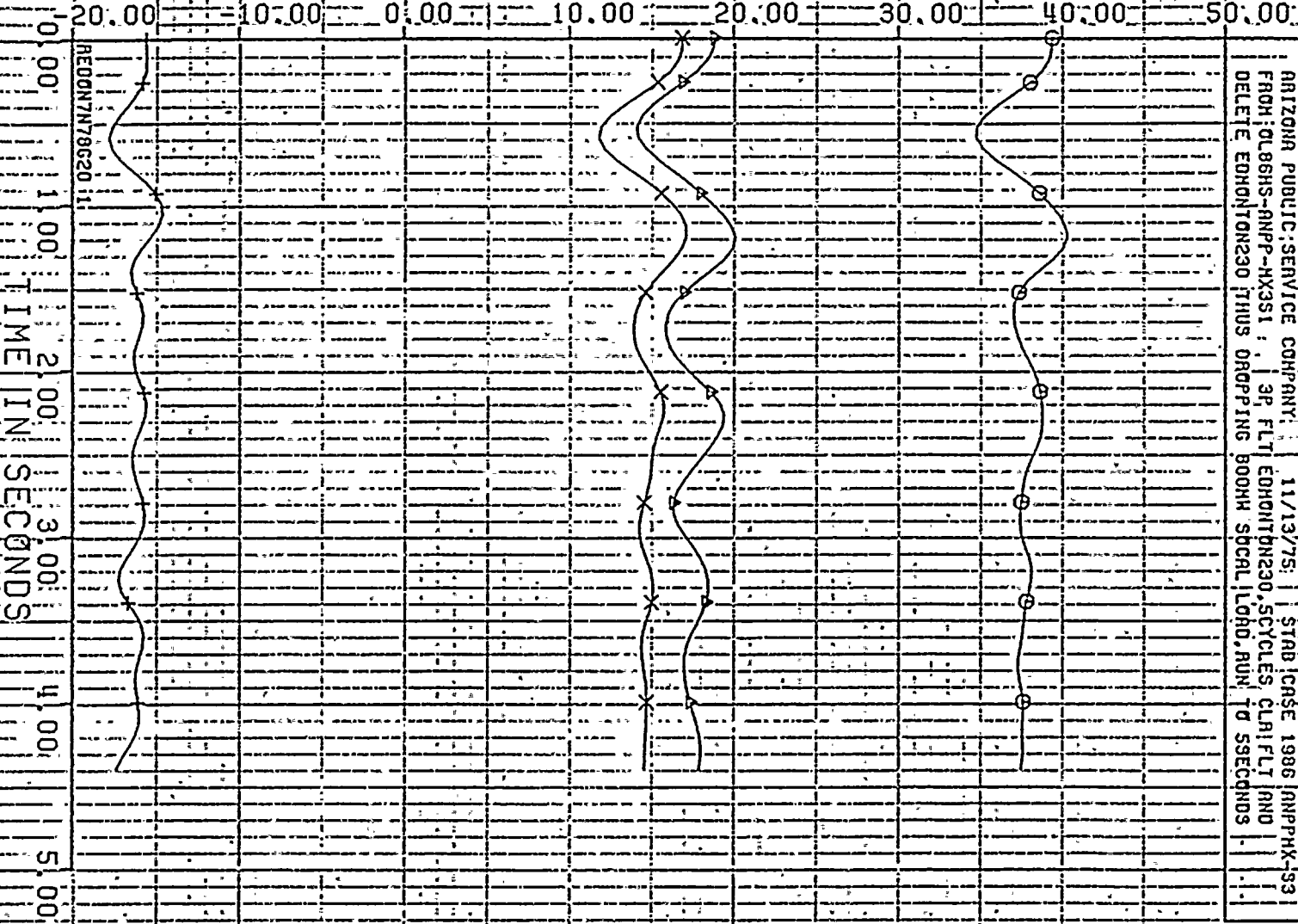
OCCT11L0230  
 HDENK0P1500  
 HANCS1R500  
 VRL1 1381

X  
 +  
 -  
 .  
 O





# GENERATOR ANGLE IN DEGREES

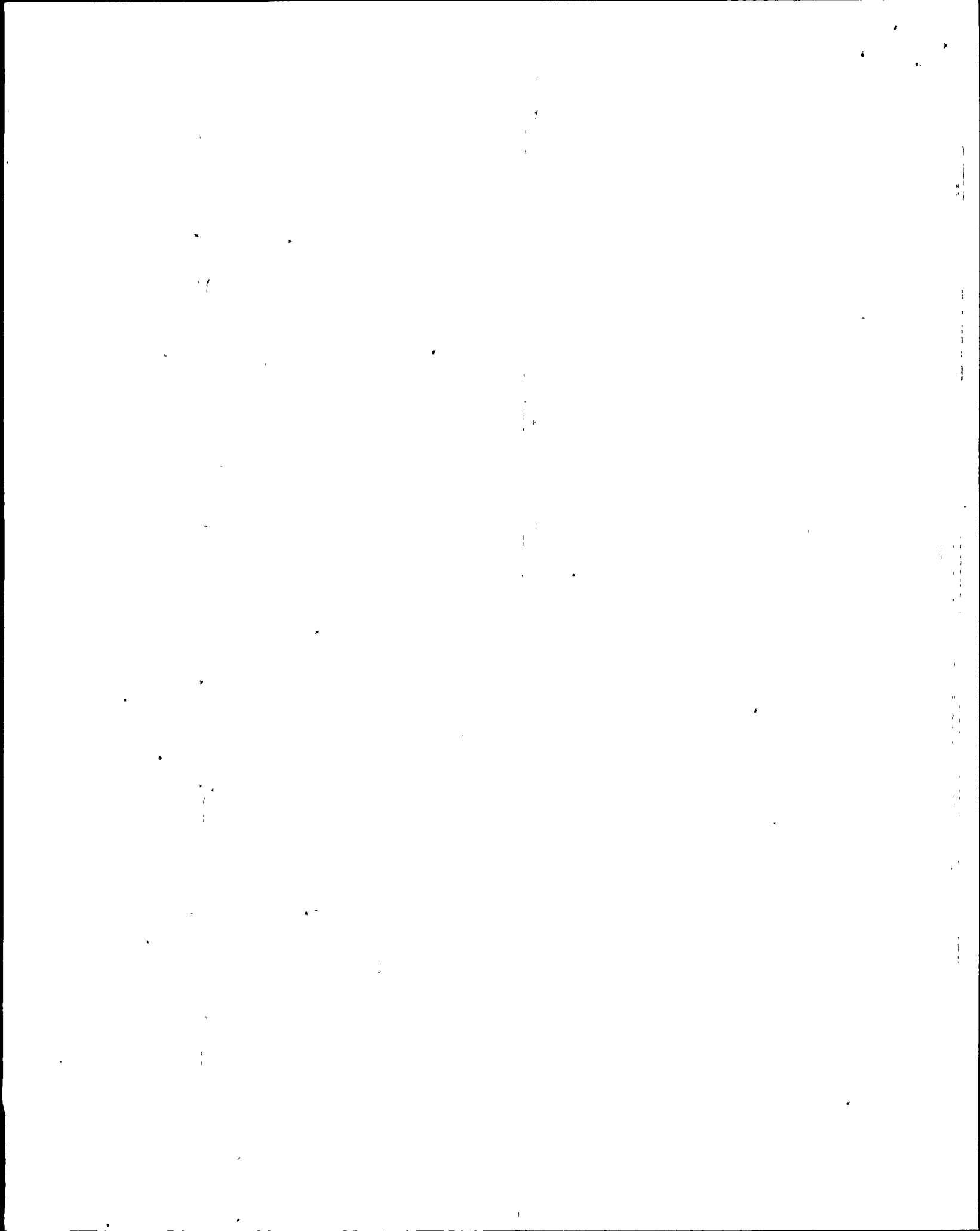


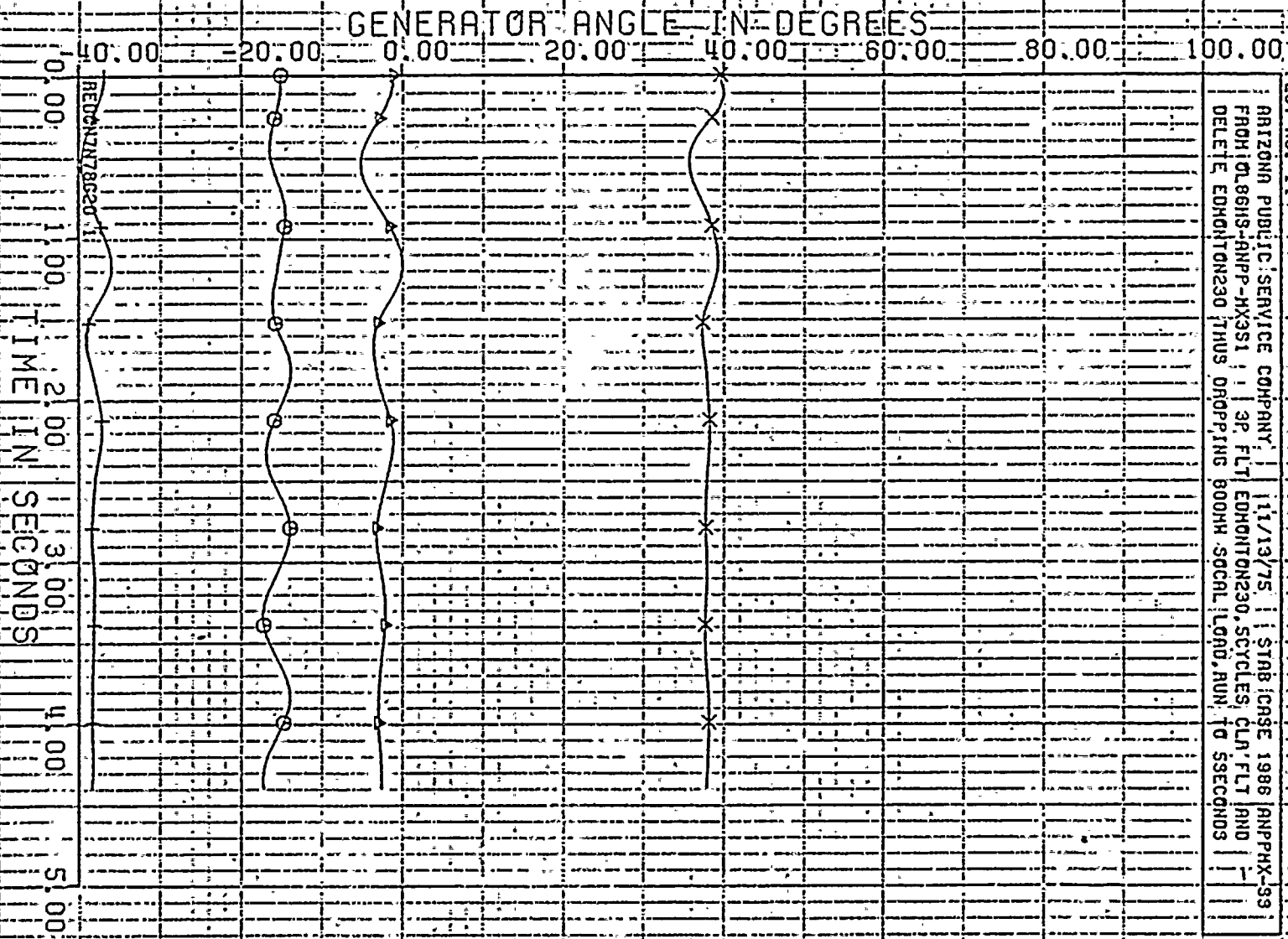
REDOINTN79G20.11

TIME IN SECONDS

PLOT NO. 13  
 ARIZONA PUBLIC SERVICE COMPANY  
 FROM: OL86HS-ANPP-HX3S1 : 3P FLTI EDHONTDN230, SCYCLES, CLAI FLT AND  
 DELETE EDHONTDN230 THUS DROPPING BOOMH SOCAL LOHD, RUN TO SSECOUNDS  
 11/13/75: STAB CASE 1986 (ANPPHX-33)

GLENCAR613.8 I - X  
 DAVIS 13.8 I - +  
 APACHE 213.8 II - A  
 CHOLLAR 22.0 II - O

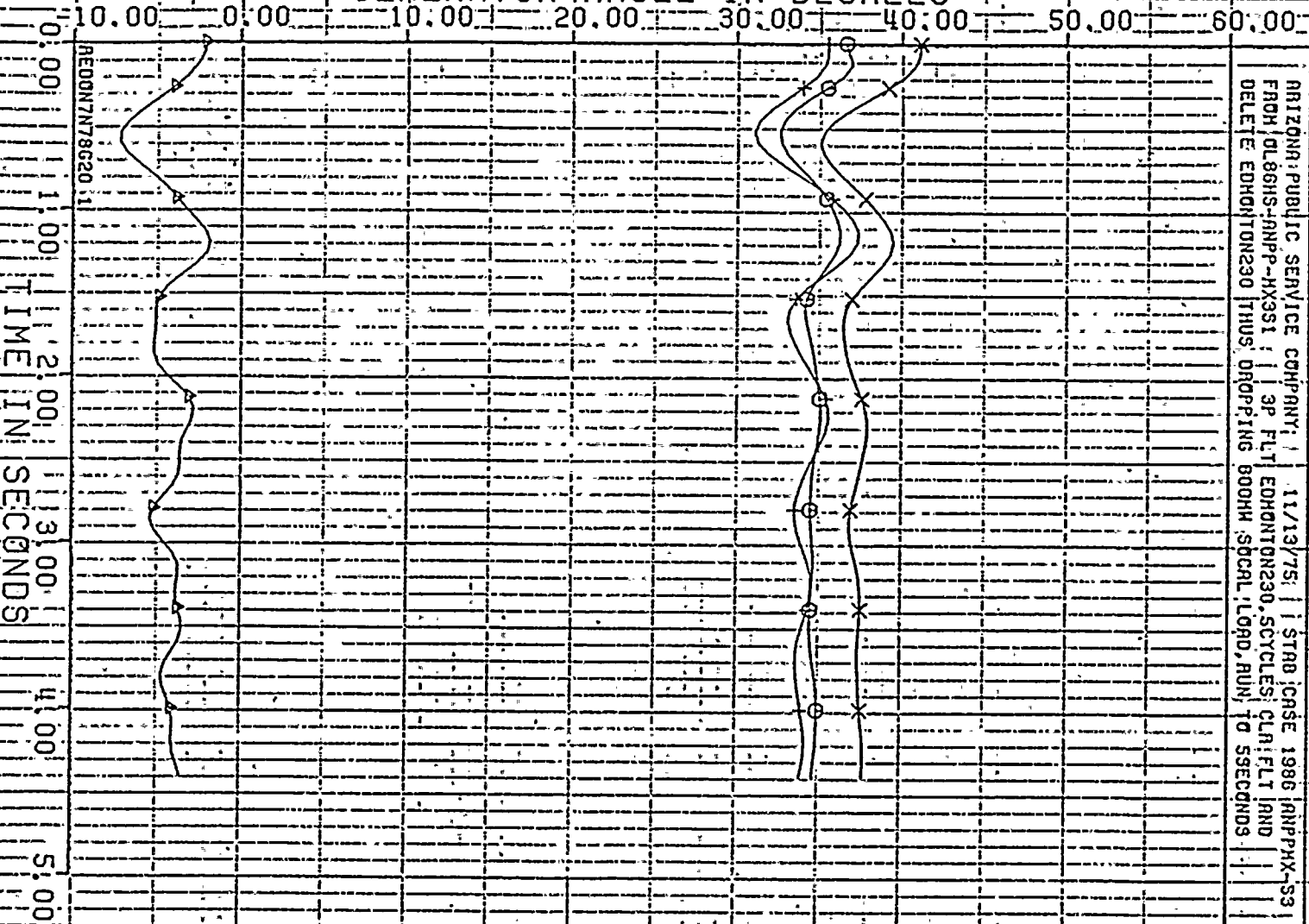




PLOT NO. 14  
 ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STATION 1986 ANPPHX-39  
 FROM DL86HS-ANPP-MX351 3P FLT EDHONTN230, SCYCLES, CLN FLT AND  
 DELETE EDHONTN230 THUS DROPPING 800MW SOCIAL LOAD, RUN TO SECONDS

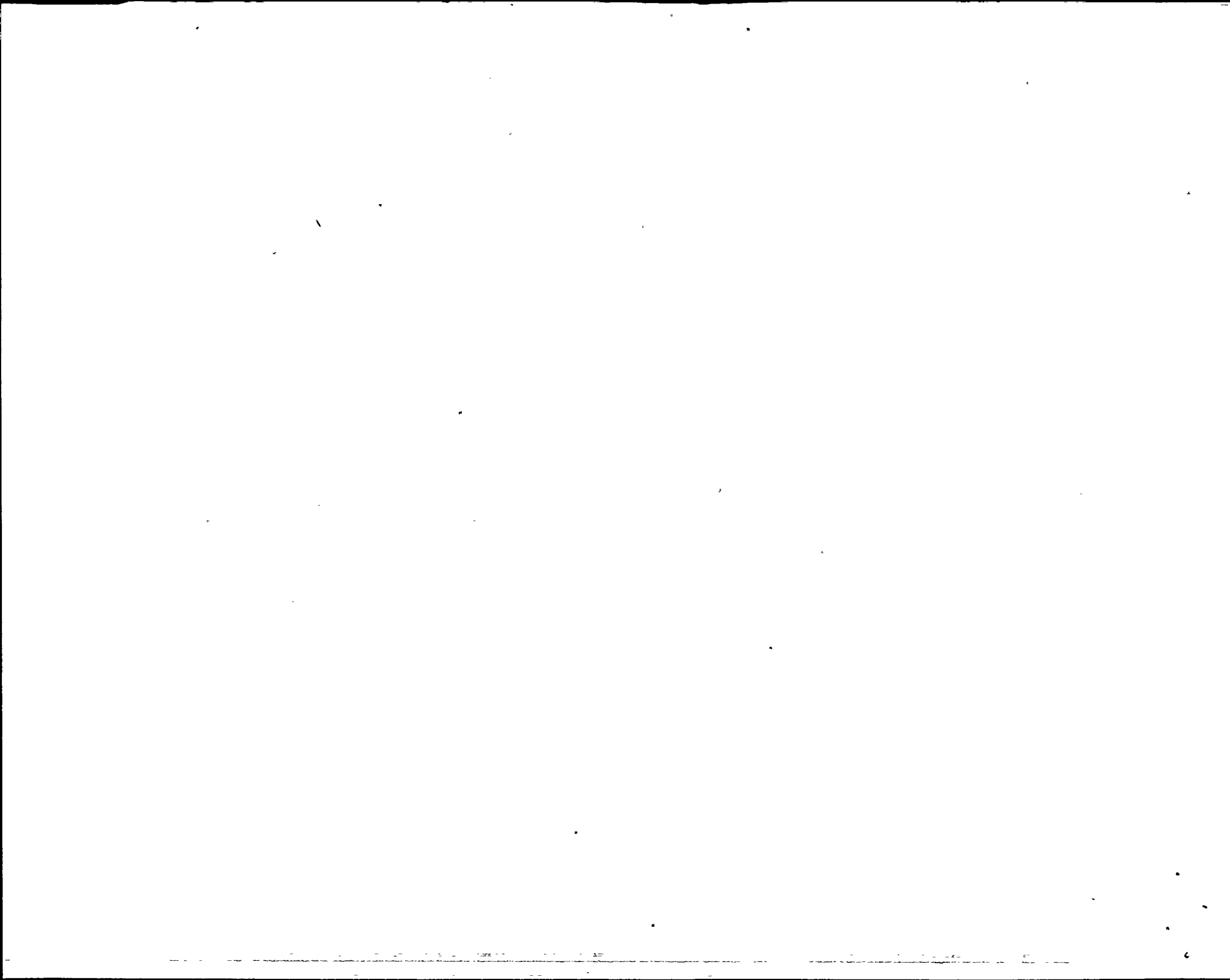
KRIFFB6126.011 - X  
 ACUAF63 18.011 - +  
 INVTG64 18.011 - A  
 HOOVER 18.511 - O

GENERATOR ANGLE IN DEGREES



PLOT NO. 15  
 ARIZONA PUBLIC SERVICE COMPANY  
 11/13/75  
 STD CASE 1986 ANPPHX-S3  
 FROM DL86HS-ANPP-MX31 3P FLT EDHONTOR230, SCYCLES: CUN, FLT AND  
 DELETE EDHONTOR230 THUS DROPPING BOOH, SPCAL, LOAD, RUN TO SECONDS

FCIGN\CC22.0 L1 - X  
 NUCCEN2 24.0 L1 - +  
 NENHANG313.8 L1 - A  
 NRYVAL0 128.0 L1 - O

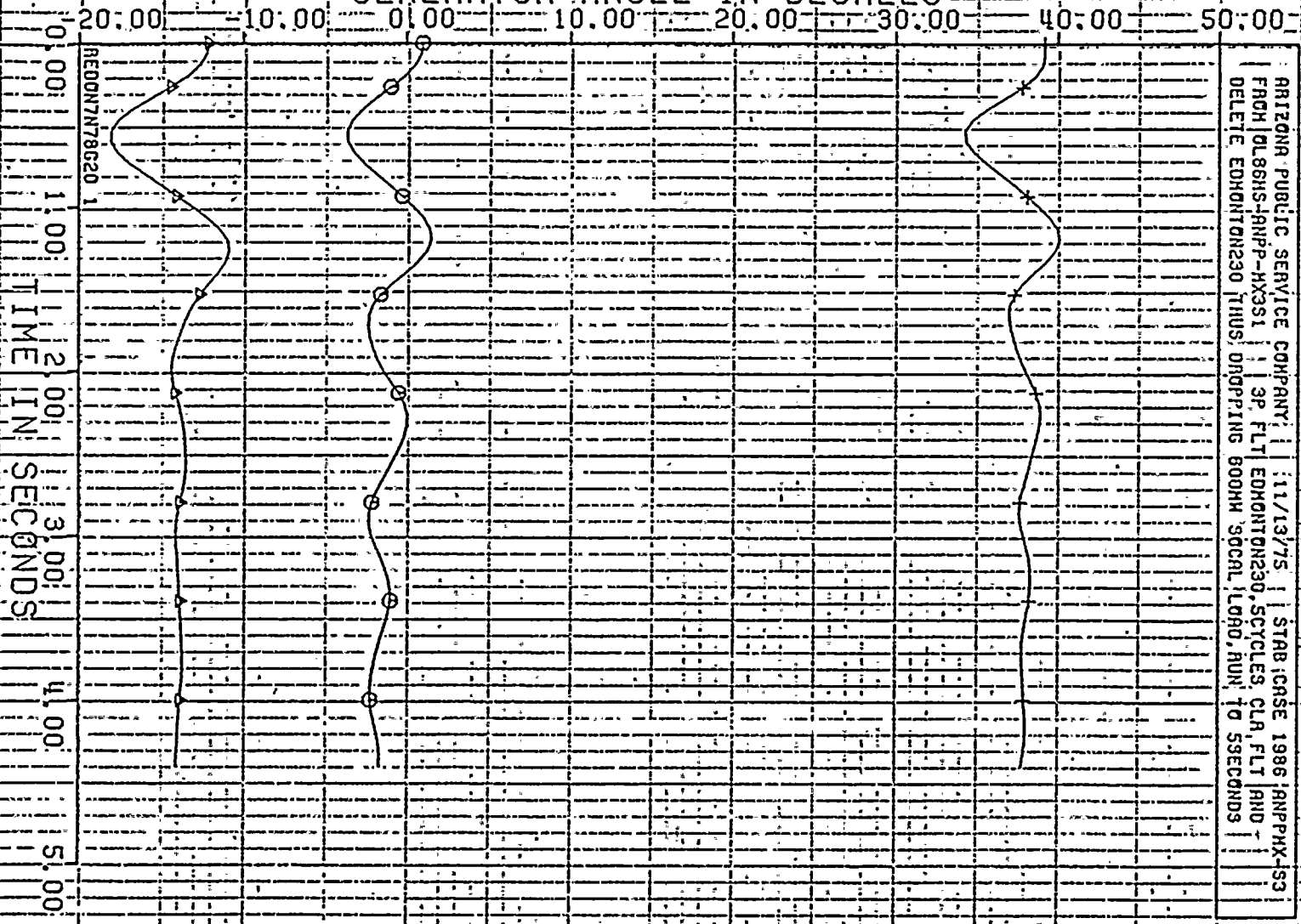


ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-S3  
 FROM 0686HS-ANP-HX331 3P, FLT EDHONTON230, SCYCLES, CLR, FLT AND  
 DELETE EDHONTON230 THUS, DROPPING 600M 90CAL 1080, RUN TO 5SECONDS

SJUAN C4122 1. = +  
 REV 63 13.8 1. = +  
 RT06 68 18.0 1. = +  
 0

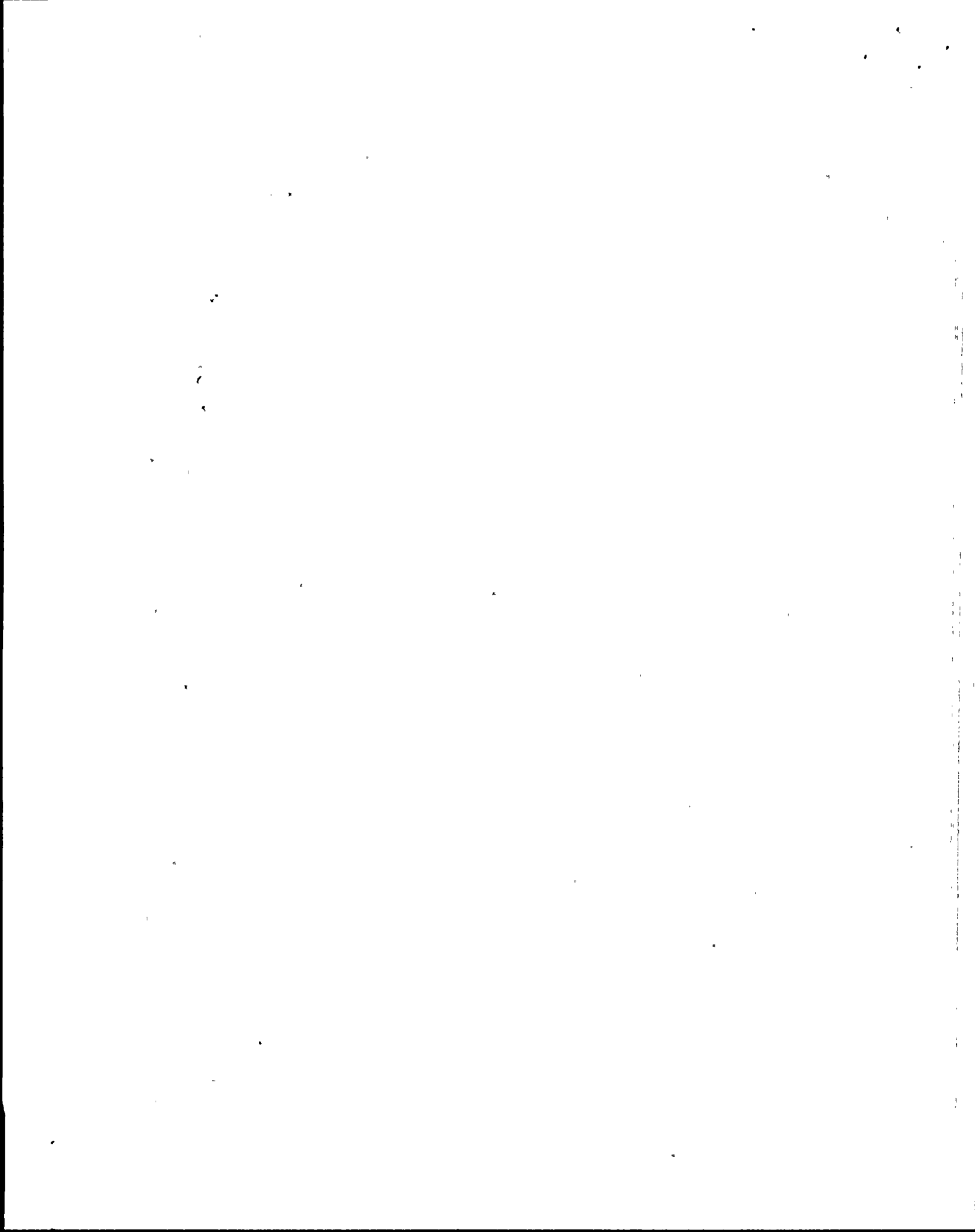
PLOT NO. 16

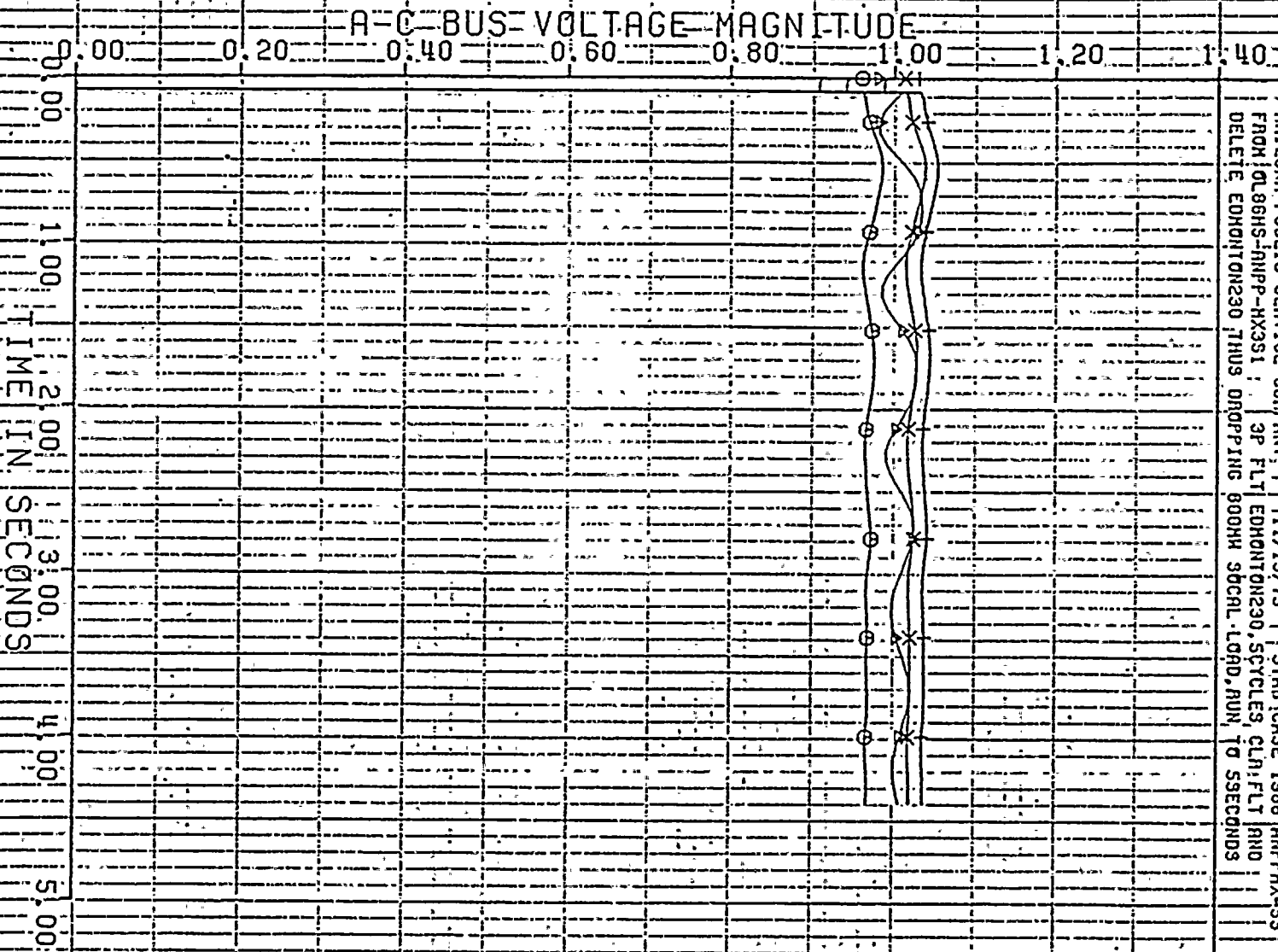
GENERATOR ANGLE IN DEGREES



REDOUN78620 1

0.00 1.00 2.00 3.00 4.00 5.00  
 TIME IN SECONDS



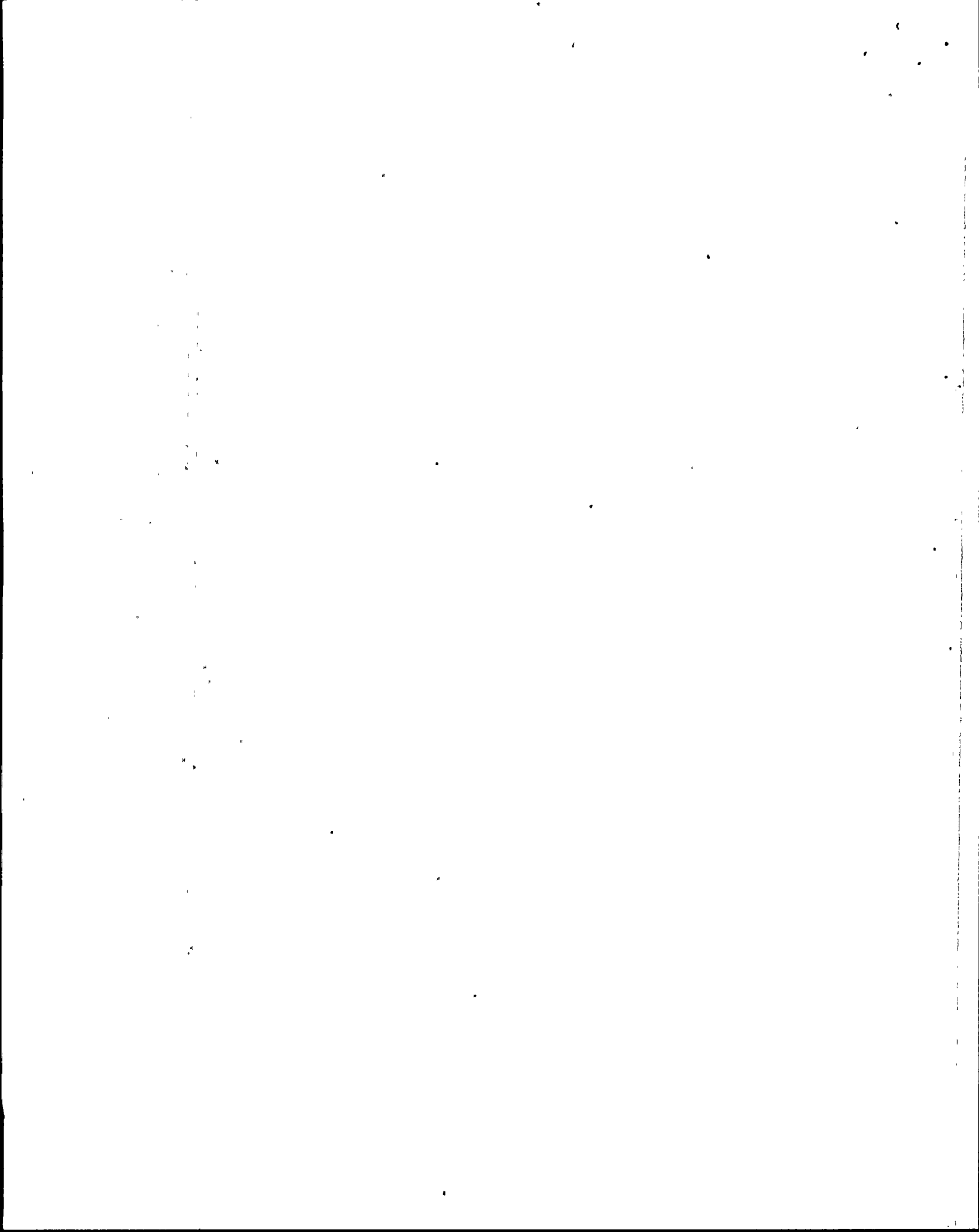


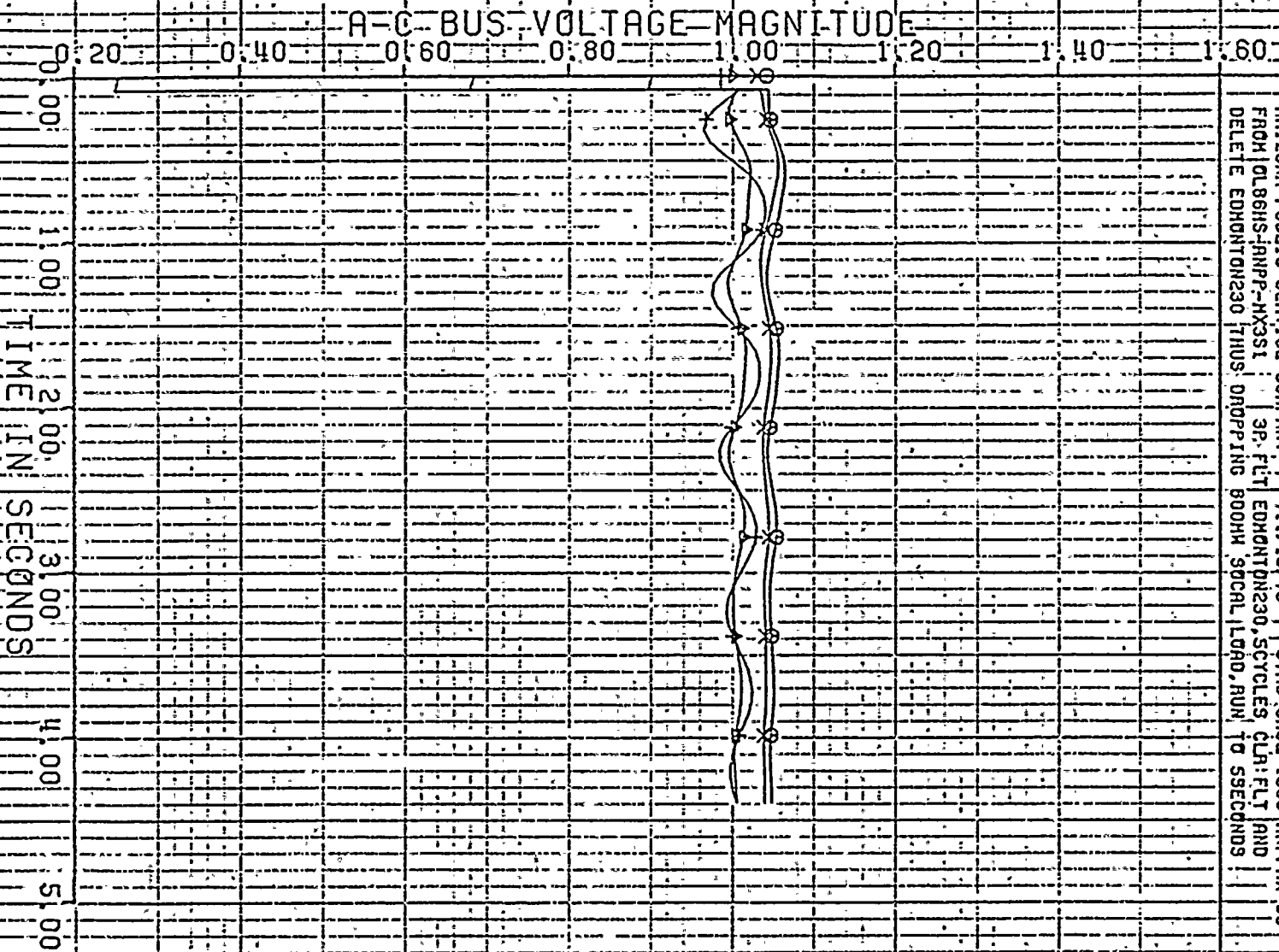
PLOT NO. 17  
 ARIZONA PUBLIC SERVICE COMPANY, 11/13/75, STAB CASE 1986 ANPFX-S3  
 FROM: 0L96HS-INPP-HX3S1, 3P FLT EDHONTON230, SCYCLES, CLN, FLT AND  
 DELETE EDHONTON230 THUS DRIPPING 600HZ STCR. LOAD, RUN TO 5SECONDS

LUGG 500.  
 EL00000500.  
 PASTOR1A230.  
 DEVERS 230.

X  
 +  
 A  
 O





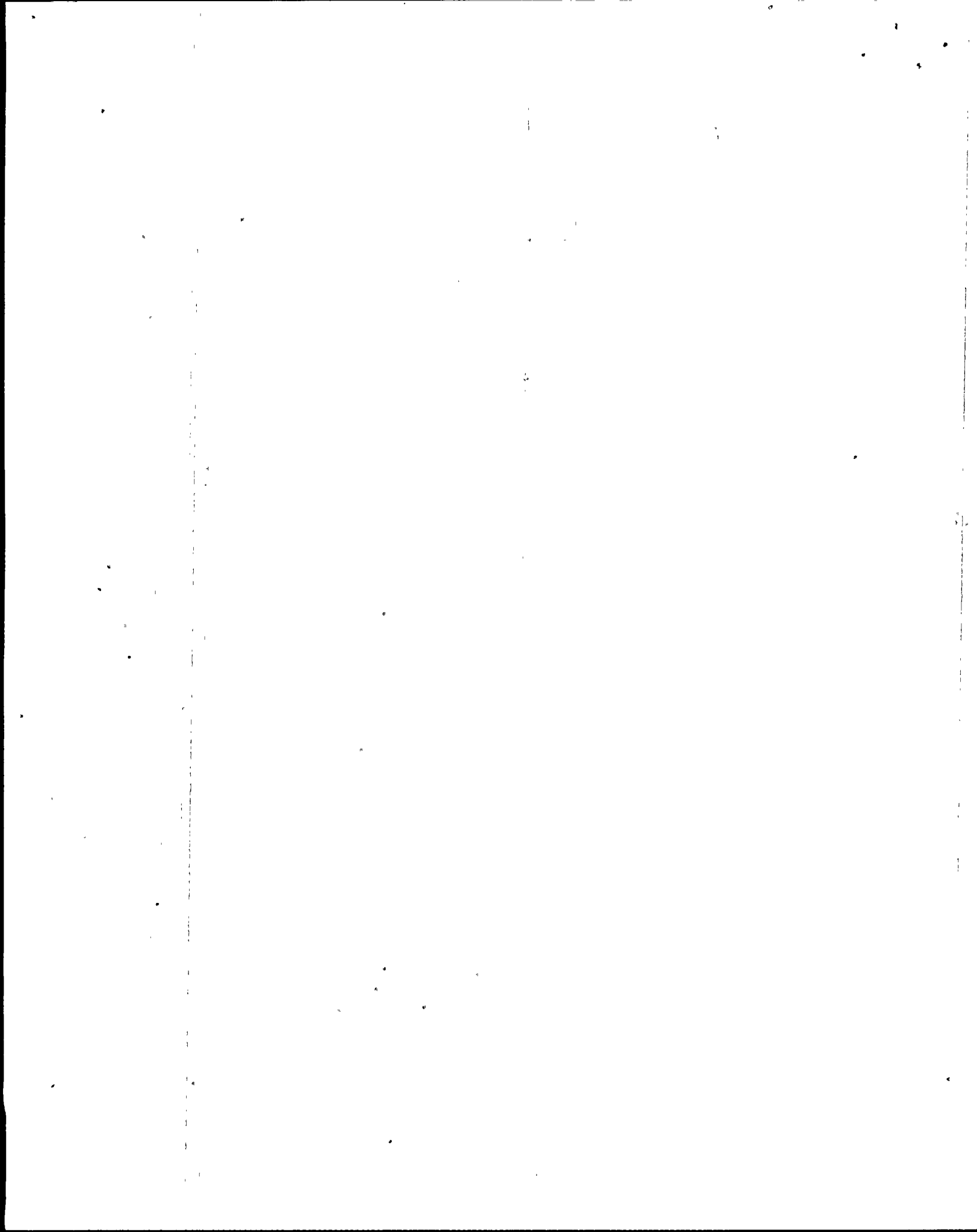


PLOT NO. 18

ARIZONA PUBLIC SERVICE COMPANY  
 FROM DL86HS-RNPP-HX31 3P-FLT EDONTDN230, SCYCLES CLR: FLT AND  
 DELETE EDONTDN230 THUS: DROPPING 800M 30CAL LOAD, RUN TO SECONDS

HOHVE: 500.  
 HRCUNDE230.  
 PARDE: 230.  
 VINCENT: 500.

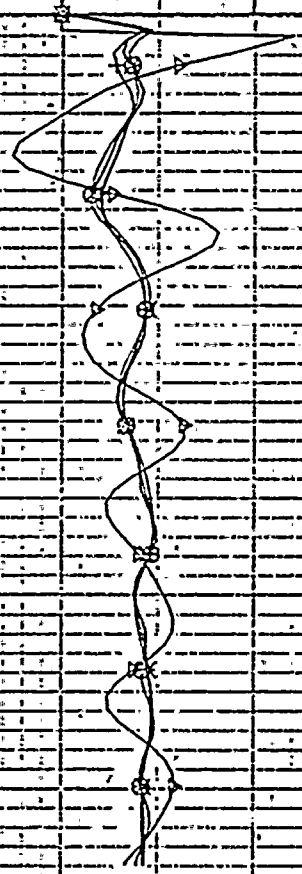
X  
 +  
 A  
 O



A-C BUS FREQ. DEV. CYCLES/SE

0.10 0.00 0.10 0.20 0.30 0.40 0.50 0.60

01.00 1.00 2.00 3.00 4.00 5.00  
TIME IN SECONDS

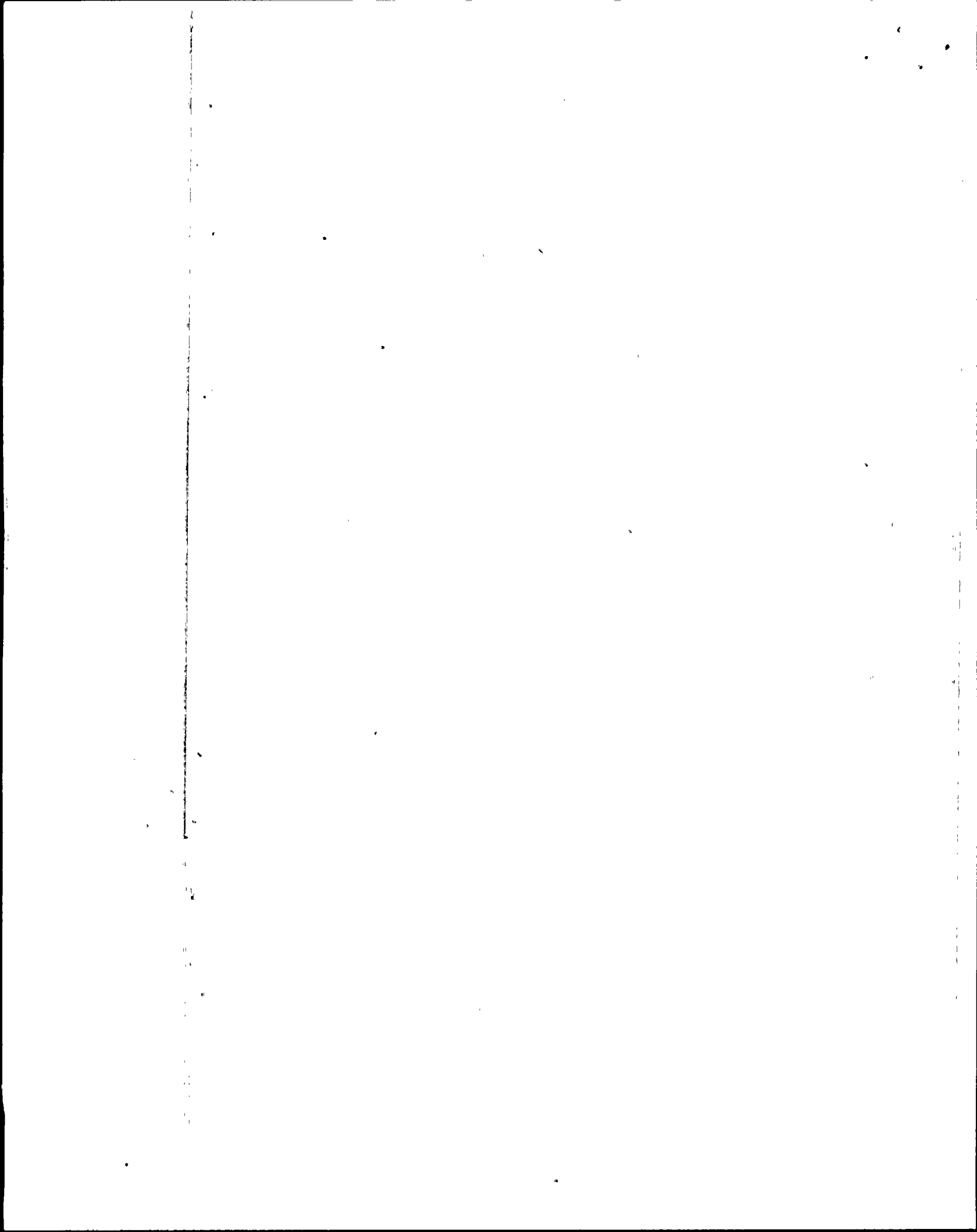


PLOT NO. 19

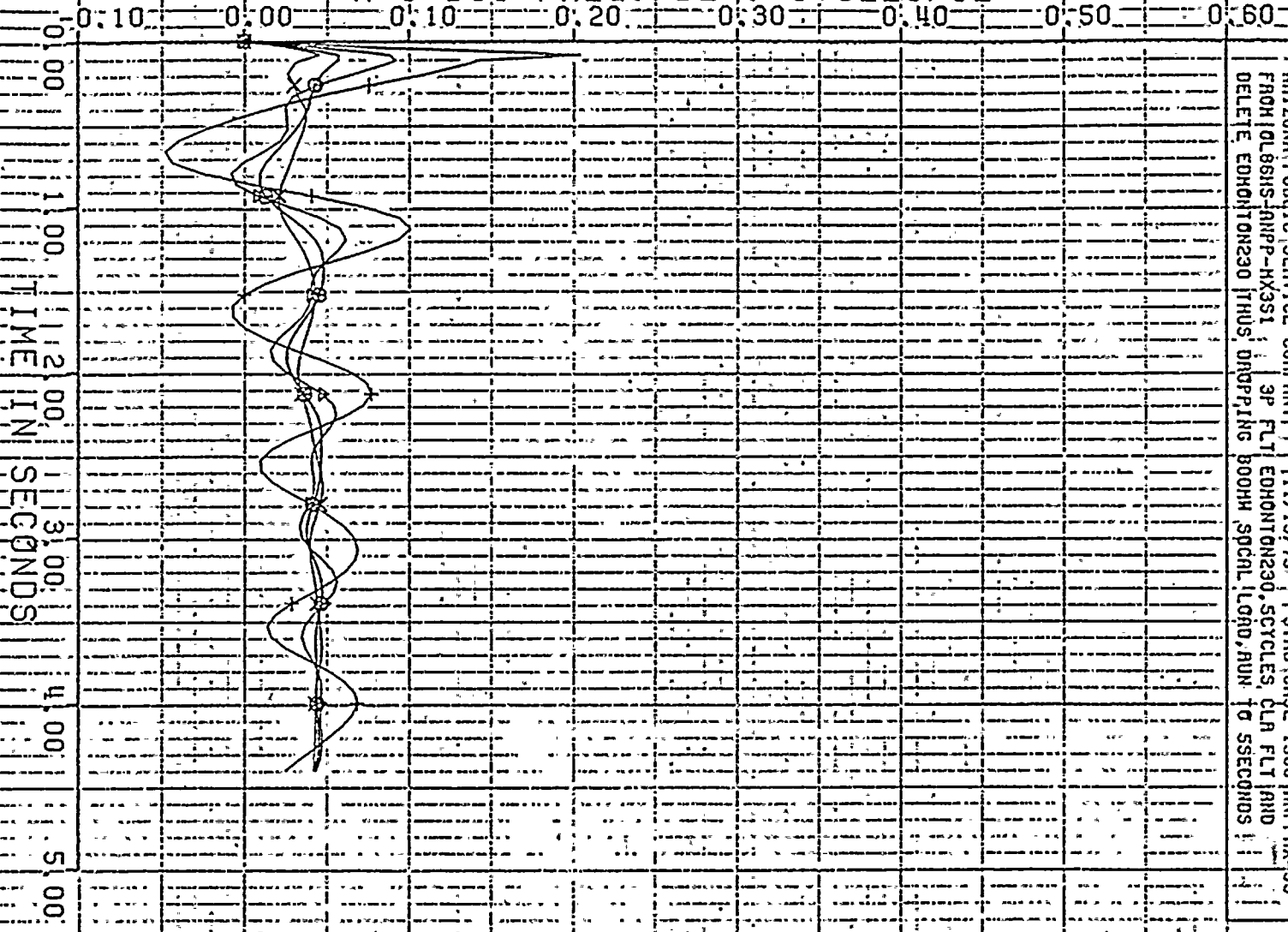
ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB. CASE 1986 ANPPHX-53  
FROM DL86HS-ANPP-NX351 3P FLT CONDITION230, CYCLES CLR FLT AND  
DELETE: CONDITION230 THUS DROPPING BOOTH SOCIAL LOAD, RUN TO SECONDS

LUGS 500.  
ELOGRAD0500.  
PAST081N230.  
DEVENS 230.

X  
+  
-  
-  
-  
G



A-C BUS FREQ. DEV. CYCLES/SE

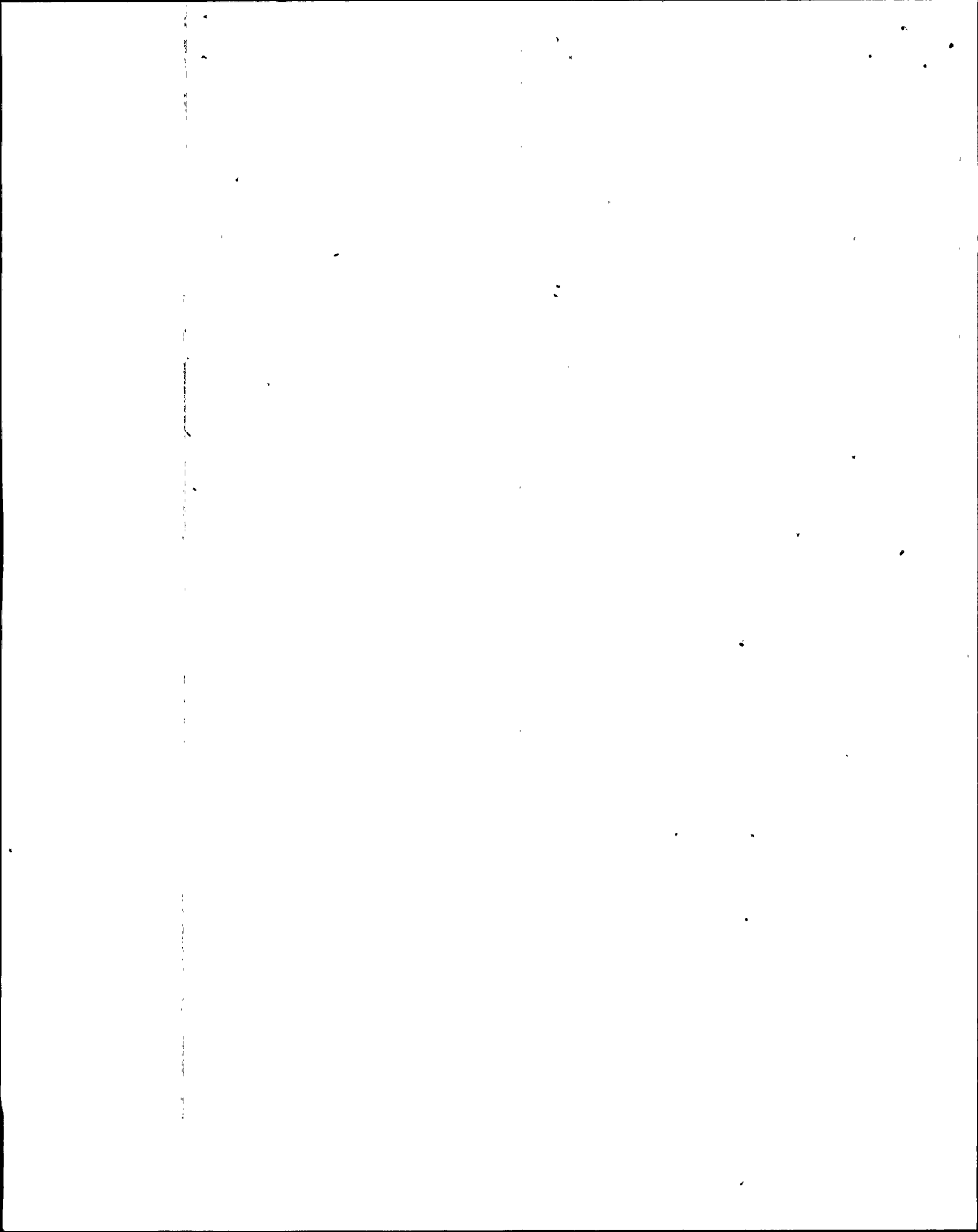


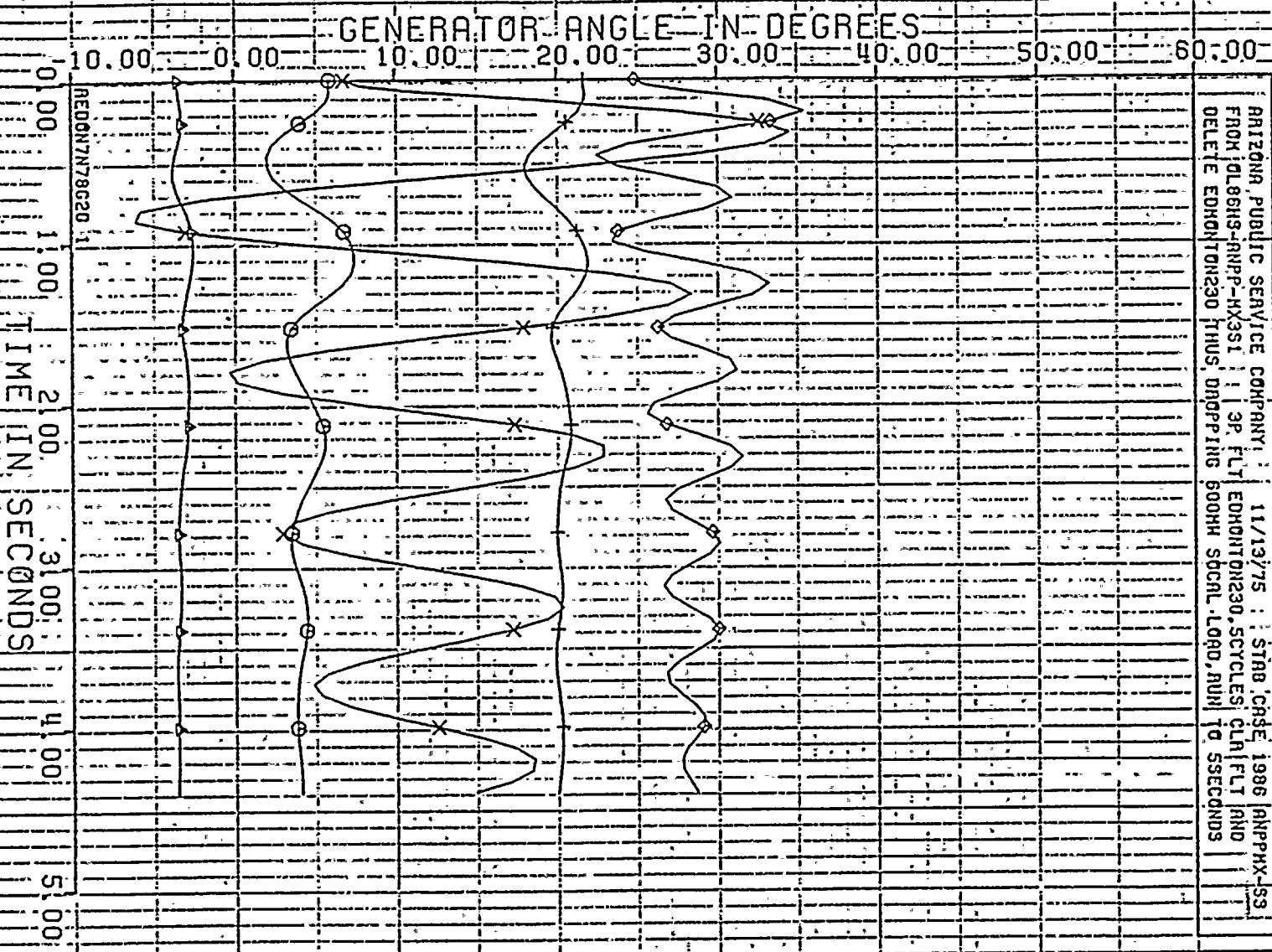
PLOT NO: 20

ARIZONA PUBLIC SERVICE COMPANY | 11/13/75 | STAB CASE 1900 ANPRX-93  
 FROM 0685S-ANPP-NX31 | 3P FLT EDHONTN230, 5CYCLES, CLN FLT AND  
 DELETE EDHONTN230 THUS, DRIPPING BOOH, SPCL LOAD, RUN TO SECONDS

HONEY 500.  
 HUGUENEN230.  
 PAROE 230.  
 VINCENT 500.

X  
 +  
 A  
 O





PLOT NO. 21

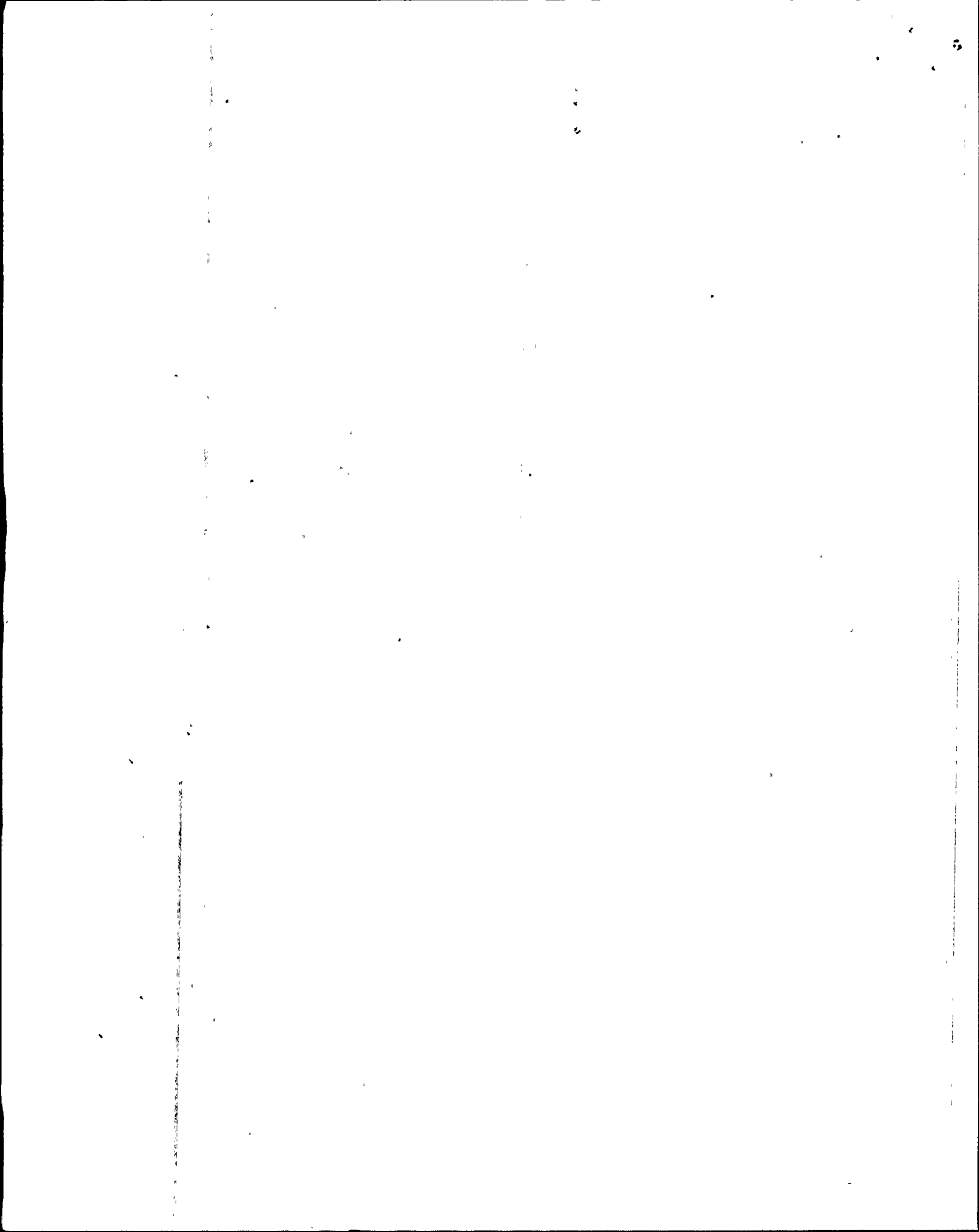
ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-553

FROM DL68H3-RNPF-HX351 3P FLT EDON7N78G20.1 SCYCLES CLR FLT AND

DELETE EDON7N78G20.1 THIS DROPPING 600MH SPCAL LOAD, RUN TO 55SECONDS

01ND01226.0	11	+	⊙
BICREK13.8	11	+	⊙
MOINV1CC22.0	11	+	⊙
RLNHT56620.0	11	+	⊙
S.01007A322.0	11	+	⊙



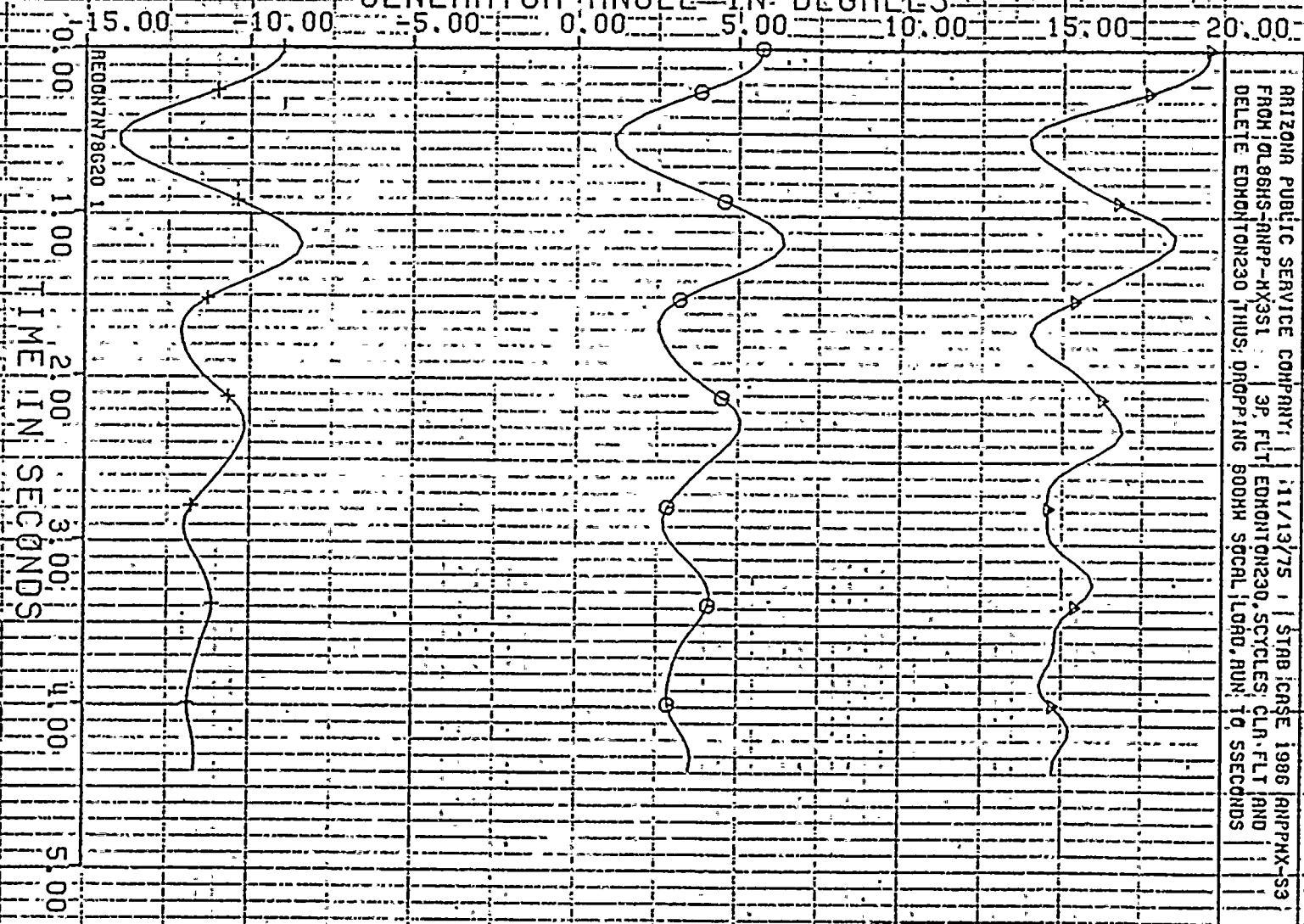


PLOT NO. 22

ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-53  
 FROM: 0186HS-ANP-PHX351 3P, FLT EDHONTON230, SCYCLES: CLN-FLT AND  
 DELETE EDHONTON230 THUS: DRGPPING 800HM SPCAL, LDRD, RUN: TO SSECONDS

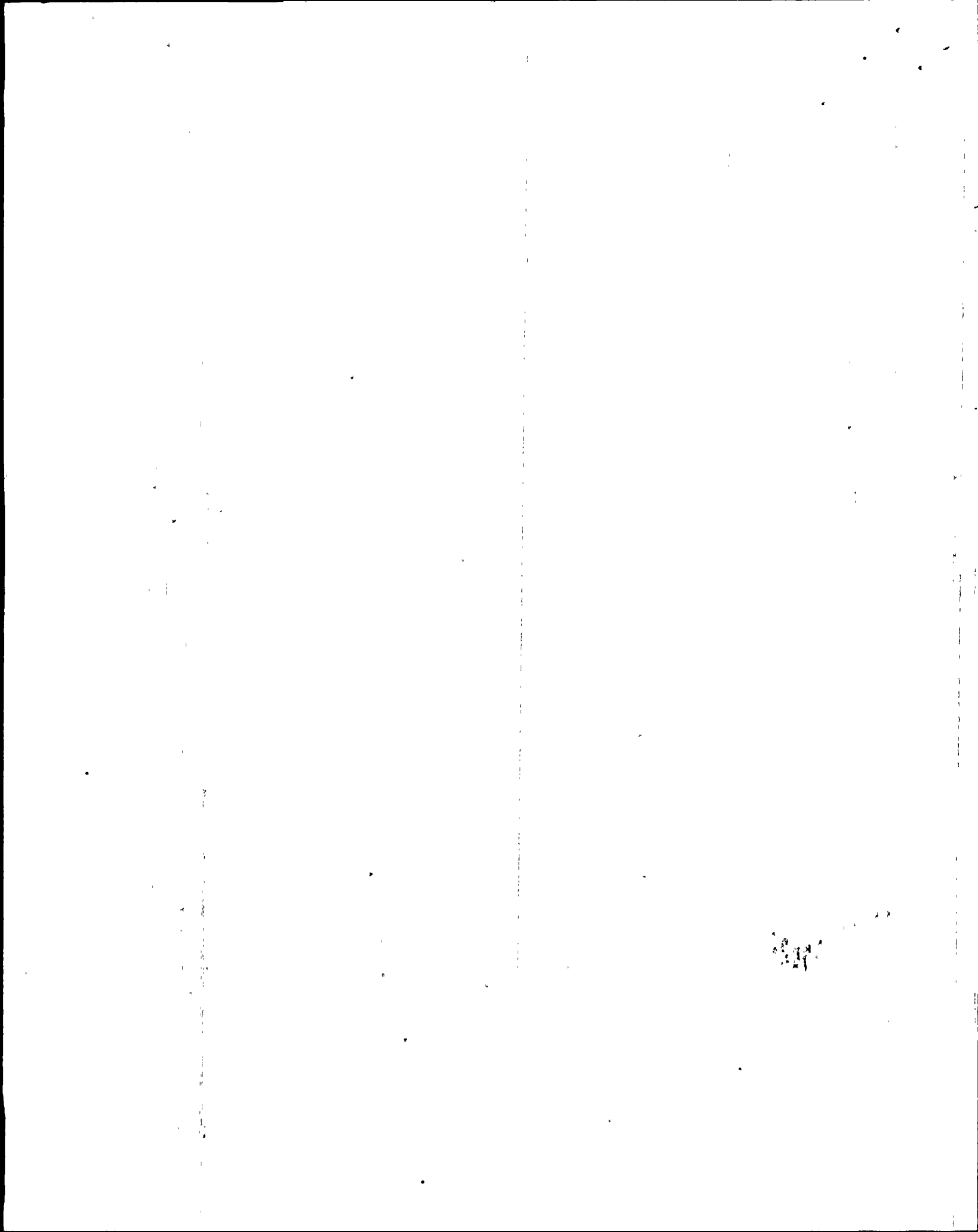
REV G1 / 13.8 1 - +  
 APRCHÉ 113.8 1 - A  
 NEHHRNG613.8 1 - O

# GENERATOR ANGLE IN DEGREES

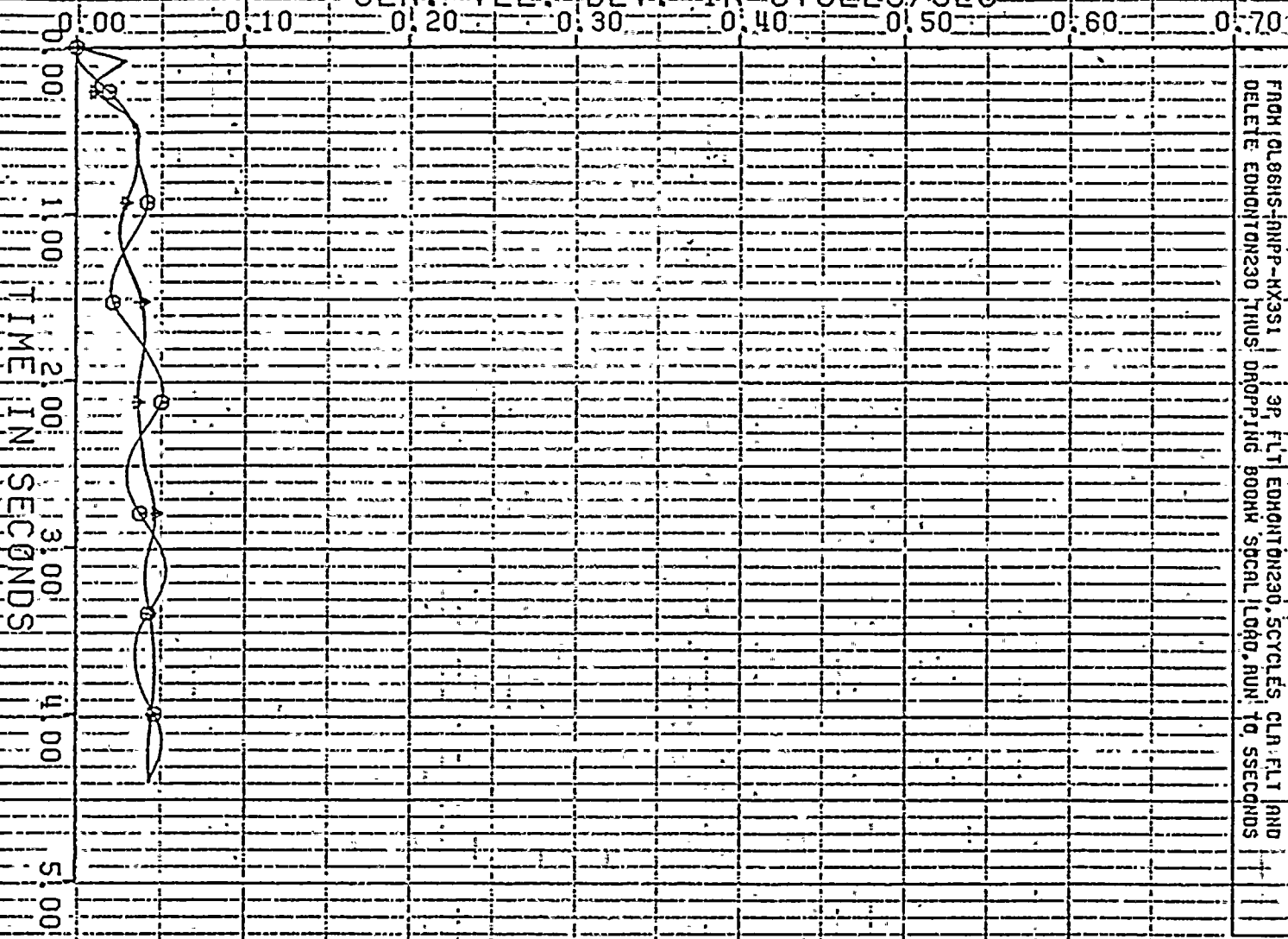


REC00N7N78620 1

0.00 1.00 2.00 3.00 4.00 5.00  
TIME IN SECONDS



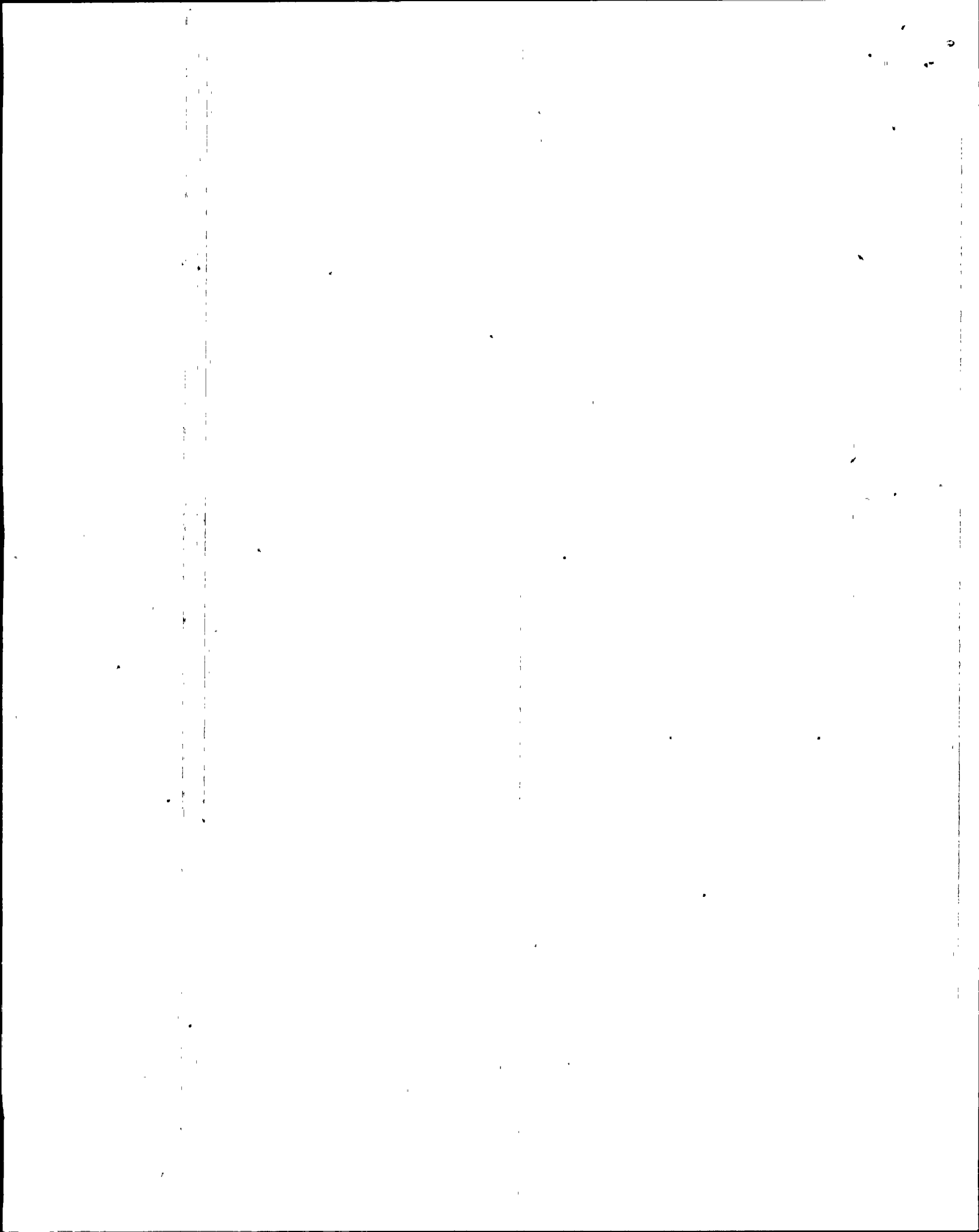
GEN. VEL. DEV. IN CYCLES/SEC

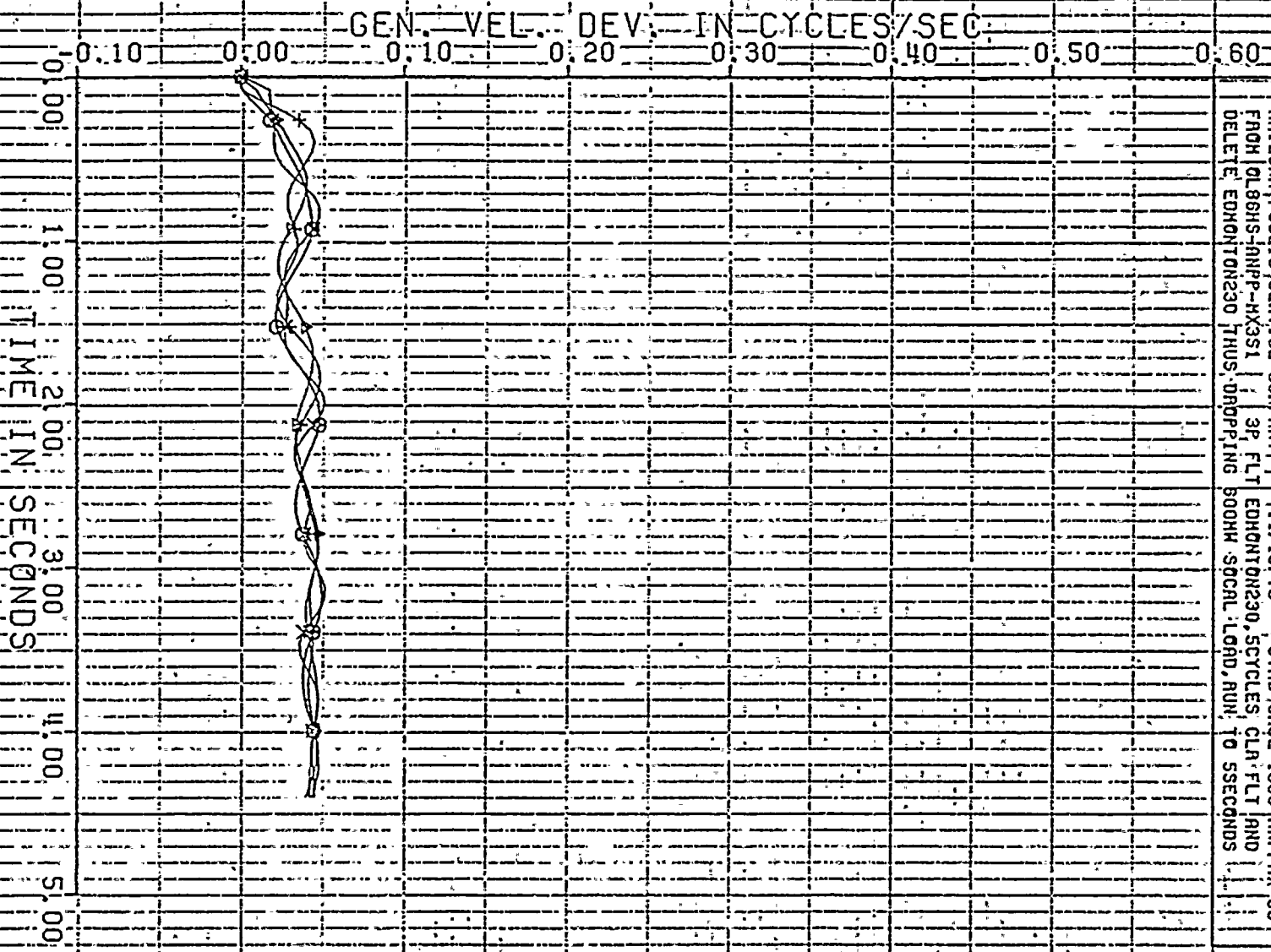


LOT NO. 23

ARIZONA PUBLIC SERVICE COMPANY  
 FROM OLBMS-IMP-AX31 3P FLT EDHONTON230 SCYCLES, CLN FLT AND  
 DELETE EDHONTON230 THUS: DROPPING 800HZ SICAL LOAD, RUN: TO SECONDS  
 11/13/75 STAB CASE 1986 ANPAX-53

NAVAJ0 126.0 11 - +  
 KRIPA0126.0 11 - +  
 AIDG 00 18.0 11 - +

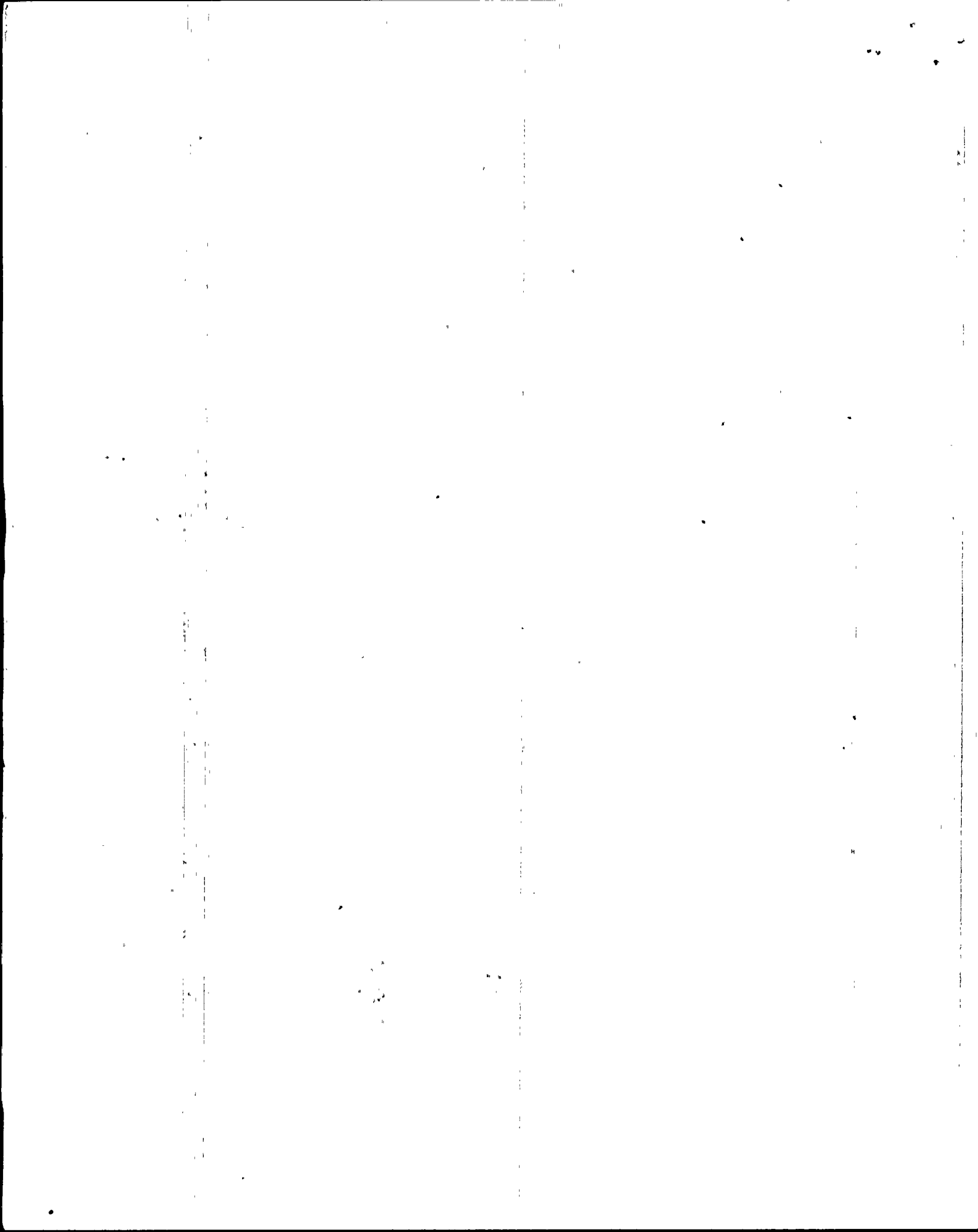


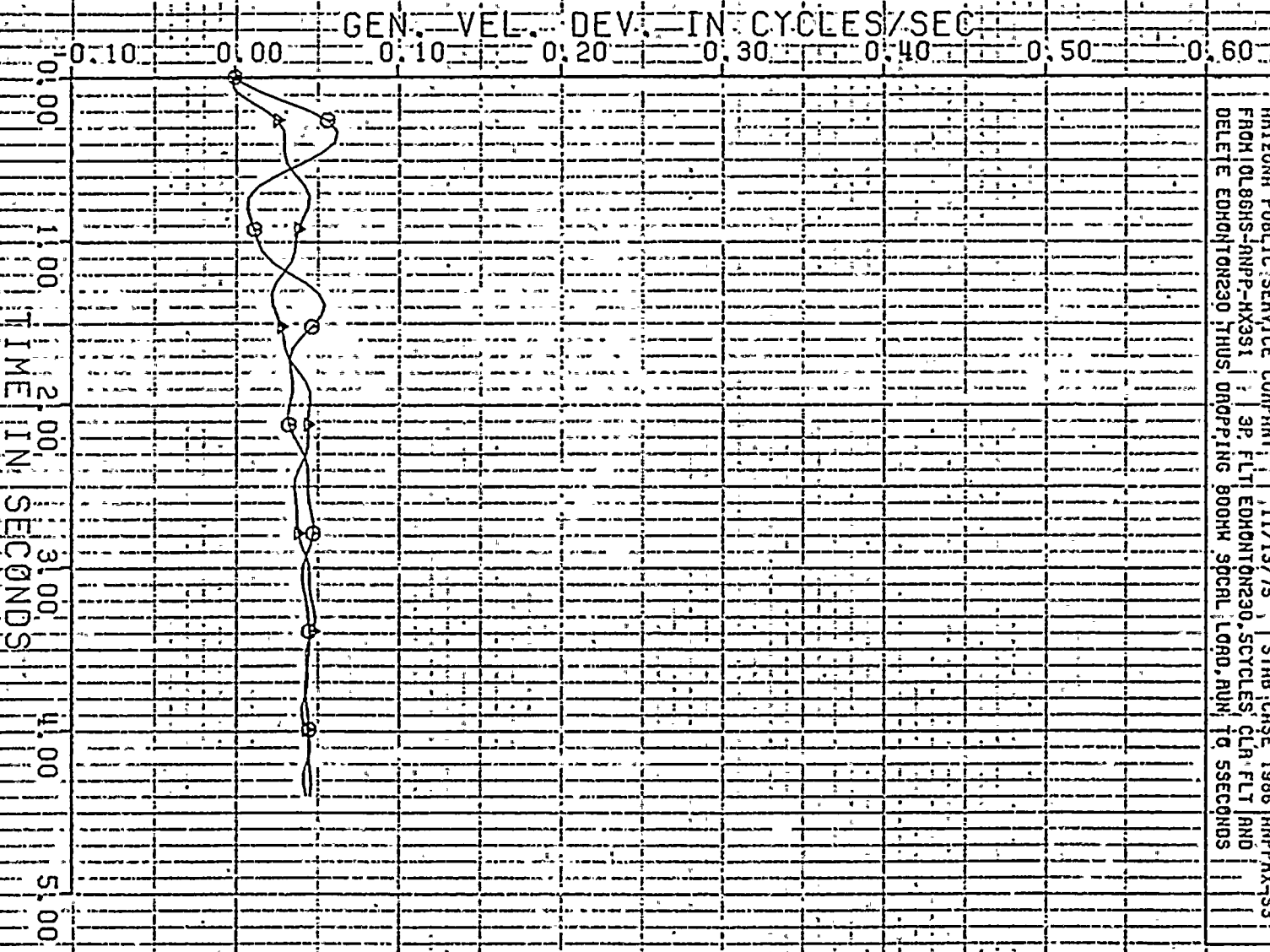


PLOT NO. 24

ARIZONA PUBLIC SERVICE COMPANY | 11/13/75 | STAB CASE 1986 ANPPHX-53  
 FROM 0186HS-ANPP-HX351 | 3P FLT EDHONTON230, SCYCLES CLA FLT AND  
 DELETE EDHONTON230 THUS DROPPING 800H SOCIAL LORD, RUN TO 5SECONDS

GLCNCAN613.8 11.X  
 ACURFR3 18.0 11.X  
 HOHRY1CC32.0 11.X  
 REV 01 13.8 11.X





PLOT NO: 25

ARIZONA PUBLIC SERVICE COMPANY 11/13/75 STAB CASE 1986 ANP-PHX-S3  
 FROM: OLBHS-ANP-HX31 3P, FLT EDONTON230, SCYCLES CLR: FLT AND  
 DELETE EDONTON230 THUS, DROPPING 800HW 30CRL, LOAD, RUN TO 5SECONDS

00011013.8 11.1 A  
 RE00178620.0 11.1 O



