REBUTTAL TESTIMONY

OF

JOHN J. SPANOS

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1 **I.**   **INTRODUCTION**

2 **Q.**   **Please state your name and address.**

3 A.   My name is John J. Spanos. My business address is 207 Senate Avenue, Camp Hill,

4   Pennsylvania 17011.

5

6 **Q.**   **Have you previously submitted direct testimony in this proceeding?**

7 A.   Yes. In January 2018, I submitted direct testimony in this proceeding in support of the

8   depreciation study performed for SUEZ Water Rhode Island's water plant.

9

10 **Q.**   **What is the purpose of your rebuttal testimony?**

11 A.   The purpose of my rebuttal testimony is to respond to the direct testimony of Roxie

12   McCullar submitted on behalf of the Division of Public Utilities and Carriers (Division).

13   Specifically, I will address the two accounts for which Ms. McCullar has recommended

14   different depreciation rates from my estimates, and I will detail the problems with the net

15   salvage analyses Ms. McCullar used to arrive at her recommendations. I will also comment

16   on some of Ms. McCullar's claims about depreciation studies in other proceedings.

17

18 **Q.**   **What is the impact of Ms. McCullar's recommendations?**

19 A.   Ms. McCullar has proposed adjustments for two water plant accounts. In total, Ms.

20   McCullar's recommendations reduce water plant depreciation by $10,502 from my

21   recommendations in the Depreciation Study. Each of Ms. McCullar's adjustments is due

22   to different proposals for the net salvage estimates for these accounts. Ms. McCullar has

23   not challenged any of the service life estimates I have made in the depreciation study.

1   As I will explain, Ms. McCullar's recommendations are not based on widely accepted and

2   properly implemented methods for estimating depreciation or estimating net salvage.

3   Instead, Ms. McCullar has adjusted the historical net salvage data based on a methodology

4   that has a number of mathematical and conceptual flaws and has not, to my knowledge,

5   been accepted by any regulatory commission. As a result, the reductions to depreciation

6   expense that she proposes are not reasonable adjustments.

7

8   **II.   NET SALVAGE ESTIMATES**

9   **Q.   What is net salvage?**

10 A.   Net salvage as used in depreciation is defined as gross salvage less cost of removal. When

11   an asset is retired, it may have scrap or reuse value, which is gross salvage. There is also

12   a cost to retire the asset (also referred to as cost of removal). For example, the retirement

13   of pipe typically requires a multiple person crew and heavy equipment to cut the pipe

14   underground and cap the pipe for disposal (abandonment). There may also be disposal

15   costs for the pipe if removed. All the costs associated with the retirement are cost of

16   removal. I should note there may also be cost of removal even if an asset is not physically

17   removed. For example, when water mains are retired in place (i.e., they remain in the

18   ground when retired), there are still costs to cut, cap, and purge water from the retired main.

19

20 **Q.   How is net salvage estimated?**

21 A.   Net salvage is expressed as a percentage of the original cost retired. For example, if an

22   account has a net salvage estimate of negative 25 percent, then a $1,000 asset would be

23   expected to, on average, cost $250 to retire, net of any gross salvage. Net salvage estimates

1		are based on a combination of statistical analysis of historical data, as well as informed
2		judgment that incorporates other factors.
3		
4	Q.	**How is the statistical analysis performed?**
5	A.	The traditional and widely accepted method of statistical analysis for net salvage is
6		performed by comparing historical cost of removal and gross salvage to historical
7		retirements as recorded in a utility's property records. For this analysis, cost of removal,
8		gross salvage, and net salvage are expressed as a percentage of the original cost of plant
9		retired. By analyzing both annual activity and longer and shorter-term averages of the
10		experienced net salvage expressed as a percentage of retirements, this analysis of the data
11		provides a statistical basis for the estimation of net salvage. This is the method of statistical
12		analysis that I have used in the Depreciation Study. I will refer to this method of analysis
13		as the "traditional method of net salvage analysis" or the "traditional net salvage analysis"
14		because it is the predominant method of net salvage analysis used for depreciation studies.
15		
16	Q.	**Is this method of statistical analysis for net salvage that you have used in the**
17		**Depreciation Study supported by depreciation textbooks?**
18	A.	Yes. Ms. McCullar cites two depreciation textbooks in her testimony in support of her
19		recommendations. These are the National Association of Regulatory Utility
20		Commissioners' (NARUC) publication *Public Utility Depreciation Practices* and
21		*Depreciation Systems* by Frank Wolf and Chester Fitch (Wolf and Fitch). Both textbooks
22		support the method of statistical analysis I have used in the Depreciation Study.
23		NARUC explains that "net salvage is expressed as a percentage of plant retired by

1   dividing the dollars of net salvage by the dollars of original cost of plant retired."[1]   Wolf

2   and Fitch also explain that net salvage is expressed as a percentage of the original cost of

3   plant retired, noting "the SR [Salvage Ratio] is the salvage divided by the original cost of

4   the retirements and usually is expressed as a percentage."[2]   Thus, both texts support the

5   exact type of analysis I have used in the Company's Depreciation Study.

6

7   **Q.**   **Do either of these textbooks support the net salvage analysis Ms. McCullar has**

8   **performed?**

9   A.   No. Although Ms. McCullar cites to NARUC in certain instances, NARUC does not

10   describe or support the actual type of analysis Ms. McCullar has performed. Similarly, as

11   I will explain in more detail in Section II.C., although Ms. McCullar claims that her

12   methodology is supported by Wolf and Fitch, she has not actually performed the analyses

13   described in her cited portions of this text.

14

15   **Q.**   **How do Ms. McCullar's recommendations differ from yours?**

16   A.   Ms. McCullar has recommended different net salvage estimates for two water plant

17   accounts. Table 1 below compares my proposed estimates to those of Ms. McCullar.

18   **Table 1: Comparison of Net Salvage Estimates to Company Data**

Account	Company Estimate	Division Estimate
311, Pumping Equipment	-10%	-5%
331, Mains	-25%	-20%

19

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[1] *Public Utility Depreciation Practices,* National Association of Regulatory Utility Commissioners, 1996, p. 18.

[2] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 261. Note that, in this context, Wolf and Fitch use the term "salvage" to mean "net salvage."

1	Q.	**What is the reason Ms. McCullar's estimates are different from your estimates?**
2	A.	Based on Ms. McCullar's testimony, her estimates differ from mine due to adjustments she
3		has made to the historical data for these two accounts. Specifically, Ms. McCullar has
4		modified historical cost of removal and gross salvage to adjust for what she presumes to
5		be differences between historical inflation and her estimate of what the inflation rate will
6		be in the future. That is, the reason for the differences between my estimates and those of
7		Ms. McCullar are the adjustments she makes to the historical data used in her analyses. I
8		am not familiar with a single regulatory jurisdiction that has adopted Ms. McCullar's
9		approach to the net salvage analysis.
10		
11	Q.	**What are the flaws in Ms. McCullar's analysis?**
12	A.	There are multiple flaws, which I will detail in the sections that follow. One flaw is that
13		Ms. McCullar has focused only on the inflation rate and fails to recognize that the time
14		period over which inflation occurs can have at least as much of an impact as the inflation
15		rate. Further, Ms. McCullar supports her methodology for adjusting the data by citing a
16		discussion of complex mathematical models for analyzing net salvage that are set forth in
17		Wolf and Fitch. However, Ms. McCullar has not actually performed the analyses set forth
18		in Wolf and Fitch that she claims to have used. Ms. McCullar's testimony fails to follow
19		the instructions of the actual text and fails to incorporate important concepts set forth in
20		Wolf and Fitch.
21		Lastly, Ms. McCullar's adjustments are based on her estimate of future inflation
22		rates, and even relatively small changes in the estimate of future inflation can materially
23		impact the results of her analysis. Because the assets in question for this case are relatively

1   long-lived property that will be in service for 45 years or more, Ms. McCullar's analysis

2   requires an accurate estimate of what the annual inflation rate will be for many decades. I

3   am not familiar with any reliable professional inflation forecasts that cover such long

4   periods of time. Further, there are numerous reasons to doubt her estimate of future

5   inflation, and thus there is no compelling reason to substitute Ms. McCullar's forecast for

6   the Company's actual historical experience.

7

8   **A. Ms. McCullar Overstates the Level of Inflation in the Traditional Net Salvage**
9   **Analysis**
10

11   **Q.   What is the basis for Ms. McCullar's adjustments to the historical net salvage data?**

12   A.   Ms. McCullar bases her adjustments to the historical net salvage data on her contention

13   that the level of historical inflation incorporated into the traditional net salvage analysis is

14   higher than the level of future inflation that she expects to occur.[3] Ms. McCullar proposes

15   a method of analysis to adjust the data so that the level of inflation in the historical data is

16   replaced with a lower level of inflation that she expects to occur in the future.[4] However,

17   Ms. McCullar's analysis suffers from two important flaws. First, Ms. McCullar fails to

18   properly consider the difference in time periods between the age of retirements in the

19   historical data and the expected lives of assets currently in service. Second, Ms.

20   McCullar's analysis is contingent on the assumption that her estimate of future inflation,

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[3] For example, on page 13 of her Direct Testimony, Ms. McCullar states that she "did consider the amount of high historic inflation incorporated in Company's historic net salvage analysis."

[4] For example, on page 12 of her Direct Testimony, Ms. McCullar describes her method by stating, "[o]nce the impact of the high historic inflation levels have been removed, the next step is to use a more reasonable estimate of inflation to aid in forecasting the future net salvage amounts."

1		which is based on a relatively short-term inflation target, will be accurate for 45 years or
2		more. The first of these flaws demonstrates that Ms. McCullar's analysis is fundamentally
3		incorrect. The second flaw demonstrates that Ms. McCullar's analysis is, in my view,
4		based on an assumption that is uncertain at best.
5		
6	**Q.**	**What is inflation?**
7	A.	Inflation is defined to be a general increase in prices or fall in the purchasing value of
8		money. In the context of Ms. McCullar's testimony, she uses the term to describe the
9		change in costs over time (e.g., removal costs or the original cost of assets placed into
10		service). As such, there are two key inputs in determining the <u>level</u> of inflation: (1) the
11		rate of inflation and (2) the time period over which inflation occurs. Both have an impact
12		on the overall level of inflation. Importantly, Ms. McCullar's testimony and her
13		calculations only focus on the first of these inputs.[5] Ms. McCullar does not properly
14		consider that the time period over which inflation occurs can have just as much of an impact
15		as the rate of inflation, if not more.
16		
17	**Q.**	**How does Ms. McCullar support her contention that the historical inflation in the**
18		**statistical analysis is higher than should be incorporated into the net salvage analysis?**
19	A.	Ms. McCullar observes that the inflation <u>rate</u> was high in the 1970s and 1980s. She then
20		concludes that "SUEZ's use of the net salvage analyses which includes these high historical
21		inflation rates assumes that the same high inflation rates will continue in the future, this is

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[5] Additionally, as I will discuss in Section II.B., there are reasons to doubt Ms. McCullar's use of the Consumer Price Index as a reasonable measure of the changes in removal costs over time. That is, there are also problems with Ms. McCullar's assumptions with regard to the rate of inflation.

1   not a reasonable assumption."[6] This statement is incorrect. Although there were some

2   years in the past that had relatively high inflation rates, the overall time period over which

3   any inflation included in the historical net salvage analysis occurred is typically less than

4   the overall time period that Company's current assets will be in service. As a result, it is

5   fundamentally incorrect to state that the historical net salvage analysis assumes that the

6   same inflation rate will continue in the future.

7

8 **Q.   Why is the overall time period included in the net salvage analysis less than the overall**

9   **time period that the Company's assets will be in service?**

10 A.   For most real-world property groups, the average age at which assets have historically been

11   retired is less than the overall average service life of the group. As an example to illustrate

12   this concept, consider a group of 20 pumps, each with the same original cost. If one pump

13   is retired each year over a 20-year period, then the group will have an average service life

14   of 10 years.[7] However, if after the tenth year one were to observe the average age at which

15   retirements have occurred, one would find that average age to be only five years.[8] Thus,

16   the average age of retirements is less than the average service life.

17   Further, for assets that are currently in service, the overall average life expectancy

18   (or the "probable life" of the group) will be greater than the average service life (unless

19   every asset is brand new). The probable life is equal to the average service life at age zero,

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[6] Direct Testimony of Roxie McCullar at 9:1-3.

[7] The assets in this group will have lives of 0.5, 1.5, 2.5, . . ., 18.5, and 19.5 years, as one asset from the group will be retired at the midpoint of each year. The average of these lives is $(0.5 \times 1 + 1.5 \times 1 + \ldots + 18.5 \times 1 + 19.5 \times 1) / 20 = 10$ years.

[8] At age 10, retirements recorded to date would have occurred at ages 0.5, 1.5, . . ., 8.5, and 9.5. The average of these ages is $(0.5 \times 1 + 1.5 \times 1 + \ldots + 8.5 \times 1 + 9.5 \times 1) / 10 = 5$ years.

1   but increases with age. In this example, the probable life at age 10 is 15 years.[9]

2   To further explain this concept, consider that the average life expectancy of an

3   American at birth is a little less than 80 years (to put this in depreciation terms, the average

4   service life of an American is a little less than 80 years). However, a person who is 80

5   years of age is not expected to die the next day. Instead, their remaining life expectancy is

6   longer than zero and their overall life expectancy (or probable life) is longer than 80 years.

7

8   Q.   **Do these same concepts also apply to utility property and to the net salvage analysis?**

9   A.   Yes. These same concepts are true for groups of utility property, in part because most

10   property groups experience growth (both real and inflationary). For the net salvage

11   analysis, the ages of retirements (as well as the historical inflation rate) determine the level

12   of inflation in the historical analysis. The net salvage percentages resulting from the net

13   salvage analysis are referred to as "realized net salvage," meaning that they represent the

14   net salvage that has occurred to date.[10] The level of inflation incorporated into realized net

15   salvage is a function of the age of historical retirements.

16   However, it is "future net salvage," the net salvage that will occur in the future for

17   the assets currently in service, which both Ms. McCullar and I agree needs to be estimated

18   in the depreciation study.[11] The level of inflation that will occur over the life of the assets

19   in the property group is a function of the probable life, not the average age of retirements.

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[9] At age 10, the remaining assets will have lives of 10.5, 11.5, . . ., 18.5, and 19.5 years. The average of these lives is (10.5 x 1 + 11.5 x 1 + . . . + 18.5 x 1 + 19.5 x 1) / 10 = 15 years.

[10] Technically the net salvage analysis may include only a subset of the realized net salvage incurred to date, in the event net salvage data is not available for the full history of a utility company.

[11] Ms. McCullar shows future net salvage included in her formula for remaining life depreciation calculations on page 4 of her Direct Testimony and uses the term "future net salvage" throughout her testimony. For example, on page 5 she states, "[t]he future net salvage percent and the average remaining life are estimates proposed in the Depreciation Study."

| 1 | | For this reason, it is incorrect for Ms. McCullar to assert that the net salvage analysis |

1 For this reason, it is incorrect for Ms. McCullar to assert that the net salvage analysis

2 projects the same inflation rate that has occurred in the past. By only focusing on the

3 inflation _rate_, Ms. McCullar fails to recognize that the time period over which inflation

4 occurs for the realized net salvage in the net salvage analyses is typically less than the time

5 period over which inflation will occur for future net salvage.

6

7 **Q.   Please provide an example to demonstrate that Ms. McCullar's assertion is incorrect.**

8 A.   Consider as an example Account 311, Pumping Equipment, which is an account for which

9 Ms. McCullar proposes a different net salvage estimate than mine. The average service

10 life estimate for this account is 45 years. The average probable life for the account is

11 somewhat longer, and is about 48 years. Both the average service life and the probable life

12 are longer than the time period over which assets included in the net salvage analysis were

13 in service (that is, the age of historical retirements).

14 The net salvage analysis for this account is based on historical data recorded for the

15 period 2007 to 2016. For this period, the average age of retirements in the historical

16 analysis is about 39 years, which is considerably shorter than both the average service life

17 and probable life for the account. Thus, the period of time over which inflation occurred

18 for assets that have been historically retired, which is the 39-year average age of

19 retirements, is considerably shorter than the probable life of assets in the account. To put

20 this concept another way, the time period incorporated into the realized net salvage is, on

21 average, 9 years shorter than the time period expected for future net salvage.

22

23 **Q.   How does the difference in time period between the average age of retirements and**

1   **the probable life impact future net salvage estimates based on the traditional net**

2   **salvage analysis?**

3 A. As demonstrated above, the age of retirements for assets included in the analysis of realized

4   net salvage (i.e., the traditional net salvage analysis) is different from the age of future

5   retirements. This difference in time period has an impact on the level of inflation that

6   occurs and on the inflation rate inherent to a net salvage estimate based on the historical

7   analysis.

8

9 Q. **How does Ms. McCullar's analysis fail to incorporate the impact of the time period**

10   **over which inflation occurs?**

11 A. Ms. McCullar's analysis focuses only on the inflation rates, and does not properly consider

12   the difference in time periods between the average age of retirements in the statistical

13   analysis and the probable life of assets currently in service. Consider the example

14   discussed above for Account 311. For Ms. McCullar's calculations, she first removes the

15   historical inflation that has occurred over an average period of 39 years. However, when

16   she adjusts the data to substitute her 2 percent inflation rate estimate in place of the

17   experienced historical inflation, she only does so for an average time period of 39 years.

18   She does not use the probable life of 48 years, as she would need to do to perform this type

19   of analysis correctly. As a result, Ms. McCullar effectively assumes that the average

20   probable life of the assets in this account is only 39 years, which is shorter than the average

21   service life estimate of 45 years for this account and the average probable life of 48 years.

22   The result is that Ms. McCullar's analysis produces results that are less negative

23   than had she properly considered the time period over which inflation has and will occur

1		for the Company's assets. Given this flaw in her analysis, Ms. McCullar's results are
2		unreliable and do not provide a reasonable basis for her net salvage estimates.
3		
4	**B.**	**Ms. McCullar Has Not Used a Reasonable Long-Term Inflation Rate for Her Analysis**
5		
6	**Q.**	**What does Ms. McCullar recommend as a future inflation rate to use in her analysis?**
7	A.	Ms. McCullar recommends that a "reasonable estimate of inflation is 2%."[12] Her estimate
8		is based on the inflation target established by the Federal Open Market Committee.[13]
9		
10	**Q.**	**Do you agree that it is reasonable to substitute this estimate of inflation in the**
11		**statistical analysis of historical data?**
12	A.	No. In addition to the flaws in Ms. McCullar's analysis discussed in the previous section,
13		I do not think it is appropriate to simply assume that inflation will occur at a 2 percent
14		annual rate for the next 40, 50, or 60 years. Ms. McCullar has not provided a compelling
15		reason to assume that her inflation estimate will be more accurate than the Company's
16		historical experience, nor has she provided a compelling reason to believe that future
17		inflation will be significantly different than inflation that has occurred over previous long-
18		term periods of time.
19		
20	**Q.**	**Why do you state that the inflation forecast must be accurate for 45 years or more?**
21	A.	For the two accounts for which Ms. McCullar proposes an adjustment to my net salvage
22		estimates, the average service life estimates range from 45 to 110 years. However, these

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[12] Direct Testimony of Roxie McCullar at 12:13.

[13] Direct Testimony of Roxie McCullar at 13:1-11.

1		are only the estimates of average service lives. Because each account will have a dispersion
2		of lives,[14] many assets will live even longer than the average. For these reasons, for Ms.
3		McCullar's analysis to be valid her forecast of future inflation must be accurate for at least
4		the 45 to 110-year average service lives (and actually even longer because many assets will
5		live longer than the average).
6		
7	**Q.**	**Why do you believe it is not appropriate to substitute Ms. McCullar's inflation rate**
8		**estimate for the Company's historical experience?**
9	A.	There are four primary reasons that I do not believe that Ms. McCullar's inflation estimate
10		is appropriate to use in lieu of the Company's historical data: (1) the inherent challenges in
11		estimating inflation over the course of many decades; (2) that history does not support Ms.
12		McCullar's estimate to be reasonable; (3) that the Consumer Price Index (CPI) is not the
13		best measure of cost increases for utility projects; and (4) that an inflation target should not
14		be used as a proxy for future inflation.
15		
16	**Q.**	**What is the uncertainty with estimating future inflation over many decades?**
17	A.	An estimate of future inflation over a period of 45 years or more would require an
18		understanding of economic conditions many decades in the future. Given the uncertainty
19		the future brings, it would be impossible to accurately predict economic conditions four
20		decades from now. I do not believe it is appropriate to simply assume that the Federal
21		Open Market Committee's current inflation target will predict the inflation rate over a
22		period of 45 years or more.

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[14] A "dispersion of lives" refers to the fact that many assets will have shorter lives than the average life, and many will have longer lives than the average life.

1   As further evidence of the inherent difficulty of long-term inflation forecasts, the

2   Federal Reserve also compiles inflation forecasts from a survey of professional

3   forecasters.[15] The longest-term such forecasts in the survey are for 10 years – a much

4   shorter period of time than the time period for which Ms. McCullar's estimate must be

5   accurate for her analysis to have any validity. Given that the Federal Reserve does not

6   publish inflation forecasts for a period longer than 10 years, it does not seem reasonable to

7   me for Ms. McCullar to simply assume that the Federal Open Market Committee's current

8   inflation target will predict future inflation over a much longer period of time.

9   The historical record of these inflation forecasts provides further evidence for this

10   concept. First, the median forecast of long-term inflation in recent years is higher than Ms.

11   McCullar's proposal. For example, the most recent median of 10-year inflation forecasts

12   compiled by the Federal Reserve is 2.34 percent, which is higher than Ms. McCullar's

13   inflation estimate.[16] Further, past forecasts show that inflation often ends up being

14   different than expected. For example, inflation forecasts in the 1950s and 1960s were

15   lower than actual inflation that occurred in the 1970s and 1980s. It is similarly possible

16   that the inflation that occurs over the coming decades will be higher than Ms. McCullar's

17   estimate (and the Federal Open Market Committee's target).

18

19   **Q.   Please explain how history does not support Ms. McCullar's proposal.**

20   A.   Again, for Ms. McCullar's analyses to have any validity, her inflation estimate must be

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[15] The Livingston Survey, published by the Philadelphia Federal Reserve, can be found at:
https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey.
[16] See page 10 of the December 2017 release of the Livingston Survey, which can be found at:
https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey.

| 1 | reasonable for a period of 45 years or more. In support of her estimate, Ms. McCullar |
2	states that "the CPI has averaged around 2 percent per year for at least the last 20 years."[17]
3	However, this is too short a period of time to assess the reasonableness of a long-term
4	forecast when determining net salvage for utility property that has average service lives
5	that are much longer than 20 years.
6	A more complete analysis of the CPI data Ms. McCullar used for her testimony is
7	provided in Figure 2 below. The chart shows the annual inflation rate for every 40-, 50-,
8	and 60-year period included in the CPI data (which begins in 1913). The chart also
9	compares these inflation rates to Ms. McCullar's inflation estimate of 2 percent. As the
10	chart demonstrates, for every 60-year period available (shown as a solid black line),
11	inflation has been higher than Ms. McCullar's estimate of 2 percent. Further, for every 40-
12	year period (shown as the smaller-dashed line) that began after 1930 and for every 50-year
13	period (shown as the larger-dashed line) that began after 1924, the annual inflation rate has
14	been higher than Ms. McCullar's estimate.[18] The only 40- and 50-year periods for which
15	inflation was lower than Ms. McCullar's estimates include the Great Depression and the
16	associated deflationary period.

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[17] Direct Testimony of Roxie McCullar at 12:16-17.
[18] The years shown in the graph are the ending years of the 40-, 50-, or 60-year period. Thus, for example, the 40-year period shown with an ending year of 1970 began in 1930.

1   **Figure 1: Long-Term Inflation Rates Over 40-, 50- and 60-Year Periods**
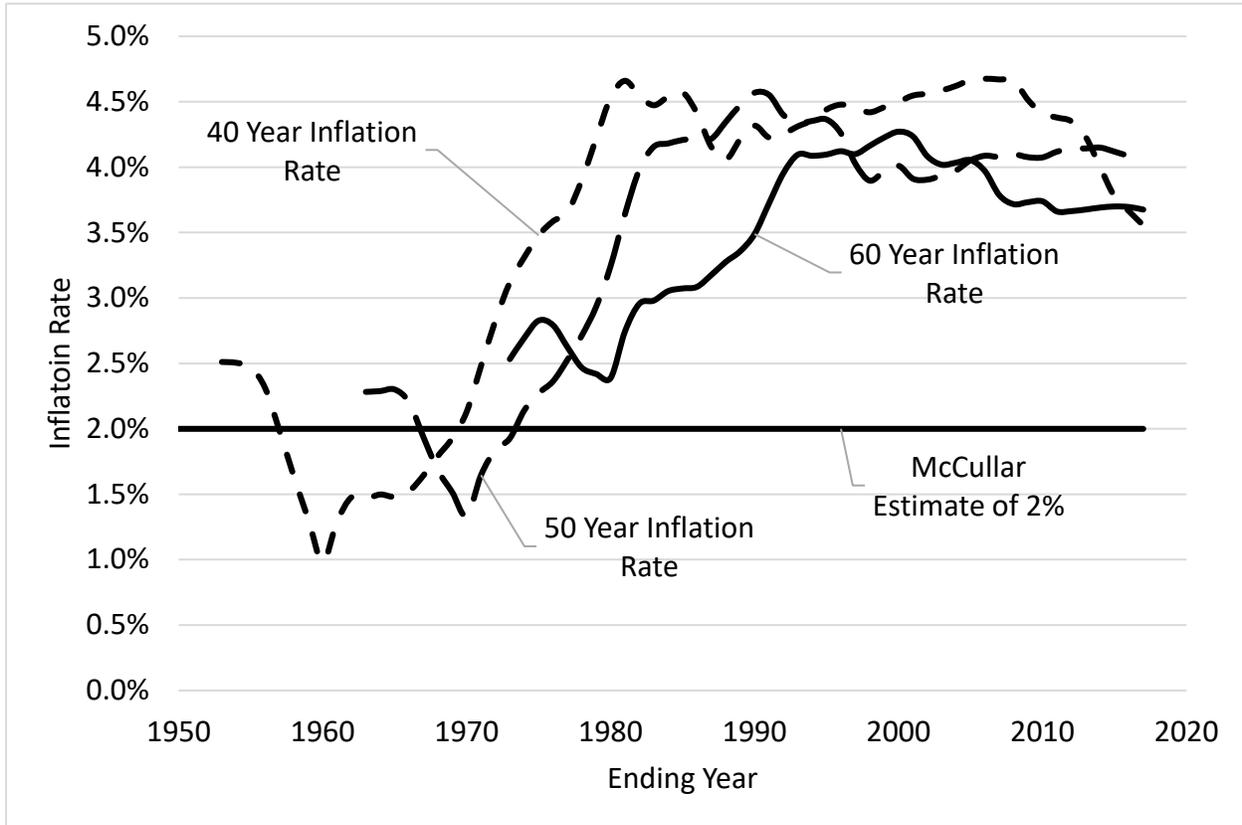
2

3   Thus, for Ms. McCullar's long-term inflation forecast to be accurate, future inflation would

4   need to be lower than almost every 40-, 50-, or 60-year period since 1913. Ms. McCullar

5   has not provided sufficient reason to expect that the long-term future will be significantly

6   different from the long-term past, and accordingly she has not provided sufficient

7   justifications for her decision to significantly alter the Company's historical net salvage

8   data.

9

10   **Q.   Why is CPI not necessarily the best inflation index to use for Ms. McCullar's analysis?**

11   A.   When estimating net salvage, the goal is to estimate what the cost of retiring the Company's

12   assets (net of any gross salvage) will be at the time the assets are retired. To the extent

1 removal costs change over time, they do not necessarily change at the rate of inflation. For

2 example, utility labor costs may increase faster than general price inflation, and work

3 requirements may add to the cost of retiring assets. For these reasons, the CPI index used

4 by Ms. McCullar, which measures general price changes throughout the economy for many

5 different goods and services, is not necessarily the appropriate index to use for the analysis

6 she has performed. Indeed, Wolf and Fitch (whom Ms. McCullar relies on in support of

7 her analysis) make a similar observation. The authors note that "[a]n important question

8 centers on which inflation factor to use." After explaining CPI, Wolf and Fitch then state:

9   It is desirable to obtain specialized indexes that reflect the inflation rates in
10   special segments of the economy, and in fact firms specialize in estimating
11   these factors. Different indexes may apply to gross salvage and cost of
12   retiring and the appropriate index for gross salvage in one account will
13   generally differ from that another account.[19]

14 One such index is the Handy Whitman construction cost index, which has increased at a

15 faster rate than CPI in recent years. For example, while Ms. McCullar cites the average

16 inflation rate based on CPI over the past 20 years,[20] the chart below demonstrates that the

17 Handy Whitman Index for Account 331, Mains (shown as the solid black line in the chart),

18 has increased at a faster pace over the same period.[21] Indeed, while the CPI has increased

19 at an annual rate of somewhat more than 2 percent over this period of time, the Handy

20 Whitman Index has increased at an annual rate of more than 3 percent. This provides

21 further evidence that the 2 percent inflation estimate made by Ms. McCullar is not

22 appropriate for her analysis.

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[19] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 61.

[20] Direct Testimony of Roxie McCullar at 12:16-17.

[21] The Handy Whitman Index for Mains and Accessories for the North Atlantic region is used for this chart. 2016 is used as the most recent full year available for the Handy Whitman Index.

**Figure 2: Comparison of CPI and Handy Whitman Index for
Account 331, Mains, 1996-2016**
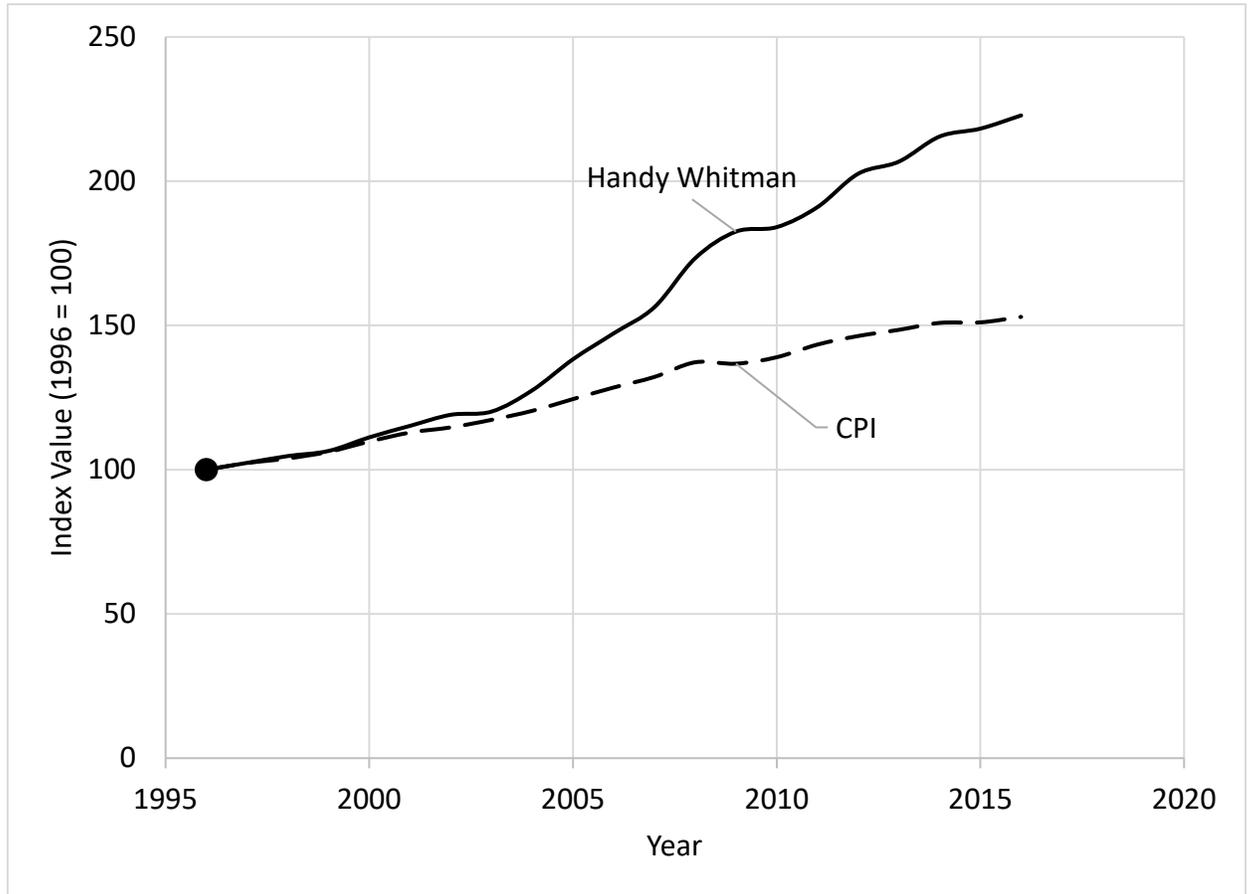
4   **Q.   What is the problem with using an inflation target as an estimate of long-term future**

5   **inflation?**

6   A.   Many of the problems with Ms. McCullar's approach of using an inflation target as a proxy

7   for long-term inflation are similar to those discussed previously, such as the uncertainty in

8   predicting long-term economic conditions and the question of whether the CPI is an

9   appropriate cost index to use for Ms. McCullar's analysis. Again, the median forecast

10   compiled by the Federal Reserve is for a higher inflation rate than the Federal Open Market

11   Committee's target. However, another problem arises because the Federal Open Market

12   Committee's goal is not just to hit its inflation target. Other economic factors also are

1   considered by the Federal Open Market Committee, as noted in the Federal Open Market

2   Committee statement provided by Ms. McCullar:

> 3   In setting monetary policy, the Committee seeks to mitigate deviations of
> 4   inflation from its longer-run goal and deviations of employment from the
> 5   Committee's assessments of its maximum level. These objectives are
> 6   generally complementary. However, under circumstances in which the
> 7   Committee judges that the objectives are not complementary, it follows a
> 8   balanced approach in promoting them, taking into account the magnitude of
> 9   the deviations and the potentially different time horizons over which
> 10   employment and inflation are projected to return to levels judged consistent
> 11   with its mandate.[22]

12   Thus, this statement acknowledges that the 2 percent inflation target is a target, not the

13   actual inflation rate that will occur over a long-term period of time, and also affirms that

14   the inflation rate is not the only economic goal of the Federal Open Market Committee.

15

16 **Q.**   **Based on these considerations, are Ms. McCullar's adjustments to the historical data**

17   **reasonable?**

18 A.   No. As I have explained in the previous section, there are significant flaws that discredit

19   Ms. McCullar's analysis. However, even if Ms. McCullar had performed her analysis

20   correctly, there is not a sufficient basis to assume, as Ms. McCullar does, that inflation will

21   average 2 percent per year over the next 45 years or more. Doing so assumes that the future

22   will be very different from almost any long-term historical period. Instead, the most

23   reasonable basis for the Company's net salvage estimates is the analysis of the unadjusted

24   historical data that I have used in the Depreciation Study.

25

26   **C. Ms. McCullar Does Not Follow the Instructions in Wolf and Fitch**
27

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[22] Schedule RMM-4.

1   **Q.**   **What authority does Ms. McCullar rely on in support of the analysis she has**

2   **performed?**

3   A.   Ms. McCullar cites Wolf and Fitch as an authority that supports her analysis. She states

4   that Wolf and Fitch "discusses a method that first converts 'the observed dollars to constant

5   dollars' which removes the high historic inflation rates, and then use a more reasonable

6   estimate of the inflation."[23] There are two significant problems with Ms. McCullar's

7   assertion that Wolf and Fitch supports her analysis. First, this is not an accurate

8   characterization of Wolf and Fitch, who do not state anywhere in the text that the intent of

9   the analysis to which Ms. McCullar cites is to "use a more reasonable estimate of the

10   inflation." Instead, a more complete reading of Wolf and Fitch makes clear that the primary

11   intent of the net salvage models presented by the authors is to account for the concepts I

12   discussed in Section II.A., namely, that the differences in time periods between the age of

13   historical retirements and the average age of future retirements impacts the traditional net

14   salvage analysis.

15   The second problem is that Ms. McCullar's analysis is not what is actually

16   presented in Wolf and Fitch. Instead, Ms. McCullar's analysis appears to be her own

17   creation and is fundamentally flawed. If she had followed the instructions in the text, her

18   analysis would have produced very different results.

19

20   **Q.**   **What is the context of the Wolf and Fitch chapter cited by Ms. McCullar?**

21   A.   In support of her analysis, Ms. McCullar cites Chapter 14 of Wolf and Fitch, which is titled

22   "Salvage Analysis and Forecasting."[24] This chapter is focused on detailed mathematical

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[23] Direct Testimony of Roxie McCullar at 11:11-12.
[24] Wolf and Fitch use the term "salvage" to refer to "net salvage," i.e., gross salvage net of cost of removal.

1   models that can be used to estimate future net salvage. As the first sentence of the chapter

2   explains:

3   This chapter discusses the analysis of aged salvage data and illustrates the
4   use of a mathematical model to help estimate future salvage.[25]

5   The models described in the text are complex and not only require aged net salvage data,

6   but also require a detailed analysis of the mortality characteristics of the property group

7   studied and the factors that that have an impact on realized net salvage and future net

8   salvage. However, the intent of these models is not to use a different estimate of inflation,

9   as Ms. McCullar asserts, but instead to account for the fact that realized net salvage is not

10   always representative of average and future net salvage (due primarily to the lower age of

11   historical retirements than the age of future retirements).[26] In concluding the chapter, Wolf

12   and Fitch summarize this concept as follows:

13   Salvage ratios are a function of inflation. For long-lived property, the
14   salvage associated with the longest-lived property is affected most.
15   However, this may not be reflected in the data for some time. A
16   mathematical model that includes the effect of salvage can be a valuable
17   forecasting tool. Salvage data by age contains information helpful for
18   constructing and verifying a mathematical model.[27]

19   As this passage makes clear, the purpose of the mathematical model is to incorporate the

20   impact of inflation on future net salvage for long-lived property that is not reflected in the

21   historical data due to the age of historical retirements. Ms. McCullar's analysis focuses

22   only on changing the inflation rate, without accounting for the impact of the age of

23   retirements on realized net salvage as compared to future net salvage. Thus, not only is

---

[25] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 260.

[26] While these models can accommodate changes to any variable (such as the inflation rate or the time period), the full texts of Wolf and Fitch make clear that their focus is on the ages of past and future retirements as the most important variables.

[27] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 267.

1   Ms. McCullar's analysis flawed, but it is not supported by Wolf and Fitch.

2

3 **Q.   Are the models described in Wolf and Fitch widely used for net salvage analysis in**

4   **utility rate proceedings?**

5 A.   No. Although these models can be useful tools for estimating future net salvage, they are

6   not widely used because of their complexity and because the data required to properly use

7   the models is not normally available. As the opening sentence of Chapter 14 of Wolf and

8   Fitch makes clear, the models described by Wolf and Fitch require "aged salvage data,"

9   meaning that for every cost of removal and gross salvage transaction analyzed, the age of

10   retirements is known. Aged salvage data is typically not available for a depreciation study,

11   a fact which is observed by Wolf and Fitch:

12   Salvage analysis starts with an examination of the data reflecting total
13   annual costs. Often these are the only data available.[28]

14   Wolf and Fitch explain the type of net salvage analysis that should be used to analyze data

15   reflecting total annual costs, which is the analysis I have used in the Depreciation Study. I

16   also note that Wolf and Fitch provide an example (Table 14.3 in the text), which is the

17   same analysis I have performed for the Depreciation Study.[29]

18

19 **Q.   Does the Company have aged net salvage data?**

20 A.   No. Aged net salvage data not only requires the age of each retirement to be known, but

21   also that each cost of removal and gross salvage transaction can be associated with each

---

[28] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 261.

[29] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 261, which references Table 14.3 on page 271 of the same text.

1	retirement by age. It is rare for this type of data to be available due to the nature of real-
2	world utility operations and the record-keeping that would be required to maintain aged net
3	salvage data. Consider, as an example, a project to replace distribution mains on a city
4	block. The work involved in such a project would often result in the retirement not only
5	of the mains, but also services (which may be replaced either because different main type
6	are utilized or because larger mains are needed) and other assets such as valves. Because
7	the mains, services and valves may not have been installed at the same time, and because
8	some of these assets are associated with different plant accounts, it would be very difficult
9	(if not impossible) to track and associate costs for each removal activity to the age of each
10	asset being retired. For this reason, aged net salvage data is rarely available for a
11	depreciation study. This is one reason why the method of analysis I have used in the
12	Depreciation Study, which Wolf and Fitch explains is the analysis that is used if aged net
13	salvage data is not available, is the most widely used method of analysis for depreciation
14	studies.
15	
16	**Q. What does Wolf and Fitch advise should be considered if aged net salvage data is not**
17	**available, as is the case for the Company?**
18	A. Wolf and Fitch make clear that the analyst must consider the age of historical retirements,
19	and that these ages are typically less than the average service life (and thus also shorter
20	than the probable life). This underscores my point that, contrary to Ms. McCullar's
21	assertion, the intent of the models described by Wolf and Fitch is to account for the
22	difference in time periods in the historical net salvage analysis and not to change the
23	historical inflation rate. Specifically, Wolf and Fitch state:

1   Often the only available data are the total annual gross salvage and
2   cost of retiring. An example of this type of data is shown in Table 14.3.
3   When analyzing unaged salvage, remember that <u>realized salvage depends</u>
4   <u>on the age of the retirements</u>. Realized salvage starts at zero and does not
5   reach the average until the final unit in the group is retired. Thus<u>, the</u>
6   <u>average age of the annual retirements and the average life of the group are</u>
7   <u>important variables. Continuous property groups showing growth typically</u>
8   <u>have large differences between the average age of the retirements and the</u>
9   <u>average life of the group.</u>[30]

11 **Q.   Had Ms. McCullar attempted to more accurately follow the instructions in Wolf and**

12 **Fitch, would her results be different from what she has proposed?**

13 A.   Yes. Had Ms. McCullar faithfully followed the instructions in Wolf and Fitch, she would

14   have followed the mathematical models set forth in the text. For example, this would mean

15   creating tables similar to Table 6.11 in Wolf and Fitch. Ms. McCullar has not done so, and

16   thus the results of her analysis do not form a reasonable basis for estimating net salvage.

18   **D. Ms. McCullar's Net Salvage Methodology Has Been Previously Rejected**

20 **Q.   Is the method of analysis proposed by Ms. McCullar widely accepted in the industry?**

21 A.   No. In fact, I am not familiar with many cases in which her proposed method of analysis

22   has even been proposed, much less accepted. Although through the years Ms. McCullar's

23   firm has proposed a variety of different unorthodox approaches to determining net salvage

24   (which also have gained limited acceptance), I am familiar with only one case in which

25   Ms. McCullar's firm proposed the same (or similar) analysis to what Ms. McCullar has

26   proposed in the instant case. That case was a 2007 rate case in Missouri for AmerenUE

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[30] *Depreciation Systems*, Frank Wolf and Chester Fitch, 1994, p. 267 (emphasis added).

1   (now AmerenMO).[31] The Missouri Public Service Commission (MPSC) rejected their

2   proposal.

3   As the MPSC explained, Ms. McCullar's colleague, William Dunkel,

4   recommended that:

5   the Commission adjust the accrual method of calculating future net
6   salvage by substituting a projection of future inflation for the historic
7   inflation actually experienced when conducting an analysis of net salvage.[32]

8   The MPSC rejected Mr. Dunkel's proposal, explaining:

9   The proposal to substitute projections of future inflation for historic rates of
10   inflation is flawed by an overstatement of the average age of historical
11   retirements used in the formulas for substituting projected future inflation
12   for historic rates of inflation. As explained by AmerenUE's witness,
13   William Stout, MIEC [Missouri Industrial Energy Consumers] and Public
14   Counsel would use average service life as the average age of future
15   retirements. The average age of future retirements is not the average service
16   life, but rather is the average probable life. The average probable life is the
17   same as average service life when an asset is first placed in service, but as
18   time passes the average probable life continues to increase beyond the
19   average service life. This is the same effect experienced in human life
20   expectancy. At birth, a child may have a life expectancy of 70 years, but a
21   69-year-old may still have a life expectancy of more than one year. The use
22   of probable life would result in the inclusion of more future inflation than
23   was recognized by MIEC and Public Counsel and would invalidate their
24   proposed adjustments.
25
26   Even more fundamentally, MIEC and Public Counsel have failed to
27   demonstrate any reason to believe their estimates of future inflation are a
28   more reliable predictor of future inflation than the past history used by Staff
29   and AmerenUE in their calculations. Expert predictions of future inflation
30   can be little more than guesswork. It is impossible to accurately predict
31   what inflation might occur 30 or 40 years in the future. No doubt if an
32   esteemed panel of experts had been polled in 1960 they never would have
33   predicted the severe inflation of the 1970s and 1980s. Similarly, today's
34   experts cannot possibly foresee whatever inflation may occur in 2023. The
35   Commission finds past history to be a better predictor of future inflation for
36   ratemaking purposes.[33]

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[31] MPSC Case No. ER-2007-0002.

[32] Report and Order, MPSC Case No. ER-2007-0002, Issued May 22, 2007, p. 90.
[33] Report and Order, MPSC Case No. ER-2007-0002, Issued May 22, 2007, pp. 92-93.

1	Q.	**Has Ms. McCullar provided any other cases in which her proposed method of net**
2		**salvage analysis was proposed or accepted by a regulatory commission?**
3	A.	No. Ms. McCullar did not provide any such examples in her testimony. She does cite
4		cases in Connecticut, the District of Columbia, Maryland, New Jersey and Pennsylvania
5		that she claims to "recognize the inflated dollars included in net salvage ratios"[34].
6		However, in none of these cited cases was the specific method used in the instant case by
7		Ms. McCullar proposed. Further, New Jersey and Pennsylvania do not include net salvage
8		in the depreciation rate, so these Commissions did not adopt "methods of getting the future
9		net salvage percent that recognizes the time value of cost of removal due to inflation", as
10		Ms. McCullar claims[35], since net salvage percents were not established in the cases she
11		cites.
12		
13	Q.	**Are you familiar with any rate cases in which a regulatory commission held that the**
14		**inflation that will occur over an assets' full-service life should be considered when**
15		**determining future net salvage costs?**
16	A.	Yes. In a 2013 Federal Energy Regulatory Commission (FERC) opinion, the FERC held
17		not only that future net salvage costs should be stated at the future cost level at which they
18		will be incurred, but that not doing so would result in intergenerational inequity. While
19		the issue at hand in the 2013 FERC case dealt specifically with the costs to retire power
20		plants, the same concepts would apply to the net salvage for any type of property. This
21		order is noteworthy for multiple reasons. The first is that FERC's Uniform System of

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[34]Direct Testimony of Roxie McCullar at 10:3-5.
[35] Direct Testimony of Roxie McCullar at 11:1-2.

1   Accounts sets forth accounting requirements that require net salvage to be included in

2   depreciation.[36] In this 2013 opinion, FERC further explains that net salvage must be future

3   net salvage determined at the expected future cost. That is, FERC supports the concepts I

4   have explained in my testimony and supports that the full-service life of future retirements

5   should be considered when estimating future net salvage. Further, I note that in the 2013

6   FERC case, FERC approved a future inflation rate estimate of 3 percent, which is higher

7   than the 2 percent inflation rate Ms. McCullar proposes. A 3 percent inflation rate would

8   result in Ms. McCullar's analysis producing different results, and further underscores my

9   points that there is uncertainty in estimating long term inflation and that Ms. McCullar has

10   not provided justification to assume that inflation will occur at a 2 percent rate over the

11   next 45 years or more.

12   In the 2013 Opinion at paragraph 175, FERC stated:

13   We affirm the Presiding Judge's finding that Entergy has demonstrated that
14   the decommissioning cost estimate should be escalated three percent
15   annually to the retirement dates estimated for Entergy Arkansas' steam
16   production units. Based on the record before us, we agree with the Presiding
17   Judge that it is reasonable for the current decommissioning costs to be
18   inflated to reflect future costs of decommissioning at the time of retirement
19   in order to avoid intergenerational inequities between current and future
20   ratepayers.[37]

21

22   **Q.   You indicated that Ms. McCullar's firm has proposed other unorthodox approaches**

23   **to estimating net salvage. Are you familiar with any recent cases in which her**

24   **proposals have been rejected?**

---

[36] Definition 37 of the Uniform System of Accounts states that "*Service value* means the difference between original cost and net salvage value of electric plant." General Instruction 22A of the Uniform System of Accounts states that "[u]tilities must use a method of depreciation that allocates in a systematic and rational manner the service value of depreciable property over the service life of the property."
[37] FERC Opinion No. 523, issued January 8, 2013, pp. 76-77, P. 175.

1   A.   Yes. Ms. McCullar's firm has not been consistent in the types of methods used in

2   developing net salvage estimates in different cases in recent years. As an example, in a

3   recent case in Washington for Puget Sound Energy, Ms. McCullar proposed a different

4   method of estimating net salvage in which she compared the annual depreciation accruals

5   resulting from her net salvage estimates to the annual amounts of net salvage the company

6   had recently incurred. Ms. McCullar's method proposed in that case is not an appropriate

7   method of estimating future net salvage, as future net salvage costs should typically be

8   expected to be higher (i.e., more negative) than recent net salvage costs. Accordingly, Ms.

9   McCullar's proposal in that case was rejected:

10   164. Public Counsel's proposed alternative to the Settlement Stipulation's
11   treatment of net salvage of mass assets used in natural water operations
12   appears to be based on testimony by Ms. McCullar that we find to be vague
13   in its methodology, not supported by authoritative accounting literature, and
14   supported by unwarranted assumptions. Mr. Spanos' estimates of net
15   salvage for natural water mass assets, in contrast, does not suffer from these
16   deficiencies.

17   165. In addition, Ms. McCullar's comparison of net salvage accruals to net
18   salvage expenditures PSE [Puget Sound Energy] incurred during recent
19   years would effectively recover net salvage as an operating expense, not a
20   depreciation expense. We do not accept this result.

21   166. Thus, we reject Public Counsel's alternative viewpoint and approve
22   the Settlement Stipulation with respect to net salvage of mass assets that
23   support PSE's natural water operations.[38]

24   This case is of note because, while she does not present a similar proposal in her testimony

25   in the instant case, Ms. McCullar does state that she also considered "the average actual

26   net salvage expense incurred over the most recent time periods."[39]   Based on Ms.

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[38] See page 60 of the Final Order of the Washington Utilities and Transportation Commission in Dockets UE-170033
and UE-170034, issued on December 5, 2017. Although other parties in that case reached a settlement agreement that
adopted most of the recommendations in PSE's depreciation study, the Washington Public Counsel (Ms. McCullar's
client in that case) did not agree to the settlement and continued to argue for Ms. McCullar's position.
[39] Direct Testimony of Roxie McCullar at 13:11-12.

1		McCullar's testimony, it does not appear that this consideration had a material impact on
2		her recommendations, which were instead based on the flawed analysis I have rebutted in
3		my testimony. However, it is important for the Public Utilities Commission to recognize
4		that a similar proposal made by Ms. McCullar recently was rejected in Washington.
5		Additionally, a proposal made by Ms. McCullar's firm related to net salvage was rejected
6		in Massachusetts ("Eversource").
7		
8	**Q.**	**Can you comment on Ms. McCullar's claim regarding net salvage in a recent**
9		**proceeding in Oklahoma?**
10	A.	Yes. The statement Ms. McCullar utilized in the Public Service of Oklahoma (PSO) case
11		was from the Administrative Law Judge (ALJ). The actual Commission Order supported
12		my methodology which was consistent with the PUD Staff for net salvage.
13		
14		**E. The Company's Practice of Retiring Most Mains in Place**
15		
16	**Q.**	**Ms. McCullar states that additional information she considered in developing her net**
17		**salvage estimates was that the Company generally retires water mains in place, as**
18		**opposed to removing these assets from the ground when retired.[40] Does this**
19		**information support her proposals for less negative net salvage estimates than those**
20		**you have proposed?**
21	A.	No. Although Ms. McCullar correctly observes that most of the Company's water mains
22		in Account 331 are retired in place, she does not provide any reason to expect that this

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[40] Direct Testimony of Roxie McCullar at 20:4-7.

1		practice would result in cost of removal being materially different in the future than has
2		been the case in the past. It is also unclear how the Company's practices for retiring these
3		assets impacted Ms. McCullar's analysis, if they impacted her results at all. Ms. McCullar
4		does not explain how the practice of retiring mains is factored into her estimates, other than
5		to state that she considered this practice and to observe that the practice of retiring mains
6		in place is "consistent with the net salvage data."
7		
8	**Q.**	**Has the Company historically retired most mains in place?**
9	A.	Yes. As a result, the costs associated with retiring these assets in place are already
10		incorporated into the historical net salvage data and the results of the statistical net salvage
11		analyses. Again, this appears to be acknowledged by Ms. McCullar, who observes that the
12		practice of retiring mains in place is "consistent with the net salvage data."[41]
13		
14	**Q.**	**Has Ms. McCullar provided any reason to expect that the Company's practice would**
15		**be different in the future than has been the case historically?**
16	A.	No. Based on her testimony, I believe that Ms. McCullar and I agree that the practice of
17		retiring mains in place will be similar going forward as has been the case in the past. Thus,
18		the practice of retiring water mains does not provide a reason to deviate from the results of
19		the statistical net salvage analyses.
20		
21	**Q.**	**Did you consider the Company's practices for retiring mains when developing your**
22		**net salvage estimates?**

---

[41] Direct Testimony of Roxie McCullar at 20:6.

1   A.   Yes. The Company historically has retired most mains in place, which also is consistent

2   with the operations of many other water utilities. Because this has been the Company's

3   historical practice, the costs of retirement associated with retiring mains in place are

4   already incorporated into the analyses of the historical net salvage data. This consistent

5   practice for retirements, therefore, provides a reason to expect that the historical net salvage

6   analyses provide a reasonable basis for the estimation of future net salvage. Ms.

7   McCullar's proposal to use a less negative net salvage estimate for mains is not the result

8   of her observation of the practice for retiring mains. Instead, Ms. McCullar's estimates are

9   based on her net salvage analyses, the flaws of which I have detailed in this rebuttal

10   testimony.

11

F. Response to Other Claims by Ms. McCullar

13   **Q.**   **Can you comment on Ms. McCullar's claim regarding additional retirements?**

14   A.   Yes. First, it is only appropriate in determining depreciation rates that the actual plant in

15   service reflects the proper plant balances. The entries that were recorded as retirements

16   were assets physically removed prior to December 31, 2016, however, these entries were

17   not recorded on the books as of December 31, 2016. Retirements reduce plant and the

18   book reserve an equal amount. These entries were not included in the development of the

19   net salvage ratios because the associated cost of removal and gross salvage had not been

20   recorded as yet, so it would not be appropriate to develop a net salvage percent without

21   both components.

22   **III.**   **CONCLUSION**

23

1 **Q.   Are Ms. McCullar's net salvage proposals appropriate and reasonable?**

2 A.   No. As I have discussed in detail, Ms. McCullar's proposals are based on a flawed net

3   salvage analysis and on assumptions of future inflation that do not stand up to scrutiny.

4   Ms. McCullar's proposed method of net salvage analysis is not widely accepted, and is not

5   even consistent with the instructions of the authority she cites in support of it. For these

6   reasons, Ms. McCullar's net salvage estimates are not appropriate and should be rejected.

7   In contrast, the net salvage estimates I have recommended are consistent with longstanding

8   depreciation practices, based on widely accepted methods, consistent with the

9   recommendations of authoritative depreciation textbooks, and are most reasonable based

10   on the data available for the depreciation study.

11

12 **Q.   Does this conclude your rebuttal testimony?**

13 A.   Yes.