STATE OF MISSOURI

PUBLIC SERVICE COMMISSION

Union Electric Company
Application for relief from
certain of the requirements
of Rule 32 of General Order
No. 20

No. 18,172

APPLICATION

COMES NOW, Union Electric Company, pursuant to Section 393.160 of R.S. Mo. and Rule 32 of the Commission's General Order No. 20, as amended and requests an order authorizing it to modify its testing of certain watthour meters, and in support thereof states as follows:

1. Applicant Union Electric Company is a corporation organized and existing under the laws of the State of Missouri, Illinois and Iowa and has its principal offices at 1901 Gratiot Street, St. Louis, Missouri 63166. It is engaged as a public utility in electric and steam heating businesses in the State of Missouri, in electric business in Iowa and electric and gas businesses in the State of Illinois. Applicant is a public utility subject to the jurisdiction of the Missouri Public Service Commission.

2. Communications in regard to this application should be addressed to William E. Jaudes and Thomas C. Palmer, Attorneys for Applicant, 1901 Gratiot Street, St. Louis, Missouri 63166.

3. Unless otherwise ordered by the Commission, Rule 32 of the Commission's General Order No. 20 requires that induction type watthour meters not exceeding 50 amperes and manufactured after 1927, but before 1937, be tested every 96 months. Said meters manufactured since 1937 must be tested every 240 months. Applicant hereby seeks approval to be relieved from full compliance with Rule 32

of General Order No. 20 specifically as described herein and in support thereof states as follows:

A. Throughout the years manufacturers of electric watthour meters have incorporated significant design improvements resulting in more stable operating and accuracy characteristics, including marked improvement in temperature compensation and overload characteristics. Applicant proposes that all single-phase in-service meters with a manufactured date prior to 1937 be classed as "obsolete" and remain on the present testing schedule under Rule 32 or be replaced with modern meters as expeditiously as is economical. Further, it is proposed that all single-phase in-service meters referred to in Paragraph 3 of Rule 32 as amended on September 21, 1959, that is all induction type meters manufactured during or since 1937, be classed as "modern" and become exempt in certain respects from the requirements of the Commission's Rule 32 of General Order No. 20.

B. Applicant proposes to adopt in lieu of the 100% periodic testing procedure now applicable to "modern" meters, a plan whereby the quality (accuracy of registration) of all such meters will be established by sample testing, using modern standardized statistical sampling procedures.

C. As of December 15, 1972, Applicant had in Missouri some 673,330 installed watthour meters of various types and ratings, of which 657,650 were "modern" single-phase meters of four manufacturers (Appendix 8 to Exhibit B specifically details the meter types classed as "modern", all of which

were produced in 1937 or later). It is proposed that the sample testing procedure be confined to this group of meters.

D. The sampling plan as proposed will insure with a confidence level of 95% that not more than 2.5% of meters in service will deviate from 100% accuracy of registration by more than plus or minus 2.0%. (See Exhibit A - For complate description of plan.)

E. Full compliance with Rule 32 of General Order No. 20 requires that petitioner test approximately 32,882 in-service meters annually at an annual cost of approximately $190,000. It is estimated that a substantial portion of this testing cost can be saved while at the same time improving the overall quality of the present single-phase meter system by directing concerted efforts towards testing distorted meter groups and isolating these distorted groups in a much smaller time frame than is required by the present meter testing program. That is, inasmuch as the number of annual sample tests is appreciably less than with the current 20 year test plan, considerable time and money is available for the maintenance of distorted meter groups discovered by the proposed sampling procedure. The operation of the sampling plan would, over a period of time, give more explicit and accurate information about the performance of meters and would result in a smaller percentage of meters in service performing outside the tolerance limits than is possible with a program of 100% testing.

F. The proposed sampling plan shall classify the 657,650 "modern" meters by manufacturer and type into 19 groups and

will further divide each group into 10 lots according to their previous test date whereby approximately 1/10 of each group will be analyzed for accuracy each year. These lots will vary in size from a minimum of 786 meters to the largest lot of 7739 meters (based on meters in service on December 15, 1972). After 10 years the total modern meter system will have been reviewed. Once each year a representative random sample will be drawn from the lot with the oldest previous test date in each of the groups in accordance with standard sampling plans designed and applied, utilizing the mathematical principles of Statistical Quality Control as set forth in published standards of the United States Military establishments and other government agencies.

G. The proposed sampling plan contemplates the use of either of two sampling methods. One is of the "attributes" type. The other is the "variables" type, which depends upon the distribution of accuracy data as disclosed by the sample. All meters in the sample groups will be field tested for accuracy of registration, which is referred to as the "as found test". The test will be made at 10% and at 100% of meter nameplate rating. The "as found" accuracy will then be calculated as the weighted arithmetic mean of these two readings, where the weighting factor ratio of the 100% rating to the 10% rating is 4 to 1. If analysis of the tests in a specific group show that meter accuracy data conforms to a normal distribution and that the performance of the group meets the specifications as set forth in paragraph D, no further sample testing will be done on the meters in that

group until the following year. If analysis of the tests show that the distribution of meter accuracies within a group is not normal, additional field tests will be made, if necessary, utilizing the principles of "attributes testing" to determine the acceptability of the group. (Exhibit A discusses sampling plans utilizing the "variables" and "attributes" principles).

H. In either case, any lot or group of meters found to be distorted and not meeting the performance specifications as set forth in paragraph D, will be disposed of by one of two possible procedures. We shall test all meters in the group or retire the group with new meter replacements. (Exhibit A discusses the first option). Economic considerations, including age of meters, will be factors determining which course to follow. If a retirement plan is selected, it will be designed that the quality level of the group will be at least as good as that produced by testing all the meters on an accelerated level. That is, the rate of retirement will be at least equal to the rate at which meters come due for test on the accelerated testing program as set forth in Exhibit A.

4. In October of 1972, Applicant completed a survey of meter accuracies of its Missouri meters using sampling techniques similar to that described above. The sampling technique differed with that described above by using 16 groups of meters that were devided into 8 lots each. Every other aspect of the test remained as described in the preceding paragraphs. Utilizing IBM data processing equipment, sample test cards were derived from each of the 16 groups of meters, according to their oldest previous test date, followed by appropriate field testing to determine the "as found" accuracy and a statistical analysis of the test results.

The preliminary, experimental survey revealed several characteristics of the meter population deemed to be significant in the operation of the sampling plan. It has precisely shown where the great bulk of maintenance effort should be expended - obviously to those meter groups that failed to meet the standards of the sampling plan as proposed herein. The standard of performance of the proposed sampling plan specifies that not more than 2.5% of in-service meters shall have accuracies of registration beyond the limits of 98% to 102%. (The results of the survey are presented in detail in Exhibit B).

WHEREFORE, Applicant requests that this Commission enter an order granting permission, consent, approval, and authority to Applicant to adopt the procedure outlined herein for the periodic testing of in-service single-phase watthour meters, not having associated demand meters, and with capacities up to and including 12 kva.

Dated at St. Louis, Missouri this 31st day of August, 1974.

UNION ELECTRIC COMPANY

By Stewart W. Smith
Vice President

STATE OF MISSOURI)
) SS
CITY OF ST. LOUIS)

Comes now S. W. Smith, a Vice President of Union Electric Company, Applicant herein, and states that the facts stated in the foregoing Application are true and correct to the best of his knowledge and belief.

Stewart W. Smith Jr.

Subscribed and sworn to before me this 21st day of August, 1974.

Margaret S. Heida
MARGARET S. HEIDA
Notary Public

My Commission expires January 23, 1976.

William E. Jaudes
William E. Jaudes

Thomas C. Palmer
Thomas C. Palmer

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EXHIBIT A

Technical Description of Proposed Method For the Sample Testing of In-Service Meters

1. During World War II the application of mathematical techniques and laws of probability to problems of testing and inspection resulted in the wide adoption of sample testing methods as an economical substitute for and which would produce equivalent results of 100 per cent testing. The proposal of Petitioner herein is an adaptation of these sample testing methods to meter testing problems using fully developed and widely recognized mathematical standards, principles and rules which can be found in standard texts and statistical sampling tables. Details of its application and its expected operation are taken from Military Standards MIL-STD-414 which describes plans utilizing the variables sampling technique and MIL-STD-105D which describes plans utilizing the attributes sampling technique.

2. The purpose of using the sample meter testing method is:

A. To determine the quality level of each specific meter class by providing a reliable estimate of the percentage of meters in each meter class lying outside the specified control limits of acceptable accuracy of registration.

B. To provide information relating to the performance of those meters of various types where the meter accuracy is not up to the specified quality level and thus provide for a basis of periodic testing or planned retirement of those meters which do

not conform to an acceptable quality level.

3. The sample meter testing plan herein described shall be used with those single-phase watthour meters manufactured during and since 1937, not exceeding 12 KVA rating, which are presently being used in the Company's Missouri operations. This cut-off date is chosen because beginning in 1934 the manufacturers of electric watthour meters incorporated into their meters significant improvements directed towards attaining more stable operating and accuracy characteristics, such as improved temperature compensation and overload characteristics. However, 1937 is simply more convenient for Union Electric to make a meter division. Therefore, the meters that were manufactured prior to 1937, herein referred to as "old meters", will remain on their present test schedule until such time as they are replaced by "modern meters". Those meters which were manufactured during and since 1937, hereinafter referred to as "modern meters", are the greater proportion of the Company's meters in service in Missouri (as of December 15, 1972, some 657,650 of the Company's 673,330 meters of this type were "modern meters").

4. The Company will classify its "modern meters" according to manufacturer and type. As of December 15, 1972, there were nineteen groups varying in size from 7,865 to 77,387 meters. (See Appendix 8 to Exhibit B for a detailed breakdown of size of meter groups as of December 15, 1972.) These meter groups are further divided into ten lots according to their previous test date so that one-tenth of each group will be sampled for testing

each year, where at the end of ten years the entire single phase meter system described in the main body will have been reviewed; the cycle is then repeated.

5. Each year a representative random sample will be selected from the lot with the oldest previous test date in each of the groups in accordance with standard sampling plans utilizing the mathematical principles of Statistical Quality Control as set forth in published standards of the United States Military establishment and other governmental agencies. The size of the sample will depend on the size of the lot it will represent (the sample sizes of the lot of the nineteen groups as of December 16, 1972, vary from 30 to 50 meters). All the meters in the sample groups will be tested for accuracy of registration. Such tests will be made at 10 per cent and 100 per cent of the meter nameplate rating. The "as found accuracy" will be calculated as the weighted arithmetic mean of the two readings. That is the meter registration at 100 per cent will be multiplied by four and added to the meter registration at 10 per cent. This value is then divided by five to determine the weighted mean value.

6. The sampling plan selected is one that will insure that not more than 2.5 per cent of the meters in service will deviate from 100 per cent accuracy of registration by more than plus or minus 2 per cent. The field data will be analyzed by application of the "chi-square" test to determine whether or not the distribution of accuracies is statistically normal. The data from a sampling showing a normal distribution will permit the determina-

tion of the percentage of meters in the group sampled that are outside of the control limits of plus or minus 2 per cent. Reference to Table B-3 of MIL-STD-414 (Appendix 1 to Exhibit A) shows that for a sample size of 50, the number of distorted units in the sample must not exceed 5.2 per cent to maintain a lot quality level of 2.5 per cent. Meter lots in a group that meet the quality level specifications will have no further tests made on them during the next ten years, but the next lot with the oldest previous test date in that group will be sampled in the following year. Meter lots that are shown to be distorted will either be placed on a 100 per cent accelerated test program or retired and replaced with modern meters on an accelerated replacement program.

7. The accelerated program consists of dividing the meters in the lots into four segments whereby, one segment of meters will be tested in each of the following four years. If all the lots fail from a particular group, the number of meters to be tested per year will increase with an accelerated rate equal to a fourth lot per year. After four years a plateau is reached because new additions of meters to be tested are offset by exhausted supplies of meters from lots that were being tested five years previous. This method will also be utilized when meter groups are replaced with new meters.

8. Probability factors which enter into the above calculations and predictions related to the over-all performance of the plan, can be illustrated by an operating characteristic curve for a sample size of 50 and an Acceptable Quality Level (AQL) of 2.5 per cent. Such a curve is shown in Appen-

dix 2 to Exhibit A and gives the probability of accepting a lot as a function of the actual quality level characteristic of the lot being sampled. From this can be determined the per cent of distorted units expected to result in the total number of meters considered for a specified period, after continued operation of the plan, and based on the premise that distorted lots, as they are found, will be 100% tested and adjusted or replaced. From such a curve it can be seen that the maximum percentage of the sub-standard meters in the lots considered in a period cannot exceed 3.0 per cent and that would only occur in the extremely unlikely case where all lots sampled contained exactly 4 per cent distorted items. The data from which these curves are constructed is as tabulated in the following:

% Distorted In Submitted Lots	Probability Of Accepting the Lot	% of Distorted Units Expected to Result in Lots Considered
1	100	1.00
2	98	1.96
3	90	2.70
4	75	3.00
5	58	2.90
6	41	2.46
7	28	1.96
8	18	1.44
9	11	.99
10	7	.70

9. If analysis of a specified sample does not meet the requirements of the "chi-square" test in that the distribution of meter accuracies is not normal, testing by the sampling technique can still be effected by using the

principle of "attributes" testing. A sample procedure utilizing the principles of attributes is one wherein the accuracy of registration of each individual meter is classified as either being within or beyond the control limits as specified by the sampling plan. A decision to accept or reject a lot is then based upon the number of meters in the sample having registration percentages beyond these control limits, which in this case means outside of the 98 to 102 per cent accuracy range. By contrast, in the variables method the meter accuracy is measured along a continuous numerical scale and is described in terms of its position along that scale. Variables method takes account of the degree to which the accuracy of the meter conforms to the specific quality requirements of the sampling plan and in most cases a decision to accept or reject the lot can be made with a much smaller sample than is necessary with the method of attributes. Sampling by attributes can be made, in one of several ways, usually classified as "single-sampling", "double-sampling", or "multiple-sampling". The plan selected for testing of meters in Missouri is the "multiple-sampling" technique, in which the initial sample drawn is almost the same in size as that drawn for the "variables" testing. Its particular advantage is that there is minimum discrepancy in the sample size required for the "attributes" technique compared to the sample size required for the "variables" technique. The sampling size chosen for any group of meters will be the largest sample size between the two techniques; thereby insuring the quantity of meters needed to utilize either sampling technique and avoiding the necessity of

drawing additional samples. Thus, for those meter lots where accuracies are not normally distributed, but having a high quality level with very few or no distorted units, the original sample will be sufficient to provide a decision. Additional samples need only be drawn in those instances where the percentage of distorted units is beyond the specified acceptance number. A portion of the master table for the multiple-sampling plan reproduced from Military Standards MIL-STD-105D (Table IV A) as shown in Appendix 3 to Exhibit A includes sample sizes which will be used in the Union Electric system in Missouri. To illustrate, inspection of this table shows that for an initial sample of 50 meters (code letter L) the lot is judged acceptable if there are no distorted units in the sample. The lot would be rejected for 4 or more distorted units and for any number of distorted units from 1 to 4, additional samples would need be drawn before a decision could be reached. If a decision to reject is arrived at, then all meters in the lot would be placed on a 100 per cent accelerated test program or retired and replaced with modern meters on an accelerated test program. For a sample of 50 units, the operating curve for multiple sampling is shown in Appendix 4 to Exhibit A along with the per cent of distorted meters expected to result in the total meter population after continued operation of the plan. The data from which these curves are constructed is a tabulated in the following:

Percentage of Meters In Submitted Lots Operating Beyond Acceptable Control Limits	Per Cent Probability Of Accepting A Lot	Percent of Distorted Units Expected to Result In Lots Considered
1	100	1.00
2	99	1.98
3	95.5	2.86
4	80	3.20
5	57	2.85
6	33.5	2.01
7	18	1.26
8	8.5	.68
9	4.0	.36
10	1.0	.10

It is apparent from this data that the maximum percentage of meters having errors of registration beyond the control limits of plus or minus 2 percent is 3.2 percent and only occurs for the unlikely case wherein all lots were exactly 4 percent distorted.

To determine the size of a sample of meters, Table A-2 is used from Military Standards 414 when a Variables test is given and Table I from Military Standards 105D is used when an Attributes test is given. The code letters listed in Table A-2 are utilized in Table B-3 in Appendix 1 to Exhibit "A" and the letters listed in Table I are utilized in Table IV-A in Appendix 3 to Exhibit "A" to determine the required sample size. The largest sample size will always be drawn between the two methods so as to insure a sufficient number of meters for either test; furthermore, the chi-square test will be conducted utilizing the largest sample size between the two methods.

VARIABLES TEST

TABLE A-1

AQL Conversion Table

For specified AQL values falling within these ranges	Use this AQL value
—— to 0.049	0.04
0.050 to 0.069	0.065
0.070 to 0.109	0.10
0.110 to 0.164	0.15
0.165 to 0.279	0.25
0.280 to 0.439	0.40
0.440 to 0.699	0.65
0.700 to 1.09	1.0
1.10 to 1.64	1.5
1.65 to 2.79	2.5
2.80 to 4.39	4.0
4.40 to 6.99	6.5
7.00 to 10.9	10.0
11.00 to 16.4	15.0

TABLE A-2

Sample Size Code Letters[1]

Lot Size	Inspection Levels				
	I	II	III	IV	V
3 to 8	B	B	B	B	C
9 to 15	B	B	B	B	D
16 to 25	B	B	B	C	E
26 to 40	B	B	B	D	F
41 to 65	B	B	C	E	G
66 to 110	B	B	D	F	H
111 to 180	B	C	E	G	I
181 to 300	B	D	F	H	J
301 to 500	C	E	G	I	K
501 to 800	D	F	H	J	L
801 to 1,300	E	G	I	K	L
1,301 to 3,200	F	H	J	L	M
3,201 to 8,000	G	I	L	M	N
8,001 to 22,000	H	J	M	N	O
22,001 to 110,000	I	K	N	O	P
110,001 to 550,000	I	K	O	P	Q
550,001 and over	I	K	P	Q	Q

[1] Sample size code letters given in body of table are applicable when the indicated inspection levels are to be used.

Section A7.1 in Military Std. 414 suggests that unless otherwise specified Inspection Level IV shall be used.

For this table, Mil. Std. 105D suggests t
General inspection level II be used unl
otherwise specified.

TABLE I—Sample size code letters

ATTRIBUTES TEST

(See 9.2 and 9.3)

Lot or batch size	Special inspection levels				General inspection levels		
	S-1	S-2	S-3	S-4	I	II	III
2 to 8	A	A	A	A	A	A	B
9 to 15	A	A	A	A	A	B	C
16 to 25	A	A	B	B	B	C	D
26 to 50	A	B	B	C	C	D	E
51 to 90	B	B	C	C	C	E	F
91 to 150	B	B	C	D	D	F	G
151 to 280	B	C	D	E	E	G	H
281 to 500	B	C	D	E	F	H	J
501 to 1200	C	C	E	F	G	J	K
1201 to 3200	C	D	E	G	H	K	L
3201 to 10000	C	D	F	G	J	L	M
10001 to 35000	C	D	F	H	K	M	N
35001 to 150000	D	E	G	J	L	N	P
150001 to 500000	D	E	G	J	M	P	Q
500001 and over	D	E	H	K	N	Q	R

Note. Small Sample inspection Levels of MIL-STD-105C

CODE LETTERS

	Convert to these special inspection levels
L-1 & L-2	S-1
L-3 & L-4	S-2
L-5 - L-6	S-3
L-7 - L-8	S-4

TABLE B-3

Standard Deviation Method

Master Table for Normal and Tightened Inspection for Plans Based on Variability Unknown
(Double Specification Limit and Form 2—Single Specification Limit)

Sample size code letter	Sample size	Acceptable Quality Levels (normal inspection)													
		.04	.065	.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00	15.00
		M	M	M	M	M	M	M	M	M	M	M	M	M	M
B	3	▼	▼	▼	▼	▼	▼	▼	▼	▼	7.59	18.86	26.94	33.69	40.47
C	4	▼	▼	▼	▼	▼	▼	▼	1.53	5.50	10.92	16.45	22.86	29.45	36.90
D	5	▼	▼	▼	▼	▼	▼	1.33	3.32	5.83	9.80	14.39	20.19	26.56	33.99
E	7	▼	▼	▼	▼	0.422	1.06	2.14	3.55	5.35	8.40	12.20	17.35	23.29	30.50
F	10	▼	▼	▼	0.349	0.716	1.30	2.17	3.26	4.77	7.29	10.54	15.17	20.74	27.57
G	15	0.099	0.186	0.312	0.503	0.818	1.31	2.11	3.05	4.31	6.56	9.46	13.71	18.94	25.61
H	20	0.135	0.228	0.365	0.544	0.846	1.29	2.05	2.95	4.09	6.17	8.92	12.99	18.03	24.53
I	25	0.155	0.250	0.380	0.551	0.877	1.29	2.00	2.86	3.97	5.97	8.63	12.57	17.51	23.97
J	30	0.179	0.280	0.413	0.581	0.879	1.29	1.98	2.83	3.91	5.86	8.47	12.36	17.24	23.58
K	35	0.170	0.264	0.388	0.535	0.847	1.23	1.87	2.68	3.70	5.57	8.10	11.87	16.65	22.91
L	40	0.179	0.275	0.401	0.566	0.873	1.26	1.88	2.71	3.72	5.58	8.09	11.85	16.61	22.86
M	50	0.163	0.250	0.363	0.503	0.789	1.17	1.71	2.49	3.45	5.20	7.61	11.23	15.87	22.00
N	75	0.147	0.228	0.330	0.467	0.720	1.07	1.60	2.29	3.20	4.87	7.15	10.63	15.13	21.11
O	100	0.145	0.220	0.317	0.447	0.689	1.02	1.53	2.20	3.07	4.69	6.91	10.32	14.75	20.66
P	150	0.134	0.203	0.293	0.413	0.638	0.949	1.43	2.05	2.89	4.43	6.57	9.88	14.20	20.02
Q	200	0.135	0.204	0.294	0.414	0.637	0.945	1.42	2.04	2.87	4.40	6.53	9.81	14.12	19.92
		.065	.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00	15.00	
		Acceptability Quality Levels (tightened inspection)													

All AQL and table values are in percent defective.

↓ Use first sampling plan below arrow, that is, both sample size as well as M value. When sample size equals or exceeds lot size, every item in the lot must be inspected.

APPENDIX 2 TO EXHIBIT "A" - Operating Characteristic Curves For Sample Size Of 50 Units. AQL = 2.5% - Method Of Variables

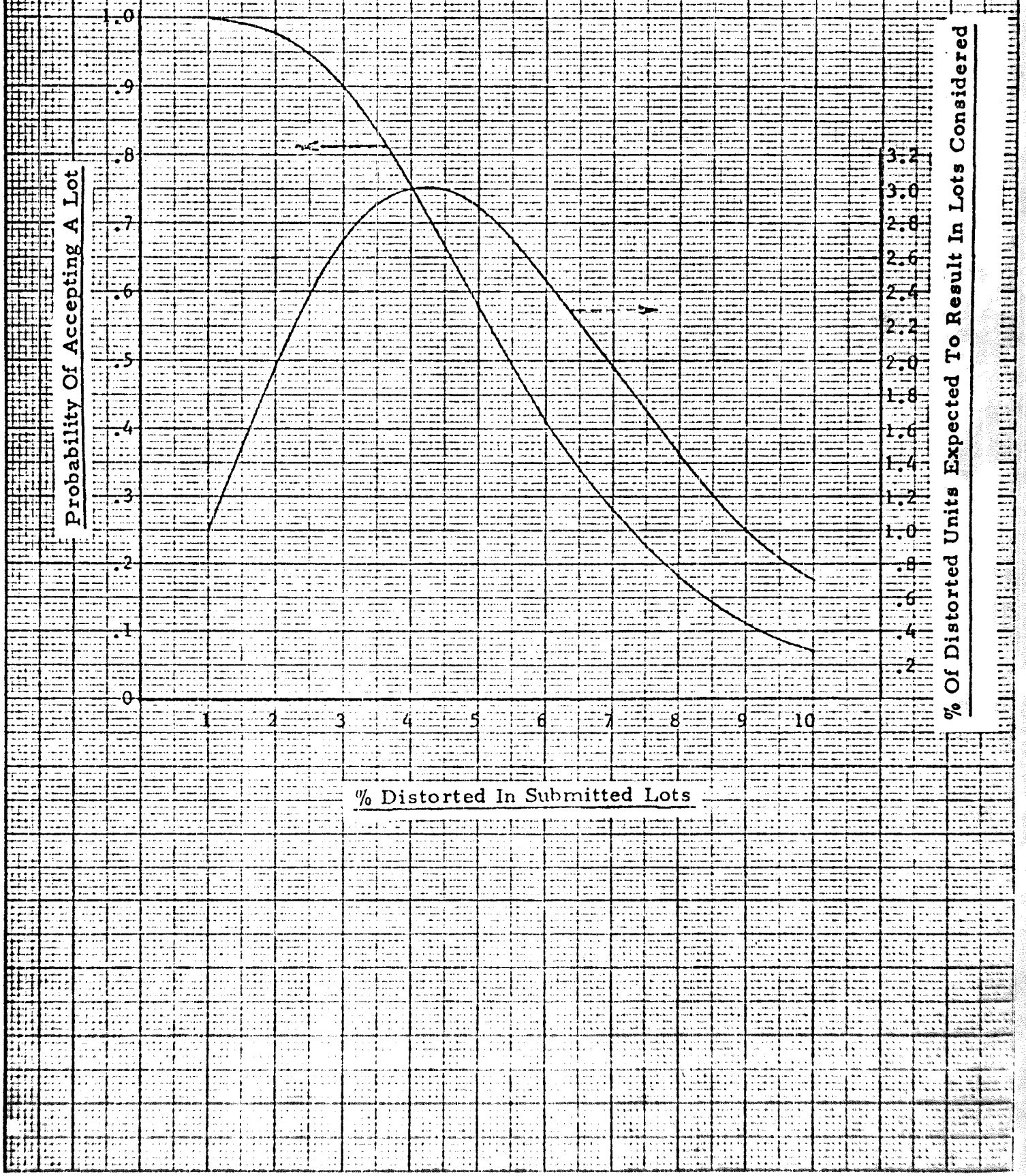

TABLE IV-A — Multiple sampling plans for normal inspection (Master table) (Continued)

(See 9.4 and 9.5)

Sample size code letter	Sample	Sample size	Cumulative sample size	Acceptable Quality Levels (normal inspection)																									
				0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
				Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
K	First	32	32	↓	↓	↓	↓	↓	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	32	64									# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14										
	Third	32	96									0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19										
	Fourth	32	128									0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25										
	Fifth	32	160									1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29										
	Sixth	32	192									1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33										
	Seventh	32	224									2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38										
L	First	50	50	↓	↓	↓	↓	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	50	100								# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14											
	Third	50	150								0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19											
	Fourth	50	200								0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25											
	Fifth	50	250								1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29											
	Sixth	50	300								1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33											
	Seventh	50	350								2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38											
M	First	80	80	↓	↓	↓	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	80	160							# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14												
	Third	80	240							0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19												
	Fourth	80	320							0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25												
	Fifth	80	400							1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29												
	Sixth	80	480							1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33												
	Seventh	80	560							2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38												
N	First	125	125	↓	↓	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	125	250						# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14													
	Third	125	375						0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19													
	Fourth	125	500						0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25													
	Fifth	125	625						1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29													
	Sixth	125	750						1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33													
	Seventh	125	875						2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38													
P	First	200	200	↓	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	200	400					# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14														
	Third	200	600					0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19														
	Fourth	200	800					0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25														
	Fifth	200	1000					1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29														
	Sixth	200	1200					1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33														
	Seventh	200	1400					2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38														
Q	First	315	315	*	↑	↓	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	315	630				# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14															
	Third	315	945				0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19															
	Fourth	315	1260				0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25															
	Fifth	315	1575				1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29															
	Sixth	315	1890				1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33															
	Seventh	315	2205				2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38															
R	First	500	500	↑	↑	# 2	# 2	# 3	# 4	0 4	0 5	1 7	2 9	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Second	500	1000			# 2	0 3	0 3	1 5	1 6	3 8	4 10	7 14																
	Third	500	1500			0 2	0 3	1 4	2 6	3 8	6 10	8 13	13 19																
	Fourth	500	2000			0 3	1 4	2 5	3 7	5 10	8 13	12 17	19 25																
	Fifth	500	2500			1 3	2 4	3 6	5 8	7 11	11 15	17 20	25 29																
	Sixth	500	3000			1 3	3 5	4 6	7 9	10 12	14 17	21 23	31 33																
	Seventh	500	3500			2 3	4 5	6 7	9 10	13 14	18 19	25 26	37 38																

↓ = Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
↑ = Use first sampling plan above arrow (refer to preceding page, when necessary).
Ac = Acceptance number.
Re = Rejection number.
* = Use corresponding single sampling plan (or alternatively, use multiple plan below, where available).
\# = Acceptance not permitted at this sample size.

APPENDIX C TO EXHIBIT A: Operating Characteristic Curves for Sample Size of 50 Units

AQL = 2.5%

Probability Of Accepting A Lot

% Distorted In Submitted Lots

0 1 2 3 4 5 6 7 8 9 10

0 1 2 3 4 5 6 7 8 9 10

% Of Distorted Units Expected To Result In Lots Considered

EXHIBIT B

ANALYSIS OF SAMPLING SURVEY ON METER ACCURACIES - MISSOURI PROPERTIES

1) During October of 1972, preliminary sampling surveys were completed of meter accuracies of all meter groups in the Missouri properties of the Union Electric System, including the St. Louis City, Jefferson County, St. Francis County, St. Charles County, Franklin County and St. Louis County districts.

2) The appendixes to this Exhibit show the results of all pertinent calculations necessary for the determination of specific lot characteristics, for all meter groups included in the preliminary sampling survey, including:-

- Mean Accuracy of Registration
- Standard Deviation
- Estimate of per cent of meters with accuracy of registration outside of the $\pm$ 2% control limits.
- Limit of per cent distorted to insure an acceptable quality level (AQL) of 2.5%.
- Chi-square test to determine normality of distribution of meter accuracies.
- Disposition of meter groups.

3) The disposition of meters within a lot of a specific group is interpreted to mean that an "acceptable" lot will have no further tests made within it for the next ten years. The following year, however, will require the next lot with the oldest previous test date in the group to be sampled and that sample field tested for the prediction of the recording accuracy of the

meters in that lot. A rejected lot will be placed on an accelerated testing or an accelerated replacement program as described in paragraph 7 of Exhibit A.

4) Calculations necessary for the determination of the average accuracy of registration, and the standard deviation of a specific group of meters are shown in Appendix 2 - Exhibit B. From this data is calculated the estimate of percentage of meters in the lot having accuracy characteristics beyond the $\pm$ 2% control limits. Appendix 4 - Exhibit B shows a typical calculation of the "chi-square" test necessary to determine the normality of meter accuracy distribution.

5) The table in Appendix I to Exhibit B shows a breakdown as well as the results of a sample test of the Missouri single phase meters as of October 1972.

In 1972 there were sixteen meter groups present in the Missouri System due to the combining of new meter models with the old models. In addition, the groups were divided into eight lots instead of the ten proposed in this petition. From each group the lot with the oldest previous test date, which in most cases contained meters that had not been tested within the past sixteen to twenty years, was sample tested and analyzed. From the analysis it was determined that sample groups 1, 5, 9, 11 & 16 were rejects, groups 6, 12 & 13 required retesting and the remaining eight groups were acceptable. Since the October 1972 analysis, group 1 has been retired and four new meter groups were created by separating the new meter models from the old meter

models. An updated breakdown of the Missouri single phase meters is listed in Appendix 8 to Exhibit B. Furthermore, additional trial tests were made in 1973 to determine if all of the lots with more recent test dates and in the groups designated as questionable in the 1972 tests are as degrading as the 1972 tests suggests. The results from these additional tests are listed in Appendix 7 to Exhibit B and a brief critique of each group is as follows:

Group 5:

The 1964 section showed that no meters in the sample were distorted, but the 1961 section showed that two meters were slightly in error while another meter was completely distorted. This suggests that after twelve years the meters may begin distorting.

Group 6:

The 1956 section proved to be in an acceptable condition, and although the decision for the 1955 & before section was "resample", only one meter failed in that section. Since only one meter was at fault the indications are that most of the meters are probably accurate in that section. This group most probably can be expected to function with minimal problems in the future.

Group 9:

The critique for group six is also true for group nine.

Group 11:

This group was rejected by the October 1972 run as well as the 1961 section of the 1973 run. However, the 1964 section had no failures out of 40 meters. This seems to indicate that somewhere between eight and twelve years

from the last test date these meters begin to distort enough to be rejected by sample testing techniques; thus requiring the total lot of meters to be tested and adjusted.

Group 12:

This group appears as though it may have some operating problems in the future. Although it was accepted in both sections of the 1973 run, the meters seem to be close to the "resample" stage which suggests that some time in the future the company may be readjusting all of the meters in some of its lots.

Group 13:

This group appears to be a reliable group even though the 1956 & 57 section indicated that resampling was necessary. In that particular section, only one meter failed from 40 meters tested. That one meter, however, was so severely distorted that it placed the rest of the group in the questionable area. When one meter becomes that distorted there is usually some reason other than normal operation that causes it to fail. Therefore, a satisfactory response from this group in the future is expected.

Group 16:

Although this group was rejected in the 1972 run, both sections of this run were accepted with only two meters failing by a small margin from a total of 100 meters tested. It appears that this group may be in a much more sound condition than as originally thought.

To summarize the above results, it appears that the groups that become distorted will begin distorting approximately 12-20 years since it was last tested. Furthermore, it appears that the principal portion of single phase meters in the Union Electric Company are of sufficient quality to allow an efficient operation of a sample testing program as well as an economical savings to the company and, therefore, to the consumer.

Appendix I To Exhibit B - Analysis of Sampling Survey Of Meter Accuracies. Field Tests Ma[de] During Aug.-Sep. and Oct. of 1972

Meter Type	Lot Size	Sample Size (Code)	Mean Accuracy %	Standard Deviation %	Estimate Lot Defective %	Limit-Lot Defective %	Ch (Sa
HF	1183	35 (K)	99.60	1.652		5.57	1
J	10717	75 (N)	99.49	2.448		4.87	4
J2	6225	50 (M)	99.57	0.514	0.07	5.20	
J3	5247	50 (M)	99.30	0.542	0.71	5.20	
CA-CS	5094	50 (M)	100.50	1.320		5.20	
DS	5714	50 (M)	100.01	0.700		5.20	
D2S	1744	40 (L)	99.67	0.468	0.01	5.58	
D3S	4535	50 (M)	99.72	0.444		5.20	
MF	3275	50 (M)	99.44	1.787		5.20	2
MK	3882	50 (M)	99.75	0.779	1.20	5.20	
MQ	4835	50 (M)	99.12	2.906		5.20	
I30	1537	40 (L)	99.64	2.305		5.58	
I50	5721	50 (M)	99.56	0.795		5.20	
I55	4234	50 (M)	99.92	0.548		5.20	
I60	9061	75 (N)	99.33	0.538	0.61	4.87	
CA-CS	7508	50 (M)	99.76	1.218	10.36	5.20	

Total

*1 Analysis of sample showed the number of sub-normal meters was excessive, resulting in

*2 Analysis by attributes method showed the number of defects not exceeding the allowable nu

*3 Analysis by variables method showed the group acceptable based on low value of per cent

*4 Analysis by attributes method showed the number of defects between the accept and reject necessary to arrive at a solution.

*5 Analysis by variables method showed the group failed based on high value of per cent defe

Determination of Mean Accuracy and Standard Deviation

Westinghouse D2s

Partition size - 1744; Sample size - 40

Meter Code	Meter Serial No.	Low Load Accuracy (X1)	High Load Accuracy (X2)	Weighted Average Accuracy (X)
63K20	38762880	100.400	100.300	100.320
63K20	38522774	100.400	99.300	99.519
63K20	38444555	99.300	99.800	99.699
63K20	38804913	99.300	99.800	99.699
63K20	38439789	101.200	99.800	100.080
63K20	38702545	98.700	99.700	99.500
63K20	38951187	99.300	99.500	99.460
63K20	38439677	98.200	99.200	99.000
63K20	38619146	99.900	99.500	99.580
63K20	38812145	99.300	99.800	99.699
63K20	38857426	99.100	99.600	99.500
63K20	38756849	100.400	100.600	100.560
63K20	38858977	98.100	99.400	99.140
63K20	38764362	98.600	99.500	99.320
63K20	38805686	99.400	99.600	99.560
63K20	38853470	100.100	100.400	100.339
63K20	38849467	98.500	99.600	99.380
63K20	38707904	100.100	100.200	100.180
63K20	38951226	98.900	100.100	99.860
63K20	38443203	100.300	100.500	100.460
63K20	38703117	99.800	100.500	100.360
63K20	38638969	97.800	101.800	101.000
63K20	38639331	99.600	99.700	99.680
63K20	38812324	98.500	99.200	99.060
63K20	38812491	98.400	99.500	99.280
63K20	38707918	100.500	100.000	100.100
63K20	38438766	99.800	99.500	99.560
63K20	38805871	98.800	99.600	99.440
63K20	38849304	98.500	99.000	98.900
63K20	38858277	100.000	99.300	99.439
63K20	38812247	98.500	99.700	99.460
63K20	38857531	99.500	99.000	99.100
63K20	38441915	98.500	99.000	98.900
63K20	38764211	99.000	99.500	99.400
63K20	38438930	99.200	99.800	99.679
63K20	38703235	100.000	99.400	99.520
63K20	38438754	100.500	99.500	99.700
63K20	38702679	100.500	99.800	99.939
63K20	38812544	100.500	99.800	99.939
63K20	38763691	99.500	99.700	99.660

Weighted Avg. Acc. Meter Serial No. - 38762880

$X = (X1 + 4X2)/5.0$

$= (100.400 + 401.200)/5.0$

$= 100.320$

Analysis of Westinghouse D2S meters:

Sample MEAN $\bar{\bar{X}}\% = \frac{\sum_{i=1}^{n} \bar{X}_i}{n} = \frac{3986.971}{40} = 99.674\%$

Standard Deviation $S = \sqrt{\sum \frac{(\bar{X} - \bar{\bar{X}})^2}{(n-1)}} = \sqrt{\frac{8.5531}{39}}$

$S = 0.468$

Estimate of percentage of meters in the lot, outside of control limits.

Upper Control Limit - U = 102%

Lower Control Limit - L = 98%

Upper Quality Index $Qu = \frac{U - \bar{\bar{X}}}{S}$

$Qu = \frac{102.0 - 99.674}{0.468} = 4.970$

Lower Quality Index $Q_L = \frac{\bar{\bar{X}} - L}{S}$

$Q_L = \frac{99.674 - 98.0}{0.468} = 3.577$

Percentage of meters below limit . . . PL = 0.004%

Percentage of meters above limit . . . P_U = 0.001%

(See Appendix 3 to Exhibit "B" for values of PL and P_U)

Total percent beyond limits . . . . . PA = 0.005%

Maximum Allowable Per Cent Defective To Maintain Quality Level at 2.5% is 5.58%

(See Appendix 1 to Exhibit "A" for Limit at AQL - 2.5%)

TABLE B-5—Continued

Table for Estimating the Lot Percent Defective Using Standard Deviation Method

$\frac{\bar{X}_U - \bar{X}}{\sigma}$	Sample Size															
	3	4	5	7	10	15	20	25	30	35	40	50	75	100	150	200
3.70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.71	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.007	0.008
3.72	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.005	0.006	0.007	0.008
3.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.005	0.006	0.007	0.009
3.74	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.005	0.007	0.009
3.75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007
3.76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.004	0.005	0.006	0.007
3.77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.003	0.005	0.006	0.006
3.78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.003	0.004	0.005	0.006
3.79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.003	0.004	0.005	0.006
3.80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.005
3.81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.005
3.82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005
3.83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005
3.84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004
3.85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004
3.86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004
3.87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004
3.88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003
3.89	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003
3.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003

Appendix 4 - Exhibit B

Determination of "Chi-Square" - Goodness Of Fit To A Normal Distribution.

Westinghouse D2S:

Mean Accuracy of Group, $\bar{\bar{x}}$ = 99.674%; Standard Deviation, S = 0.468

See Appendix 5 - Exhibit B for Table of Preferred Cell Intervals. For sample size of 40,

Number of Cells = 4 and Degrees Of Freedom = 1

Cell	Accuracy Range	(f) (frequency)	Normal Frequency f' %	Normal Frequency f' Number	f-f'	$\frac{(f-f')^2}{f'}$
	100.15 - and up	7	15.87	6.35	0.65	0.066
1.0s	99.68 - 100.14	12	34.13	13.65	-1.65	0.199
MEAN	$\bar{\bar{x}}$ = 99.67	0				
-1.0s	99.21 - 99.67	16	34.13	13.65	2.35	0.404
	Up to - 99.20	5	15.87	6.35	- 1.35	0.287
		40	100.00	40.00		0.9574 $(Chi)^2$

See Appendix 6 - Exhibit B for critical values of the $(Chi)^2$ distribution. For probability, P = 0.05 and one degree of freedom, the critical value is - - - 3.84. Hence this distribution may be considered normal.

APPENDIX 5 TO EXHIBIT "B"

THE CHI-SQUARE TEST
TABLE OF PREDETERMINED CELL INTERVALS

For Testing a Group of N Observations for Normality of Distribution

Degrees of Freedom Shown Below assume $\bar{X}'$ and σ' to be Taken from the Observed Data

Total Number of Observations in Data (N)		Body of Table Gives Fractional Cell Frequencies				
		Over 5000	1000-5000	250-1000	100-250	50-100
No. of Cells (n)		14	12	10	8	4
Deg. of Freedom		11	9	7	5	1
For Cells Bounded by σ-Intervals Shown in Next Column	$+\infty$	.0013	.0062	.0227	.0668	.1587
	$+3.0\ \sigma$	.0049				
	$+2.5\ \sigma$	.0165	.0165			
	$+2.0\ \sigma$	.0441	.0441	.0441		
	$+1.5\ \sigma$	.0919	.0919	.0919	.0919	
	$+1.0\ \sigma$	.1498	.1498	.1498	.1498	.3413
	$+0.5\ \sigma$	.1915	.1915	.1915	.1915	
	Mean	.1915	.1915	.1915	.1915	.3413
	$-0.5\ \sigma$	.1498	.1498	.1498	.1498	
	$-1.0\ \sigma$	.0919	.0919	.0919	.0919	
	$-1.5\ \sigma$	.0441	.0441	.0441		
	$-2.0\ \sigma$	.0165	.0165			
	$-2.5\ \sigma$	.0049	.0062	.0227	.0668	.1587
	$-3.0\ \sigma$	.0013				
	$-\infty$					

APPENDIX 6 - EXHIBIT "B"

CRITICAL VALUES OF THE CHI-SQUARE DISTRIBUTION

Probability %	0.10	0.05	0.025	0.010
Degrees Of Freedom				
1	2.70554	3.84146	5.02389	6.63490
2	4.60517	5.99147	7.37776	9.21034
3	6.25139	7.81473	9.34840	11.3449
4	7.77944	9.48773	11.1433	13.2767
5	9.23635	11.0705	12.8325	15.0863
6	10.6446	12.5916	14.4494	16.8119
7	12.0170	14.0671	16.0128	18.4753
8	13.3616	15.5073	17.5346	20.0902
9	14.6837	16.9190	19.0228	21.6660
10	15.9871	18.3070	20.4831	23.2093

See Appendix 5 - Exhibit B for determination of degrees of freedom

TRIAL TESTS - QUESTIONABLE SAMPLE GROUPS

Group		Style & Mfg.	Year Of Previous Test	Decision	Comment
5	(1)	West. C & CS	1961	Resample	3 meters out of 40 failed. 1 meter was extremely bad.
5	(1)	West. CA & CS	1964	Accept	0 meters out of 40 failed.
6	(2)	West. DS	1955 & before	Resample	1 meter out of 40 failed.
6	(2)	West. DS	1956	Accept	1 meter out of 75 failed slightly.
9	(1)	Duncan MF	1961	Resample	1 meter out of 40 failed.
9	(1)	Duncan MF	1964	Accept	0 meters out of 40 failed.
11	(1)	Duncan MQ	1961 & before	Reject	7 meters out of 50 failed slightly.
11	(1)	Duncan MQ	1964	Accept	0 meters out of 40 failed.
12	(2)	GE I30	1956	Accept	1 meter out of 35 failed slightly.
12	(2)	GE I30	1957	Accept	3 meters out of 35 failed slightly.
13	(2)	GE I50	1955 & before	Accept	1 meter out of 40 failed slightly.
13	(2)	GE I50	1956 & 57	Resample	1 meter out of 40 failed miserably.
16	(1)	West. CA & CS	1961	Accept	1 meter out of 50 failed slightly.
16	(1)	West. CA & CS	1964	Accept	1 meter out of 50 failed slightly.

(1) Oldest tested meters that failed the 1972 test.
(2) Oldest tested meters that had to be resampled from the 1972 test.

APPENDIX 8 - EXHIBIT B

MISSOURI SYSTEM METER BREAKDOWN

1973

MFG. & TYPE	GROUP	TOTAL NO.	SAMPLE LOT	SAMPLE SIZE
Sangamo HF	1	13	This group has been retired.	
Sangamo J	2	54050	5405	50
Sangamo J2	3	45283	4528	50
Sangamo J3	4	42873	4287	50
West. CA & CS	5	26675	2668	40
West. DS	6	77387	7739	50
West. D2S	7	22745	2274	40
West. D3S	8	32725	3272	50
Duncan MF	9	25736	2754	40
Duncan MK	10	25302	2530	40
Duncan MQ	11	39950	3995	50
GE I30	12	11045	1104	35
GE I50	13	32310	3231	50
GE I55	14	26267	2627	40
GE I60	15	57496	5750	50
West. CA & CS	16	62952	6295	50
Duncan MS	17	13936	1394	40
GE I70	18	27017	2702	40
Sangamo J4S	19	7865	786	30
Duncan D4S	20	24223	2422	40
Total		657,650	65,763	835

Copy

Missouri Public Service Commission

August 26, 1974

Mr. Thomas C. Palmer, Attorney
Union Electric Company
1901 Gratiot Street
P. O. Box 149
St. Louis, Missouri 63166

Re: Case No. 18,172

Dear Mr. Palmer:

We acknowledge receipt of your letter of August 21, 1974 enclosing the original and nine copies of Union Electric Company's application for relief from certain of the requirements of Rule 32 of General Order No. 20.

The application has been filed in this office today as Case No. 18,172 and called to the attention of the Commission.

You will be informed when further action is taken in this matter.

Sincerely yours,

Robert L. Gilmore
Secretary

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