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July 1, 2005

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Ms. Beth O'Donnell
Executive Director
Public Service Commission of Kentucky
211 Sower Boulevard
P.O. Box 615
Frankfort, Kentucky 40602-0615

Case 2005-00276

Re: ***P.S.C. Case No. ~~99-441.~~***

Dear Ms. O'Donnell:

I enclose the Evaluation Report prepared by Inter County Energy Cooperative Corp., Kentucky Power Company, Kentucky Utilities Company, Louisville Gas and Electric Company, Owen Electric Cooperative, Shelby Energy Cooperative and Union Light, Heat and Power Company in conformity with the Commission's Orders in Case No. 99-441.

The filing also contains the utilities' request to modify the Revised Amended Sample Meter Test Plan and to make the modified plan permanent effective January 1, 2006.

Please call if you have any questions.

Sincerely yours,

STITES & HARBISON, PLLC

Mark R. Overstreet

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COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

THE JOINT AMENDED APPLICATION OF THE UTILITIES: INTER COUNTY ENERGY COOPERATIVE CORP., KENTUCKY POWER COMPANY, KENTUCKY UTILITIES COMPANY, LOUISVILLE GAS AND ELECTRIC COMPANY, OWEN ELECTRIC COOPERATIVE, SHELBY ENERGY COOPERATIVE UNION LIGHT, HEAT AND POWER COMPANY FOR APPROVAL OF A PILOT METER TESTING PLAN PURSUANT TO 807 KAR 5:041, SECTIONS 13, 15, 16, 17 AND 22	)	2005-00276 **Case No. ~~99-441~~**

Inter County Energy Cooperative Corp., Kentucky Power Company, Kentucky Utilities Company, Louisville Gas and Electric Company, Owen Electric Cooperative, Shelby Energy Cooperative and Union Light, Heat and Power Company (the "Utilities") file their evaluation report pursuant to the Utilities' October 25, 2000 Revised Amended Sample Meter Test Pilot accepted and approved by the Commission in its December 12, 2000 Order. The Utilities also move the Commission to modify the Revised Amended Sample Meter Test Plan as set forth below and to make the modified plan permanent effective January 1, 2006.

Evaluation Report

1. In its October 25, 2000 Revised Amended Sample Meter Test Pilot the Utilities agreed to file an evaluation of the costs and benefits of the 5-Year Pilot Meter Test Program six months before the pilot was to end, or on or before July 1, 2005.

2. In accordance with the October 25, 2000 Revised Amended Sample Meter Test Pilot and the Commission's December 12, 2000 Order the following cost-benefit analyses are attached as Exhibits 1-7:

(a) Inter County Energy Cooperative Corp. [Exhibit 1];

(b) Kentucky Power Company. [Exhibit 2];

(c) Kentucky Utilities Company. [Exhibit 3];

(d) Louisville Gas and Electric Company. [Exhibit 4];

(e) Owen Electric Cooperative. [Exhibit 5];

(f) Shelby Energy Cooperative. [Exhibit 6];

(g) Union Light Heat and Power Company. [Exhibit 7].

3. The Utilities' average annual savings were $1,012,603.

4. The pilot program resulted in additional benefits. It required the Utilities to divide installed meters into homogeneous groups. This change increased the number of test groups and focused attention on poor performing groups thereby resulting in increased meter accuracy. Additionally, statistical sampling is a proven method of identifying poorly performing meters thereby yielding increased meter dependability and providing certain unmeasured savings by extending the intervals for testing metering equipment.

Request to Adopt 2006 Sample Meter Testing Plan And
To Make The Plan Permanent

5. Consistent with the Commission's August 23, 1995 Order in Case No. 94-046, whereby Louisville Gas & Electric Company was permitted to adopt a Sample Meter Testing Plan under which poor-performing subgroups of a "failed" lot could be identified for segregation and the remainder of the lot permitted to remain in service

under certain conditions, the Utilities request the Commission: (1) to enter an Order modifying the Revised Amended Sample Meter Testing Plan as described below ("2006 Sample Meter Testing Plan"); and (2) making, effective January 1, 2006, the 2006 Sample Meter Testing Plan permanent. The current pilot meter sampling test plan is scheduled to expire January 1, 2006. A copy of the 2006 Sample Meter Testing Plan is attached as Exhibit 8.

6. The 2006 Sample Meter Testing Plan is identical to the Revised Amended Sample Meter Testing Plan previously approved by the Commission except that Section II(D)(3)(b) (see pages 10 and 11 of the 2006 Plan) is amended to permit the Utilities to further sub-divide meter lots pursuant to ANSI C12.1-1995, Section 5.1.4.3.3. Under the amendment, a "failed" meter lot will be further subdivided, if appropriate, by removing from service any identified poor-performing subgroup within the failed lot. The remainder of the original group will remain in service if the Utility can demonstrate that the remainder of the original group meets the accuracy level established by Section II(D)(3)(b) of the 2006 Sample Meter Testing Plan. Supporting documentation pertaining to sub-dividing meter lots is attached as Appendix 1 and 2.

7. Utilities establish meter sample groups (lots) based on their best knowledge of the manufacturer's homogeneous groups. However, there can be a need to subdivide a group further based on additional knowledge of a group resulting from actual test data or information from a manufacturer. For example, a manufacturer could learn years after a product has been in service that a certain group of meters have a common problem. The ability to subdivide groups will insure poor performing meters are removed from service and good meters remain in service.

8. 807 KAR 5:041, Section 16 establishes, in the absence of an approved Meter Test Plan deviating from the regulation, the percentage of meters to be tested in any year based on the prior year's sample test results. This table is based solely upon the percentage of sample meters within 2% of 100% and has a maximum of 16% of the meters in a poor performing group required for testing (or removal) in the year after the sample test was completed. Under the current Meter Test Pilot, the statistical standard ANSI Z1.9 is used to determine acceptable meter performance. It uses both an average accuracy and a sigma (deviation from the average). This method finds problematic meters sooner and at a lower cost. For example, Kentucky Power Company had a failed group in 2003 where the average accuracy was 99.66% with a standard deviation (sigma) of 1.250. This group's failure was identified sooner than it would have been and the poor performing meters were thus removed from service sooner.

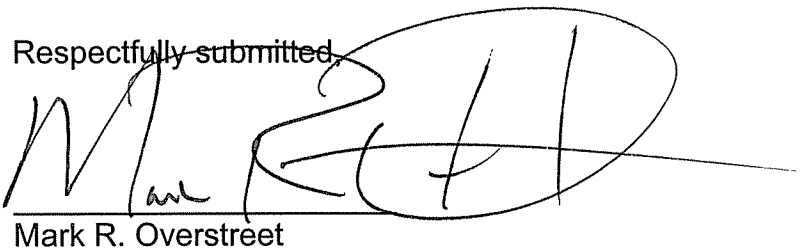
WHEREFORE, the Utilities respectfully request the Commission enter an Order:

1. Authorizing the Utilities, effective January 1, 2006, to test meters in accordance with the 2006 Sample Meter Testing Plan;

2. Granting the Utilities a permanent deviation from the regulations of the Commission governing meter testing; and

3. Granting the Utilities such further relief as to which they may be entitled.

Respectfully submitted,



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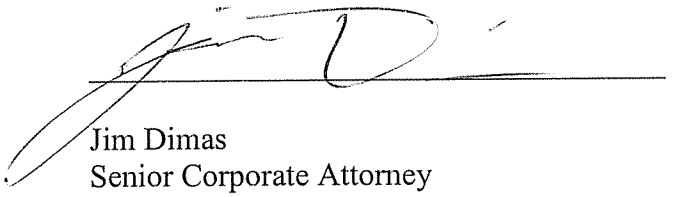


Jim Dimas
Senior Corporate Attorney
Louisville Gas and Electric Company
Kentucky Utilities Company
220 West Main Street
Louisville, KY 40202

EXHIBIT 1

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Below is the actual annual cost savings from implementing the pilot meter-testing plan.

Annual Cost Savings for Inter County Energy Cooperative

I) Implementation of ANSI Z-1.9 statistical sampling plan

a)	Annual average number of sample meters tested prior to the pilot program:	2762
b)	Annual average number of sample meters during the pilot program:	503
c)	Annual change in the number of sample meters tested:	2259

Note: Inter County Energy did not use the 25 year rule. We tested meters every 8 years.

*Annual Cost Savings for Sample Meter Tests: (2,259 * $44.58): *$100,706.22

II) Elimination of 100% Testing of New Meters by the Utility

a) Annual average number of new residential meters purchased during pilot program:
b) Annual average number of new residential meters sample tested by utility:
c) Annual average number of new residential meters only tested by manufacturer:

Note: New meters are still tested.

d) Annual average number of new singlephase KWH/KW purchased during pilot program:
e) Annual average number of new singlephase KWH/KW meters sample tested by utility:
f) Annual average number of new singlephase KWH/KW meters only tested by manufacturer:

g) Annual average number of new CTs purchased during pilot program:
h) Annual average number of new CTs sample tested by utility:
i) Annual average number of new CTs only tested by manufacturer:

*Annual Cost Savings for Reduction in New Meter Tests: *$0.00

III) Reduction of Testing Due to Extended Test Frequencies

a)	Annual average number of periodic meters tested prior to the pilot program:	83
b)	Annual average number of periodic meters during the pilot program:	42
c)	Annual change in the number of periodic meters tested:	41

Annual Cost Savings for Periodic Meter Tests: (41 * $50.00) $2,050

IV) Other

TOTAL ANNUAL COST SAVINGS: $102,756.22*

Estimated Cost Savings from Pilot Proposal:

*(Inter County Energy) originally submitted Estimated Cost Savings of $16,484 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal, therefore, the estimated cost savings of $16,484 should be reduced by $908.20 for a revised Estimated Cost Savings of $15,575.80. As shown above, the Actual Annual Cost Savings of $102,756.22 exceed the Estimated Cost Savings of $15,575.80.

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Below is the actual annual cost savings from implementing the pilot meter-testing plan.

Annual Cost Savings for Kentucky Power

I) Implementation of ANSI Z-1.9 statistical sampling plan

a)	Annual average number of sample meters tested prior to the pilot program:	4,585
b)	Annual average number of sample meters during the pilot program:	- 1,750*
c)	Annual change in the number of sample meters tested:	2,835

Annual Cost Savings for Sample Meter Tests: $96,300

Multiply (c) by [0.8 (change out, test, and clerical time) * $22 (base wages) * 1.93 (overhead rate)

* The number of sample meters tested during the pilot was higher than original estimate of 800 due to changes in the allowed sample test program after estimates were submitted.

II) Elimination of 100% Testing of New Meters by the Utility

a)	Annual average number of new residential meters purchased during pilot program:	5,862
b)	Annual average number of new residential meters sample tested by utility:	- 200
c)	Annual average number of new residential meters only tested by manufacturer:	5,662
d)	Annual average number of new singlephase KWH/KW purchased during pilot program:	516
e)	Annual average number of new singlephase KWH/KW meters sample tested by utility:	- 190
f)	Annual average number of new singlephase KWH/KW meters only tested by manufacturer:	326
g)	Annual average number of new CTs purchased during pilot program:	282
h)	Annual average number of new CTs sample tested by utility:	- 30
i)	Annual average number of new CTs only tested by manufacturer:	252

*Annual Cost Savings for Reduction in New Meter Tests: $57,582

Multiply by [X (test time) X $22 (wages) X 1.93 (overhead rate)]:
X = 0.2 for residential meter test time
X = 0.3 for KWH/KW meter test time
X = 0.5 for new CT test time

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Annual Cost Savings for Kentucky Power

III) Reduction of Testing Due to Extended Test Frequencies

a)	Annual average number of periodic meters tested prior to the pilot program:	2,128
b)	Annual average number of periodic meters during the pilot program:	- 244
c)	Annual change in the number of periodic meters tested:	1,884

Annual Cost Savings for Periodic Meter Tests: $64,000

Multiply by [0.8 (change out, test, and clerical time) * $22 (wages) * 1.93 (overhead rate)]

IV) Other

The 5-year pilot plan identified a group of meters whose performance was not acceptable. A total of 4,093 meters were tested and retired in addition to the above figures.

Annual Cost addition for additional 'Failed group' labor ($34,783)

TOTAL ANNUAL COST SAVINGS: **$183,100***

* Kentucky Power originally submitted Estimated Cost Savings of $193,400 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal; therefore, the estimated cost savings of $193,400 should be reduced by $28,659 for a revised Estimated Cost Savings of $164,741. As shown above, the Actual Annual Cost Savings of $183,100 exceed the revised Estimated Cost Savings of $164,741.

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Actual Annual Cost Savings for Kentucky Utilities Company

I) Implementation of ANSI Z-1.9 statistical sampling plan

a)	Annual average number of sample meters tested prior to the pilot program:	17,600
b)	Annual average number of sample meters during the pilot program:	4,000*
c)	Annual change in the number of sample meters tested:	13,600

Annual Cost Savings for Sample Meter Tests: $276,760

Multiply (c) by [0.5 (change out, test, and clerical time) * $22 (base wages) * 1.85 (overhead rate)

* The number of sample meters tested during the pilot was higher than original estimate of 2,000 due to changes in the allowed sample test program after estimates were submitted.

II) Elimination of 100% Testing of New Meters by the Utility

a)	Annual average number of new residential meters purchased during pilot program:	13,700
b)	Annual average number of new residential meters sample tested by utility:	400
c)	Annual average number of new residential meters only tested by manufacturer:	13,300
d)	Annual average number of new singlephase KWH/KW purchased during pilot program:	200
e)	Annual average number of new singlephase KWH/KW meters sample tested by utility:	200
f)	Annual average number of new singlephase KWH/KW meters only tested by manufacturer:	0
g)	Annual average number of new CTs purchased during pilot program:	800
h)	Annual average number of new CTs sample tested by utility:	800
i)	Annual average number of new CTs only tested by manufacturer:	0

*Annual Cost Savings for Reduction in New Meter Tests: $108,262

Multiply by [X (test time) * $22 (wages) * 1.85 (overhead rate)]:
X = 0.2 for residential meter test time
X = 0.3 for KWH/KW meter test time
X = 0.5 for new CT test time

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Actual Annual Cost Savings for Kentucky Utilities Company

III) Reduction of Testing Due to Extended Test Frequencies

a)	Annual average number of periodic meters tested prior to the pilot program:	3,100
b)	Annual average number of periodic meters during the pilot program:	2,350
c)	Annual change in the number of periodic meters tested:	750

Annual Cost Savings for Periodic Meter Tests: $24,420

Multiply by [0.8 (change out, test, and clerical time) * $22 (wages) * 1.85 (overhead rate)]

IV) Other

The 5-year pilot plan identified a few groups of meters whose performance was not acceptable. A total of 24,443 meters were tested in addition to the above quantities.

Annual Cost for "Failed Group" Meter Tests: ($99,442)

TOTAL ANNUAL COST SAVINGS: $310,000*

* Kentucky Utilities originally submitted Estimated Cost Savings of $424,000 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal, therefore, the estimated cost savings of $424,000 should be reduced by $56,000 for a revised Estimated Cost Savings of $368,000. As shown above, the Actual Annual Cost Savings of $310,000 did not exceed the Estimated Cost Savings of $368,000.

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Actual Annual Cost Savings for Louisville Gas & Electric Company

I) Implementation of ANSI Z-1.9 statistical sampling plan

a)	Annual average number of sample meters tested prior to the pilot program:	11,560
b)	Annual average number of sample meters during the pilot program:	3,200*
c)	Annual change in the number of sample meters tested:	8,360

Annual Cost Savings for Sample Meter Tests: $174,724

Multiply (c) by [0.5 (change out, test, and clerical time) * $22 (base wages) * 1.90 (overhead rate)

* The number of sample meters tested during the pilot was higher than original estimate of 2,000 due to changes in the allowed sample test program after estimates were submitted.

II) Elimination of 100% Testing of New Meters by the Utility

a)	Annual average number of new residential meters purchased during pilot program:	8,300
b)	Annual average number of new residential meters sample tested by utility:	200
c)	Annual average number of new residential meters only tested by manufacturer:	8,100
d)	Annual average number of new singlephase KWH/KW purchased during pilot program:	100
e)	Annual average number of new singlephase KWH/KW meters sample tested by utility:	100
f)	Annual average number of new singlephase KWH/KW meters only tested by manufacturer:	0
g)	Annual average number of new CTs purchased during pilot program:	725
h)	Annual average number of new CTs sample tested by utility:	725
i)	Annual average number of new CTs only tested by manufacturer:	0

*Annual Cost Savings for Reduction in New Meter Tests: $67,716

Multiply by [X (test time) * $22 (wages) * 1.90 (overhead rate)]:
X = 0.2 for residential meter test time
X = 0.3 for KWH/KW meter test time
X = 0.5 for new CT test time

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Actual Annual Cost Savings for Louisville Gas & Electric Company

III) Reduction of Testing Due to Extended Test Frequencies

a)	Annual average number of periodic meters tested prior to the pilot program:	3,700
b)	Annual average number of periodic meters during the pilot program:	2,800
c)	Annual change in the number of periodic meters tested:	900

Annual Cost Savings for Periodic Meter Tests: $30,096

Multiply by [0.8 (change out, test, and clerical time) * $22 (wages) * 1.90 (overhead rate)]

IV) Other

The 5-year pilot plan identified a few groups of meters whose performance was not acceptable. A total of 7,950 meters were tested in addition to the above quantities.

Annual cost for "Failed Group" Meter Test: ($32,356)

TOTAL ANNUAL COST SAVINGS: **$240,180***

* Louisville Gas & Electric originally submitted Estimated Cost Savings of $258,000 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal, therefore, the estimated cost savings of $258,000 should be reduced by $24,000 for a revised Estimated Cost Savings of $234,000. As shown above, the Actual Annual Cost Savings of $240,180 exceed the Estimated Cost Savings of $234,000.

EXHIBIT 5

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Below is the actual annual cost savings from implementing the pilot meter-testing plan.

Annual Cost Savings for Owen Electric Cooperative

I) Implementation of ANSI Z-1.9 statistical sampling plan

a) Annual average number of sample meters tested prior to the pilot program: 2100
b) Annual average number of sample meters during the pilot program: -750
c) Annual change in the number of sample meters tested: 1350

*Annual Cost Savings for Sample Meter Tests: (c) *(labor cost per new meter test): **$46, 000**
*Same formula was used for labor cost as submitted in the original pilot request)

II) Elimination of 100% Testing of New Meters by the Utility

a) Annual average number of new residential meters purchased during pilot program: 2500
b) Annual average number of new residential meters sample tested by utility: -75
c) Annual average number of new residential meters only tested by manufacturer: 2425

d) Annual average number of new singlephase KWH/KW purchased during pilot program: 150
e) Annual average number of new singlephase KWH/KW meters sample tested by utility: -75
f) Annual average number of new singlephase KWH/KW meters only tested by manufacturer: 75

g) Annual average number of new CTs purchased during pilot program: 120
h) Annual average number of new CTs sample tested by utility: -60
i) Annual average number of new CTs only tested by manufacturer: 60

*Annual Cost Savings for Reduction in New Meter Tests: [(c) * (cost per new residential meter test)] + **$22,500**
[(f) * (cost per new KWH/KW meter test)] + [(i) * (cost per new CT test)]:
*Same formula was used for labor cost as submitted in the original pilot request)

III) Reduction of Testing Due to Extended Test Frequencies

a) Annual average number of periodic meters tested prior to the pilot program: 100
b) Annual average number of periodic meters during the pilot program: -50
c) Annual change in the number of periodic meters tested: 50

Annual Cost Savings for Periodic Meter Tests: (c) * (cost per new meter test): + **$2,500**

IV) Other: The 5-year plan identified two groups of meters whose performance was not acceptable. A total of 3,527 were effected and being retired.

Annual Cost addition for additional "Failed group" labor **-($5,990)**

TOTAL ANNUAL COST SAVINGS: **$65,010**

Estimated Cost Savings from Pilot Proposal:

*(Owen Electric Cooperative) originally submitted Estimated Cost Savings of $15,700 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal, therefore, the estimated cost savings of $15,700 should be reduced by $2,500 for a revised Estimated Cost Savings of $13,200. As shown above, the Actual Annual Cost Savings of $65,010 exceed the Estimated Cost Savings of $13,200.

EXHIBIT 6

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Annual Cost Savings for Shelby Energy Cooperative

I) Implementation of ANSI Z-1.9 statistical sampling plan

a) Annual average number of sample meters tested prior to the pilot program:	550
b) Annual average number of sample meters during the pilot program:	360
c) Annual change in the number of sample meters tested:	190

Annual Cost Savings for Sample Meter Tests: $6,080

II) Elimination of 100% Testing of New Meters by the Utility

a) Annual average number of new residential meters purchased during pilot program:	600
b) Annual average number of new residential meters sample tested by utility:	14
c) Annual average number of new residential meters only tested by manufacturer:	144
d) Annual average number of new singlephase KWH/KW purchased during pilot program:	0
e) Annual average number of new singlephase KWH/KW meters sample tested by utility:	0
f) Annual average number of new singlephase KWH/KW meters only tested by manufacturer:	0

Annual Cost Savings for Reduction in New Meter Tests: $1,152

III) Reduction of Testing Due to Extended Test Frequencies

a) Annual average number of periodic meters tested prior to the pilot program:	32
b) Annual average number of periodic meters during the pilot program:	17
c) Annual change in the number of periodic meters tested:	15

Annual Cost Savings for Periodic Meter Tests: $1050

TOTAL ANNUAL COST SAVINGS: $8,282

Shelby Energy originally submitted Estimated Cost Savings of $8,627 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). Shelby Energy did not utilize the elimination of testing new meters initially, only recently was sample testing new meters implemented. An additional $3000 could have been saved annually during this pilot project (and will be saved in the future if allowed to continue this sample meter testing plan).

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Below is the actual annual cost savings from implementing the pilot meter-testing plan.

Annual Cost Savings for Union Light Heat & Power

I) Implementation of ANSI Z-1.9 statistical sampling plan

a)	Annual average number of sample meters tested prior to the pilot program:	3,610
b)	Annual average number of sample meters during the pilot program:	-1,500*
c)	Annual change in the number of sample meters tested:	2,110

Annual Cost Savings for Sample Meter Tests: $72,600

Multiply (c) by [0.8 (change out, test, and clerical time) * $23 (base wages) * 1.87 (overhead rate)

* The number of sample meters tested during the pilot was higher than original estimate of 930 due to changes in the allowed sample test program after estimates were submitted.

II) Elimination of 100% Testing of New Meters by the Utility

a)	Annual average number of new residential meters purchased during pilot program:	2,675
b)	Annual average number of new residential meters sample tested by utility:	-1,000
c)	Annual average number of new residential meters only tested by manufacturer:	1,675
d)	Annual average number of new singlephase KWH/KW purchased during pilot program:	400
e)	Annual average number of new singlephase KWH/KW meters sample tested by utility:	-300
f)	Annual average number of new singlephase KWH/KW meters only tested by manufacturer:	100

*Annual Cost Savings for Reduction in New Meter Tests: $15,699

Multiply by [X (test time) X $23 (wages) X 1.87 (overhead rate)]: *
X = 0.2 for residential meter test time
X = 0.3 for KWH/KW meter test time

July 2005 Progress Report
to the Kentucky Public Service Commission
Regarding the Pilot Meter Testing Plan
As Approved in Case No. 99-441

Annual Cost Savings for Union Light Heat & Power

III) Reduction of Testing Due to Extended Test Frequencies

a) Annual average number of periodic meters tested prior to the pilot program:	732
b) Annual average number of periodic meters during the pilot program:	-193
c) Annual change in the number of periodic meters tested:	539
Annual Cost Savings for Periodic Meter Tests:	$18,546

Multiply by [0.8 (change out, test, and clerical time) * $23 (wages) * 1.87 (overhead rate)]

IV) Other

The 5-year pilot plan identified a group of meters whose performance was lower than other groups. ULH&P voluntarily subdivided, then tested and retired 415 meters in addition to the above figures to improve the performance of this group.

Annual Cost addition for additional replaced meter labor	($ 3,570)

TOTAL ANNUAL COST SAVINGS:	**$103,275***

* Union Light Heat & Power originally submitted Estimated Cost Savings of $120,000 (see Data Request No. 13, in Case No. 99-441, filed January 21, 2000). At the time the estimated cost savings was calculated, the utilities included the cost to be saved by eliminating the requirement of reinstalling or retiring a meter without testing. The Commission rejected that proposal, therefore, the estimated cost savings of $120,000 should be reduced by $18,105 for a revised Estimated Cost Savings of $101,895. As shown above, the Actual Annual Cost Savings of $103,275 exceed the Estimated Cost Savings of $101,895.

KENTUCKY PUBLIC SERVICE COMMISSION

JOINT APPLICATION ON BEHALF OF:

Inter County Energy Cooperative Corporation

Kentucky Power Company

Kentucky Utilities Company

Louisville Gas and Electric Company

Owen Electric Cooperative, Inc.

Shelby Energy Cooperative, Inc.

The Union Light, Heat and Power Company

2006 SAMPLE METER TESTING PLAN

Date Filed with Commission: July 1, 2005 Effective Date: January 1, 2006

2006 Sample Meter Testing Plan

2006 SAMPLE METER TESTING PLAN

I. New Metering Device Tests

1. New metering devices shall be either 100% tested by the utility or 100% tested by the manufacturer.
2. New meters tested by the manufacturer should be sampled tested by the utility prior to being placed in service.
3. Utilities must obtain a watt-hour reference standard from each meter manufacturer that supplies them with meters and perform the required testing of those meters and send it to the Commission's Meter Standards Laboratory for testing annually.
4. Utilities must provide certified test results of all new meters received to the Commission's Meter Testing Laboratory annually.
5. National Institute of Standards and Technology comparison test results should also be provided from all of the manufacturers that are performing 100 percent testing as well as traceability charts.

II. Standards for In-Service Performance - Watthour Meters and Electronic Registers

A. Purpose

1. This section shall establish accuracy limits, test plans and inspection procedures for alternating-current revenue watthour meters.
2. Watthour meters placed into service or returned to service shall meet the provisions set forth in this Section test plan.

3. All watthour meters and their associated equipment shall be thoroughly inspected at the time of installation to assure safe and accurate operation.

B. Accuracy Requirements

1. Testing Equipment and Standards

a. All working electronic watt-hour standards when regularly used shall be compared with a master standard every six months. Working watt-hour standards infrequently used shall be compared with a master standard before they are used.

b. All working indicating instruments that affect the customer's quality of service shall be checked against master indicating instruments annually. If the working instrument is found appreciably in error at zero or in error by more than one (1) percent of indication at commonly used scale deflections, it shall be adjusted. A calibration record shall be maintained for each instrument showing all pertinent data and name of person performing tests.

2. Test Loads

Full load shall be approximately 100% of test amperes at unity power factor, light load approximately 10% of test amperes at unity power factor and power factor 100% test amperes 50% lagging power factor. For meters used with current transformers, full load shall be approximately 100% of either meter test amperes

or the secondary current rating of the current transformers; light load shall be approximately 10% of the selected full load current.

3. Acceptable Performance

The performance of all in-service watthour meters is considered to be acceptable when the percent registration is not less than 98% or more than 102% as determined in paragraph D(5) of this section.

4. Adjustment Limits

Watthour meters shall be adjusted when the error in registration exceeds 1% at either light load or full load or when the error in registrations exceeds 2% at power factor. The registration of the watthour meter shall be adjusted within these limits as close to 100% as practical.

5. Acceptable Performance for Electronic Registers

The performance of a watthour meter with an electronic register when tested for other than kilowatthour registration shall be acceptable when the error measured does not exceed ±2 of reading.

C. Tests

1. As-found Tests

As-found tests are done to determine the watthour meter accuracy before recalibration.

2. As-left Tests

As-left tests shall be conducted after all adjustments are completed and are in accordance with paragraph B(3) in this section.

D. Performance Tests

1. General

The performance of watthour meters should be verified by an annual test program such as one of the plans listed below. Records shall be maintained on each watthour meter tested. Subsequently, an analysis of the test results for each group of watthour meters shall be made and appropriate action shall be taken. The plans for testing are:

a. Periodic Interval Plan

b. Statistical Sampling Plan

2. Objectives

The primary purpose of performance testing is to provide information on which the utility may base a program to maintain meters in an acceptable degree of accuracy throughout their service life.

3. Test Plans

The Periodic Interval Plan is a schedule of testing for watthour meters at various set intervals. The Statistical Sampling Plan provides for the division of watthour meters into homogeneous groups. The annual selection process is random where each watthour meter within each group has an equal chance of being selected.

a. Periodic Interval Plan

The selected periodic interval for testing a watthour meter depends on the size of the service, complexity of the metering system, reliability of the type of watthour meter and/or manufacturer's recommendations. The plan listed below is a detailed periodic testing schedule by watthour meter and attachments:

Periodic Testing Schedule

	Years Between Testing
(1) Graphic Watthour Demand	2
(2) Electromechanical Watthour Meters without surge-proof magnets	8
(3) Thermal Lagged Demand Meters	16
(4) Magnetic Tape Demand Records	12
(5) Electromechanical Watthour Meters with surge-proof magnets and:	
(a) Mech KWH Register	16
(b) Mech Demand Registers	10
(c) Electronic Demand Register	16
(d) Mech Cam Pulse Initiator	2
(e) Mech Gear Shutter Pulse Initiator	8
(f) Electronic Pulse Initiator	12
(g) Electronic Remote Registers	8
(h) Electronic TOU Register	16
(6) Electronic Meter	16
For single phase and polyphase transformer rated meters:	
(7) Electronic Meters	
(a) Billing Constant 500 or less	12
(b) Billing Constant 500 - 10,000	8
(c) Billing Constant > 10,000	4
(8) Electromechanical Watthour Meters With surge proof magnets	
(a) Billing Constant 500 or less	8
(b) Billing Constant >500	4

Test interval is based on the Billing Constant which equals the absolute CT ratio X VT ratio. (i.e. with a 40:1 CT and a 60:1 VT ratio, the Billing Constant is 2400)

b. Statistical Sampling Plan

The Statistical Sampling Plan used shall conform to accepted principles of statistical sampling based on either variables or attributes methods. Meters shall be divided into homogeneous groups, or lots. Meter lot composition will be based on manufacturer and model, assuming like design and construction, with individual lot population not to exceed 15,000 meters. For meter model populations of like design exceeding 15,000 units, multiple lots must be established, with meter age determining lot composition. For example, the first 15,000 meters purchased will comprise Lot #1, the second 15,000 meters purchased will comprise Lot #2, etc. This process will continue until the meter model population is exhausted. Utilities will have the option of using a smaller lot of composition, as shown below:

Lot	Meter Type	Meter Population
1	J4S	7,882
2	I70S	10,000
3	I70S	9,130
4	D5S	4,535
5	MS	6,892
6	J5S	9,922
7	MX	8,325

The number of meters to be selected in a Sample Test Plan shall be based on the American National Standard

ANSI/ASQC Z1.9-1993: The performance of the meters will also be based on criteria within this standard.

The minimum quantity of meters pulled shall be based on Inspection Level II, AQL = 2.5, Table A-2 (see Attachment No. 1) and Table B-3 (see Attachment No. 2).

Lot performance shall be deemed acceptable if the full load performance of the meters within the lot meet the acceptability criteria of the ANSI/ASQC Z1.9-1993 based on an upper limit of 102% and a lower limit of 98% using Table B-3 (see Attachment No. 2).

When a control group is classified as "failed" and a poor performing sub-group can be identified for separation from the original control group, the deviate sub-group will be removed from service within a 12-month period. New

If, by the removal of a specific sub-group of meters, the utility can demonstrate that the original control group of meters now meets the accuracy standard under Section II(D)(3)(b) the remaining meters in the original control group shall remain in service. New

If a deviate sub-group of meters cannot be identified to improve the control groups accuracy, then the utility will make every reasonable effort to remove the entire control group of New

meters from service within 18 months once it has failed the applicable governing standard for the control group.

Subgroups of the control group may be determined by evaluating the date of original purchase, date of original manufacture, and date of remanufacture. Other methods of determining subgroups may also be used. New

If this requirement should pose an operational hardship on a utility, then the utility should file a request for deviation. New

4. Test Records

The data to be recorded for the sample test plan shall include:

(a) the number of meters in each group at the beginning of the test year

(b) the number of meters tested

(c) the analyzed test results

5. Determination of Billing Accuracy

The percentage registration of a watthour meter is, in general, different at light loads then at full loads, and may have still other values at other loads. The determination of the average percentage registration of a watthour meter is not a simple matter, since it involves the characteristics of the meter and the loading. The accuracy of meters is more closely associated with the FL test accuracy for most loads since the LL accuracy is only

representative of the meter's performance at a very small load conditions.

Average percentage registration is the weighted average of the percentage registration at light load (LL) and at full load (FL), giving the full load registration a weight of four:

$$\text{Weighted Percentage Registration} = \frac{4FL + LL}{5}$$

III. Mechanical and Thermal Demand Registers and Pulse Recorders

A. Accuracy Requirements

1. Acceptable Performance

The performance of a mechanical or lagged demand register shall be acceptable when the error in demand registration does not exceed ±4 percent in terms of full-scale value when tested at any point between 50% and 100% of full-scale.

Under usual operating conditions, the performance of a pulse recording device shall be acceptable when the kilowatthours calculated from the pulse count do not differ by more than 2% from the corresponding kilowatthour meter registration.

2. Test Points

Mechanical or lagged demand registers should be tested at load Points or at above 50% of full scale.

3. Adjustment Limits

When a test of a mechanical or lagged demand register indicates that the error in registration exceeds that specified in paragraph A(1) in this section, the demand register shall be adjusted to within ±2% of full-scale value.

B. Instrument Transformers (Magnetic)

1. Pre-installation Tests

Prior to installation, all new instrument transformers shall be tested for voltage withstand, ratio correction factor, and phase angle. The tests shall be performed in accordance with the criteria established in IEEE C57.13.

2. Instrument Transformers Removed from Service

Instrument transformers removed from service will continue to be tested before retirement or return to service.

TABLE A-1
AQL Conversion Table

For specified AQL values falling within these ranges.	Use this AQL value
– 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 0.669	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

TABLE A-2[2]
Sample Size Code Letters[1]

Lot Size	Inspection Levels	
	Special S3 S4	General I II III
2 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 50	B B	C D F
51 to 90	B B	D E G
91 to 150	B C	E F H
151 to 280	B D	F G I
281 to 400	C E	G H J
401 to 500	C E	G I J
501 to 1,200	D F	H J K
1,201 to 3,200	E G	I K L
3,201 to 10,000	F H	J L M
10,001 to 35,000	G I	K M N
35,001 to 150,000	H J	L N P
150,001 to 500,000	H K	M P P
500,001 and over	H K	N P P

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

[2]The theory governing inspection by variables depends on the properties of the normal distribution and, therefore, this method of inspection is only applicable when there is reason to believe that the frequency distribution is normal.

Source: ANSI/ASQC Z1.9-1993, page 5

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)											
		T	.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00
		M	M	M	M	M	M	M	M	M	M	M	M
B	3	↓	↓	↓	↓	↓	↓	↓	↓	7.59	18.86	26.94	33.69
C	4	↓	↓	↓	↓	↓	↓	1.49	5.46	10.88	16.41	22.84	29.43
D	5	↓	↓	↓	↓	0.041	1.34	3.33	5.82	9.80	14.37	20.19	26.55
E	7	↓	0.005	0.087	0.421	1.05	2.13	3.54	5.34	8.40	12.19	17.34	23.30
F	10	0.077	0.179	0.349	0.714	1.27	2.14	3.27	4.72	7.26	10.53	15.17	20.73
G	15	0.186	0.311	0.491	0.839	1.33	2.09	3.06	4.32	6.55	9.48	13.74	18.97
H	20	0.228	0.356	0.531	0.864	1.33	2.03	2.93	4.10	6.18	8.95	13.01	18.07
I	25	0.250	0.378	0.551	0.874	1.32	2.00	2.86	3.97	5.98	8.65	12.60	17.55
J	35	0.253	0.373	0.534	0.833	1.24	1.87	2.66	3.70	5.58	8.11	11.89	16.67
K	50	0.243	0.355	0.503	0.778	1.16	1.73	2.47	3.44	5.21	7.61	11.23	15.87
L	75	0.225	0.326	0.461	0.711	1.06	1.59	2.27	3.17	4.83	7.10	10.58	15.07
M	100	0.218	0.315	0.444	0.684	1.02	1.52	2.18	3.06	4.67	6.88	10.29	14.71
N	150	0.202	0.292	0.412	0.636	0.946	1.42	2.05	2.88	4.42	6.56	9.86	14.18
P	200	0.204	0.294	0.414	0.637	0.945	1.42	2.04	2.86	4.39	6.52	9.80	14.11
		.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00	
		Acceptable Quality Levels (tightened inspection)											

All AQL values are in percent nonconforming. T denotes plan used exclusively on tightened inspection and provides symbol for identification of appropriate OC curve.

↓ 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 1

Kentucky Utilities Company

Documentation Supporting Pilot Sample Plan

The Pilot Sample Plan was an overall success and an improvement over the previous sample plan. Although, on average, fewer meters were tested annually, meter performance has improved. The process targeted poor performing meters and forced corrective action. The end result was better performing meters and less expense. Kentucky Utilities averaged $310,000 annual savings throughout the sample pilot.

The pilot identified six (6) groups of meters that failed to meet acceptable accuracy levels and required additional testing. These poor performing meters were undetected by the previous sample plan and were permitted to remain in service. The "Failed Lots" were separated from the sampling process and removed from service in the allotted 18 months timeframe. The poor performing groups are as follows:

2001:	Westinghouse	D2S,	D3S,	D4S,	D5S
2002:	Duncan	MF			
2004:	Schlumberger	J4S			

The six (6) "Failed Lots" consist of 24,803 meters, of which 530 meters fall outside +/- 2% accuracy, as illustrated in Frequency Charts 1 – 6 located at the end of this appendix.

Further analysis of data collected throughout the pilot revealed that the J4S "Failed Lot" population performed better than the J4S sample as shown below in figure 1, which compares the normal distribution curves of the J4S sample, J4S population, and the 2004 Sample Average.

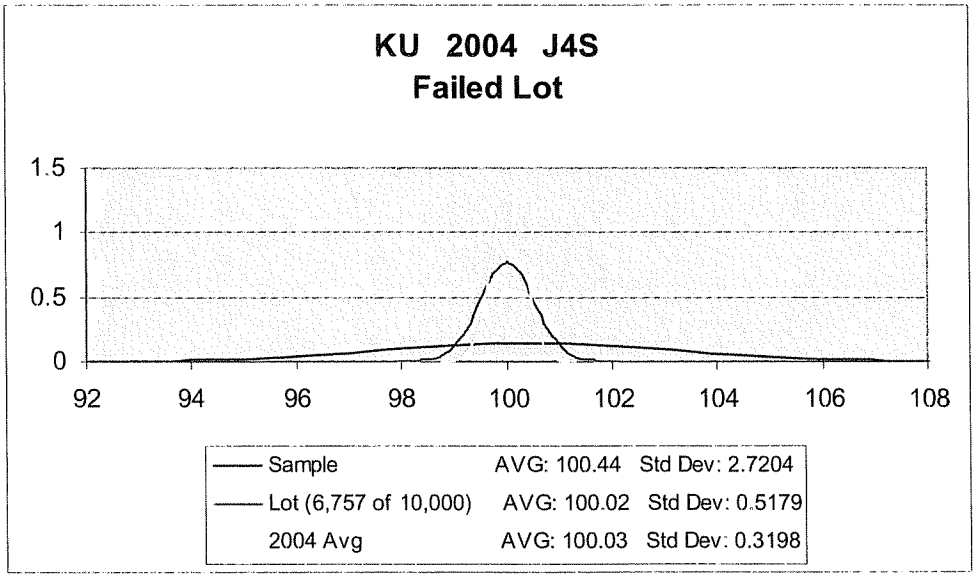


Figure 1

APPENDIX 1

A closer look at the J4S sample data (see chart 26) shows that two meters failed the J4S group, with an average full load accuracy of 100.44 and a standard deviation of 2.72. The two meters were removed from the sample data and the statistical calculations were performed, which resulted in an average full load accuracy of 100.05 and a standard deviation of 0.311. The revised calculations produce a normal distribution curve similar to the J4S lot population and nearly identical to the 2004 Sample average, as shown in figure 2.

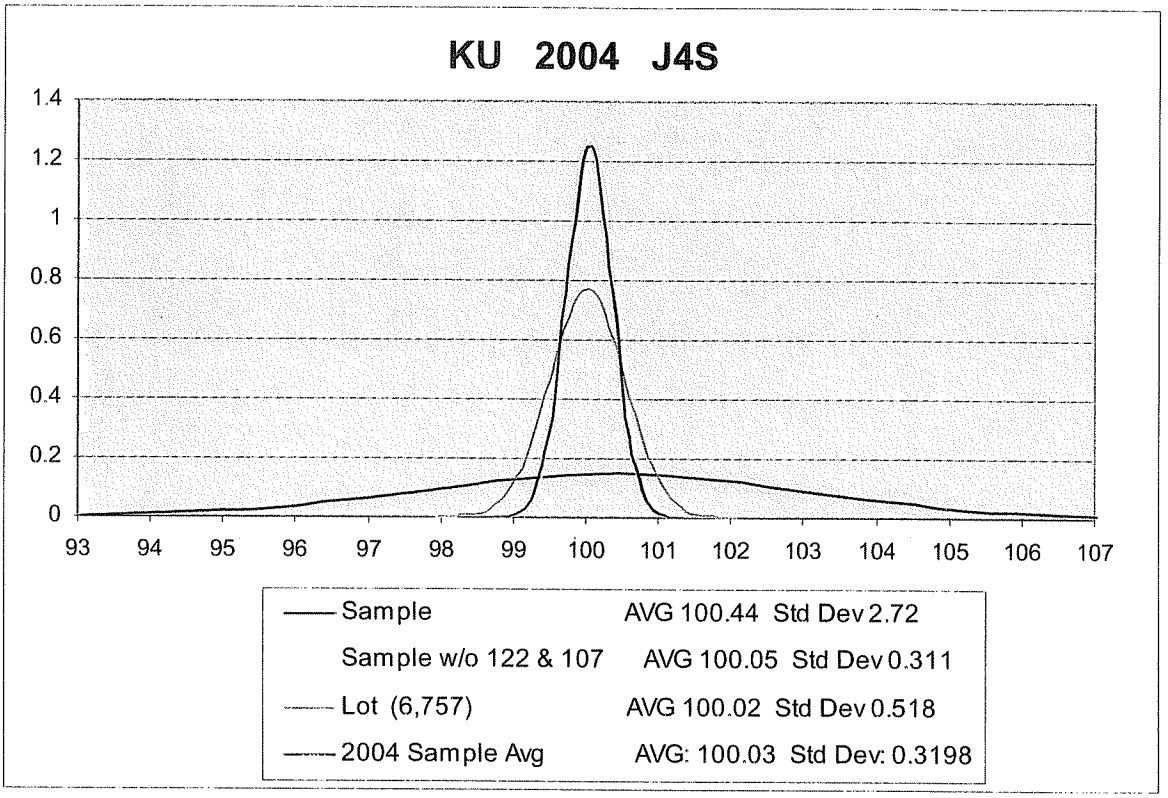


Figure 2

Additional normal distribution curve charts for each "Failed Lot" group are included at the end of this appendix, charts 7 - 14.

Schlumberger identified meters (within the serial number range of 35,600,000 through 55,674,259) that have plastic end caps in the bearing assembly. Kentucky Utilities noticed the performance of meters with plastic end caps gradually deteriorate.

The following graph (figure 3) is the Full Load accuracy of 6,757 J4S "Failed Lot" meters. These meters are in serial number order and were tested through mid-June 2005. The graph illustrates much accuracy variation at the beginning of the chart.

Figure 4 is the same graph depicting the plastic end cap meters removed. Note: The two meters above the 102 % accuracy were struck by lightning.

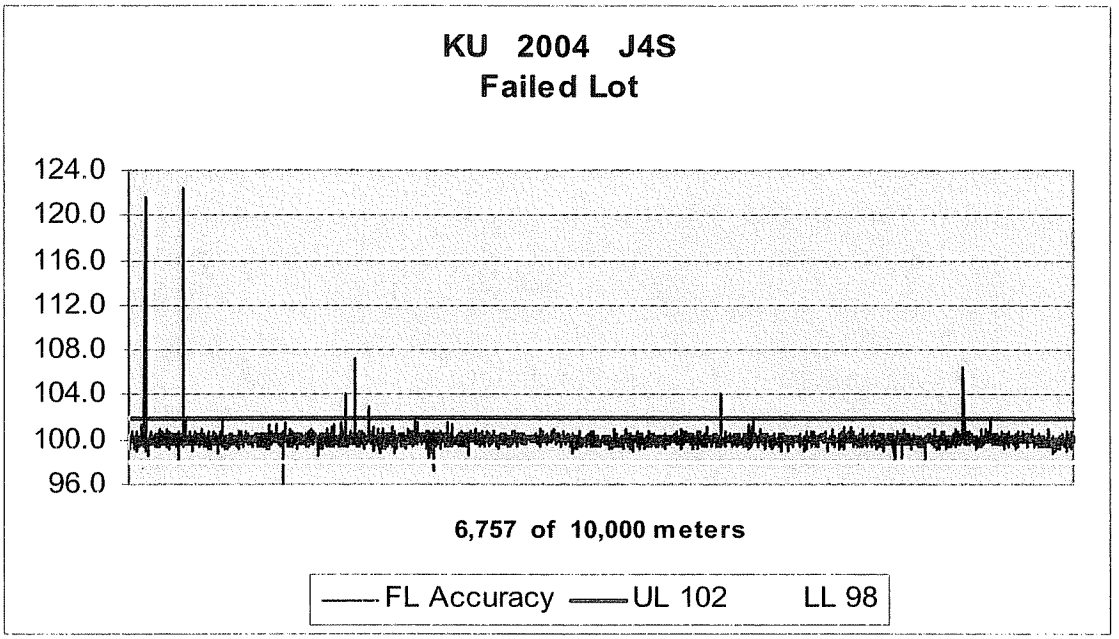


Figure 3

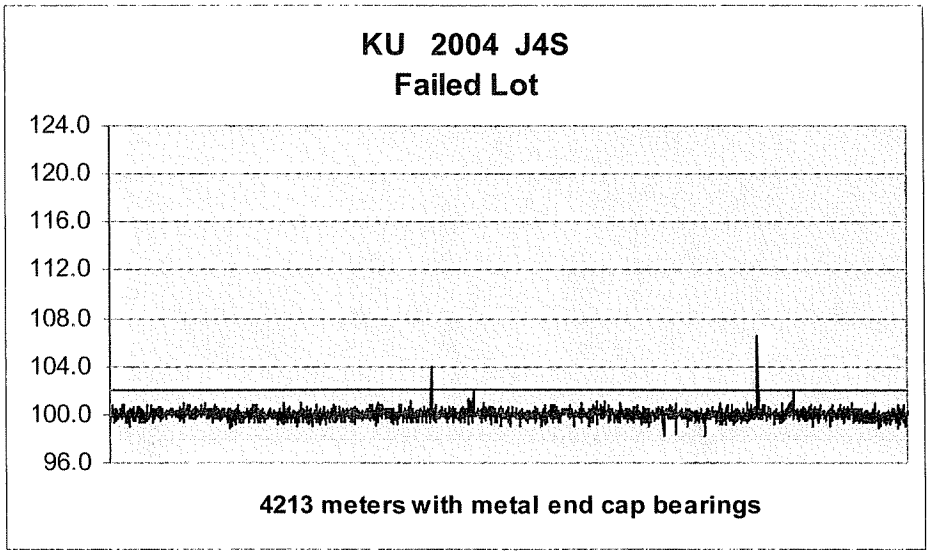


Figure 4

Additional Full Load Accuracy charts for each "Failed Lot" are at the end of this appendix, charts 15 - 20.

The following chart of the 2001 D5S "Failed Lot" population also indicates poor performing meters with almost two-thirds of the group. The noticeable improvement in the Full Load accuracy occurs around the 74,500,000 range of serial numbers where improvements were implemented, by the manufacturer, in the bearing assembly.

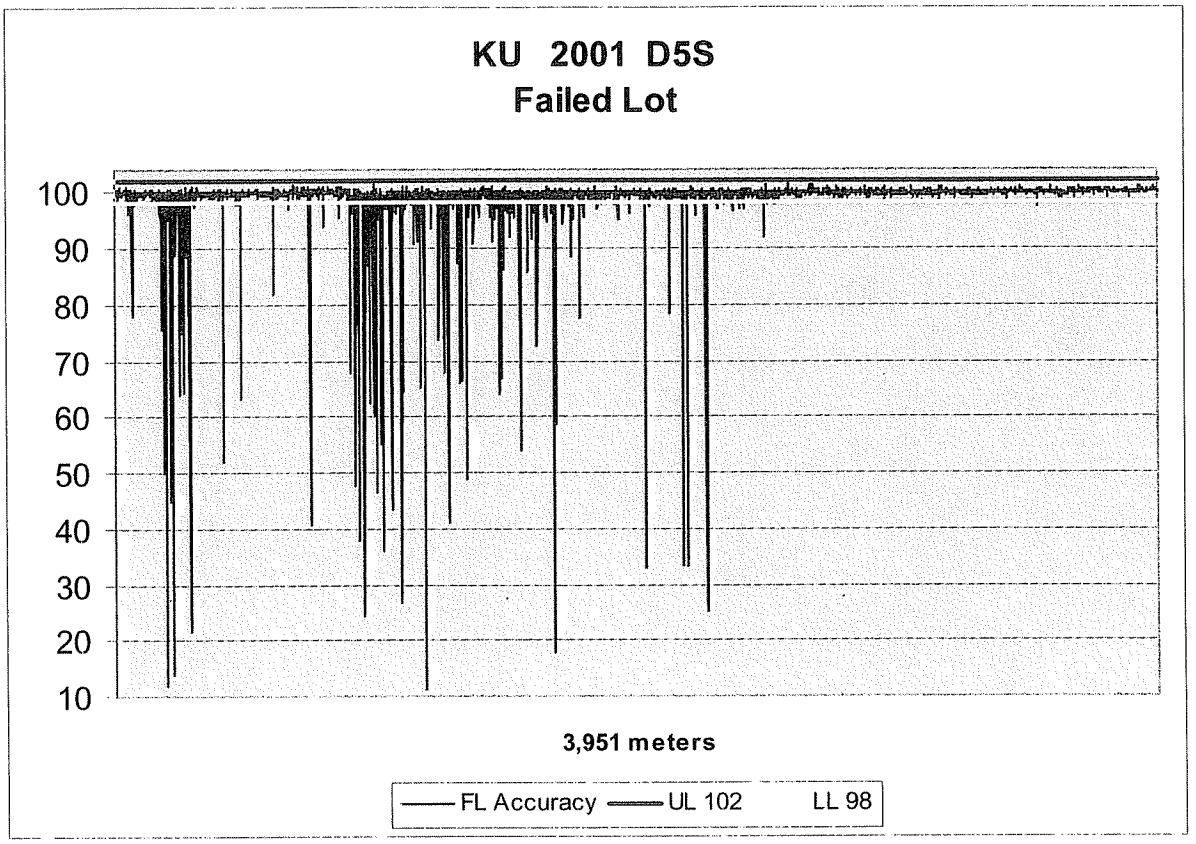


Figure 5

As illustrated by the above graphs the J4S and D5S control groups are potential candidates for sub-grouping of the respective original control group. By sub-grouping these two groups of meters and reducing the "Failed Lot" meter count by 4,850 meters Kentucky Utilities would realize an additional savings of nearly $100,000 and still maintain a high level of meter accuracy for these two groups.

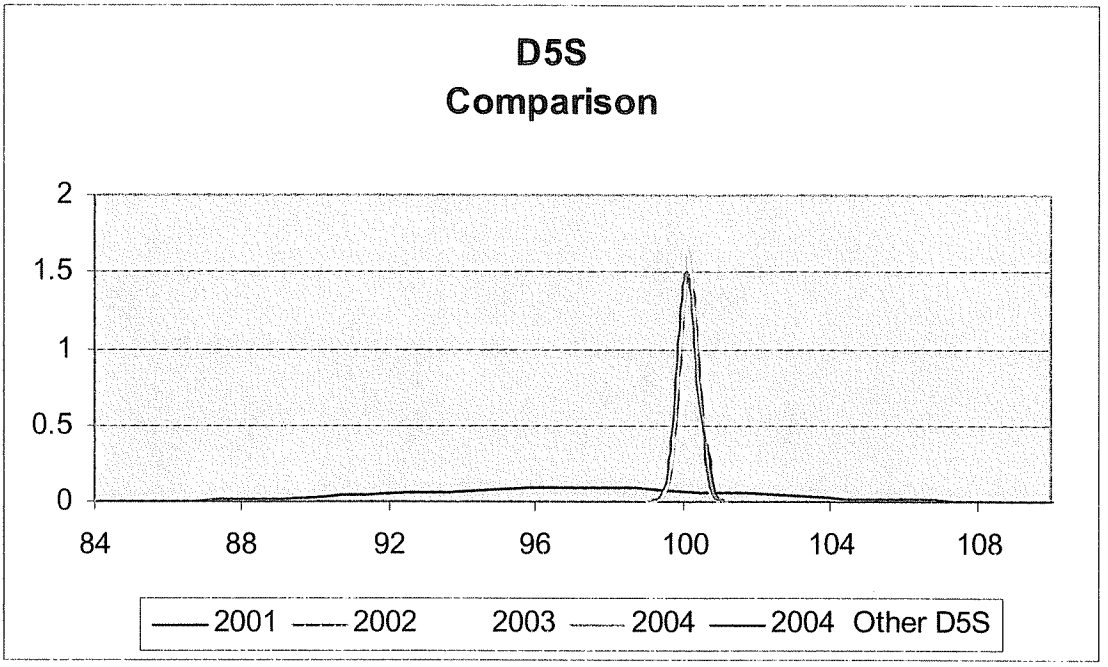


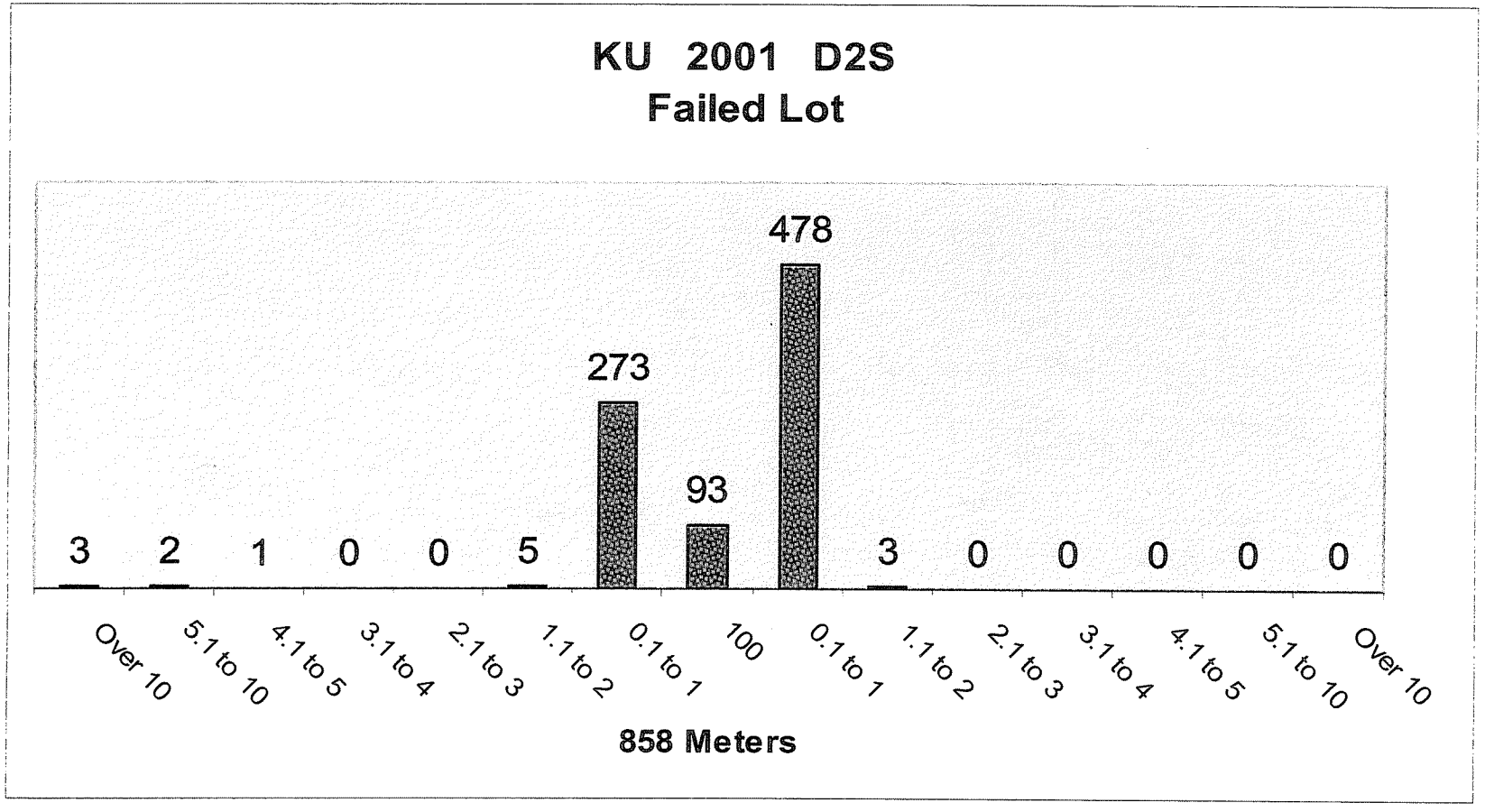
Figure 6

The graph in figure 6 compares the normal distribution curves of the D5S samples from 2001 through 2004 plus additional D5S meters that were tested in 2004 for "Other" reasons. The 2001 D5S group failed; therefore was removed from service, tested, and meters within the range of serial numbers with defective bearings were retired. The 2002 through 2004 curves are nearly identical and reflect the improved performance of the D5S group.

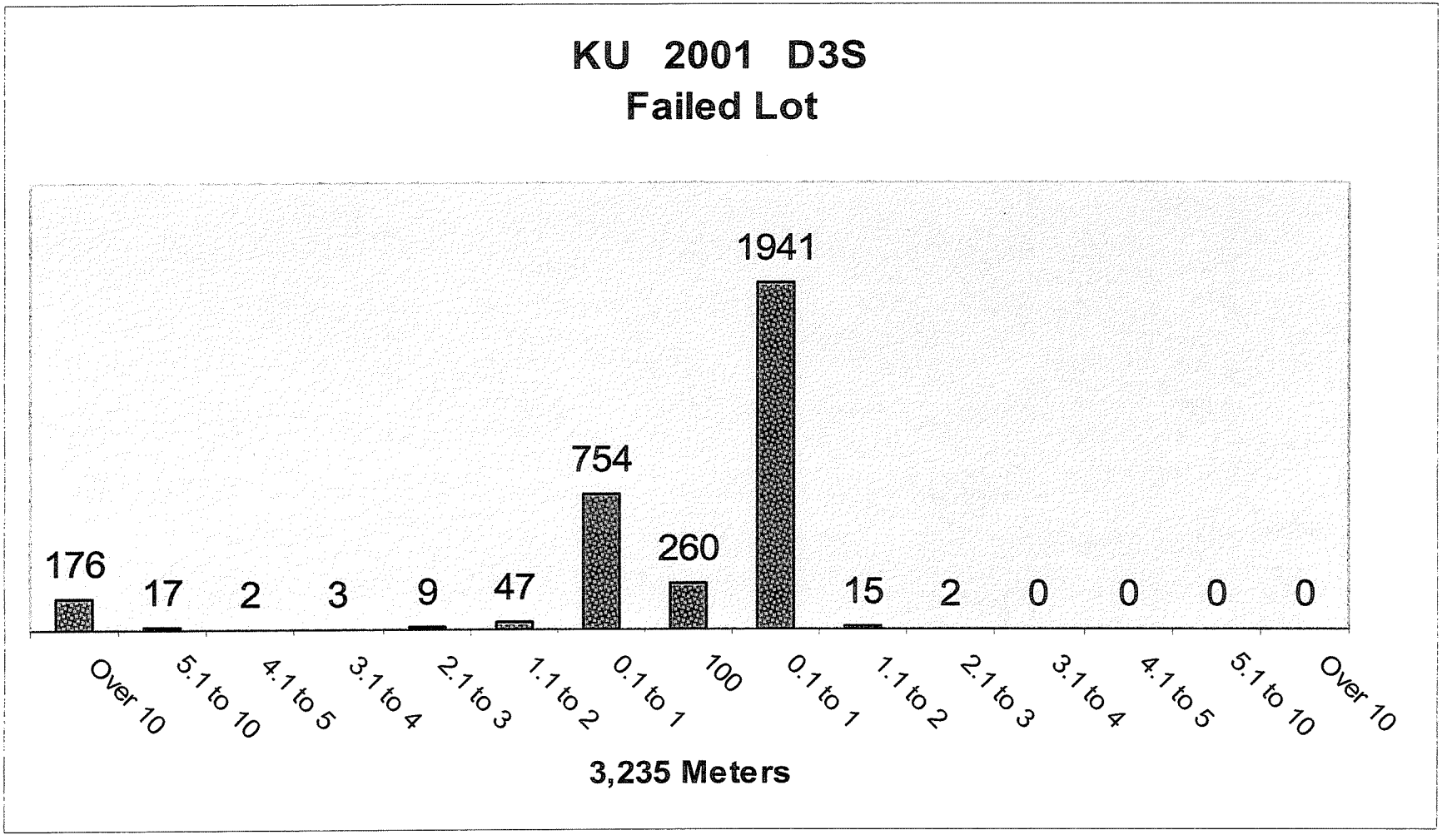
Kentucky Utilities realizes that sub-grouping of original control groups will not always be applicable. However, when known defects and other methods of determining sub-grouping are applicable, sub-grouping offers additional benefits to improve the performance of meters and results in cost savings.

Additional benefits of the proposed sample plan allow utilities to monitor the performance of meter groups and react to downward trending homogenous groups before the performance erodes to cause a "Failed Group".

Frequency Distribution
Chart 1

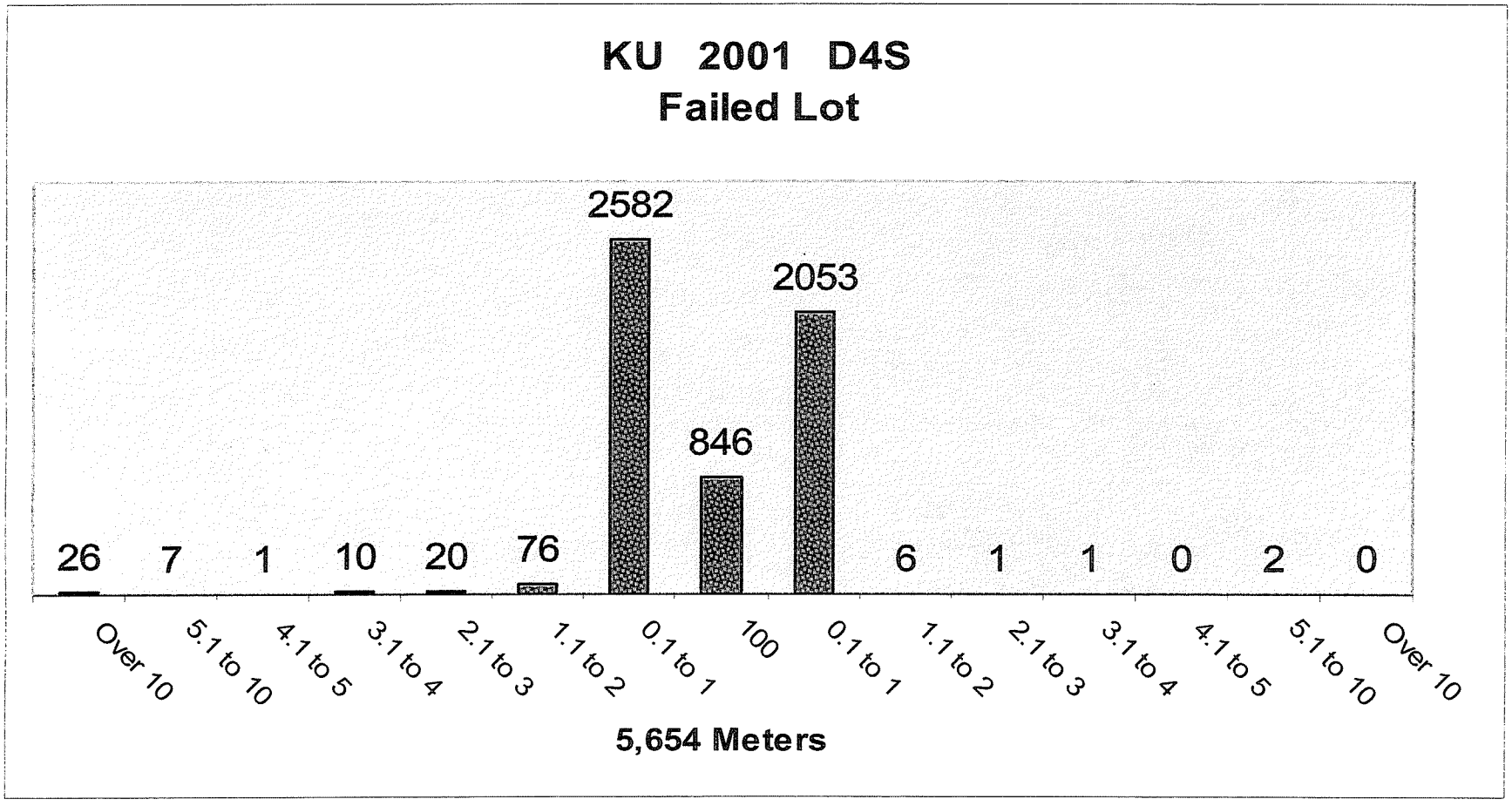


Frequency Distribution
Chart 2



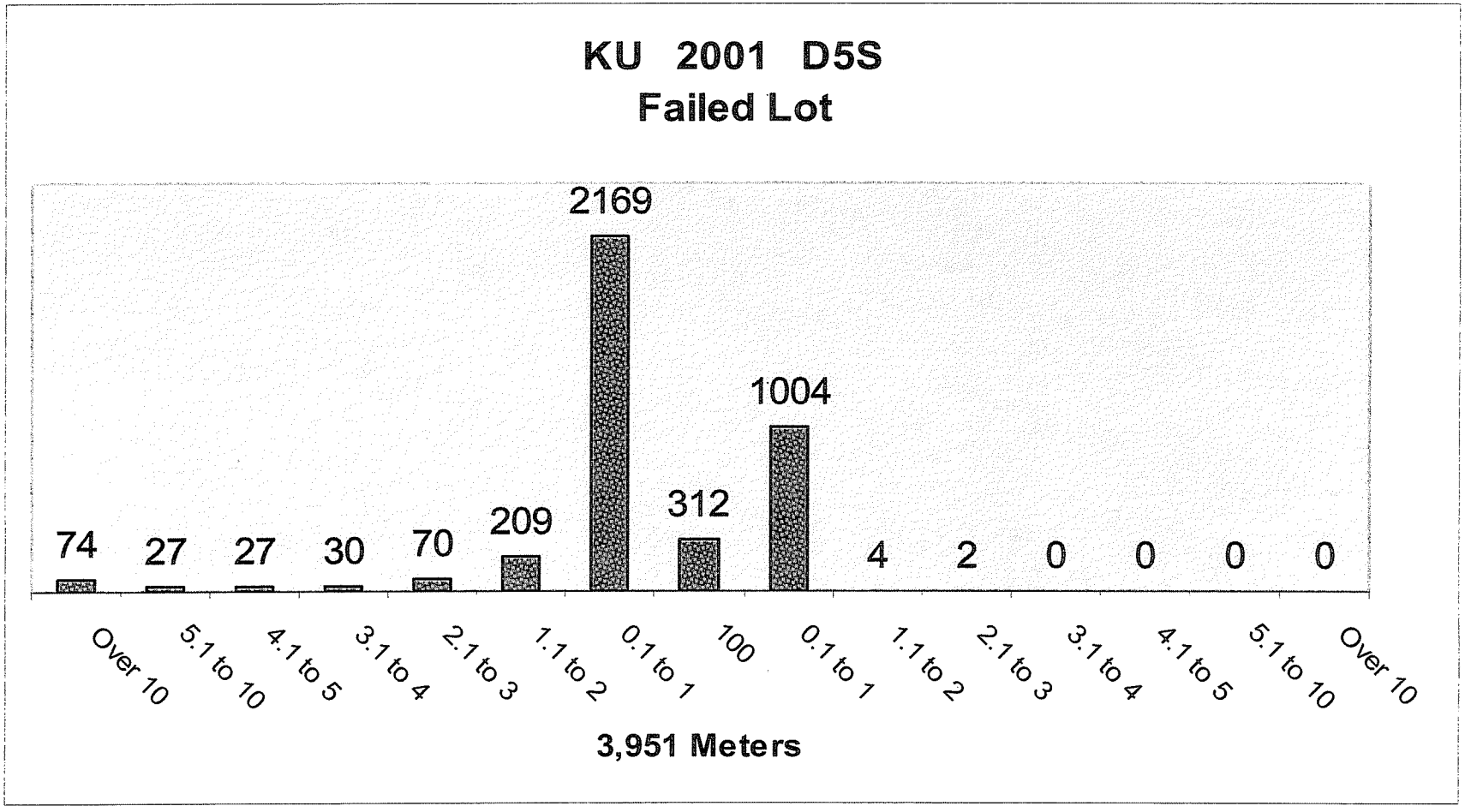
NOTE: THIS CHART DOES NOT INCLUDE METERS THAT DID NOT REGISTER (3) AND MISSING (6)

Frequency Distribution
Chart 3



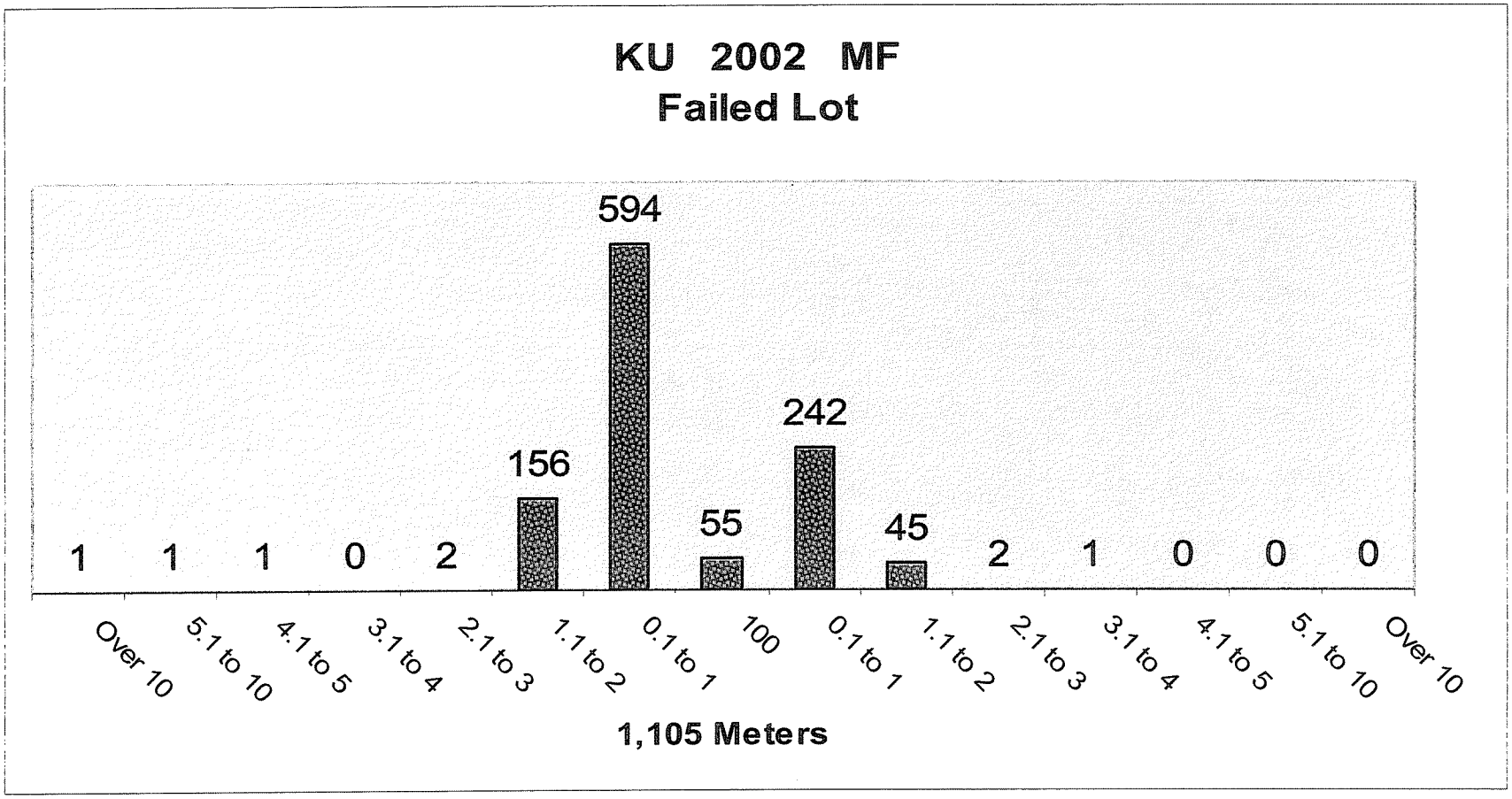
NOTE: THIS CHART DOES NOT INLCUDE METERS THAT DID NOT REGISTER (12) AND ARE MISSING (11)

Frequency Distribution
Chart 4



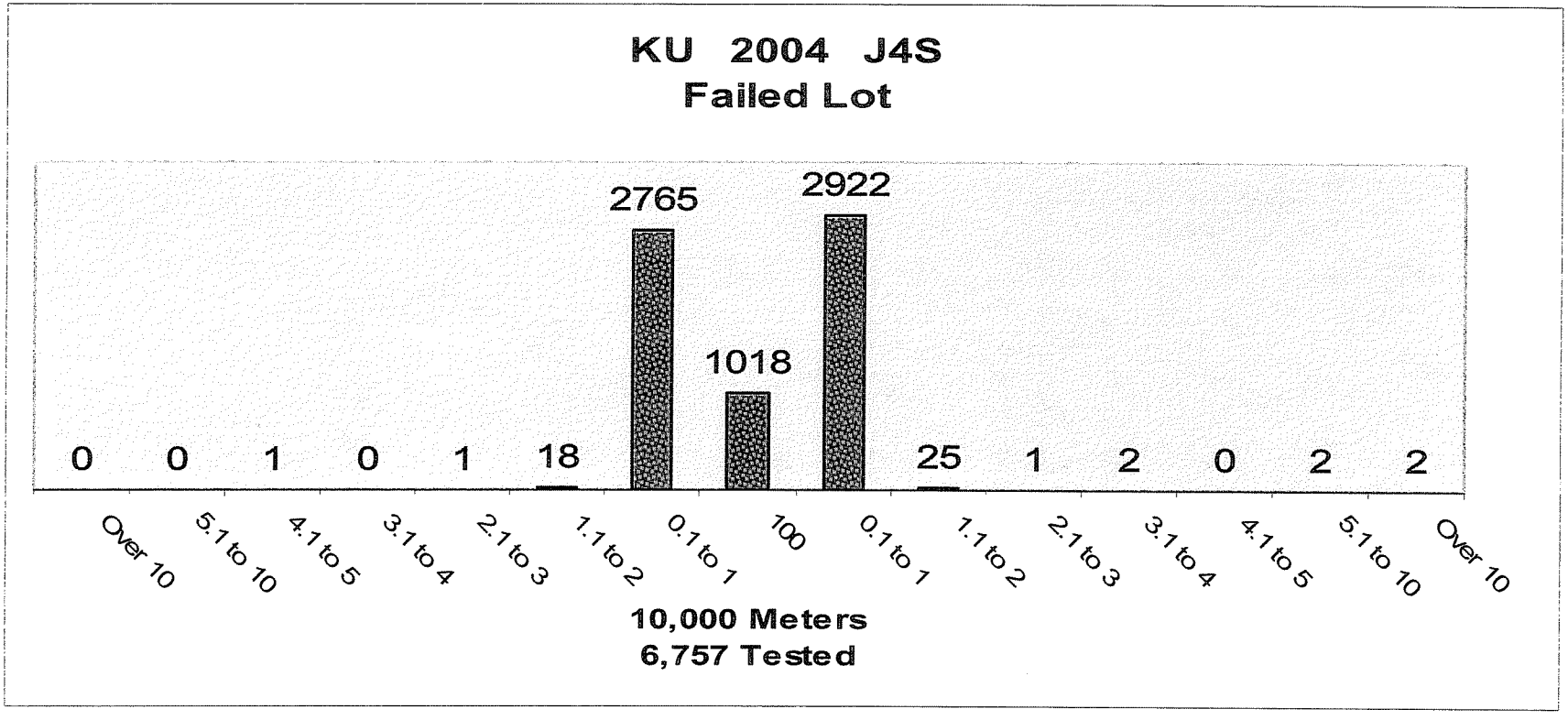
NOTE: THIS CHART DOES NOT INCLUDE METERS THAT DID NOT REGISTER (9) AND ARE MISSING (14)

Frequency Distribution
Chart 5



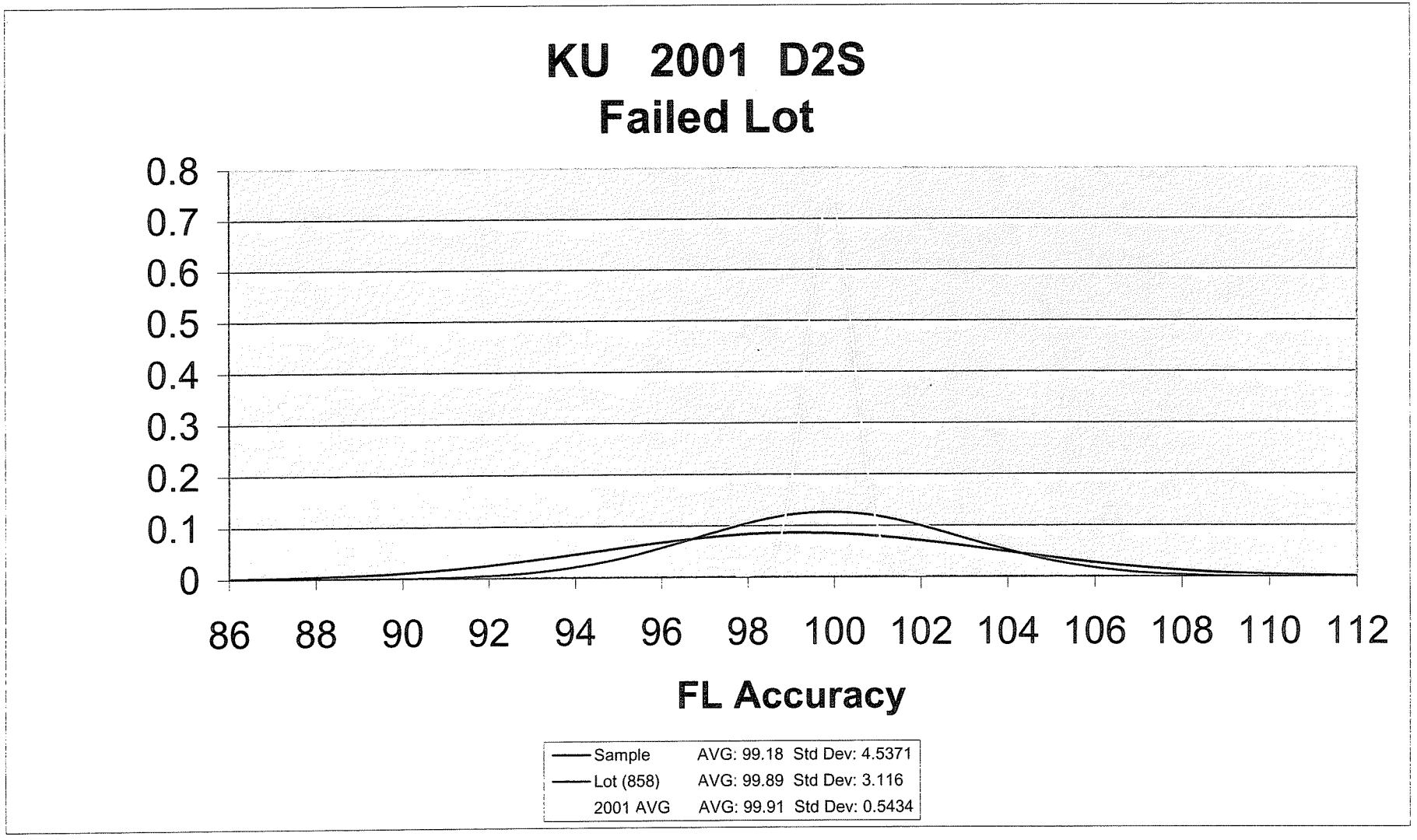
NOTE: THIS CHART DOES NOT INCLUDE METERS THAT DID NOT REGISTER (1) AND ARE MISSING (4)

Frequency Distribution
Chart 6

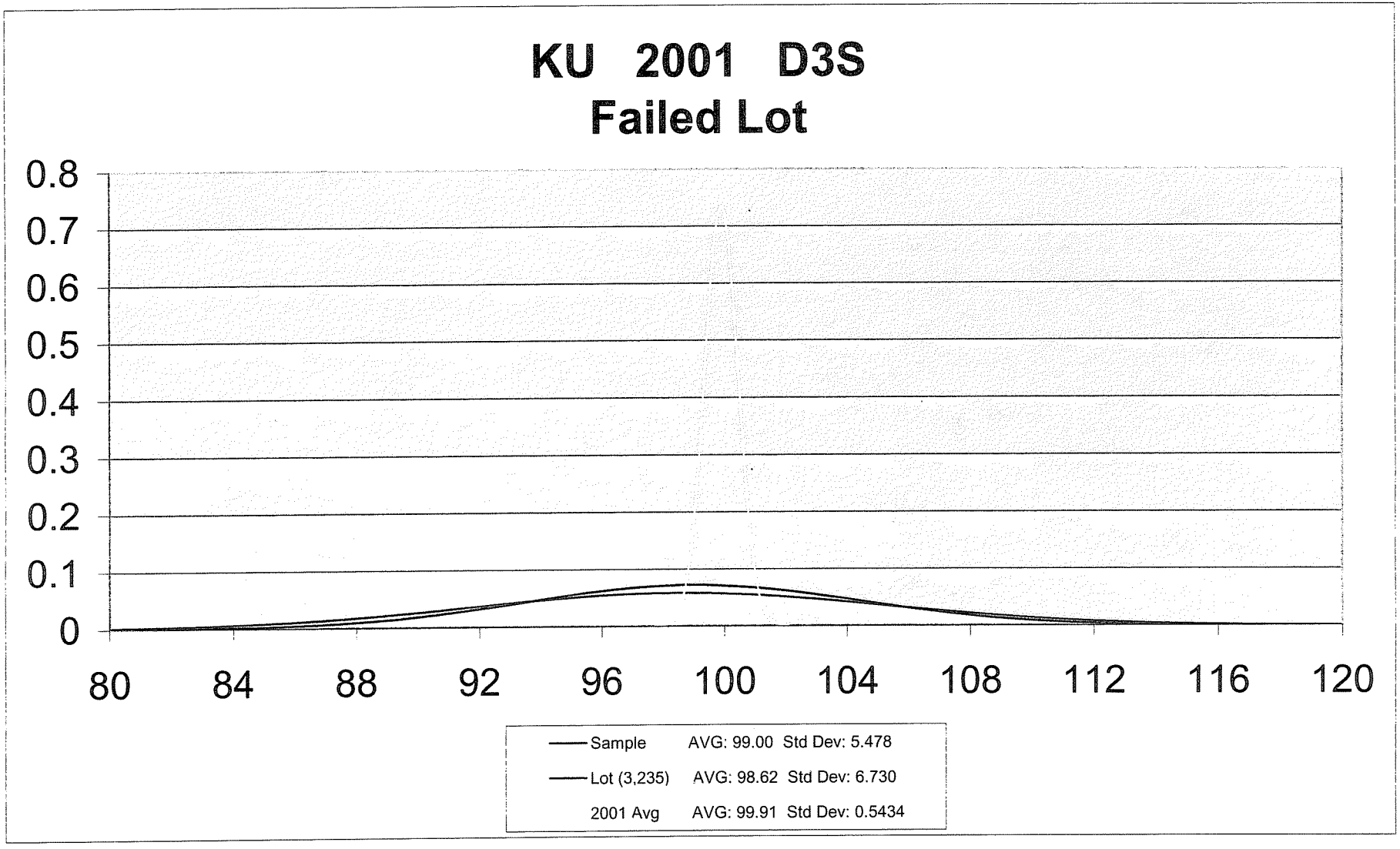


NOTE: THIS CHART DOES NOT INCLUDE METERS THAT DID NOT REGISTER (25) AND NOT TESTED YET (3,214)

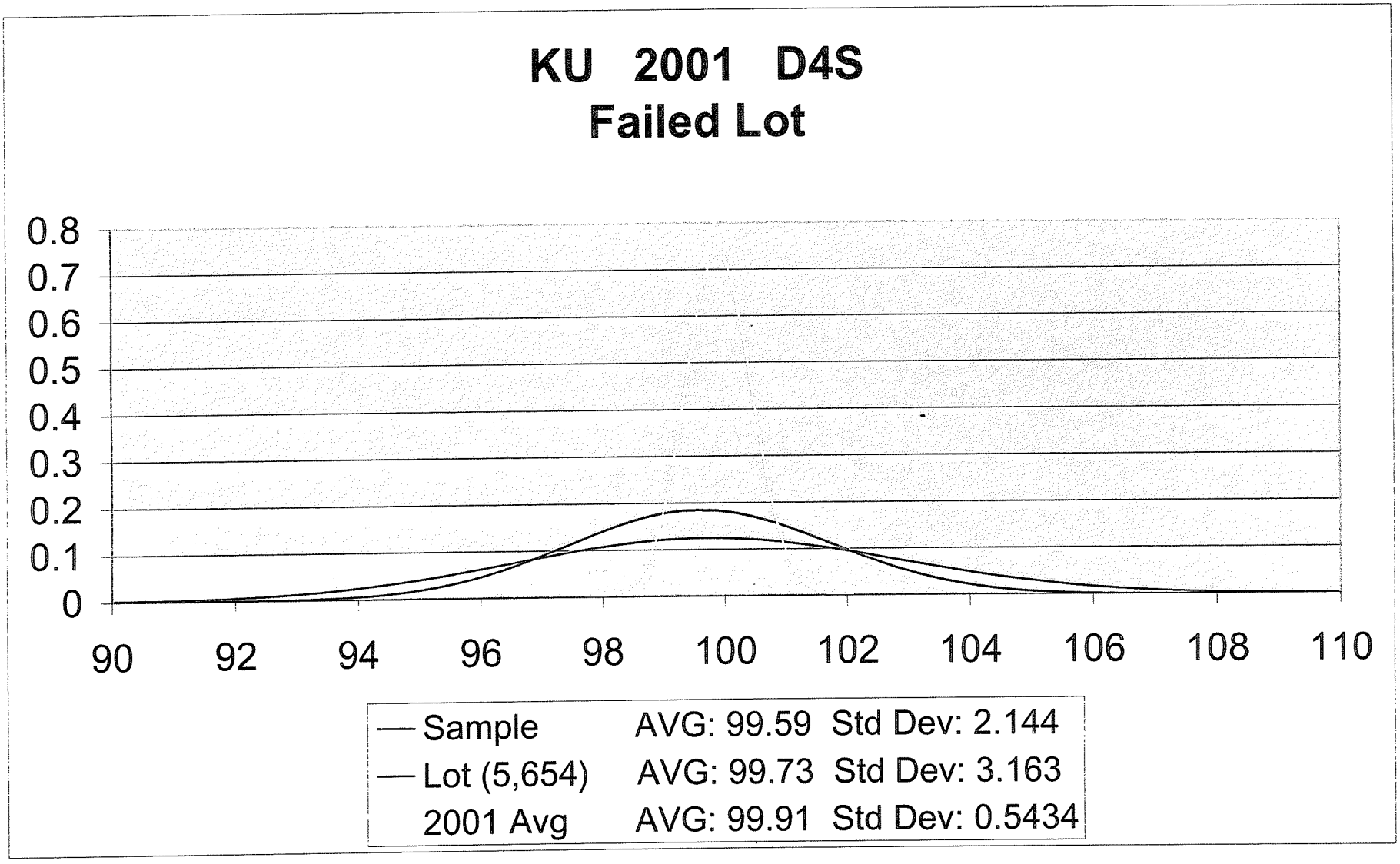
Normal Distribution Curve
Chart 7



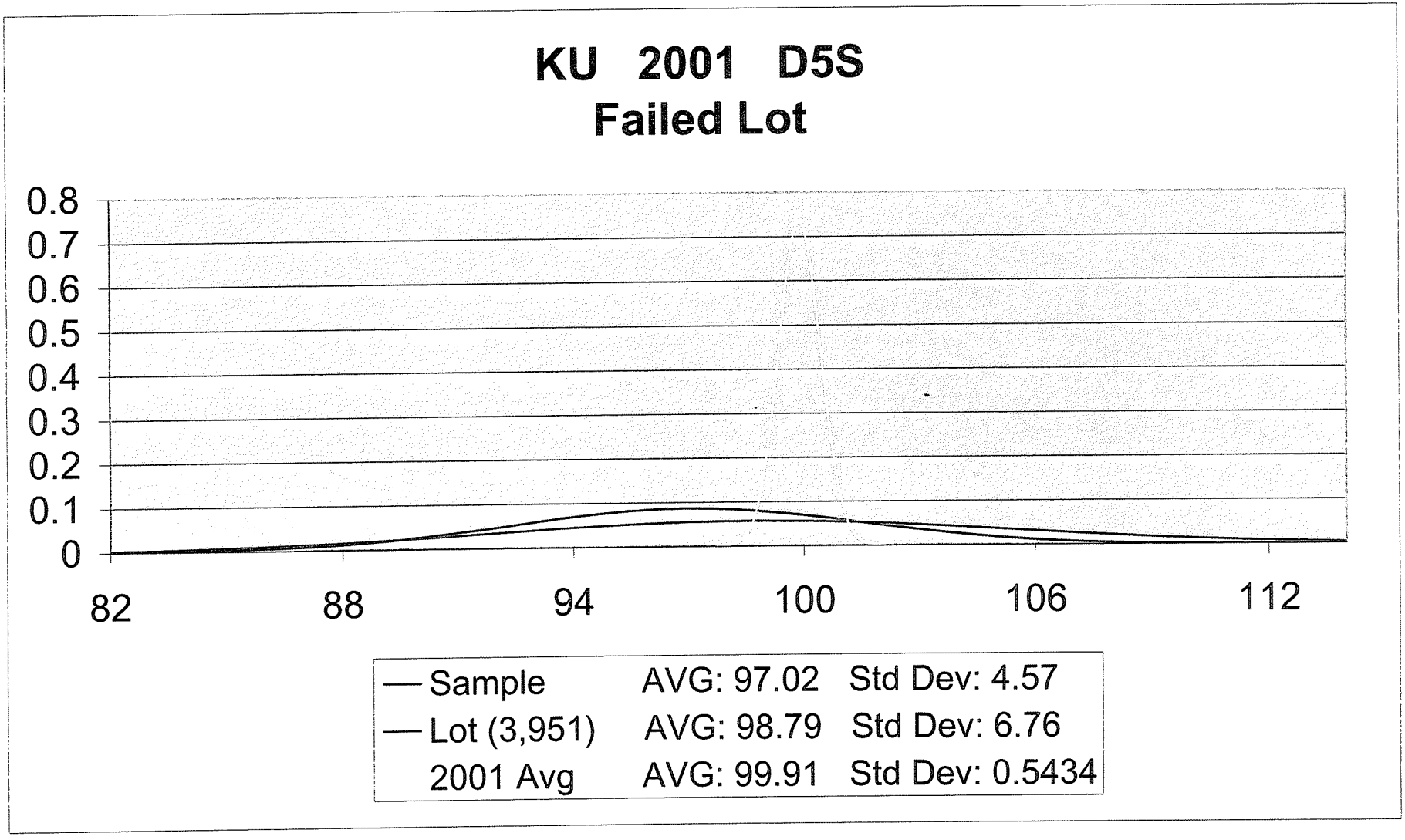
Normal Distribution Curve
Chart 8



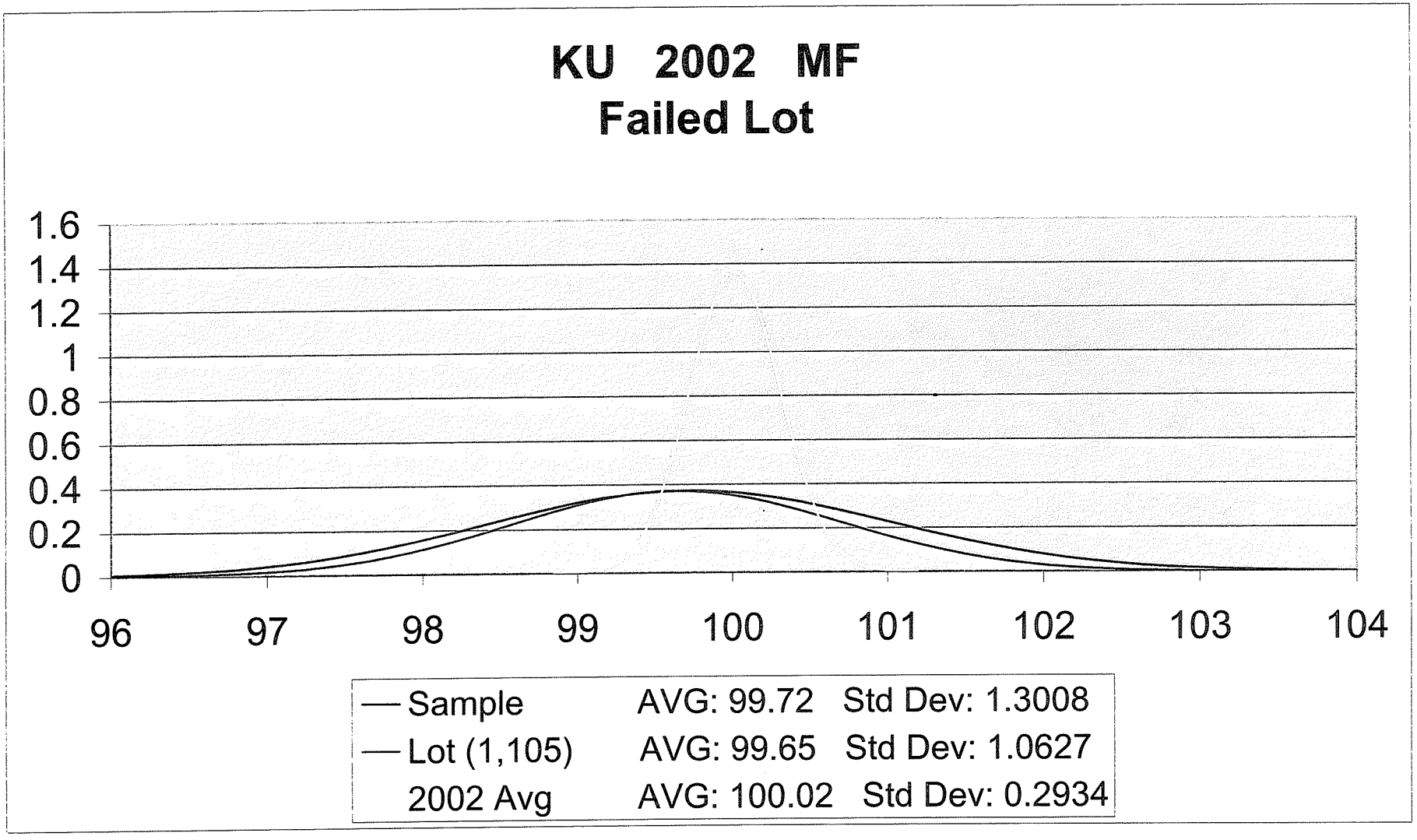
Normal Distribution Curve
Chart 9



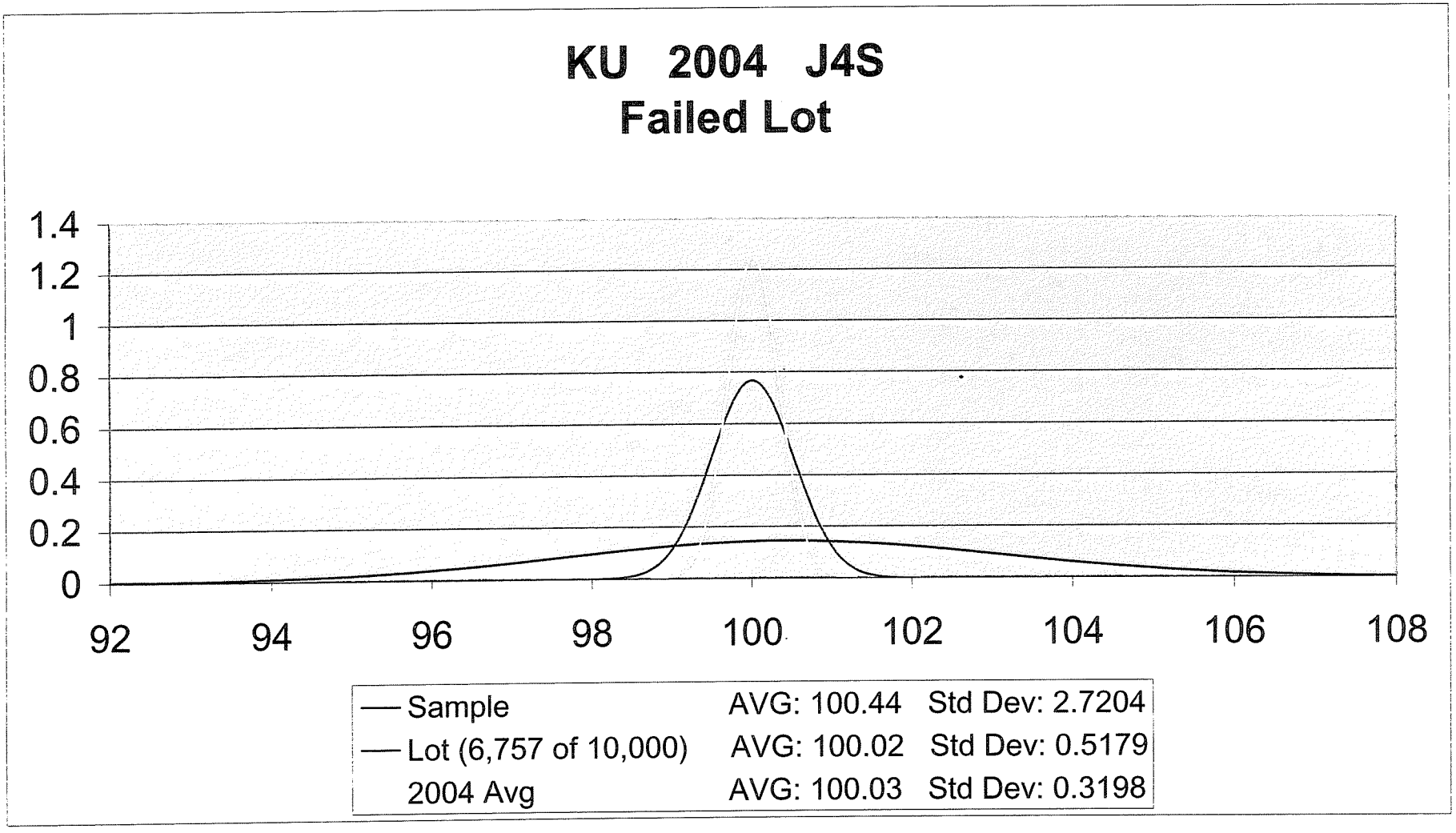
Normal Distribution Curve
Chart 10



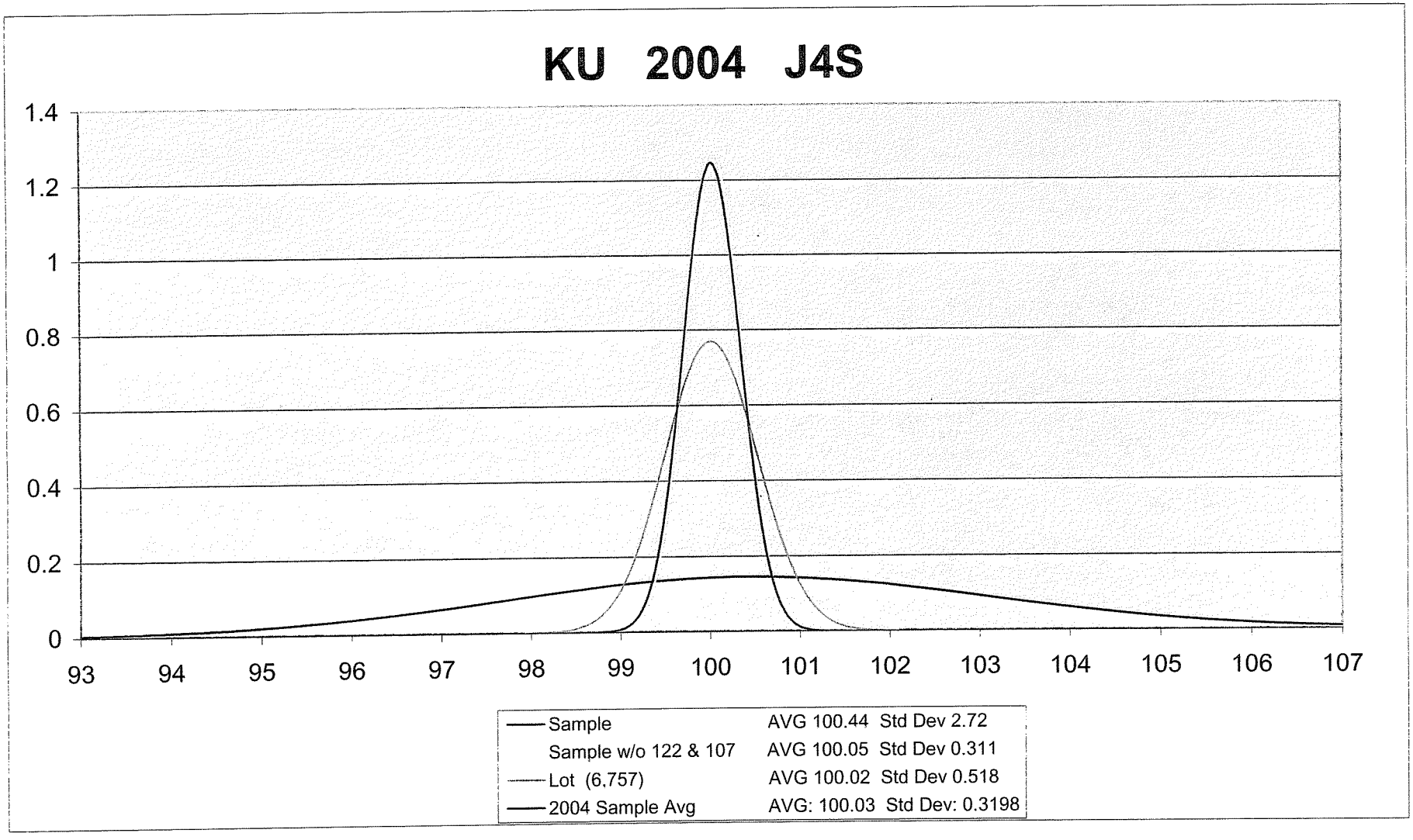
Normal Distribution Curve
Chart 11



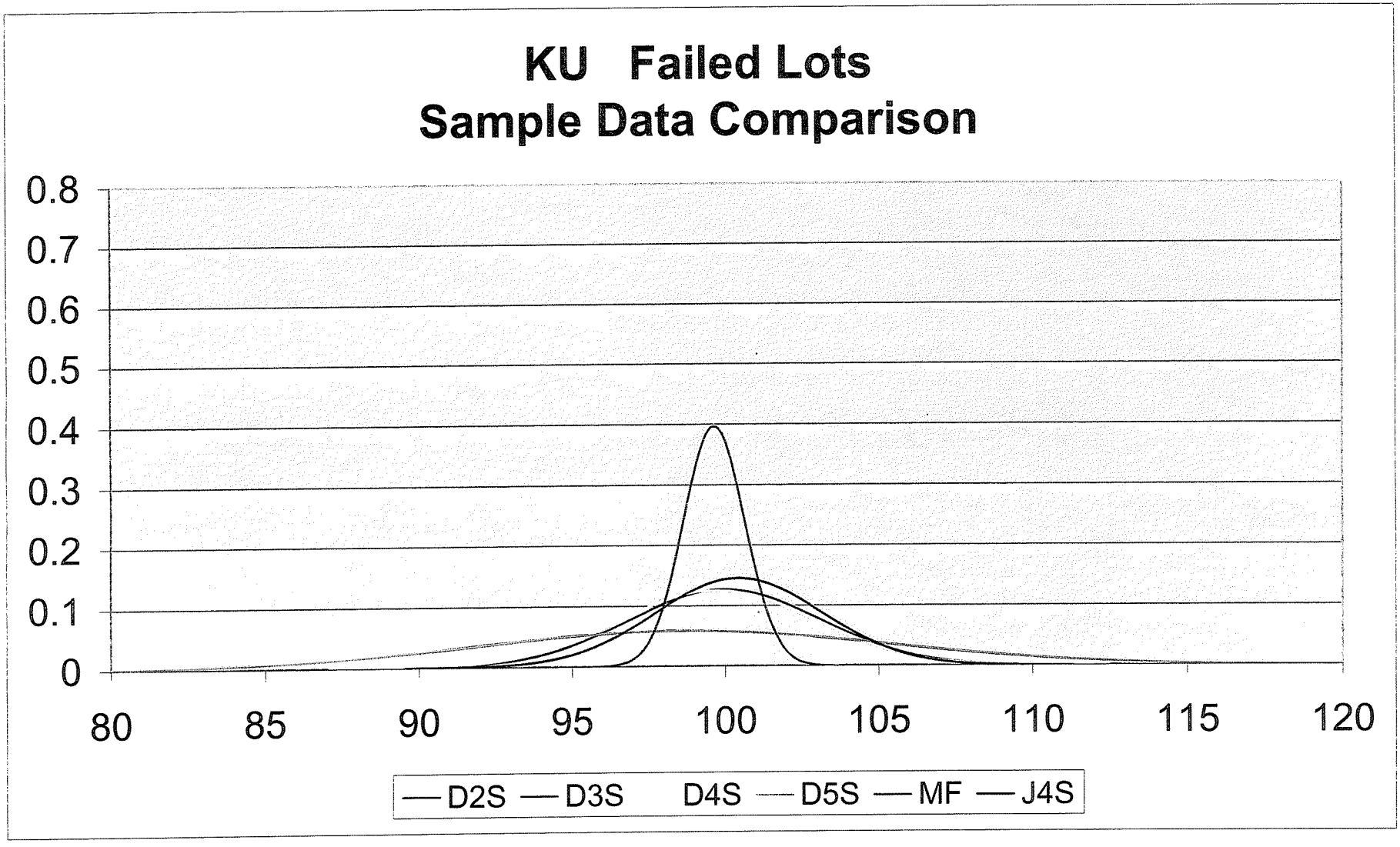
Normal Distribution Curve
Chart 12



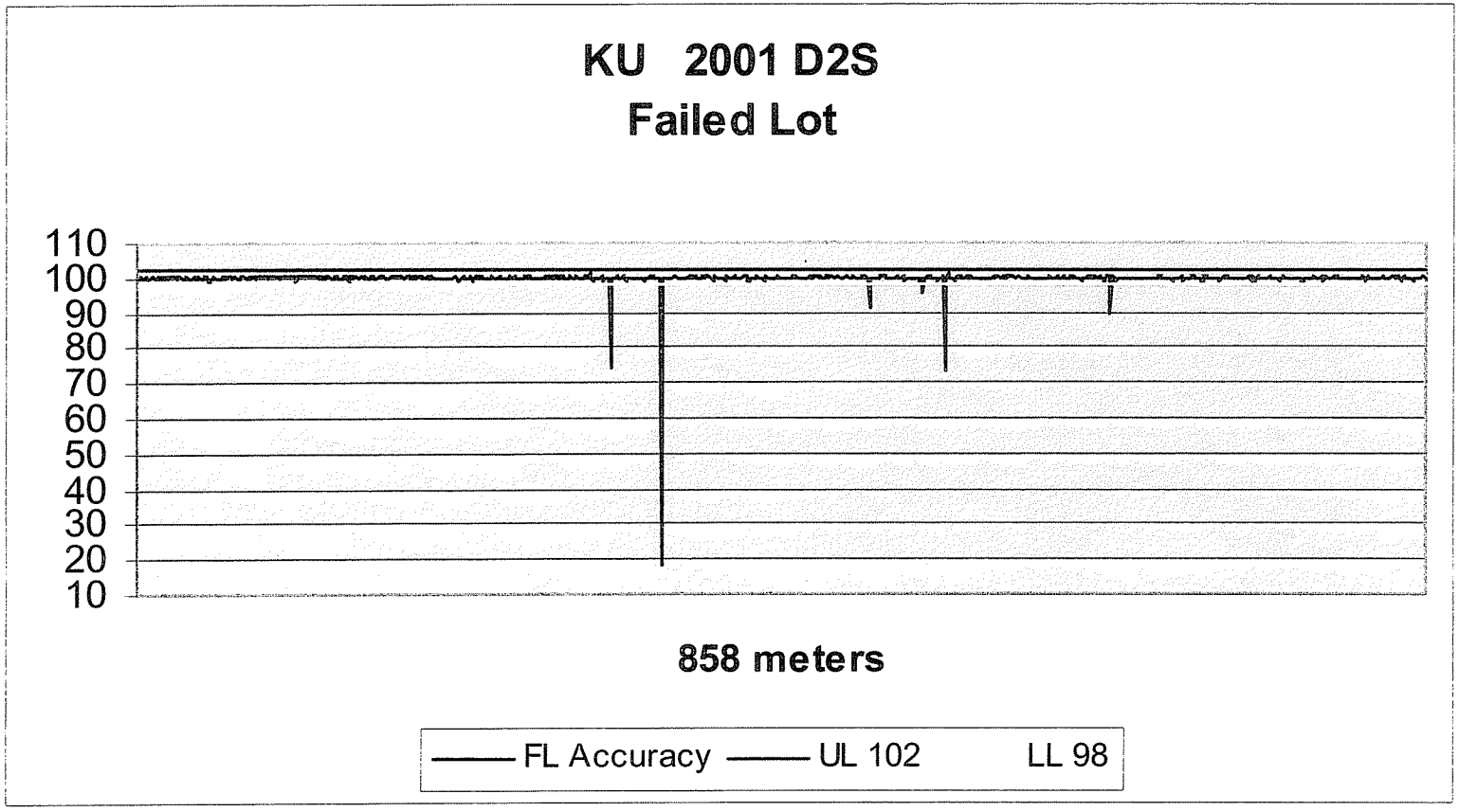
Normal Distribution Curve
Chart 13



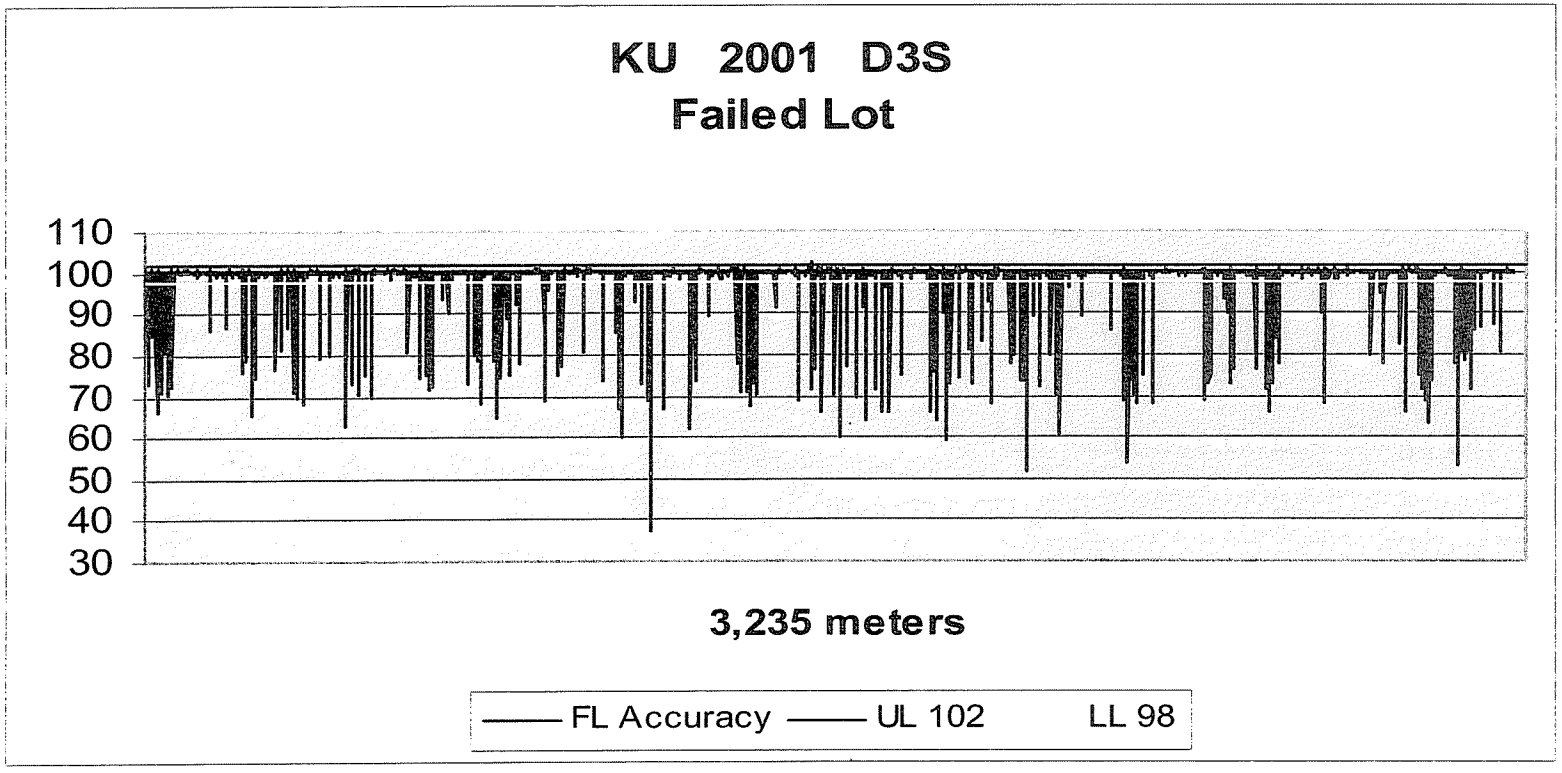
Normal Distribution Curve
Chart 14



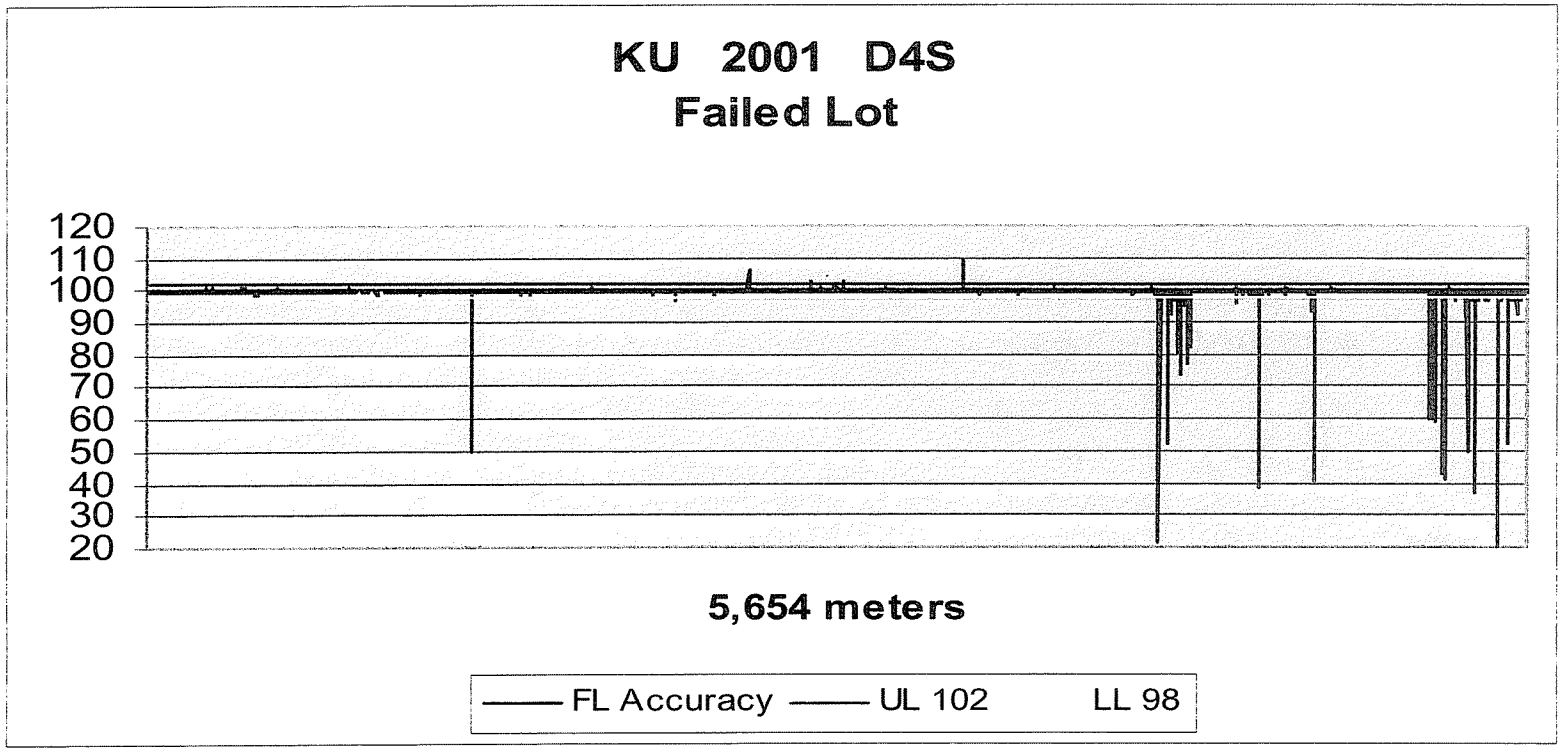
Full Load Accuracy
Chart 15



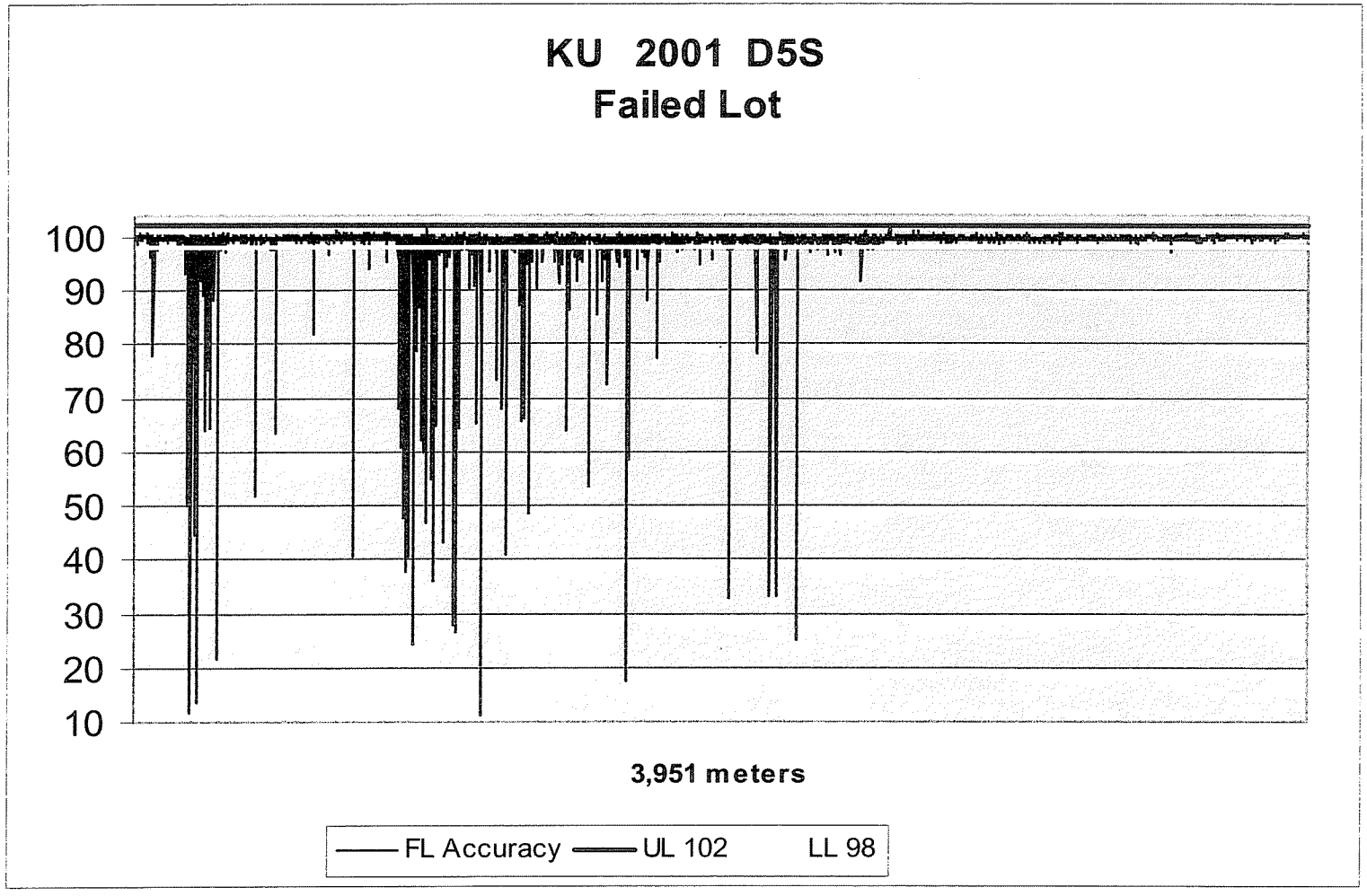
Full Load Accuracy
Chart 16



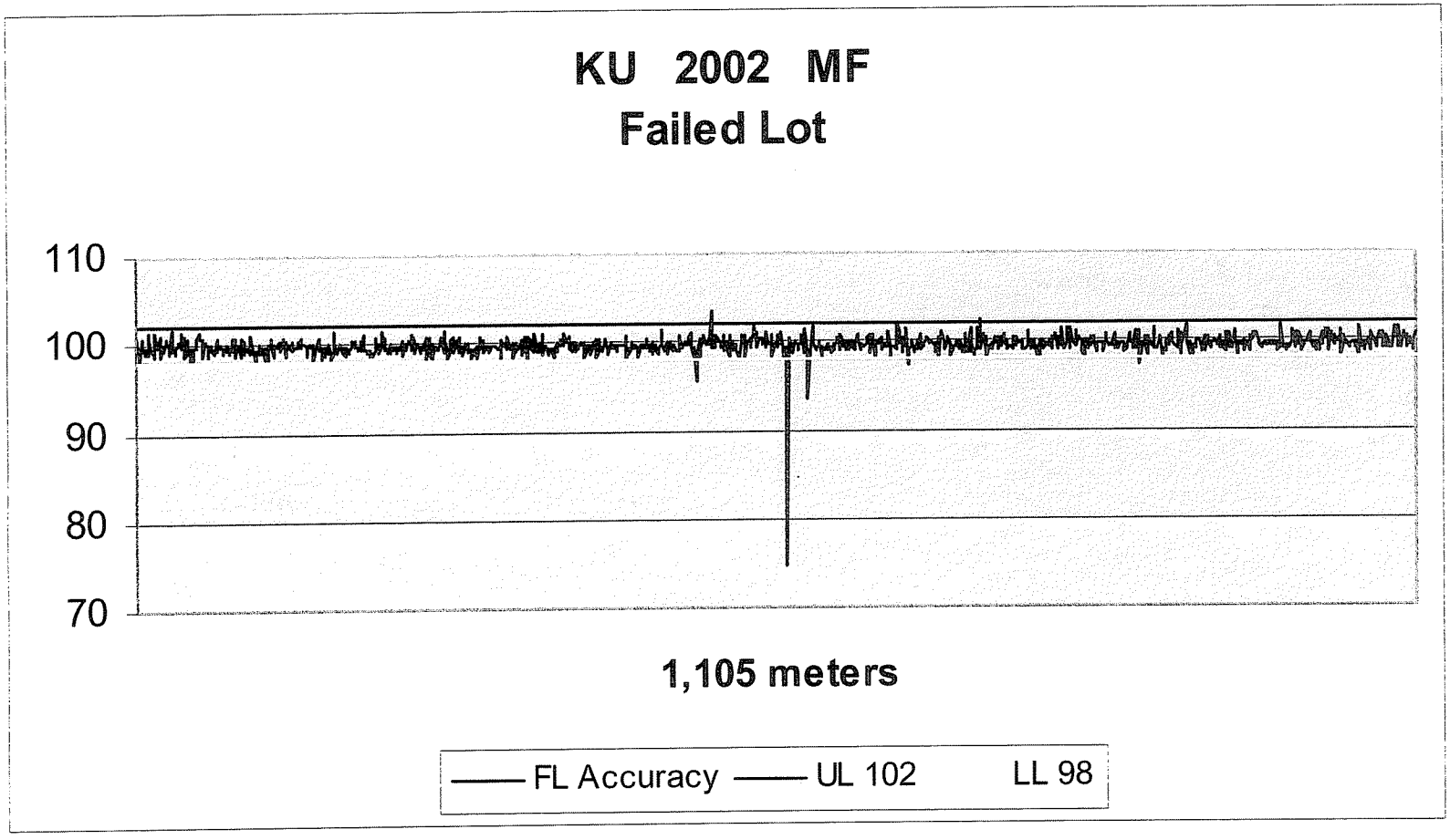
Full Load Accuracy
Chart 17



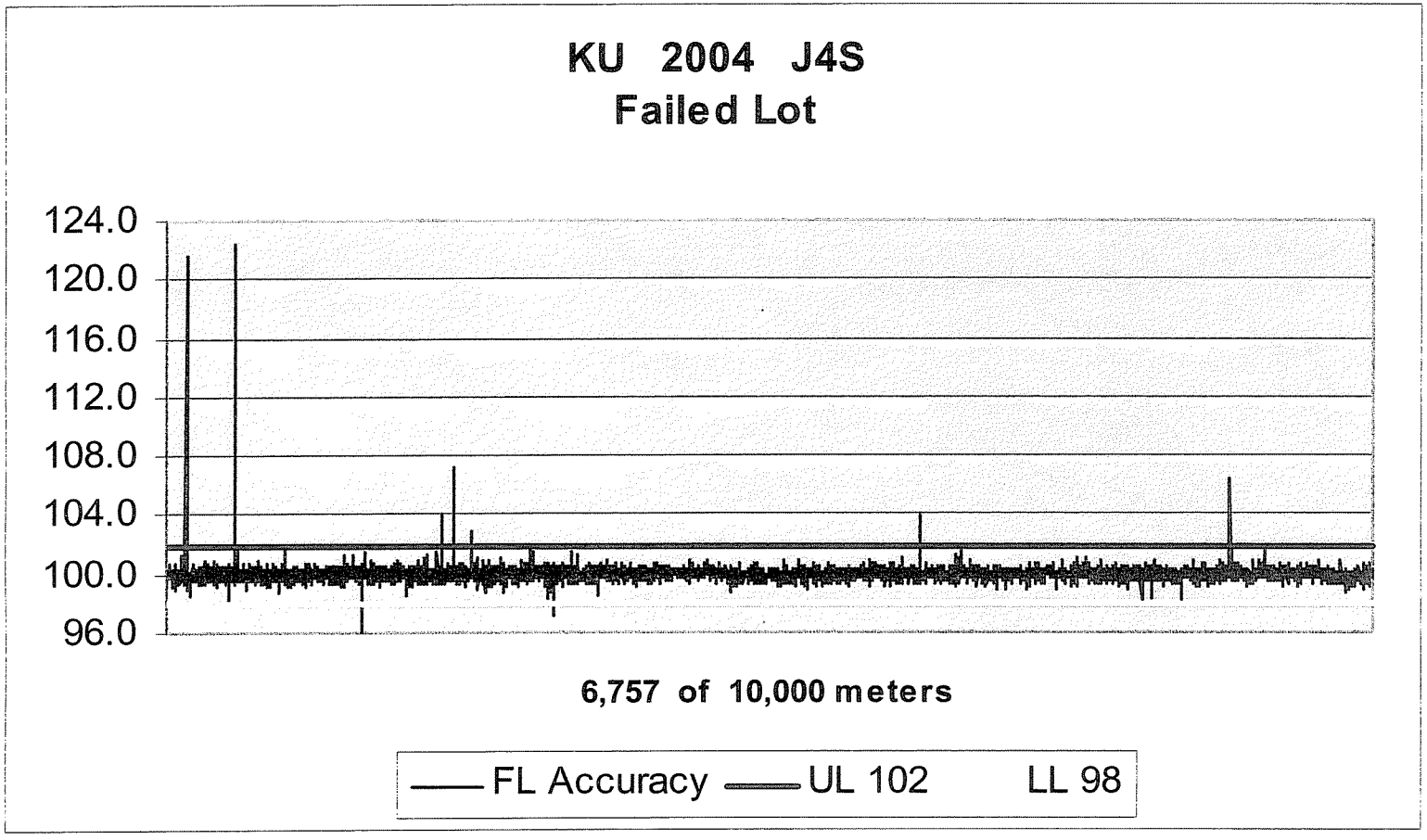
Full Load Accuracy
Chart 18



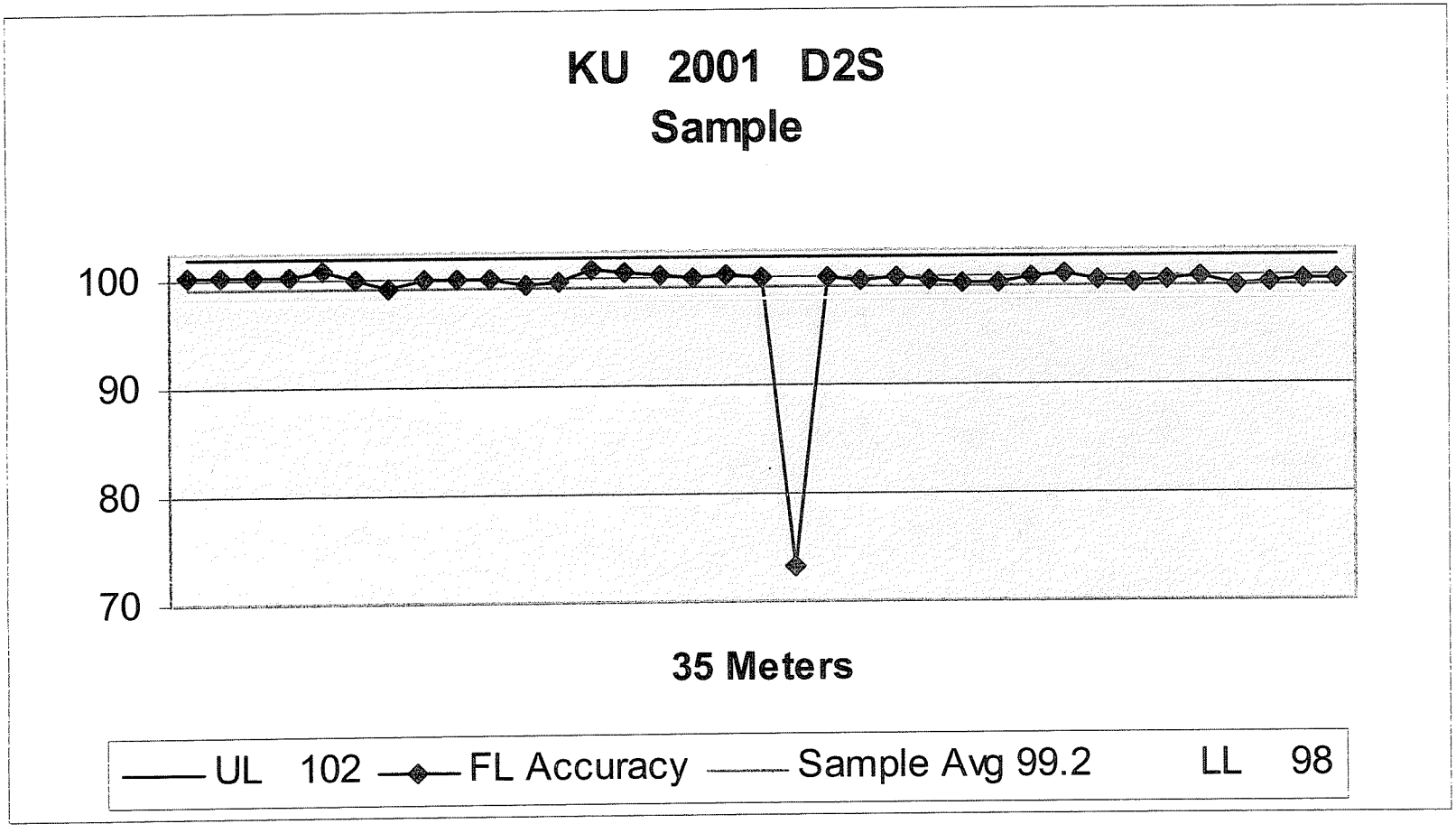
Full Load Accuracy
Chart 19



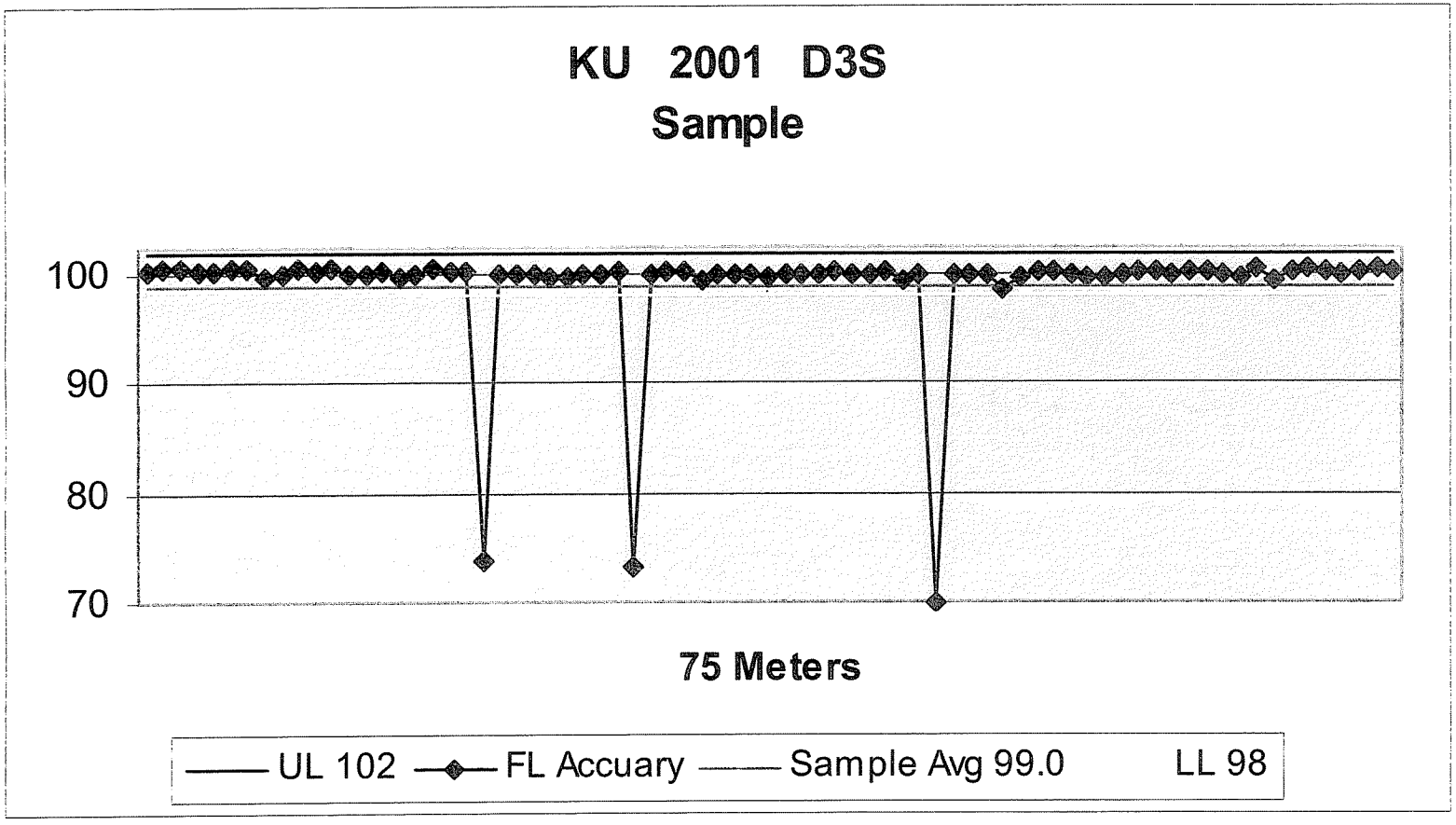
Full Load Accuracy
Chart 20



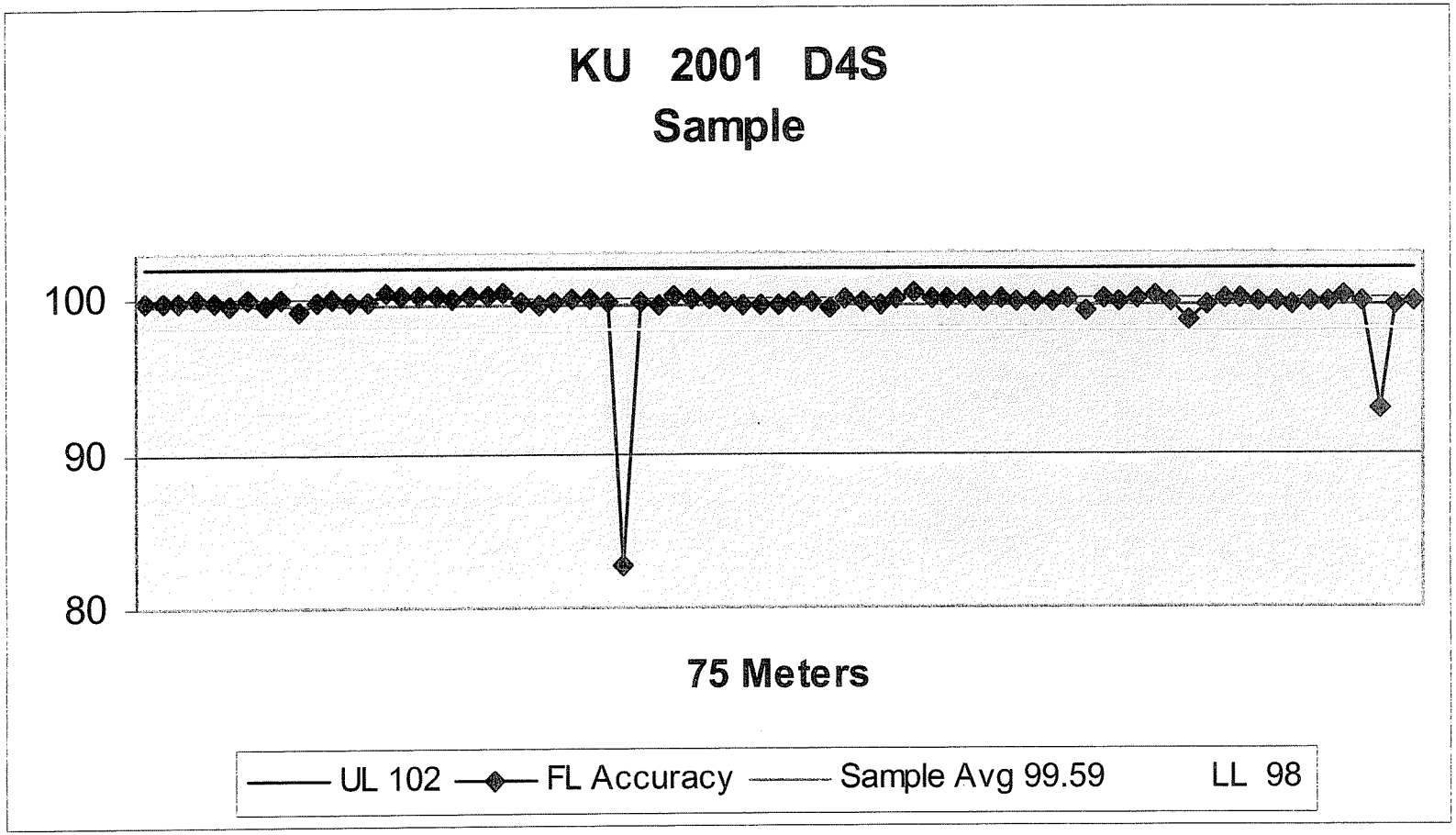
Full Load Accuracy
Chart 21



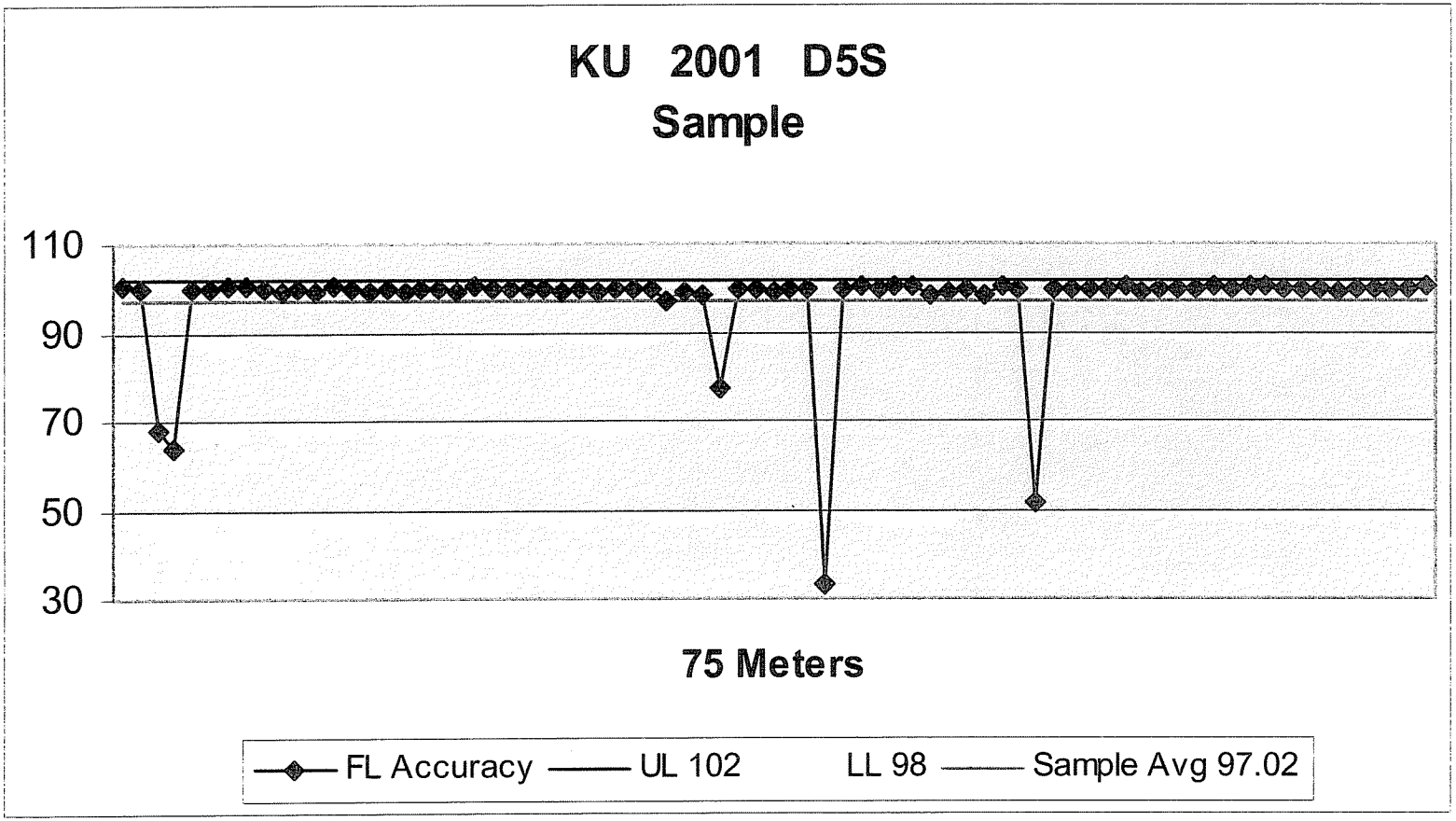
Full Load Accuracy
Chart 22



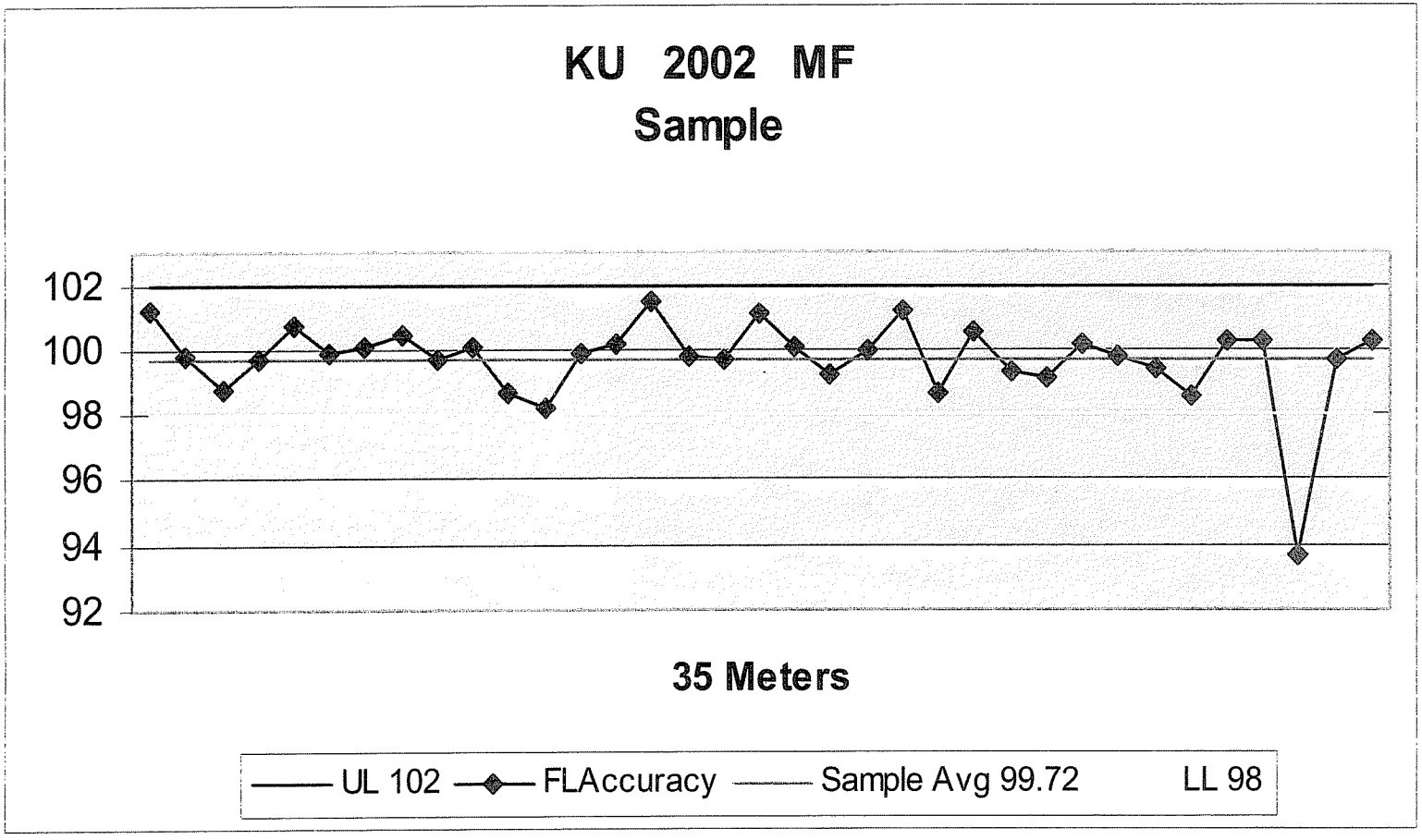
Full Load Accuracy
Chart 23



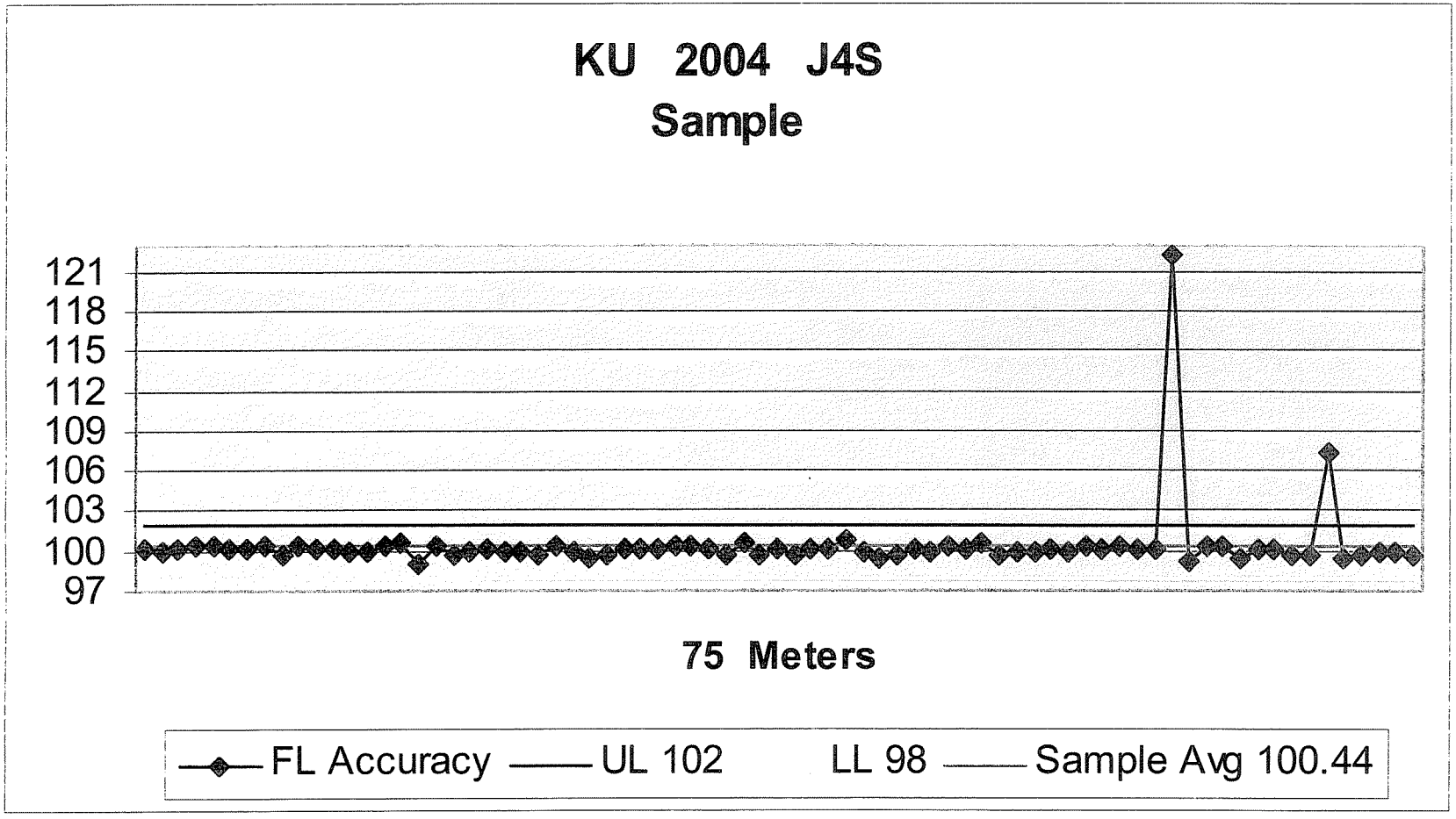
Full Load Accuracy
Chart 24



Full Load Accuracy
Chart 25



Full Load Accuracy
Chart 26



APPENDIX 2

Louisville Gas & Electric

Documentation Supporting Pilot Sample Plan

The Pilot Sample Plan was an overall success and an improvement over the previous sample plan. Although, on average, fewer meters were tested annually, meter performance has improved. The process targeted poor performing meters and forced corrective action. The end result was better performing meters and less expense. Louisville Gas & Electric averaged $240,180 annual savings throughout the sample pilot.

The pilot identified five (5) groups of meters that failed to meet acceptable accuracy levels and required additional testing. These poor performing meters were undetected by the previous sample plan and were permitted to remain in service. The "Failed Lots" were separated from the sampling process and removed from service in the allotted 18 months timeframe. The poor performing groups are as follows:

2001:	Westinghouse	DS
	General Electric	I30
2002:	Westinghouse	D3S, D5S
	General Electric	I20

The five (5) "Failed Lots" consist of 8,065 meters, of which 193 meters fall outside +/- 2% accuracy, as illustrated in the frequency distribution chart in figure 1. Because meter records are deleted from the system three years after meters are retired, only the D5S data is available. Additionally, the other four "Failed Lots" consist of 1,183 meters. The I20, I30, and DS "Failed Lots" are smaller as a result of previous efforts to remove poor performing meters.

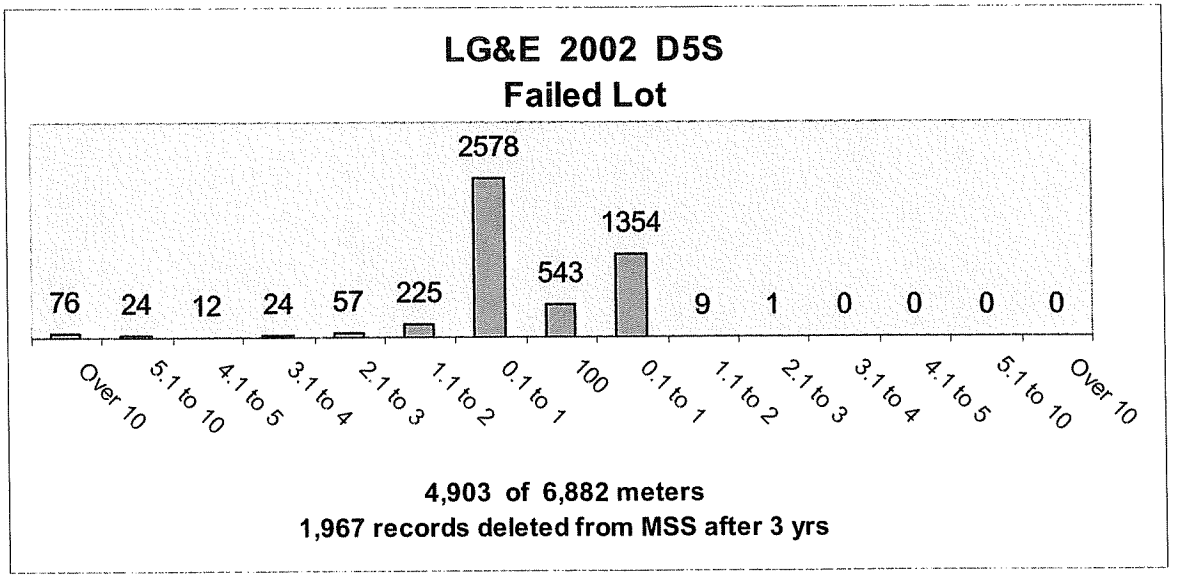


Figure 1

NOTE: Figure 1 does not reflect 12 meters that did not register.

APPENDIX 2

The following D5S normal distribution chart (figure 2) compares the 2002 D5S sample, D5S lot population, and the 2002 Sample average.

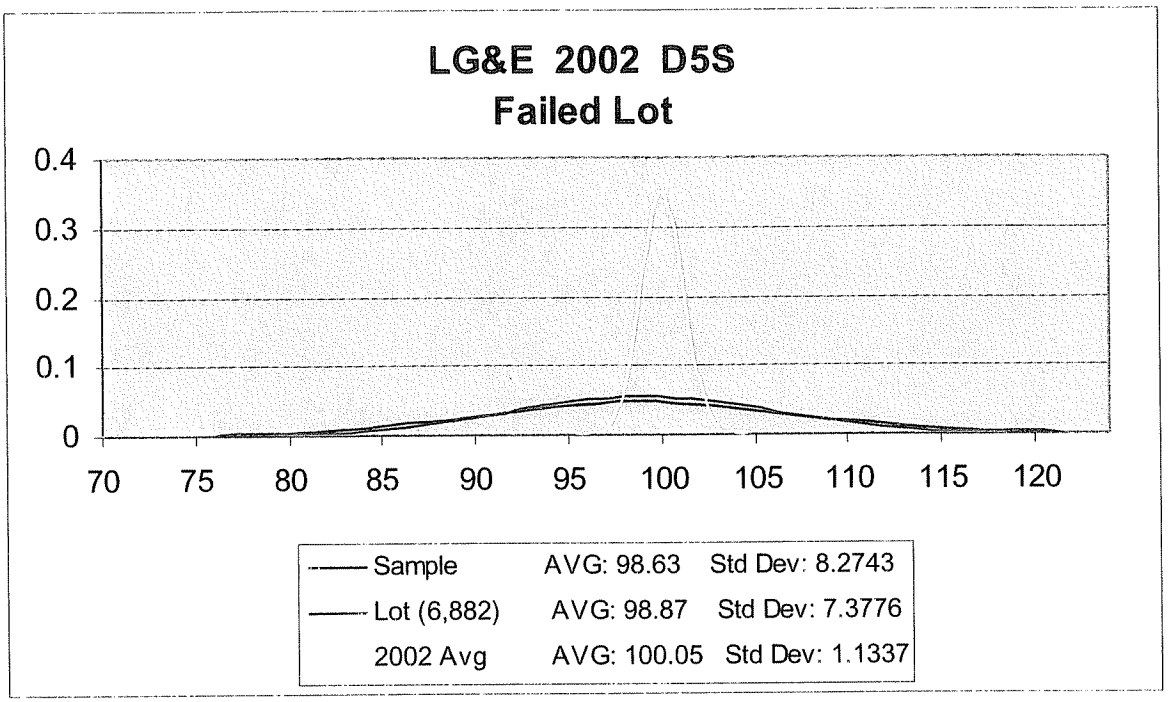


Figure 2

Figure 3, illustrates Full Load accuracy of 4,903 meters of the 2002 D5S "Failed Lot" population, sorted by serial number. The chart indicates poor performing meters with almost one-half of the group. The noticeable improvement in the Full Load accuracy occurs around the 74,500,000 range of serial numbers where improvements were implemented, by the manufacturer, in the bearing assembly.

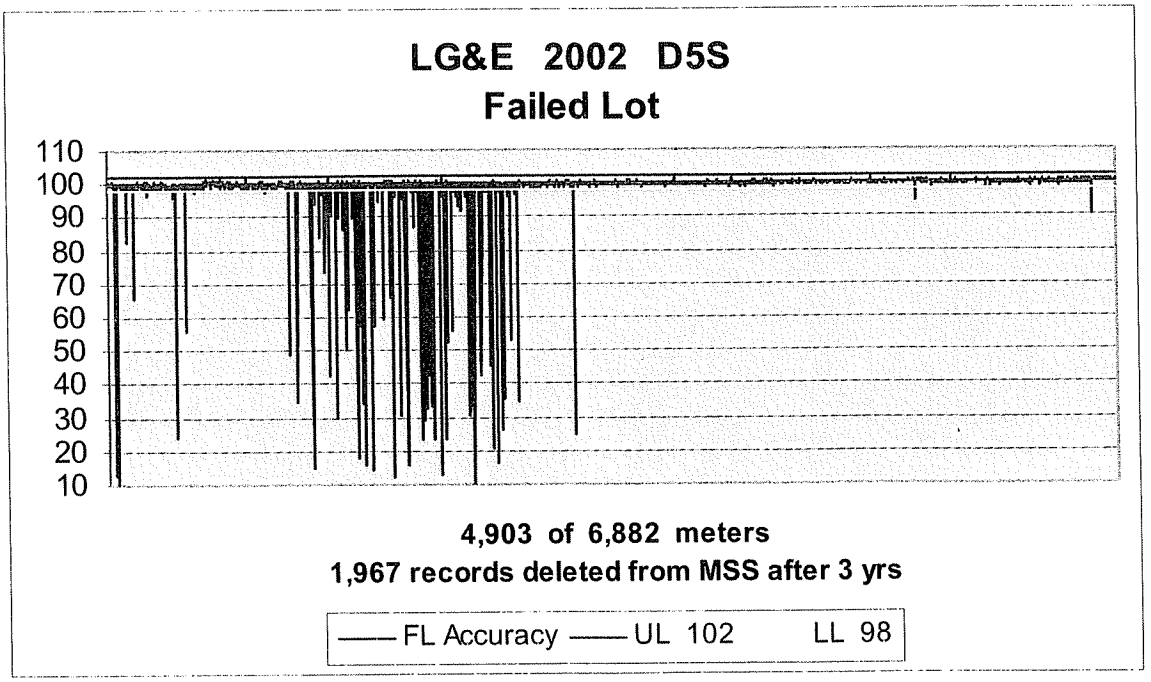


Figure 3

As illustrated by the above graph, the D5S control group is a potential candidate for sub-grouping of the original control group. By sub-grouping this control group of meters and reducing the "Failed Lot" meter count by 2,312 meters Louisville Gas & Electric would realize an additional savings of nearly $47,000 while maintaining a high level of meter accuracy for this group.

Louisville Gas & Electric realizes that sub-grouping of original control groups will not always be applicable. However, when known defects and other methods of determining sub-grouping are applicable, sub-grouping offers additional benefits to improve the performance of meters and results in cost savings.

Additional benefits of the proposed sample plan allow utilities to monitor the performance of meter groups and react to downward trending homogenous groups before the performance erodes to cause a "Failed Group".