

**Goss  
Samford**

ATTORNEYS AT LAW | PLLC

RECEIVED

DEC 16 2021

PUBLIC SERVICE  
COMMISSION

**David S. Samford**  
david@gosssamfordlaw.com  
(859) 368-7740

December 16, 2021

**VIA EMAIL TO [PSCED@KY.GOV](mailto:PSCED@KY.GOV)**

Hon. Linda Bridwell, P.E.  
Executive Director  
Kentucky Public Service Commission  
211 Sower Boulevard  
Frankfort, KY 40601

RE: *Application of Farmers Rural Electric Cooperative Corporation for an Adjustment of Rates, Case No. 2016-00365 – Post-Case Correspondence*

Dear Ms. Bridwell:

Attached, please find a copy of a depreciation study conducted for Farmers Rural Electric Cooperative Corporation (“Farmers RECC”). The Commission entered a final order in the above-styled case on May 12, 2017. Ordering paragraph 4 of the May 12, 2017 Order required Farmers RECC to conduct and file a depreciation study with its next base rate case or within five years from the date of the Order, whichever came first. Therefore, Farmers RECC is filing the attached depreciation study in order to comply with the five-year deadline contained in the Commission’s May 12, 2017 Order. Based upon the results of the depreciation study, Farmers RECC is not requesting any change in its depreciation rates at this time.

Please do not hesitate to contact me if you have any questions.

Sincerely,



David S. Samford

Enc.

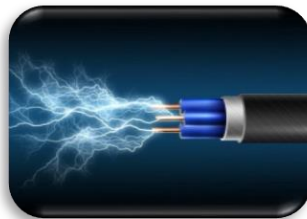
# Farmers Rural Electric Cooperative Corporation

## Depreciation Study

**July 1, 2020**

*Prepared By*

**CATALYST**  
CONSULTING LLC



## Table of Contents

	<u>Page</u>
Executive Summary .....	2
Description of Methodology.....	2
Distribution Plant.....	8
Account 364.00 – Poles, Towers & Fixtures .....	8
Account 365.00 – Overhead Conductor & Devices.....	8
Account 367.00 – Underground Conductor & Devices.....	8
Account 368.00 – Line Transformers.....	8
Account 369.00 – Services.....	9
Account 370.00 – Meters .....	9
Account 371.00 –Outdoor Lighting Conventional Fixtures .....	9
Account 371.20 – Outdoor Lighting – LED Fixtures .....	10
Account 373.00 – Street Light & Signal Systems.....	10
Appendix A - SPR Analysis	
Appendix B - Net Salvage Analysis	
Appendix C - Proposed Depreciation Rates	
Appendix D - Comparison of Other Utilities	

## **Executive Summary**

Catalyst Consulting LLC (“Catalyst”) prepared a depreciation study for Farmers Rural Electric Cooperative Corporation (“Farmers”). In developing its recommended depreciation rates, Catalyst performed a Simulated Property Records (“SPR”) analysis to identify the appropriate survivor curve and average service life (“ASL”) that most accurately matched Farmers’ historical retirement data. Catalyst also performed an analysis of historical salvage values and removal costs to estimate net salvage percentages. In calculating the proposed depreciation rates the average service life depreciation procedure, the straight-line method, and the whole life basis were utilized. The depreciation study rates were determined using standard methodologies used in the electric utility industry and accepted by the Kentucky Public Service Commission for electric cooperatives in Kentucky. The proposed depreciation rates are shown in Appendix C of the report.

## **Description of Methodology**

The purpose of performing a depreciation study is to ensure that the depreciation expenses recorded by the utility and included in cost of service represent a reasonably accurate and systematic measurement of the annual accrual levels necessary to distribute plant costs, less salvage and removal, over the estimated useful lives of the assets.

In performing this study, data was compiled showing plant additions, retirements and transfers going back as far as 1940 shortly after when the cooperative was formed. For certain plant accounts, such as for poles, overhead conductor, transformers, and services, data were available going back to 1940. For outdoor and street lighting, annual plant additions and retirements were not available until the late 1950s. For underground conductor, such data were not available until the early 1970s.

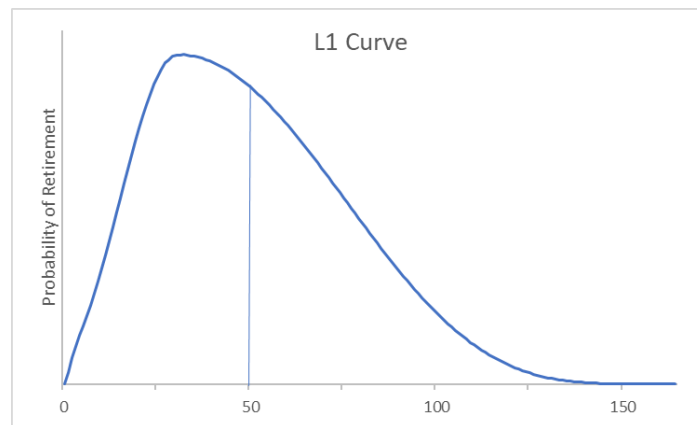
Where sufficient data was available, the ASLs were determined by identifying the survivor curve and associated ASL that best fit the pattern of retirements or plant balances from the historical data provided by Farmers. A computer software model was used to perform a SPR analysis using the plant additions and retirements for each major plant account. For each of forty standard survivor curves, the SPR model calculated the (a) the sum of square differences (“SSDs”) between the actual retirements and simulated retirements, (b) the sum of absolute differences (“SADs”) between the actual retirements and simulated retirements, and (c) the SSDs between the actual plant balances and simulated plant balances for the years 2013, 2016, and 2019. The computer model also produces a graph of the simulated plant and

simulated retirements compared to actual plant and retirements. These graphs are used in validating the survivor curves.

The survivor curves utilized in this study correspond to the “Iowa Curves” that were developed under the direction of Robley Winfrey at Iowa State University, as described in various bulletins and publications. These curves are still widely used within the industry.

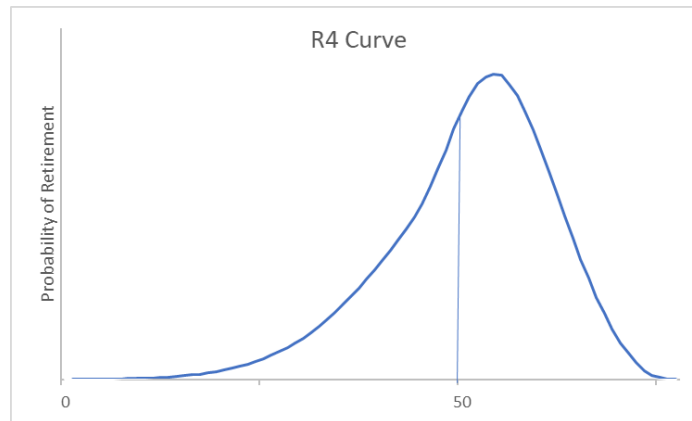
The original Iowa State publications identified four classes of survivor curves: (i) Left-Model Curves (“L” curves), (ii) Right-Model Curves (“R” curves), (iii) Symmetrical Curves (“S” curves), and (iv) Origin Model Curves (“O” curves).

With the “L” curve, most of the property is retired prior to the ASL; therefore, the probability density curve is skewed toward the left, as illustrated in the following graph showing an L1 curve with an ASL of 50 years:



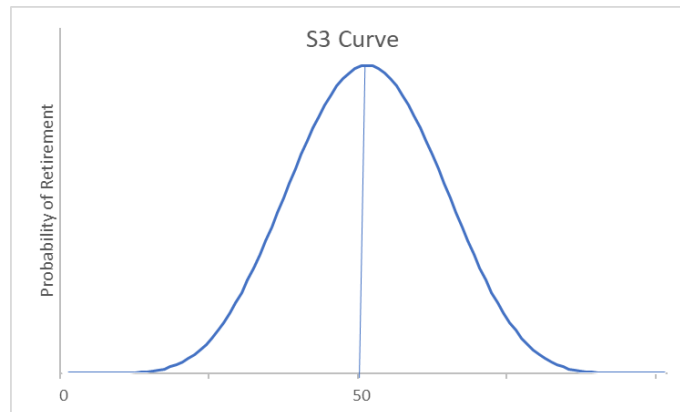
A characteristic of the “L” class of survivor curves is that while the high percentage of the property is retired prior to the average service life, the longer the property has been in service the less likely it is to fail, as illustrated by the long tail of the probability density curve on the right.

With an “R” curve, most of the property is retired after the ASL; therefore, the probability density curve is skewed to the right. This is illustrated in the following graph showing the R1 curve with an ASL of 50 years:

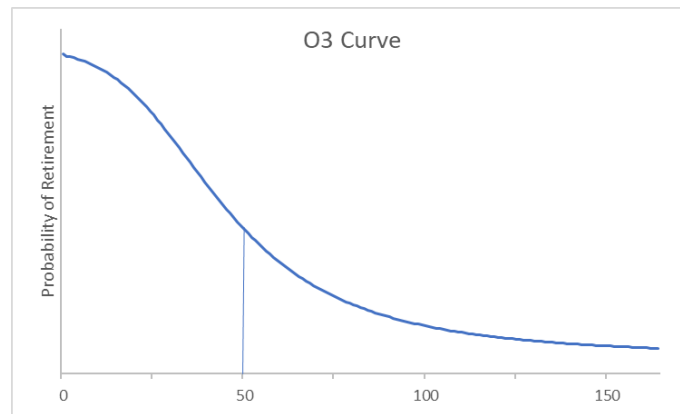


A characteristic of the “R” class of survivor curves is that most of the property is retired after the average service life. However, the longer the property has been in service the more likely it is to fail, as illustrated by the short tail of the probability density curve on the right.

With the “S” curves, the retirements are distributed symmetrically about the ASL, in a manner similar to the bell-shaped Gaussian or Normal curve. This is illustrated in the following graph showing the S3 curve with an ASL of 50 years:



With the “O” class of curves, most of the plant is retired in the earliest years of the plant life, as illustrated in the following graph showing the O3 curve with an ASL of 50 years:

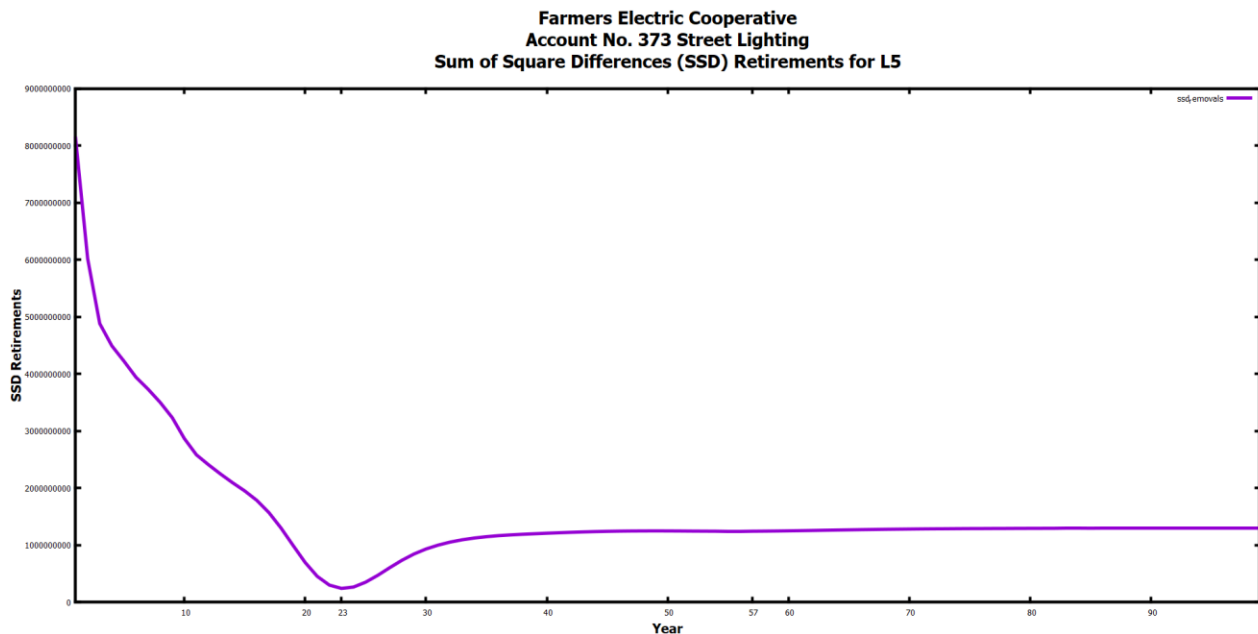


In addition to the curves identified in the Iowa State publications, so-called “half curves” were also utilized in the SPR analysis. Half curves are simple averages between two curves within the same class of Iowa Curves. For example, The S1.5 curve represents the average of an S1 and S2 curve.

The following is a list of the Iowa Curves used in the SPR analysis:

- **L Curves (11):** L0, L0.5, L1, L1.5, L2, L2.5, L3, L3.5, L4, L4.5, L5
- **R Curves (9):** R1, R1.5, R2, R2.5, R3, R3.5, R4, R4.5, R5
- **S Curves (13):** S0, S0.5, S1, S1.5, S2, S2.5, S3, S3.5, S4, S4.5, S5, S5.5, S6
- **O Curves (7):** O1, O1.5, O2, O2.5, O3, O3.5, O4

For each survivor curve, the SPR model identifies the ASL that “optimizes” the SSD between simulated and actual retirements by determining the ASL that generates the minimum SSD for each curve. The model also calculates the sum of absolute differences (“SAD”) for the optimal curve determined based on minimum SSD. This optimization process is illustrated in the graph showing the SSD between actual retirements and simulated retirements based on an L5 Iowa Curve for Farmers’ plant data for Street Lighting plant.



As can be seen from the above graph, the SSDs between simulated and actual retirements are minimized when the ASL is equal to 23 years. This indicates that an ASL of 23 years results in the minimum sum of squared differences between simulated retirements and actual retirements for the analysis period. This process is similar to the minimization of the sum of squares (“least squares”) used linear regression models.

For each survivor curve, the SPR model also identifies the ASL that “optimizes” the SSD plant balances for the years 2013, 2016, and 2019 by determining the ASL that generates the minimum SSD between simulated and actual plant balances for each curve.

The results of the SPR analysis for each plant category for which retirement data were available are shown in Appendix A of this report. For each plant category, the SPR analysis shows the “SSD Removals” and “Abs Diff Removals” for each Iowa Curve (as shown on the first two pages of the analysis). The values under the heading “SSD Removals” represent the sum of square differences between simulated retirements and actual retirements. The ASLs identified in the analysis represent the ASLs that minimize the SSD Removals for each Iowa Curve. The values under the heading “Abs Diff Removals” represent the corresponding sum of absolute differences for the ASL with the lowest SSD. On the third and fourth pages, the SPR analysis shows the “SSD Balance” for each Iowa Curve, where the values under the heading “SSD Balance” represent the sum of square differences between simulated plant balances and actual plant balances for the years 2013, 2016, and 2019. A graph of the SSD by year is shown on the following page, followed by a graph of the survivor curve and probability density curve that best



fit the data. This graph is followed by numerical results of the SPR analysis showing a comparison of the simulated retirements and simulated plant balances compared to actual retirements and actual plant balances for each year of the analysis. Finally, this analysis is followed by two graphs, the first plotting actual versus simulated plant balances by year and the second plotting actual versus simulated plant balances by year.

The proposed Iowa Curves and associated ASLs for the major property groups were developed based on the information included in these analyses while also considering qualitative information obtained from discussions with Farmer's executive and engineering staff. In most cases, the selection of the Iowa Curves and ASLs was guided by the minimum SSDs for retirements and plant balances.

Net salvage percentages were estimated based on an analysis of the salvage values and removal cost as a percentage of retirements for the period 2007 through 2020. The net salvage analysis is shown in Appendix B. Recognizing the regulatory principle of rate continuity and gradualism, negative net salvage values were generally selected that are less negative than those that could be supported by the attached analysis. Catalyst recommends that Farmers take a gradual approach to moving these negative net salvage values toward the values reflective of empirical results.

The depreciation accrual rates are calculated using the average service life depreciation procedure, the straight-line method, and the whole life basis. Using this approach, the whole life annual accrual for each category of plant is determined by dividing one less the net salvage percentage (stated as a ratio) by the ASL, as follows:

$$\text{Depreciation Rate} = \frac{1 - \text{Net Salvage Ratio}}{\text{ASL}}$$

A table showing the current depreciation rates and the proposed depreciation rates is included in Appendix C. Catalyst is not proposing to modify the depreciation rates for plant accounts in which sufficient retirement data are unavailable. The ASLs and net salvage percentages for these accounts appear to be reasonable based on comparisons with other utilities in Kentucky, as shown in Appendix D.

## **Distribution Plant**

### **Account 364.00 – Poles, Towers & Fixtures**

Farmers has records of its plant additions and retirements for this account dating back to 1940. An SPR analysis was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data is O1 with an ASL of 46 years. The proposed net salvage rate for this account is -50%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 3.26%.

### **Account 365.00 – Overhead Conductor & Devices**

Farmers has records of its plant additions and retirements for this account dating back to 1940. An SPR analysis was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data is S2 with an ASL of 37 years. The proposed net salvage rate for this account is -37%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 3.65%.

### **Account 367.00 – Underground Conductor & Devices**

Farmers has records of its plant additions and retirements for this account dating back to 1972. An SPR analysis was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data based the analysis of multiple parameters is S0 with an ASL of 35 years. While an ASL of 33 years results in a lower SSD of plant balances, an ASL of 35 years results in a lower sum of absolute differences between the simulated retirements and actual retirements. The proposed net salvage rate for this account is -25%. The recommended ASL and negative net salvage percentage for this account are generally reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 3.57%.

### **Account 368.00 – Line Transformers**

Farmers has records of its plant additions and retirements for this account dating back to 1940. An SPR analysis was conducted for this account based on Farmer's historical plant additions

and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data is O1 with an ASL of 39 years. The proposed net salvage rate for this account is -20%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 3.08%.

### **Account 369.00 – Services**

Farmers has records of its plant additions and retirements for this account dating back to 1940. An SPR analysis was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The SPR analysis of the account is inconclusive. While the R1 Iowa Curve with an ASL of 57 provides a reasonable SSD of removals as well as a reasonable sum of absolute differences, an analysis of the graph of the differences between the simulated plant balances and actual plant balances indicates that the simulated plant balances during the latter years of the analysis are higher than the actual balances. This suggests that an ASL of 57 years overstates the life of the property in the SPR analysis. One possible reason for this, based on discussions with Farmers' engineering staff, is because of Farmers' past practice of leaving services in place, and not removing those services, when a customer disconnects services. In recent years, Farmers has begun to retire many of the services that were remained on the books after customers have disconnected service. Therefore, based on the SPR analysis and discussions with Farmers' staff, Catalyst has determined that a R1 Iowa Curve with an ASL of 45 years is appropriate. The proposed net salvage rate for this account is -50%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 3.33%.

### **Account 370.00 – Meters**

The current depreciation accrual rate for meters is 6.67%. Farmers recently replaced most of its meters with smart meters and therefore does not have sufficient historical data which can be used to perform an SPR analysis. Farmers' current depreciation rate is roughly equivalent to a depreciation rate based on an ASL of 20 years with a net salvage percentage of 32%. Farmers' depreciation rate for smart meters is not out of line with those used by other utilities. Therefore, Catalyst is not proposing a change to the current depreciation rate for meters.

### **Account 371.00 –Outdoor Lighting Conventional Fixtures**

Farmers has records of its plant additions and retirements for this account dating back to 1958. Farmers has been recently replacing many conventional fixtures with LEDs. An SPR analysis

was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data is S6 with an ASL of 19 years. The proposed net salvage rate for this account is -20%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 6.32%.

### **Account 371.20 – Outdoor Lighting – LED Fixtures**

Farmers does not have sufficient historical data which can be used to perform an SPR analysis of LED outdoor lights. The technology is relatively new, and Farmers only began installing significant numbers of LED fixtures in 2016. The current depreciation accrual rate for this account is 3.24%. Based on its experience working with other utilities, Catalyst proposes an ASL for LED outdoor lights of 25 years and a net salvage percentage of -20%. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 4.80%.

### **Account 373.00 – Street Light & Signal Systems**

Farmers has records of its plant additions and retirements for this account dating back to 1956. An SPR analysis was conducted for this account based on Farmer's historical plant additions and retirements. The current depreciation accrual rate for this account is 3.24%. The survivor curve that best fits the data is L5 with an ASL of 23 years. The proposed net salvage rate for this account is -20%. The recommended ASL and negative net salvage percentage for this account are reasonable compared with other electric distribution utilities in Kentucky. Based on the proposed ASL and net salvage percentage the recommended accrual rate is 5.22%.

**Appendix A**  
**Simulated Property Records (SPR)**  
**Analysis**

## **Account 364 – Poles**

Farmers Rural Electric Cooperative  
 Account 364 -- Poles

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	40	1.41982e+11	2.02991e+06
S0.5	38	1.41517e+11	2.05629e+06
S1	37	1.40863e+11	2.06218e+06
S1.5	36	1.41044e+11	2.07638e+06
S2	35	1.41616e+11	2.10313e+06
S2.5	35	1.46851e+11	2.1424e+06
S3	34	1.51916e+11	2.20602e+06
S3.5	34	1.64858e+11	2.31215e+06
S4	34	1.8001e+11	2.43585e+06
S4.5	34	1.94427e+11	2.56178e+06
S5	34	2.10618e+11	2.6952e+06
S5.5	35	2.20706e+11	2.7946e+06
S6	35	2.30289e+11	2.8982e+06
R1	40	1.38976e+11	2.0017e+06
R1.5	38	1.38815e+11	2.0307e+06
R2	37	1.40193e+11	2.04791e+06
R2.5	36	1.43436e+11	2.10041e+06
R3	35	1.49274e+11	2.17688e+06
R3.5	35	1.57704e+11	2.26063e+06
R4	34	1.66861e+11	2.3569e+06
R4.5	34	1.80675e+11	2.48766e+06
R5	34	1.96654e+11	2.62557e+06
L0	47	1.41048e+11	1.99475e+06
L0.5	44	1.39514e+11	1.98038e+06
L1	41	1.37952e+11	1.99974e+06
L1.5	39	1.38787e+11	2.02535e+06
L2	37	1.38937e+11	2.04893e+06
L2.5	36	1.43114e+11	2.08725e+06
L3	35	1.47214e+11	2.12732e+06
L3.5	35	1.55616e+11	2.20497e+06
L4	34	1.64821e+11	2.29243e+06
L4.5	34	1.77527e+11	2.40094e+06
L5	34	1.9205e+11	2.52217e+06
O1	46	1.37901e+11	1.97749e+06
O1.5	49	1.38223e+11	1.98344e+06
O2	51	1.38359e+11	1.978e+06
O2.5	59	1.39862e+11	1.98599e+06
O3	69	1.42279e+11	2.02608e+06
O3.5	80	1.40754e+11	2.01011e+06
O4	91	1.39771e+11	2.00029e+06

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
O1	46	1.37901e+11

Farmers Rural Electric Cooperative  
 Account 364 -- Poles

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
O1	46	1.37901e+11	1.97749e+06
L1	41	1.37952e+11	1.99974e+06
O1.5	49	1.38223e+11	1.98344e+06
O2	51	1.38359e+11	1.978e+06
L1.5	39	1.38787e+11	2.02535e+06
R1.5	38	1.38815e+11	2.0307e+06
L2	37	1.38937e+11	2.04893e+06
R1	40	1.38976e+11	2.0017e+06
L0.5	44	1.39514e+11	1.98038e+06
O4	91	1.39771e+11	2.00029e+06
O2.5	59	1.39862e+11	1.98599e+06
R2	37	1.40193e+11	2.04791e+06
O3.5	80	1.40754e+11	2.01011e+06
S1	37	1.40863e+11	2.06218e+06
S1.5	36	1.41044e+11	2.07638e+06
L0	47	1.41048e+11	1.99475e+06
S0.5	38	1.41517e+11	2.05629e+06
S2	35	1.41616e+11	2.10313e+06
S0	40	1.41982e+11	2.02991e+06
O3	69	1.42279e+11	2.02608e+06
L2.5	36	1.43114e+11	2.08725e+06
R2.5	36	1.43436e+11	2.10041e+06
S2.5	35	1.46851e+11	2.1424e+06
L3	35	1.47214e+11	2.12732e+06
R3	35	1.49274e+11	2.17688e+06
S3	34	1.51916e+11	2.20602e+06
L3.5	35	1.55616e+11	2.20497e+06
R3.5	35	1.57704e+11	2.26063e+06
L4	34	1.64821e+11	2.29243e+06
S3.5	34	1.64858e+11	2.31215e+06
R4	34	1.66861e+11	2.3569e+06
L4.5	34	1.77527e+11	2.40094e+06
S4	34	1.8001e+11	2.43585e+06
R4.5	34	1.80675e+11	2.48766e+06
L5	34	1.9205e+11	2.52217e+06
S4.5	34	1.94427e+11	2.56178e+06
R5	34	1.96654e+11	2.62557e+06
S5	34	2.10618e+11	2.6952e+06
S5.5	35	2.20706e+11	2.7946e+06
S6	35	2.30289e+11	2.8982e+06



Farmers Rural Electric Cooperative  
 Account 364 -- Poles

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

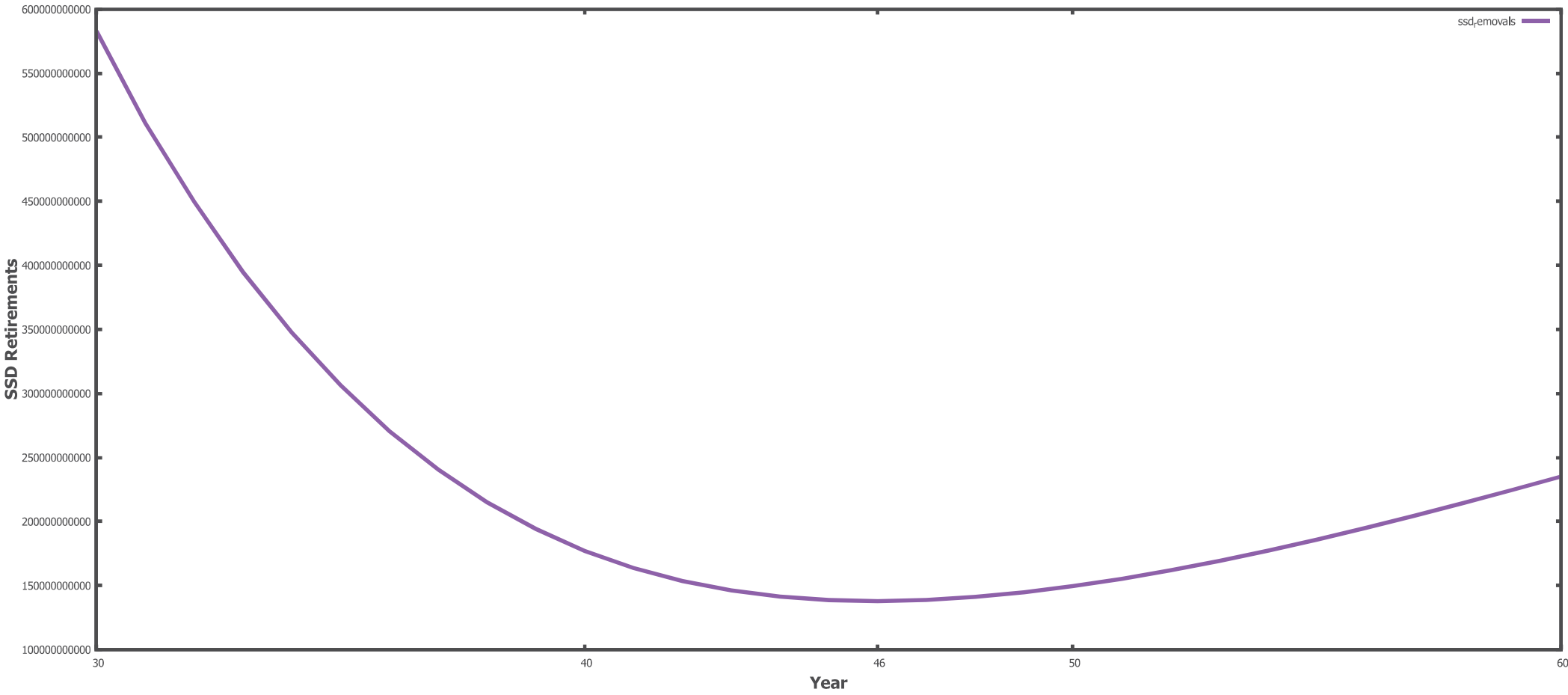
Iowa Curve	ASL	SSD Balance
S0	38	1.74408e+10
S0.5	37	3.51368e+10
S1	35	8.01111e+09
S1.5	34	1.36095e+10
S2	33	4.00321e+10
S2.5	33	2.11243e+10
S3	32	3.36362e+10
S3.5	32	4.31004e+09
S4	32	8.26156e+10
S4.5	31	8.32023e+10
S5	31	4.29942e+10
S5.5	31	4.22096e+10
S6	31	4.73634e+10
R1	38	4.61016e+10
R1.5	37	4.70931e+10
R2	35	2.24819e+09
R2.5	34	5.65594e+09
R3	33	3.97113e+09
R3.5	32	9.5256e+10
R4	32	4.53809e+09
R4.5	32	4.4247e+10
R5	31	7.37599e+10
L0	45	3.64168e+10
L0.5	42	1.01981e+10
L1	39	2.20483e+10
L1.5	37	3.70452e+10
L2	36	1.91325e+10
L2.5	35	5.38189e+10
L3	34	8.11497e+10
L3.5	33	1.69875e+10
L4	32	5.42392e+09
L4.5	32	1.87816e+10
L5	31	1.08627e+11
O1	45	4.30277e+10
O1.5	48	3.27065e+10
O2	51	3.36799e+10
O2.5	59	4.38119e+10
O3	69	4.72796e+10
O3.5	79	5.38804e+10
O4	91	5.0624e+10

Farmers Rural Electric Cooperative  
Account 364 -- Poles

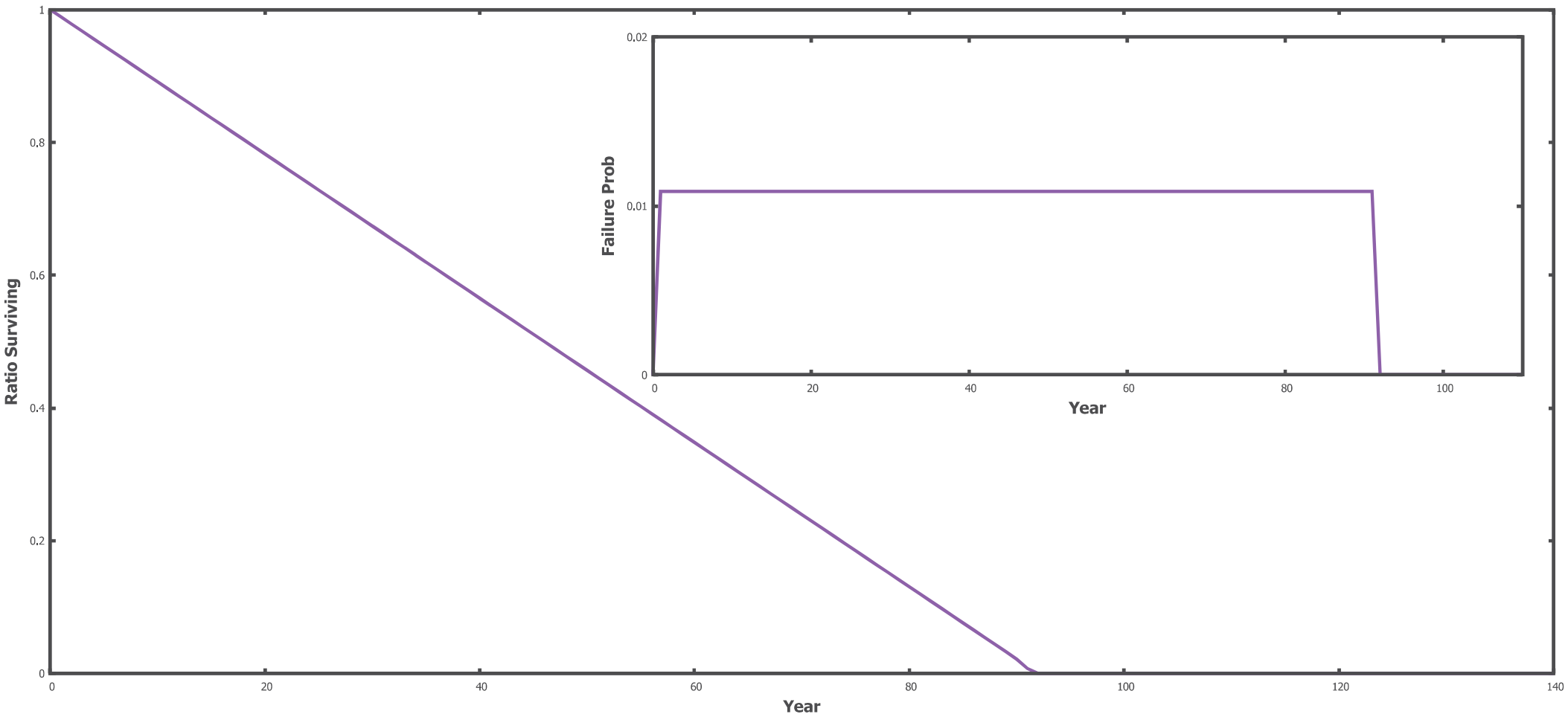
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
R2	35	2.24819e+09
R3	33	3.97113e+09
S3.5	32	4.31004e+09
R4	32	4.53809e+09
L4	32	5.42392e+09
R2.5	34	5.65594e+09
S1	35	8.01111e+09
L0.5	42	1.01981e+10
S1.5	34	1.36095e+10
L3.5	33	1.69875e+10
S0	38	1.74408e+10
L4.5	32	1.87816e+10
L2	36	1.91325e+10
S2.5	33	2.11243e+10
L1	39	2.20483e+10
O1.5	48	3.27065e+10
S3	32	3.36362e+10
O2	51	3.36799e+10
S0.5	37	3.51368e+10
L0	45	3.64168e+10
L1.5	37	3.70452e+10
S2	33	4.00321e+10
S5.5	31	4.22096e+10
S5	31	4.29942e+10
O1	45	4.30277e+10
O2.5	59	4.38119e+10
R4.5	32	4.4247e+10
R1	38	4.61016e+10
R1.5	37	4.70931e+10
O3	69	4.72796e+10
S6	31	4.73634e+10
O4	91	5.0624e+10
L2.5	35	5.38189e+10
O3.5	79	5.38804e+10
R5	31	7.37599e+10
L3	34	8.11497e+10
S4	32	8.26156e+10
S4.5	31	8.32023e+10
R3.5	32	9.5256e+10
L5	31	1.08627e+11

**Farmers Electric Cooperative  
Account No. 364 Poles  
Sum of Square Differences (SSD) Retirements for O1**



**Account No. 364 -- Poles**  
**Iowa Curve: O1 ASL: 46 Years**



Farmers Rural Electric Cooperative  
 Account 364 -- Poles

Simulated Retirements for Iowa Curve 01 with ASL = 46

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1938	26622	0	26622	0	26622	0	0
1939	53243	0	79865	289	79576	-289	289
1940	79865	0	159730	868	158573	-868	1157
1941	2418	14	162134	1736	159254	-1722	2880
1942	14506	690	175949	1762	171997	-1072	3952
1943	6054	526	181478	1920	176132	-1394	5346
1944	8086	907	188657	1986	182232	-1079	6425
1945	20804	184	209278	2074	200962	-1890	8315
1946	0	0	209278	2300	198662	-2300	10615
1947	8723	40	217961	2300	205085	-2260	12875
1948	76491	0	294452	2395	279182	-2395	15270
1949	133693	1009	427136	3226	409648	-2217	17487
1950	292468	12268	707335	4679	697437	7589	9898
1951	63877	4571	766642	7858	753456	-3288	13186
1952	54120	1390	819372	8553	799023	-7163	20349
1953	54120	1390	872102	9141	844003	-7751	28100
1954	54120	1390	924833	9729	888394	-8339	36439
1955	54120	1390	977563	10318	932196	-8928	45367
1956	36254	7801	1006017	10906	957545	-3105	48472
1957	48418	16033	1038402	11300	994663	4733	43739
1958	47967	8699	1077670	11826	1030804	-3127	46866
1959	64421	11364	1130727	12347	1082877	-983	47849
1960	86923	18283	1199367	13048	1156753	5235	42614
1961	121579	154557	1166389	13992	1264339	140564	-97950
1962	68988	19222	1216156	15314	1318013	3908	-101858
1963	96111	21971	1290295	16064	1398061	5908	-107765
1964	125263	38213	1377345	17109	1506215	21104	-128870
1965	99527	28915	1447956	18470	1587271	10445	-139315

Farmers Rural Electric Cooperative  
 Account 364 -- Poles

Simulated Retirements for Iowa Curve 01 with ASL = 46

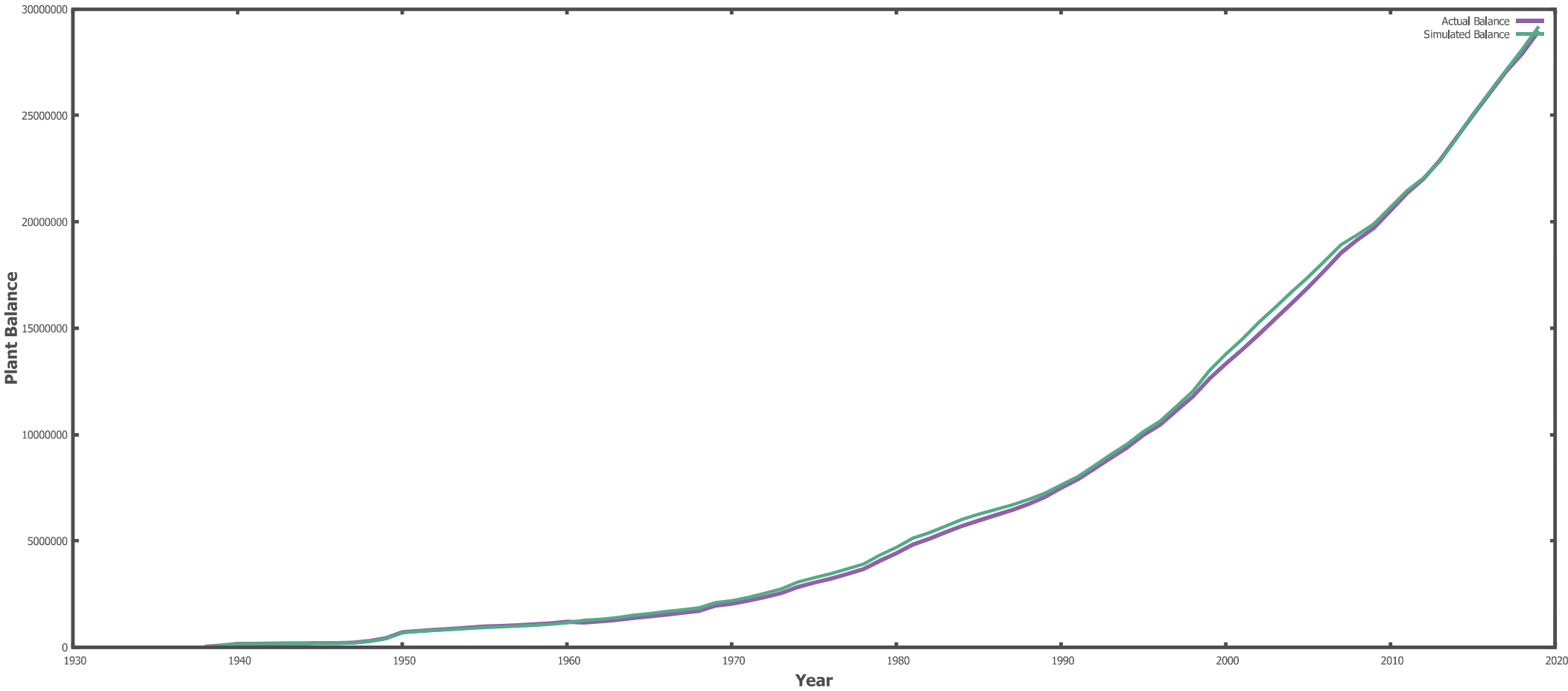
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1966	111633	25186	1534403	19552	1679352	5634	-144949
1967	105098	22849	1616651	20765	1763684	2084	-147033
1968	110513	21476	1705689	21908	1852290	-432	-146601
1969	266708	22101	1950296	23109	2095889	-1008	-145593
1970	121959	24558	2047697	26008	2191840	-1450	-144143
1971	185358	45243	2187812	27334	2349864	17910	-162053
1972	218657	42447	2364022	29348	2539173	13098	-175151
1973	232322	48459	2547885	31725	2739770	16733	-191884
1974	356820	70580	2834126	34250	3062339	36329	-228214
1975	244814	40929	3038011	38129	3269025	2801	-231014
1976	233869	47836	3224043	40790	3462104	7046	-238061
1977	262963	45051	3441955	43332	3681735	1719	-239779
1978	277399	37766	3681588	46190	3912944	-8424	-231356
1979	474621	82496	4073712	49205	4338359	33291	-264647
1980	415636	64591	4424757	54364	4699631	10227	-274874
1981	487852	76373	4836236	58882	5128601	17491	-292365
1982	322165	51489	5106912	64185	5386581	-12695	-279669
1983	385107	75069	5416950	67687	5704002	7383	-287052
1984	385792	91926	5710816	71873	6017921	20053	-307105
1985	318169	67885	5961100	76066	6260024	-8181	-298924
1986	293523	46118	6208505	79524	6474023	-33406	-265518
1987	298620	60396	6446729	82715	6689928	-22319	-243199
1988	340061	54726	6732064	85961	6944028	-31235	-211964
1989	383770	58514	7057320	89657	7238141	-31143	-180821
1990	494175	58121	7493374	93828	7638488	-35707	-145114
1991	475381	83304	7885451	99200	8014669	-15896	-129218
1992	619131	118618	8385964	104367	8529433	14251	-143469
1993	628825	118305	8896484	111097	9047161	7208	-150677

Farmers Rural Electric Cooperative  
 Account 364 -- Poles

Simulated Retirements for Iowa Curve 01 with ASL = 46

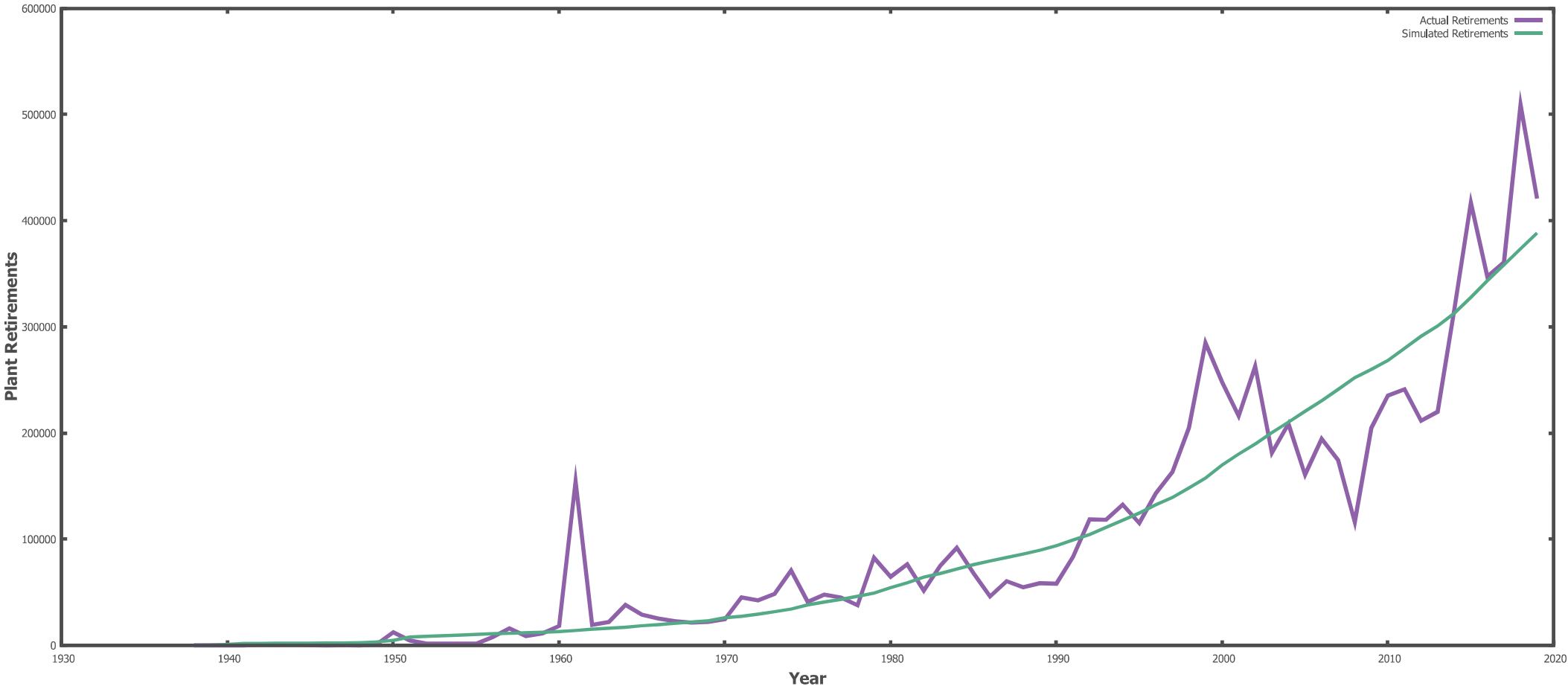
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1994	617992	132592	9381884	117932	9547222	14660	-165338
1995	719385	115187	9986082	124649	10141957	-9462	-155875
1996	618613	143261	10461433	132468	10628102	10793	-166669
1997	835223	163363	11133294	139193	11324133	24170	-190839
1998	859823	204893	11788224	148271	12035685	56622	-247461
1999	1128108	284987	12631346	157617	13006176	127370	-374831
2000	949215	247969	13332592	169879	13785512	78089	-452920
2001	879852	216024	13996420	180196	14485168	35828	-488748
2002	977544	262856	14711108	189761	15272951	73095	-561843
2003	912872	181339	15442641	200386	15985437	-19046	-542797
2004	939077	208715	16173003	210308	16714206	-1594	-541203
2005	908661	160679	16920985	220515	17402352	-59836	-481367
2006	988072	194614	17714443	230392	18160032	-35778	-445588
2007	1006474	174526	18546391	241133	18925373	-66607	-378982
2008	732545	116138	19162798	252072	19405846	-135934	-243048
2009	769140	204817	19727122	260035	19914951	-55218	-187830
2010	1045519	235358	20537283	268395	20692076	-33037	-154793
2011	1050770	241249	21346804	279759	21463087	-38510	-116282
2012	888585	211687	22023701	291180	22060491	-79493	-36789
2013	1091856	220009	22895549	300839	22851508	-80830	44041
2014	1374401	315544	23954407	312707	23913201	2836	41205
2015	1467719	417078	25005047	327646	25053275	89432	-48227
2016	1370102	347537	26027612	343600	26079777	3937	-52164
2017	1387417	360814	27054215	358492	27108702	2322	-54487
2018	1368670	509398	27913486	373573	28103799	135825	-190312
2019	1474506	420800	28967192	388449	29189855	32351	-222663

**Farmers Electric Cooperative  
Account No. 364 Poles  
Plant Balances**





**Farmers Electric Cooperative  
Account No. 364 Poles  
Plant Retirements**



## **Account 365 – Overhead Conductor**

Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	41	1.26469e+11	1.99687e+06
S0.5	40	1.24251e+11	1.95277e+06
S1	39	1.22381e+11	1.92095e+06
S1.5	38	1.2145e+11	1.9307e+06
S2	37	1.20573e+11	1.94624e+06
S2.5	37	1.25047e+11	1.96621e+06
S3	36	1.30384e+11	2.04382e+06
S3.5	37	1.4017e+11	2.09467e+06
S4	38	1.51086e+11	2.15981e+06
S4.5	38	1.53998e+11	2.20712e+06
S5	39	1.58088e+11	2.21567e+06
S5.5	39	1.56255e+11	2.21361e+06
S6	39	1.57106e+11	2.24267e+06
R1	41	1.22573e+11	1.98928e+06
R1.5	40	1.21497e+11	1.94662e+06
R2	38	1.2111e+11	1.96324e+06
R2.5	38	1.20897e+11	1.92569e+06
R3	37	1.22408e+11	1.96045e+06
R3.5	37	1.26024e+11	1.98188e+06
R4	37	1.3048e+11	2.01678e+06
R4.5	38	1.4059e+11	2.07412e+06
R5	38	1.51005e+11	2.17327e+06
L0	48	1.29488e+11	2.04081e+06
L0.5	45	1.25922e+11	1.9978e+06
L1	42	1.22224e+11	1.97192e+06
L1.5	40	1.22631e+11	1.978e+06
L2	39	1.21883e+11	1.95287e+06
L2.5	38	1.26735e+11	1.99079e+06
L3	37	1.3294e+11	2.03985e+06
L3.5	37	1.3748e+11	2.06917e+06
L4	38	1.4365e+11	2.10291e+06
L4.5	38	1.48257e+11	2.16071e+06
L5	38	1.54028e+11	2.22473e+06
O1	47	1.24818e+11	2.04357e+06
O1.5	50	1.25298e+11	2.041e+06
O2	53	1.25512e+11	2.03948e+06
O2.5	61	1.27486e+11	2.06364e+06
O3	70	1.31825e+11	2.11942e+06
O3.5	82	1.2987e+11	2.08039e+06
O4	93	1.28894e+11	2.08602e+06

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
S2	37	1.20573e+11

Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S2	37	1.20573e+11	1.94624e+06
R2.5	38	1.20897e+11	1.92569e+06
R2	38	1.2111e+11	1.96324e+06
S1.5	38	1.2145e+11	1.9307e+06
R1.5	40	1.21497e+11	1.94662e+06
L2	39	1.21883e+11	1.95287e+06
L1	42	1.22224e+11	1.97192e+06
S1	39	1.22381e+11	1.92095e+06
R3	37	1.22408e+11	1.96045e+06
R1	41	1.22573e+11	1.98928e+06
L1.5	40	1.22631e+11	1.978e+06
S0.5	40	1.24251e+11	1.95277e+06
O1	47	1.24818e+11	2.04357e+06
S2.5	37	1.25047e+11	1.96621e+06
O1.5	50	1.25298e+11	2.041e+06
O2	53	1.25512e+11	2.03948e+06
L0.5	45	1.25922e+11	1.9978e+06
R3.5	37	1.26024e+11	1.98188e+06
S0	41	1.26469e+11	1.99687e+06
L2.5	38	1.26735e+11	1.99079e+06
O2.5	61	1.27486e+11	2.06364e+06
O4	93	1.28894e+11	2.08602e+06
L0	48	1.29488e+11	2.04081e+06
O3.5	82	1.2987e+11	2.08039e+06
S3	36	1.30384e+11	2.04382e+06
R4	37	1.3048e+11	2.01678e+06
O3	70	1.31825e+11	2.11942e+06
L3	37	1.3294e+11	2.03985e+06
L3.5	37	1.3748e+11	2.06917e+06
S3.5	37	1.4017e+11	2.09467e+06
R4.5	38	1.4059e+11	2.07412e+06
L4	38	1.4365e+11	2.10291e+06
L4.5	38	1.48257e+11	2.16071e+06
R5	38	1.51005e+11	2.17327e+06
S4	38	1.51086e+11	2.15981e+06
S4.5	38	1.53998e+11	2.20712e+06
L5	38	1.54028e+11	2.22473e+06
S5.5	39	1.56255e+11	2.21361e+06
S6	39	1.57106e+11	2.24267e+06
S5	39	1.58088e+11	2.21567e+06

Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

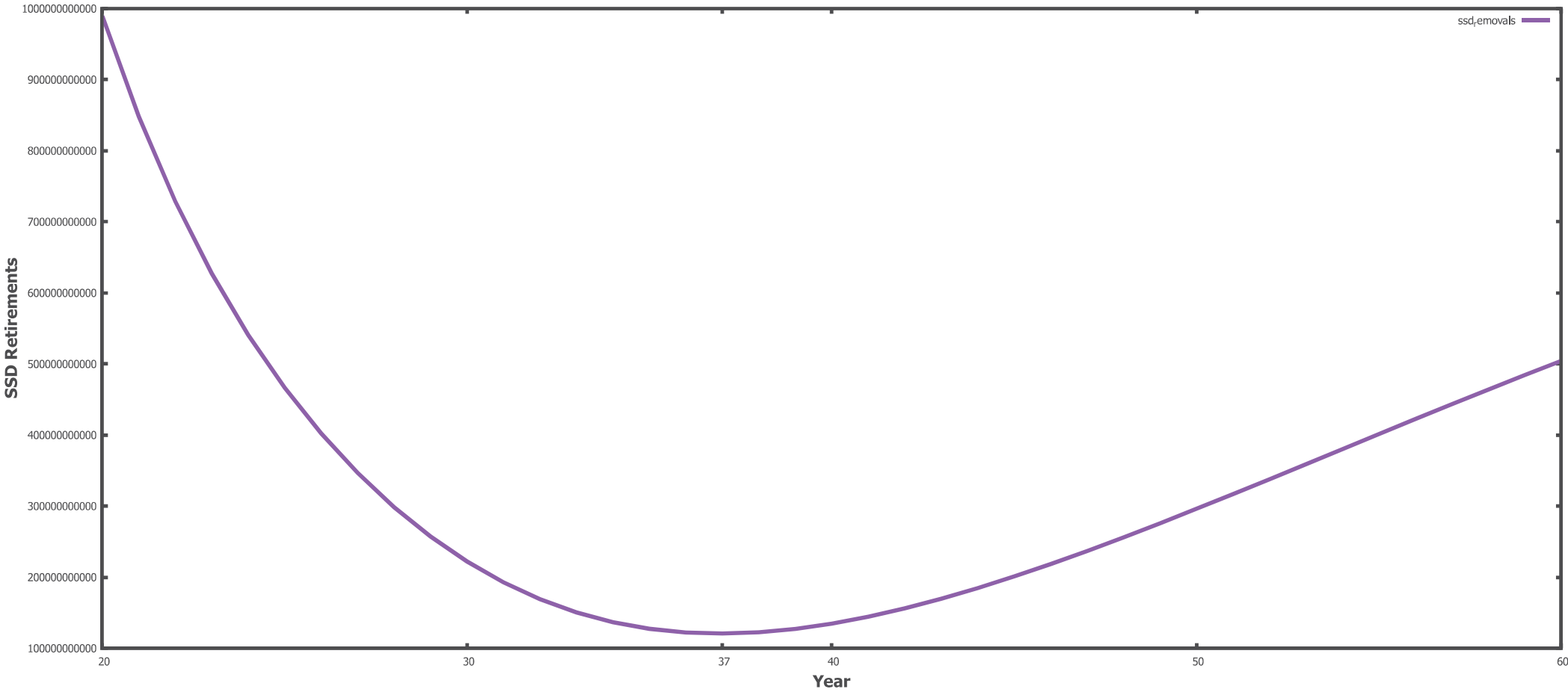
Iowa Curve	ASL	SSD Balance
S0	43	8.95022e+10
S0.5	41	7.67282e+10
S1	39	7.7681e+10
S1.5	38	6.92023e+10
S2	37	6.74951e+10
S2.5	37	6.84581e+10
S3	36	6.04021e+10
S3.5	36	5.4644e+10
S4	36	8.30689e+10
S4.5	36	8.68273e+10
S5	36	9.3523e+10
S5.5	36	7.92636e+10
S6	36	6.80493e+10
R1	43	8.34959e+10
R1.5	41	7.29523e+10
R2	39	6.40737e+10
R2.5	38	5.41962e+10
R3	37	4.63126e+10
R3.5	36	6.22922e+10
R4	36	3.41531e+10
R4.5	36	5.08653e+10
R5	36	8.58542e+10
L0	51	1.151e+11
L0.5	47	1.0358e+11
L1	44	8.58707e+10
L1.5	42	8.13092e+10
L2	40	7.54089e+10
L2.5	39	8.13893e+10
L3	38	9.59396e+10
L3.5	37	6.85498e+10
L4	36	6.87633e+10
L4.5	36	5.98407e+10
L5	36	7.75497e+10
O1	52	1.19598e+11
O1.5	55	1.18023e+11
O2	58	1.16718e+11
O2.5	68	1.27033e+11
O3	79	1.3586e+11
O3.5	92	1.29845e+11
O4	99	3.26537e+11

Farmers Rural Electric Cooperative  
Account 365 -- Overhead Conductor

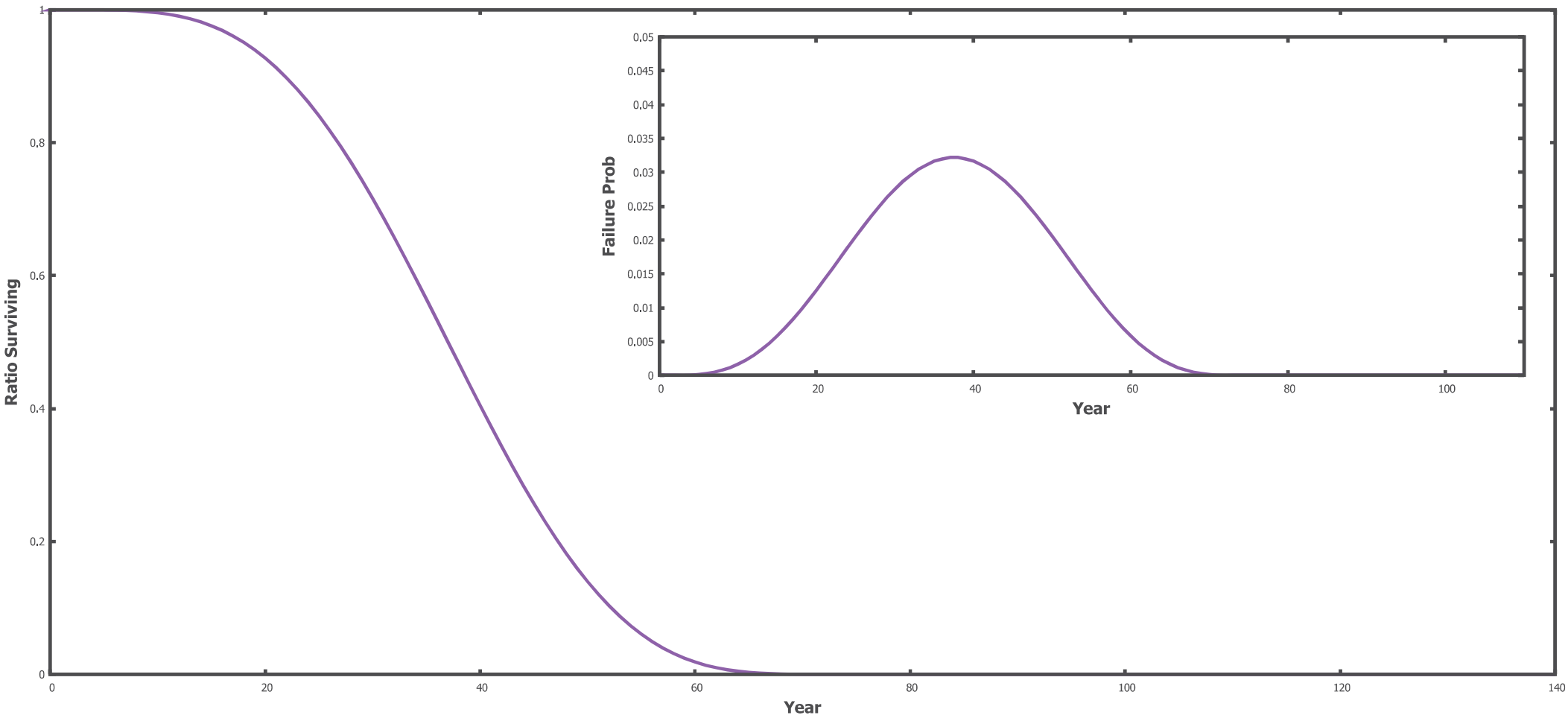
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
R4	36	3.41531e+10
R3	37	4.63126e+10
R4.5	36	5.08653e+10
R2.5	38	5.41962e+10
S3.5	36	5.4644e+10
L4.5	36	5.98407e+10
S3	36	6.04021e+10
R3.5	36	6.22922e+10
R2	39	6.40737e+10
S2	37	6.74951e+10
S6	36	6.80493e+10
S2.5	37	6.84581e+10
L3.5	37	6.85498e+10
L4	36	6.87633e+10
S1.5	38	6.92023e+10
R1.5	41	7.29523e+10
L2	40	7.54089e+10
S0.5	41	7.67282e+10
L5	36	7.75497e+10
S1	39	7.7681e+10
S5.5	36	7.92636e+10
L1.5	42	8.13092e+10
L2.5	39	8.13893e+10
S4	36	8.30689e+10
R1	43	8.34959e+10
R5	36	8.58542e+10
L1	44	8.58707e+10
S4.5	36	8.68273e+10
S0	43	8.95022e+10
S5	36	9.3523e+10
L3	38	9.59396e+10
L0.5	47	1.0358e+11
L0	51	1.151e+11
O2	58	1.16718e+11
O1.5	55	1.18023e+11
O1	52	1.19598e+11
O2.5	68	1.27033e+11
O3.5	92	1.29845e+11
O3	79	1.3586e+11
O4	99	3.26537e+11

**Farmers Electric Cooperative  
Account No. 365 Overhead Conductor  
Sum of Square Differences (SSD) Retirements for S2**



**Account No. 365 -- Overhead Conductor**  
**Iowa Curve: S2 ASL: 37 Years**





Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

Simulated Retirements for Iowa Curve S2 with ASL = 37

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1938	649	0	649	0	649	0	0
1939	1298	0	1946	0	1946	-0	0
1940	1946	0	3893	0	3893	-0	0
1941	34988	4	38877	0	38880	4	-4
1942	125051	8	163920	0	163931	7	-11
1943	2927	353	166494	0	166857	352	-363
1944	7147	564	173077	1	174003	562	-926
1945	5532	194	178416	5	179530	188	-1114
1946	9303	110	187608	13	188820	97	-1211
1947	5311	25	192895	30	194101	-5	-1206
1948	63184	0	256078	58	257227	-58	-1149
1949	101961	3680	354359	94	359093	3586	-4734
1950	307335	15577	646117	152	666276	15425	-20159
1951	48646	6048	688715	222	714700	5826	-25985
1952	45611	1694	732633	321	759990	1372	-27357
1953	45611	1694	776550	445	805156	1248	-28605
1954	45611	1694	820468	611	850156	1083	-29688
1955	45611	1694	864385	821	894946	872	-30561
1956	25483	4395	885473	1094	919335	3301	-33862
1957	37017	9384	913106	1418	954934	7965	-41827
1958	24698	4955	932850	1829	977804	3126	-44953
1959	51343	11743	972451	2307	1026840	9435	-54389
1960	71073	13832	1029692	2882	1095030	10950	-65338
1961	160607	21534	1168766	3540	1252098	17994	-83332
1962	51949	12842	1207873	4296	1299751	8546	-91878
1963	91893	16831	1282935	5149	1386495	11682	-103560
1964	128707	27954	1383687	6095	1509106	21859	-125419
1965	95214	18205	1460696	7151	1597169	11053	-136472

Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

Simulated Retirements for Iowa Curve S2 with ASL = 37

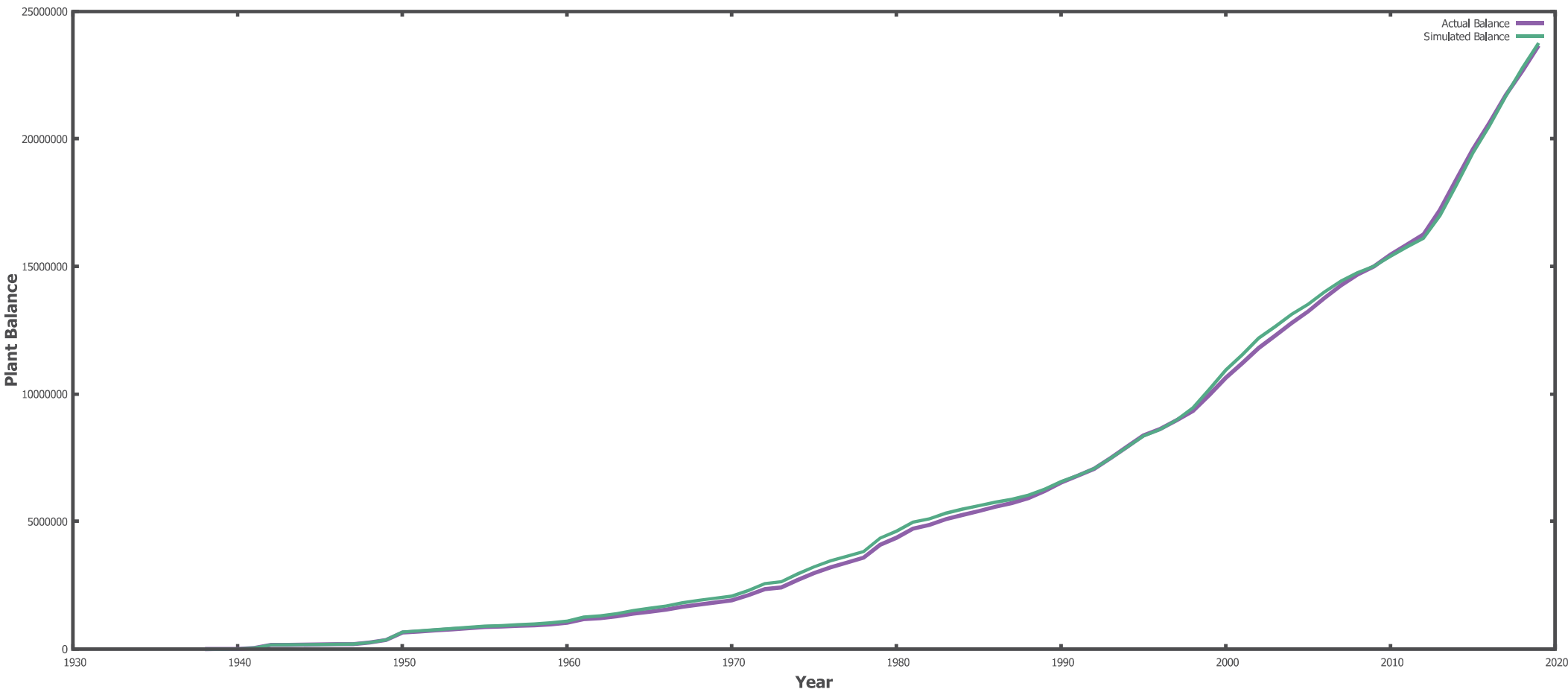
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1966	98024	17338	1541382	8297	1686895	9041	-145514
1967	135321	14554	1662148	9561	1812655	4994	-150507
1968	108910	29262	1741796	10905	1910660	18357	-168864
1969	97152	9859	1829089	12375	1995438	-2516	-166349
1970	94190	11091	1912188	13923	2075704	-2833	-163516
1971	236227	38965	2109450	15592	2296339	23373	-186889
1972	284537	45054	2348933	17341	2563535	27713	-214602
1973	93842	24039	2418735	19204	2638173	4835	-219437
1974	328698	40862	2706571	21148	2945723	19715	-239152
1975	300789	23281	2984079	23199	3223313	82	-239234
1976	268640	44788	3207931	25332	3466621	19456	-258690
1977	204479	19246	3393164	27583	3643517	-8337	-250353
1978	208637	16292	3585509	29916	3822238	-13624	-236729
1979	559776	58836	4086449	32373	4349641	26463	-263192
1980	306953	31055	4362347	34936	4621658	-3882	-259310
1981	393286	38001	4717633	37628	4977316	373	-259683
1982	172060	21691	4868002	40451	5108925	-18760	-240923
1983	260328	33635	5094694	43417	5325836	-9781	-231142
1984	207700	43813	5258581	46548	5486988	-2735	-228407
1985	183431	30398	5411614	49857	5620562	-19459	-208948
1986	187970	18973	5580611	53344	5755188	-34371	-174577
1987	171639	25148	5727102	57045	5869782	-31897	-142680
1988	220705	26344	5921463	60940	6029547	-34596	-108084
1989	300497	30056	6191904	65065	6264979	-35009	-73075
1990	372923	33254	6531573	69398	6568504	-36144	-36931
1991	307663	46394	6792842	73951	6802216	-27557	-9374
1992	348332	76782	7064392	78726	7071822	-1944	-7430
1993	493502	69158	7488736	83692	7481632	-14534	7104

Farmers Rural Electric Cooperative  
 Account 365 -- Overhead Conductor

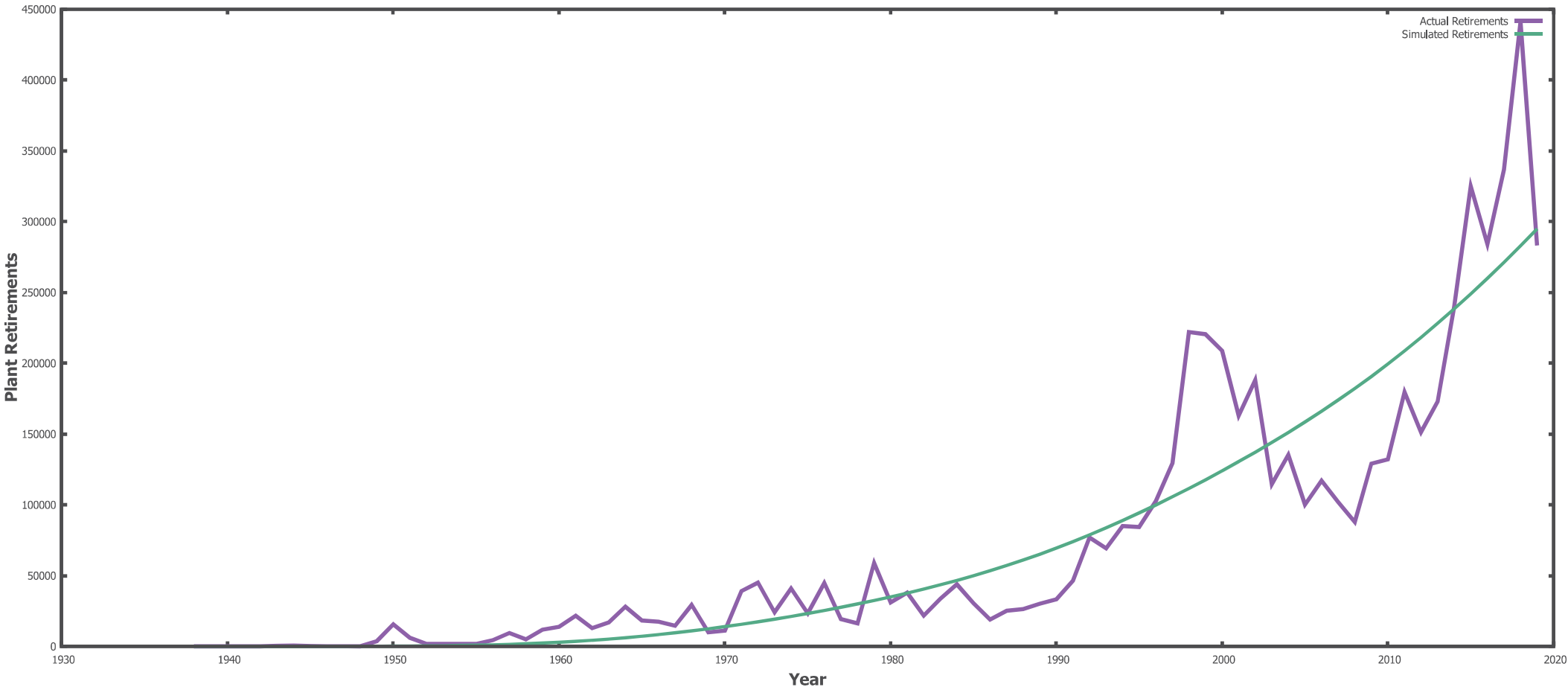
Simulated Retirements for Iowa Curve S2 with ASL = 37

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1994	526035	84934	7929837	88891	7918777	-3957	11060
1995	529527	84284	8375080	94250	8354053	-9966	21026
1996	354205	102522	8626764	99847	8608412	2675	18352
1997	473162	129327	8970598	105578	8975995	23749	-5397
1998	590362	221918	9339042	111545	9454812	110373	-115770
1999	848392	220443	9966991	117652	10185552	102790	-218561
2000	882143	208762	10640372	123974	10943721	84789	-303349
2001	729659	162926	11207105	130458	11542923	32468	-335818
2002	783591	188002	11802694	137133	12189380	50869	-386686
2003	599844	114492	12288046	144019	12645205	-29527	-357159
2004	629191	135240	12781997	151103	13123293	-15863	-341297
2005	555934	100103	13237828	158450	13520777	-58348	-282949
2006	651375	116984	13772219	166030	14006122	-49045	-233904
2007	595055	101842	14265431	173909	14427268	-72067	-161837
2008	510639	87827	14688243	182087	14755820	-94260	-67577
2009	446127	128966	15005405	190576	15011371	-61611	-5966
2010	589924	132064	15463265	199437	15401858	-67373	61407
2011	576943	179640	15860568	208602	15770198	-28963	90370
2012	549435	151274	16258729	218191	16101443	-66916	157286
2013	1126105	172938	17211896	228068	16999480	-55130	212416
2014	1434321	239988	18406230	238375	18195426	1613	210803
2015	1500644	324912	19581962	248962	19447108	75950	134854
2016	1316130	284026	20614065	259947	20503291	24080	110774
2017	1441826	336701	21719190	271230	21673887	65471	45302
2018	1375542	440482	22654249	282867	22766563	157616	-112313
2019	1291291	283086	23662454	294883	23762971	-11796	-100517

**Farmers Electric Cooperative  
Account No. 365 Overhead Conductor  
Plant Balances**



**Farmers Electric Cooperative  
Account No. 365 Overhead Conductor  
Plant Retirements**



## **Account 367 – Underground Conductor**

Farmers Rural Electric Cooperative  
 Account 367 -- Underground Conductor

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	35	3.80381e+09	191745
S0.5	32	3.77846e+09	200074
S1	29	3.74145e+09	201443
S1.5	27	3.72655e+09	204929
S2	26	3.69898e+09	200367
S2.5	25	3.66964e+09	200934
S3	24	3.6316e+09	202155
S3.5	23	3.59299e+09	207248
S4	23	3.55802e+09	199688
S4.5	23	3.53463e+09	198277
S5	22	3.51985e+09	206568
S5.5	23	3.59566e+09	201656
S6	24	3.68657e+09	190304
R1	37	3.87276e+09	205592
R1.5	33	3.84734e+09	204276
R2	30	3.81739e+09	201621
R2.5	27	3.78912e+09	207648
R3	25	3.72214e+09	207128
R3.5	24	3.65945e+09	206006
R4	23	3.60252e+09	207252
R4.5	23	3.54953e+09	200454
R5	22	3.52238e+09	207901
L0	46	3.85009e+09	205266
L0.5	40	3.82101e+09	203479
L1	35	3.77573e+09	201996
L1.5	32	3.75064e+09	200045
L2	29	3.70935e+09	200927
L2.5	27	3.68349e+09	203678
L3	26	3.64964e+09	198193
L3.5	25	3.62735e+09	197045
L4	24	3.59077e+09	197244
L4.5	23	3.5689e+09	204340
L5	23	3.565e+09	200732
O1	52	3.91593e+09	207829
O1.5	55	3.91597e+09	208330
O2	59	3.91592e+09	206738
O2.5	68	3.91917e+09	212570
O3	84	3.90552e+09	207575
O3.5	99	3.92456e+09	207434
O4	99	3.97958e+09	224816

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
S5	22	3.51985e+09

Farmers Rural Electric Cooperative  
 Account 367 -- Underground Conductor

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S5	22	3.51985e+09	206568
R5	22	3.52238e+09	207901
S4.5	23	3.53463e+09	198277
R4.5	23	3.54953e+09	200454
S4	23	3.55802e+09	199688
L5	23	3.565e+09	200732
L4.5	23	3.5689e+09	204340
L4	24	3.59077e+09	197244
S3.5	23	3.59299e+09	207248
S5.5	23	3.59566e+09	201656
R4	23	3.60252e+09	207252
L3.5	25	3.62735e+09	197045
S3	24	3.6316e+09	202155
L3	26	3.64964e+09	198193
R3.5	24	3.65945e+09	206006
S2.5	25	3.66964e+09	200934
L2.5	27	3.68349e+09	203678
S6	24	3.68657e+09	190304
S2	26	3.69898e+09	200367
L2	29	3.70935e+09	200927
R3	25	3.72214e+09	207128
S1.5	27	3.72655e+09	204929
S1	29	3.74145e+09	201443
L1.5	32	3.75064e+09	200045
L1	35	3.77573e+09	201996
S0.5	32	3.77846e+09	200074
R2.5	27	3.78912e+09	207648
S0	35	3.80381e+09	191745
R2	30	3.81739e+09	201621
L0.5	40	3.82101e+09	203479
R1.5	33	3.84734e+09	204276
L0	46	3.85009e+09	205266
R1	37	3.87276e+09	205592
O3	84	3.90552e+09	207575
O2	59	3.91592e+09	206738
O1	52	3.91593e+09	207829
O1.5	55	3.91597e+09	208330
O2.5	68	3.91917e+09	212570
O3.5	99	3.92456e+09	207434
O4	99	3.97958e+09	224816



Farmers Rural Electric Cooperative  
 Account 367 -- Underground Conductor

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

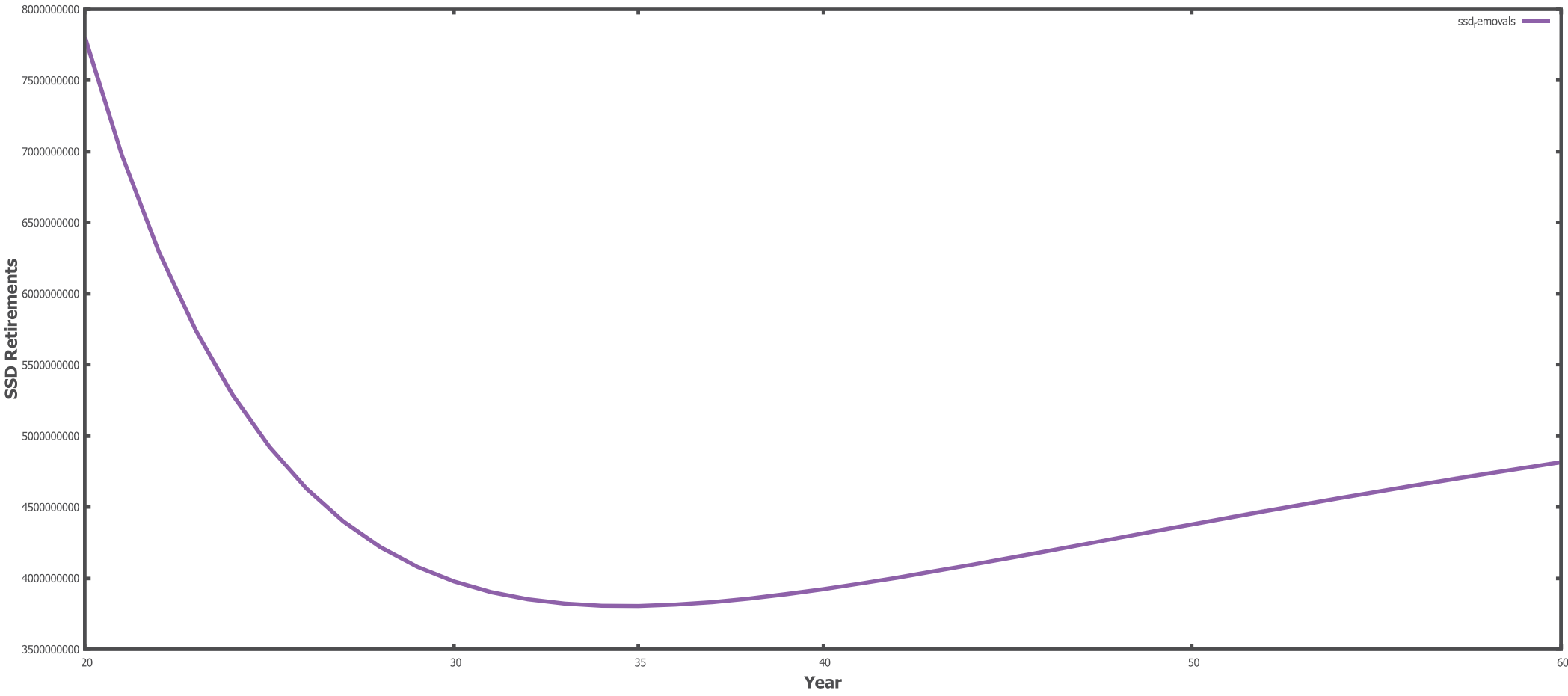
Iowa Curve	ASL	SSD Balance
S0	33	3.09101e+08
S0.5	30	3.48802e+08
S1	28	3.1023e+08
S1.5	27	4.17085e+08
S2	25	3.11558e+08
S2.5	24	4.09207e+08
S3	24	3.37005e+08
S3.5	23	2.47346e+08
S4	23	4.92934e+08
S4.5	22	3.76604e+08
S5	22	3.36568e+08
S5.5	22	4.10891e+08
S6	22	5.57661e+08
R1	35	3.0552e+08
R1.5	32	3.45844e+08
R2	29	3.82621e+08
R2.5	27	3.11316e+08
R3	25	2.06498e+08
R3.5	24	1.8034e+08
R4	23	2.06605e+08
R4.5	23	3.54145e+08
R5	22	2.90704e+08
L0	44	2.74994e+08
L0.5	38	2.91633e+08
L1	34	3.44091e+08
L1.5	31	3.53644e+08
L2	28	3.14255e+08
L2.5	27	4.22479e+08
L3	25	3.2434e+08
L3.5	24	3.18968e+08
L4	23	3.77221e+08
L4.5	23	3.05188e+08
L5	22	4.98363e+08
O1	50	2.67035e+08
O1.5	53	2.67711e+08
O2	56	2.69052e+08
O2.5	68	2.6538e+08
O3	81	2.60931e+08
O3.5	95	2.73674e+08
O4	99	1.25155e+09

Farmers Rural Electric Cooperative  
Account 367 -- Underground Conductor

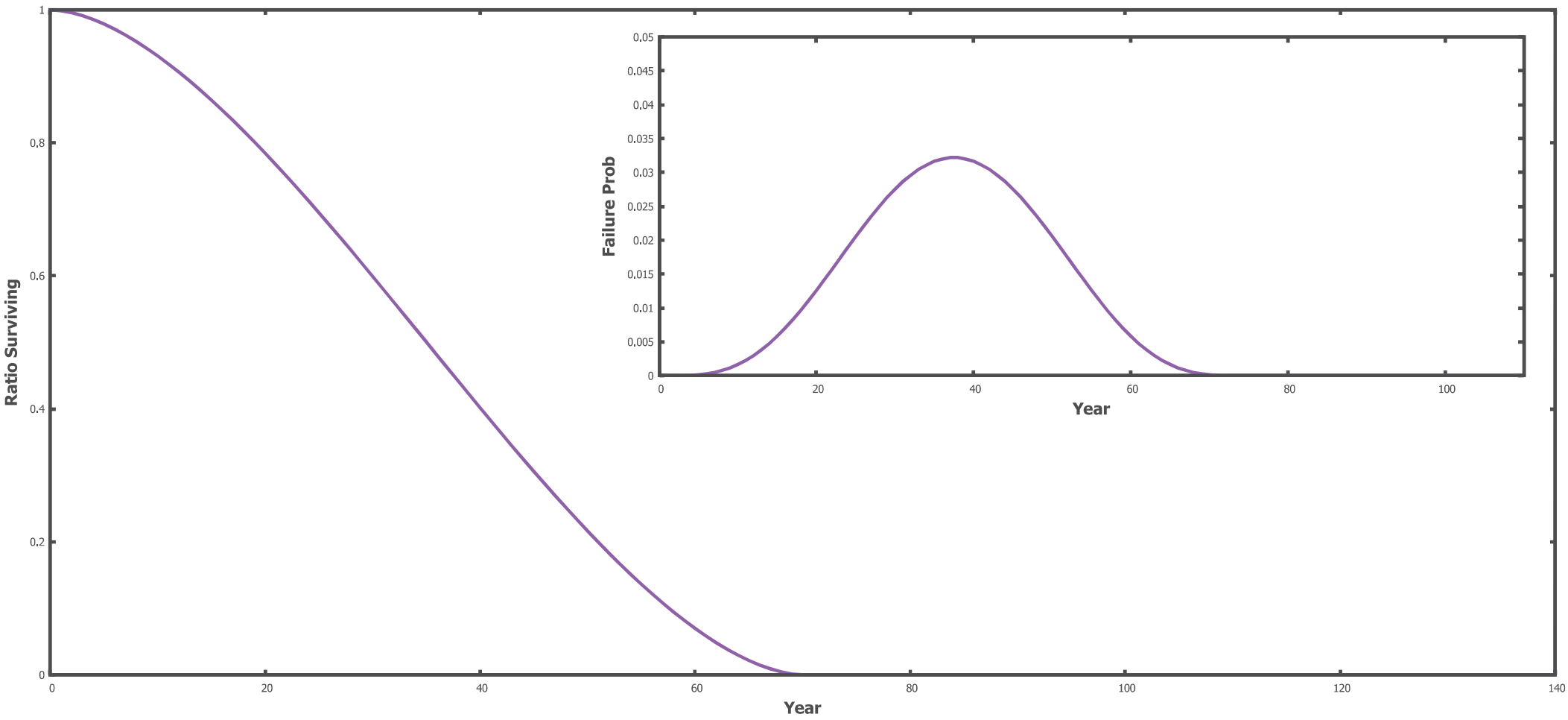
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
R3.5	24	1.8034e+08
R3	25	2.06498e+08
R4	23	2.06605e+08
S3.5	23	2.47346e+08
O3	81	2.60931e+08
O2.5	68	2.6538e+08
O1	50	2.67035e+08
O1.5	53	2.67711e+08
O2	56	2.69052e+08
O3.5	95	2.73674e+08
L0	44	2.74994e+08
R5	22	2.90704e+08
L0.5	38	2.91633e+08
L4.5	23	3.05188e+08
R1	35	3.0552e+08
S0	33	3.09101e+08
S1	28	3.1023e+08
R2.5	27	3.11316e+08
S2	25	3.11558e+08
L2	28	3.14255e+08
L3.5	24	3.18968e+08
L3	25	3.2434e+08
S5	22	3.36568e+08
S3	24	3.37005e+08
L1	34	3.44091e+08
R1.5	32	3.45844e+08
S0.5	30	3.48802e+08
L1.5	31	3.53644e+08
R4.5	23	3.54145e+08
S4.5	22	3.76604e+08
L4	23	3.77221e+08
R2	29	3.82621e+08
S2.5	24	4.09207e+08
S5.5	22	4.10891e+08
S1.5	27	4.17085e+08
L2.5	27	4.22479e+08
S4	23	4.92934e+08
L5	22	4.98363e+08
S6	22	5.57661e+08
O4	99	1.25155e+09

**Farmers Electric Cooperative  
Account No. 367 Underground Conductor  
Sum of Square Differences (SSD) Retirements for S0**



**Account No. 367 -- Underground Conductor**  
**Iowa Curve: S0 ASL: 35 Years**



Account 367 -- Underground Conductor

Simulated Retirements for Iowa Curve S0 with ASL = 35

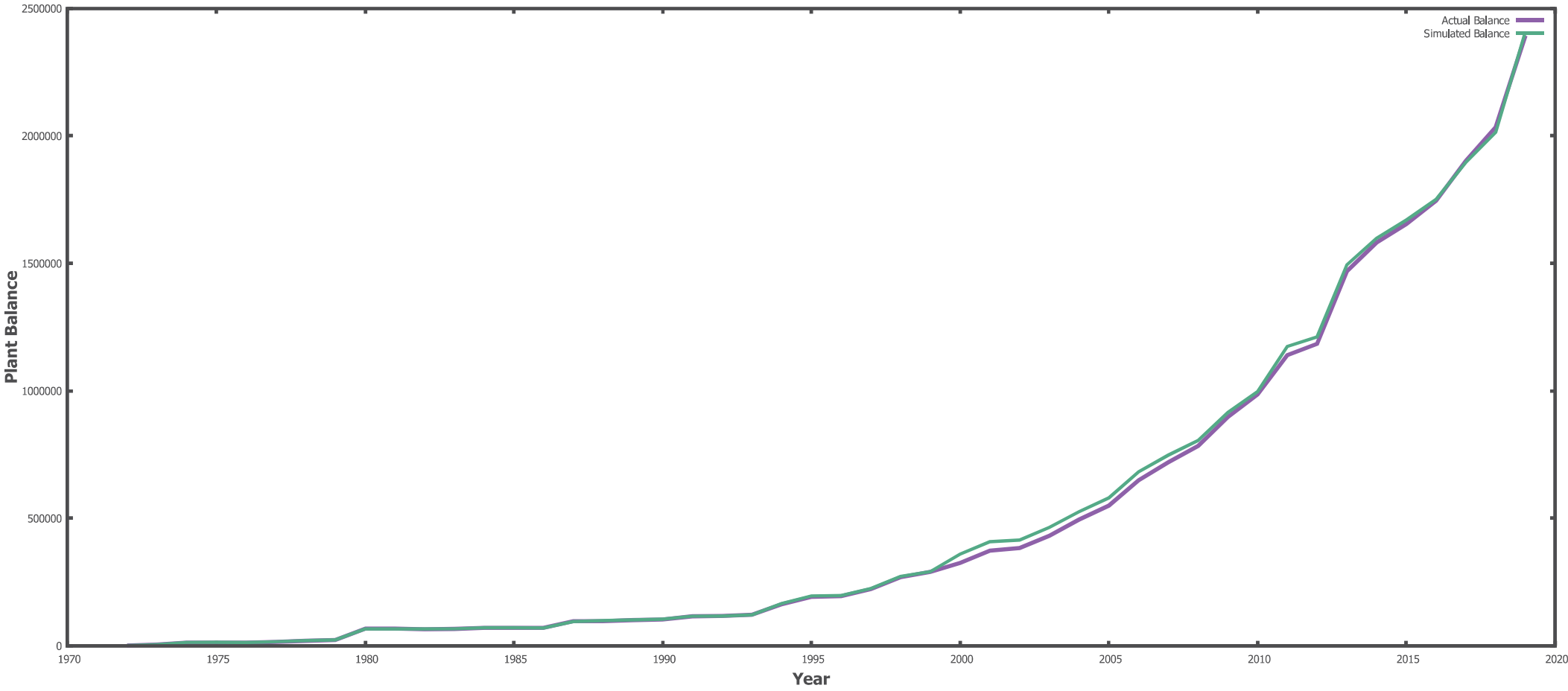
Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1972	1454	0	1454	0	1454	0	0
1973	3390	0	4844	2	4841	-2	2
1974	8611	1075	12380	10	13443	1066	-1063
1975	419	0	12798	30	13831	-30	-1033
1976	-455	0	12344	48	13329	-48	-985
1977	3119	0	15462	69	16379	-69	-917
1978	4077	0	19540	90	20367	-90	-827
1979	3263	0	22803	114	23515	-114	-713
1980	43285	0	66088	142	66658	-142	-571
1981	0	0	66088	242	66417	-242	-329
1982	0	831	65256	312	66104	519	-848
1983	1075	0	66331	413	66766	-413	-435
1984	5038	916	70453	487	71317	429	-864
1985	0	0	70453	565	70752	-565	-299
1986	0	0	70453	633	70118	-633	335
1987	26068	0	96521	702	95484	-702	1037
1988	4310	4077	96754	807	98987	3270	-2233
1989	4084	0	100838	899	102173	-899	-1335
1990	3522	1227	103133	1011	104683	216	-1550
1991	12747	0	115880	1110	116320	-1110	-440
1992	1834	758	116956	1225	116929	-467	27
1993	6048	1273	121731	1327	121650	-54	81
1994	45777	4638	162870	1443	165984	3195	-3114
1995	31424	2716	191578	1619	195789	1097	-4211
1996	3076	0	194654	1816	197050	-1816	-2396
1997	30022	2204	222472	2024	225048	180	-2576
1998	49468	2808	269132	2270	272246	538	-3114
1999	21734	378	290489	2556	291424	-2178	-936

Farmers Rural Electric Cooperative  
 Account 367 -- Underground Conductor

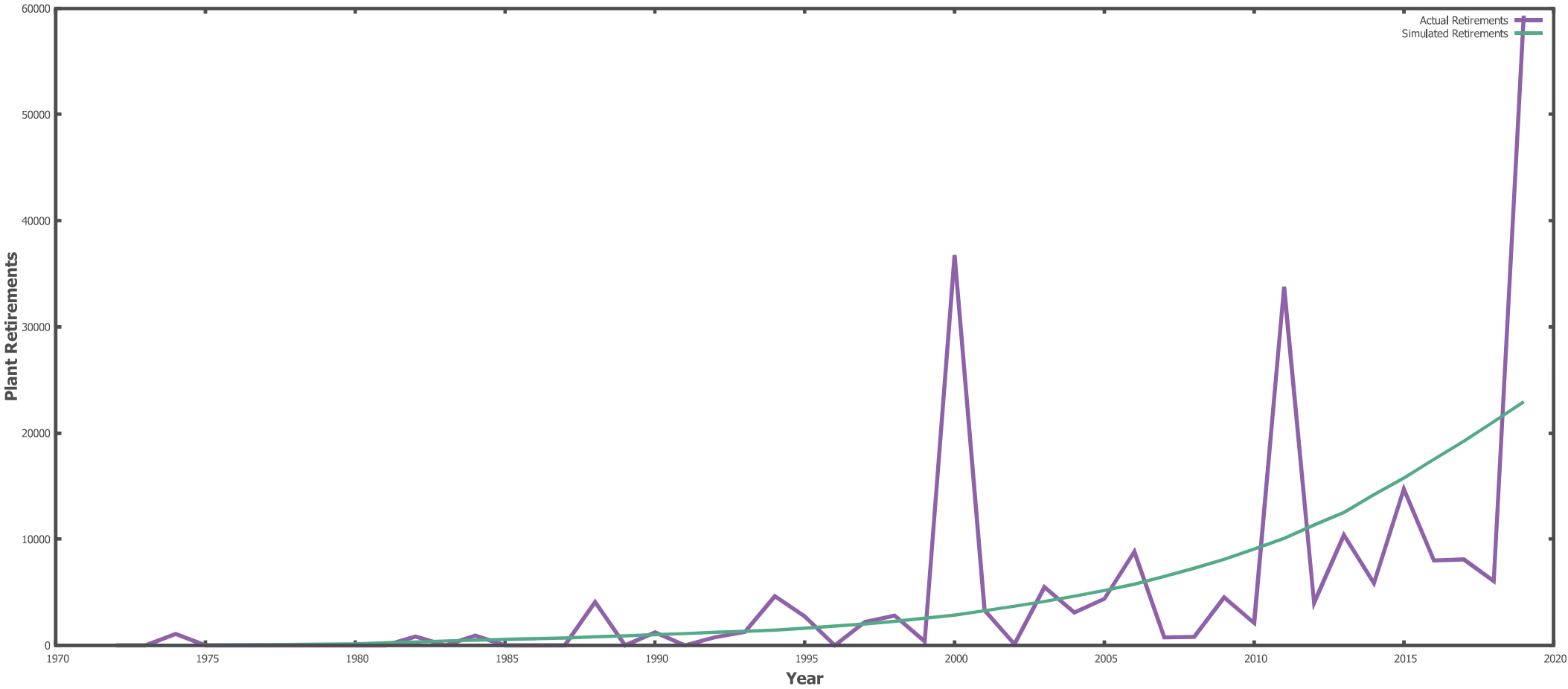
Simulated Retirements for Iowa Curve S0 with ASL = 35

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
2000	71236	36772	324953	2853	359807	33919	-34854
2001	51741	3306	373388	3266	408282	40	-34894
2002	10247	110	383525	3694	414836	-3583	-31311
2003	53544	5482	431587	4131	464248	1351	-32662
2004	66766	3100	495252	4631	526383	-1530	-31131
2005	59136	4384	550004	5164	580356	-780	-30351
2006	108110	8825	649289	5762	682703	3063	-33414
2007	71774	752	720311	6498	747979	-5746	-27668
2008	64724	788	784247	7267	805436	-6478	-21189
2009	118128	4515	897860	8113	915451	-3598	-17591
2010	90575	2107	986328	9074	996952	-6967	-10624
2011	187357	33782	1139903	10077	1174231	23704	-34328
2012	48656	4003	1184556	11343	1211545	-7340	-26989
2013	295148	10391	1469313	12524	1494169	-2132	-24856
2014	118613	5855	1582070	14206	1598576	-8350	-16506
2015	87320	14721	1654669	15762	1670134	-1041	-15465
2016	99105	8001	1745773	17524	1751715	-9523	-5942
2017	164378	8100	1902051	19230	1896863	-11130	5188
2018	138468	6059	2034460	21070	2014261	-15011	20199
2019	418165	59324	2393302	22951	2409476	36373	-16174

**Farmers Electric Cooperative  
Account No. 367 Underground Conductor  
Plant Balances**



**Farmers Electric Cooperative  
Account No. 367 Underground Conductor  
Plant Retirements**





## **Account 368 – Transformers**

Farmers Rural Electric Cooperative  
 Account 368 -- Line Transformers

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	36	3.2732e+11	3.32211e+06
S0.5	35	3.28404e+11	3.34506e+06
S1	34	3.28785e+11	3.37524e+06
S1.5	33	3.27705e+11	3.41315e+06
S2	32	3.26172e+11	3.45186e+06
S2.5	31	3.28938e+11	3.5075e+06
S3	30	3.30187e+11	3.55088e+06
S3.5	28	3.36625e+11	3.61848e+06
S4	27	3.34516e+11	3.66182e+06
S4.5	26	3.33634e+11	3.7233e+06
S5	26	3.31932e+11	3.73787e+06
S5.5	25	3.34324e+11	3.78114e+06
S6	25	3.37407e+11	3.8041e+06
R1	36	3.2431e+11	3.31784e+06
R1.5	35	3.27651e+11	3.34853e+06
R2	34	3.30707e+11	3.38932e+06
R2.5	33	3.35239e+11	3.451e+06
R3	33	3.40721e+11	3.47598e+06
R3.5	33	3.49313e+11	3.51902e+06
R4	32	3.58525e+11	3.61047e+06
R4.5	26	3.50441e+11	3.77397e+06
R5	26	3.39561e+11	3.75667e+06
L0	40	3.27209e+11	3.31586e+06
L0.5	38	3.25387e+11	3.31556e+06
L1	37	3.24643e+11	3.29983e+06
L1.5	35	3.2178e+11	3.33977e+06
L2	34	3.17292e+11	3.34663e+06
L2.5	32	3.19328e+11	3.41627e+06
L3	31	3.1736e+11	3.445e+06
L3.5	30	3.25208e+11	3.51725e+06
L4	28	3.28604e+11	3.59001e+06
L4.5	27	3.30008e+11	3.65689e+06
L5	27	3.28825e+11	3.67129e+06
O1	39	3.16557e+11	3.27242e+06
O1.5	40	3.19494e+11	3.30988e+06
O2	43	3.22e+11	3.29991e+06
O2.5	49	3.20415e+11	3.2718e+06
O3	52	3.18792e+11	3.33175e+06
O3.5	61	3.27872e+11	3.33873e+06
O4	69	3.26751e+11	3.33266e+06

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
O1	39	3.16557e+11

Farmers Rural Electric Cooperative  
 Account 368 -- Line Transformers

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
O1	39	3.16557e+11	3.27242e+06
L2	34	3.17292e+11	3.34663e+06
L3	31	3.1736e+11	3.445e+06
O3	52	3.18792e+11	3.33175e+06
L2.5	32	3.19328e+11	3.41627e+06
O1.5	40	3.19494e+11	3.30988e+06
O2.5	49	3.20415e+11	3.2718e+06
L1.5	35	3.2178e+11	3.33977e+06
O2	43	3.22e+11	3.29991e+06
R1	36	3.2431e+11	3.31784e+06
L1	37	3.24643e+11	3.29983e+06
L3.5	30	3.25208e+11	3.51725e+06
L0.5	38	3.25387e+11	3.31556e+06
S2	32	3.26172e+11	3.45186e+06
O4	69	3.26751e+11	3.33266e+06
L0	40	3.27209e+11	3.31586e+06
S0	36	3.2732e+11	3.32211e+06
R1.5	35	3.27651e+11	3.34853e+06
S1.5	33	3.27705e+11	3.41315e+06
O3.5	61	3.27872e+11	3.33873e+06
S0.5	35	3.28404e+11	3.34506e+06
L4	28	3.28604e+11	3.59001e+06
S1	34	3.28785e+11	3.37524e+06
L5	27	3.28825e+11	3.67129e+06
S2.5	31	3.28938e+11	3.5075e+06
L4.5	27	3.30008e+11	3.65689e+06
S3	30	3.30187e+11	3.55088e+06
R2	34	3.30707e+11	3.38932e+06
S5	26	3.31932e+11	3.73787e+06
S4.5	26	3.33634e+11	3.7233e+06
S5.5	25	3.34324e+11	3.78114e+06
S4	27	3.34516e+11	3.66182e+06
R2.5	33	3.35239e+11	3.451e+06
S3.5	28	3.36625e+11	3.61848e+06
S6	25	3.37407e+11	3.8041e+06
R5	26	3.39561e+11	3.75667e+06
R3	33	3.40721e+11	3.47598e+06
R3.5	33	3.49313e+11	3.51902e+06
R4.5	26	3.50441e+11	3.77397e+06
R4	32	3.58525e+11	3.61047e+06

Farmers Rural Electric Cooperative  
 Account 368 -- Line Transformers

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

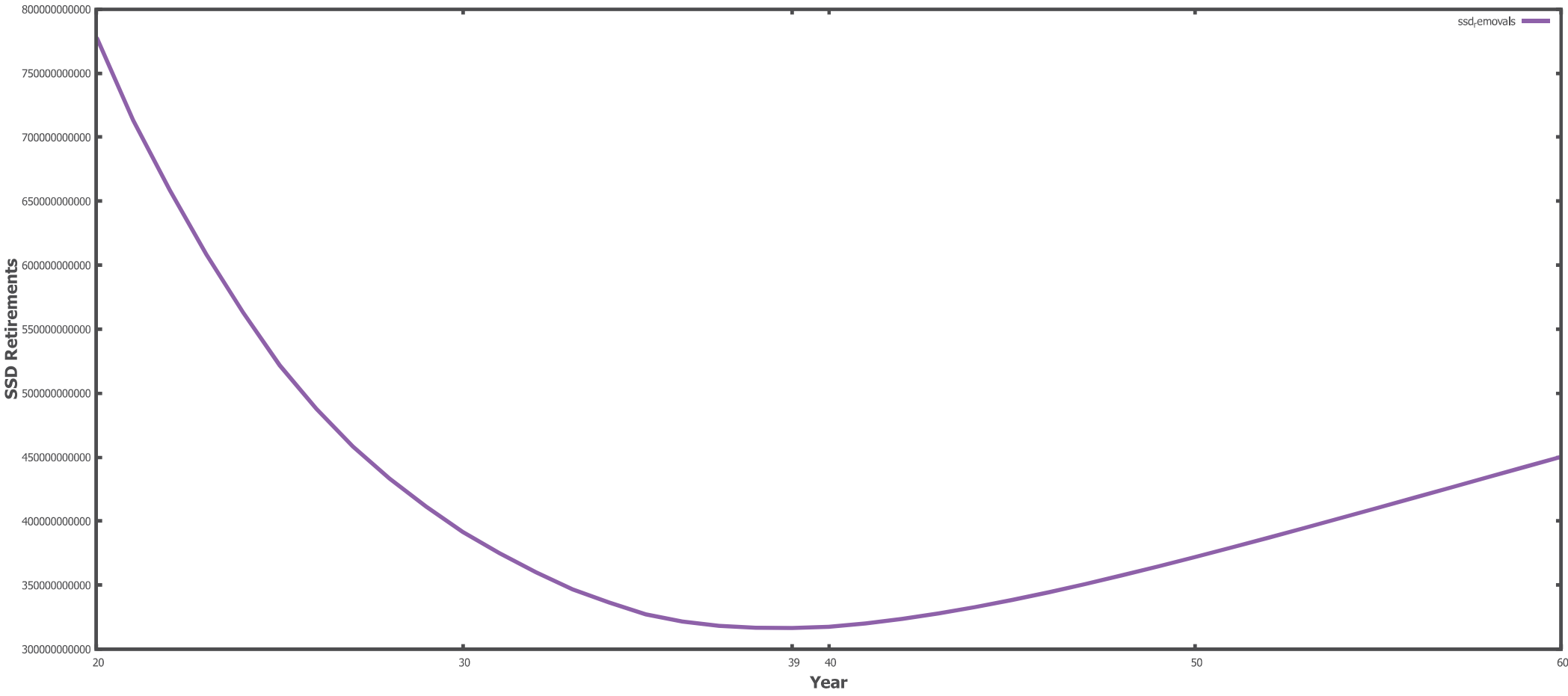
Iowa Curve	ASL	SSD Balance
S0	38	3.13965e+11
S0.5	37	3.05328e+11
S1	36	3.03363e+11
S1.5	35	2.95478e+11
S2	34	3.00787e+11
S2.5	34	3.01464e+11
S3	33	3.13651e+11
S3.5	33	3.27473e+11
S4	33	3.85914e+11
S4.5	32	4.14231e+11
S5	32	4.50962e+11
S5.5	32	5.1063e+11
S6	32	5.78012e+11
R1	38	3.1314e+11
R1.5	37	3.03392e+11
R2	36	3.15778e+11
R2.5	35	3.0952e+11
R3	34	3.08614e+11
R3.5	34	3.50621e+11
R4	33	3.36123e+11
R4.5	33	3.8771e+11
R5	32	4.3446e+11
L0	44	3.47351e+11
L0.5	41	3.3804e+11
L1	39	3.16953e+11
L1.5	38	3.14987e+11
L2	36	2.95941e+11
L2.5	35	3.00497e+11
L3	34	3.07268e+11
L3.5	34	3.26109e+11
L4	33	3.33918e+11
L4.5	33	3.78441e+11
L5	32	4.14298e+11
O1	43	3.37674e+11
O1.5	46	3.45905e+11
O2	48	3.51153e+11
O2.5	55	3.66693e+11
O3	64	3.77416e+11
O3.5	73	3.81748e+11
O4	84	3.85928e+11

Farmers Rural Electric Cooperative  
Account 368 -- Line Transformers

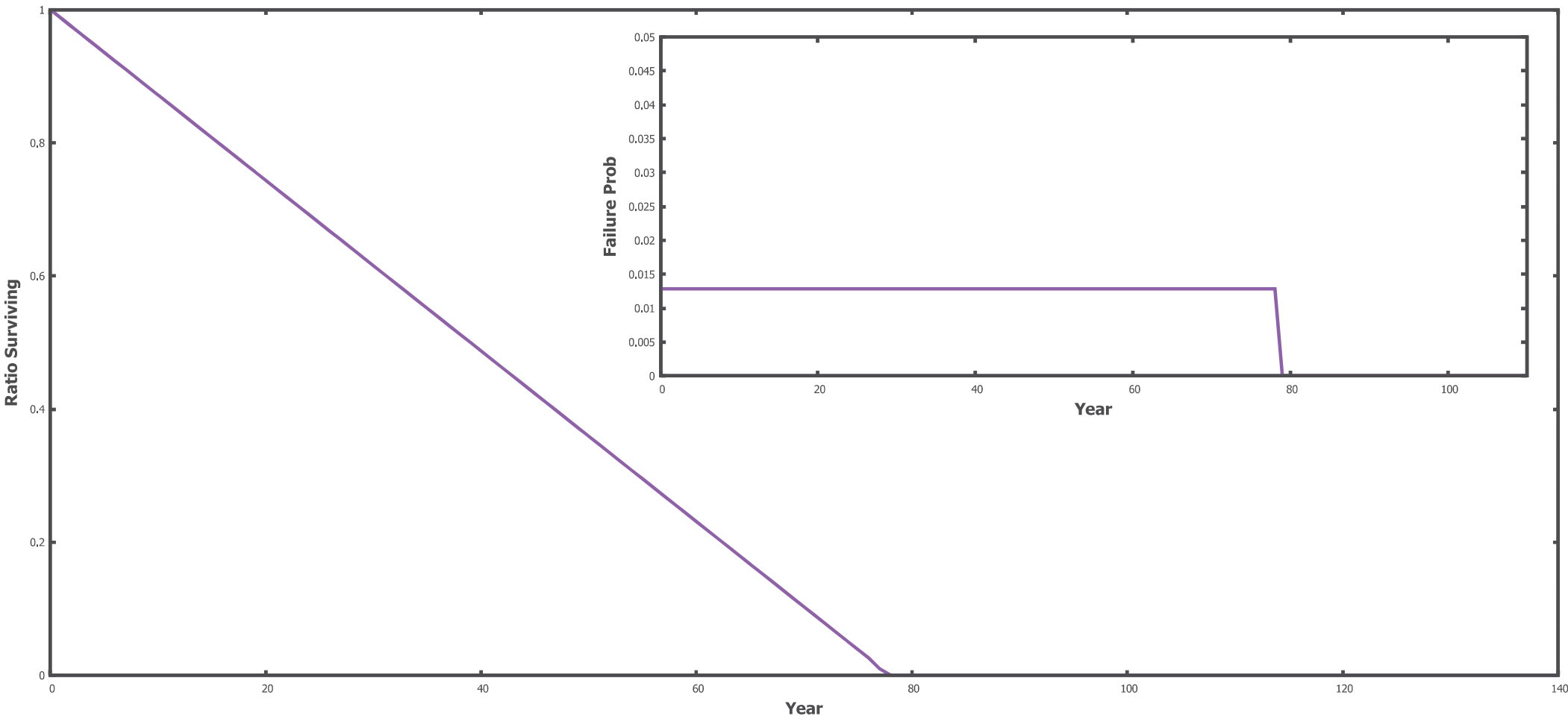
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
S1.5	35	2.95478e+11
L2	36	2.95941e+11
L2.5	35	3.00497e+11
S2	34	3.00787e+11
S2.5	34	3.01464e+11
S1	36	3.03363e+11
R1.5	37	3.03392e+11
S0.5	37	3.05328e+11
L3	34	3.07268e+11
R3	34	3.08614e+11
R2.5	35	3.0952e+11
R1	38	3.1314e+11
S3	33	3.13651e+11
S0	38	3.13965e+11
L1.5	38	3.14987e+11
R2	36	3.15778e+11
L1	39	3.16953e+11
L3.5	34	3.26109e+11
S3.5	33	3.27473e+11
L4	33	3.33918e+11
R4	33	3.36123e+11
O1	43	3.37674e+11
L0.5	41	3.3804e+11
O1.5	46	3.45905e+11
L0	44	3.47351e+11
R3.5	34	3.50621e+11
O2	48	3.51153e+11
O2.5	55	3.66693e+11
O3	64	3.77416e+11
L4.5	33	3.78441e+11
O3.5	73	3.81748e+11
S4	33	3.85914e+11
O4	84	3.85928e+11
R4.5	33	3.8771e+11
S4.5	32	4.14231e+11
L5	32	4.14298e+11
R5	32	4.3446e+11
S5	32	4.50962e+11
S5.5	32	5.1063e+11
S6	32	5.78012e+11

**Farmers Electric Cooperative  
Account No. 368 Transformers  
Sum of Square Differences (SSD) Retirements for O1**



**Account No. 368 -- Transformers**  
**Iowa Curve: O1 ASL: 39 Years**



Account 368 -- Line Transformers

Simulated Retirements for Iowa Curve 01 with ASL = 39

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1938	11769	0	11769	0	11769	0	0
1939	23539	0	35308	151	35158	-151	151
1940	35308	0	70617	453	70013	-453	604
1941	2592	0	73209	905	71700	-905	1509
1942	20326	136	93399	939	91088	-802	2311
1943	6135	98	99436	1199	96024	-1102	3413
1944	4892	100	104229	1278	99638	-1178	4591
1945	13234	62	117401	1341	111532	-1278	5869
1946	28751	18	146133	1510	138773	-1492	7361
1947	28519	265	174387	1879	165413	-1614	8975
1948	104246	604	278030	2244	267414	-1641	10615
1949	151750	33597	396182	3581	415583	30016	-19401
1950	121760	9355	508588	5526	531817	3829	-23230
1951	70182	744	578026	7088	594912	-6344	-16886
1952	62559	4517	636068	7987	649484	-3471	-13415
1953	62559	4517	694111	8789	703253	-4273	-9143
1954	62559	4517	752153	9591	756221	-5075	-4068
1955	62559	4517	810195	10393	808386	-5877	1809
1956	37118	717	846596	11195	834309	-10478	12287
1957	60006	3955	902647	11671	882644	-7716	20003
1958	57771	3495	956923	12441	927974	-8946	28949
1959	139140	20468	1075595	13181	1053933	7287	21662
1960	125777	17136	1184237	14965	1164745	2171	19492
1961	129311	27170	1286378	16578	1277478	10592	8900
1962	84901	22618	1348661	18235	1344144	4382	4517
1963	106296	90085	1364872	19324	1431116	70762	-66244
1964	107204	54241	1417834	20687	1517633	33555	-99799
1965	91734	62654	1446914	22061	1587306	40593	-140392



Farmers Rural Electric Cooperative  
 Account 368 -- Line Transformers

Simulated Retirements for Iowa Curve 01 with ASL = 39

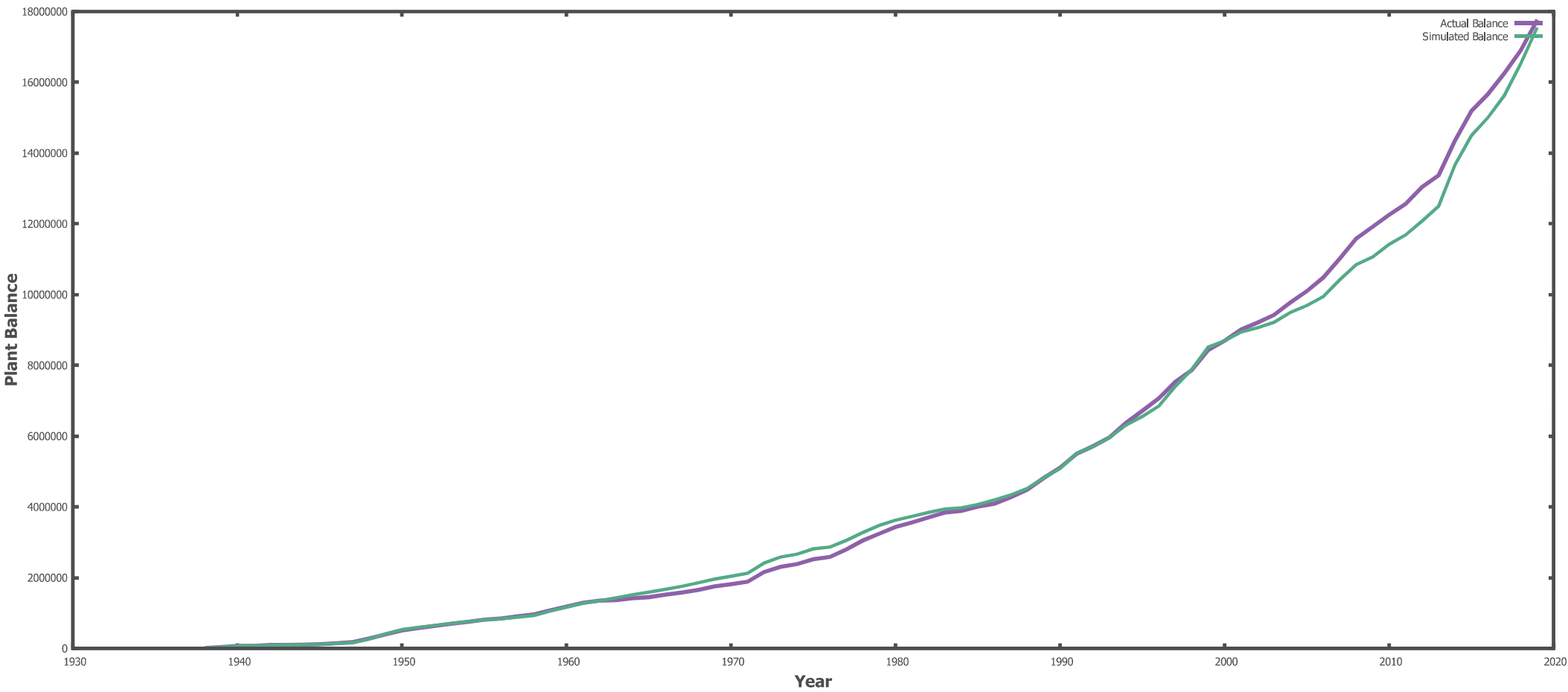
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1966	104859	34416	1517356	23237	1668928	11179	-151571
1967	107051	49090	1575317	24581	1751397	24509	-176080
1968	129807	51496	1653629	25954	1855250	25542	-201622
1969	130589	34623	1749595	27618	1958221	7005	-208627
1970	110554	47950	1812199	29292	2039483	18658	-227284
1971	113162	41811	1883550	30710	2121935	11101	-238385
1972	321764	48568	2156745	32161	2411538	16408	-254793
1973	203975	58382	2302338	36286	2579227	22096	-276889
1974	119789	39305	2382823	38901	2660116	404	-277293
1975	194613	56838	2520597	40437	2814292	16402	-293695
1976	90405	27310	2583693	42932	2861766	-15622	-278073
1977	234889	22556	2796026	44091	3052564	-21534	-256538
1978	268378	14765	3049639	47102	3273841	-32337	-224202
1979	253959	64381	3239217	50543	3477257	13838	-238040
1980	198353	6106	3431464	53799	3621811	-47692	-190347
1981	163805	33796	3561473	56342	3729275	-22546	-167802
1982	170922	30272	3702123	58442	3841755	-28169	-139632
1983	154945	20131	3836937	60633	3936067	-40502	-99130
1984	97785	51346	3883376	62620	3971233	-11274	-87857
1985	161395	35992	4008779	63873	4068755	-27881	-59976
1986	192813	113331	4088261	65942	4195625	47389	-107364
1987	209382	27534	4270109	68414	4336593	-40880	-66484
1988	257044	40434	4486719	71099	4522538	-30665	-35819
1989	370131	43195	4813655	74394	4818275	-31199	-4620
1990	344899	48073	5110481	79140	5084035	-31067	26446
1991	510776	123911	5497346	83561	5511250	40350	-13904
1992	285352	71222	5711476	90110	5706492	-18888	4984
1993	344120	93667	5961929	93768	5956844	-101	5085

Farmers Rural Electric Cooperative  
 Account 368 -- Line Transformers

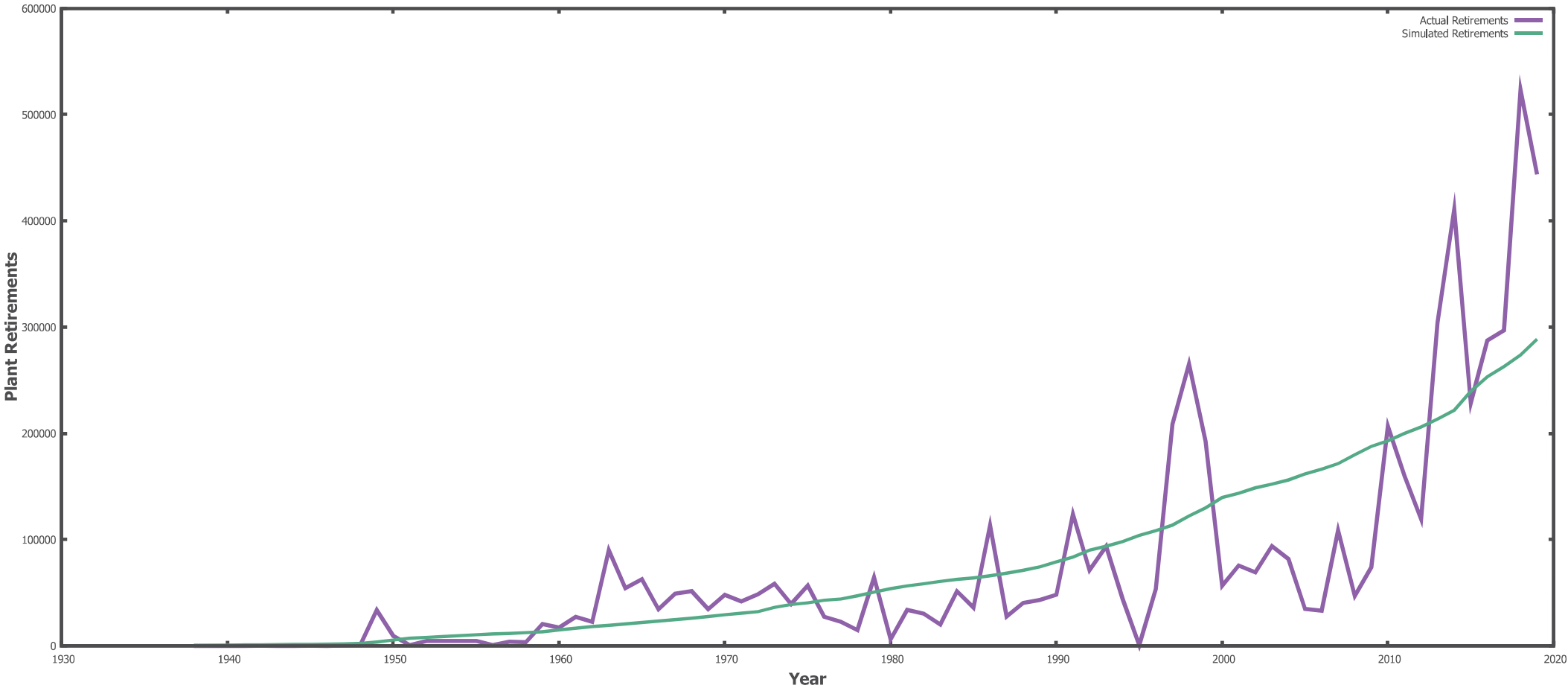
Simulated Retirements for Iowa Curve 01 with ASL = 39

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1994	452997	43961	6370965	98180	6311661	-54219	59304
1995	346177	650	6716492	103987	6553851	-103337	162641
1996	404087	53451	7067128	108426	6849512	-54975	217616
1997	670320	208808	7528640	113606	7406226	95202	122414
1998	600414	265271	7863783	122200	7884440	143071	-20657
1999	757891	192604	8429070	129897	8512433	62706	-83363
2000	321464	56484	8694050	139614	8694283	-83130	-233
2001	390775	75615	9009210	143735	8941322	-68120	67887
2002	264901	69186	9204924	148746	9057477	-79560	147447
2003	308736	93918	9419742	152141	9214072	-58224	205670
2004	436899	81741	9774900	156100	9494871	-74359	280030
2005	356609	34798	10096711	161701	9689779	-126902	406932
2006	415328	33061	10478978	166273	9938833	-133213	540145
2007	648278	108751	11018506	171597	10415514	-62846	602991
2008	607274	46897	11578882	179909	10842879	-133012	736004
2009	408899	74067	11913715	187694	11064084	-113627	849631
2010	547810	206737	12254787	192937	11418957	13800	835831
2011	464922	159852	12559857	199960	11683919	-40108	875938
2012	597624	119261	13038220	205921	12075621	-86660	962599
2013	632115	304446	13365889	213582	12494154	90864	871735
2014	1391652	410786	14346755	221687	13664119	189099	682635
2015	1068788	228501	15187042	239564	14493344	-11063	693698
2016	757554	287426	15657170	253266	14997631	34160	659539
2017	888179	296905	16248444	262828	15622982	34077	625462
2018	1175755	523455	16900744	273777	16524959	249678	375784
2019	1307950	443741	17764953	288552	17544358	155189	220595

# Farmers Electric Cooperative Account No. 368 Transformers Plant Balances



**Farmers Electric Cooperative  
Account No. 368 Transformers  
Plant Retirements**



## **Account 369 – Services**

Farmers Rural Electric Cooperative  
 Account 369 -- Services

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	57	6.11394e+09	555219
S0.5	53	6.92445e+09	591247
S1	50	7.9697e+09	636328
S1.5	48	8.73895e+09	668207
S2	46	9.66763e+09	701033
S2.5	45	1.03882e+10	728200
S3	44	1.13064e+10	758674
S3.5	44	1.23386e+10	797463
S4	43	1.37544e+10	832289
S4.5	43	1.49041e+10	869700
S5	43	1.63553e+10	917546
S5.5	43	1.72666e+10	945070
S6	43	1.83532e+10	972593
R1	57	5.10937e+09	504863
R1.5	53	5.96313e+09	549113
R2	49	7.07734e+09	596868
R2.5	47	7.97691e+09	637312
R3	45	9.1419e+09	682721
R3.5	44	1.00256e+10	714614
R4	43	1.12532e+10	754227
R4.5	43	1.27995e+10	811470
R5	43	1.47476e+10	879391
L0	72	5.01616e+09	499766
L0.5	64	5.66886e+09	532023
L1	58	6.57853e+09	574679
L1.5	54	7.4564e+09	613184
L2	51	8.67307e+09	664638
L2.5	49	9.52824e+09	700235
L3	47	1.07531e+10	743639
L3.5	45	1.1491e+10	761412
L4	44	1.26836e+10	798812
L4.5	44	1.3635e+10	836727
L5	44	1.49811e+10	891759
O1	75	4.01067e+09	443087
O1.5	80	4.00934e+09	443345
O2	85	4.01032e+09	443916
O2.5	99	3.94603e+09	433529
O3	99	5.99687e+09	469306
O3.5	99	1.13335e+10	617595
O4	99	2.00929e+10	801156

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
O2.5	99	3.94603e+09

Farmers Rural Electric Cooperative  
 Account 369 -- Services

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
O2.5	99	3.94603e+09	433529
O1.5	80	4.00934e+09	443345
O2	85	4.01032e+09	443916
O1	75	4.01067e+09	443087
L0	72	5.01616e+09	499766
R1	57	5.10937e+09	504863
L0.5	64	5.66886e+09	532023
R1.5	53	5.96313e+09	549113
O3	99	5.99687e+09	469306
S0	57	6.11394e+09	555219
L1	58	6.57853e+09	574679
S0.5	53	6.92445e+09	591247
R2	49	7.07734e+09	596868
L1.5	54	7.4564e+09	613184
S1	50	7.9697e+09	636328
R2.5	47	7.97691e+09	637312
L2	51	8.67307e+09	664638
S1.5	48	8.73895e+09	668207
R3	45	9.1419e+09	682721
L2.5	49	9.52824e+09	700235
S2	46	9.66763e+09	701033
R3.5	44	1.00256e+10	714614
S2.5	45	1.03882e+10	728200
L3	47	1.07531e+10	743639
R4	43	1.12532e+10	754227
S3	44	1.13064e+10	758674
O3.5	99	1.13335e+10	617595
L3.5	45	1.1491e+10	761412
S3.5	44	1.23386e+10	797463
L4	44	1.26836e+10	798812
R4.5	43	1.27995e+10	811470
L4.5	44	1.3635e+10	836727
S4	43	1.37544e+10	832289
R5	43	1.47476e+10	879391
S4.5	43	1.49041e+10	869700
L5	44	1.49811e+10	891759
S5	43	1.63553e+10	917546
S5.5	43	1.72666e+10	945070
S6	43	1.83532e+10	972593
O4	99	2.00929e+10	801156

Farmers Rural Electric Cooperative  
 Account 369 -- Services

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

Iowa Curve	ASL	SSD Balance
S0	46	2.25474e+10
S0.5	43	2.73043e+10
S1	41	3.29349e+10
S1.5	39	3.84244e+10
S2	38	4.22513e+10
S2.5	37	4.84107e+10
S3	36	5.92119e+10
S3.5	36	6.19133e+10
S4	35	7.83121e+10
S4.5	35	8.16282e+10
S5	35	8.81317e+10
S5.5	35	9.57336e+10
S6	35	1.04178e+11
R1	47	1.86312e+10
R1.5	43	2.3342e+10
R2	40	3.22798e+10
R2.5	39	3.97351e+10
R3	37	4.9507e+10
R3.5	36	6.45779e+10
R4	36	6.82346e+10
R4.5	35	8.53996e+10
R5	35	8.69545e+10
L0	58	1.61254e+10
L0.5	52	1.9326e+10
L1	47	2.45988e+10
L1.5	44	2.89427e+10
L2	42	3.54159e+10
L2.5	40	3.90082e+10
L3	38	4.71299e+10
L3.5	37	5.33748e+10
L4	36	6.206e+10
L4.5	36	6.80966e+10
L5	35	8.12791e+10
O1	60	1.07902e+10
O1.5	64	1.07407e+10
O2	68	1.09247e+10
O2.5	81	1.01995e+10
O3	95	1.02441e+10
O3.5	99	8.67923e+10
O4	99	4.47946e+11

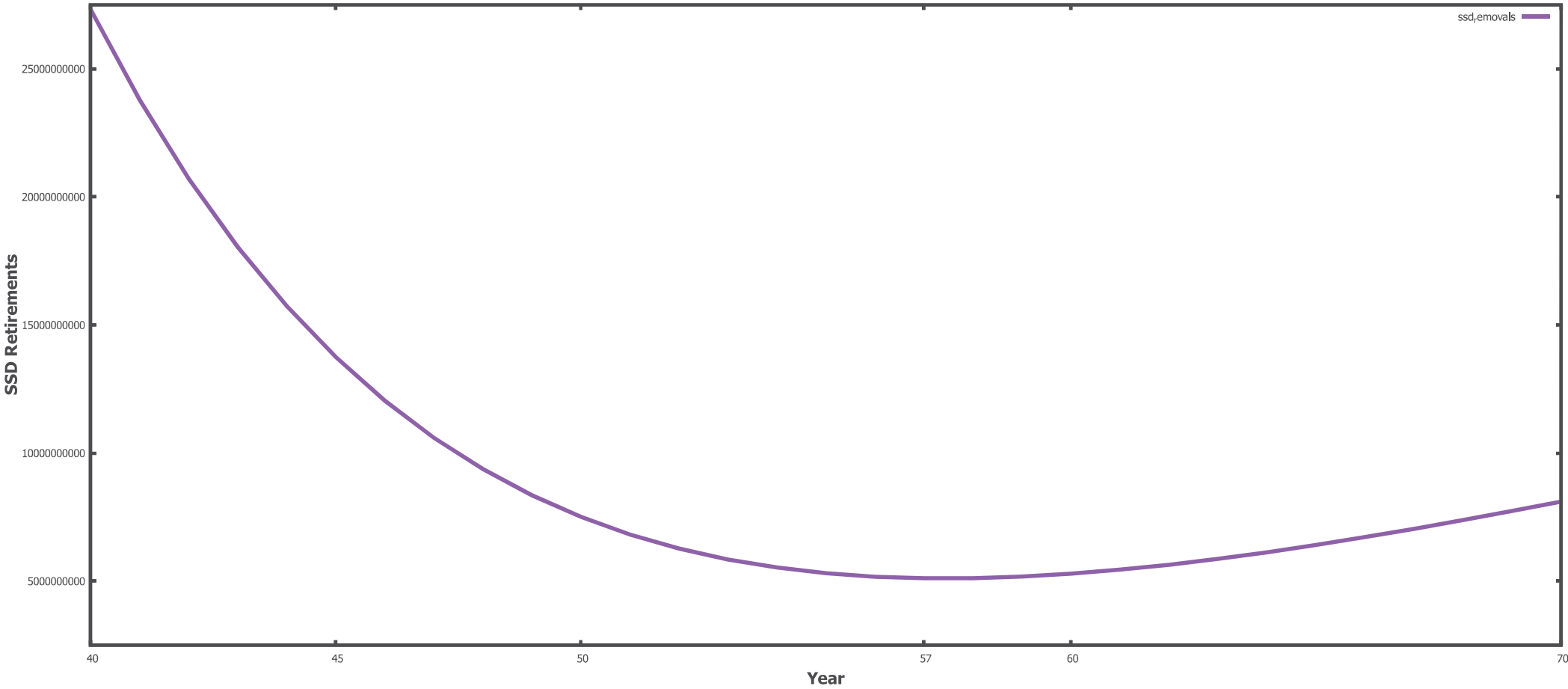


Farmers Rural Electric Cooperative  
Account 369 -- Services

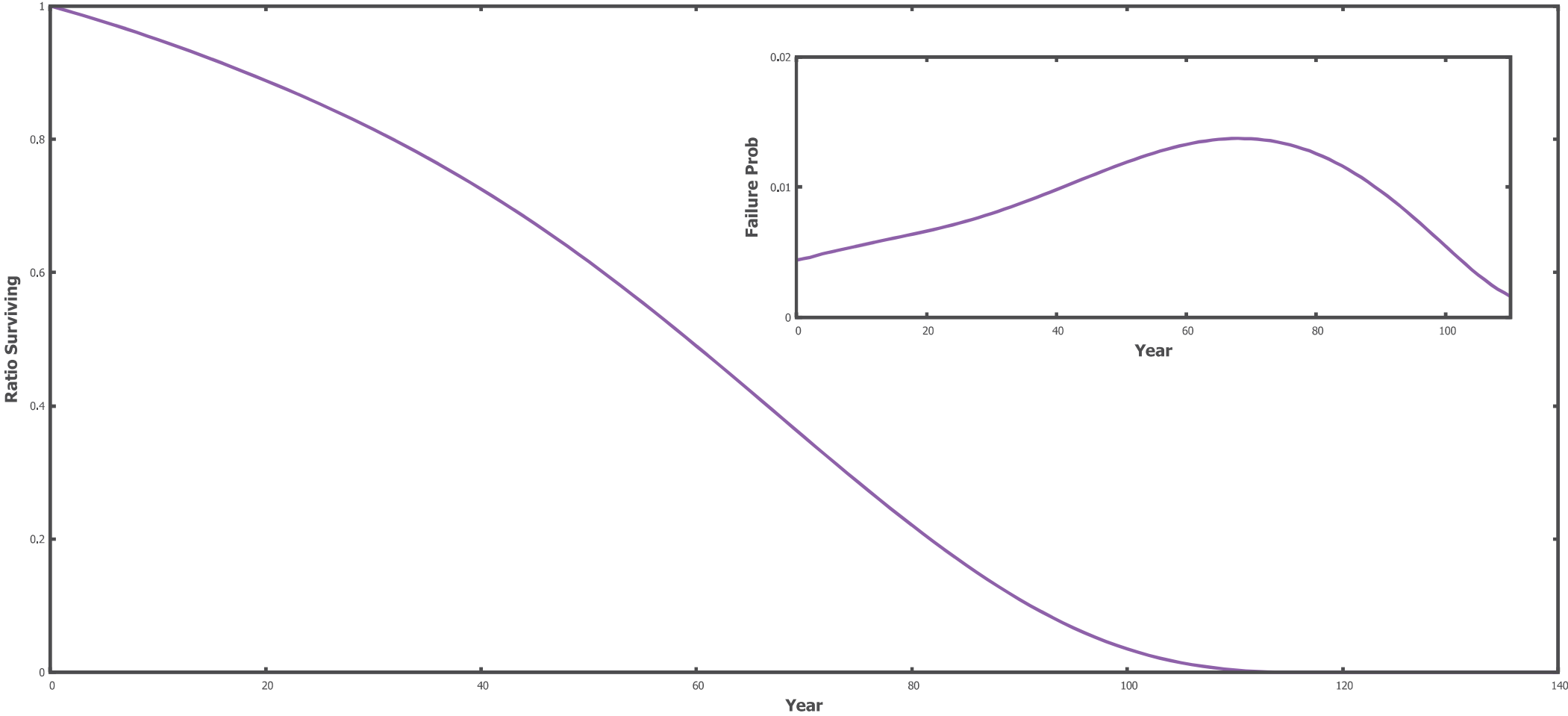
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
O2.5	81	1.01995e+10
O3	95	1.02441e+10
O1.5	64	1.07407e+10
O1	60	1.07902e+10
O2	68	1.09247e+10
L0	58	1.61254e+10
R1	47	1.86312e+10
L0.5	52	1.9326e+10
S0	46	2.25474e+10
R1.5	43	2.3342e+10
L1	47	2.45988e+10
S0.5	43	2.73043e+10
L1.5	44	2.89427e+10
R2	40	3.22798e+10
S1	41	3.29349e+10
L2	42	3.54159e+10
S1.5	39	3.84244e+10
L2.5	40	3.90082e+10
R2.5	39	3.97351e+10
S2	38	4.22513e+10
L3	38	4.71299e+10
S2.5	37	4.84107e+10
R3	37	4.9507e+10
L3.5	37	5.33748e+10
S3	36	5.92119e+10
S3.5	36	6.19133e+10
L4	36	6.206e+10
R3.5	36	6.45779e+10
L4.5	36	6.80966e+10
R4	36	6.82346e+10
S4	35	7.83121e+10
L5	35	8.12791e+10
S4.5	35	8.16282e+10
R4.5	35	8.53996e+10
O3.5	99	8.67923e+10
R5	35	8.69545e+10
S5	35	8.81317e+10
S5.5	35	9.57336e+10
S6	35	1.04178e+11
O4	99	4.47946e+11

**Farmers Electric Cooperative  
Account No. 369 Services  
Sum of Square Differences (SSD) Retirements for R1**



**Account No. 369 -- Services**  
**Iowa Curve: R1 ASL: 57 Years**



Farmers Rural Electric Cooperative  
 Account 369 -- Services

Simulated Retirements for Iowa Curve R1 with ASL = 57

Year	Additions	Actual Retirements	Actual Balance	Simmulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1938	2817	0	2817	0	2817	0	0
1939	5633	0	8450	13	8437	-13	13
1940	8450	0	16900	39	16848	-39	52
1941	1245	1	18144	78	18014	-77	129
1942	10895	26	29012	85	28824	-59	188
1943	1285	113	30184	138	29971	-25	213
1944	1654	56	31782	146	31479	-90	303
1945	1916	31	33666	157	33237	-126	429
1946	1976	74	35568	170	35043	-96	525
1947	1256	0	36824	182	36117	-182	708
1948	9355	0	46180	192	45280	-192	900
1949	29111	1523	73768	239	74152	1284	-384
1950	51936	2501	123202	378	125709	2123	-2507
1951	16040	1741	137501	623	141126	1118	-3625
1952	13227	559	150168	707	153646	-148	-3477
1953	13227	559	162836	783	166089	-225	-3253
1954	13227	559	175504	862	178453	-303	-2950
1955	13227	559	188172	941	190739	-382	-2567
1956	8103	2422	193852	1022	197820	1400	-3968
1957	13236	5438	201650	1080	209976	4358	-8326
1958	16681	5446	212885	1163	225494	4283	-12609
1959	17385	7379	222890	1263	241615	6116	-18725
1960	19005	8361	233534	1368	259251	6993	-25718
1961	-502	9866	223166	1483	257267	8384	-34101
1962	18657	8333	233490	1509	274416	6824	-40925
1963	9772	7283	235979	1626	282562	5658	-46583
1964	20666	10171	246474	1701	301526	8470	-55053
1965	22393	10199	258667	1829	322090	8370	-63423

Farmers Rural Electric Cooperative  
 Account 369 -- Services

Simulated Retirements for Iowa Curve R1 with ASL = 57

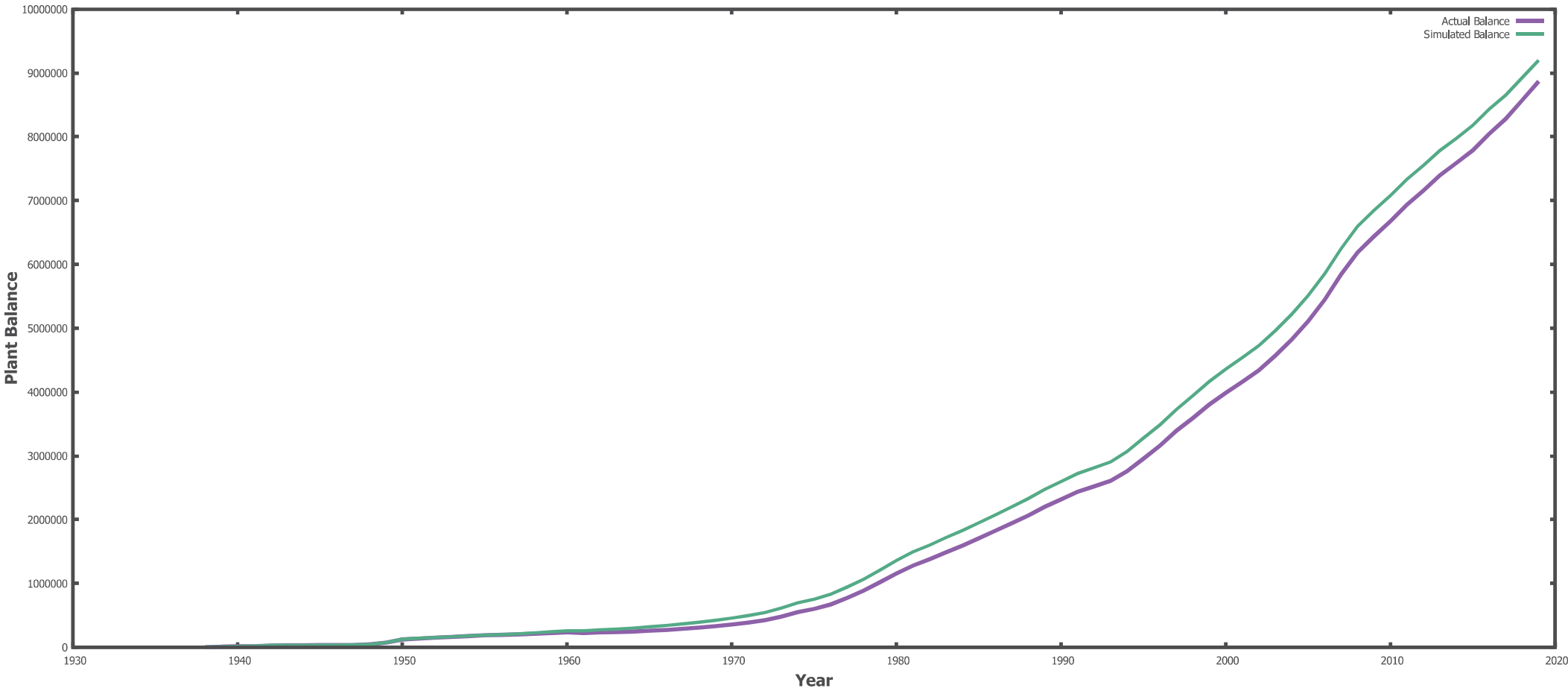
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1966	21905	9259	271313	1966	342029	7293	-70716
1967	26550	9312	288551	2104	366475	7208	-77924
1968	27158	8467	307242	2266	391367	6201	-84125
1969	34633	11265	330610	2433	423566	8832	-92957
1970	36695	9916	357389	2639	457623	7278	-100234
1971	42210	12557	387042	2857	496976	9700	-109934
1972	50634	13007	424669	3106	544504	9901	-119834
1973	72458	16797	480330	3399	613562	13398	-133233
1974	87619	16228	551721	3798	697383	12430	-145663
1975	61374	10862	602233	4274	754483	6587	-152250
1976	80374	11512	671096	4639	830218	6873	-159123
1977	118143	14373	774866	5102	943259	9270	-168393
1978	127914	13960	888821	5749	1065425	8211	-176604
1979	153440	21676	1020585	6450	1212416	15226	-191831
1980	155478	19247	1156816	7284	1360610	11963	-203794
1981	143049	19940	1279926	8144	1495516	11796	-215590
1982	113016	15387	1377555	8965	1599566	6421	-222011
1983	129800	20083	1487272	9667	1719699	10416	-232427
1984	121588	17622	1591238	10463	1830823	7159	-239585
1985	132068	15821	1707485	11234	1951657	4587	-244172
1986	134412	16817	1825080	12069	2074000	4748	-248920
1987	141276	22354	1944002	12929	2202347	9425	-258345
1988	141875	21587	2064290	13836	2330386	7751	-266096
1989	159594	21924	2201960	14763	2475218	7161	-273258
1990	139201	22311	2318850	15788	2598631	6523	-279781
1991	140670	22307	2437213	16736	2722565	5571	-285352
1992	106453	21630	2522036	17710	2811309	3920	-289273
1993	111925	25586	2608375	18543	2904691	7043	-296316

Farmers Rural Electric Cooperative  
 Account 369 -- Services

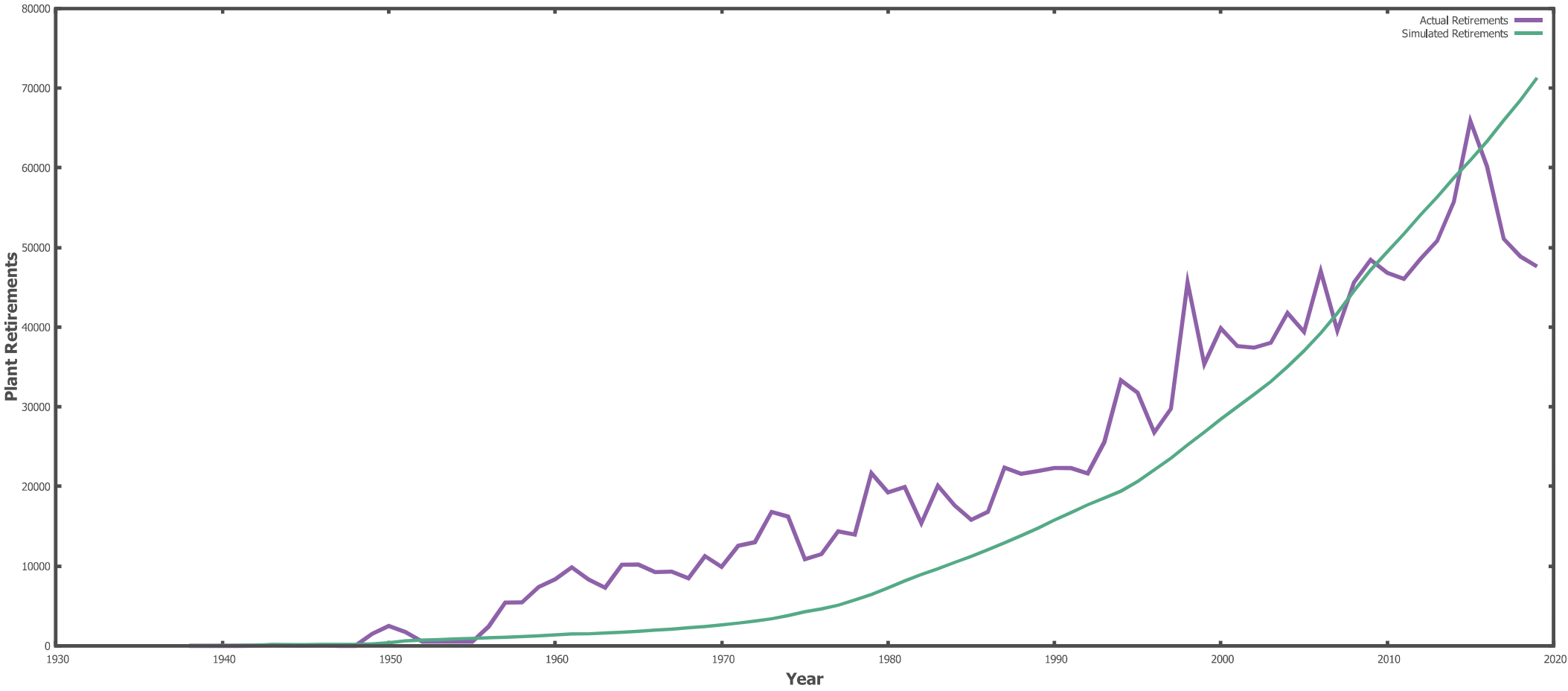
Simulated Retirements for Iowa Curve R1 with ASL = 57

Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1994	183128	33339	2758164	19417	3068401	13922	-310238
1995	231299	31776	2957687	20634	3279067	11142	-321380
1996	228758	26783	3159662	22087	3485738	4696	-326076
1997	264713	29750	3394625	23553	3726898	6198	-332274
1998	242336	45625	3591336	25215	3944020	20410	-352684
1999	249471	35360	3805447	26804	4166686	8555	-361239
2000	222265	39852	3987859	28461	4360490	11391	-372631
2001	209412	37624	4159646	30023	4539878	7601	-380232
2002	218648	37433	4340861	31558	4726968	5875	-386107
2003	266768	38034	4569596	33165	4960570	4868	-390975
2004	292645	41776	4820465	35022	5218193	6753	-397728
2005	329971	39404	5111031	37029	5511135	2375	-400103
2006	380703	47026	5444708	39246	5852592	7780	-407884
2007	437841	39550	5842998	41737	6248696	-2186	-405698
2008	390327	45604	6187721	44537	6594486	1067	-406765
2009	299018	48452	6438287	47169	6846334	1283	-408047
2010	284149	46805	6675630	49437	7081046	-2632	-405416
2011	305543	46051	6935123	51687	7334902	-5637	-399779
2012	269787	48575	7156335	54075	7550614	-5499	-394279
2013	291903	50832	7397406	56332	7786185	-5501	-388779
2014	248588	55724	7590270	58734	7976039	-3010	-385769
2015	263562	65869	7787963	60973	8178628	4896	-390665
2016	319549	60155	8047358	63319	8434858	-3164	-387501
2017	285494	51083	8281769	65961	8654392	-14878	-372622
2018	340878	48864	8573783	68482	8926788	-19618	-353005
2019	344162	47607	8870338	71301	9199648	-23694	-329310

**Farmers Electric Cooperative  
Account No. 369 Services  
Plant Balances**



**Farmers Electric Cooperative  
Account No. 369 Services  
Plant Retirements**





**Account 371 – Installations on Customer Premises  
(Outdoor Lighting – Conventional Fixtures)**

Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	15	9.35296e+10	1.209e+06
S0.5	15	9.17392e+10	1.19791e+06
S1	16	8.99534e+10	1.12738e+06
S1.5	16	8.81784e+10	1.11738e+06
S2	16	8.64932e+10	1.10803e+06
S2.5	16	8.49087e+10	1.10172e+06
S3	16	8.33874e+10	1.09794e+06
S3.5	16	8.15952e+10	1.0942e+06
S4	16	7.98829e+10	1.09045e+06
S4.5	16	7.86938e+10	1.08841e+06
S5	16	7.75753e+10	1.08916e+06
S5.5	16	7.71332e+10	1.09167e+06
S6	16	7.67576e+10	1.09418e+06
R1	15	9.27272e+10	1.19821e+06
R1.5	15	9.04704e+10	1.18372e+06
R2	15	8.83666e+10	1.16982e+06
R2.5	15	8.64128e+10	1.15977e+06
R3	16	8.45595e+10	1.09371e+06
R3.5	16	8.29331e+10	1.09036e+06
R4	16	8.13822e+10	1.08832e+06
R4.5	16	7.9815e+10	1.08714e+06
R5	16	7.834e+10	1.08678e+06
L0	16	9.98878e+10	1.22337e+06
L0.5	16	9.78251e+10	1.20221e+06
L1	16	9.58535e+10	1.1828e+06
L1.5	16	9.36195e+10	1.16637e+06
L2	16	9.15047e+10	1.15067e+06
L2.5	17	8.90301e+10	1.07829e+06
L3	17	8.66324e+10	1.06333e+06
L3.5	16	8.4362e+10	1.10559e+06
L4	16	8.21211e+10	1.09841e+06
L4.5	16	8.0599e+10	1.09472e+06
L5	16	7.91474e+10	1.0913e+06
O1	14	9.83751e+10	1.29882e+06
O1.5	15	1.0018e+11	1.27358e+06
O2	16	1.01164e+11	1.25088e+06
O2.5	17	1.04299e+11	1.26112e+06
O3	19	1.0715e+11	1.24324e+06
O3.5	21	1.0939e+11	1.22848e+06
O4	24	1.11223e+11	1.20288e+06

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
S6	16	7.67576e+10

Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S6	16	7.67576e+10	1.09418e+06
S5.5	16	7.71332e+10	1.09167e+06
S5	16	7.75753e+10	1.08916e+06
R5	16	7.834e+10	1.08678e+06
S4.5	16	7.86938e+10	1.08841e+06
L5	16	7.91474e+10	1.0913e+06
R4.5	16	7.9815e+10	1.08714e+06
S4	16	7.98829e+10	1.09045e+06
L4.5	16	8.0599e+10	1.09472e+06
R4	16	8.13822e+10	1.08832e+06
S3.5	16	8.15952e+10	1.0942e+06
L4	16	8.21211e+10	1.09841e+06
R3.5	16	8.29331e+10	1.09036e+06
S3	16	8.33874e+10	1.09794e+06
L3.5	16	8.4362e+10	1.10559e+06
R3	16	8.45595e+10	1.09371e+06
S2.5	16	8.49087e+10	1.10172e+06
R2.5	15	8.64128e+10	1.15977e+06
S2	16	8.64932e+10	1.10803e+06
L3	17	8.66324e+10	1.06333e+06
S1.5	16	8.81784e+10	1.11738e+06
R2	15	8.83666e+10	1.16982e+06
L2.5	17	8.90301e+10	1.07829e+06
S1	16	8.99534e+10	1.12738e+06
R1.5	15	9.04704e+10	1.18372e+06
L2	16	9.15047e+10	1.15067e+06
S0.5	15	9.17392e+10	1.19791e+06
R1	15	9.27272e+10	1.19821e+06
S0	15	9.35296e+10	1.209e+06
L1.5	16	9.36195e+10	1.16637e+06
L1	16	9.58535e+10	1.1828e+06
L0.5	16	9.78251e+10	1.20221e+06
O1	14	9.83751e+10	1.29882e+06
L0	16	9.98878e+10	1.22337e+06
O1.5	15	1.0018e+11	1.27358e+06
O2	16	1.01164e+11	1.25088e+06
O2.5	17	1.04299e+11	1.26112e+06
O3	19	1.0715e+11	1.24324e+06
O3.5	21	1.0939e+11	1.22848e+06
O4	24	1.11223e+11	1.20288e+06

Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

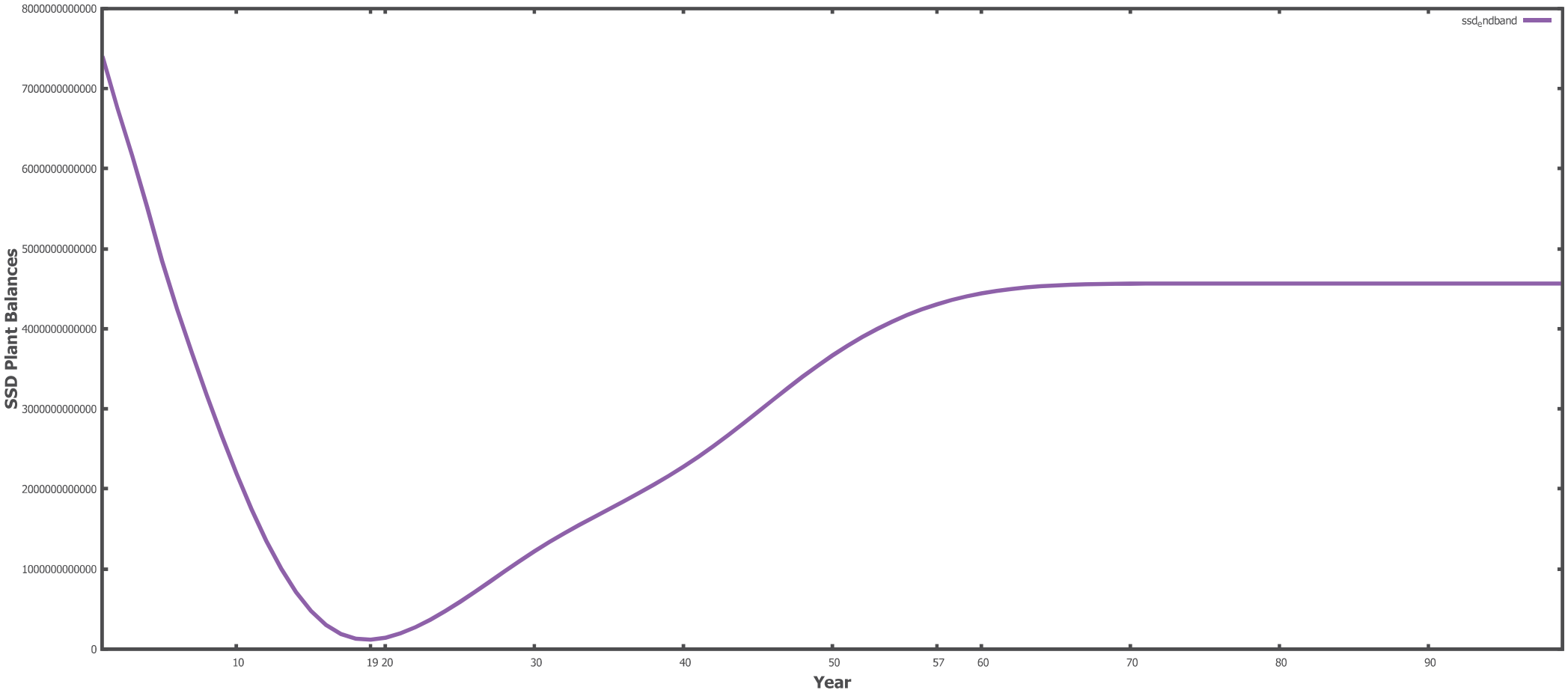
Iowa Curve	ASL	SSD Balance
S0	21	1.72436e+11
S0.5	21	1.64572e+11
S1	20	1.58087e+11
S1.5	20	1.49452e+11
S2	20	1.42604e+11
S2.5	20	1.38636e+11
S3	19	1.34905e+11
S3.5	19	1.28832e+11
S4	19	1.23413e+11
S4.5	19	1.2105e+11
S5	19	1.1895e+11
S5.5	19	1.18312e+11
S6	19	1.1776e+11
R1	21	1.75474e+11
R1.5	20	1.68259e+11
R2	20	1.56326e+11
R2.5	20	1.48539e+11
R3	20	1.42729e+11
R3.5	19	1.36986e+11
R4	19	1.30623e+11
R4.5	19	1.25755e+11
R5	19	1.21308e+11
L0	23	1.80335e+11
L0.5	23	1.7496e+11
L1	22	1.66982e+11
L1.5	21	1.6047e+11
L2	21	1.51831e+11
L2.5	20	1.4793e+11
L3	20	1.39059e+11
L3.5	20	1.3503e+11
L4	19	1.30834e+11
L4.5	19	1.25735e+11
L5	19	1.21272e+11
O1	23	1.8743e+11
O1.5	24	1.88846e+11
O2	24	1.89932e+11
O2.5	27	1.95207e+11
O3	30	1.98375e+11
O3.5	33	2.02825e+11
O4	37	2.06072e+11

Farmers Rural Electric Cooperative  
Account 371 -- Outdoor Lights

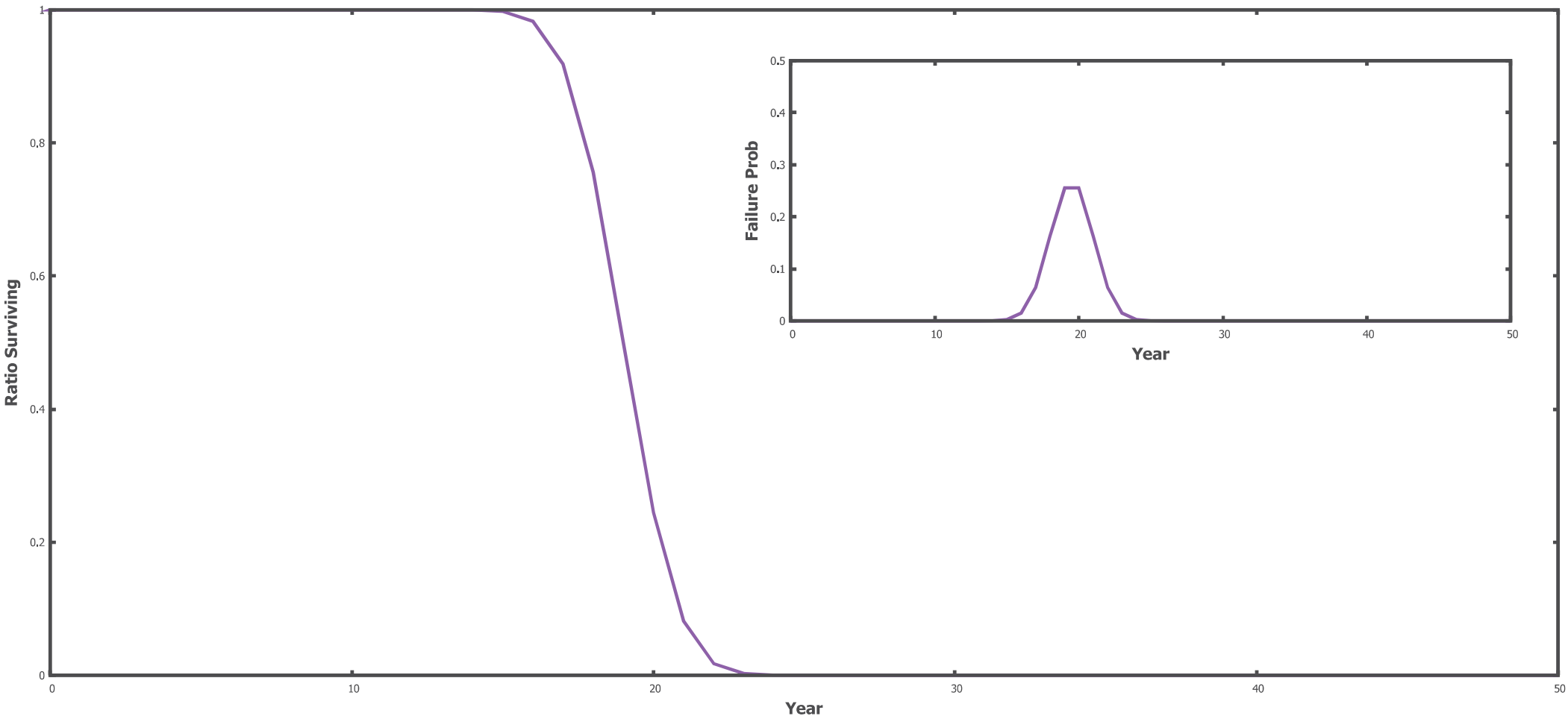
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
S6	19	1.1776e+11
S5.5	19	1.18312e+11
S5	19	1.1895e+11
S4.5	19	1.2105e+11
L5	19	1.21272e+11
R5	19	1.21308e+11
S4	19	1.23413e+11
L4.5	19	1.25735e+11
R4.5	19	1.25755e+11
S3.5	19	1.28832e+11
R4	19	1.30623e+11
L4	19	1.30834e+11
S3	19	1.34905e+11
L3.5	20	1.3503e+11
R3.5	19	1.36986e+11
S2.5	20	1.38636e+11
L3	20	1.39059e+11
S2	20	1.42604e+11
R3	20	1.42729e+11
L2.5	20	1.4793e+11
R2.5	20	1.48539e+11
S1.5	20	1.49452e+11
L2	21	1.51831e+11
R2	20	1.56326e+11
S1	20	1.58087e+11
L1.5	21	1.6047e+11
S0.5	21	1.64572e+11
L1	22	1.66982e+11
R1.5	20	1.68259e+11
S0	21	1.72436e+11
L0.5	23	1.7496e+11
R1	21	1.75474e+11
L0	23	1.80335e+11
O1	23	1.8743e+11
O1.5	24	1.88846e+11
O2	24	1.89932e+11
O2.5	27	1.95207e+11
O3	30	1.98375e+11
O3.5	33	2.02825e+11
O4	37	2.06072e+11

**Farmers Electric Cooperative  
Account No. 371 Outdoor Lighting  
Sum of Square Differences (SSD) Plant Balances 2013, 2016 and 2019 for S6**



**Account No. 371 -- Outdoor Lighting**  
**Iowa Curve: S6 ASL: 19 Years**



Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

Simulated Retirements for Iowa Curve S6 with ASL = 19

Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1958	2239	624	1615	0	2239	624	-624
1959	1576	0	3191	0	3815	0	-624
1960	19189	214	22166	0	23004	214	-838
1961	29038	413	50792	0	52042	413	-1251
1962	10331	3187	57935	0	62373	3187	-4438
1963	7384	1777	63542	0	69757	1777	-6215
1964	6878	1053	69368	0	76635	1053	-7268
1965	8983	1953	76397	0	85618	1953	-9221
1966	19779	4371	91805	0	105397	4371	-13592
1967	13017	1601	103221	0	118414	1601	-15192
1968	30709	1471	132459	0	149123	1471	-16664
1969	28473	1672	159260	0	177596	1672	-18336
1970	29663	4877	184046	0	207258	4877	-23213
1971	24429	8495	199979	0	231687	8495	-31708
1972	36578	4959	231599	0	268265	4958	-36667
1973	50595	5773	276421	5	318855	5767	-42434
1974	23049	4549	294921	41	341863	4508	-46942
1975	19299	8510	305710	214	360948	8296	-55238
1976	24029	3930	325809	820	384157	3110	-58348
1977	20112	3105	342816	2517	401753	589	-58937
1978	19567	2809	359573	6133	415186	-3324	-55613
1979	22256	5297	376532	11195	426247	-5898	-49715
1980	21797	3489	394840	15012	433031	-11523	-38191
1981	23558	4356	414042	15151	441438	-10796	-27396
1982	27185	5466	435761	12545	456078	-7079	-20317
1983	20239	7099	448901	10476	465841	-3378	-16940
1984	23040	4870	467071	10983	477898	-6113	-10827
1985	21764	4899	483936	13751	485910	-8852	-1974



Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

Simulated Retirements for Iowa Curve S6 with ASL = 19

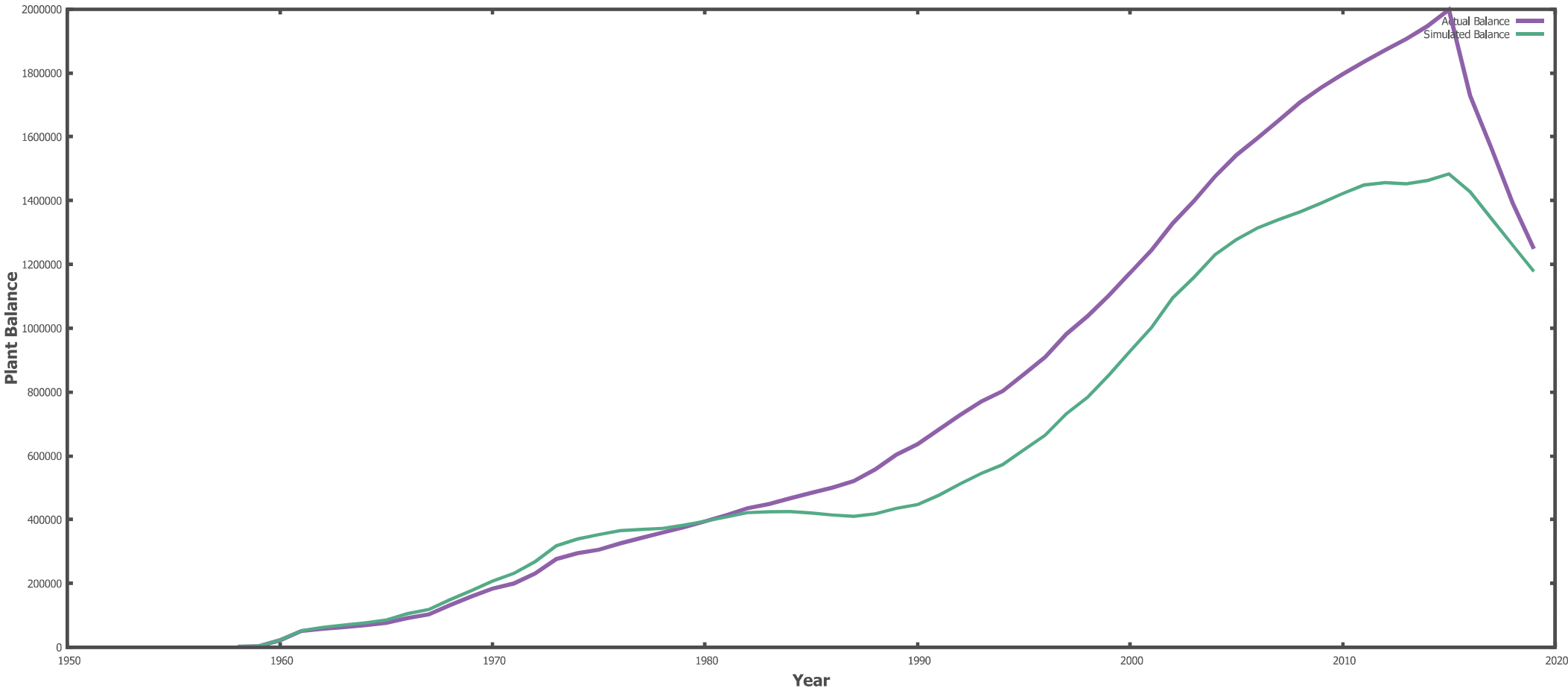
Year	Additions	Actual Retirements	Actual Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1986	21833	5215	500554	17760	489984	-12545	10570
1987	26013	5454	521113	22093	493904	-16639	27209
1988	40729	4548	557294	25730	508903	-21182	48391
1989	52829	6124	603999	28154	533578	-22030	70421
1990	44818	12211	636606	30265	548132	-18054	88474
1991	55682	9722	682566	32813	571000	-23091	111566
1992	58341	12502	728405	34062	595279	-21560	133126
1993	54552	12846	770111	31897	617935	-19051	152176
1994	48257	15364	803005	27400	638793	-12036	164212
1995	67490	14708	855787	23594	682689	-8886	173099
1996	68093	14600	909280	21746	729036	-7145	180244
1997	90024	17267	982037	21197	797863	-3931	184175
1998	75795	19928	1037904	21373	852285	-1445	185619
1999	92700	27569	1103035	22082	922903	5487	180133
2000	97638	27247	1173427	22956	997585	4291	175842
2001	96319	25414	1244332	23443	1070461	1971	173871
2002	116293	32053	1328571	23279	1163475	8774	165096
2003	92566	22684	1398452	22816	1233225	-131	165227
2004	105570	27923	1476099	22856	1315939	5067	160160
2005	89860	23244	1542716	24406	1381393	-1163	161323
2006	84490	30938	1596268	28444	1437439	2494	158829
2007	78080	22499	1651849	34860	1480659	-12361	171190
2008	77805	21233	1708421	41807	1516657	-20574	191765
2009	82701	36351	1754771	47391	1551967	-11040	202805
2010	85835	44306	1796301	51235	1586567	-6929	209734
2011	87313	48914	1834700	53664	1620215	-4751	214485
2012	75490	38117	1872073	55107	1640598	-16990	231475
2013	72236	37166	1907143	57041	1655792	-19875	251351

Farmers Rural Electric Cooperative  
 Account 371 -- Outdoor Lights

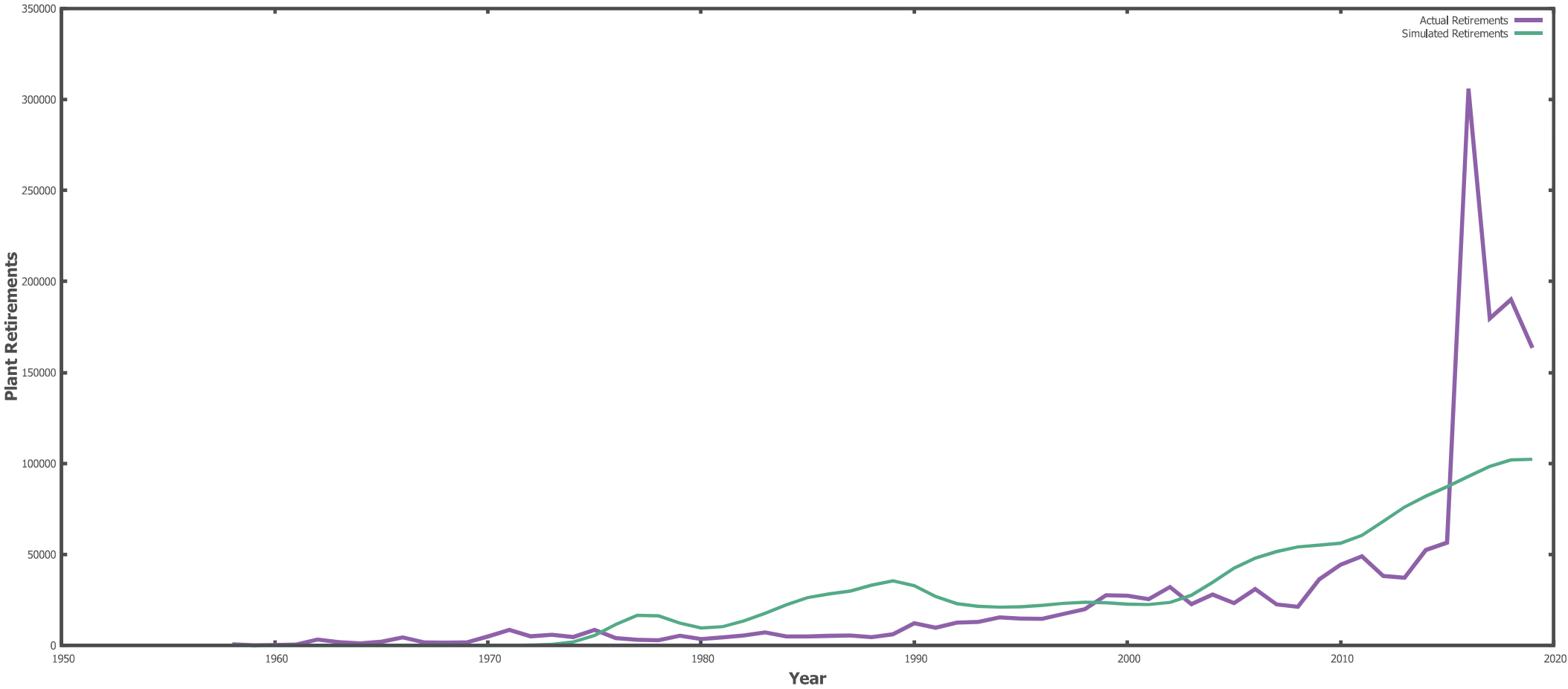
Simulated Retirements for Iowa Curve S6 with ASL = 19

Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
2014	92453	52397	1947198	61374	1686871	-8977	260327
2015	107780	56458	1998521	68169	1726482	-11711	272039
2016	36306	305960	1728867	75449	1687339	230511	41528
2017	14977	179629	1564215	81735	1620581	97894	-56366
2018	18538	190072	1392680	87278	1551841	102794	-159161
2019	19677	163476	1248881	92727	1478791	70750	-229910

**Farmers Electric Cooperative  
Account No. 371 Outdoor Lighting  
Plant Balances**



**Farmers Electric Cooperative  
Account No. 371 Outdoor Lighting  
Plant Retirements**



## **Account 373 – Street Lighting**

Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
S0	21	6.11913e+08	106211
S0.5	22	5.78304e+08	100316
S1	22	5.49563e+08	97458
S1.5	22	5.05587e+08	93953.6
S2	22	4.69854e+08	91566.6
S2.5	22	4.25867e+08	86969.8
S3	23	3.88068e+08	79292.2
S3.5	23	3.26922e+08	72305.2
S4	23	2.86805e+08	66915.7
S4.5	23	2.44429e+08	63227.3
S5	23	2.39539e+08	61687.7
S5.5	23	2.78626e+08	64711.1
S6	23	3.8176e+08	75351.1
R1	20	5.38685e+08	102967
R1.5	20	4.95627e+08	98161.4
R2	20	4.6279e+08	95008
R2.5	21	4.09642e+08	86532.3
R3	21	3.69617e+08	82648.3
R3.5	22	3.24861e+08	74561.7
R4	22	2.88043e+08	69981.8
R4.5	22	2.54525e+08	65022.8
R5	23	2.49084e+08	63158.1
L0	24	6.74101e+08	111630
L0.5	24	6.54205e+08	107095
L1	24	6.40411e+08	104317
L1.5	25	5.96546e+08	97658.2
L2	25	5.60505e+08	93821.8
L2.5	25	4.97192e+08	86484.4
L3	25	4.455e+08	81290.7
L3.5	24	3.69455e+08	76279.4
L4	23	3.09861e+08	71985
L4.5	23	2.62396e+08	64321.9
L5	23	2.39032e+08	62068.5
O1	20	6.33966e+08	115687
O1.5	21	6.39676e+08	116179
O2	23	6.40376e+08	114537
O2.5	28	6.68672e+08	112848
O3	28	6.8897e+08	120122
O3.5	37	7.04446e+08	115360
O4	45	7.11788e+08	113122

Best fitting Iowa Curve and ASL

Iowa Curve	ASL	SSD Removals
L5	23	2.39032e+08

Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

Iowa Curves -- Sorted

Iowa Curve	ASL	SSD Removals	Abs Diff Removals
L5	23	2.39032e+08	62068.5
S5	23	2.39539e+08	61687.7
S4.5	23	2.44429e+08	63227.3
R5	23	2.49084e+08	63158.1
R4.5	22	2.54525e+08	65022.8
L4.5	23	2.62396e+08	64321.9
S5.5	23	2.78626e+08	64711.1
S4	23	2.86805e+08	66915.7
R4	22	2.88043e+08	69981.8
L4	23	3.09861e+08	71985
R3.5	22	3.24861e+08	74561.7
S3.5	23	3.26922e+08	72305.2
L3.5	24	3.69455e+08	76279.4
R3	21	3.69617e+08	82648.3
S6	23	3.8176e+08	75351.1
S3	23	3.88068e+08	79292.2
R2.5	21	4.09642e+08	86532.3
S2.5	22	4.25867e+08	86969.8
L3	25	4.455e+08	81290.7
R2	20	4.6279e+08	95008
S2	22	4.69854e+08	91566.6
R1.5	20	4.95627e+08	98161.4
L2.5	25	4.97192e+08	86484.4
S1.5	22	5.05587e+08	93953.6
R1	20	5.38685e+08	102967
S1	22	5.49563e+08	97458
L2	25	5.60505e+08	93821.8
S0.5	22	5.78304e+08	100316
L1.5	25	5.96546e+08	97658.2
S0	21	6.11913e+08	106211
O1	20	6.33966e+08	115687
O1.5	21	6.39676e+08	116179
O2	23	6.40376e+08	114537
L1	24	6.40411e+08	104317
L0.5	24	6.54205e+08	107095
O2.5	28	6.68672e+08	112848
L0	24	6.74101e+08	111630
O3	28	6.8897e+08	120122
O3.5	37	7.04446e+08	115360
O4	45	7.11788e+08	113122

Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

ASL with the Minimum Sum of Squared Differences for years 2013, 2016, and 2019

Iowa Curve	ASL	SSD Balance
S0	26	1.01722e+09
S0.5	25	8.76892e+08
S1	24	7.4186e+08
S1.5	24	6.15536e+08
S2	23	4.48159e+08
S2.5	23	3.32965e+08
S3	22	2.50232e+08
S3.5	22	1.07159e+08
S4	22	4.58732e+07
S4.5	22	6.50596e+07
S5	22	1.78844e+08
S5.5	22	3.52751e+08
S6	22	6.0817e+08
R1	25	9.66823e+08
R1.5	24	8.04221e+08
R2	23	6.39793e+08
R2.5	23	4.86595e+08
R3	22	2.86962e+08
R3.5	22	1.42919e+08
R4	22	5.93927e+07
R4.5	22	2.15895e+07
R5	22	8.3807e+07
L0	31	1.17415e+09
L0.5	29	1.07698e+09
L1	28	9.89993e+08
L1.5	26	8.24343e+08
L2	25	6.79527e+08
L2.5	24	5.23244e+08
L3	24	3.56711e+08
L3.5	23	1.98859e+08
L4	23	1.41574e+08
L4.5	22	9.88777e+07
L5	22	8.48607e+07
O1	31	1.19651e+09
O1.5	32	1.1967e+09
O2	34	1.19903e+09
O2.5	40	1.2399e+09
O3	48	1.22315e+09
O3.5	54	1.22564e+09
O4	62	1.27415e+09

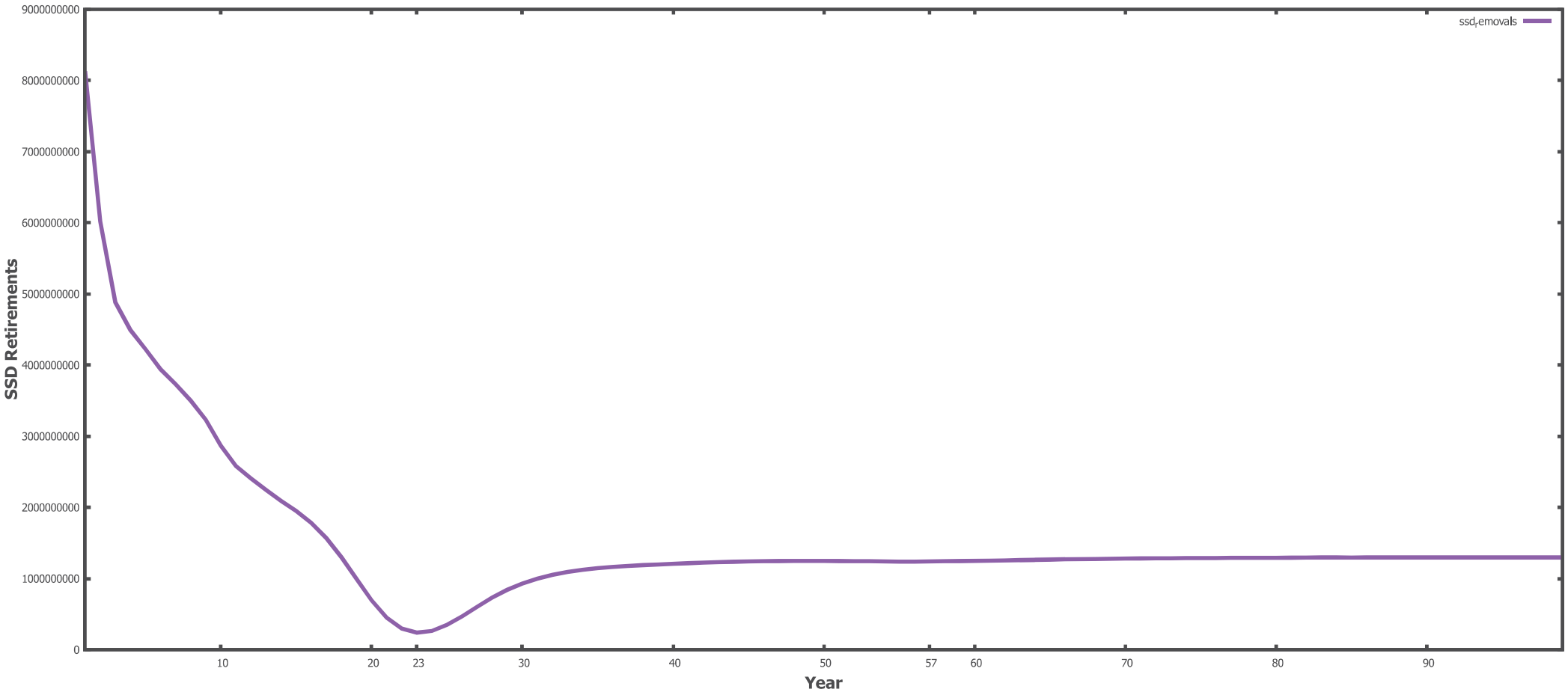


Farmers Rural Electric Cooperative  
Account 373 - Street Lights

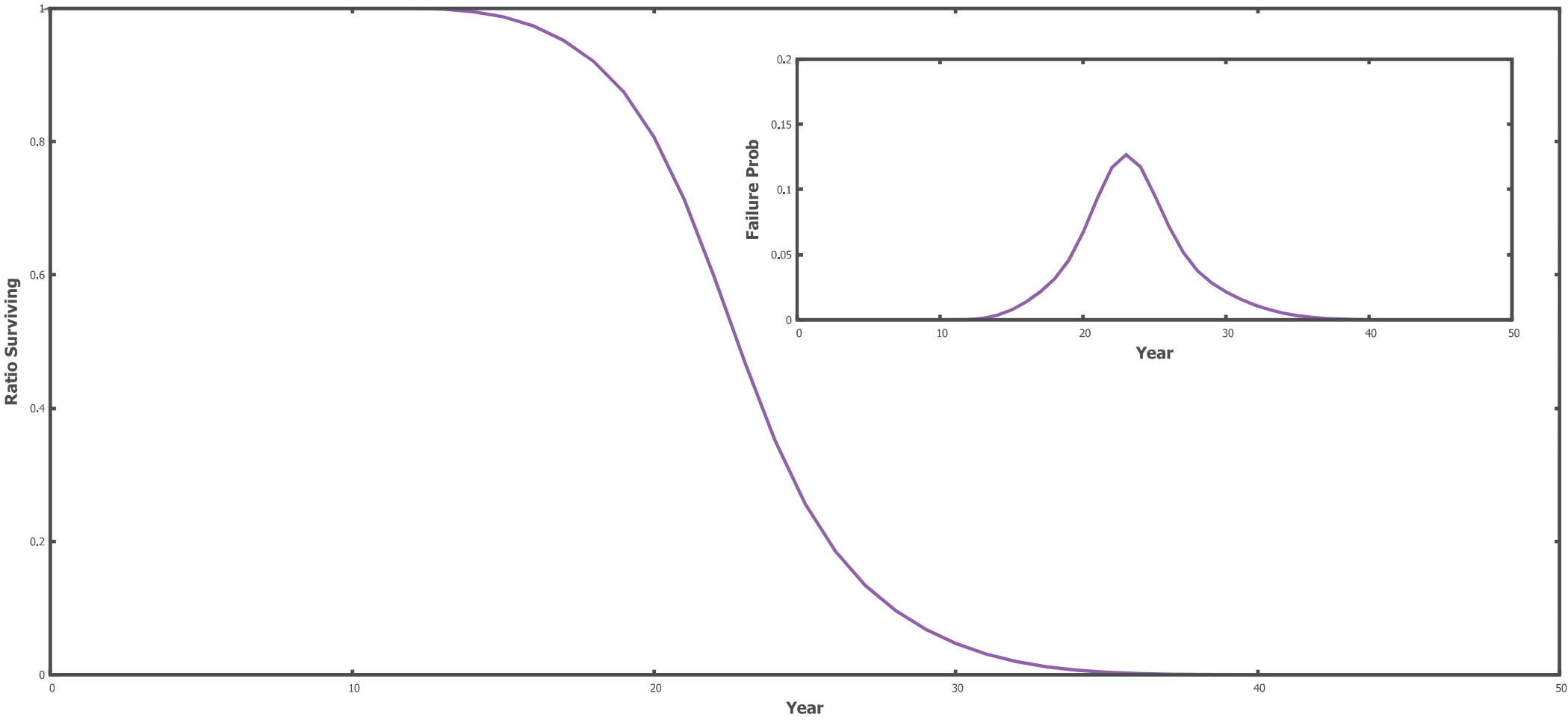
Iowa Curves -- Sorted by SSD Balance

Iowa Curve	ASL	SSD Balance
R4.5	22	2.15895e+07
S4	22	4.58732e+07
R4	22	5.93927e+07
S4.5	22	6.50596e+07
R5	22	8.3807e+07
L5	22	8.48607e+07
L4.5	22	9.88777e+07
S3.5	22	1.07159e+08
L4	23	1.41574e+08
R3.5	22	1.42919e+08
S5	22	1.78844e+08
L3.5	23	1.98859e+08
S3	22	2.50232e+08
R3	22	2.86962e+08
S2.5	23	3.32965e+08
S5.5	22	3.52751e+08
L3	24	3.56711e+08
S2	23	4.48159e+08
R2.5	23	4.86595e+08
L2.5	24	5.23244e+08
S6	22	6.0817e+08
S1.5	24	6.15536e+08
R2	23	6.39793e+08
L2	25	6.79527e+08
S1	24	7.4186e+08
R1.5	24	8.04221e+08
L1.5	26	8.24343e+08
S0.5	25	8.76892e+08
R1	25	9.66823e+08
L1	28	9.89993e+08
S0	26	1.01722e+09
L0.5	29	1.07698e+09
L0	31	1.17415e+09
O1	31	1.19651e+09
O1.5	32	1.1967e+09
O2	34	1.19903e+09
O3	48	1.22315e+09
O3.5	54	1.22564e+09
O2.5	40	1.2399e+09
O4	62	1.27415e+09

Farmers Electric Cooperative  
Account No. 373 Street Lighting  
Sum of Square Differences (SSD) Retirements for L5



**Account No. 373 -- Street Lighting**  
**Iowa Curve: L5 ASL: 23 Years**



Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

Simulated Retirements for Iowa Curve L5 with ASL = 23

Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1956	397	0	397	0	397	0	0
1957	198	0	595	0	595	0	0
1958	1727	146	2176	0	2322	146	-146
1959	1258	0	3434	0	3580	0	-146
1960	305	213	3526	0	3885	213	-359
1961	572	297	3800	0	4456	297	-656
1962	1944	1455	4289	0	6400	1455	-2112
1963	0	1663	2625	0	6400	1663	-3775
1964	0	0	2625	0	6400	0	-3775
1965	0	0	2625	0	6400	0	-3775
1966	0	0	2625	0	6400	0	-3775
1967	0	0	2625	0	6400	-0	-3775
1968	0	0	2625	0	6400	-0	-3775
1969	0	0	2625	1	6400	-1	-3774
1970	0	0	2625	2	6398	-2	-3772
1971	0	0	2625	6	6392	-6	-3766
1972	0	0	2625	15	6377	-15	-3751
1973	0	0	2625	30	6347	-30	-3722
1974	0	0	2625	53	6294	-53	-3669
1975	0	0	2625	86	6208	-86	-3583
1976	0	0	2625	133	6075	-133	-3450
1977	0	0	2625	199	5876	-199	-3251
1978	5036	351	7311	288	10624	62	-3313
1979	0	0	7311	394	10230	-394	-2919
1980	0	0	7311	500	9730	-500	-2419
1981	0	0	7311	584	9146	-584	-1835
1982	0	0	7311	630	8516	-630	-1205
1983	0	0	7311	634	7882	-634	-571

Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

Simulated Retirements for Iowa Curve L5 with ASL = 23

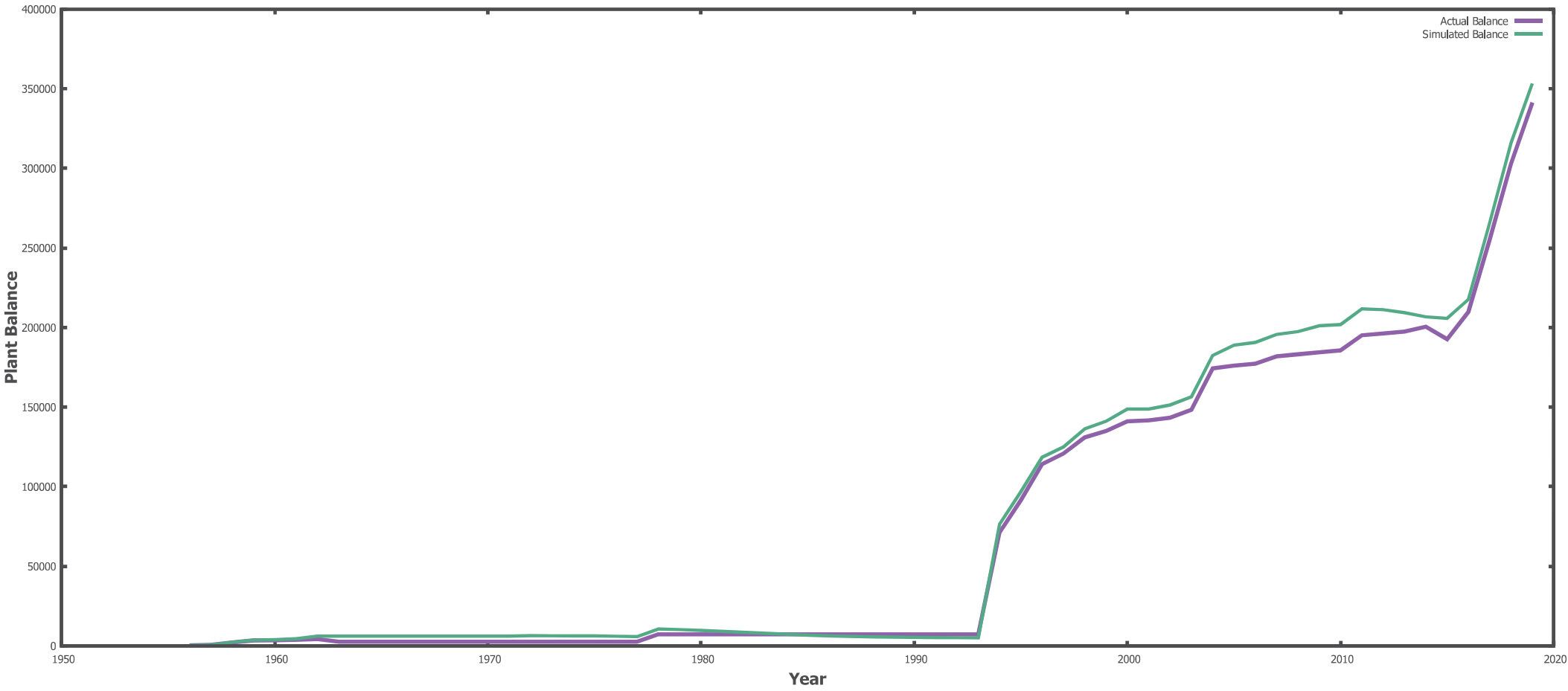
Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
1984	0	0	7311	604	7278	-604	33
1985	0	0	7311	540	6738	-540	573
1986	0	0	7311	448	6290	-448	1021
1987	0	0	7311	348	5942	-348	1369
1988	0	0	7311	259	5683	-259	1628
1989	0	0	7311	190	5493	-190	1818
1990	0	0	7311	140	5353	-140	1958
1991	0	0	7311	107	5246	-107	2065
1992	0	0	7311	92	5154	-92	2157
1993	0	0	7311	91	5063	-91	2248
1994	71565	7676	71201	105	76523	7570	-5322
1995	20518	301	91418	132	96909	169	-5492
1996	21717	579	114203	173	118454	406	-4251
1997	6824	230	120796	240	125037	-10	-4241
1998	11649	1446	131000	345	136342	1101	-5342
1999	5313	745	135086	474	141181	271	-6095
2000	8165	2224	141027	590	148755	1633	-7728
2001	603	0	141630	639	148719	-639	-7089
2002	3197	1509	143318	591	151324	917	-8006
2003	5675	627	148365	480	156519	147	-8153
2004	26227	179	174413	359	182387	-180	-7974
2005	6788	5135	176066	261	188913	4874	-12848
2006	1944	725	177284	205	190651	520	-13367
2007	5216	540	181959	231	195636	309	-13677
2008	2213	1008	183165	397	197452	610	-14287
2009	4399	3192	184372	735	201116	2457	-16744
2010	2056	806	185622	1295	201877	-489	-16255
2011	11956	2463	195115	2077	211756	386	-16641

Farmers Rural Electric Cooperative  
 Account 373 - Street Lights

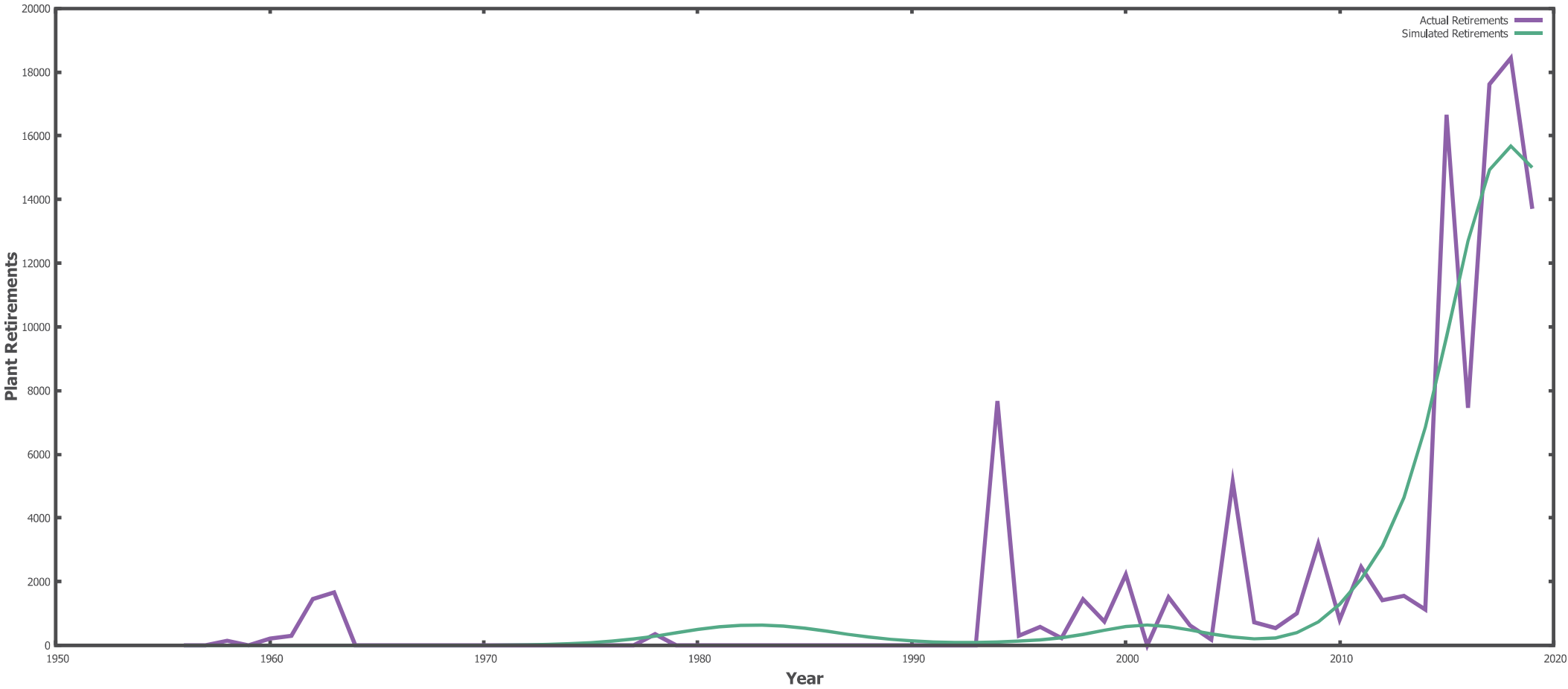
Simulated Retirements for Iowa Curve L5 with ASL = 23

Year	Additions	Actual Retirements	Balance	Simulated Retirements	Sim Balance	Difference in Retirements	Difference in Plant Balance
2012	2560	1418	196257	3123	211193	-1705	-14936
2013	2740	1555	197441	4639	209293	-3084	-11852
2014	4257	1126	200572	6852	206698	-5726	-6126
2015	8755	16660	192667	9706	205747	6954	-13080
2016	24582	7456	209792	12698	217631	-5242	-7838
2017	63065	17620	255238	14937	265759	2683	-10521
2018	66065	18441	302862	15676	316148	2765	-13286
2019	52212	13707	341367	15004	353356	-1297	-11990

# Farmers Electric Cooperative Account No. 373 Street Lighting Plant Balances



**Farmers Electric Cooperative  
Account No. 373 Street Lighting  
Plant Retirements**





# **Appendix B**

## **Analysis of Net Salvage**

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 364 - Poles  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	174,526	6,175	197,548	(191,373)	-109.65%									
2008	116,138	5,887	120,893	(115,006)	-99.03%	-105.41%								
2009	204,817	6,295	164,366	(158,072)	-77.18%	-85.08%	-93.74%							
2010	235,358	5,790	220,043	(214,253)	-91.03%	-84.59%	-87.60%	-92.87%						
2011	241,249	6,652	199,476	(192,824)	-79.93%	-85.41%	-82.94%	-85.28%	-89.66%					
2012	211,687	8,997	163,329	(154,332)	-72.91%	-76.65%	-81.57%	-80.56%	-82.68%	-86.66%				
2013	220,009	9,864	204,454	(194,590)	-88.45%	-80.83%	-80.50%	-83.23%	-82.12%	-83.72%	-86.94%			
2014	315,544	11,994	284,733	(272,738)	-86.43%	-87.26%	-83.19%	-82.40%	-84.06%	-83.07%	-84.27%	-86.85%		
2015	417,078	14,375	303,592	(289,217)	-69.34%	-76.70%	-79.42%	-78.23%	-78.52%	-80.32%	-79.97%	-81.10%	-83.43%	
2016	347,537	24,125	246,600	(222,475)	-64.01%	-66.92%	-72.62%	-75.30%	-74.96%	-75.65%	-77.47%	-77.44%	-78.53%	-80.71%
2017	360,814	16,024	239,039	(223,014)	-61.81%	-62.89%	-65.28%	-69.91%	-72.37%	-72.43%	-73.29%	-75.06%	-75.23%	-76.27%
2018	509,398	12,426	321,500	(309,073)	-60.67%	-61.14%	-61.96%	-63.85%	-67.50%	-69.62%	-69.92%	-70.84%	-72.50%	-72.81%
2019	420,800	10,313	303,042	(292,729)	-69.56%	-64.70%	-63.89%	-63.92%	-65.02%	-67.87%	-69.61%	-69.86%	-70.66%	-72.12%
2020	Trend Estimate					-57.65%								

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 365 - Overhead Conductor  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	101,842	11,524	102,851	(91,328)	-89.68%									
2008	87,827	14,590	91,012	(76,422)	-87.01%	-88.44%								
2009	128,966	23,087	95,566	(72,479)	-56.20%	-68.68%	-75.39%							
2010	132,064	29,669	95,002	(65,333)	-49.47%	-52.80%	-61.41%	-67.80%						
2011	179,640	37,578	146,465	(108,888)	-60.61%	-55.89%	-55.98%	-61.14%	-65.75%					
2012	151,274	35,025	119,807	(84,782)	-56.05%	-58.53%	-55.94%	-56.00%	-60.01%	-63.87%				
2013	172,938	27,650	148,478	(120,828)	-69.87%	-63.42%	-62.42%	-59.73%	-59.13%	-62.01%	-64.96%			
2014	239,988	30,111	215,391	(185,280)	-77.20%	-74.13%	-69.28%	-67.19%	-64.52%	-63.45%	-65.34%	-67.42%		
2015	324,912	33,639	225,717	(192,078)	-59.12%	-66.80%	-67.52%	-65.57%	-64.73%	-63.06%	-62.39%	-63.92%	-65.64%	
2016	284,026	33,203	186,619	(153,415)	-54.01%	-56.74%	-62.52%	-63.77%	-62.77%	-62.48%	-61.33%	-60.92%	-62.26%	-63.81%
2017	336,701	41,210	193,138	(151,929)	-45.12%	-49.19%	-52.60%	-57.58%	-59.15%	-58.83%	-59.02%	-58.33%	-58.19%	-59.43%
2018	440,482	29,783	272,166	(242,383)	-55.03%	-50.74%	-51.61%	-53.37%	-56.89%	-58.14%	-57.97%	-58.20%	-57.69%	-57.61%
2019	283,086	20,300	200,600	(180,300)	-63.69%	-58.42%	-54.19%	-54.16%	-55.12%	-57.90%	-58.89%	-58.70%	-58.84%	-58.36%
2020	Trend Estimate					-51.13%								

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 367 - Underground Conductor  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	752	324	936	(612)	-81.37%									
2008	788	952	954	(2)	-0.24%	-39.84%								
2009	4,515	601	3,757	(3,156)	-69.90%	-59.55%	-62.25%							
2010	2,107	570	2,268	(1,699)	-80.63%	-73.32%	-65.54%	-67.00%						
2011	33,782	3,010	24,588	(21,578)	-63.88%	-64.86%	-65.42%	-64.18%	-64.48%					
2012	4,003	1,287	3,543	(2,255)	-56.35%	-63.08%	-64.00%	-64.60%	-63.48%	-63.77%				
2013	10,391	1,577	9,591	(8,014)	-77.12%	-71.34%	-66.11%	-66.72%	-66.98%	-66.03%	-66.24%			
2014	5,855	326	5,442	(5,116)	-87.38%	-80.82%	-75.98%	-68.41%	-68.87%	-68.95%	-68.07%	-68.23%		
2015	14,721	918	10,620	(9,702)	-65.91%	-72.02%	-73.73%	-71.74%	-67.88%	-68.25%	-68.35%	-67.65%	-67.78%	
2016	8,001	2,390	5,917	(3,527)	-44.09%	-58.22%	-64.20%	-67.64%	-66.59%	-65.40%	-65.80%	-66.02%	-65.41%	-65.55%
2017	8,100	948	5,334	(4,385)	-54.14%	-49.14%	-57.15%	-61.98%	-65.32%	-64.62%	-64.32%	-64.72%	-64.97%	-64.42%
2018	6,059	3,370	3,923	(553)	-9.13%	-34.88%	-38.20%	-49.26%	-54.48%	-58.91%	-58.73%	-60.64%	-61.10%	-61.50%
2019	59,324	296	46,439	(46,143)	-77.78%	-71.42%	-69.52%	-67.02%	-66.85%	-68.03%	-68.87%	-68.44%	-67.41%	-67.59%
2020	Trend Estimate					-60.62%								

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 368 - Transformers  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	108,751	-	47,032	(47,032)	-43.25%									
2008	46,897	341	35,770	(35,429)	-75.55%	-52.98%								
2009	74,067	235	34,456	(34,221)	-46.20%	-57.58%	-50.79%							
2010	206,737	199	23,830	(23,631)	-11.43%	-20.60%	-28.47%	-32.15%						
2011	159,852	1,198	48,352	(47,154)	-29.50%	-19.31%	-23.83%	-28.80%	-31.44%					
2012	119,261	200	49,305	(49,105)	-41.17%	-34.49%	-24.68%	-27.52%	-31.24%	-33.06%				
2013	304,446	1,542	59,407	(57,864)	-19.01%	-25.25%	-26.41%	-22.49%	-24.52%	-27.15%	-28.87%			
2014	410,786	13,358	77,637	(64,278)	-15.65%	-17.08%	-20.52%	-21.96%	-20.15%	-21.66%	-23.58%	-25.07%		
2015	228,501	33,063	81,265	(48,202)	-21.10%	-17.59%	-18.05%	-20.64%	-21.80%	-20.30%	-21.58%	-23.21%	-24.52%	
2016	287,426	101,190	90,731	10,459	3.64%	-7.32%	-11.01%	-12.99%	-15.48%	-16.96%	-16.29%	-17.53%	-19.01%	-20.37%
2017	296,905	64,687	62,675	2,013	0.68%	2.13%	-4.40%	-8.17%	-10.33%	-12.56%	-14.06%	-13.79%	-14.94%	-16.27%
2018	523,455	57,437	94,585	(37,148)	-7.10%	-4.28%	-2.23%	-5.45%	-7.85%	-9.51%	-11.25%	-12.50%	-12.41%	-13.37%
2019	443,741	57,941	97,802	(39,861)	-8.98%	-7.96%	-5.93%	-4.16%	-6.33%	-8.08%	-9.41%	-10.86%	-11.94%	-11.90%
2020	Trend Estimate						6.61%							

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 369 - Services  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	39,550	6,974	41,476	(34,502)	-87.24%									
2008	45,604	10,191	43,470	(33,279)	-72.97%	-79.60%								
2009	48,452	11,388	35,790	(24,401)	-50.36%	-61.33%	-69.00%							
2010	46,805	11,624	39,268	(27,644)	-59.06%	-54.64%	-60.57%	-66.42%						
2011	46,051	14,534	34,538	(20,004)	-43.44%	-51.31%	-50.99%	-56.35%	-61.75%					
2012	45,292	12,069	37,941	(25,872)	-57.12%	-50.22%	-53.22%	-52.48%	-56.50%	-60.98%				
2013	50,832	8,992	43,741	(34,749)	-68.36%	-63.07%	-56.71%	-57.29%	-55.88%	-58.63%	-62.14%			
2014	55,724	9,660	48,869	(39,209)	-70.36%	-69.41%	-65.74%	-60.55%	-60.27%	-58.63%	-60.56%	-63.35%		
2015	65,869	11,633	44,521	(32,887)	-49.93%	-59.29%	-61.97%	-60.96%	-57.90%	-58.08%	-57.03%	-58.83%	-61.36%	
2016	60,155	12,992	40,845	(27,853)	-46.30%	-48.20%	-54.99%	-57.92%	-57.79%	-55.75%	-56.16%	-55.49%	-57.21%	-59.56%
2017	51,083	10,725	32,137	(21,413)	-41.92%	-44.29%	-46.39%	-52.12%	-55.03%	-55.32%	-53.86%	-54.44%	-54.02%	-55.70%
2018	48,864	11,419	29,835	(18,416)	-37.69%	-39.85%	-42.27%	-44.51%	-49.62%	-52.49%	-53.04%	-52.00%	-52.70%	-52.48%
2019	47,607	5,748	33,769	(28,021)	-58.86%	-48.14%	-45.98%	-46.08%	-47.00%	-50.96%	-53.28%	-53.69%	-52.69%	-53.27%
2020	Trend Estimate						-42.28%							

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 370 - Meters  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	601,475	-	-	-	0.00%									
2008	646,429	12,872	-	12,872	1.99%	1.03%								
2009	1,103	-	-	-	0.00%		1.03%							
2010	7,970	-	-	-	0.00%	0.00%	1.96%	1.02%						
2011	18,719	-	424	(424)	-2.27%	-1.59%	-1.53%	1.85%	0.98%					
2012	26,845	3,825	-	3,825	14.25%	7.46%	6.35%	6.22%	2.32%	1.25%				
2013	3,302	52,544	384	52,160	1579.65%	185.71%	113.70%	97.75%	95.89%	9.72%	5.24%			
2014	45,466	-	-	-	0.00%	106.95%	74.04%	58.90%	54.31%	53.73%	9.13%	5.06%		
2015	23,466	-	103	(103)	-0.44%	-0.15%	72.07%	56.40%	47.08%	44.09%	43.71%	8.84%	4.97%	
2016	8,862	-	140	(140)	-1.58%	-0.75%	-0.31%	64.02%	51.64%	43.67%	41.09%	40.75%	8.72%	4.93%
2017	-	-	99	(99)	NA	-2.70%	-1.06%	-0.44%	63.90%	51.55%	43.60%	41.01%	40.68%	8.71%
2018	4,018	-	97	(97)	-2.42%	-4.88%	-2.61%	-1.21%	-0.54%	60.77%	49.61%	42.18%	39.76%	39.44%
2019	-	-	-	-	NA	-2.42%	-4.88%	-2.61%	-1.21%	-0.54%	60.77%	49.61%	42.18%	39.76%
2020	Trend Estimate						19.31%							

**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 371 - Installations on Customer Premises (Outdoor Lighting)  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	22,499	4,076	18,648	(14,572)	-64.77%									
2008	21,233	3,679	16,189	(12,509)	-58.92%	-61.93%								
2009	36,351	4,264	22,189	(17,924)	-49.31%		-56.20%							
2010	44,306	5,142	31,205	(26,063)	-58.82%	-54.54%	-55.45%	-57.13%						
2011	48,914	3,271	31,333	(28,062)	-57.37%	-58.06%	-55.61%	-56.07%	-57.20%					
2012	38,117	2,968	25,996	(23,028)	-60.41%	-58.70%	-58.74%	-56.70%	-56.95%	-57.78%				
2013	37,166	12,277	28,544	(16,267)	-43.77%	-52.20%	-54.23%	-55.44%	-54.35%	-54.78%	-55.69%			
2014	52,397	8,473	41,434	(32,960)	-62.90%	-54.96%	-56.59%	-56.81%	-57.21%	-56.09%	-56.31%	-56.94%		
2015	56,458	11,210	34,611	(23,401)	-41.45%	-51.78%	-49.74%	-51.95%	-53.09%	-54.00%	-53.46%	-53.80%	-54.49%	
2016	305,960	8,961	120,894	(111,933)	-36.58%	-37.34%	-40.57%	-40.83%	-42.36%	-43.72%	-44.87%	-45.13%	-45.58%	-46.23%
2017	179,629	8,091	115,331	(107,240)	-59.70%	-45.14%	-44.75%	-46.35%	-46.20%	-47.01%	-47.71%	-48.36%	-48.40%	-48.67%
2018	190,072	16,652	121,882	(105,230)	-55.36%	-57.47%	-48.01%	-47.51%	-48.53%	-48.32%	-48.86%	-49.31%	-49.76%	-49.74%
2019	163,476	20,388	132,540	(112,152)	-68.60%	-61.49%	-60.88%	-52.02%	-51.36%	-52.00%	-51.69%	-52.01%	-52.26%	-52.52%
2020	Trend Estimate					-50.45%								



**Farmers Rural Electric Cooperative  
Retirement and Salvage Analysis  
Account 373 - Street Lighting  
2007-2019**

<b>Year</b>	<b>Retirements</b>	<b>Salvage</b>	<b>Removal Cost</b>	<b>Net Salvage</b>	<b>Net Salv. %</b>	<b>2- yr Net Salv. %</b>	<b>3- yr Net Salv. %</b>	<b>4- yr Net Salv. %</b>	<b>5- yr Net Salv. %</b>	<b>6- yr Net Salv. %</b>	<b>7- yr Net Salv. %</b>	<b>8- yr Net Salv. %</b>	<b>9- yr Net Salv. %</b>	<b>10- yr Net Salv. %</b>
2007	540	-	512	(512)	-94.79%									
2008	1,008	-	813	(813)	-80.71%	-85.62%								
2009	3,192	-	2,328	(2,328)	-72.95%	-74.81%	-77.09%							
2010	806	-	731	(731)	-90.71%	-76.53%	-77.37%	-79.07%						
2011	2,463	-	1,765	(1,765)	-71.67%	-76.37%	-74.68%	-75.49%	-76.79%					
2012	1,418	-	1,022	(1,022)	-72.05%	-71.81%	-75.06%	-74.20%	-74.94%	-76.08%				
2013	1,555	-	1,800	(1,800)	-115.72%	-94.89%	-84.37%	-85.19%	-81.05%	-81.02%	-81.69%			
2014	1,126	-	1,019	(1,019)	-90.50%	-105.13%	-93.68%	-85.42%	-86.00%	-82.06%	-81.94%	-82.51%		
2015	16,660	-	15,501	(15,501)	-93.05%	-92.88%	-94.72%	-93.17%	-90.89%	-90.89%	-88.78%	-88.49%	-88.61%	
2016	7,456	-	3,565	(3,565)	-47.81%	-79.06%	-79.57%	-81.67%	-81.18%	-80.42%	-80.68%	-79.97%	-79.99%	-80.21%
2017	17,620	-	10,323	(10,323)	-58.59%	-55.38%	-70.42%	-70.94%	-72.51%	-72.50%	-72.46%	-72.76%	-72.77%	-72.92%
2018	18,441	-	10,795	(10,795)	-58.54%	-58.56%	-56.72%	-66.78%	-67.21%	-68.41%	-68.49%	-68.61%	-68.87%	-69.06%
2019	13,707	-	8,285	(8,285)	-60.44%	-59.35%	-59.08%	-57.61%	-65.60%	-65.98%	-66.99%	-67.08%	-67.22%	-67.45%
2020	Trend Estimate					-66.25%								

# **Appendix C**

## **Proposed Depreciation Rates**

**Farmers Rural Electric Cooperative**

Proposed Depreciation Rates

Based on 2020 Depreciation Study

Acct	Description	Current Rate	Average Service Life ASL	Iowa Curve	Proposed ASL	Proposed Net Salvage Percentage	Proposed Depreciation Rate
364.00	Poles	3.24%	46	O1-46	46	-50%	3.26%
365.00	Overhead Conductor	3.24%	37	S2-37	37	-35%	3.65%
367.00	Underground Conductor	3.24%	35	S0-35	35	-25%	3.57%
368.00	Line Transformers	3.24%	39	O1-39	39	-20%	3.08%
369.00	Services	3.24%	57	R1-57	45	-50%	3.33%
370.00	Meters	6.67%	*	*	*	*	6.67%
370.01	TWAC Meters	6.67%	*	*	*	*	6.67%
370.02	TWAC Receivers	6.67%	*	*	*	*	6.67%
370.03	TWAC Transformers	6.67%	*	*	*	*	6.67%
370.04	TWAC Computers	20.00%	*	*	*	*	20.00%
370.05	TWAC Control Links	14.40%	*	*	*	*	14.40%
371.00	Outdoor Lighting -- Conv Fixtures	3.24%	19	S6-19	19	-20%	6.32%
371.20	Outdoor Lighting -- LED Fixtures	3.24%	25		25	-20%	4.80%
373.00	Municipal Streetlighting	3.24%	23	L5-23	23	-20%	5.22%

\* Sufficient retirement data were not available to perform an SPR Analysis

**Appendix D**

**Comparison of Average Service Lives**

**And Net Salvage Percentages**

**For Utilities in Kentucky**

**Farmers Rural Electric Cooperative**  
Comparison of Average Service Lives and Net Salvage  
of Utilities in Kentucky

Account	Description	Kenergy			Kentucky Power			Kentucky Utilities			Louisville Gas and Electric			Duke Energy Kentucky		
		ASL	Iowa Curve	Net Salvage Pct	ASL	Iowa Curve	Net Salvage Pct	ASL	Iowa Curve	Net Salvage Pct	ASL	Iowa Curve	Net Salvage Pct	ASL	Iowa Curve	Net Salvage Pct
364.00	Poles	32	R1-32	-51%	28	R0.5-28	6%	50	R2.5-50	-50%	56	R2-56	-80%	54	R0.5-54	-40%
365.00	Overhead Conductor	36	R3-36	-44%	27	L0-27	6%	47	R1-47	-30%	53	R1.5-53	-75%	52	O1-52	-40%
367.00	Underground Conductor	45	S0-45	-31%	44	R0.5-44	-13%	45	R2-48	-20%	65	R3-65	-40%	58	R2-58	-40%
368.00	Line Transformers	40	L0.5-40	-39%	25	L0-25	-1%	48	R2-48	-5%	46	R3-46	-20%	46	R0.5-46	-15%
369.00	Services	33	R2.5-33	-32%	20	L0-20	-38%	48	R1-48	-25%	47	S1.5-47	-50%	65	R2.5	-25%
370.00	Meters	38	S0.5-38	-127%	17	R4-17	3%	25	L1-28	0%	25	L1-25	0%	24	L1-24	0%
370.00	Meters - AMS	15	S0.5-15	12%				15	S2.5-15	0%	15	S2.5-15	0%	15	S2.5-15	0%
371.00	Outdoor Lighting -- Conventional Fixtures	30	R1-30	-54%	11	L0-11	-32%	28	O1-28	-10%	27	S0-27	-30%	10	R2-10	0%
371.20	Outdoor Lighting -- LED Fixtures	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
373.00	Municipal Streetlighting	25	L5-25	-15%	20	L0-20	-34%	28	L0.5-28	-10%	27	S0-27	-30%	32	L0.5-32	-15%

- Notes: (1) Kenergy's most recent depreciation study was submitted in Case No. 2015-00312. The SPR methodology was used to calculate the Average Service Lives (ASLs). The whole life method was used to calculate the depreciation rates.
- (2) Kentucky Power's most recent depreciation study for distribution plant was submitted in Case No. 2014-00396. The SPR methodology was used to calculate the Average Service Lives (ASLs). Kentucky Power performed a depreciation study for generation assets in Case No. 2017-00179. The remaining life method was used to calculate the depreciation rates.
- (3) Kentucky Utilities Company's most recent depreciation study for distribution plant was submitted in Case No. 2016-00370. Semi-actuarial methods were used to calculate the Average Service Lives (ASLs). KU performed a depreciation study for generation assets in Case No. 2018-00294. The remaining life method was used to calculate the depreciation rates.
- (4) Louisville Gas and Electric Company's most recent depreciation study for distribution plant was submitted in Case No. 2016-00371. Semi-actuarial methods were used to calculate the Average Service Lives (ASLs). LG&E performed a depreciation study for generation assets in Case No. 2018-00295. The remaining life method was used to calculate the depreciation rates.
- (5) Duke Energy's most recent depreciation study for distribution plant was submitted in Case No. 2019-00271. Semi-actuarial methods were used to calculate the Average Service Lives (ASLs). The remaining life method was used to calculate the depreciation rates.