

**Illinois Commerce Commission
Docket No. 99-0115**

**Commonwealth Edison Company
Petition for Decommissioning Expense Adjustment
and for Permission to File a Change to Rider 31**

Direct Testimony and Exhibits of

Bruce Edward Biewald

On Behalf of the

Citizens Utility Board

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1. Qualifications

1
2 **Q. State your name, occupation and business address.**

3 A. My name is Bruce Edward Biewald. My address is Synapse Energy
4 Economics, Inc., 22 Crescent Street, Cambridge, Massachusetts, 01238.

5 **Q. Please describe your current employment.**

6 A. I am President of Synapse Energy Economics, Inc., a consulting company
7 specializing in economic and policy analysis of electricity restructuring,
8 particularly issues of consumer protection, market power, stranded costs,
9 efficiency, renewable energy, environmental quality, and nuclear power.

10 **Q. What are your qualifications in the fields of electric utility regulation
11 and energy policy?**

12 A. I graduated from the Massachusetts Institute of Technology in 1981, where
13 I studied energy use in buildings. I was employed for 15 years at the Tellus
14 Institute, where I was Manager of the Electricity Program, responsible for
15 studies on a broad range of electric system regulatory and policy issues. I
16 have testified on energy issues in nearly seventy regulatory proceedings in
17 twenty four states, two Canadian provinces, and before the Federal Energy
18 Regulatory Commission. I have co-authored more than one hundred
19 reports, including studies for the Electric Power Research Institute, the U.S.
20 Department of Energy, the U.S. Environmental Protection Agency, the
21 Office of Technology Assessment, the New England Governors'
22 Conference, the New England Conference of Public Utility Commissioners,
23 and the National Association of Regulatory Utility Commissioners. My
24 papers have been published in the *Electricity Journal*, *Energy Journal*,
25 *Energy Policy*, *Public Utilities Fortnightly* and numerous conference
26 proceedings, and I have made presentations on the economic and
27 environmental dimensions of energy throughout the U.S. and
28 internationally. My resume is provided here as Exhibit ___(BEB-1).

29 **Q. What is your experience specifically with regard to nuclear power plant
30 decommissioning?**

31 A. I have investigated, studied and testified on the topic of nuclear power plant
32 economics and decommissioning costs since 1982. I have testified on the
33 projected costs and funding of nuclear plant decommissioning in state
34 regulatory proceedings in Arizona, California, Massachusetts, New
35 Hampshire, Pennsylvania, and Wisconsin. I have been invited to speak on
36 decommissioning by the National Association of State Utility Consumer

1 Advocates (NASUCA), and my papers on the subject have been published
2 in the Energy Journal and Public Utilities Fortnightly. I have compiled and
3 analyzed a database of nuclear plant decommissioning cost estimates that
4 were prepared by TLG Engineering, Commonwealth Edison's
5 decommissioning cost consultant in this case. In January of this year I
6 completed a report for Citizens Action Coalition Education Fund, Inc. and
7 Mullet & Associates on nuclear power plant economics, decommissioning,
8 and spent nuclear fuel disposal. In 1984 I drafted a section of an ESRG
9 report in which I discussed nuclear power plant decommissioning costs
10 generally and commented on ComEd's decommissioning cost estimate for
11 Braidwood in particular. ESRG, now known as the Tellus Institute, is a
12 not-for-profit research and consulting organization that prepared the
13 analysis of Braidwood on behalf of intervenors in a docket before the ICC.
14 A portion of the 1984 report is provided here as Exhibit ___(BEB-2).

2. Summary and Recommendations

1
2 **Q. What is the purpose of your testimony in this case?**

3 A. I was retained by the Illinois Citizens Utility Board to review and comment
4 on Commonwealth Edison's filing on decommissioning costs in this
5 proceeding. My testimony was prepared in coordination with the testimony
6 of Mr. David Schlissel, also testifying in this case on behalf of the Citizens
7 Utility Board.

8 **Q. Please summarize your conclusions and recommendations.**

9 A. My key conclusions are the following:

- 10 1. ComEd was slow to recognize the real costs of decommissioning and
11 consequently misled the ICC and itself about the economic viability
12 of nuclear power plants.
- 13 2. ComEd has acknowledged extensive mismanagement of its nuclear
14 program, especially at its Zion nuclear power station.
- 15 3. ComEd shut Zion permanently in January, 1998, about fifteen years
16 before the expiration of its forty year scheduled operating life.
- 17 4. The premature shutdown of Zion resulted in a dramatic shortfall
18 between the funds needed to decommission the plant and the funds
19 that were collected from its customers for decommissioning.
- 20 5. ComEd has drastically increased its decommissioning estimates for
21 Zion since the plant was closed.
- 22 6. ComEd's current customers should not pay for any additional
23 decommissioning costs of Zion, because they are no longer receiving
24 from electricity produced at the plant, and especially given the poor
25 historical performance of that plant.
- 26 7. If the Commission permits ComEd to recover its decommissioning
27 costs for Zion in this case, ComEd should share the responsibility for
28 decommissioning costs with its customers in order to provide the
29 Company with an economic incentive to minimize those costs.

30 Considerations of intergenerational equity and "used and useful" dictate
31 that customers who are not receiving electricity from a particular power
32 plant should not bear the burden of the costs of that plant. In addition, the
33 ultimate cost of decommissioning Zion, or any other nuclear unit, will

1 depend upon the regulatory framework in which the decommissioning takes
2 place. If the owner of the plant is able to pass the cost through to customers
3 then there is little or no incentive for cost control. Decommissioning could
4 easily end up costing far more than ComEd's current estimates. If an
5 appropriate incentive framework is put in place then the Company will be
6 more creative in finding opportunities to control costs and decommission
7 the plant efficiently.

3. Decommissioning Cost Estimates for ComEd Nuclear Plants

1
2 **Q. What is ComEd's current cost estimate to decommission its Zion**
3 **station?**

4 A. According to the testimony of ComEd's decommissioning consultant,
5 Thomas LaGuardia, the cost of decommissioning Zion units 1 and 2 will be
6 \$975 million in 1996 dollars. This includes \$904 million for
7 decommissioning radiological portions of the plant and \$71 million for
8 decommissioning non-radiological portions. ComEd's customers have
9 already contributed about \$370 million into the Zion decommissioning
10 fund. In annual dollars, ComEd seeks \$33 million each year for the next
11 thirteen years to pay for the decommissioning of the Zion station. Including
12 Zion, ComEd seeks a total of \$130 million each year for the
13 decommissioning of all its nuclear plants (See Attachment B to the direct
14 testimony of Robert E. Berdelle in this case.) This \$33 million represents
15 about 25% of ComEd's total decommissioning collections from its
16 customers in any year.

17 Zion last produced electricity for its customers in February, 1997 and
18 ComEd decided to permanently shut down the plant in January, 1998.
19 ComEd continues to collect for decommissioning the Zion plant under its
20 decommissioning tariff.

21 According to ComEd, the ultimate estimated decommissioning cost for all
22 of ComEd's nuclear plants amounts to \$5.4 billion. (in 1996 dollars for all
23 13 nuclear units as estimated by TLG Services, Inc.; see Schedule TSL-1 to
24 the direct testimony of Thomas S. LaGuardia in this case).

25 **Q. How does the current Zion cost estimate compare with earlier ComEd**
26 **decommissioning cost estimates?**

27 A. ComEd's estimate for decommissioning Zion continues to rapidly increase.
28 In Exhibit___(BEB-3) I have summarized ComEd's decommissioning cost
29 estimates for Braidwood and Zion. On the left side of the table the
30 estimates are listed in original year dollars. In the two right-hand columns,
31 the estimates are listed in constant 1996 dollars. A graph of the various
32 estimates is presented in Exhibit___(BEB-4).

33 **Q. Why do you discuss both Zion and Braidwood decommissioning costs?**

34 A. I discuss ComEd's decommissioning estimates for the Zion and Braidwood
35 plants because these are linked logically and historically. ComEd prepared
36 its nuclear decommissioning cost estimates in a context with some plants

1 completed and operating and others under construction. Also, I have not
2 been able to review older ComEd estimates for the Zion plant.

3 **Q. Please discuss the first ComEd decommissioning cost estimate that you**
4 **are aware of.**

5 A. In a data request to ComEd in this case, CUB requested a list of each
6 decommissioning estimate prepared by or for Edison for each of its plants.
7 ComEd responded by making its collection of estimates available. The
8 earliest ComEd estimate made available dated from 1990. However, the
9 first ComEd decommissioning cost estimate that I am aware of dates from
10 the early 1980's and was used by the Company in Docket No. 82-0855,
11 involving the economics of construction of the Braidwood units. ComEd
12 put the cost of decommissioning Braidwood 1&2 at \$58.5 million for each
13 unit (in 1983 dollars), amounting to \$117 million (in 1983 dollars) to
14 decommission the two unit station. In 1996 dollars this amounts to \$175
15 million. This estimate was developed based upon Battelle's generic
16 estimate for the Nuclear Regulatory Commission. Adjustments were made
17 to the generic estimate for capacity, cooling towers, and dual unit siting –
18 but the resulting estimate for Braidwood was not radically different from
19 the Battelle generic estimate.

20 I am not certain whether there ComEd had a decommissioning cost estimate
21 for the Zion units in that proceeding.

22 **Q. What was the context in which you first encountered this**
23 **decommissioning cost estimate?**

24 A. I was a research associate with ES&RG. We had been hired by Business and
25 Professional People for the Public Interest, the United Mine Workers, and
26 Citizens for a Better Environment to conduct a study of the costs and
27 benefits of cancellation of ComEd's Braidwood plant, then under
28 construction. I drafted the Section of ES&RG's report dealing with
29 decommissioning costs, reproduced here as Exhibit ___ (BEB-2).

30 **Q. What was your opinion of ComEd's decommissioning cost estimate for**
31 **Braidwood at that time?**

32 A. In the 1984 report, I pointed out that actual experience with nuclear reactor
33 decommissioning was very limited (page 5.45) and that there was
34 considerable uncertainty about the costs (page 5.51). I pointed out that
35 Thomas LaGuardia's estimate for decommissioning the Ginna unit had
36 increased from \$37 million in 1979 to \$120 million in 1982 (page 5.48). I
37 pointed out that the experience with Elk River dismantlement and other

1 analyses indicated that then current engineering estimates of
2 decommissioning cost were too low (pages 5.46 to 5.50).

3 With regard specifically to ComEd's estimate for Braidwood
4 decommissioning cost, I said that it should be updated to reflect then
5 current engineering estimates such as Consumers Power Company's
6 estimate for Midland, and went on to identify reasons "to expect the
7 ultimate cost of decommissioning Braidwood to be even higher." These
8 included (1) the track record with nuclear construction cost overruns, (2) the
9 tendency for overnight engineering estimates to overlook and underestimate
10 particular activities, (3) the escalation experienced in the prices of labor and
11 materials generally, (4) the escalation in the costs of radioactive waste
12 disposal, and (5) the effects of regulatory changes (pages 5.51 to 5.53). I
13 concluded that a cost of \$250 million for each Braidwood unit (in 1983
14 dollars) should be used for the economic analysis (page 5.53). This
15 amounts to \$500 million in 1983 dollars to decommission the two unit
16 station – or \$749 million in 1996 dollars. My figure was more than four
17 times higher than the Company's.

18 **Q. Which of the estimates from 1984 were more accurate – yours or the**
19 **Company's?**

20 A. No one knows yet what it will actually cost to decommission Braidwood or
21 Zion. The experience with the escalation of ComEd's estimates over the
22 last 15 years, however, brings us to a situation in which the Company's
23 current estimates are approaching, or have exceeded my 1984 figure.

24 **Q. Please discuss the Company's 1993 decommissioning cost estimates.**

25 A. ComEd provided some of their decommissioning cost estimates in response
26 to discovery in this case. The earliest of these estimates for Zion was
27 prepared for the Company in 1993 by META, a consulting firm in Nevada
28 City, California. The META study estimated the decommissioning costs
29 for Zion, Byron, and Braidwood. The estimated cost to decommission Zion
30 1&2 by the "DECON" option was put at \$519 million, in 1993 dollars,
31 which amounts to about \$557 million in 1996 dollars. The method used by
32 META to develop the estimate was not actually site-specific. Rather,
33 META used the generic estimate prepared by Battelle for the Nuclear
34 Regulatory Commission, and made adjustments to recognize some of the
35 characteristics of the ComEd plants.

36 META's estimate for Braidwood decommissioning put the cost at \$563
37 million (in 1996 dollars), more than three times higher than the 1984 figure
38 – representing annual escalation in the cost estimate of 14 percent faster

1 than inflation.

2 It is noteworthy that the META 1993 study came up with decommissioning
3 cost estimates for Braidwood and for Zion that were nearly identical –
4 differing by less than \$10 million, or about 2 percent of the estimate.

5 **Q. Please comment on ComEd’s 1997 decommissioning estimates.**

6 A. In January, 1997, TLG prepared site-specific decommissioning cost
7 estimates for ComEd’s nuclear units. In real (inflation adjusted) terms,
8 TLG’s 1997 estimate for Braidwood was only 2 percent higher than
9 META’s 1993 estimate, but TLG’s 1997 estimate for Zion was 20 percent
10 higher than the earlier estimate. For Zion, at least, the rapid escalation of
11 the cost estimate continued.

12 **Q. Please comment on ComEd’s 1999 decommissioning estimates.**

13 In February, 1999, TLG prepared a new site-specific decommissioning cost
14 estimate for Zion. As noted above, this latest estimate puts the cost to
15 decommission Zion at \$904 million in 1996 dollars (excluding non-
16 radiological costs). The increase of \$240 million – or 36 percent – in just
17 two years is shocking, albeit part of a general long-term pattern of
18 escalating costs.

19 Mr. LaGuardia explains in his direct testimony that two key causes for the
20 increase are the inclusion of decommissioning costs resulting from
21 secondary side contamination and to address asbestos, some of which is
22 radiologically contaminated. Mr. Schlissel, in his direct testimony on
23 behalf of CUB, questions the Company’s request for recovery of these costs
24 and recommends that they not be passed fully along to customers. Both
25 items – secondary side contamination and asbestos – appear to be costs that
26 could reasonably have been anticipated. In that sense they are just the latest
27 in a long series of additional costs that should have been included earlier
28 and that have continuously been added to nuclear decommissioning cost
29 estimates over the past two decades.

30 **Q. If the ICC had access to more accurate information about nuclear
31 plant decommissioning costs, would its decisions made during the past
32 15 or twenty years been different?**

33 A. I believe that the ICC may have made different decisions. The decisions
34 made with respect to the Company’s nuclear construction program could
35 have been further questioned or challenged and the decisions made with
36 respect to putting the nuclear construction costs into rates may have been
37 less generous.

1 **4. Proposed Treatment of Nuclear Decommissioning Costs**

2 **Q. In your view, how much will it cost to decommission Zion?**

3 A. The ultimate cost to decommission Zion, or any other nuclear power plant,
4 is not entirely a question of engineering. The regulatory framework in
5 which the decommissioning process is carried out will be a crucial factor in
6 creating incentives for efficient management of the project. If the owner of
7 the plant is able to pass all of the costs through to customers in a non-
8 bypassable charge then there is little or no incentive for cost control and
9 decommissioning could easily end up costing far more than ComEd's
10 current estimates. If an appropriate incentive framework is put in place,
11 then the Company will be creative in finding opportunities to control costs
12 and to decommission the plant efficiently.

13 **Q. Is periodic regulatory review adequate to provide assurance that**
14 **decommissioning will be carried out efficiently?**

15 A. No. Particularly for a large, complex process such as nuclear plant
16 decommissioning regulators cannot and should not attempt to micro-
17 manage the process. While state and federal regulators have an important
18 oversight role with respect to worker and public safety and the
19 decommissioning process, the responsibility for planning, management, and
20 execution is ultimately upon the licensee. The experience with nuclear
21 power plant construction projects has demonstrated that regulatory
22 oversight can be burdensome and ineffective. Prudence reviews consume
23 considerable resources of both the reviewer and reviewed; involve facts and
24 judgments that are often difficult to establish; and tend to occur after the
25 fact when little can be done to improve events – parties are merely arguing
26 about who should bear the burden of unfortunate decisions or events.
27 Where regulators can set up a framework in advance to align shareholder
28 and the public interest, this is generally the preferable approach.

29 **Q. How can the ICC ensure that ComEd appropriately decommissions its**
30 **nuclear plants?**

31 A. ComEd estimates its total nuclear decommissioning bill at more than \$5
32 billion (see Schedule TSL-1 to the Direct Testimony of Thomas LaGuardia
33 in this case). Surely some substantial portion of this cost is subject to
34 management control. It is imperative that regulators act now to establish an
35 incentive framework to ensure that appropriate management attention is
36 focused upon opportunities to reduce these costs and to mitigate further
37 increases.

1 **Q. Do you propose a specific regulatory framework that shares the**
2 **responsibility for Zion’s decommissioning cost?**

3 A. I will outline three methods which result in a sharing of the incentives to
4 minimize Zion’s decommissioning cost. These approaches balance the
5 various considerations, but each in a different manner. I will call these
6 approaches “intergenerational equity,” “50/50 sharing of additional
7 funding,” and “minimum decommissioning incentive.”

8 **Q. Please describe the first approach, your proposed application of**
9 **“intergenerational equity” to Zion.**

10 A. The Zion plant is shut down and ComEd’s customers should not be required
11 to pay for the costs of a closed plant. This is consistent with the principle of
12 intergenerational equity. That is, customers who benefit by receiving
13 electricity from a plant should pay a reasonable portion of plant costs, but
14 customers who receive no power from the plant should not be asked to pay
15 for its costs.

16 In addition, Zion is not used and useful and, under rate of return regulation,
17 Zion would not be part of rate base. “Used and useful,” as a general
18 ratemaking principle, requires that only assets or activities that are used and
19 useful in providing service to customers can have their costs charged to
20 customers. ComEd may argue that Zion was once used and useful.
21 However, it is uncontested that Zion is not now used and useful.

22 The Commission should not permit ComEd to recover any further amounts
23 from its customers to decommission Zion. ComEd has already collected
24 \$370 million of the \$900 million estimated to decommission the plant.
25 ComEd planned to collect its funds for the Zion decommissioning while
26 Zion was operating, since the customers benefiting from the electricity
27 produced by Zion should be the customers who pay for Zion. However,
28 Zion will never again be producing electricity for ComEd’s customers.
29 Since Zion is no longer producing electricity, it is unfair for current
30 customers to pay for the cost of a plant that is no longer serving them.

31 The poor operation of Zion further illustrates why current customers should
32 not have to pay for costs related to ComEd’s past mistakes. According to
33 the Chairman of ComEd, the shutdown of Zion gave its nuclear plant
34 employees the message that poor operation of a plant will result in the loss
35 of jobs at that plant:

36 The shutdown of ... [Zion] ... has made tangible, has
37 made real to every employee in the nuclear division

1 that only successful performance will sustain jobs.
2 (John Rowe, Chairman of ComEd, speaking to the
3 Commissioners of the Nuclear Regulatory Commission
4 in an Open Session Meeting held June 30, 1998 in
5 Rockville, Maryland.)

6 This statement is one of many statements made by ComEd management
7 acknowledging their failures in operating Zion and their fleet of nuclear
8 power plants. Mr. Schlissel's testimony, also sponsored by CUB, discusses
9 the poor operation of Zion.

10 Also, the shortfall in Zion decommissioning funding is directly related to
11 ComEd's failure to adequately estimate ultimate decommissioning costs.
12 As discussed in Section 3 of this testimony, above, ComEd was very slow
13 to do site-specific decommissioning cost studies, and slow to recognize the
14 costs of decommissioning. While shutdown prior to the expected date will
15 generally result in some decommissioning funding shortfall, the amount of
16 the shortfall would be smaller if the early cost estimates had been
17 reasonable. The burden of ComEd's mistakes in estimating future costs
18 belongs with Edison, not with its customers.

19 Finally, the annual decommissioning costs for Zion are only about 25% of
20 ComEd's total amount that it will collect for annual decommissioning. In
21 this proceeding, ComEd is seeking recovery of \$130 million on an annual
22 basis for decommissioning its fleet of plants. Of this \$130 million, about
23 \$33 million are related to Zion. (Attachment B to the direct testimony of
24 Robert E. Berdelle, Comptroller for ComEd.)

25 Considering the immediate and substantial economic benefits that ComEd
26 shareholders received from closing the plant, ComEd's customers should
27 not be expected to pay for a plant no longer in operation.

28 **Q. Please describe the second approach, your proposed application of**
29 **“50/50 sharing of additional funding” to Zion.**

30 A. The second approach for treatment of decommissioning funding is to share
31 any additional funding requirements for Zion beyond what has already been
32 collected from customers evenly between shareholders and customers.

33 The early closure of Zion is in some ways analogous to the cancellation of a
34 power plant construction project. Management choice and discretion
35 determined how the plant was operated and if the plant should be shut
36 down. According to ComEd, Zion closed early because of substantial
37 economic benefits to shutting the plant down. In the past, the costs of

1 construction for canceled electric plants have sometimes been shared, by
2 allowing recovery of but no return on those costs. A 50/50 sharing of any
3 unfunded decommissioning costs would provide some protection to
4 customers and a significant incentive to the Company to minimize Zion’s
5 decommissioning costs.

6 **Q. Please describe the “minimum decommissioning incentive” – the third**
7 **approach for treatment of decommissioning costs.**

8 A. The third approach would require ComEd to bear a small slice of the total
9 cost of decommissioning Zion. The amount should be large enough to
10 provide a meaningful incentive to the Company to manage the
11 decommissioning project efficiently. A share of 10 percent would seem
12 appropriate. A 10 percent slice of total decommissioning costs corresponds
13 roughly with Mr. Schlissel’s disallowance for secondary side contamination
14 and asbestos. Mr. Schlissel testifies that \$74 million (in 1996 dollars) of
15 ComEd’s total decommissioning estimate should be disallowed. The total
16 decommissioning cost for Zion has been estimated by the Company at \$904
17 million including the \$108 million that the Company has agreed not to
18 charge customers, and also including a currently unknown amount that will
19 be refunded by the Department of Energy related to spent fuel costs. The
20 10/90 sharing of decommissioning costs applied to the net decommissioning
21 cost estimate would have the Company responsible for an amount in the
22 neighborhood of the \$74 million disallowance recommended by Mr.
23 Schlissel.

24 The actual amount would, of course, be higher or lower depending upon the
25 ultimate cost of Zion decommissioning. Indeed, that is the point of this
26 “minimal decommissioning incentive” approach – that it at least provides
27 some incentive to the plant owner to manage and execute the
28 decommissioning project at lowest reasonable cost.

29 **Q. Which of the three methods best suits the policy needs of Illinois?**

30 A. I recommend that the first approach – based upon the intergenerational
31 equity standard – be applied in the case of Zion, because of the plant’s
32 particular circumstances. The third approach is appropriate for all nuclear
33 units, including units that continue to operate and produce electricity. Any
34 of the three approaches would represent a significant improvement over
35 business-as-usual, in which decommissioning cost estimates escalate at
36 rates far above inflation and ComEd has insufficient economic incentives to
37 minimize these costs.

38 **Q. Could the ICC combine elements of the three approaches?**

1 A. Yes. For example, the Commission may decide to disallow the \$74 million
2 per Mr. Schlissel's recommendation, and then require the Company to be
3 responsible for 10 percent of the remaining decommissioning cost, thus
4 providing a specific disallowance and an incentive to minimize
5 decommissioning costs.

6 **Q. Are you recommending that decommissioning funding policy be done**
7 **in a way that will jeopardize the availability of adequate funding for**
8 **decommissioning?**

9 A. No. As required by law, the Company should place a proper amount of
10 money into the external decommissioning funds for all of its plants. My
11 testimony speaks to whether and to what extent those funds should be
12 recovered from customers. I recommend that whatever approach be taken,
13 ComEd's external decommissioning fund must be fully funded to properly
14 decommission its fleet of nuclear plants.

15 **Q. Does this conclude your testimony?**

16 A. Yes.

Section 5.6 on Decommissioning
from
“Cost-Benefit Analysis of the Cancellation of Commonwealth Edison
Company’s Braidwood Nuclear Generating Station”
ESRG Study No. 83-87
October, 1984

Summary of Decommissioning Cost Estimates for Braidwood and Zion

Estimate, Year	Braidwood 1&2	Zion 1&2	Braidwood 1&2 (in 1996\$)	Zion 1&2 (in 1996\$)
Biewald 1984	\$500 million (1983\$)	NA	\$749 million	NA
ComEd 1984	\$117 million (1983\$)	NA	\$175 million	NA
META 1993	\$528 million (1993\$)	\$519 million (1993\$)	\$563 million	\$554 million
TLG 1997	\$576 million (1996\$)	\$664 million (1996\$)	\$576 million	\$664 million
TLG 1999	NA	\$904 million (1996\$)	NA	\$904 million

Note: Conversion to 1996 dollars is based upon the GDP price index as reported in “The Economic Report of the President,” 1999.

Sources:

- Biewald, 1984: “Cost-Benefit Analysis of the Cancellation of Commonwealth Edison Company’s Braidwood Nuclear Generating Station,” ESRG Study No. 83-87, October, 1984.
- ComEd, 1984: Commonwealth Edison estimate in ICC Docket No. 82-0855, based upon Battelle’s 1978 study for the NRC.
- META, 1993: “Generic Regional Decommissioning Cost Estimates,” submitted to Commonwealth Edison by META, March, 1993.
- TLG, 1997: “Decommissioning Cost Estimate for the Braidwood Nuclear Power Station Units 1 and 2” and “Decommissioning Cost Estimate for the Zion Nuclear Power Station Units 1 and 2,” prepared for Commonwealth Edison by TLG Services, Inc., January, 1997.
- TLG, 1999: “Decommissioning Cost Estimate for the Zion Nuclear Power Station Units 1 and 2,” prepared for Commonwealth Edison by TLG Services, Inc., February, 1999.

**Graph of Decommissioning Cost
Estimates for Braidwood and Zion**
(in millions of 1996 constant dollars)

