CHAPTER 6

ANALYSIS OF RESULTS OF INFORMATION SURVEY

As was mentioned earlier, the total number of returned and complete[1] Utility Company Survey instruments was 291 and the number of Master Meter Survey instruments was 371. SASC recognizes that these figures represent very small samples out of the total populations sampled. Therefore, considerable care was taken in the analysis of the data to avoid making erroneous conclusions or attempting to apply sophisticated statistical analysis techniques on "soft" data. The data was indicative and informative, however, as will be seen in the histograms that follow. For the reader who is more acquainted with vertical histograms, he or she night need to adjust to the horizontal histograms provided by the SPSS. This should not be difficult to do since the meaning is the same.

6.1 UTILITY COMPANY SURVEY

SASC relied upon Brown's Directory of North American Gas Companies, 91st Edition (1977) for the names and addresses of natural gas utility companies in this country. The 92nd Edition was "in press" and not expected to be available until January 1979, which was judged to be too late for the needs of the project. In anticipation

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[1] Although more of each of the instruments were received by the project, a decision was made early in March to "freeze" the data bases at the above figures in view of the Phase I schedule. Validating data by telephone with the respondents is frequently time consuming and could have caused serious delays, if continued. Data that was questionable or incomplete was deemed invalid by the study team, unless clarification by telephone was accomplished.

of the changing nature of staffing in companies, and the non-standard staff position titles between companies, a decision was made to address the utility instruments to the "President" of each company. This could have caused some data mortality since it was learned later that in some of the larger companies, no record could be found of having received the instrument. Additional instruments were furnished when it was learned that this had occurred. Another problem that was present was with companies having operating subsidiaries in more than one state. Since attempting to sort this out would not have been cost-effective to the Project, it was decided to mail insrruments to all listed companies serving natural gas in each state. This may have caused some confusion out in the industry, but the intent was consistent with the need to segregate the data by state. To reinforce this intent, the statement

"(PLEASE COMPLETE ONE FORM FOR EACH STATE SERVED)"

was placed at the top of the first page of the instrument.

6.1.1 Utility Company Data

The instrument design was relatively standard in format requiring company information, a unique alpha/numeric control code, respondent's name, position and telephone number. It is of interest to see a display of the distribution of the 291 returned instruments across the 50 states shown in Table 6-1. The numerical codes in the table relate to each state (vertically) and the numbers in parentheses on thehorizontalbars are the frequencies or counts

36/39/79 FILE - GO - CREATED 36/39/79 PA61 3

STATE *STATE SERVING*

COCE

1. **** (1)
I AK
2. ********** (19)
I AL
3. ********** (5)
I AR
4. ********* (3)
I AZ
5. **** (1)
I CA
6. ..... (11)
I CO
9. ****** (2)
I DE
10. ..... (15)
I PL
11. ********** (6)
I GA
13. ..... (9)
I IA
14. **** (1)
I ID
15. ********** (5)
I IL
16. ********** (10)
I IN
17. ********** (13)
I KS
18. ********** (10)
I KY
19. ********** (8)
I LA
20. ..... (11)
I MA
21. ********** (6)
I MD
22. **** (1)
I ME
23. ********** (7)
I MI
24. ********** (11)
I MN
25. ..... (11)
I MO
26. ********** (6)
I MS

TABLE 6-1
(Page 1 of 2)

```
I
27. ********* (     3)
I  MT
I
I
28. ********** (     6)
I  NS
I
I
29. **** (     1)
I  ND
I
30. ********** (     6)
I  NE
I
I
31. ********* (     3)
I  NH
I
I
33. ****** (     2)
I  NM
I
I
35. ****************************** (    12)
I  NX
I
I
36. ******************* (     7)
I  OH
I
I
37. ************** (     5)
I  OK
I
I
38. **** (     1)
I  OR
I
I
39. ********************* (     8)
I  PA
I
I
40. *********** (     4)
I  RI
I
```



```
I
41. *********** (     4)
I  SC
I
I
42. ****** (     2)
I  SD
I
I
43. ********************************************** (    18)
I  TN
I
I
44. ************************ (     9)
I  TX
I
I
45. **** (     1)
I  UT
I
I
46. ********** (     6)
I  VA
I
I
48. ************** (     5)
I  WA
I
I
49. ************************ (     9)
I  WI
I
I
50. *********** (     4)
I  WV
I
I
51. ********* (     3)
I  WY
I
I     ,/////I.........I.........I.........I     ,/////I
0        4         8        12        16        20
FREQUENCY
```

VALID CASES 291 MISSING CASES 0

TABLE 6-1
(Page 2 of 2)

of instruments in the data base from the respective states. Note that there are no validated instruments from CT, DC, HI, NJ, NV, and VT[2]. Another element of interest was the date that the form was completed, which required a month/year entry, and is shown in Table 6-2. This date was important to the project, since some numeric entries requested on the form were values needed for all of 1978[3]. In instances where respondents did not make date entries, SASC's "date received" imprint was used for this element. Table 6-2 shows that the majority of those responding did so within 30-75 days after receiving the instrument. The types of companies that responded may be seen in Table 6-3, which shows that over one half of those responding were Distribution companies and approximately 32% were Municipal Gas Systems, considered by some as the ultimate master meter owner/operator. The remaining two elements of information requested in this section, Miles of Pipeline Owned and Natural Gas Sold, were numeric, and the reported values required grouping as can he seen in Tables 6-4 and 6-5. These tables show that 45% of the companies responding owned 100 or less miles of pipeline (approximately 3% had over 5,000) and half sold over 1,000,000 Mcf in 1978 (approximately 2% sold over 100,000,000 Mcf).

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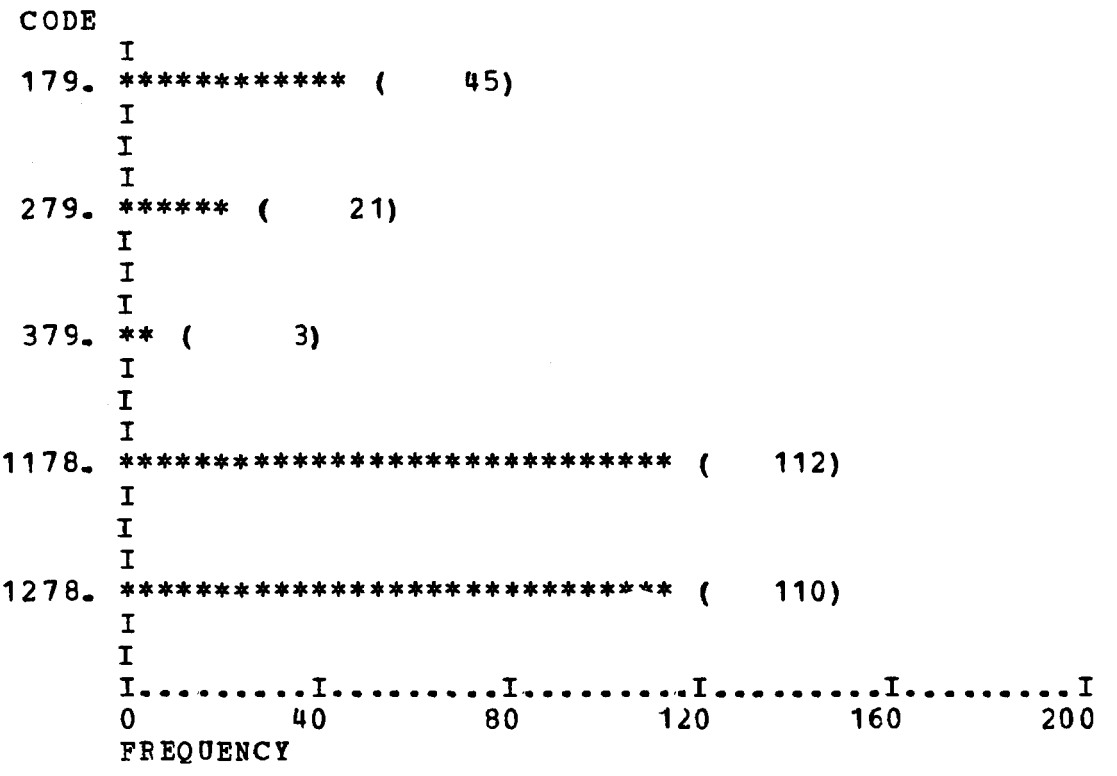
2 Standard state abbreviations used by the U.S. Post Office

3 The Phase I project spanned parts of 1978 and 1979, which did not coincide with DOT's 12 calendar month reporting requirements for gas utility companies. Hence, some numeric values provided have to be projections.

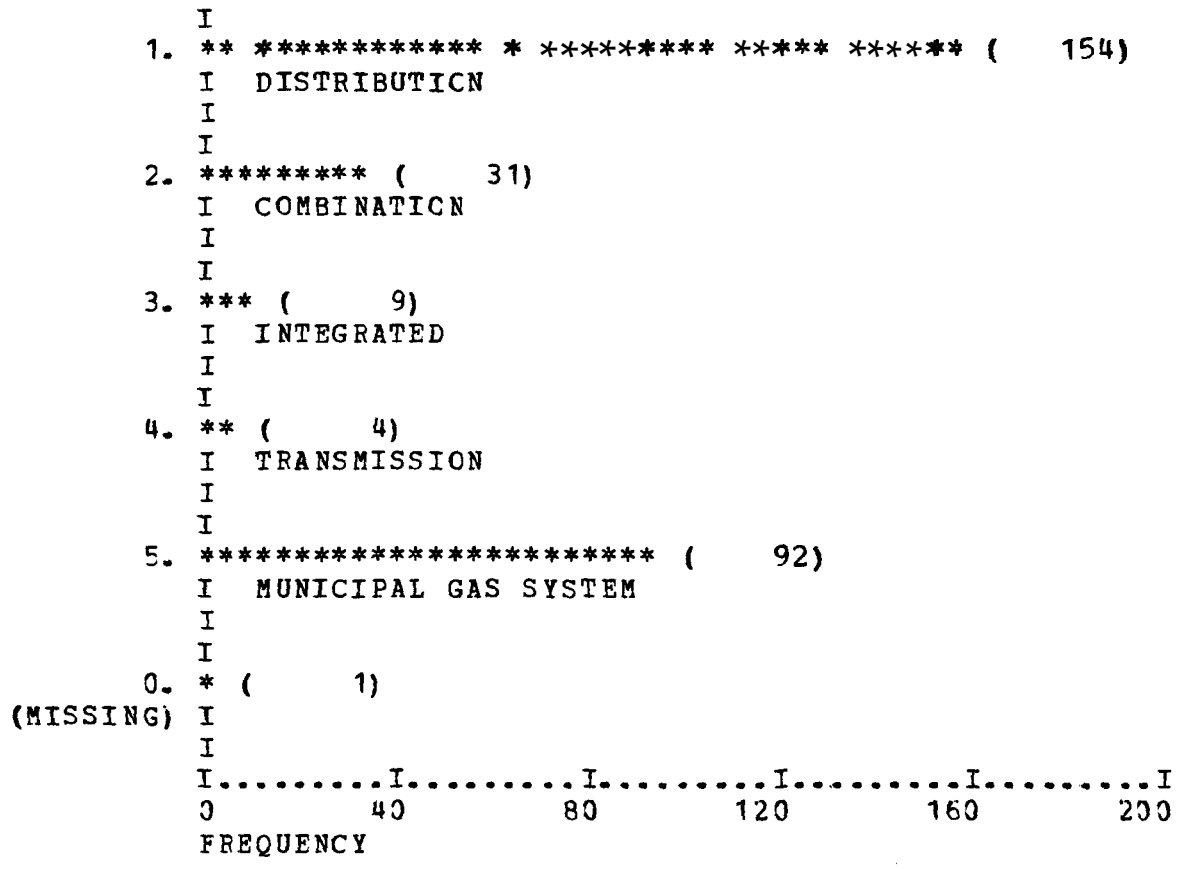
MONTHYR DATE COMPLETED



VALID <AS≤S 291 MISSING <AS≤∃ 0

TABLE 6-2

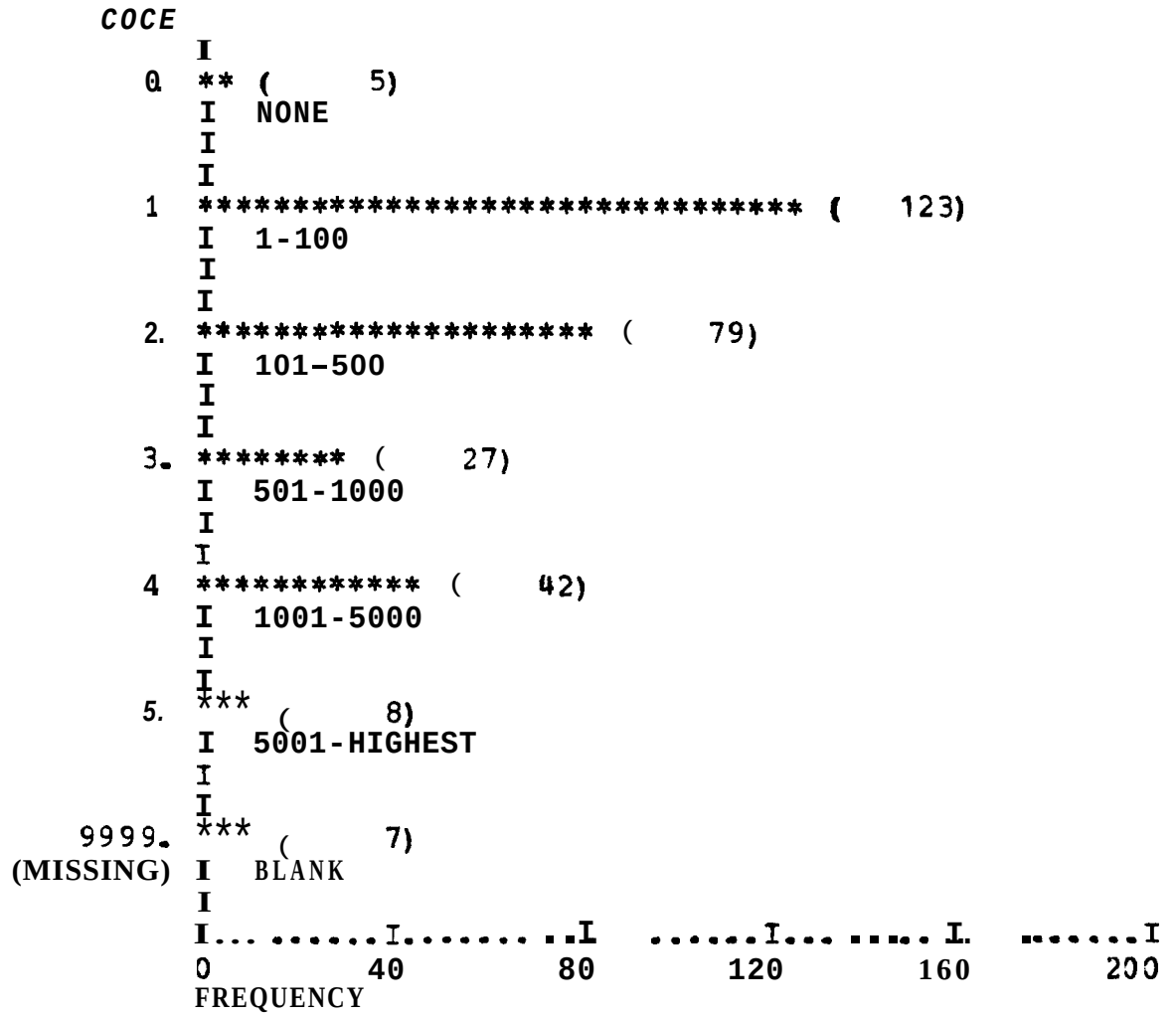
TYPE COMPANY TYPE



VALID CASES 290 MISSING CASES 1

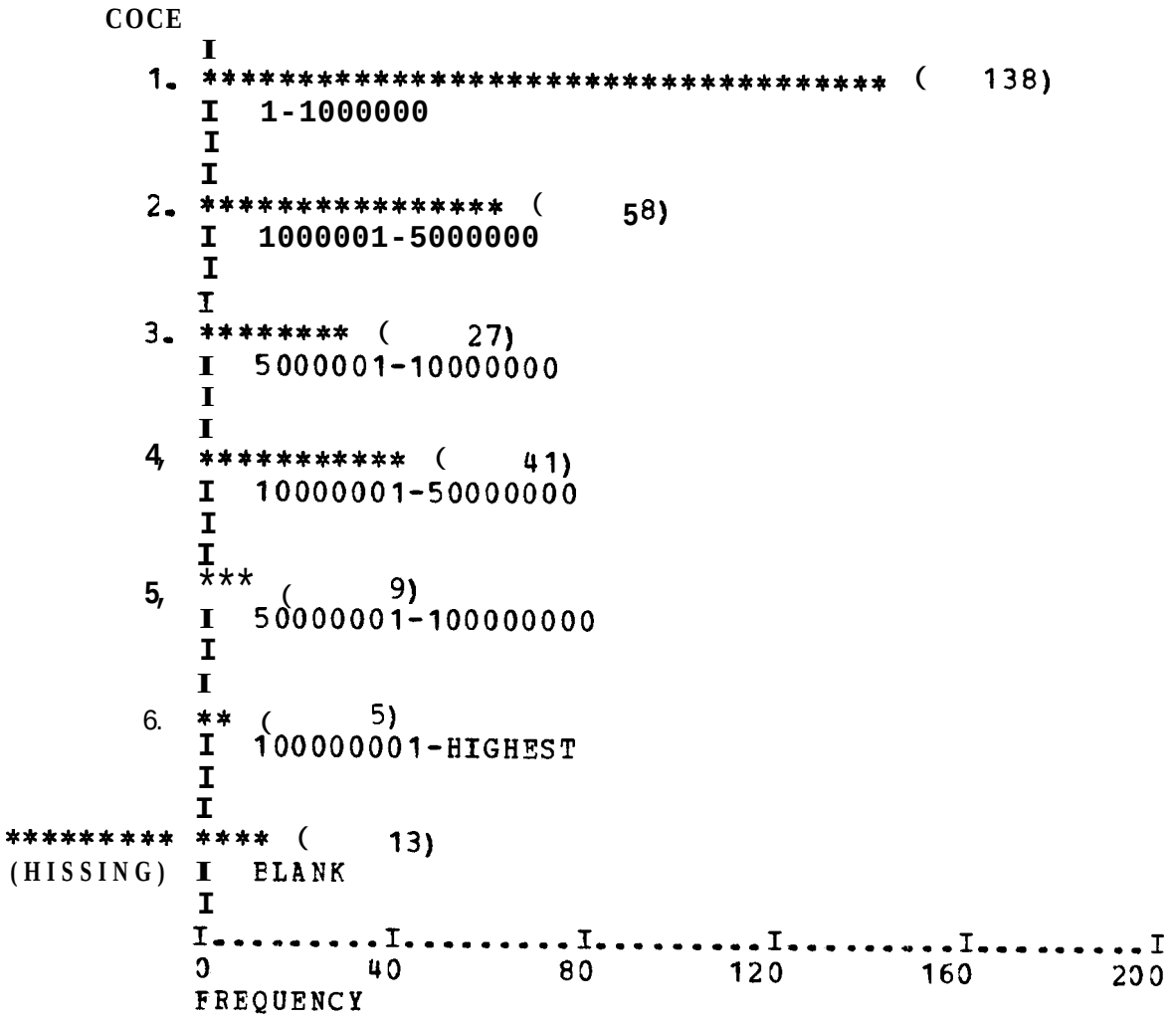
TABLE 6-3

MILES MILES OF PIPELINE



VALID CASES 284 HISSING CASES 7

GASSOLD NATURAL GAS SOLD



VALID CASES 278 MISSING CASES 13

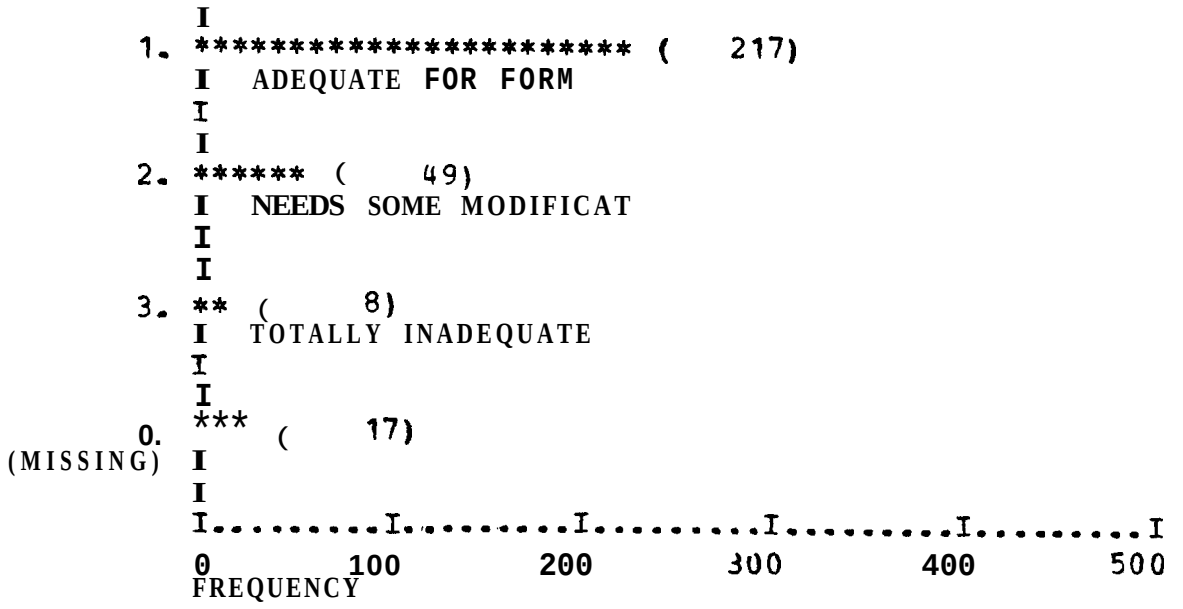
TABLE 6-5

6.1.2 Introduction and Definition

The definition of master meter system developed by the Project was substantially refined for this study to exclude installations where large commercial gas meters were installed at or in high rise apartment/commercial buildings where no appreciable downstream buried/exterior piping existed. This type of installation, with minimal buried/exterior piping, did not pose the potential safety hazard that downstream buried/exterior gas piping did, since, in the words of one utility company official, "If we are painting our meter, that miniscule piece of customer piping gets it, too". The main thrust of the study was directed towards those natural gas customers who owned and were responsible for the maintenance and safety of their downstream natural gas distribution systems. It was also felt that this "tailored" definition should be accompanied on the form with an opportunity for the respondent to rate his understanding of our definition. Table 6-6 shows that 79% of those responding to this question found the definition adequate for completing the form vs 3% who found the definition totally inadequate. Those not agreeing with the definition provided comments, such as:

> "It would help if you added 'branching' to downstream...
>
> The use of exterior implies above ground, only...
>
> You should! have specified minimum length of downstream piping...
>
> Your definition is contrary to the general understanding of master meters by industry, etc..."

DEFINE DEFINITION OF MM



VALID CASES 274 MISSING CASES 17

TABLE *6-6*

B. Recognizing that DOT/SASC's definition of natural gas Master Meter System is narrow for this study, please indicate the types of accounts that your company serves (complete all entries that are appropriate).

(27-28) % Group Meters - installation of a meter serving more than one user and possessing no exterior pipelines downstrenm of the meter.

(29-30) % Customer Yard Lines - customer-owned gas pipeline downstream of the meter and exterior to a single family residence.

(31-32) % Line/Farm Taps - installation of a service line and meter from a transmission line to an account in a remote area.

(33-34) % Unit/Customer Meters - installation of a meter serving a single residence (or converted commerical establishment) possessing no exterior pipelines downstream of the meter.

(35-36) % Master Meter Systems - as defined for this study.

(37-38) % Others - please define.

_____

Total = 100% _____

_____

C. At tho end of the next five years, the projected change in these percentages (as defined in II B) will be (complete all entries that are appropriate):

% Group Meter Users (39-40)

% Customer Yard Lines (41-42)

% Line/Farm Taps (43-44)

% Unit/Customer Meters (45-46)

% Master Meter Systems (47-48)

% Others, explain. (49-50)

TOTAL = 100%

_____

_____

_____

Questions II B and II C requested that respondents show percentages of various types of accounts that they have and are projected to have out of a total of all accounts. These questions were designed to gather information on the present breakdown of existing accounts and what changes they were expecting in the future for comparison.

Since percentages are numeric data, these categories were grouped into intervals of 10% with the SPSS[4]. Tables 6-7 and 6-8 are shown together by category on each page to more easily make comparisons of the expected changes. This data, as a whole, shows stability in the types of accounts the utilities have now and are expected to have during the next five years. It should be noted that the few that responded with the high percentages in Group Meters, Plaster Meters and Others were obviously having difficulty using SASC's definition in regard to their system.. The categories that could be classed as potential safety hazards, i.e., Customer Yard Lines, Line or Farm Taps, and Master Meters, did show a trend downward for the future, although slight.

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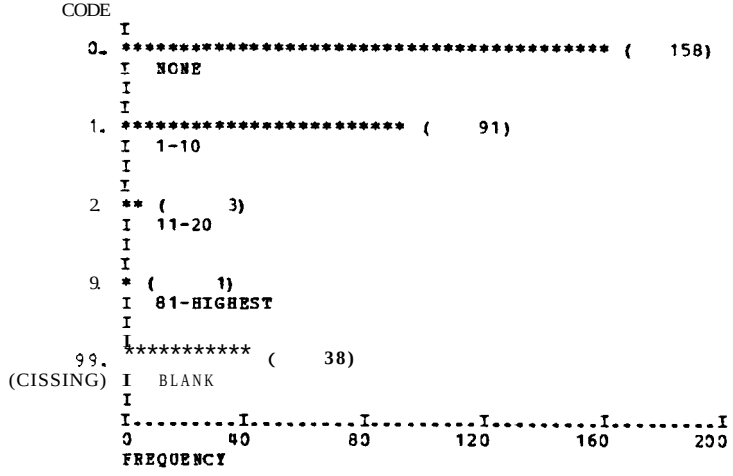
[4] SPSS will not print an interval that is empty. Hence, some intervals on the Tables which contained no data are missing.

BGROUP **GROUP METERS**

CURRENT

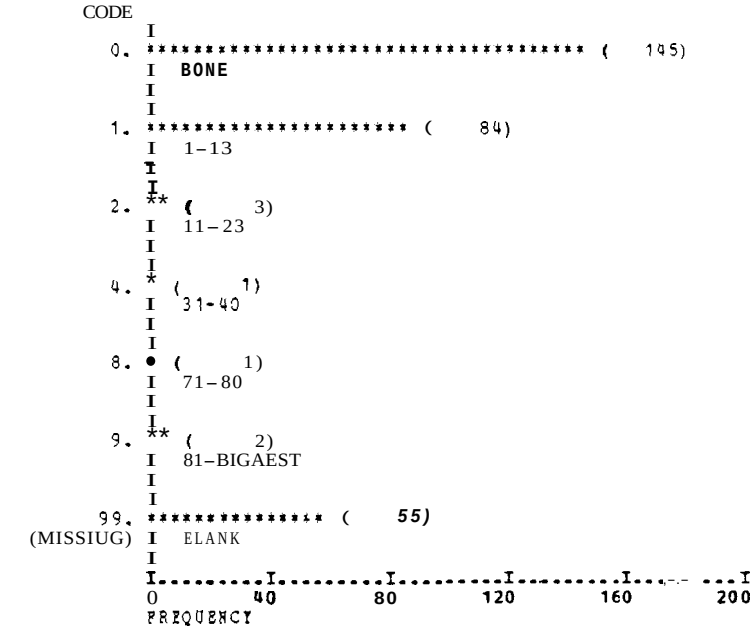


VALID **CASES** 253 MISSING CASES **38**

TABLE 6-7a

CGEOOP GROOP METER OSERS

PROJECTED



VALID **CASES** 236 MISSING **CASES** 55

TABLE 6-8a

BYARDLIN CDSTCEER YARD LINES

CURRENT

```
CODE
           I
     0.    ****************************************  (    151)
           I  NONE
           I
           I
     1.    ***********  (    40)
           I  1-13
           I
           I
     2.    ***  (     6)
           I  11-20
           I
           I
     3.    **  (     4)
           I  21-30
           I
           I
     4.    *  (     1)
           I  31-43
           I
           I
     5.    **  (     3)
           I  41-53
           I
           I
     6     **  (     2)
           I  51-63
           I
           I
     7.    **  (     5)
           I  61-70
           I
           I
     8.    ****  (    12)
           I  71-83
           I
           I
     9.    ********  (    28)
           I  81-HIGHEST
           I
           I
    99.    ***********  (    39)
(MISSING)  I  BLANK
           I
           I.........I.........I.........I.........I.........I
           0        40        80       120       160       200
           FREQUENCY
```

VALID CASES 252 MISSING CASES 39

TABLE 6-7b

CPARDLIA CUSTOMER YARD LINES

PROJECTED

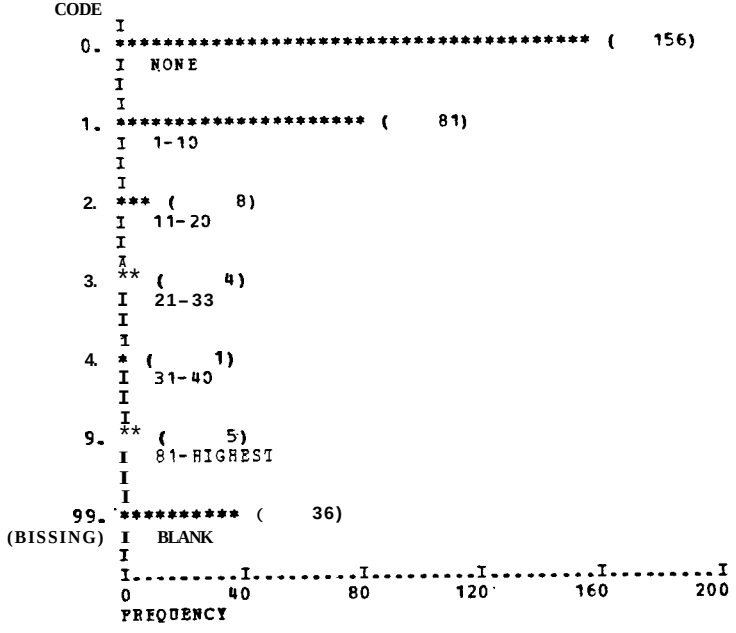
```
CODE
           I
     0.    ****************************************  (    150)
           I  NONE
           I
           I
     1.    *********  (    33)
           I  1-13
           I
           I
     2.    **  (     4)
           I  11-23
           I
           I
     3.    **  (     4)
           I  21-33
           I
           I
     4.    *  (     1)
           I  31-40
           I
           I
     5.    **  (     3)
           I  41-53
           I
           I
     6.    *  (     1)
           I  51-63
           I
           I
     7.    **  (     5)
           I  61-70
           I
           I
     E.    ****  (    12)
           I  71-83
           I
           I
     9.    *******  (    24)
           I  81-RIGREST
           I
           I
    99.    ***************  (    5")
(MISSING)  I  ELANK
           I
           I.........I.........I.........I.........I.........I
           0        40        80       120       160       200
           FREQUENCY
```

VALID CASES 237 MISSING CASES 54

TABLE 6-8b

EFARMTAF LINE OP PARM TAPS

CURRENT

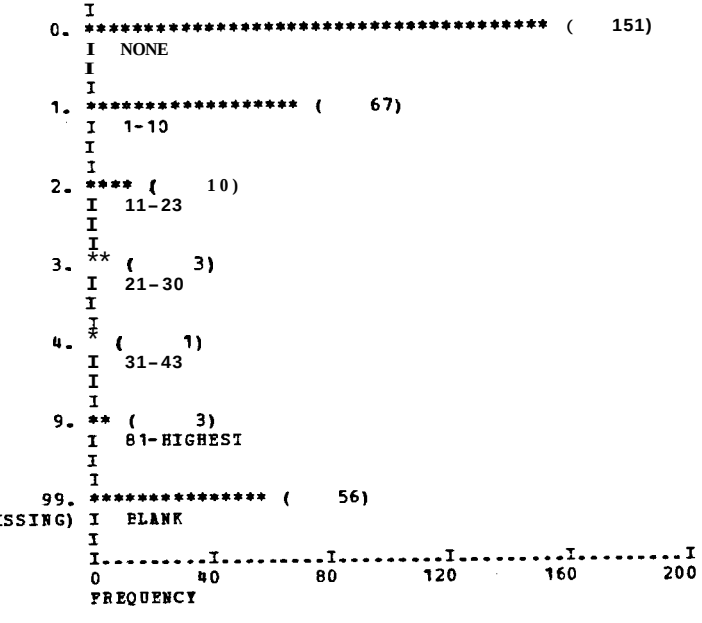


VALID CASES 255 MISSING CASES 36

TABLE 6-7c

CPARMTAF LINE OF FARM TAPS

PROJECTED



VALID CASES 235 BISSING CASES 56

TABLE 6-8c

BCUSTOMR UNIT OR COSTCEER METERS

CURRENT

```
CODE
      I
  0.  ******** (    28)
      I  NONE
      I
      I
  1.  ****** (    19)
      I  1-13
      I
      I
  2.  *** (     9)
      I  11-23
      I
      I
  3.  ** (     2)
      I  21-33
      I
      I
  4.  ** (     3)
      I  31-43
      I
      I
  5.  * (     1)
      I  41-53
      I
      I
  6.  ** (     4)
      I  51-63
      I
      I
  7.  ** (     5)
      I  61-73
      I
      I
  8.  *** (     8)
      I  71-83
      I
      I
  9.  ************************************************ (   183)
      I  81-HIGHEST
      I
      I
 99.  ******** (    29)
(MISSING) I  BLANK
      I
      I.........I.........I.........I.........I.........I
      0         40        80        120       160       200
      FREQUENCY

      VALID CASES    262     MISSING CASES    29
```

TABLE 6-7d

CCUSTOMR UNIT OR COSTCCCR METERS

PROJECTED

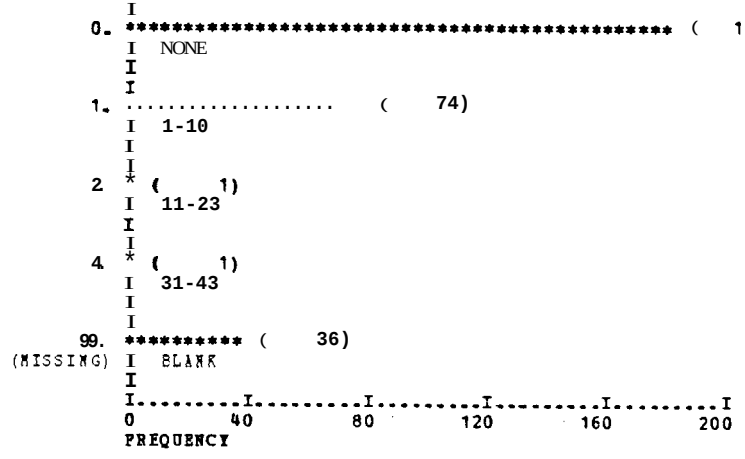
```
CODE
      I
  0.  ********* (    33)
      I  NONE
      I
      I
  1.  ****** (    19)
      I  1-13
      I
      I
  2.  *** (     8)
      I  11-23
      I
      I
  3.  ** (     3)
      I  21-33
      I
      I
  4.  ** (    21
      I  31-40
      I
      I
  5.  * (     1)
      I  41-53
      I
      I
  6.  ** (     2)
      I  51-63
      I
      I
  7.  ** (     5)
      I  61-73
      I
      I
  8.  *** (     6)
      I  71-83
      I
      I
  9.  ******************************************* (   160)
      I  81-HIGHEST
      I
      I
 99.  ************** (    52)
(MISSING) I  BLANK
      I
      I.........I.........I.........I.........I.........I
      0         40        80        120       160       200
      FREQUENCY

      VALID CASES    239     MISSING CASES    52
```

TABLE 6-8d

BMSYST MASTER METER SISTERS

CURRENT

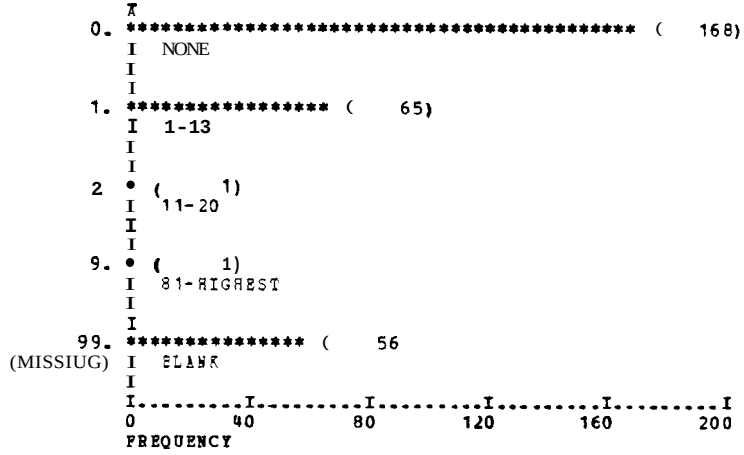


VALID CASES 255 MISSING CASES 36

TABLE 6-1e

CMSYST MASTER METER SYSTEMS

PROJECTED



VALID CASES 235 MISSING CASES 56

TABLE 6-8e

BOTHERS CTHERS

CURRENT

CODE

0. ********** (152)
NONE

1. ********** (85)
1-10

2. **** (12)
11-20

3. * (1)
21-33

6. * (1)
51-60

7. * (1)
61-70

9. ** (2)
81-RIGREST

99. ********** (37)
(MISSING) BLANK

0 40 80 120 160 200
FREQUENCY

VALID CASES 254 MISSING CASES 37

TABLE 6-7f

BOTHERS CTHERS

PROJECTED

CODE

0. ********** (152)
NONE

1. ********** (69)
1-10

2. **** (11)
11-20

3. * (1)
21-33

6. * (1)
51-60

7. * (1)
61-70

9. ** (2)
81-HIGHEST

99. ********** (51)
(MISSING) BLANK

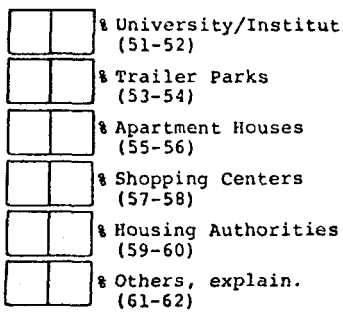
0 40 80 120 160 200
FREQUENCY

VALID CASES 243 MISSING CASES 51

TABLE 5-E:

Question II D requested a breakdown of master meter types in percentages of total master meter customers that the utilities serve. These categories, for those companies with just a few

D. What are the Percentages (by type) of businesses or operations which comprise the natural gas Master Meter Distribution Systems served by your company (complete all entries that are appropriate).



TOTAL = 100%

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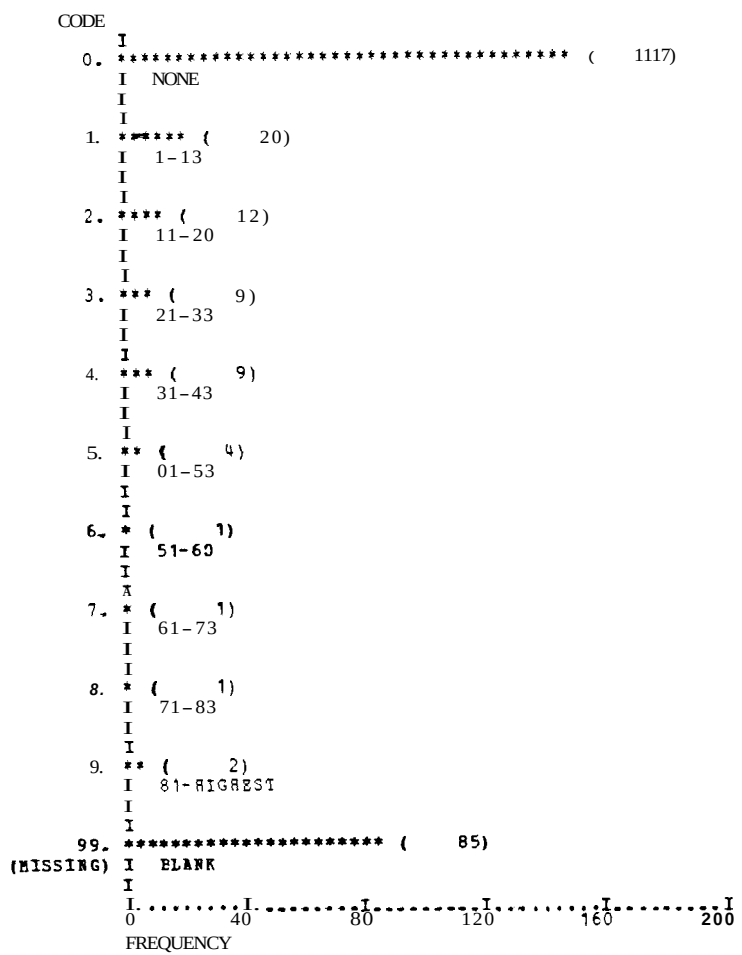
master meter customers, proved to unduly influence the data from those 'serving larger numbers of customers. For example, a 2 master meter response (one mobile home park and a university) would result in 50% being entered in the respective categories. A single master metered high-riseapartmentwould have resulted in 100% being entered. SASC has included these results in Table 6-9, but they provided very little information of value to the study.

In anticipation that some smaller utility companies might not be aware of the regulatory authorities concerned with gas pipeline safety, Question II E was included. It also provided the Project with some insight into the general awareness of industry to gas pipeline safety enforcement programs at all levels of government. The data displayed in Table 6-10 indicated that 17% of the companies are regulated primarily at the state and/or local levels only.

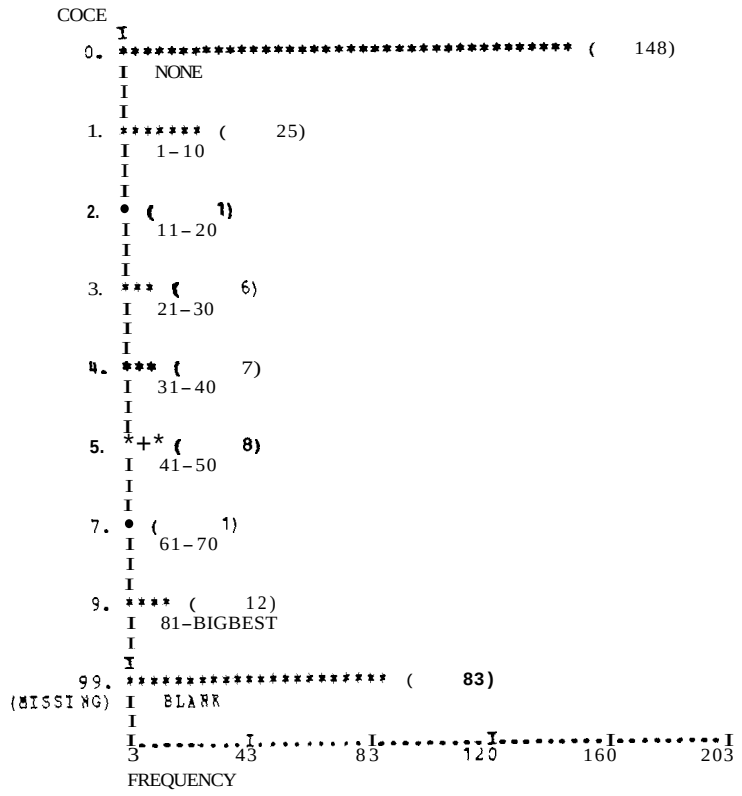
UNIVERS ORIVERSITY CCMPLEXES



VALID CASES 206 MISSING CASES 85

TABLE 6-9a

TRAILER TRAILER PARRS



VALID CASES 208 MISSING CASES a3

TABLE 6-9b

```
APARTENT  APARTMENT HOUSES

     CODE
          I
       0. ****************************** (   117)
          I  NONE
          I
          I
       1. ****** (     21)
          I  1-10
          I
          I
       2. *** (      7)
          I  11-20
          I
          I
       3. ***** (     14)
          I  21-30
          I
          I
       4. ***** (     16)
          I  31-40
          I
          I
       5. *** (      8)
          I  41-50
          I
          I
       6. ** (      2)
          I  51-60
          I
          I
       7. ** (      4)
          I  61-70
          I
          I
       8. ** (      2)
          I  71-80
          I
          I
       9. ***** (     16)
          I  81-HIGHEST
          I
          I
      99. ********************** (    84)
(MISSING) I  BLANK
          I
          I  ......I.........I.........I...... ..I .........I
          3      40         83       123       160       200
          FREQUENCY

          VALID CASES    207     MISSING CASES    84
```

TABLE 6-9c


```
SHOPPING  SHOPPING CENTERS

     COCE
          I
       0. *********************************************** (    84)
          I  BONE
          I
          I
       1. ***** (     15)
          I  1-10
          I
          I
       2. ** (      3)
          I  11-20
          I
          I
       3. * (      1)
          I  21-30
          I
          I
       4. * (      1)
          I  31-40
          I
          I
       7. * (      1)
          I  61-70
          I
          I
      99. *********************** (    86)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0        40        80       120       160       200
          FREQUENCY

VALID CASES    205     MISSING CASES    66
```

TABLE 6-9d

HOUSING HOUSING AOTRORITIES

CODE		
0.	UOUE	(91)
1.	1-10	(19)
2.	11-20	(9)
3.	21-30	(8)
4.	31-40	(9)
5.	41-50	(9)
6	51-60	(4)
7.	61-70	(7)
8.	71-80	(8)
9.	81-RIGREST	(47)
99. (EISSIUG)	ELARK	(80)

3 23 43 60 83 133
FREQUENCY

VALID CASES 211 MISSING CASES 80

TABLE 6-9e

OTEERS CTHEBS

CODE		
0.	NONE	(112)
1.	1-13	(61)
2.	11-20	(7)
3.	21-33	(6)
4	31-40	(6)
5.	41-50	(5)
7.	61-70	(1)
8.	71-80	(1)
9.	01-RIGREST	(12)
99. (MISSING)	BLANK	(80)

0 40 80 120 160 200
FREQUENCY

VALID CASES 211 MISSING CASES 80

TABLE 6-9f

REGULATE NG IS REGULATED BY

```
     <ODE
          I
       1. *** (     7)
          I  FEDERAL GOVERNMENT
          I
          I
       2. ********************************** (   124)
          I  FEDERAL AND STATE
          I
          I
       3. ************************ (    90)
          I  BOTH OF THE ABOVE
          I
          I
       4. **** (    11)
          I  FEDERAL AND LOCAL
          I
          I
       5. ******** (    29)
          I  STATE ONLY
          I
          I
       6. ** (     5)
          I  LOCAL ONLY
          I
          I
       7. ***** (    15)
          I  STATE AND LOCAL
          I
          I
       0. **** (    10)
(MISSING) I
          I
          I.........I.........I.........I.........I.........I
          0         40        80        120       160       200
          FREQUENCY

VALID <A≡≤S     281      MISSING CASES    10
```

TA℘LE 6-10

E. Your company's responsibility for maintaining the natural gas distribution system to your customers is regulatsd by:

☐ 1. Federal Government, only.
☐ 2. Federal and State Governments, only.
☐ 3. Both of the above and local governments.
☐ 4. Federal and local governments, only.
☐ 5. State governments, only.
☐ 6. Local governments, only.
☐ 7. State and local governments, only.

(63)

6.1.3 Operational Information

The information requested in this section of the Utility Company Survey instrument covered a wide range of topics regarding company policy. The questions were designed to gather information considered valuable to implementing solutions to the potential gas pipeline safety problem. For example, Question III A requested information on company policy concerning gas pipeline maintenance to their customers. In general, utility companies do not get involved beyond the outlet of the meter since their ownership responsibilities end abruptly at this point.

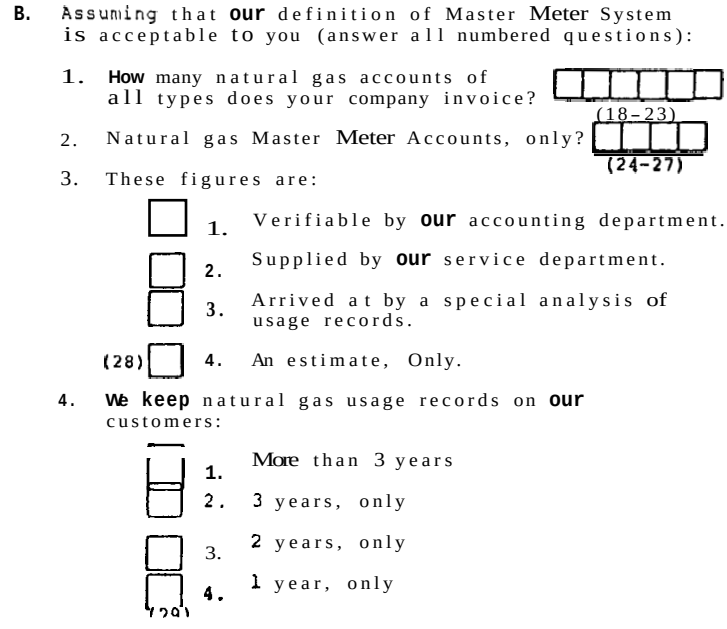
A. Which of the following represents your company's maintenance policy to your customers?

☐ 1. The full distribution system, including exterior pipelines.
☐ 2. Up to and including the outlet of the meter irrespective of the property lines.
☐ 3. Up to and including the outlet of the meter at the property lines, only.
☐ 4. Other, explain:

(64)

_____
_____
_____

This general practice throughout industry was confirmed by the display shown in Table **6-11** where deviations from this policy (19%) were from Municipal Gas Systems. Tables **6-12** and **6-13** show the results of responses to Questions III **B1** and **2** that requested the number of natural gas and master meter accounts. Table **6-12** indicates that nearly **54%** of the responding utilities serve fewer than 5000 customers each. Less than 10% serve more than 100,000 customers each. Table **6-13** shows that **64%** of the companies responding served at least one master meter system, or almost **2/3**



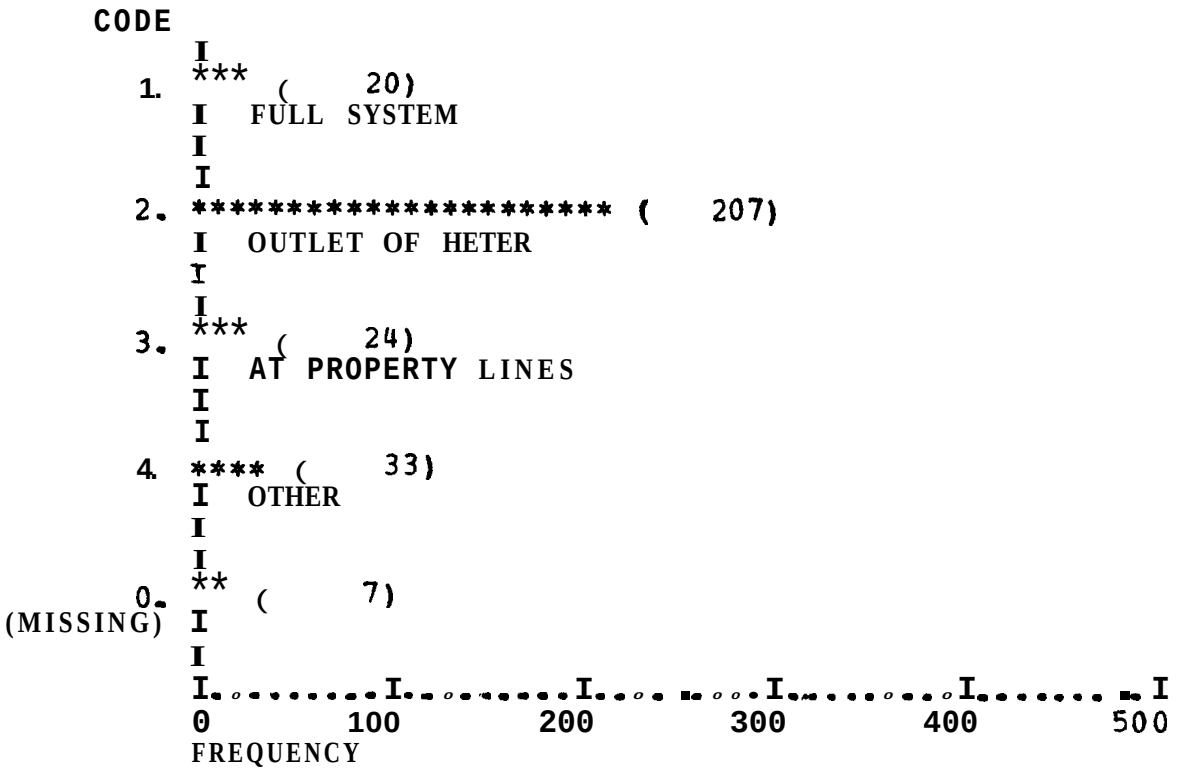
B. Assuming that **our** definition of Master Meter System is acceptable to you (answer all numbered questions):

1. **How** many natural gas accounts of all types does your company invoice? (18–23)
2. Natural gas Master Meter Accounts, only? (24–27)
3. These figures are:
   - 1. Verifiable by **our** accounting department.
   - 2. Supplied by **our** service department.
   - 3. Arrived at by a special analysis of usage records.
   - (28) 4. An estimate, Only.
4. **We keep** natural gas usage records on **our** customers:
   - 1. More than 3 years
   - 2. 3 years, only
   - 3. 2 years, only
   - 4. 1 year, only

(29)

of the Nation's gas utility companies can be expected to serve at least one master meter account. While 79% of the responses to Question III **B3** indicated (Table **6-14)** that these figures were verifiable by company records, **21%** were forced to make estimates to their responses. Table **6-15** shows that **89%** of the companies responding keep customer records for **3** years or longer.

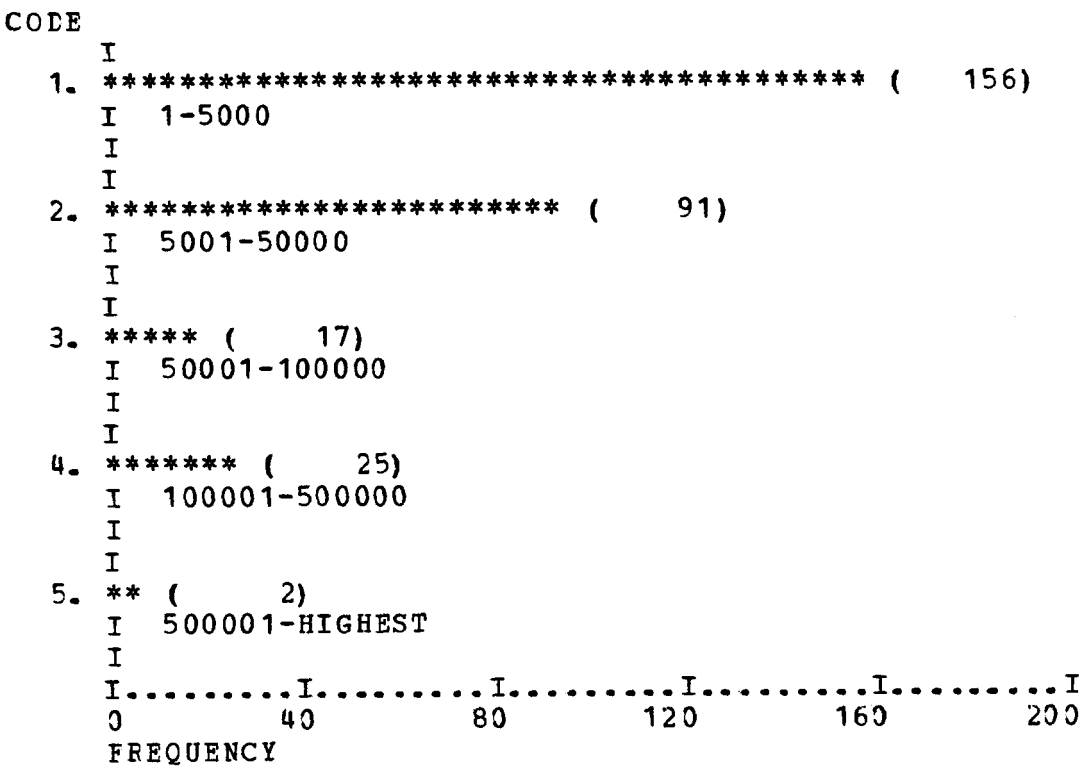
POLICY COMPANY **POLICY**



VALID CASES 284 MISSING CASES 7

TABLE **6-11**

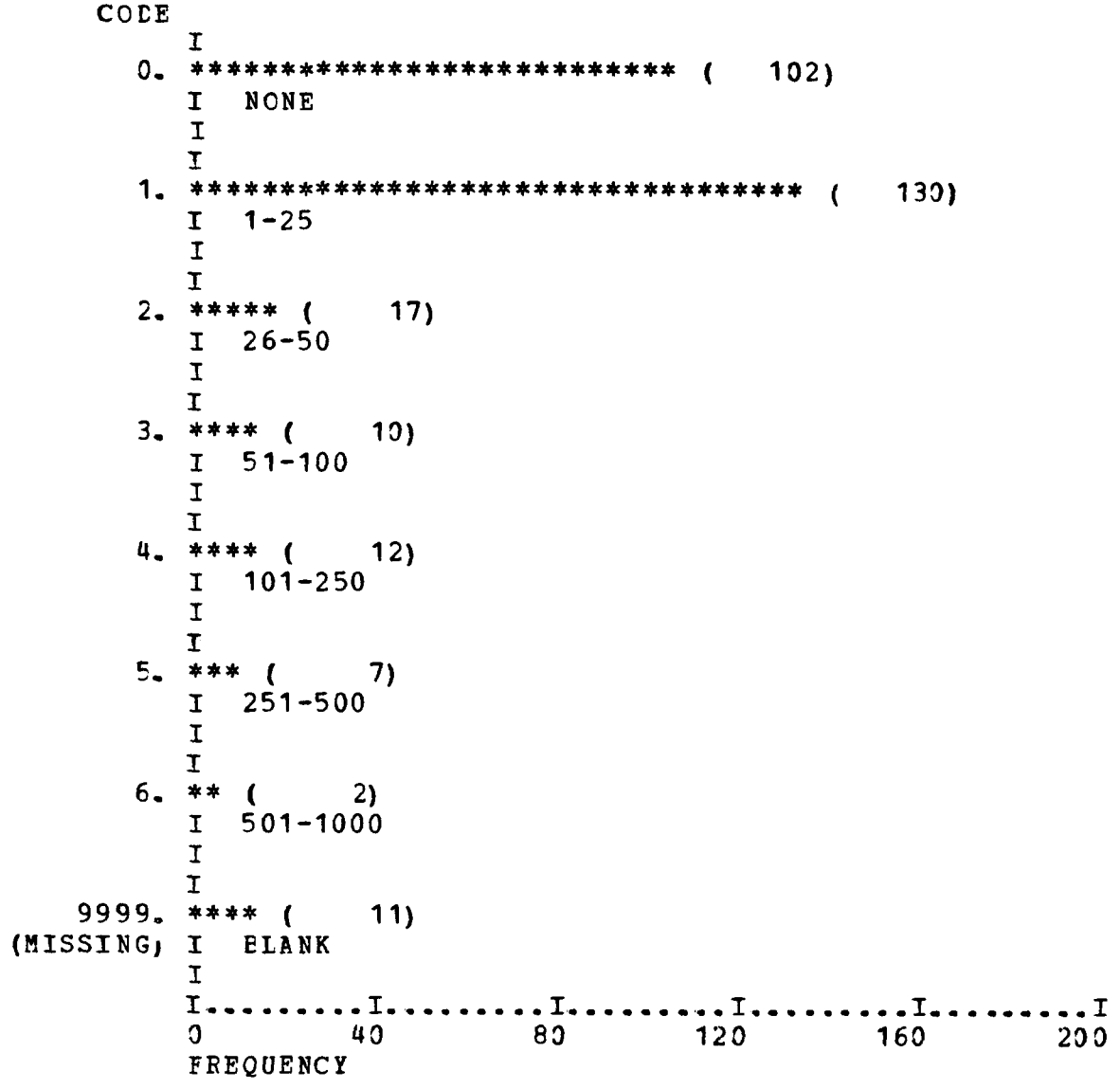
ACCOUNTS NATURAL GAS ACCOUNTS



VALID CASES 291 MISSING CASES 0

TABLE 6-12

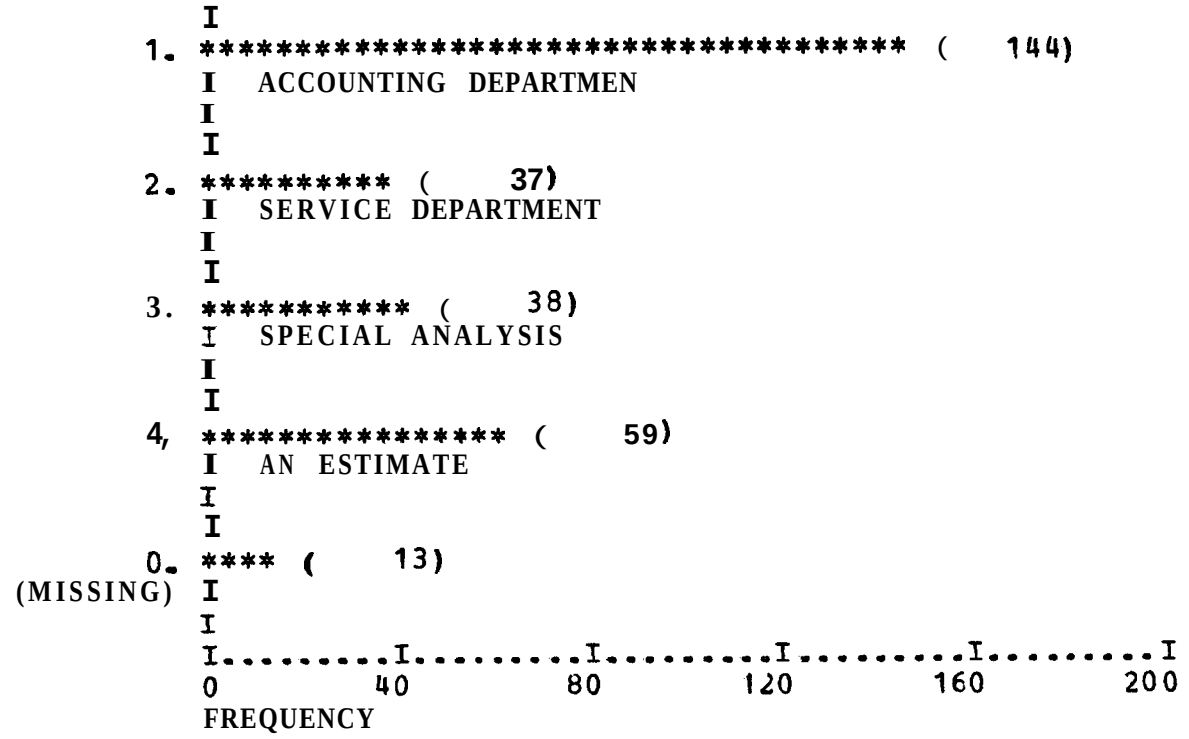
MMACCOUN MASTER METER ACCOUNTS



VALID CASES 280 MISSING CASES 11

TABLE 6-15

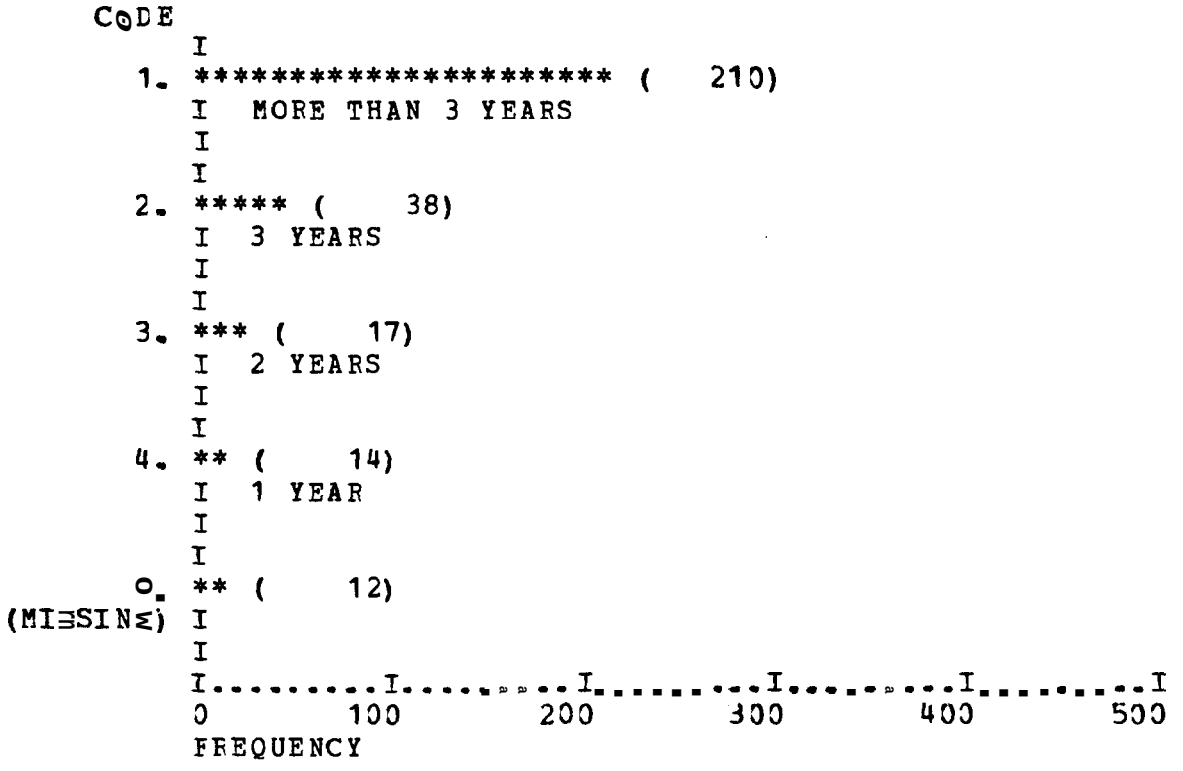
FIGURES SOURCES OF FIGURES



VALID CASES 278 MISSING CASES 13

TABLE 6-14

RECORDS PERIOD RECORDS KEPT



VALID CASES 279 MISSING CASES 1%

TABLE 6-15

Question III C requested natural gas consumption figures for master meter customers and the results are shown in Table 6-16. Sixty-five percent of the valid responses indicated consumption of natural gas in their respective master meter systems. However, an additional 61 respondents left the question blank.

Respondents to Questions III D and III E indicated that continuous usage records are kept on master meter customers for periods of 3 years or more by 60% of the companies (Table 6-17) responding,

C. What is the 1978 (or projected) consumption of natural gas attributed to Master Meter Systems (according to our definition) that are served by **your** company?

☐☐☐☐☐ Mcf

(11–15)

D. Continuous usage records (not to include private information) can conveniently be provided on these customers for:

☐ 1. More than 3 years
☐ 2. 3 years
☐ 3. 2 years
☐ 4. 1 **full** year, only
☐ 5. None of the above, explain:

(17)

_____
_____
_____

E. If your company were requested to supply continuous usage records on natural gas Master Meter Systems (as defined here) for a specified period, **you** would be able to furnish:

☐ 1. 100%of the requested information.
☐ 2. 75% of the requested information.
● 3. 50% of the requested information.
☐ 4. Less than **509**, explain:

(30)

_____
_____
_____
_____

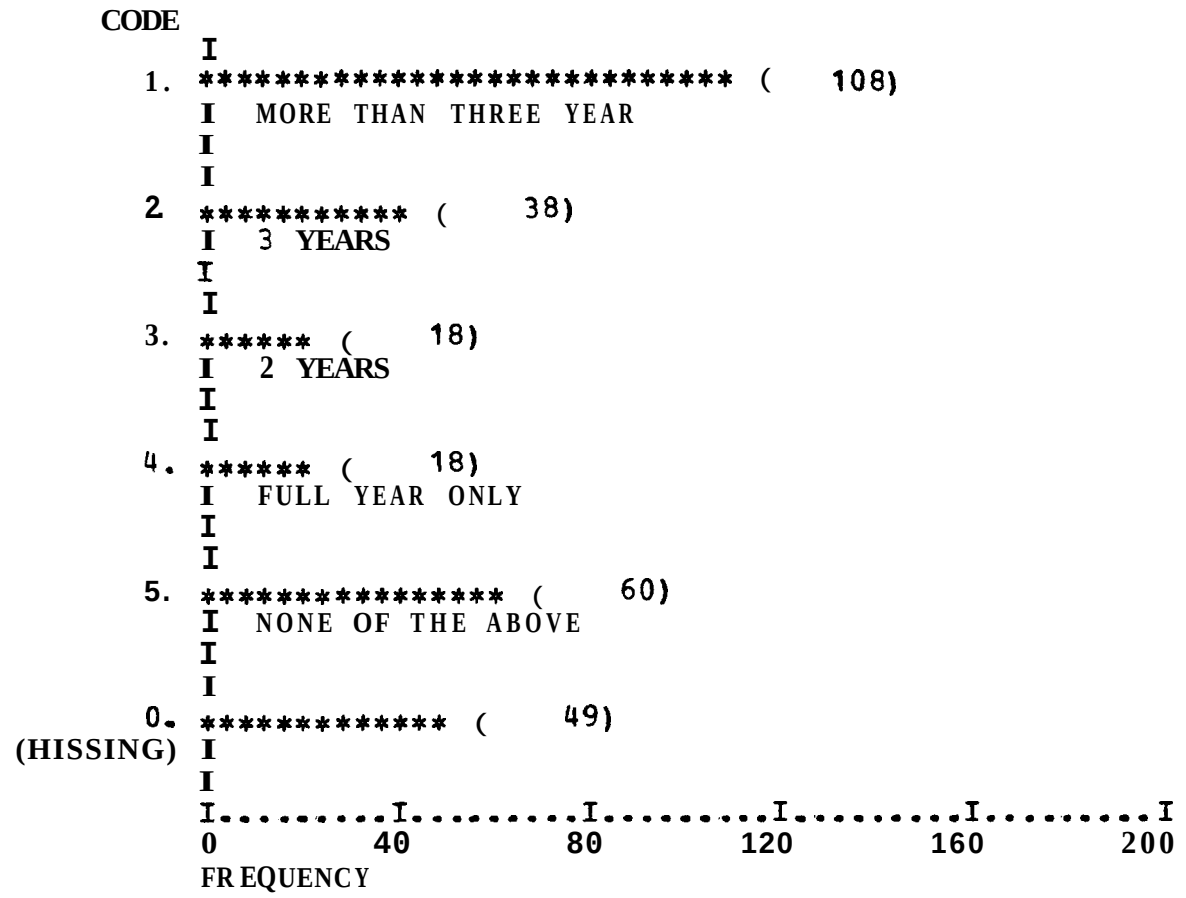
CONSUMPT MM CONSUMPTION OF NG

```
     CODE
          I
       0. ****************************************** (     80)
          I  NONE
          I
          I
       1, ************************** (     49)
          I  1-10000
          I
          I
       2  ********************************** (     66)
          I  10001-100000
          I
          I
       3. ********** (     18)
          I  100001-500000
          I
          I
       4. **** (      5)
          I  500001-1000000
          I
          I
       5. ****** (     10)
          I  1000001-5000000
          I
          I
       6  ** (      2)
          I  5000001-HIGHEST
          I
          I
 9999999. ******************************** (     61)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0         20        43        60        80        130
          FREQUENCY
```

VALID CASES 230 MISSING CASES 61

TABLE 6-16

USAGEREC CONTINUOUS USAGE RECORDS



VALID CASES 242 BISSING CASES 49

TABLE 6-17

and that 80% of those responding could provide all (Table 6-18) of the requested records for a specified period. Note that 81 returned instruments had missing data to this question.

If master meter systems are subject to the Gas Pipeline Safety Regulations, responses to Question III F showed that only 39% of the responding companys' master meter customers were

F. What is the primary pipeline corrosion prevention technique practiced by the owners of the natural gas Master Meter Distribution Systems in your area:

- ☐ 1. Cathodic Treatment
- ☐ 2. Pipeline Coatings
- ☐ 3. Use of Plastic Pipe
- ☐ 4. Several, no particular technique
- ☐ 5. None
- ☐ 6. Unknown

(31)

cathodically protected as can be seen in Table 6-19. This supports the premise that there may be a need for DOT to take corrective action. Recognizing that since utility companies do not generally own or maintain master meter system pipelines, Question III G was developed to determine if they do get involved to some extent. Approximately 27% responded (Table 6-20) that

G. What is the frequency of Leak Surveys that your company conducts as a matterof policy on natural gas Master Meter Distribution Systems (only) per year?

- ☐ 1. Quarterly, as a minimum
- ☐ 2. Once every 6 months, as a minimum
- ☐ 3. Once per year as a minimum
- ☐ 4. On request, only
- ☐ 5. None of the above, explain:

(40) _____

_____

_____

SUPPLY **SUPPLY CONTINUOUS RECORDS**

```
     CODE
          I
       1. ********************************************** (   167)
          I  ALL
          I
          I
       2. *** (     9)
          I  MOST
          I
          I
       3. * (     1)
          I  HALF
          I
          I
       4. ********* (    33)
          I  LESS THAN HALF
          I
          I
       0. ********************** (    81)
(MISSING) I
          I
          I.........I.........I.........I.........I.........I
          0         40        80        120       160       200
          FREQUENCY
```

VALID CASES 210 HISSING CASES 81

TABLE 6-18

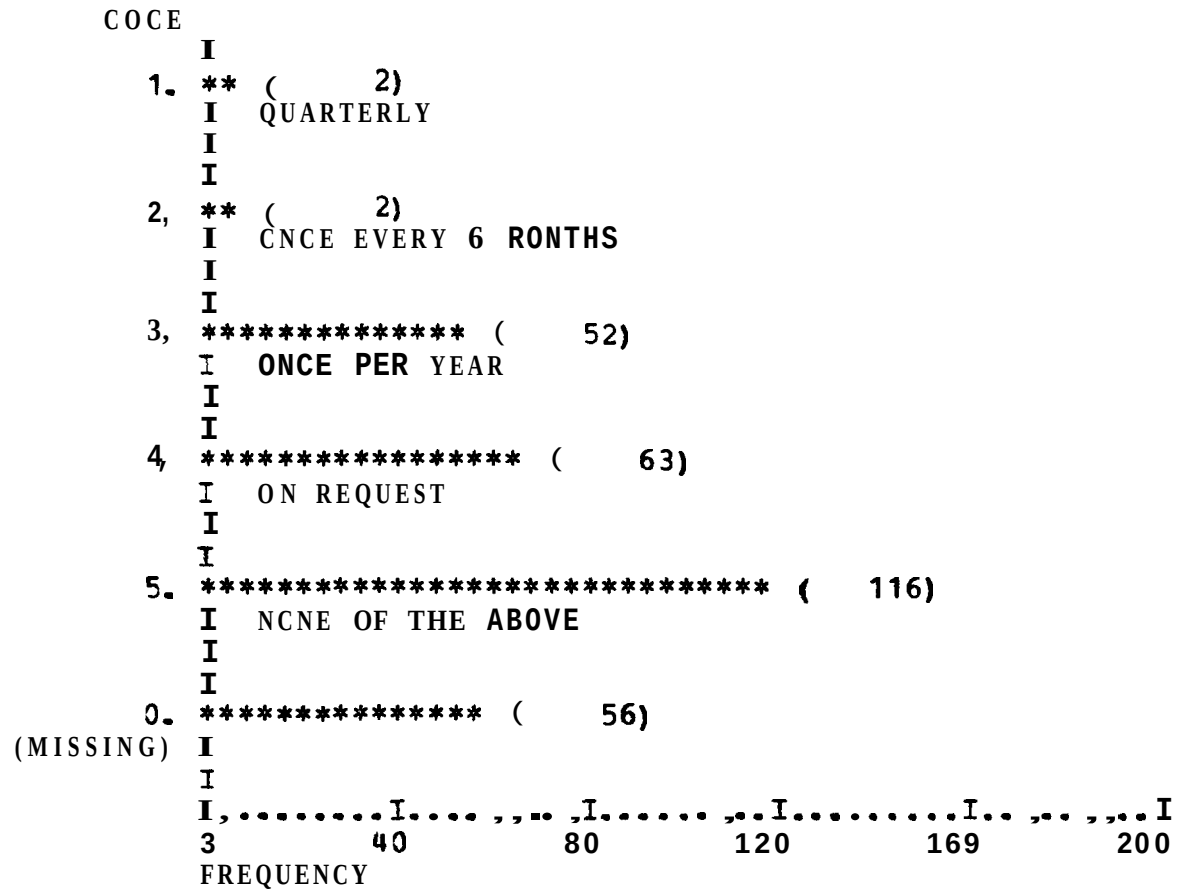
CORRPROT PIPELINE CORROSION PREVENTION

```
      CODE
           I
        1. ********************************************** (     94)
           I  CATHODIC TREATHENT
           I
           I
        2. *******  (     12)
           I  PIPELINE COATINGS
           I
           I
        3. **********  (     17)
           I  PLASTIC PIFE
           I
           I
        4. ****************  (     32)
           I  SEVERAL
           I
           I
        5. ********  (     14)
           I  NONE
           I
           I
        6. ************************************  (     69)
           I  UNKNOWN
           I
           I
        3. ****************************  (     53)
(MISSING)  I
           I
           I.........I.........I.........I.........I.........I
           0         23        40        63        83        133
           FREQUENCY
```

VALID CASES 238 MISSING CASES 53

TABLE 6-19

LEAKSURV FREQUENCY OF SURVEYS



VALID CASES 235 MISSING CASES 56

TABLE 6-20

they will conduct leak surveys on request and 24% also indicated that they conduct leak surveys at least once per year on master metered customer pipelines.

The Project was also primarily interested in knowing if utility companies were aware of master meter confirmed leaks in Question III H. Since DOT collects reports on confirmed gas leaks from each utility company annually, the partial year figures also requested in this question did not prove of much value here. Table 6-21 shows the displayed values with **76%** responding "none" or no knowledge of confirmed master meter system leaks of one or more in **1978** (partial year). Note that 90 companies did not respond to this question. Table 6-22 shows leak data for utility owned systems. Forty-five percent of responding utilities reported more than 100 leaks in **1978** on their distribution system,

h. How many exterior pipeline leaks were confirmed in your locale by your company in 1978 for (complete both entries):

Master Meter Systems ☐☐☐☐☐ (41-45)

Other natural gas systems ☐☐☐☐☐☐ (46-51)

Many of the utility companies make use of corrosion consultants intermittently through the year, or on a continuing basis. SASC was interested in determining sources of reliable professionals working in gas pipeline safety in developing Question III I. Table 6-23 reveals that more than half of the companies responding could furnish the Project with a list of contacts, if required.

1. Can you provide us with a list of reliable independent pipeline inspectors/consultants in your geographical area, if requested?

(72) ☐ 1. Yes ☐ 2. No

```
MMLEAKS    MASTER METER LEAKS

     CODE
          I
      0.  ********** ** *** *** **** ** **** **** *(    153)
          I  NONE
          I
          I
      1.  ********** *(     41)
          I  1-10
          I
          I
      2.  ** (      3)
          I  11-20
          I
          I
      3.  * (       1)
          I  21-30
          I
          I
      4.  * (       1)
          I  31-40
          I
          I
      5.  ** (      2)
          I  41-HIGHEST
          I
          I
  99999.  * ************* ******* *(    90)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0        40        80       120       160       200
          FREQUENCY

VALID CASES      01        MISSING CASES     90
```

TABLE 6-21

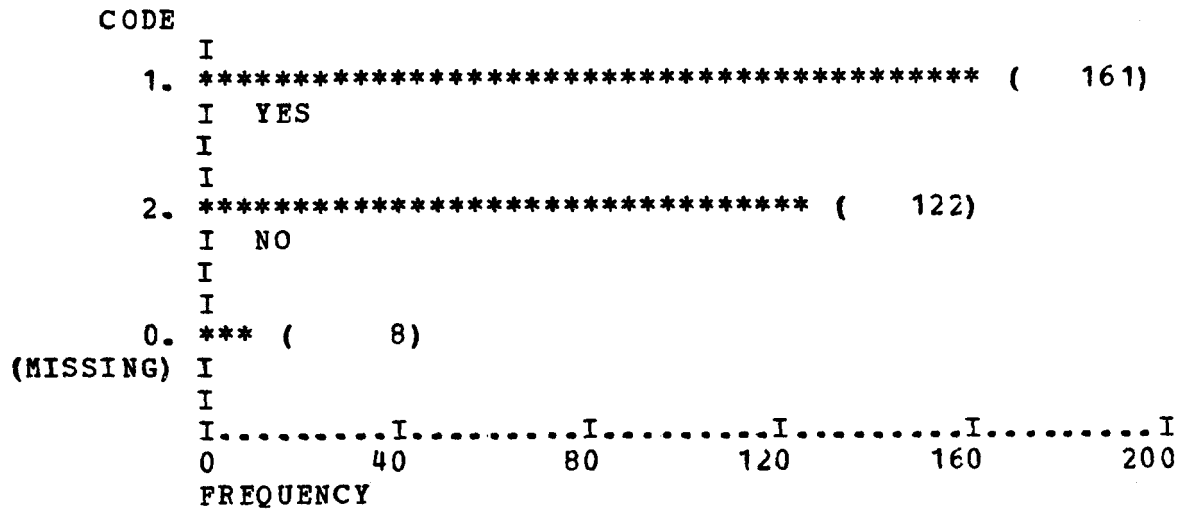
NGLEAKS NATURAL GAS LEAKS

```
     CODE
          I
       0. ** **** *** (     20)
          I  NONE
          I
          I
       1. * ***** ******* ****** * **** *******(     69)
          I  1-25
          I
          I
       2  ** ***** ** ***(     25)
          I  26-50
          I
          I
       3. * ***** (     12)
          I  51-75
          I
          I
       4. *** (      5)
          I  75-100
          I
          I
       5. * **** (     10)
          I  101-125
          I
          I
       6. *** (      6)
          I  126-150
          I
          I
       7. ** (      4)
          I  151-175
          I
          I
       8. * ** (      7)
          I  175-200
          I
          I
       9. ************ * * ********** ************ (     82)
          I  201-HIGHEST
          I
          I
  999999. ***** * ****** ***** **** (     50)
(MISSING) I  ELA N
          I
          I.... ...I.....I.....I.....I.....I.....I
          0        20        40        60        80        100
          FREQUENCY

          VALID CASES     241     MISSING CASES     50
```

TABLE 6-22

RELIABLE RELIABLE CONSULTANTS



VALID CASES 283 MISSING CASES 8

TABLE 6-23

It was determined early in the Project that the larger utility companies have highly qualified pipeline safety departments who not only have done a credible job of maintaining their own lines, but who have contributed to the technology. In view of this, Question III J was included to determine what level of support there

J. Does your company neqotiate contracts with natural gas Master Meter Distribution Systems' owners to install/inspect/maintain their pipelines?

(73) ☐ 1. Yes ☐ 2. No

would be from utility companies in assisting master meter owners/operators to upgrade their systems. The data shows (Table 6-24) that 10% of those responding negotiate these kinds of contracts, and that 2% of those responding to Question III K (Table 6-25) are planning to undertake this responsibility in the future. Response to Question III L (Table 6-26) indicated that 26 percent of the companies would be able and interested

K. If answer to J. was no, is this concept in the planning stage for some time in the future?

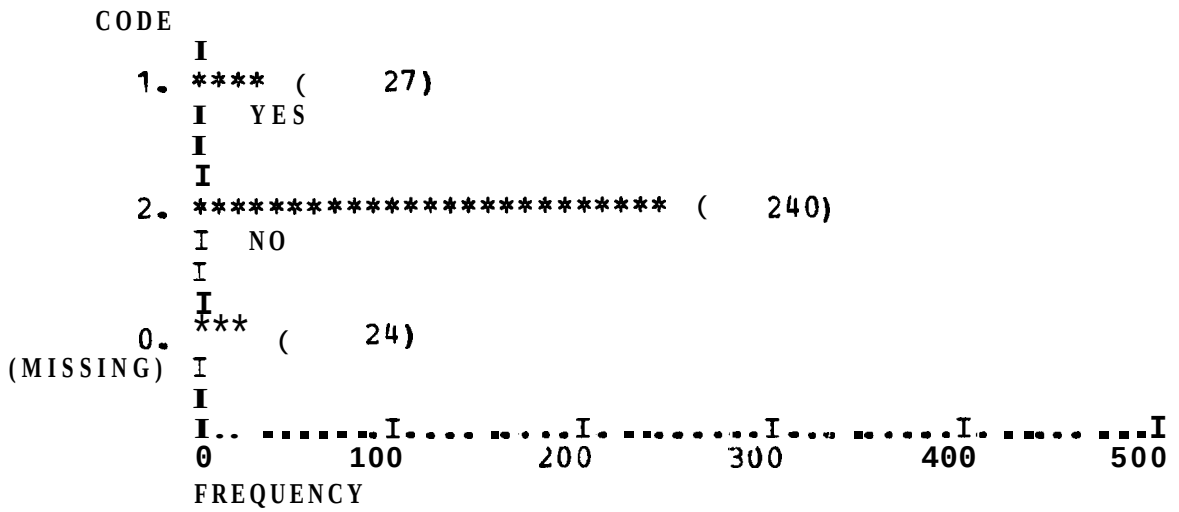
(74) ☐ 1. Yes ☐ 2. No.

in assisting master meter owners in maintaining their natural gas systems under contract, with 60% of those responding to

L. If answer to K was no, would your company be able (and interested) to install/inspect/maintain Master Meter Distribution Systems under contract with the owners?

(75) ☐ 1. Yes ☐ 2. No

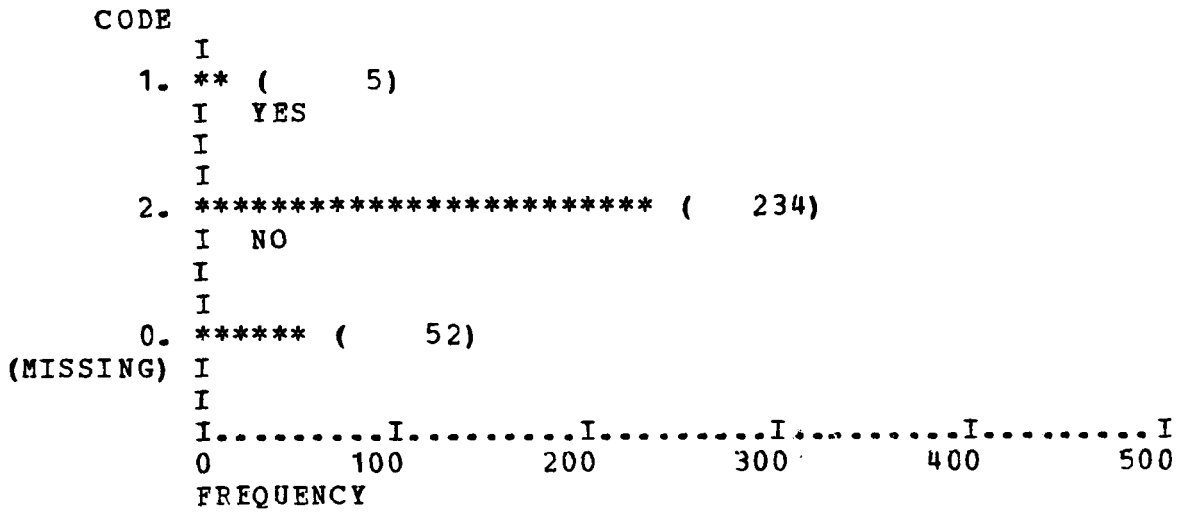
NEGOTIAT NEGOTIATE CONTRACTS WITH MM



VALID CASES 267 MISSING CASES 24

TABLE 6-24

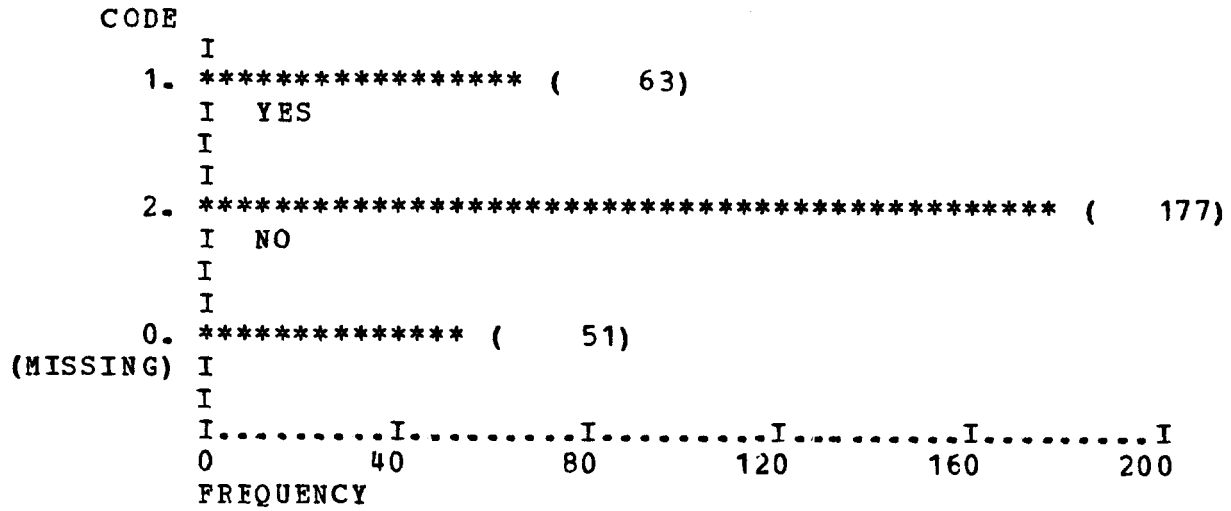
PLANNING PLANNED FOR FUTURE



VALID CASES 239 MISSING CASES 52

TABLE 6-25

INSPINST INSTALL OR INSPECT MM



VALID CASES 243 HISSING CASES 51

TABLE 6-26

M. If answer to L was yes, indicate when:

☐ 1. In 3 years or more
☐ 2. In 2 years
☐ 3. Next year
☐ 4. Now
(76)

Question III M (Table **6-27)** indicating that they would be interested now.

Continuing along this same line, SASC was interested in Question III N in determining the amount of staffing the utility companies maintained in their pipeline safety departments.

N. **How** many individuals are assigned **to** your **Leak** Survey/ Safety Inspection staff (complete all entries that are appropriate).

☐☐ (32-33) Professionals (holders **of** engineering or academic degrees as **a** minimum).

☐☐ (34-35) Para-Drofessionals (holders **of** technical school certificates **as** a minimum).

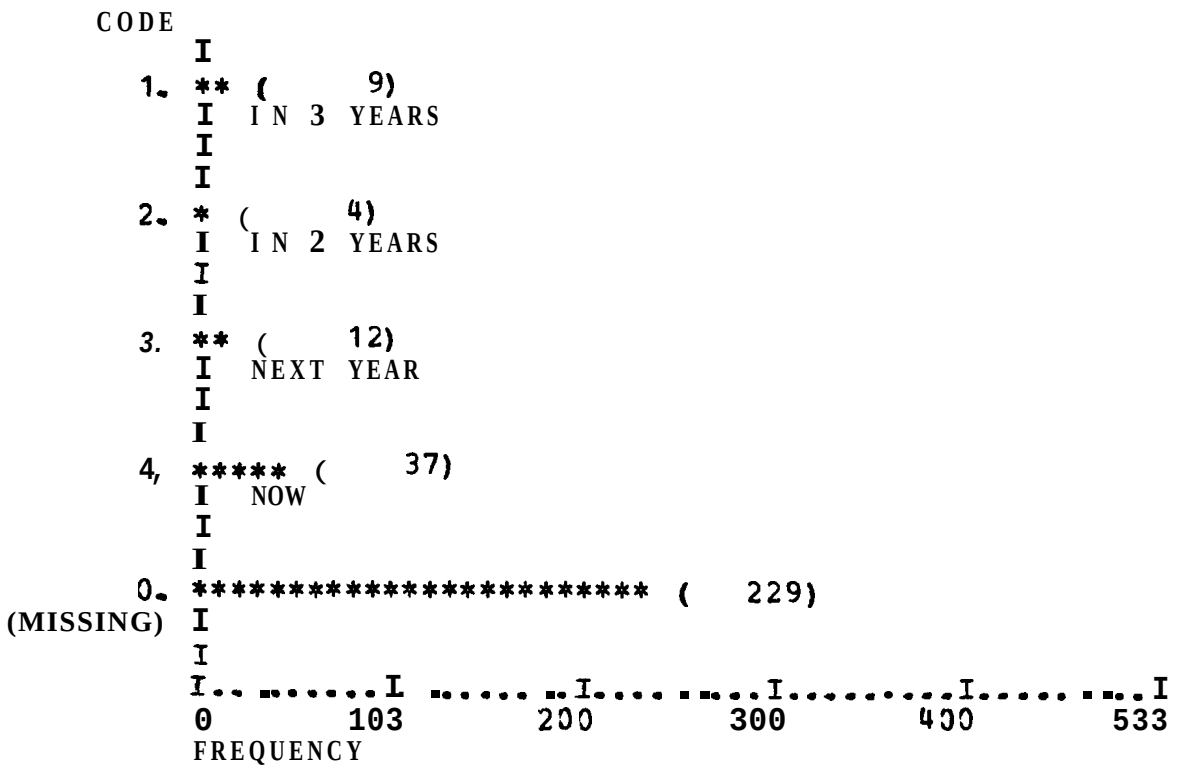
☐☐ (36-37) Clerical/Non-Professionals (received on **the the job** training, primarily).

☐☐ (38-39) None, explain. _____

_____

Tables **6-28** through **6-30** show the results of the responses, with 31% of the respondents indicating that they have up to 10 professionals (degreed) in their Pipeline Safety Departments, and **36%** have an equivalent number of paraprofessionals in this assignment. Further analysis of the data showed that 1% of the respondents employed no regular safety staff, but relied on consultants, when needed.

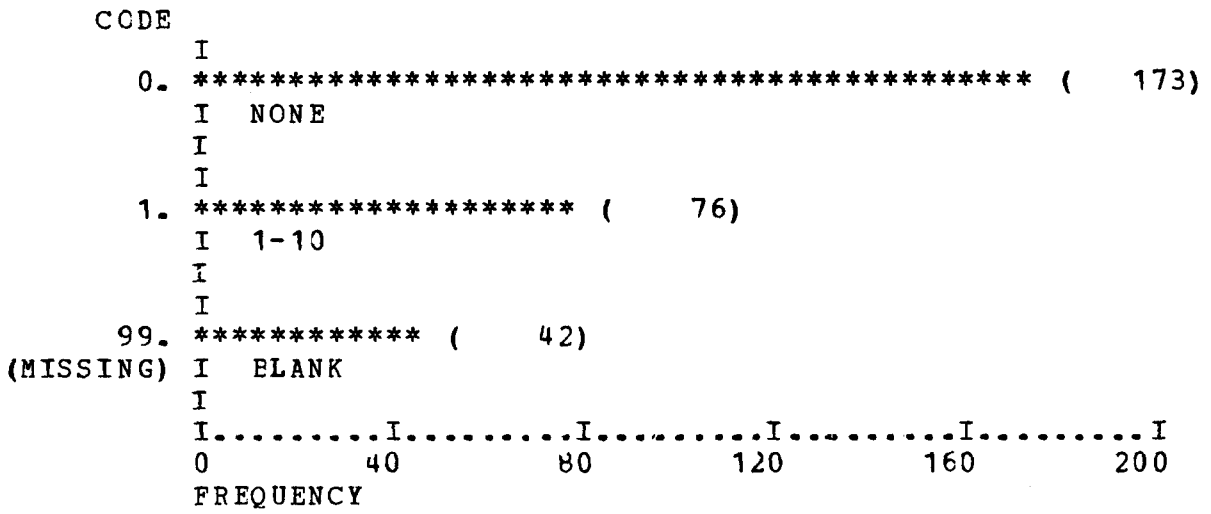
INDICATE IN WHAT PERIOD



VALID CASES 62 HISSING CASES 229

TABLE 6-27

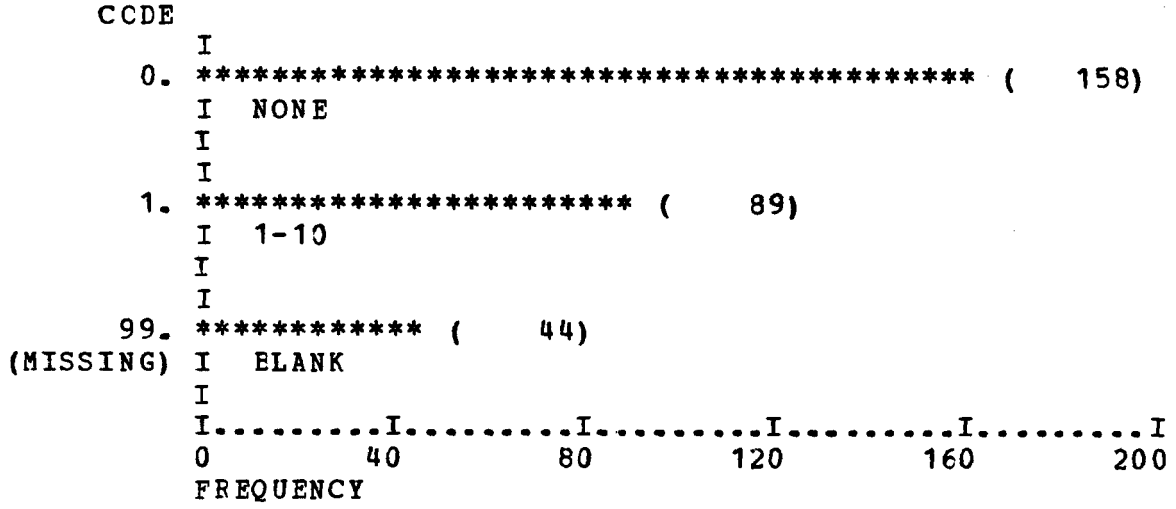
PROFESS PROFESSIONALS



VALID CASES 249 MISSING CASES 42

TABLE 6-28

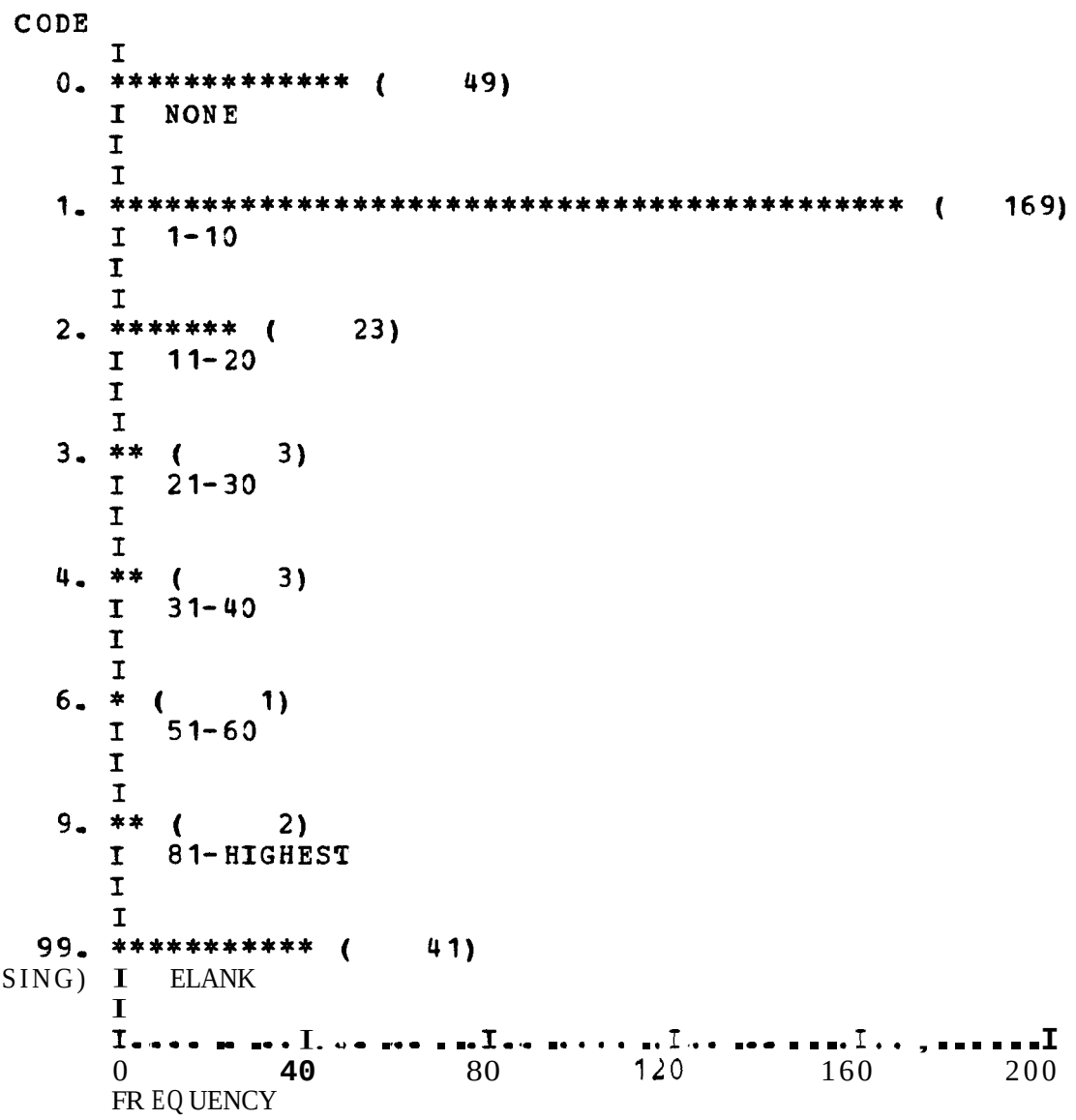
FARAFROF PARAPROFESSIONALS



VALID CASES 247 MISSING CASES 44

TABLE 6-29

CLERICAI CLERICALS



VALID CASES 250 MISSING CASES 41

The last question on the instrument requested accident statistics on both master meter and other natural gas systems which are shown in Tables 6-31 through 6-40. This data, which for the most part covered less than 12 months of 1978, shows that there were minimal numbers of master meter natural gas accidents of serious consequences for the period covered. On the utility owned natural gas systems, the serious accidents reported, also a relatively minimal number, shows that 95% of those responding had no reported personal injuries, 100% had no loss of life, 81% experiencednoserious property damage, 92% did not have any property damage with personal injuries, and 96%did not have any property damage with fatalities. (Since 100% had no loss of life, this implied that 100% also did not have any property damage with fatalities. Hence, some companies interpreted this question as property damage or fatalities.)

0. How many natural gas accidents resulting in loss of property/life occurred in 1978 in your locale for (complete all appropriate entries).

1. Master Meter Systems?

(52-53) Personal injury, only.

(54-55) Loss of life, only.

(56-57) Property damage, only.

(58-59) Property damage/injury.

(60-61) Property damage/fatality(ies).

2. Other Natural Gas Systems?

(62-63) Personal injury, only

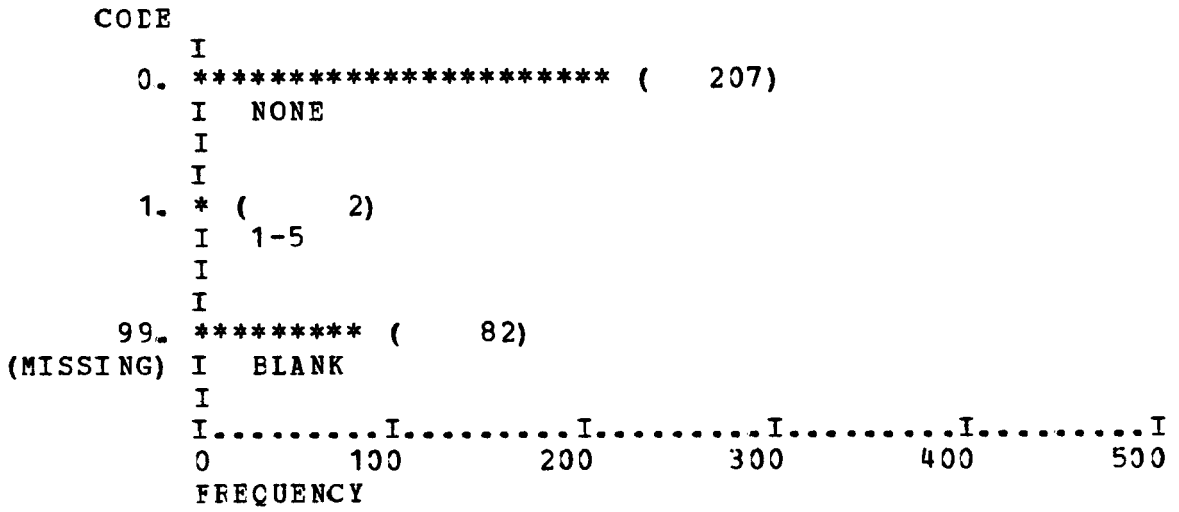
(64-65) Loss of life, only.

(66-67) Property damage, only.

(68-69) Property damage/injury.

(70-71) Property damage/fatality(ies).

MMPERS MM PERSONAL INJURY

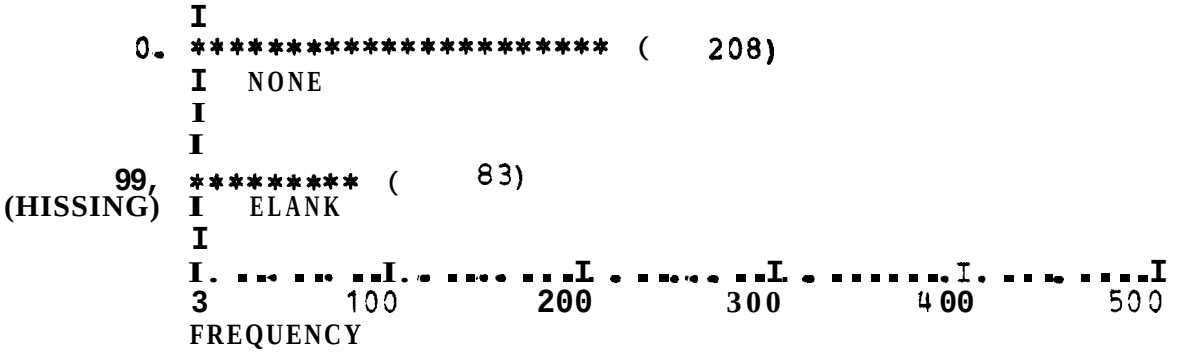


VALID CASES 209 HISSING CASES 82

TABLE 6-31

MMLIFE MM LCSS OF LIFE

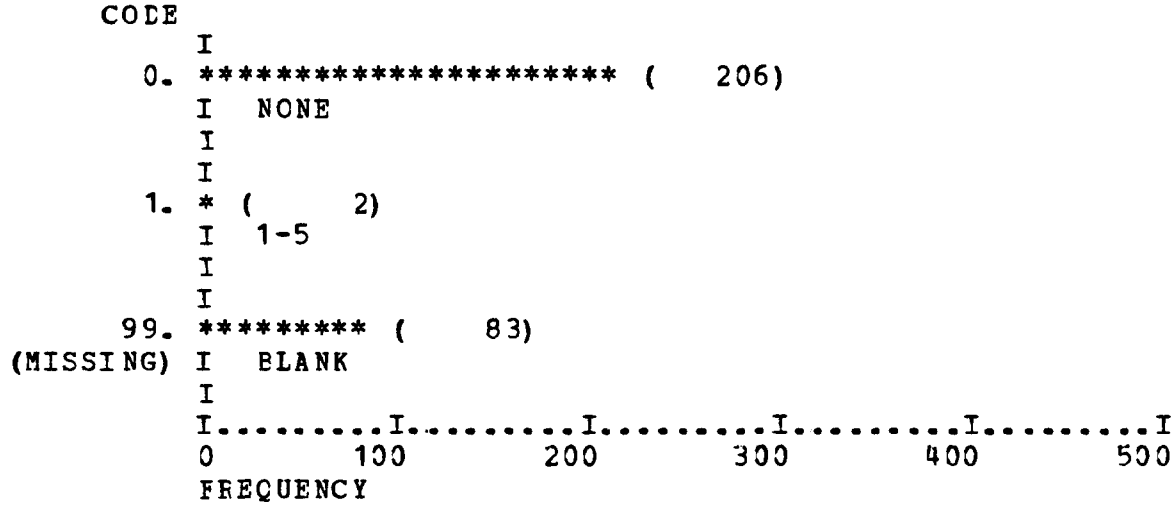
COCE



VALID CASES 208 HISSING CASES 83

TABLE 6-32

MMPROP MM PROPERTY DAMAGE



VALID CASES 208 MISSING CASES 83

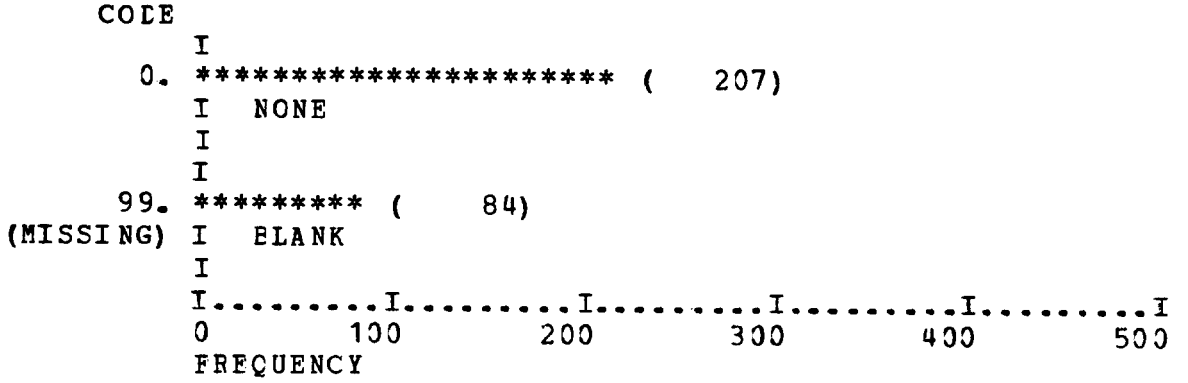
MMDAMINJ NE FROPERTY DAMAGE W/ INJURY

```
     CODE
          I
       0. ********************** (   208)
          I  NONE
          I
          I
      99. ********* (    83)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0        100       200       300       400       500
          FREQUENCY
```

VALID CASES 208 HISSING CASES 83

TABLE 6-34

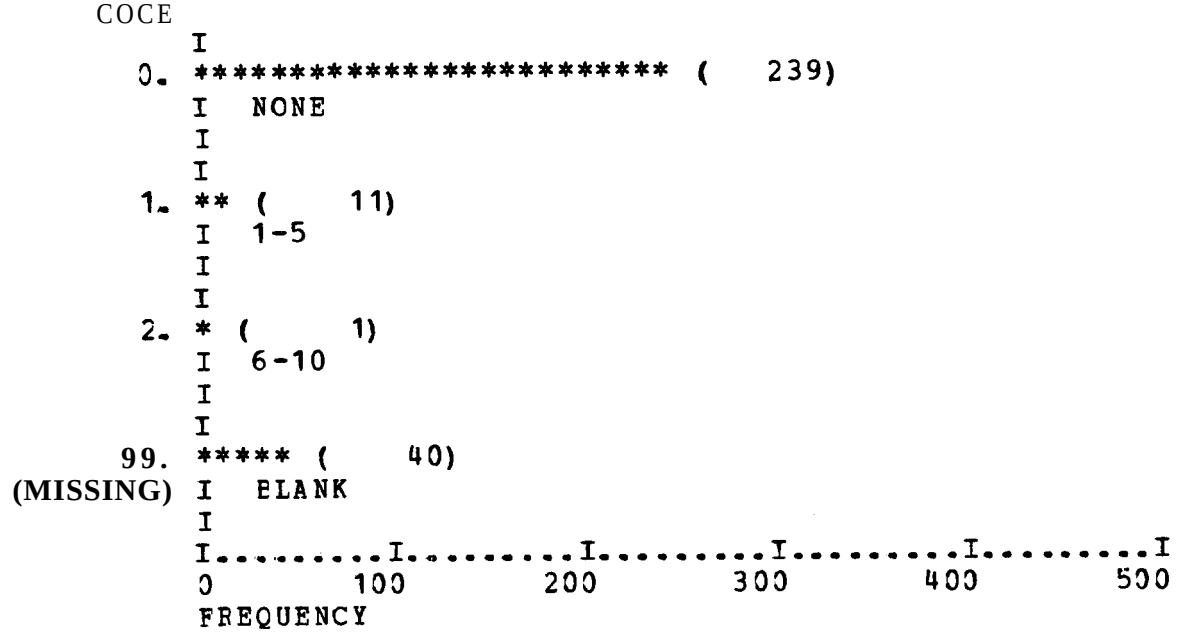
MMDAMFAT MM PROPERTY DAMAGE W/ FATALITIES



VALID CASES 207 MISSING CASES 84

TABLE 6-35

NGPERS NG PERSONAL INJURY



VALID CASES 251 HISSING CASES 40

TABLE 6-36

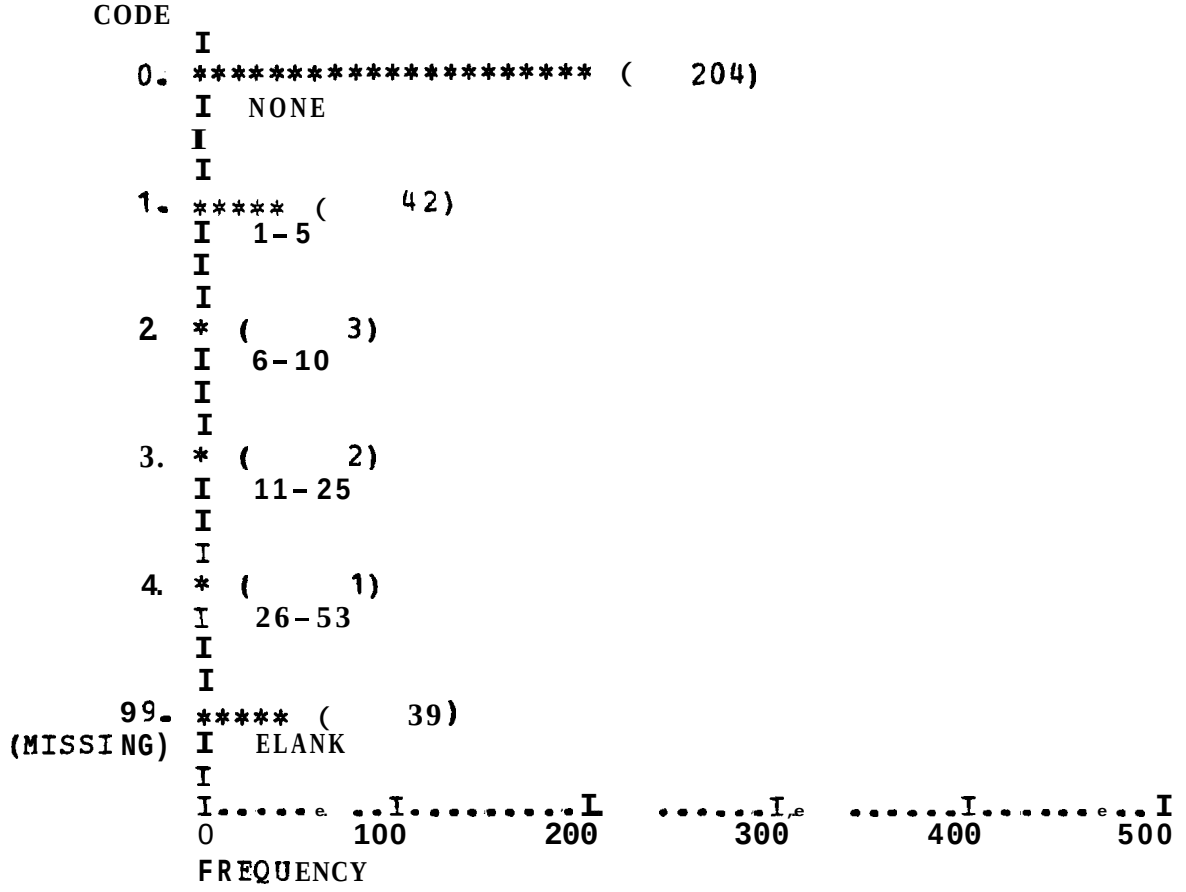
NGLIPE NG LOSS OF LIFE

```
     CODE
          I
       0. ************************* (   251)
          I  NONE
          I
          I
      99. ***** (    40)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0        100       200       300       400       500
          FREQUENCY
```

VALID CASES 251 MISSING CASES 40

TABLE 6-37

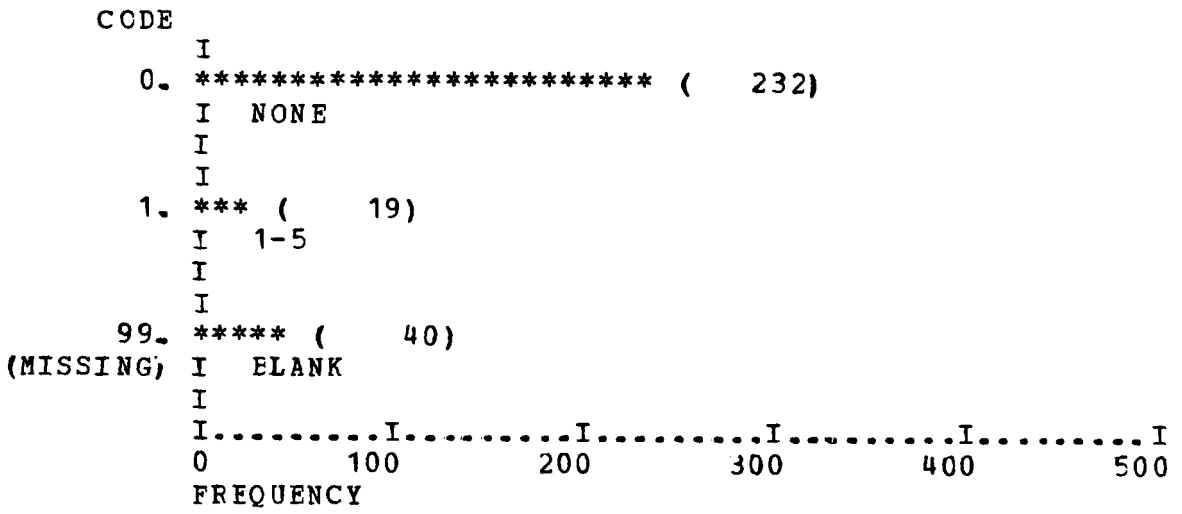
NGPROP NG PROPERTY DAHAGE



VALID CASES 252 MISSING CASES 39

TABLE 6-38

NGCAMINJ NG PROPERTY DAMAGE W/ INJURY



VALID CASES 251 MISSING CASES 40

TABLE 6-39

NGDAMFAT NG PROPERTY DAMAGE W/ FATALITIES

```
     CODE
          I
       0. ************************* (   240)
          I  NONE
          I
          I
       1. ** (    11)
          I  1-5
          I
          I
      99. ***** (    40)
(MISSING) I  BLANK
          I
          I.........I.........I.........I.........I.........I
          0        100       200       300       400       500
          FREQUENCY
```

VALID CASES 251 MISSING CASES 40

TABLE 6-40

6.2 MASTER METER OPERATOR SURVEY

Implementation of the second survey, with master meter operators and owners, was done to obtain data on the characteristics of master meter systems nationwide. Unlike the utility company survey, which used Brown's Directory of North American Gas Companies as a mailing list, the master meter survey did not have the benefit of a directory of names and addresses of master meter operators and owners. Consequently, it was necessary to obtain a mailing list for the master meter survey. SASC generated this list from two sources, returned utility company instruments and state public service commissions.[5] The difficulty in obtaining a sufficiently large enough list of names and addresses required SASC to mail instruments to as many master meter owners and operators as could be made available.

Unfortunately, this mailing list, and subsequent responses from master meter owners and operators, was not representative of the geographic mix of master meter systems nor of the type of master meter systems as identified by the study. For example, no instruments were returned from master meter owners and operators in Texas, where the largest number of systems had been identified. Furthermore, as will be shown, responses from housing authorities/ apartments tended to be overrepresented in the data.

Therefore, it was felt that an analysis of this data, though useful in assessing characteristics of these master meter systems,

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[5] The DOT Regional Chiefs also contributed significantly to the development of this mailing list by personally contacting the state officials and encouraging them to cooperate with this study.

could not be extrapolated to the entire national population of master meter systems. Analysis of the data obtained from these master meter system owners and operators was performed. Included in the analysis, as mentioned earlier, was information about the property, specifically the gas distribution system, leak history, maintenance and repairs on their pipeline system, and other related elements. In addition, pairs of questions were cross tabulated against each other to determine if any cause/effect relationships existed.

Results of these analyses are provided in the Appendix. It is important to emphasize that these results can not be applied to the entire population of master meter systems nationwide with any degree of reliability. Nevertheless, they are useful in providing a framework of the characteristics of master meter systems, especially in those areas where owners and operators overwhelmingly answered similarly.